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1919









# Standard Program of Studies

FOR THE

# SECONDARY SCHOOLS OF NEW HAMPSHIRE



DEPARTMENT OF EDUCATION

THIRD EDITION

1919



*New Hampshire. Dept. of public instruction.*  
STANDARD PROGRAM OF STUDIES

FOR THE

SECONDARY SCHOOLS

OF

NEW HAMPSHIRE

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CONCORD, N. H.  
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## PREFACE.

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The General Court of 1917 authorized this document by a specific appropriation to enable the Department of Education to revise and republish the program of studies of the secondary schools of New Hampshire.

The revised program as here presented is intended to express the judgment of the Department of Education as to the standards which are sufficient to constitute a secondary school within the meaning of Chapter 96 of the Session Laws of 1901. It is also expected that it will serve as a guide to school boards, superintendents and teachers and so will tend to unify the aims of New Hampshire secondary schools and to give public expression to our educational policies.

Part I states the standards under which secondary schools will be approved and discusses their organization and administration.

Part II typifies the suggested program for New Hampshire secondary schools and outlines recommended curricula.

Part III specifies the agreed quantitative minimum standards of the different courses and recommended content of these courses with methods of classroom procedure. In every case the standards given have the approval of the Educational Council of New Hampshire and are based upon the classroom results in our best schools.

The commissioner of education accepts the responsibility of the form in which the program is presented and gratefully acknowledges his indebtedness to his colleagues, in and out of the Department, for wise counsel, for specific outlines and for unstinted assistance.



Much detailed work has been done by the committee appointed by the Educational Council: Headmaster Harlan M. Bisbee, Robinson Seminary; Superintendent Norman J. Page, Woodsville; Professor Charles L. Simmers, New Hampshire College; Superintendent William H. Slayton, Portsmouth; and Headmaster Willis O. Smith, Keene.

The outlines for the several courses were drafted as follows:

- French—Superintendent Maro S. Brooks, Exeter.  
 Latin—Headmaster Harlan M. Bisbee, Robinson Seminary, Exeter.  
 United States Constitutional History—Headmaster Justin O. Wellman, Colby Academy, New London.  
 Economics and Business Practices—Superintendent Harry L. Moore, Berlin.  
 Masterpieces of Music and Art—Mrs. Willis O. Smith, Keene, and Headmaster Francis T. Clayton, Proctor Academy, Andover.  
 Greek and Roman Literature—Headmaster Elbert E. Orcutt, Plymouth.  
 Physics—Headmaster Willis O. Smith, Keene.  
 Chemistry—Superintendent H. Leslie Sawyer, Lebanon.  
 Mathematics—Director Wallace E. Mason, Keene, and Headmaster Daniel W. MacLean, Berlin.  
 Practical Arts—Deputy Commissioner of Education George H. Whitcher.  
 Bibliography on the Secondary School—Professor Charles L. Simmers, New Hampshire College, Durham.

## INTRODUCTION.

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### THE 1919 PROGRAM.

NOTE: *This program has been prepared for high schools organized on the six-year plan. Its adoption is not obligatory. Other equally good programs may be adopted and will be approved. Schools which are not ready to reorganize may continue with four-year programs of the old type.*

#### *The Outline.*

In the preparation of the outline here given, the Department of Education has had in mind only the educational needs of the young people of New Hampshire. It has believed it best, though, in a time of great and momentous changes in the educational world, to present an entirely conservative plan with the expectation of further changes as needs arise. It has looked upon the standards set by different colleges for entrance requirements as valuable expressions of the experiences of past years but not as barriers to the healthy development of our schools. It will be found, however, that the suggestive curricula offer full preparation for effective college work.

#### *The Last Decade.*

There are three reasons why the new program must differ radically from the former ones. (a) In ten years, the number of pupils in our secondary schools has more than doubled and a large part of the increase is of pupils who have little inherited interest in and natural aptitude for the formal studies of academic programs. (b) The advances made in education call for a revision of all school organization. In particular, the junior high school has

established its position in our educational system. (c) The events of these years emphasize the need of greater development of practical work.

*The Six-Four-Two Plan.*

In 1916, the elementary program was revised on the basis of six years in the elementary schools. The work for these six years was carefully outlined, together with the history, the science and the practical arts of Grades VII and VIII. This revision of the secondary program must carry on the plan as accepted. It is held that the development of the child in the first four classes of the six-year secondary school, that is, of a child twelve to sixteen years of age, calls for concrete work in many fields but does not respond readily to drill and abstract instruction. On the other hand, the pupils of Classes V and VI have reached a maturity that permits effective organization of knowledge. Accordingly, the program is based on a four-two division, with the fourth year a period of transition; that is, in the first four years are grouped subjects that are inspirational, instructive and experimental, while the last two years contain courses designed to organize and make systematic the subject matter of various lines of study.

*Emphasis on Science and Its Application.*

Former programs were defective in that they permitted the devotion of excessive time to the language arts and slighted science and the practical arts. The events of the last few years have shown the folly of this emphasis and made it imperative that thorough work in science, in mechanic arts and in agriculture should be available for all boys. It is equally important that all girls who are not fitting for the traditional requirements of some specific college should carry the study of domestic arts throughout their course. It will be seen that this is easily possible with a six-year program when difficult with one of four years.

### *Other Important Changes.*

This program lays greater stress than before on French as a school subject and places it in the first years of the secondary school. It delays formal courses in Mathematics and other traditional school subjects until there have been completed practical and concrete courses in English, History and Mathematics. It recommends for all seniors a full year's work in Economics and the Business Practices.

#### THE LAW.

“By the term ‘high school’ or ‘academy’ as used in this act, is understood a school having at least one course of not less than four years, properly equipped and teaching such subjects as are required for admission to college, technical school, and normal school, including reasonable instruction in the constitution of the United States and in the constitution of New Hampshire, such high school or academy to be approved by the Commissioner of Education as complying with the requirements of this section. And said superintendent is authorized to approve a school maintaining any part of such course, for the part so maintained.” Laws of 1901, Chapter 96.

#### DEFINITIONS OF TERMS USED.

*State Program.* The pamphlet entitled “Program of Studies for the Secondary Schools of New Hampshire.” This standard program provides a guide for administrative officers and is suggestive rather than mandatory.

*Approved Program.* The whole outline of work contemplated by an institution. It should be called The Program of the School, and not The Course of Study or the Curricula.

*Curriculum.* A portion or division of the program describing a particular line of work to be followed throughout the number of years that the program contemplates.

*Subject.* A separate branch of learning as Latin, science or history.

*Course.* The work in a particular subject within a single year.

*Study.* A division of a subject or of a course, as logarithms or Latin prose composition.

*Unit.* A single course pursued not less than four periods a week for one school year of not less than thirty-six weeks; in certain cases a unit may be made up of two consecutive courses in allied subjects, each course being one semester in length.

*Semester.* One-half year of school work.

*Time-table.* The daily program or order of exercises of the school.

*Period.* A regular sub-division of the time-table.

*Pupil.* A general term for all persons enrolled as members in elementary or secondary schools.

*Student.* A general term for all persons enrolled as members in colleges, normal schools, or other post-secondary institutions.

*Mark.* A general term to denote any numeral, letter or other character used in records, as "T," for tardy; "E," for excellent; "74," for 74%, etc.

*Passing Mark.* The minimum standard for passing work. Usually 70.

*Rank.* Any mark given in percentage form to denote the relative quality of the work done.

*Grades.* Conventional marks used in some schools to indicate groups of excellence, as "A," "B," "C," "D," and "E."

*Standards.* The minimum requirements of excellency in the various courses upon which approval is given by the state Department of Education.



PART I.  
The Secondary School Characterized.

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CHAPTER I.

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THE APPROVAL OF SECONDARY SCHOOLS.

*The Standards in Brief.*

Secondary schools will be approved under the following conditions:

(1) They must follow a *program* adopted by the governing board and approved by the Commissioner of Education.

(2) They must employ a staff of *teachers* with sufficient qualifications.

(3) They must provide a suitable building for instruction and *equipment* adequate for the courses proposed.

(4) They must show that their *organization* follows regular and proper standards.

(5) They must secure efficient *administration*.

The approval of schools expires August 31st, annually, but for cause is subject to review and revocation at any time.

For convenience, schools are listed in six classes. Class A includes all schools with complete secondary programs. The other classes, B to F, in alphabetical order show that the program is incomplete by one to five years. To the class letter may be attached a numeral to show the number of years in the approved program.

*The Standards in Detail.*

*Programs.* It is to be emphasized that the program here given is recommended but is not obligatory. A school

board may adopt for its schools any program that it wishes, provided that the subjects required by law are included. (1901, 92:6, with amendments.) All such programs prepared for secondary schools will be approved by the Department of Education, if they meet the reasonable standards for secondary schools. (1901, 96:4 with amendments.) Among the standards by which secondary programs will be tested are the following:

1. Four unit courses in admitted secondary subjects per year form the minimum basis of each program, though each curriculum should contain optional and required non-unit courses. These latter need not be given daily.

2. To avoid a program narrow in scope, each pupil should pursue courses in each of several fields of knowledge, as English, history, science, mathematics, foreign language and practical arts.

3. To avoid a smattering of knowledge, each pupil should carry work in some subjects for three or four years, or to a point of definite mastery. See Secondary Circular No. 1.

4. The program must be economical according to the accumulated experience of the best schools of the state. A program which proposes to do work in algebra or in French for two or three years, which other schools do in one or two years, will be viewed with suspicion. Similarly, courses may not be given which merely repeat formal drill on the fundamental principles of a subject when the work to be educational should progress into purposeful activity. Experience has shown that two courses in bookkeeping or in stenography exhaust the possibility of gainful drill. If a third course in either is given, it should be in the actual application under real conditions of the principles learned.

5. The curricula of the school program should be equal in value, and constituent unit courses should merit equal respect. There should be no easy curricula or snap courses.

6. A school which offers a six-year program to be ap-

proved must show clearly that it accomplishes more work and carries work farther than a school with a four-year program. A school which adds to an unchanged high school program two introductory years filled with artificial non-continuous courses will be approved for four years only. A six-year program should have these two characteristics: (a) It should add a year to the pupil's program by carrying four subjects a year beyond the common high school point of conclusion. (b) It should also enrich the usual high school program of each pupil by four courses, valuable but not of necessity courses which are in a sequence. This will be held as the conclusive test of all six-year programs presented for approval: Does the program actually carry the pupil a year farther in his work than did our earlier programs?

#### *Teachers.*

*General Education Required.* Teachers must have a bachelor's degree from an approved college. Except that:

(1) Teachers who have studied four full years in approved schools of post-secondary grade.

(2) Teachers of modern languages who have received adequate European or other training. Individual cases to be approved by the Department. Provided in this and the three cases following that not less than eighty per cent. of their teaching be in their specialized subject.

(3) Teachers of domestic arts and of commerce who have pursued at least three full years of post-secondary study in approved special institutions.

(4) Teachers of commerce who have pursued at least two full years of post-secondary study in commerce in approved special institutions. In addition, they must have two years of general post-secondary study, of office work or of successful experience in teaching.

(5) Teachers of mechanic arts with scholastic and practical preparation sufficient for needs of their work. Individual cases to be approved by the Department.

(6) Teachers holding Grade B certificates whose work is restricted to grades seven to nine except as specifically approved.

(7) Teachers who have one, two or three years of post-secondary study in approved institutions may be approved to teach courses not above the corresponding years of the secondary program.

(8) Teachers who fail to meet the above qualifications but have taught with success in approved New Hampshire secondary schools. Individual cases to be approved and the courses that may be taught to be specified by the Department.

*Special Preparation Required.* Teachers must be prepared by two or more years of post-secondary study of each subject they propose to teach, such study to include the branches of the subject presented in the secondary courses. Except that:

(1) Teachers who have but one or two classes in a subject may be prepared by one year of post-secondary study of that subject.

(2) Each year of post-secondary study may be replaced by two years of successful teaching of the subject in approved secondary schools.

(3) For inexperienced teachers, the Department may waive the minimum requirement for one class only. Individual cases to be approved.

#### *Equipment.*

The Commissioner of Education may refuse approval to any school housed in an unwholesome building or one which makes satisfactory work impossible.

For each of the courses approved, the school must possess, or have the use of, such texts, reference books, maps, laboratory and school shop equipment as are needed for standard work along the proposed lines. The equipment is in general indicated in the outline of the general course.

### *Organization.*

A school is not a collection of classes, but an organization where all are working with the same ideals for a common end and the headmaster must organize it for this purpose.

*He should unify his school.* By the general exercises of the school, by its organizations for special interests, by its public exhibitions, the headmaster makes of his school a social unit. He should regard it as one of his peculiar duties so to form and guide the various clubs, teams and other interests of his school that they become powerful factors in its life and, though he reserves to himself the control, he should so divide the work that each assistant teacher has some responsible part in the social organization of the school.

*He should know his pupils.* The headmaster must deal with parents, teachers and pupils and unite their diverse interests so that all may work in unison in their common task. By patient study he must learn the characteristics of his pupils, their ideals and ambitions and the conditions of their home life, and he must do this through a real interest in all that concerns them. An interested teacher can do more than a truant officer to keep pupils in school.

*He should make effective his authority.* The headmaster as disciplinary head of the school is to be held responsible for the conduct of the pupils in the building and basements, on the playground and on the streets as they come to the school and return to their homes. He must strengthen the control of his assistant teachers and lead them into better methods of solving school difficulties, while he is constantly alert that full justice be done to pupil as well as to teacher.

*He should be efficient in the management of his office.* His records should be kept with system and dispatch, he should not permit desultory attendance, he should insist



that pupils do reasonable work, that they follow the prescribed curricula and that they promptly make up deficient work. He should prepare an economical time-table and plan the work of the school to avoid confusion and waste of time and effort.

In particular, the marking system and the recorded ranks are in his charge. He should provide that the school has a marking system thoroughly understood by all teachers and uniformly administered by them. He should check any individual modifications of this system and refuse to record ranks that express the carelessness or mental vagaries of the teachers. It must be emphasized that no work is to be recorded except it be a judicial statement of fact, and when recorded it must stand as a permanent school record. The headmaster must protect pupil and school from recorded ranks too high or too low for complete justice.

#### *Administration.*

The administration of the work in public secondary schools is a task in which school board, superintendent, headmaster and teachers have definite parts; for administration includes the government, the supervision, the organization of the schools and the instruction of the pupils.

*The Government.* In the administration of the schools, the school board is the governing body. It is subject only to the instructions and expressed wishes of the electorate, to the laws of the state and to the rules and regulations of the state board of education. It is a legislative and judicial body, but not an executive one. It gives general directions and rules for the administration of the schools and it passes judgment on the results obtained. No member may assume the power of supervision, organization or instruction, except by vote of the board.

*The Supervision.* In the administration of the schools, the superintendent is the supervisory and executive offi-

cer. As the agent of the state board of education and of the school board, he governs the schools, makes concrete the general directions given him and secures the enforcement of the school laws of the state and the rules and regulations of the state board and the school board. The supervision of the schools is his particular duty. He must outline the material for instruction, direct the methods of teaching and judge both the efficiency of the teaching and the quality of the work done. He must also organize his school system by keeping its purposes and ideals before teachers, pupils and citizens—so as to harmonize all interests and unify the aims of the schools. He must instruct his teachers in the psychology and pedagogy of their work and see that they are familiar with the advances made in the science and practice of teaching.

*The Organization.* In the administration of the schools, the headmaster's chief work is organization. Under the general direction of the school board as interpreted by the superintendent, he governs his school and aids the superintendent in the supervision of its work. He may also be a teacher of classes, but his primary duty is the organization of his school. Though the superintendent may at any time review the details of organization, it should seldom be necessary for him to do so. He should rather present the general scheme so that the headmaster be given great freedom in working out the details, as he is to be held strictly responsible for results.

*The Instruction.* In the administration of the schools, the teacher's chief duty is instruction. She must govern her room, supervise the work of her pupils and organize her classes, but she is primarily a teacher.

## CHAPTER II.

## THE JUNIOR HIGH SCHOOL.

*Definition.*

The standard elementary program recommends that the work of the lower grades be so effectively presented that elementary courses are completed with the sixth school year. The present program recommends that the secondary schools be so reorganized that they present to the pupils in Grades VII, VIII, IX and X secondary courses in a concrete and practical form and that they group in the two final years of the secondary school, courses designed to organize and make systematic the subject matter of various lines of study. The term junior high school is used to designate the earlier years of such a reorganized secondary program.

*The Program.*

The junior high school program consists of four unit courses, together with B and C subjects. The A subjects are those requiring drill and systematic training. The B subjects consist of general exercises and the organization of school activities. The C subjects include literature and reading for information and appreciation. See the chapter on "B and C Subjects" and pages 10 and 11 of the elementary program. The four recommended unit courses for Years I and II are history, French, mathematics and a half-unit of elementary science with a half-unit of practical arts. English is not approved as a unit subject for these two years but, as a B and C subject, should be a part of the work of all pupils.

It can be seen that the constant work in English required of all pupils should in part receive attention in periods of each of the classes mentioned above. Formal

instruction in the mechanics of English is not suited to pupils of these years, but practice should be constant, with insistence on correct habits of expression, and liberal time should be given to the enjoyment of literature, to recitations by pupils, to dramatization and to effective oral reading. Classroom work in books of the formal "First Year English" type has no place in the junior high school. During these four years all pupils should carry on their work in gardening, and all girls their work in cooking and sewing, and in these activities the school is to show interest.

### *The School Day.*

So far as the school organization will allow, supervised school study should be emphasized in Years I to IV in the secondary school. Periods should be extended and the school day lengthened until all work is in the classroom and the pupil goes home free for his home duties and his personal plans. The old-time recitation should seldom be seen and all classrooms should become laboratories for study and participatory activities. Each pupil's school day should be completely divided among the A, B and C subjects of his program, with no vacant, unorganized periods. See elementary program, pages 222 to 224.

### *Elementary Subjects.*

The junior high school is a secondary school and follows the completion of elementary subjects. Its program contains the application of the subjects of the elementary program but may not include formal courses in arithmetic, geography, grammar, reading and the other fundamental courses. It is to be noted that the arithmetic merges into the secondary school mathematics of these years, that geography continues in the study of current history, that grammar is expanded in the French course and that the program provides for such drill as is needed in reading, writing and spelling. Whenever it becomes apparent that

junior high school pupils have forgotten the process of computing simple interest or of dividing fractions, or of spelling correctly "grammar" and "separate" or of distinguishing between the common parts of speech, the B periods should be devoted to drill in the recovery of these lost arts. Elementary subjects should not be retaught. They should be redrilled and a renewed insistence placed upon their correct use. The high school must not allow pupils to forget the knowledge and practice of the elementary school.

#### *Tests of Completion.*

The junior high school does not teach reading and history, spelling, handwriting, composition, grammar and language, physiology and civil government by reviewing textbooks but by so organizing itself that the school at all times passes with success the junior high school tests which follow.

Reading and history should be tested by the knowledge that pupils have of things of vital interest, by the papers, magazines and books that appear in the schoolroom and by their apparent use, by determining what pupils read and by their use of the local library.

Spelling, handwriting, composition, grammar and language should be tested by the ordinary use of English as it appears in school papers and notebooks, in demonstrations and other board work, in the English expression of the classroom, of the school corridor and of the playground.

Physiology should be tested by the results that it has produced in establishing habits of correct living. The subject is not worthy of approval in schools where the teeth, or hands, or persons of pupils lack cleanliness, where pupils sit in bad posture and wear their rubbers, where schoolroom light and ventilation is defective, where noon lunches are of unsuitable material and are bolted rather than eaten, and where pupils pass the intermissions grouped in parallel or in series in place of seeking fresh



air. When the register shows poor attendance, with many tardinesses and dismissals, it indicates that the study of hygiene has not become effective.

Civil government should be tested by the respect which it seems pupils hold for themselves, for each other, for their teachers and those in authority. The subject is not worthy of approval where pupils are dishonest or indecorous in the classroom, where they are rude and silly in their behavior to each other and to their teachers, where the ordinary amenities of cultured society are lacking, where school desks are in disorder and paper thrown upon the floors and yard, where school books and other property are abused and basement walls marked and defaced, where pupils cross the school lawn and avoid the paths, where they are rough and boisterous on the street and in the cars as they come to school, where respect and reverence are so absent that profanity is heard on the playground, the school Bible is used for a paper weight and the flag is carried with indifference. Where these things occur, civil government has failed to accomplish its full purpose.

The junior high school should not teach or reteach these elementary subjects but it is to insist that the knowledge brought from the lower grades be retained and that forms of correct expression become habitual.

#### *Failure or Success.*

The junior high school will fail whenever teachers are allowed to reteach elementary subjects in the hope that perfection will be reached instead of insisting that knowledge acquired in the lower grades be retained and used correctly and with precision in the habits of personal expression and in the duties of the schoolroom.

The junior high school will fail when the program is composed of the traditional high school subjects taught in a formal way by teachers who have no sympathy with the early adolescent years and who feel a loss of dignity

when they teach to young pupils the subjects in which such pupils are properly interested.

The junior high school will succeed when to the pupils of these years is opened the wealth of knowledge that has been concealed in formal courses offered in high schools of the older type.

The junior high school will succeed when the pupils are taught by the best methods of successful teachers in the upper elementary grades.

For success, the junior high school must borrow its content for instruction from the high school and its teaching method from the elementary school. The keynote of success with the junior high school is personal interested work with the individual pupil.

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### CHAPTER III.

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#### HIGH SCHOOL SUBJECTS GROUPED.

In the growing complexities of civilized life, constant and insistent demands are being made upon all schools to add new subjects to their programs and new activities to their daily schedules. These additions are desirable but it is constantly necessary to classify them, to judge their comparative values and to harmonize them in the school organization. To this end, in our programs the studies of the school are divided into three groups, A, B and C.

##### *Group A.*

The subjects listed here call for systematic instruction and drill. They will be assigned a regular place on the time-table with daily recitations or class exercises. These are the unit subjects of the program.

In some schools, fortunately a decreasing number, these are the only subjects to which the school gives serious consideration. In these schools, the headmaster keeps the records and maintains discipline. The science teacher teaches science, the mathematics teacher teaches mathematics and the English teacher teaches English, but no one teaches primarily boys and girls. As a result, knowledge is imparted but school spirit is not developed, ideals and aims are not inculcated or unified and the school fails of its high purpose.

In such institutions, there is a group of instructors but no teaching staff. There are several classes but no school. Every high school should be organized for ultra-program activities and teachers and pupils should regard these as vital parts of the larger school program. This should be the case throughout the six years of the secondary program but the need is so insistent during the first four of these years, that is, the junior high school years, that the program which follows will give definite place in these years to B and C subjects.

### *Group B.*

These subjects, though in some instances requiring systematic development, do not require daily instruction and drill. They are general school exercises and in presentation often call for private and personal application.

They should be a part of the school organization for the first four years of the program and should have recognition on the time-table. Two twenty-minute periods a day are recommended, though accommodation should be secured for long period in subjects like drawing. Desirable periods are at the opening and close of morning and afternoon sessions of the school.

These subjects should include the following: (1) Personal Periods. There should be much personal and group instruction and insistence on hygiene, health, habits, manners and morals.

In this instruction, there can be no formal outline and no definite, determined plan. As the teachers study their pupils in the formal and informal relations of the school and the home, they should be alert to exemplify right personal reactions, to warn and to advise, to guide and to direct. The school staff should meet frequently to study and discuss their pupils as persons and not merely as recipients of ranks which record varying degrees of failure in assimilating the information of textbooks.

It is a growing custom for teachers to be directed to this work and to unite in it so that in some schools the pupils are given reports which indicate their rank in meeting the standards of wholesome and social living. It is recommended that each teacher devote a section of a private record or memorandum to each of her pupils and there note as occasion arises, the details to be considered in these private conferences. In small groups, by brief talks, teachers should instruct pupils with particular attention to personal help and to the amenities of social behavior. It is a duty then of all teachers in a most intimate way to point out to individual pupils the changes that they should make in habits and in manners as they grow into efficient manhood and womanhood. It is inconceivable that schools should longer take pride in scholastic records when they allow pupils to retain unwholesome habits and uncouth mannerisms. That a pupil should be reproved for a misplaced French accent, while his uncared-for teeth are endured in silence, that a pupil may be taught the correct atomic weights and not be taught to address a stranger with quiet good breeding, that a pupil may be told of his mistakes in algebra and not told of bizarre phrases and awkward gestures, which have become habitual to him, is to tithe the mint and cummin. This will be no longer possible when personal periods are required in the school organization.

(2) Drill Periods. All recitations, oral or written, and all exercises must show the completion of elementary sub-

jects. Individual deficiencies in spelling, composition, arithmetic, etc., may be met by personal drill.

In any well-ordered system, pupils come from the elementary schools with sufficient knowledge of arithmetic, grammar, spelling, writing and other school practices. A secondary school which allows this knowledge to be forgotten and these habits to fail through disuse is seriously at fault. No written work in any subject, either at the board or at the desk, should be accepted until it is legibly and neatly written, correctly spelled and expressed and, similarly, all oral recitations must be in clear and expressive English. For pupils negligent or forgetful, there should be individual and group drill but this is distinctly a corrective exercise personal in its application. In English classes, most of the composition work will be actual drill and practice work in the classroom under the guidance of the teacher.

(3) Cultural Periods. These are periods for the study of literature for expression, for drawing, for singing and for the study of current history. Each day the news of the world should be considered and the vital study of geography continued.

In the cultural periods, personal ideals are developed and school spirit is organized. For these a few minutes at the opening and at the close of the day are sufficient. Aside from the study of music, there should be much singing in the high school. The great songs and hymns should be known and loved. The pictures of the schoolrooms should be appreciated and pupils made familiar with the story which they tell. In cultural periods, the school should be a large family to whose information and enjoyment pupils alone and in groups make contributions. The news of the world, of the town and of the school circle should be discussed, reports made and recitations given. The devotional exercises of the school should not be of the stereotyped form but should be characterized by simplicity and reverence. For this the closing of the school day is particularly

appropriate. By brief inspirational talks, the headmaster of the school can do much to formulate school ideals. Illustrations of this are the talks given by Superintendent J. H. Philipps gathered in his book, entitled "Old Tales and Modern Ideals," and by J. A. Mowry in "Talks to My Boys."

(4) Organization Periods. It is to be emphasized that the school is not only a thinking body but a working body and frequently it should be organized for some specific task. Commonly, schools are organized to support athletic teams and occasionally to present a dramatic production. To this should be added the social and productive work of the school. The garden plans and various forms of relief work and united social service when needed are indications of the extent of this field.

#### *Group C.*

The term "well read" should characterize high school pupils as it always has characterized scholars. The interests of pupils in agriculture, in science, in domestic arts, should result in large reading in the books and general magazines devoted to these subjects. The study of French or of Spanish should produce a reading interest in all that concerns these people and these countries. "Outside reading" is a vital part, not of the work of English classes alone but of the work of all subjects and should be a requirement in the outline for each course. Group C includes the wide reading of the educated pupil and the specific reading upon subjects that he studies.

The school program should make provision for this reading. An opportunity should be given pupils to discuss their reading with their teachers and to report to their interested classmates. The school reading table or the school library should provide for this need and much work by pupils and by classes, with their teachers, should be done at the public library.



## CHAPTER IV.

## THE DAILY TIME-TABLE.

*The High School "Recitation."*

In our high schools, it has been customary to divide a five-hour day into six short periods. In each of four of these periods called "recitations," the pupils in a body meet the teacher of the subject in order that she may devote the greater part of the period to attempting to make them recall and repeat the statements made by an author in a book called the textbook. During two periods called "study" periods, the pupil in a general room prepares his assignment and without the help of the teacher attempts to solve difficulties inherent to the assimilation of new material. At the close of the day's session, the pupil takes home his textbook and is directed to devote to further preparation for the recitation period of the next day, two or three hours of intensive study and practice. This exercise is called "home study." It can readily be seen that this method, though still prevalent, is neither economical nor efficient. It is not economical, as the teacher cannot profitably spend forty minutes daily in testing the proficiency of pupils and making assignments. It is not economical since during time supposed to be devoted to intensive study the pupil is away from the primary direction of his teacher and the secondary help of reference books and school equipment, for he is at home in an undirected study room. For this reason, for young pupils, home study and unguided school study is seldom of real value. The pupils' study periods are periods devoted to research, to orderly arrangement and to practice and it is for these activities that there is the greatest need of the personal presence of the teacher. That this condition is faulty has long been recognized by thoughtful teachers and both the Department of Education and the Educational Council by circulars and

programs have urged a change. In no school should the daily "recitation," which is devoted mainly to questions by instructor and answers by pupils on the statements of specific textbook pages, be longer countenanced. Superintendents and headmasters who permit new teachers to acquire this teaching habit or who do not direct experienced teachers into a better process are negligent to a large degree.

### *Project Periods.*

During the last few years, the practical arts in various forms have firmly established their position in our secondary program. The courses offered in agriculture, domestic arts, manual arts and some of those in commerce, have kept themselves free from the formalized recitation. Moreover, many courses in science, through the influence of the laboratory, and most courses in American constitutional history, through the interest of the teacher, have laid aside the recitation periods and provided in their place project periods. The teachers of other subjects should study with care the successful methods used in these courses and should imitate the class technique of well-taught classes in the shop, the field and the laboratory.

### *Technique.*

The work set for the class should be divided not into page assignments but into projects or topics. These may be longer or shorter, for an hour, a week or a month, as the subject demands. Teacher and class should give little time to tests and to recitations but together should study and work until the project is completed. In general, all work which requires guidance and class direction that efficient results be obtained and unnecessary habits be not formed, should be done in the classroom with the teacher. General reading may be done outside and when necessary specific projects completed there but, ordinarily, neither

home work nor written examinations is desirable. In fact, except when a formal test is needed, there should be little writing by pupils except that done in the classroom and all this writing should be judged and corrected in the classroom as written.

### *A Work Room.*

It is held that the class should meet in a work room rather than a recitation room and should combine class with group and individual help and instruction. In this room, the pupils are learning the lesson and the teacher is guiding and directing them. The work will vary from hour to hour.

(1) Instruction. In work periods, the teacher will first present the main topic to the entire class and as the work progresses will re-present it to groups of slower pupils and to individuals. She will devote small time to the few best pupils but will guide them with individual encouragement to more advanced work than is possible for the class as a whole. She will spend more time with the large body of average pupils. These vary little in ability and are open to group instruction. She will spend much patient time with the poorest pupils as individuals, making full use of the principles of drill with repetition and practice.

(2) Drill. In work periods, much time must be given to drill but drill given only to pupils who fail in the essential reactions desired. A drill group should always exclude pupils who have reached the degree of perfection sought. The drill may be on new material of the subject presented, as on the Latin vocabularies and the idioms in Latin grammar or on any weakness observed in other lines, as in spelling, in writing and in arithmetic. The B practice period for the retention of elementary subjects mentioned in the former chapter should not require a separate place on the school time-table but should be incidental to the

various courses. Repetition is not sufficient. For effective drill, the repetition must be with improvement and as a teaching exercise must be preceded by participatory activity and followed by habitual and correct use.

(3) Practice and Correction. In work periods, the pupils will spend much time in practice work under the guidance of the teacher. It is her function to correct errors before unfortunate habits are formed. In particular, in oral and written work errors should be noted as they are made and correct forms required. The chief purpose of practice periods is to fix correct habits of work and expression.

(4) Tests. In work periods, some time must be given to testing results. This need seldom be by formal examination or for the whole class as a unit but by simple tests whenever a topic or subject is believed to be completed. Their purpose is to determine which pupils need additional practice rather than to secure for all pupils formal ranks.

#### *Supervised Study.*

Many attempts at supervised study have failed because teachers were unable to teach pupils how to study or to demonstrate the process. Supervised study is certain to fail whenever the teacher allows herself to serve as a dictionary and encyclopedia and an answer book to the pupils of her class. She is not to give them information but to direct them to its acquisition. Teachers are recommended to see Circular No. 73, "The Long School Day in Winchester High School," and No. 76, "Physics Without Assignments for Study at Home." See also Hall-Quest's "Supervised Study" and the appropriate chapter in Parker's "The Method of Teaching in High Schools."

A number of schools have reported success where the attention of pupils has been directed to habits of study by

the class use of one of the simpler texts on the subject, as Whipple's "How to Study," Sordwick's "How to Study and What to Study," but more important than this is the study method employed by the teacher herself as she works with the class. If she knows how to study, how to approach, to master and to use new information, the class will follow with ready imitation.

### *The Work Periods.*

It is entirely possible, as shown in our schoolrooms, for prepared and alert teachers to carry out with success work of the kind described with classes of as many as thirty pupils. It is not necessary that these pupils be in a single class but the work period may unite allied classes as Latin III and Latin IV or Mathematics I and Mathematics II. With group instruction for each class in small schools this arrangement is necessary and desirable. The work periods should be of sufficient length so that all of the work required be done in the classroom. This would usually mean a period from seventy-five to ninety minutes in length.

### *The School Day.*

The school day should be so arranged that all school work on unit classes, all developed school activities, together with necessary periods for relaxation and needed exercise, be completed in a school day and the pupils go home free from school requirements for the pleasures and duties of the home and social living.

For this a seven-hour day, from 8:30 to 3:30, which includes the luncheon period, is sufficient and is all that should be required of the child in the junior high school years. Schools may with safety add for the mature pupils of classes V and VI an hour of home work but even this is of doubtful value.

There is a pronounced tendency in our schools to have a two-session day, to lengthen this to six full hours of

school work, to drop the old-time recess, to organize the noon hour with prepared and supervised luncheons, and to arrange for school periods an hour or more in length with supervised study and all work done during school hours.

*A Suggested Time-Table.*

A seven-hour school day permits four seventy-five or eighty minute work periods like those described in this chapter, together with suitable periods for the school luncheon, for physical exercises and relaxation and for school organizations. A typical time-table for a school with a six-year program, five teachers and sixty to one hundred pupils is given for illustration. The plan is applicable, with modifications, for larger schools since in large schools the pupils would meet in smaller groups for some of the general periods:

First Period,	8.30 to 8.45	Opening Exercises.
Second Period,	8.45 to 10.05	First Work Period.
Third Period,	10.05 to 10.10	Relaxation.
Fourth Period,	10.10 to 11.30	Second Work Period.
Fifth Period,	11.30 to 12.15	Luncheon and Physical Exercises.
Sixth Period,	12.15 to 1.35	Third Work Period.
Seventh Period,	1.35 to 1.40	Relaxation.
Eighth Period,	1.40 to 3.00	Fourth Work Period.
Ninth Period,	3.00 to 3.30	Organization Period.

Period I. The school opens at 8.30 with one of the school songs, for every school should have its own, with other patriotic and inspirational songs, with the salute of the flag and such other exercises as will start the school happily and busily at its day's work. Here should come the reports and discussions of the important events in the school world and the larger world outside. The ideal is that of a large family coming together in the morning with cordial greetings, with a discussion of common interests and plans for the day's work. The teachers are but leaders and inter-



ested members of this family. These exercises should never become formalized and should differ from morning to morning. Assignments for the day may be made but this is no time for school discipline or formal didactics.

Periods II, IV, VI and VIII. These are the four work periods of the day. They give time for the completion of A or unit subjects, together with the incidental B and C subjects.

Periods III and VII. These are brief relaxation periods when all windows are opened and pupils are at ease. In winter months, they may be lengthened for brief intensive physical drill and setting up exercises.

Period V. This is a period for the noon luncheon and the development of social interests. The luncheon should be light but satisfying with at least one hot dish served by the school, supplemented by the personal luncheon of the pupils. The pupils should be seated with the teachers at tables or desks with attention to the customs which health demands and custom prescribes. There should be light games, dancing, singing and practice in dramatization. When possible, this should be out of doors but in inclement weather the building may be used. All of this calls for organization, for leaders from among the pupils and gives the teachers an unrivaled opportunity by suggestion, by guidance and by demonstration to teach to the school lessons in physiology, in civics, in manners and morals, an opportunity that has been wanting in most secondary school programs.

Period IX. This is a serious part of the day. The headmaster frequently will talk to his school on subjects which concern its welfare and the advancement of its pupils. The results accomplished in separate classes will be reported by competent pupils. The school will be organized for new activities, failures pointed out and successes applauded.

It will be a period for appreciation through the presentation to the school of some masterpiece in art until the school in common knows and feels the message of a great picture or of some great musical composition or of some poem, some speech or some dramatic production. It will be the period for recitations by the pupils, for songs by them, for the presentation of dramatic scenes. On one day a new poem—the best magazine poem of the month—will be taught with appreciation and will be memorized. On another day, a great hymn will be learned and these will be used at opening periods until they can never be forgotten. The period should close with the quiet devotional exercises of the day. The plan will vary from day to day and often will be in separate rooms with teachers assigned for single groups. Its purpose is to harmonize and unify the whole organization, to develop school spirit with respect for one's fellows and a feeling of individual responsibility. If Waterloo was won at Eton, it was because the Eton masters organized boys into a society.

*The Four Work Periods.*

The hypothetical school under discussion may have a program composed of the agricultural curriculum for boys and the liberal domestic arts curriculum for girls and may have a teaching staff of five; a college graduate of agriculture, one of domestic arts, a normal school graduate trained for junior high school work and two college graduates equipped for academic subjects. Since the school is small, by the combination of classes a number of courses need be given only on alternate years and two classes in the same subject may work together in a common work period. The courses which by alternation need not be given this year in Year IV are field crops and iron work, masterpieces of music and art, nursing and physiology, and physics, in Year V, the common sciences, and in Year VI, household management, farm organization and management and roads and forestry. The program would allow the following

classes to each teacher during the four work periods. It will be seen that there are no vacant periods but all pupils and all teachers are constantly occupied.

*First Period.*

- Teacher A. V and VI, tools and engineering. (boys)  
 Teacher B. I and II, cooking and sewing, Monday and Wednesday.  
     Elementary science, Tuesday, Thursday, Friday. (girls)  
 Teacher C. I and II, manual training, Monday and Wednesday.  
     Elementary science, Tuesday, Thursday, Friday. (boys)  
 Teacher D. III and IV, history of civilization.  
 Teacher E. V and VI, Greek and Roman literature. (girls)

*Second Period.*

- Teacher A. III and IV, woodwork. (boys)  
 Teacher B. VI, economics and business practices.  
 Teacher C. I and II, history and civics.  
 Teacher D. V, algebra and geometry.  
 Teacher E. III and IV, French. (girls)

*Third Period.*

- Teacher A. V and VI, animal husbandry. (boys)  
 Teacher B. V and VI, household organization. (girls)  
 Teacher C. II, mathematics.  
 Teacher D. I, mathematics.  
 Teacher E. III and IV, English.

*Fourth Period*

- Teacher A. III and IV, soils and horticulture. (boys)  
 Teacher B. III and IV, household appliances. (girls)  
 Teacher C. I and II, French.  
 Teacher D. VI, United States constitutional history.  
 Teacher E. V, English.

## CHAPTER V.

## THE EVALUATION OF SCHOOL WORK.

*Scholastic Ranks.* We are now concerned only with the scholastic ranks. These represent accomplishment alone. They do not indicate what the pupil can do nor what he ought to do. They represent what a pupil has done. They show relative degree of success in the completion of work assigned the class by the teacher.

*The Present Custom.* It is the custom of many teachers to wait until the end of the half term and then assign the ranks by their best judgment according to their remembrance of the work done. Still more teachers stand with call book in hand and at the close of each individual recitation record therein its value. Both methods are unsatisfactory. The former reflects the carelessness, the indifference or the varying moods of the teacher. The latter distracts the teacher's attention from the class, puts the emphasis on form rather than substance and usually results in ranks modified by the teacher's conception of the pupil and his work.

This method was possible as long as teachers were satisfied with a recitation each day, a period for hearing the lesson; but in laboratory science and in the practical arts, a daily recitation is inconceivable and ranks must be assigned in terms of laboratory exercises, projects and other accomplishments. Not only in the newer subjects but in the traditional ones, the adoption of supervised study and the principles of Project Periods has caused vital teaching to replace the old-time daily recitation, and calls for a revision of present marking systems.

*The Suggested Plan.* Teachers should generally replace these methods by obtaining ranks from a combination of the results of a considerable number of carefully graded

tests based upon definite accomplishment. An illustration may be taken from a first-year history class. During the first week with a new class, the teacher devotes herself to teaching, she interests her class in the subject, she becomes acquainted with her pupils but she does not consciously evaluate their daily efforts. At the end of the week she takes her class list and assigns the value which she thinks each pupil deserves for his work. The next day she gives a short unannounced test on the chapter covered and with especial care, ranks these papers. A few days later she collects the map books and ranks them. From time to time she studies the notebooks and tests the outside reading for a similar purpose. With these will be combined formal recitations, oral reports on reading, many short written tests and any other objective measurement she can make of any phase of class accomplishment. At times she will grade the class according to participatory activity and at times in terms of use of the library or the newspapers to interpret historic events.

Each of the above tests with others will be a definite evaluation of material or objective results and the average of these all will closely give the actual accomplishment of the pupil. They are measurements of definite lines of achievement but if carefully assigned will seldom vary greatly from each other. Teachers should find occasion for such tests as often as twice a week and in their rank books should record, in the decimal scale, the pupils' rank together with the date and nature of the test.

When teachers are ranking subjects for oral or written tests as a whole, they should not attempt a finer measure than the decimal scale, and similarly by the same scale the separate answers in the examinations should be ranked. All averages, however, should be in percentage notation for 87% obtained as a mean from fifteen of the tests just described has a definite meaning and is very different from an 87% judged to be the value of an entire composition.

It is a comparatively easy matter to rank papers in arithmetic and algebra or to indicate the quality of handwriting

or spelling, since in these subjects we have accepted standards of measurement and relative perfection. In other subjects the rank must still depend largely upon the judgment of the teacher and must indicate not absolute value in any scale but relative value. This means that all papers ranked 78 are of equal value and are as much better than papers ranked 75 as they are poorer than those ranked 81.

*Grading Papers.* Teachers who have many papers to grade according to their relative value will economize in time and effort by throwing the papers into a quintile scale. To do this they should give the papers a cursory reading and should then place in pile A, the few papers that show marked, unmistakable merit; in pile E the equally small number of papers that are clearly below grade; in pile B, the considerable number of papers of high general work, mainly correct in form and in content but not of striking excellence; in pile D, the same considerable number of papers of low grade and of doubtful passing value, and in pile C, the still larger number of mediocre papers, the average papers of average pupils. Teachers will then carefully re-read the papers of each group and will find occasion to raise or lower by one grade such papers as have evidently been misplaced. At the end about 7% should be in class A and in class E, about 24% in each of B and D and the remainder, 38%, in class C. The result of these tests may be transferred and entered in percentage notation based upon the passing rank of the school. When this is 70%, A may well be 95, B 88, C 81, D 73 and E some appropriate value under 70%.

It is understood that the above suggestions are for a fair and economical method of evaluating tests and marking written work, they have nothing to do with the correction of errors. These same papers may, of course, be corrected for errors and returned to the writers. This, however, should seldom be done. It is burdensome to the teacher, of little value to the pupil and a great waste of red ink. Most written work should be prepared in the laboratory



or classroom and corrections required by the teachers as the errors are being made. Tests should always be marked as tests, though deficiencies should be noted for later teaching or drill.

*Distribution of Ranks.* A particular duty of the headmaster is to test the credibility of ranks submitted by teachers. If we apply the probability curve of statistical measurement to the scaling of individual scholastic differences, we may expect where 70 is passing rank, 2% of all ranks to be under 65, 5% between 65 and 69, 18% between 70 and 74, 25% between 70 and 79, 25% between 80 and 84, 18% between 85 and 90, 5% between 90 and 94 and 2% of 95 or more. Very few classes will meet these standards, nor should they, since of necessity small classes differ widely in composition. But, the headmaster should know the reason for any marked divergence and when he finds teachers who mark habitually too high or too low, who mark erratically, with prejudice and carelessness, he should insist that they so revise their standards that justice be done the pupils. It cannot be over-emphasized that the headmaster must not enter ranks upon the school record until he is convinced that they fairly represent the actual accomplishments of the pupils.

*Formal Examinations vs. Tests.* Many schools still follow the custom of periodic examinations and assign to the results one-third of the value in reaching the pupil's rank for the period. Probably this is a satisfactory evaluation of recitation and examination work under the traditional system. Many schools are coming to see, however, that the common custom by which at the middle or the end of the term, work in all classes stops for a fortnight of protracted review, two examination days of nerve strain and a week of anxious waiting and disorganized activity until the papers are corrected and the cards are out, is wasteful in the extreme and is of very doubtful educative value.

It is the advice of the Educational Council, that formal

and final examinations be entirely replaced by many short unannounced tests given when the class has finished a period or chapter of the course and has procured results that may be tested. Reviews should be given as before but would have no necessary connection with examinations. Their purpose would be to organize material, not to cram for examination. The Educational Council recommends that the average of the proposed tests count one-half in determining the standard of pupils.

Since the common examinations of our schools have their origin in the college entrance examinations and in the examinations given by university professors at the end of lecture courses, it is worth while to note why school tests should differ from formal examinations given by someone who has not taught the pupils examined and has but a single opportunity to determine their attainments. Such formal examinations should be long, should permit a choice between questions, should have a low passing rank and probably a sliding scale of passing values. Examinations of this nature may properly be given tuition candidates for high school admission, and furnish justification for the familiar regulation that admission may be granted to pupils who have "a general average of 70 or more and no subject under 50%."

The tests a teacher gives his own class should be entirely different. They should be short, frequently given, at natural intervals and with definite questions. There should be no alternative questions, no preferred courses and the class should be held to a high degree of attainment.

*The Superintendent's Duty.* Superintendents should establish definitely a clearly understood marking system for their schools and have the regulations of that system entered in the school record book. The regulations should name the passing rank of the school, the values assigned examinations, together with their nature and frequency.

## PART II.

### The Suggested Program: The Nine Curricula.

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#### *The Proposed Program.*

The following curricula are presented as models but are doubtless susceptible of improvement and each school mindful of the advantage of similar programs in all of the secondary schools of the state should still modify these curricula to meet its distinct and individual needs. It is not supposed that any school will adopt all curricula given. A small school should make its program of but one or two curricula. A large school may offer wider choice. The program presented has the following characteristics:

1. Without loss of time, it adds a full year to the pupil's course. In the academic classical curriculum, for instance, he takes the equivalent of a year of college work in that he takes four courses that he would not have otherwise. They are physics, chemistry, college Latin and college mathematics.

2. In addition, it enriches the course by a full year of work that has not been given. It gives a year in elementary science, one in the practical arts, one in economics and business practices and an additional year in French. The following table compares the two courses and it is to be remembered that it is proposed to do the work in English and in Latin formerly done in four years in three each.

OLD PROGRAM.		NEW PROGRAM.	
English	4 years	English	3 years
Latin	4 years	Latin	4 years
History	2 years	History	4 years
Mathematics	3 years	Mathematics	4 years
French	3 years	French	4 years
	—	Science	3 years
	16	Practical Arts	1 year
		Economics	1 year

There is a similar gain in other curricula.

3. The program given is for six years and, as four unit courses are required each year, twenty-four units are needed to complete each program.

4. In all but the Academic Classical Curriculum, four full courses in household arts are required of all girls.

5. No curriculum is made up of scattered courses but each has continuity provided for in the carrying of some subjects beyond the elementary stage.

6. The curricula are not restricted to a narrow field of work, as all require work during the last four years in English, in history, in mathematics, in science, in economics and all, except the two Smith-Hughes curricula, require work in these years in a foreign language.

7. Science is recognized as it was not in the older program.

8. In the first four years, subjects are grouped that are inspirational and appeal to the imagination and experience of the child. In the last two years are the subjects that require drill and organization.

9. Any subject of secondary grade may be included in a school program, if the school is equipped for its efficient presentation. Many desirable courses, as those in Greek, German, biology and geology, are not given in this program but may be introduced in different schools.

10. To a secondary school organized on the six-six plan, pupils may be admitted who have completed the elementary work of an eight-four system and may complete the work in five years. They will be admitted to Class II and would take for the first year Science I, Science II, French I, Mathematics I and Mathematics II. In Classes III and IV, they would do regular work, with extra work in French. To a school organized on the eight-four plan, pupils may be admitted who have completed the elementary work of a six-six system and may complete the work in five years. They would be admitted to Grade VIII and would take double history, arithmetic, geography, grammar, etc.

11. It will be noted that no courses are suggested in biology, physiography, astronomy and geology, in ancient, European and English history, in Greek or in German. These subjects are not omitted because they are not proper constituents of a secondary program. Admirable outlines for each were given in the 1912 program and schools which wish to continue these subjects will be able to refer to the standards set for the different courses.

12. The curricula offered are nine:

Academic Classical	boys	girls
Academic Domestic Arts		girls
Liberal Domestic Arts		girls
Commerce: Girls		girls
Commerce: Boys	boys	
Business: Girls		girls
Business: Boys	boys	
Smith-Hughes Agricultural	boys	
Smith-Hughes Mechanic Arts	boys	

#### ALL CURRICULA.

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Year			
	History and Civics	5 days	5 periods
	French	5 days	5 periods
I	Mathematics	5 days	5 periods
	Elementary Science	3 days	3 periods
	Manual Training (boys), Cooking and Sewing (girls)	2 days	4 periods
	(B and C Subjects. Drawing, Composition, Plays, Gardens, Mu- sic, Current Events, Literature, Hygiene)	5 days	10 half-periods
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	History and Civics	5 days	5 periods
	French	5 days	5 periods
II	Mathematics	5 days	5 periods
	Elementary Science	3 days	3 periods
	Manual Training (boys), Cooking and Sewing (girls)	2 days	4 periods
	(B and C Subjects)	5 days	10 half-periods

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## ACADEMIC CLASSICAL CURRICULUM.

Year			
	English	5 days	5 periods
	French	5 days	5 periods
III	Latin	5 days	5 periods
	History of Civilization (B and C Subjects)	5 days	5 periods 5 days 10 half-periods
	English	5 days	5 periods
	French	5 days	5 periods
IV	Latin	5 days	5 periods
	Physics (B and C Subjects)	5 days	7 periods 5 days 10 half-periods
	English	5 days	5 periods
	Latin	5 days	5 periods
V	Algebra and Geometry	5 days	5 periods
	Chemistry	5 days	7 periods
	United States Constitutional His- tory	5 days	5 periods
	Latin	5 days	5 periods
VI	Senior Mathematics	5 days	5 periods
	Economics and Business Practices	5 days	5 periods

## ACADEMIC DOMESTIC ARTS CURRICULUM.

Year			
	English	5 days	5 periods
	French	5 days	5 periods
III	Latin	5 days	5 periods
	Household Appliances (B and C Subjects)	5 days	7 periods 5 days 10 half-periods
	English	5 days	5 periods
	French	5 days	5 periods
IV	Latin	5 days	5 periods
	Nursing and Physiology (B and C Subjects)	5 days	5 periods 5 days 10 half-periods



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Year			
	English	5 days	5 periods
	Latin	5 days	5 periods
V	Algebra and Geometry	5 days	5 periods
	Household Organization	5 days	5 periods

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	United States Constitutional His- tory	5 days	5 periods
	Latin	5 days	5 periods
VI	Economics and Business Practices	5 days	5 periods
	Household Management	5 days	5 periods

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#### LIBERAL DOMESTIC ARTS CURRICULUM.

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Year			
	English	5 days	5 periods
	French	5 days	5 periods
III	History of Civilization	5 days	5 periods
	Household Appliances	5 days	7 periods
	(B and C Subjects)	5 days	10 half-periods

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	English	5 days	5 periods
	French	5 days	5 periods
IV	Masterpieces of Music and Art	5 days	5 periods
	Nursing and Physiology	5 days	5 periods
	(B and C Subjects)	5 days	10 half-periods

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	English	5 days	5 periods
	The Common Sciences	5 days	5 periods
V	Algebra and Geometry	5 days	5 periods
	Household Organization	5 days	5 periods

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	United States Constitutional His- tory	5 days	5 periods
	Greek and Roman Literature	5 days	5 periods
VI	Economics and Business Practices	5 days	5 periods
	Household Management	5 days	5 periods

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## COMMERCE CURRICULUM: GIRLS.

Year		
	English	5 days 5 periods
	French	5 days 5 periods
III	Bookkeeping, Arithmetic and Typewriting	5 days 8 periods
	Household Appliances	5 days 7 periods
	(B and C Subjects)	5 days 10 half-periods
	English	5 days 5 periods
	Commercial Geography and History	5 days 5 periods
IV	Bookkeeping, Arithmetic, Stenography and Typewriting	5 days 10 periods
	Nursing and Physiology	5 days 5 periods
	(B and C Subjects)	5 days 10 half-periods
	English	5 days 5 periods
	Stenography and Typewriting, Spelling and Correspondence	5 days 7 periods
V	The Common Sciences	5 days 5 periods
	Household Organization	5 days 5 periods
	United States Constitutional History	5 days 5 periods
	Office Practice, Stenography and Typewriting	5 days 7 periods
VI	Economics and Business Practices	5 days 5 periods
	Household Management	5 days 5 periods

## COMMERCE CURRICULUM: BOYS.

Year		
	English	5 days 5 periods
	French	5 days 5 periods
III	Bookkeeping, Arithmetic and Typewriting	5 days 8 periods
	History of Civilization	5 days 5 periods
	(B and C Subjects)	5 days 10 half-periods

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Year		
	English	5 days 5 periods
	Commercial Geography and History	5 days 5 periods
IV	Bookkeeping, Arithmetic, Stenography and Typewriting	5 days 10 periods
	Physics	5 days 7 periods
	(B and C Subjects)	5 days 10 half-periods

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	English	5 days 5 periods
	Spanish	5 days 5 periods
V	Stenography and Typewriting, Spelling and Correspondence	5 days 7 periods
	Chemistry	5 days 7 periods

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	United States Constitutional History	5 days 5 periods
	Spanish	5 days 5 periods
VI	Office Practice, Stenography and Typewriting	5 days 7 periods
	Economics and Business Practices	5 days 5 periods

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### BUSINESS CURRICULUM: GIRLS.

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Year		
	English	5 days 5 periods
	French	5 days 5 periods
III	Bookkeeping, Arithmetic and Typewriting	5 days 8 periods
	Household Appliances	5 days 7 periods
	(B and C Subjects)	5 days 10 half-periods

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	English	5 days 5 periods
	Commercial Geography and History	5 days 5 periods
IV	Bookkeeping, Arithmetic, Typewriting, Spelling, Correspondence	5 days 10 periods
	Nursing and Physiology	5 days 5 periods
	(B and C Subjects)	5 days 10 half-periods

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Year			
	English	5 days	5 periods
	Spanish	5 days	5 periods
V	Household Organization	5 days	5 periods
	The Common Sciences	5 days	5 periods

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	United States Constitutional History	5 days	5 periods
	Spanish	5 days	5 periods
VI	Household Management	5 days	5 periods
	Economics and Business Practices	5 days	5 periods

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### BUSINESS CURRICULUM: BOYS.

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Year			
	English	5 days	5 periods
	French	5 days	5 periods
III	Bookkeeping, Arithmetic and Typewriting	5 days	8 periods
	History of Civilization	5 days	5 periods
	(B and C Subjects)	5 days	10 half-periods

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	English	5 days	5 periods
	Commercial Geography and History	5 days	5 periods
IV	Bookkeeping, Arithmetic, Typewriting, Spelling, Correspondence	5 days	8 periods
	Physics	5 days	7 periods
	(B and C Subjects)	5 days	10 half-periods

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	English	5 days	5 periods
	Spanish	5 days	5 periods
V	Algebra and Geometry	5 days	5 periods
	Chemistry	5 days	7 periods

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	United States Constitutional History	5 days	5 periods
	Spanish	5 days	5 periods
VI	Senior Mathematics	5 days	5 periods
	Economics and Business Practices	5 days	5 periods

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## SMITH-HUGHES AGRICULTURAL CURRICULUM.

Year			
	English	5 days	5 periods
	History of Civilization	5 days	5 periods
III	Soils and Horticulture	5 days	10 periods
	Wood Work	5 days	5 periods
	(B and C Subjects)	5 days	10 half-periods
	English	5 days	5 periods
	Physics	5 days	7 periods
IV	Field Crops	5 days	10 periods
	Iron Work	5 days	5 periods
	(B and C Subjects)	5 days	10 half-periods
	English	5 days	5 periods
	Algebra and Geometry	5 days	5 periods
V	Animal Husbandry	5 days	7 periods
	Farm Engineering and Tools	5 days	5 periods
	United States Constitutional History	5 days	5 periods
	Farm Organization and Management	5 days	5 periods
VI	Roads and Forestry	5 days	5 periods
	Economics and Business Practices	5 days	5 periods

## SMITH-HUGHES MECHANIC ARTS CURRICULUM.

Year			
	English	5 days	5 periods
	History of Civilization	5 days	5 periods
III	Shop Work and Mechanical Drawing	5 days	20 periods
	(B and C Subjects)	5 days	10 half-periods
	English	5 days	5 periods
	Physics	5 days	7 periods
IV	Pattern Making, Forging and Moulding	5 days	20 periods
	(B and C Subjects)	5 days	10 half-periods

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Year			
	English	5 days	5 periods
	Algebra and Geometry	5 days	5 periods
V	Machine Shop and Electrical Wiring	5 days	15 periods
	Chemistry	5 days	7 periods

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	United States Constitutional History	5 days	5 periods
VI	Machine Shop Mechanisms and Engineering	5 days	20 periods
	Economics and Business Practices	5 days	5 periods

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### NOTES ON CURRICULA.

#### ALL CURRICULA.

#### *Years I and II (Grades VII and VIII).*

*In General.* The events of the last few years have made the knowledge of French an essential element in education and several years of successful experience in a number of our schools has established the fact that the proposed courses in elementary science and in concrete mathematics have a vital hold upon pupils of this age. Accordingly, the same courses are proposed for all pupils during these two years, the different curricula are not distinguished and a binding choice need not be made by the pupils until the third year. A careful study will also show that ambitious pupils who have started in the wrong curriculum may, in many cases, change without great hardship at the beginning of the fourth or even the fifth year.

*Possible Changes.* Many changes are possible in this list as schools may prefer to give Latin in place of French. The French may also be replaced by two well-organized courses in elementary agriculture and these made to lead to the subsidized Smith-Hughes curricula in agriculture



and in mechanic arts, as given for Years III to VI, though the recommended curriculum leads to these as well.

### *I. Academic Classical Curriculum.*

*In General.* This curriculum is designed for boys who are preparing for a college course that will lead to work in the professions. It is appropriate also for girls who desire to enter those colleges which still restrict their entrance requirements.

*Possible Changes.* The course in History of Civilization may be replaced by the traditional course in ancient history. For pupils who are preparing for colleges which will not accept the new course, a brief non-unit course in one of the later years may be given. Schools which desire to give a third foreign language, German or Spanish, may introduce courses in place of the chemistry and economics.

In three effective years we can easily do all the work in English that is now assigned for four years. Schools which do not accept this view may, of course, replace the economics proposed for the senior year by a fourth course in English.

### *II. Academic Domestic Arts Curriculum.*

*In General.* This curriculum is for girls who wish four years of Latin. It is identical with the Academic Classical Curriculum, except that it replaces the history of civilization, the physics, the chemistry and the advanced mathematics by the four regular courses in domestic arts. It is a curriculum of high educational value.

*Possible Changes.* It is doubtful that any changes should be made in this curriculum. We believe that any separate courses in the domestic arts should not be approved but that the four courses of these years are continuous

and possess a unity that should not be broken. As has already been said, additional mathematics or additional English could replace the course in economics.

### *III. Liberal Domestic Arts Curriculum.*

*In General.* This is like the Academic Domestic Arts Curriculum, except that it replaces the four courses in Latin with history of civilization and three new courses. It is a liberal course of high educational merit and should be offered in most schools and chosen by a majority of high school girls. It furnishes the best preparation offered for the normal schools, makes full preparation for New Hampshire College and furnishes the broad education needed for the teacher, the nurse and the home maker.

*Possible Changes.* A second foreign language may be introduced in place of the new courses or of economics.

### *IV. Commerce Curriculum: Girls.*

*In General.* This curriculum is designed to prepare girls for office work and for clerical positions. There is a great demand at present for young women for work of this nature, but there is a possibility that the supply may be greater than the demand by the time that the girls of our younger classes have completed their preparation. Accordingly, it is desirable that this curriculum should not have a narrow restriction to branches of commerce but should also furnish a liberal education and full preparation for the career of home maker. In the four-year high school, it was very difficult to give to the same pupils both the work in commerce and that in domestic arts. In this program, it will be seen to be entirely possible.

This curriculum is like the Academic Domestic Arts, except that the Latin and mathematics and the fourth year in French are replaced by one course in science and five in commerce. These five courses are (III) Book-

keeping with arithmetic and typewriting; (IV) Book-keeping with arithmetic, stenography and typewriting and commercial geography with history; (V) Stenography with typewriting, spelling, correspondence and penmanship; (VI) Office practice with stenography and typewriting.

*Possible Changes.* It will be noted that with the course in economics and business practices, six courses of commerce are given in this curriculum. By agreement, this is ample for commercial work but the courses in commerce may be rearranged by schools that believe some other plan better than the one suggested. Not over two years may be devoted to drill and formal work in book-keeping or in stenography, and office practice, if offered, must be purposeful work of a practical kind.

#### V. *Commerce Curriculum: Boys.*

*In General.* This is like the girls' curriculum, except that the four courses in domestic arts and the one in the common sciences are replaced by the history of civilization, by physics, and by chemistry and by two years of Spanish. The curriculum is designed for boys who look forward to office and clerical work.

*Possible Changes.* The two years of Spanish may be replaced by two years of mathematics in schools which are not prepared to teach Spanish. It is believed, however, that particularly for boys, Spanish is a desirable part of a course in commerce and, with the development of intimate relations with South American countries, is likely to be of great value.

#### VI. *Business Curriculum: Girls.*

*In General.* This is like the commerce curriculum for girls, except that stenography and office practice are not given. The Years III and IV are the same, except that

in Year IV the stenography is replaced by additional drill in typewriting and business English and in the last two years is replaced by Spanish. This curriculum is suggested to meet the needs of girls who wish to do work as cashiers or bookkeepers or who engage in other clerical work which does not call for the use of stenography. The curriculum is not recommended for general adoption.

*Possible Changes.* Spanish may be replaced by German or by mathematics.

#### VII. *Business Curriculum: Boys.*

*In General.* This is like the business curriculum for girls, except that the four years of domestic arts and the year in the common sciences are replaced by history of civilization, physics, chemistry and two years of mathematics. Many boys wish courses in bookkeeping but do not desire work in stenography and, commonly, clerical positions which call for stenography are held by young women. This curriculum is recommended for schools where curricula in agriculture and in mechanic arts cannot be established and should be chosen by boys who do not wish a Latin course.

*Possible Changes.* French may be continued for another year and may replace the course proposed in history of civilization.

#### VIII. *Smith-Hughes Agricultural Curriculum.*

*In General.* This is the curriculum subsidized by the Smith-Hughes Act. The vocational courses are the four in agriculture, the two in farm mechanics, the course in roads and forestry and the one in farm tools and engineering. The non-vocational courses are three in English, two in history, physics, algebra and geometry and economics and business practices. This curriculum

should be in every city and country secondary school in the state where there are farm boys and its selection should be urged upon a large number of boys.

*Possible Changes.* Some changes may be made in the non-vocational courses but none in the vocational.

#### *IX. Smith-Hughes Mechanic Arts Curriculum.*

*In General.* This is a Smith-Hughes curriculum. The vocational courses are in shop work, in pattern making, turning, forging and moulding, in machine shop practice, electric wiring, mechanics and engineering. The non-vocational courses are three in English, two in history, physics, chemistry, algebra and geometry and economics and business practices. This curriculum should be in every New Hampshire secondary school that is in an industrial center. It is a most important curriculum.

*Possible Changes.* Some changes may be made in the non-vocational courses but none in the vocational.

## PART III.

### Courses Outlined.

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#### CHAPTER I.

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##### ENGLISH.

###### *Aims.*

English courses are offered in our secondary programs (1) to open to pupils the world's storehouse of information, that is, to make them well-read persons. (2) To aid them to appreciate and relive the inspiring thoughts of others. (3) To develop in them the power to express themselves correctly and with force.

Three courses are recommended: English III, English IV and English V.

###### *Standards.*

1. The appreciative study in the class of twelve books each year, these to be books of proven value in which the pupil may take a real interest.

2. The reading throughout the year of one of the general history magazines and one magazine connected with the courses which the pupil follows, as one which deals with domestic economy, with science, with mechanics, with agriculture, with geography or with literature.

3. The individual reading of six books, preferably modern, on geography, history, invention, commerce or the like. These are the worth-while books of the day which are more interesting than novels.

4. The constant incidental and functional study of composition, grammar and rhetoric in all three years.

5. The systematic study of the history of English and



American literature, of composition, grammar and rhetoric in the third year.

6. In the first two years, constant drill and class practice in composition.

7. In each year from fifty to one hundred pages of carefully prepared written expression, the greater part of this to be regular work in other courses.

8. The organization of the school for correct habits of English expression.

### *Suggestions.*

English in the First and Second Years. Formal courses in English in these two years are not advised. As already described in the organized A, B and C periods of these years, there should be much reading, composition and the study and appreciation of literature. From the first day, illiteracy should not be endured but corrective drill and constructive practice should be applied to all pupils who do not write legibly, spell correctly and express themselves in clear terms until a cure is effected.

### *English III and IV.*

*The General Plan.* It is recommended that during the first two years the equivalent of three days a week be devoted to reading and literature and two days to composition, expression and drill. Each may be stressed in turn, for the reading of an interesting story should not be interrupted by the insertion of a composition day. Most English periods, whether literature or composition, should begin with attention to the events of the day. Ordinarily, the teacher should make a brief statement of the day's news, should answer questions and secure definite reports. For this five minutes is ordinarily sufficient. That our pupils may be well informed, they must be well-read and the purpose of these exercises is not to give information, but that the teacher may arouse interest and by suggestion may lead pupils to intelligent reading.

Doubtless, a school is under the same obligation to provide pupils with current periodicals as it is with copies of *Ivanhoe*. Many schools, however, find the five cent a week club plan preferable as each pupil then owns his personal copy. Among the weeklies, *The Literary Digest*, *The Independent* and *The Outlook* are recommended and, if provided by the school, ten copies of each will be sufficient for the entire school if English classes number not over thirty pupils. Pupils must also have access to daily papers and technical magazines. The little paper, "Current Events," is in no sense adequate for high school work.

*Literature Periods.* Much of the reading of periodicals should be in the classroom. After the teacher has given her morning summary and suggestions, each pupil should turn to his reading and the teacher should go from desk to desk for personal suggestions and for discussion of topics which have aroused interest.

Most of the ordinary outside reading of selected books should similarly be in the classroom and the pupils as they retell the story and explain its incidents will adequately replace the formal book reviews now in vogue.

In addition it is likely that the class should read together at least a dozen books during the year. Each classic should be taught by the teacher, by the suggestions of Chapter XXII. See also the suggestions in Parker's "Methods of Teaching in High Schools" and the appropriate chapters in Judd's "Psychology of High School Subjects."

There should be no word pronouncing of paragraphs as at present, but much reading for rhetorical effect of selected practiced paragraphs. The purpose throughout is that the pupil can understand and appreciate the story and to this everything else should be subordinate. There should be little conscious study of the style of the writer or the meaning of isolated phrases or incidents. Vocabularies should be enlarged by forcing the meaning of

new words from their context and not by the common "Look it up in the dictionary." The comments of the teacher should keep the subject constantly before the class and her questions should be thought and not memory questions, not "In what English county did you learn yesterday that York was situated?" or "How many men does Stevenson say David heard while he was in the apple barrel?" but rather, "Now that he has heard the plot, what will he do?" "What would you do if you were in his place?" The teacher should outline the story, the class should read it silently with the coöperation of the teacher, then should follow class discussion and the study, re-reading and enjoyment of selected passages. Most classes spend upon each book double the time that is profitable.

English teachers should, of course, have access to the "English Journal" and the bulletins referred to above. It is very important that they understand the psychology of the reading process. References are, Huey's "The Psychology and Pedagogy of Reading" and G. Stanley Hall's "Pedagogy of Reading" in "Educational Problems."

Few teachers can teach well to their classes, *Ivanhoe*, *The Last of the Mohicans* and the *Tale of Two Cities*. Those that can should continue with them. Recommended books for these years are *Treasure Island*, *Kidnapped*, *David Copperfield*, *Nicholas Nickleby*, *The Man Without a Country*, *Two Years Before the Mast*, *Captains Courageous*, *Silas Marner*. See also the excellent lists in *Bulletin 1917*, No. 2, *Reorganization of English in Secondary Schools* by the National Bureau of Education.

During each year there should be more careful study with re-reading of a number of longer poems as illustrated by Shakespeare's plays, Scott's poems, *The Ancient Mariner*, *The Holy Grail* and the best poems of the year as they appear in current magazines. It is particu-

larly desirable that pupils memorize and use short poems, paragraphs, verses and lines. On procedure in teaching the memorizing of poems, see Halburton & Smith's "Teaching Poetry in the Grades" and Bolenus' "Teaching Literature in Grammar Grades and High School."

*Composition Periods.* All practice writing should be in the classroom and be directed and corrected as written. Teachers who delight to spend their evenings in correcting compositions may continue to do so but should regard it as a diversion as it is not connected with the inculcation of corrected habits of expression. During the class period the teacher will pass from desk to desk with constructive criticism. In an ordinary class of twenty there will be fourteen pupils who will need from the teacher little more than occasional encouragement and direction. There will be six whose practice should be under constant guidance. Errors should be corrected at once and the proper forms written and rewritten until the habit of correct expression is established. For this practice work the exercises should not be long, nor should they be formal compositions. A formal composition is one written for the sake of a composition, not in order to express thought. To send a girl who loves music to the encyclopedia to look up wireless telegraphy so that she can write a composition on it, is to impose on her a formal composition. She is not concerned with the subject but only in the connection of two hundred words. On the other hand, the boy who has his own plant is interested to tell the class what he knows and what they do not. This is a basis for successful composition, to furnish expert information to the uninformed. In his practice compositions each pupil should tell simply that which he already knows, that which he has seen or what he has done. The newer manuals of composition are full of desirable suggestions.

*Drill.* That the teachers in all subjects must refuse all work in incorrect form and that the school must not

admit illiterate pupils or promote them has already been made plain in our circulars. Such pupils must be given special drill but must understand that teachers will not tolerate careless or superficial work. No paper should be accepted or corrected which does not reach 60 on the Ayres' Penmanship Scale or which misspells any of the Ayres' "1000 Commonest Words." See Institute Circular No. 2.

In Institute Circular No. 1, it was suggested that schools should organize for correct English expression. There have been many experiments but the most hopeful attempts have followed this method. The teachers of other subjects are primarily Latin or physics teachers but they insist on good English and they furnish the English teacher with material for drill. In their classroom and in the school halls they note with the name of each pupil his ungrammatical, unrhetorical or uncouth statements. From his written work, they gather his errors in composition and occasional spelling. They emphasize good English before their classes and in personal conferences aid their pupils. At the end of the week, they give the English teacher their notes of pupils who need specified drill and she files these notes as part of her individual account with each pupil.

The teacher now has material for her drill periods but this will seldom be drill for the whole class. The two-thirds of the class whose habits are correct will be seated in the back of the room at whatever work they need to do. Usually the teacher will have drill work with not over four or five pupils at a time or may work with individual pupils. The errors to be corrected will be in spelling, in sentence formation, in paragraphing, in slovenly expression, in pronunciation and in uncouth mannerisms of speech. To the individual pupil the teacher will point out his error, will show how the error may be detected, will give much drill on the repetition of the correct form and will see that the pupil gives it the prac-



tice that is needed until it becomes habitual. At later drill periods the pupil reports progress and learns of the statements of his teachers.

Many of the composition and rhetoric textbooks contain suitable exercises for drill of this kind but these exercises are valueless without attentive repetition. The same sentences should be given again and again by the pupil who needs the practice till his response is habitual.

Frequently the teacher should secure the written work in other subjects, notebooks, reports and the like. She should not correct these, but the English expression should be a large factor in her determination of the composition rank to be given the pupil. A most excellent test of the pupil's ability of punctuating correctly is to study his written demonstration in geometry. See Circular No. 2, pages 6 and 7.

*The Incidental Teaching of Grammar, Composition and Rhetoric.* In these two years there should be no recitation or general class work in any of the formal treatises in composition and rhetoric but there should be in the classroom for reference, a number of these books and particularly Wooley's Handbook. Each teacher should have a copy of the 1916 Elementary Program of Studies and become familiar with the synopsis of grammar, given on pages 49 to 52. The teacher should remember that pupils come from the elementary schools in possession of this minimum and no additional grammar is needed for these two years. The teacher should hold this knowledge by use, and especially by use in the composition periods where the names and use of the parts of speech, the division of sentences and the forms of expression will constantly be associated with production.

In the composition periods, the rhetorical terms, *clearness, force, coherence, topic paragraph* will be in general use to denote characteristics that make composition clear and well understood. So, too, in the literature, the



names of the figures of speech and the technical terms in versification will be but the names for the forms of forceful expressions and of the rhythm of pleasing verse. They, however, are concrete illustration. The definitions are not known or the classification. The pupil knows that the third line of *Evangeline* has a simile that pleases him and which he repeats with pleasure, but he does not forthwith learn the seven forms of metonymy. In the same study, he delights to associate the name and the swing of the dactylic hexameter but he does not wish to classify all known forms of prosody.

### *English V.*

*The General Plan.* The division of time of this year may well be one period a week for the history of literature, two for grammar and rhetoric and two for literature. During the year the work in current history and literature will continue as before and there will be much reading in technical magazines and books connected with the pupil's interest and studies. All teachers will insist on correct work and it is hoped that but little personal drill is needed.

Manuals of American and English Literature should be studied but all parts omitted that have to do with authors or works which the class have not read or are not now reading. We should attempt to organize only the material that we have collected. The literature for the year should be closely connected with the history of literature and should consist of reading and study of the most important books of the writers whose lives are studied. Palgrave's *Golden Treasury* should be used and other compendiums which contain copious selections of illustrative literature.

During this year grammar should be reviewed and organized and all the elements of composition and rhetoric used in the practice of the earlier years should be classi-

fied and systematized. Pupils should be provided with some one of the textbooks on grammar, and on composition and rhetoric and should carefully study and follow these outlines.

*English in the Sixth Year.* In our present English courses we have sufficient material for not more than three years. This has long been the opinion of college entrance boards which allow but three units for the four years' work in English. Until we can do the work well it is not desirable to further extend the course. In any case, the work in current history for the senior year is an integral part of the required course in United States Constitutional History rather than of the English course, and so there is no break in the purposeful reading habits by pupils.

Schools which do not share in this belief may well divide the work outlined above for the third year between the third and fourth.

For the benefit of the pupils preparing for colleges whose entrance requirements are not met by the above suggestions, many of our schools would need for the present to give a fourth year in English, but this should be an optional or elective course to be taken only by those who need it to meet college demands. There should be much writing of long, formal compositions, a complete mastery of the definitions and nomenclature employed in rhetoric and in English literature. There should also be a word by word study of the classics on the college required list. There will, of course, be no time to attempt to make this course of educational value. It would be a definite preparation for college entrance.

#### *Bibliography.*

- Parker, "Methods of Teaching in High Schools."  
 Judd, "Psychology of High School Subjects."  
 "English Journal."

Huey, "The Psychology and Pedagogy of Reading."

Hall, "Pedagogy of Reading."

National Bureau of Education, "Reorganization of English in Secondary Schools."

Massachusetts Board of Education, "English for Grades VII, VIII and IX."

Halburton & Smith, "Teaching Poetry in the Grades."

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

Wooley, "Handbook of Composition."

Ayres, "Penmanship Scale."

Ayres, "1000 Commonest Words."

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## CHAPTER II.

### FOREIGN LANGUAGES.

Courses in Greek and German are not listed here as Greek has almost entirely disappeared from New Hampshire secondary schools and German has been dropped from most programs. Those who desire will find courses in Greek and German outlined in former programs.

#### LATIN.

##### *Aims.*

Since competent psychological experimentation has demonstrated the fallacy of the doctrine of formal mental discipline with unlimited transfer of training, and since the principle seems to be well established that no such general mental discipline exists, the presence of Latin in a school program must be justified on other grounds than as a means of mental discipline.

Most schools have modified their language teaching to conform to this principle and in Latin, as in all other

languages, teachers stress the development of ability to get the thought from the printed page. In each year of the course they are emphasizing sight translation and reading in Latin and are reducing the amount of time given to grammatical and syntactical drill.

In brief, the aims kept in mind in the following courses are that pupils may understand the life and the ideals of a notable people, foreign to them in time and race, and that they may profit by an intimate knowledge of the written memorials of these people. Throughout, the study is one of life and of literature.

#### *Standards.*

In this program, four Latin courses are planned and are assigned to Years III to VI of the reorganized six-year high school program. The courses will be taken by pupils who have preceded the study by two years of work in French and in these courses have taken sufficient interest so that they wish to choose a curriculum that directs them to further linguistic and literary study. The pupils who in these French courses have found their ability to lie in other lines will not elect a Latin curriculum.

Because of this selective restriction, and because of the two years of familiarity with a foreign language, progress in the Latin classes should be rapid from the first.

It has long been the custom in most schools to devote one day in five to Latin prose composition and much of this work has had no intimate connection with the subject matter of the translation days. Educationally, this plan was indefensible and in practice resulted in much time uneconomically spent. In progressive schools during the last few years, this amount of time has been very much reduced, since the excessive work in composition was designed to give proficiency in grammar and grammar is no longer held as a primary Latin end.

In the same classes, the larger part of the translation

time was often spent in tagging and classifying separate words under the name of syntax. This custom, too, is losing ground.

In our best classes, there is increasingly much silent reading, much thoughtful translation and much collateral study of the life that is mirrored in the literature read, with the result that the old quantitative standards set for these courses are found to be inadequate to measure reasonable work for these years.

It is evident that the standards should be materially raised and it is held that well organized schools, working under the plan of this program, can complete in three years all of the work set in translation for four years by the older plan. There will then be opportunity for a full year of additional reading.

1. No requirement is now set in prose composition, since classroom drill will in general be sufficient for the educational needs of the pupils. Schools which must meet special requirements with pupils for college entrance will, however, need to add formal work.

2. Standards of completion in grammar consist of all regular inflections, all common irregular verbs and syntax of prose authors read.

3. Fifty per cent., at least, of all reading should be sight reading. Selections should be read and re-read until pupils are familiar with the thought and can return fluent and satisfactory translations.

4. *Latin III*. A beginner's book, with at least thirty pages of connected reading.

*Latin IV*. An amount quantitatively equivalent to four books of Caesar and two orations of Cicero.

*Latin V*. An amount quantitatively equivalent to four orations of Cicero and six books of Vergil.

*Latin VI.* An amount quantitatively equivalent to at least the work of Latin V. The texts recommended are Cicero, Ovid, Livy, Horace, Tacitus, Pliny.

It is recognized that in schools where Latin is not preceded by French, the above quantitative standards are probably excessive and these may be substituted:

*Latin IV.* An amount quantitatively equivalent to five books of Caesar.

*Latin V.* An amount quantitatively equivalent to eight orations of Cicero.

*Latin VI.* An amount quantitatively equivalent to six books of Vergil, with 2,000 lines of Ovid.

In some schools, Latin may be given in place of French in Grades VII and VIII. No outline has been prepared for such courses but teachers may find helpful suggestions in the section on French for these years. The attempt in American schools to teach Latin as a spoken language, however, in imitation of conversational work in French is probably pedantic affectation.

### *Suggestions.*

It is found that extensive reading, with due insistence upon accuracy and idiomatic English, develops greater ability in thought-getting and in translation than is generally acquired through excessive attention to syntax.

Mastery of forms through intensive drill is imperative in first-year work. Much of this drill is best given by extensive reading of simple, well-graded story exercises. Work of this kind is particularly successful when stories are written by teachers to supplement the material found in beginners' books. The need of a particular class is best satisfied in this way because at the close of a period the teachers know what forms especially need numerous repetitions in the translation of the following day. By select-



ing stories and sentences from many first-year books, much material may be provided for sight translation from the blackboard or from printed sheets. Some schools are using material in the first year which is equivalent to all that can be found in five first-year Latin books.

If stories are so carefully graded that pupils are led by easy steps from one form of expression or principle of syntax to another only slightly more difficult, and if abundant practice in reading is provided, the task of greatest importance will be accomplished. Doubtless many first-year classes could read five or six times the amount they usually read.

In connection with sight translation, it is valuable to have the class read rapidly a story or selection to get the thought and have pupils give an outline of the essential points before giving a careful, detailed translation.

Rapid perception card drill for short intervals in class on forms and vocabulary is one of the best devices known for effective repetition and mastery of essentials and is advised for each year of the course. Pupils also should practice daily in study periods with small individual perception cards, using them as rapidly as possible.

A working vocabulary should be thoroughly known so that it will be necessary for the pupil to consult a lexicon very rarely when he is reading.

Energy should be spent on reading, on working out the meaning of words from known sources, on derivation of words—not on looking up in the lexicon the meaning of words that the pupil is capable of thinking out. Less finger exercise on the vocabulary and more active exercising of brain cells is needed in nearly every Latin class.

Attention to mythology, to historical and literary allusions enhances the pupil's interest and adds appreciably to his enjoyment both in school and in later life.

Prose drill at sight in class generally will be sufficient to meet the needs of pupils not preparing for college. The latter may be given additional prose work.

*Bibliography.*

Suggested material for reading :

*Latin III.*

Chickering's Latin Reader : Charles Scribner's Sons.  
 Nutting's Latin Reader : American Book Company.  
 Fabulae Faciles : Longmans, Green & Company.  
 Reynolds' Latin Reader : D. C. Heath & Company.

*Latin IV.*

Viri Romae.  
 Via Latina.  
 Eutropius.  
 Nepos, Lives.  
 Caesar, Gallic War, Civil War.

*Latin V.*

Sallust, Catiline, Jugurthine War.  
 Cicero, Letters.  
 Ovid Metamorphoses.  
 Vergil.

*Latin VI.*

Vergil.  
 Cicero, de Senectute, de Amicitia.  
 Ovid, Fasti, Tristia.  
 Livy, Books I, XXI, XXII.  
 Horace, Odes.  
 Tacitus, Agricola.  
 Pliny, Letters.

Other books good for beginners are :

Smith : Allyn & Bacon.  
 Perkins : Benjamin H. Sanborn & Company.  
 Ritchie's First Steps : Longmans, Green & Company.  
 Barss : D. C. Heath & Company.  
 Collar, Daniell & Jenkins : Ginn & Company.  
 Kirtland & Rogers : D. Appleton & Company.

Good direct-method books are :

- Chickering: Charles Scribner's Sons.  
 Primus Annus: Oxford Press, New York.  
 Decem Fabulae: Oxford Press.

FRENCH.

*Aims.*

The aim of instruction in a modern foreign language is highly complex. To one group of students fluency in speaking the language will prove of special value; to another, ability to read foreign newspapers and periodicals in connection with literary, artistic, or scientific pursuits; to a third, so thorough a reading knowledge as to make the study of the literature a source of profit and pleasure; to a fourth, facility in writing the language for commercial purposes.

Whatever be the appeal to the student because of his special needs or aptitudes, the successful study of a foreign language gives him a new point of view toward his mother tongue. He acquires a better understanding of its structure. He increases his working vocabulary, and as he becomes more sensitive to shades of meaning through comparison and discrimination, he develops greater precision in the relation of words to thought.

In recent years the tendency has been to emphasize the utilitarian, rather than the cultural or disciplinary, values in the study of a foreign language. The fact remains that power and breadth are to be derived from such study, and that it should be carried on in such a way as to furnish means of development and to add to one's life a permanent intellectual interest.

One great purpose of foreign-language study is to create so deep an interest in the country, its people, literature, history, and civilization that the student may be led to broaden his acquaintance with the country after finishing his school course. His study of the country should inspire

him so to apply the lessons learned from it that he may better understand the problems of his own country and be better prepared to do his part in solving them. In other words, because of his study he should become a better American citizen.

The concrete aim of the teaching of French in the junior and the senior high schools may be best expressed in the words of the originators of the reform method: "Correct pronunciation, reading ability developed by means of speaking facility, with grammar as a means and not as an end."

While ability to speak is to be regarded as secondary to the ability to read, it is unjustifiable and unnecessary for a pupil to spend from two to four years on the study of French and not be able to express orally simple thoughts in an intelligible manner.

#### *Summary of Aims.*

1. To pronounce the language with sufficient accuracy to appreciate its beauty and to catch its spirit.
2. To acquire a live, working vocabulary that can be used in conversation and in reading.
3. To understand the structure of the language.
4. To obtain a better command of English.
5. To acquire the habit of reading French outside the classroom.
6. To lay a basis for the appreciation of French literature.
7. To study sympathetically the life and history of the French people in France and in America.
8. To broaden the student's horizon and make him a better citizen.

#### *Standards.*

The student who begins French in the junior high school and continues it during four years should at the end

of this period obtain a sufficient mastery of the language to enable him:

1. To read aloud correctly and fluently ordinary French.

2. To carry on a simple conversation.

3. To read understandingly and without translating a passage of ordinary narrative or easy description. Ability to do this is to be tested by a *résumé*, preferably in French.

4. To translate accurately, not literally, into English the thought expressed in a passage of medium difficulty.

5. To explain the usual grammatical constructions involved in conversation and reading.

6. To write with approximate correctness from dictation, to transcribe simple conversation, and to write with reasonable accuracy a letter or a free composition on a subject requiring only an everyday vocabulary.

7. To show a reasonable knowledge of French customs and of the leading characters and events of French history, including the experiences and achievements of the French in America.

#### *Reading Requirements.*

8. *French I*: fifty to one hundred pages.

*French II*: two hundred pages.

*French III*: four hundred pages.

*French IV*: six hundred pages.

#### *Suggestions.*

#### DIRECT METHOD.

While it may be argued that the teaching of a foreign language for practical uses only or for cultural ends exclusively is not justifiable, it must be admitted that when the language is taught in such a manner as to serve both purposes, the time given to such study is well spent. To accomplish the aims of the French course and to meet the

standards prescribed, a direct method should be employed. The teacher should choose a form of direct method which, when rightly used, will combine all the advantages claimed for the various grammar, translation, or natural methods. The method should also be adapted to the age of the pupils. It should capitalize the dramatic instinct of the adolescent and his desire to speak a language other than his own. The study of a foreign language in the junior high school follows naturally and supplements the work in English of grades five and six.

The work of the first year must be taken slowly and thoroughly. At the beginning practically all of it must be done in the classroom to avoid inaccuracies. The chief objection to most direct method teaching, even when done by teachers who have complete mastery of the language, is that it lacks definiteness and is therefore conducive to superficiality. The teacher must keep a careful and detailed record of the ground covered and make the work cumulative. In no other way is it possible to lay a broad and solid basis for future work in the language. The main purpose of the instruction of the first two years is the formation of habit, not the acquiring of information. We must teach the language and not about the language.

Two distinct types of direct method are in common use:

(1) The object method, which is largely descriptive. The conversation centers about people and objects found in the classroom, school, home, street, etc., with the introduction of details as to size, number, color, etc. If this plan is followed, the nouns should be used immediately and constantly with verbs other than *to be* or *to have*.

(2) The series method, which is distinctly narrative and lays the emphasis on the verb. At first the various acts of the series are expressed in the first person singular of the present tense and are arranged chronologically. Each sentence answers the question, "What happens next?" The pupils learn the series by heart, reciting it singly and in concert. So far as is possible the action expressed in each



verb is performed or imitated as the sentence is said. When the use of the first person is mastered, the series is repeated with a change of person and, when necessary, with a corresponding change in the form of the verb. Later each series is used with a change of tense, addition of adjectives and adverbs, and various other modifications. By this method conversation and practical grammar are taught at the same time.

### *Conversation.*

The primary receptive organ of speech is the ear. Therefore, the speaking of a language furnishes the natural and logical approach both to reading and writing.

Conversation arouses immediate interest and, if continued faithfully, proves the best means of sustaining it. Because of the opportunity for self-activity and self-expression on the part of the pupils, the socialized recitation follows as a natural consequence. The study furnishes its own motivation.

All directions should be given in French and, whenever reasonable, should produce an oral, as well as physical, reaction from the members of the class. The pupils should be required to give French answers to questions asked in French. This is practice in real composition. After a few weeks French should be the language of the classroom. The pupils should be permitted to use French only, in speaking to one another while in the room and should be encouraged to keep up the practice whenever they meet. A French club is easily organized and managed and is a great help in fostering conversation. The enthusiastic teacher who is prepared for her work and is consistent in the matter of speaking French in the class and, whenever possible, outside the class, will find no lack of enthusiasm.

Class work in conversation must not be haphazard. It must be purposeful and must proceed by logical steps. At first the pupils' answers to questions should be in the exact words given them by the teacher.

Common sense will suggest to the teacher when it is wiser to use English than to waste an undue amount of time over explanations in French. It will usually be advisable to restate the matter in French for the sake of the final impression.

After reading has begun, the conversation should be based on the text. At first, questions will be so framed that the answers may be in the exact words of the passage read. Complete sentences should be required in all answers. As soon as the class has mastered a set of questions and answers orally, they should be written on the board by the teacher for the pupils to copy into their notebooks. The questionnaire thus obtained should be used for further oral practice and for written work, including dictation.

#### *Pronunciation.*

One of the strongest arguments in favor of the introduction of foreign-language study into the lower grades is the greater ease with which children learn to pronounce correctly. While greater facility could undoubtedly be thus obtained, the majority of children from twelve to fourteen years of age have vocal organs sufficiently plastic and are still sufficiently imitative and lacking in self-consciousness to justify the delay.

Careful attention to the pronunciation of French is essential for several reasons:

(1) The learner is forced to adopt some sort of name for each combination of letters that he sees, whether he says the word silently or audibly. The forming of a correct habit at the start (a) makes the acquiring of a satisfactory pronunciation of French entirely possible, (b) obviates the necessity of the teacher's irritating and futile interruption of reading to correct mistakes during the later stages of the course, (c) saves an incalculable amount of time, (d) prevents the pupils from becoming discouraged.

(2) The interest of the pupils is far greater. The beauty of the spoken language is one of the teacher's greatest assets and should not be lost. It makes a strong appeal to the adolescent. Furthermore, boys and girls seem to know instinctively whether their French sounds like French and gauge their interest accordingly. Unless it is well pronounced, the spirit of the language is largely lost.

(3) If the pupil is to understand spoken French or make himself understood by French people, he must have an adequate pronunciation.

### *Phonetics.*

The teaching of pronunciation should rest upon a strong phonetic basis. This is a fundamental principle as well as one of the chief characteristics of direct-method teaching. The thoroughness with which the sounds of the language should be taught cannot be overemphasized. In teaching pronunciation, the American teacher, who has a good working knowledge of phonetics, may easily prove superior to the native teacher who does not understand the difficulties encountered by American pupils. Young children are able to catch the sounds by imitation, but those of junior high school age or over must be taught the conscious use of the organs of speech.

While every pupil must receive individual attention, drill in concert, especially on new sounds, is strongly recommended. The drill in unison should not continue so long that some of the members of the class will acquire the habit of letting the rest of the class do all the work. Daily practice during the first half-year should be given on vowels, syllables, words, breath-groups, and sentences, and special attention paid to intonation. Until sufficient drill has been given to make the pronunciation of the French sounds and their combinations absolutely automatic, the class should not see a French word or even a letter. The

greatest obstacle to acquiring a correct French accent is the visual resemblance of French to English, since there is not a syllable in French that has an exact oral counterpart in English.

When the class has thoroughly mastered the formation of the sounds and when a sufficient knowledge of the spoken language has been obtained to make the beginning of reading and writing advisable, time should be taken for the transition from oral to written work.

*Transition Period.*

This is the crucial point in the plan thus far outlined. If the transition is not successfully made, much of the value of the phonetic drill will be lost. The following is suggested as a mode of procedure:

The teacher names a vowel sound, has the class repeat it after her, and then writes on the board the letter or combination of letters composing the sound. The class names the sound again. A second sound is taken up in the same manner. The exercise continues in this way until all the vowel sounds and combinations, including nasals, have been written by the teacher and pronounced many times by the class. After a sound is written, the teacher reviews the sounds already represented on the board. The next step consists of drill on vowel sounds in combination with consonants. At this point the French alphabet should be learned, to lay a basis for spelling in French. Practice should be given in naming both vowels and consonants as the teacher writes them on the board, singly, in syllables, and in easy words. All the French that has been learned orally and has become a means of expressing thought should be reduced to writing by the teacher and copied by the pupils into their notebooks. At first the teacher will write the materials in the presence of the class, requiring the pupils to read with the same accuracy of sound-formation and intonation that they have been accustomed

to use before seeing French. The material of the notebooks will be used for practice in reading and for dictation.

After the writing point has been reached, great emphasis should be placed on the division of words into syllables both for the sake of pronunciation and to avoid difficulty in spelling. The French names of the letters should be used from the start, and care should be taken that they are properly uttered.

The memorizing of poems, songs, and anecdotes is recommended for their value in perfecting pronunciation and in rendering the spirit of the language.

*Phonetic symbols should not be used with the class*, but the teacher should be sufficiently familiar with them to be able to read the transcription employed by the International Phonetic Association.

### *Reading.*

In teaching children to read their mother tongue, it has been found that the emphasis at first should be upon thought rather than form. The same is true in the case of a foreign language. If the transition from oral to written work described under the section on Phonetics is successfully made, a long step has been taken toward reading without translating. The French learned orally becomes the first material for reading.

The use of pictures will be found helpful. By carefully prepared questions the teacher will utilize the French already acquired by the class to bring out as much as possible of the story contained in the picture, adding such details as she desires. She will then write the story on the board, the pupils reading each sentence aloud as soon as she has written it and later copying it into their notebooks. The recitation of the next day will be upon this story. It will consist of oral and written answers to questions. On another day the story will be told or written from memory.

If the teacher is not prepared to use conversation as the approach to reading, she will choose a book carefully arranged for beginners and containing an interesting story with questions and grammatical drill based upon it. She will permit as little translation as possible, especially at first.

By a strictly direct method in a four years' course a text would not be introduced before the end of the fourth or fifth month. Every book chosen should be thoroughly French and deal with the life of French-speaking people.

After sufficient practice in reading the pupils will prepare and ask their classmates questions on a passage read and later on an episode or a whole story. This kind of work leads naturally to the giving of oral and written summaries.

Reading should be both intensive and extensive. It should be interesting to the pupils and varied in character. Fiction, plays, and history should be represented in the choice of texts.

After the second year, supplementary reading should be done outside of class. This reading should be done for the sake of the story. The pupils should be instructed to look up only the words necessary to get the sense or which arouse interest as to their meaning. In Class III there should be at least two hundred pages and in Class IV three hundred pages of supplementary reading in addition to the regular requirement.

Every class that has had French a half-year or more should have access to French newspapers and magazines. These may be profitably used as sources of material for conversation and reports. In the daily exercises of French classes there should be reports by teacher and pupils of current French history. The teacher who limits her work to the study of French language and French literature, misses a great opportunity.



*Translation.*

*French into English.* After the habit of thinking in French is firmly fixed, frequent translation into idiomatic English should be required. It should not be looked upon as a method of teaching reading but as a means of testing the pupil's understanding of the text. The teacher should never hesitate to call for the translation of a passage if she has any doubt as to the pupil's taking in the thought.

Translation affords excellent training in the choice of words. It may be extremely valuable as an exercise in English and should be correlated with the work of the English department of the school. From time to time written translations should be passed upon by the teacher of French for accuracy of thought, and by the teacher of English for the form of expression. If teachers of French bear in mind constantly that they are teaching a living tongue and not dissecting a dead body of language facts, they will be in little danger of overdoing translation.

*English into French.* There should be very little translation from English into French, as this process is the greatest hindrance to acquiring the habit of thinking in the foreign language. Students preparing for college examinations must be given special training in so-called composition during the last year of their course. This should be based on passages of simple idiomatic French. Constant practice in oral and written French is the best drill in real composition.

*Grammar.*

In the direct method, grammar is not neglected. It is not taught as a separate science with disconnected sentences invented to illustrate rules, but is made to serve as a guide to correctness of expression. To this end it must be taught inductively. From the first lessons changes in grammatical forms are introduced, and the habit of using correctly different persons, numbers, genders, tenses, nega-

tives, etc., is acquired. A few points taught slowly and mastered thoroughly are of more value than much ground covered hastily. After the pupils have become familiar with correct French, they are led to discover the principles and formulate the rules of construction. Before the end of the course the principles and rules should be systematized and reviewed. For this purpose a formal French grammar will be found of value.

### *Dictation.*

No other single exercise has the potential value of dictation. It combines ear-training, thought-getting, and the application of grammatical principles. From the time the class begins to write, there should be almost daily practice in this exercise throughout the course. At first it should consist of questions and answers or connected passages carefully studied. After the second year both prepared and unprepared dictations are desirable.

### *Accessories.*

The following illustrative material is suggested: books of songs, lantern slides, photographs, foreign post cards, maps, plans of cities, wall pictures showing French scenes and architecture, copies of works of art, illustrated books, reviews, and newspapers.

The use of the phonograph is recommended, not for any of the so-called language-phone methods, but to reproduce French songs and especially recitations by masters of French diction.

Correspondence with French students is highly valuable when each student writes carefully in his own language.

The desirability of forming French clubs has already been mentioned. Games, charades, and simple plays may be used to stimulate interest and furnish practice in speaking French.

*Bibliography.*

The books listed here are in no way prescribed but are merely suggested for use with a direct method.

## BEGINNERS BY OBJECT METHOD.

Batchelor: *Mon Premier Livre de Français* (Clarendon Press).

Dubrulle: *Le Français pour Tous* (Ginn).

Walter and Ballard: *Beginners' French*, revised edition (Scribner). (For beginners in senior high school.)

## SOURCE BOOKS FOR SERIES METHOD.

Gouin: *Art of Teaching and Studying Languages* (Longmans, Green).

Thémoin: *Premier et Deuxième Livres pour les Enfants; Cours de Français pour Adultes* (Hachette).

## METHOD BASED ON READING.

Méras: *Le Premier Livre; Le Second Livre* (American Book Co.).

## BOOKS CONTAINING MATERIAL FOR TEACHER'S USE WITH CLASS.

Alge, Rippman and Buell: *First French Book* (Newson).

Armand: *Grammaire Élémentaire* (Heath).

Bruce: *Dictées Françaises* (Heath); *Grammaire Française* (Heath).

Frazer and Squair: *French Grammar*, complete edition (Heath).

La Fontaine: *One Hundred Fables* (Ginn).

Larive et Fleury: *La Deuxième Année de Grammaire* (Colin, Paris).

Rippmann and Buell: *French Daily Life* (Newson).

Super: *Anecdotes Faciles* (Heath).

*Chansons de France and Vieilles Chansons et Rondes* (Plon, Paris).

*Reading.*

## FIRST YEAR.

- Ballard: Short Stories for Oral French (Scribner).  
 Bierman and Frank: Conversational French Reader  
 (Allyn & Bacon).  
 Bruce: Lectures Faciles (Heath).  
 Capus: Pour Charmer n<sup>os</sup> Petits (Heath).  
 Guerber: Contes et Légendes, Part I (American Book  
 Co.).  
 Malot: Sans Famille in Le Premier Livre (American  
 Book Co.).  
 Méras and Roth: Petits Contes de France (American  
 Book Co.). (Or first half of second year.)  
 deSégur: Les Malheurs de Sophie, edited by Bement  
 (Sanborn).  
 Snow and Lebon: Easy French (Heath).

## SECOND YEAR.

- Benton: Easy French Plays (Scott).  
 Bruno: Le Tour de la France (American Book Co.),  
 (Heath), (Holt).  
 Daudet: Le Petit Chose (Heath); Neuf Contes Choisis  
 (Holt).  
 David: Chez Nous (Holt).  
 Duprès: Drames et Comédies (American Book Co.).  
 Fontaine: En France (Heath).  
 François et Giroud: Easy French Reading (Holt); Sim-  
 ple French (Holt).  
 Génin: Le Petit Tailleur Bouton (Heath).  
 Halévy: Labbé Constantin (American Book Co.),  
 (Ginn), (Heath), (Holt).  
 Labiche et Martin: Le Voyage de Monsieur Perrichon  
 (American Book Co.), (Ginn), (Heath), (Holt); La  
 Poudre aux Yeux (American Book Co.), (Heath), (Holt).  
 Lazare: Contes et Nouvelles (Ginn).  
 Porchat: Le Berger et le Proscrit (Clarendon Press).  
 Super: French Reader (Heath).

## THIRD YEAR.

About: *Le Roi des Montagnes*, abridged edition (Holt).  
 Allen and Schoell: *French Life* (Holt). (Basis for conversation.)

Bazin: *Le Blé qui Lève* (Holt).

Coppée: *On Rend l'Argent* (Ginn).

Cramer: *Ça et Là en France* (American Book Co.).

Daudet: *Tartarin de Tarascon* (American Book Co.), (Ginn), (Heath).

Eckmann-Chatrion: *Le Conscrit de 1813* (Heath), (Holt).

France: *Le Livre de Mon Ami* (Holt).

Laurie: *Mémoires d'un Collégien* (American Book Co.).

Lavisse: *Histoire de France, cours élémentaire* (Heath).

(Recommended for careful study; could be *read* in second year.)

Mairet: *La Petite Princesse* (American Book Co.).

Mérimée: *Colomba* (Ginn), (Heath), (Holt).

Osgood: *La France Héroïque* (Heath).

Scribe: *Bataille de Dames* (Heath).

## FOURTH YEAR.

Bazin: *Les Oberlé* (Heath).

Dumas: *Le Comte de Monte Cristo* (Holt); *La Tulipe Noire* (Heath).

France: *Le Crime de Sylvestre Bonnard* (Holt).

Hugo: *Quatre-Vingt-Treize* (Holt); *Les Misérables* (Holt).

Lamartine: *Jeanne d'Arc* (Hachette).

Loti: *Pêcheur d'Islande* (Heath).

Maupassant: *Huit Contes Choisis* (Heath).

Moraud: *Sous les Armes* (Holt).

Sandeau: *Mlle. de la Seiglière* (Holt).

Super: *Histoire de France* (Holt).

Verne: *Tour du Monde en Quatre-Vingts Jours* (Heath).

deVigny: *La Canne de Jonc* (Heath).

## PEDAGOGY AND REFERENCE.

Bahlsen: *The Teaching of Modern Languages* (Ginn).

Breul: *The Teaching of Modern Foreign Languages* (Cambridge, Univ. Press).

Geddes: *French Pronunciation* (Oxford, Univ. Press).  
An excellent, practical treatise.

Gouin: *Art of Teaching and Studying Languages* (Longmans, Green). Should be read and studied by every teacher of languages.

Handschin: *The Teaching of Modern Languages in the United States* (Bureau of Education, No. 510). Historical treatise with exhaustive bibliography.

Jespersen: *How to Teach a Foreign Language* (Macmillan).

Jousset: *La France géographique illustrée* (2 vols.) (Larousse, Paris).

Krause: *Direct Method in Modern Languages* (Scribner). A strong plea for direct method.

Larousse: *Petit Larousse Illustré*. (An all-French dictionary.)

*Methods of Teaching Modern Languages*, edition of 1915 (Heath). Especially important chapters by Wm. B. Snow, pp. 109 and 144; W. R. Price, p. 124; E. Spanhoofd, p. 207.

Passy-Hempl: *International French Dictionary* (Hinds, Noble). Pronunciation indicated in phonetic transcription.

Rousselot et Laclotte: *Précis de Prononciation Française* (Weller, Paris). A thoroughly scientific exposition of standard pronunciation.

Walter: *French Lessons*. A demonstration of the direct method (Scribner).

Yersin, M. and J.: *Phono-rhythmic Method of Pronunciation* (Lippincott). Popular and practical.

## CHAPTERS FROM EDUCATIONAL TREATISES.

Hollister: *High School and Class Management*, XVIII (Heath).



Inglis: Principles of Secondary Education, XIII (Houghton, Mifflin).

Johnston: High School Education, XIV (Scribner).

Judd: Psychology of High School Subjects, X (Ginn).

Monroe: Principles of Secondary Education, XI (Macmillan).

Snedden: Problems of Secondary Education, XIV (Houghton, Mifflin).

#### SPANISH.

The elimination of German courses in high schools has opened the way for a second foreign language in school programs. Spanish has a worthy literature and is with English the great language of the Americas. When introduced in the lower classes of secondary schools, the pedagogy should follow closely the suggestions given for similar French courses.

In this program, two courses are planned for boys of the upper years of the Commerce and Business curricula. The design of these courses is to familiarize boys, who are preparing for business and clerical positions, with the commercial language of Central and South America. A necessary part of these courses should be much study of the history, the geography and the life of the countries of Spanish America.

There should be extensive reading and the following standards are tentative only:

*Spanish V*: 300 pages.

*Spanish VI*: 500 pages.

## CHAPTER III.

## SOCIAL SCIENCES.

## HISTORY AND CIVICS I AND II.

*Aim.*

These courses aim to appeal strongly to the idealized imagination of children in the beginning of the adolescent period. The courses center about (1) great leaders, (2) dramatic deeds, (3) manners and methods of living, and concern themselves little with formal outlines, with cause and effect, with presidential administrations and with logical development.

By stories, study, pictures and dramatization, the teacher leads the boy through the heroic past of history while he relives heroic deeds and in his day dreams is Raleigh throwing his coat before the majestic queen or Balboa looking over the uncharted sea, "silent upon a peak in Darien," and the girl is Priscilla at the wheel or Pocahontas in the lodge of her tribe. By study, observation and participation, the teacher of civics brings her pupils to realize their intimate connection with, and participation in, the life of the community and the state.

*Standards.*

1. The careful study of the history of the United States.
2. The weekly study of current history.
3. The study of the government of town or city, of state and nation.
4. The reading of the constitution of the state.

*Suggestions.*

1. An adequate outline for this course is printed on pages 94 to 104 of the elementary program. It does not seem necessary to repeat it here but throughout additions

should be made to make clear the vital part New Hampshire has played in the nation's story. The following topics and others should be added to the outline under the sections indicated:

Grade VII: I, John Smith and the Isles of Shoals. II, The Scotch-Irish in Ireland and New Hampshire. III, The New Hampshire Indians, their villages, chiefs and life. IV, Beginnings of the Vermont-New Hampshire boundary dispute. New Hampshire's iron mines. Waldron. Rogers. Stark. Sullivan. Langdon. Belknap. William Pepperell at Louisburg. V, Colonial life in New Hampshire. New Hampshire border towns through one hundred years of Indian warfare. Grade VIII: I, New Hampshire tea parties. The pine tree riot. The capture of Fort William and Mary. Bunker Hill. The New Hampshire grants. II, The New Hampshire loyalists. III, Financial difficulty in New Hampshire under the confederacy. Attempted secession of New Hampshire towns. V, New Hampshire canals and post roads. VII, New Hampshire railroads and the coming of the Irish. VIII, The war factories and the coming of the French Canadians. XII, Immigration from the Mediterranean states.

In these courses teachers must lead classes to a sympathetic interest in all races which form the citizenship of our new New Hampshire. From the texts and from the instruction must be eliminated all references or statements which would perpetuate suspicion, distrust or hatred that exists between nations and has been fostered by some teachers and some books against the mother country, England, or the great northern sister, Canada. Classes should also be taught the heroic history and the inspiring ideals of the newer racial elements of our state: as the Irish, the Canadian French, the Greek, the Italian, the Scandinavian, the Lithuanian and the Armenian. It is recognized that schools should devote a week or more to the study of the states of Central and South America, and at least two weeks to the study of Canada that broader interests may

be developed in the greater America. The teacher can find material in the *Geographic Magazine*, in books of travel, in Shepherd's Latin America and in the History of Canada published by the Department of Education at Toronto.

2. The current history, which must be a part of the work of years I and II, may well be combined with the history of these two years. In this connection elementary geography is to be retained and made vital. The school-room atlases and maps should be used to locate all places under discussion.

3. There are now upon the market a number of interesting texts, entitled "Community Civics." These should be introduced for reading and discussion but the instruction should lead to the book and not from it. It should be based upon the political and civic affairs of the town where the children live. The spring repairing of local roads, the preparation of the family inventory for the use of the assessors, the health officer as he enforces vaccination, give the proper start toward the teaching of transportation, taxation and public health and make intelligible the discussion of texts available for class use. During the year the alert teacher can find in local activities the proper approach to all the subjects generally listed under Civics.

4. The law requires the reading of the constitution of New Hampshire and of the United States during the last year of this course. The spirit of this requirement may be met if the class is led to an interest in the responsibilities and work of the legislative, executive and judicial departments of the state. This may be done in part by visits to the state capitol and to state institutions, and in part by well-prepared expositions by the teacher.

#### HISTORY OF CIVILIZATION III.

Since satisfactory courses in ancient history, European history and English history are outlined at length in the secondary program of 1915, they are not repeated here as

they are available for all schools that wish to continue to give these courses. Most pupils have in their upper high school only two history courses, one in ancient history and the one in United States constitutional history. For this reason it has seemed best in this program to reorganize the course in ancient history into the course in history of civilization which follows.

#### *Aim.*

This is a first-year course in history designed to cover the whole historic field and to show from what sources, by what means and through what experiences man has come to his present degree of civilization. It will naturally be followed by the sixth-year course in constitutional history, a course which shows the development and application of our ideals of representative government and personal freedom.

#### *Standards.*

1. The completion of a satisfactory textbook of ancient history and one of European history with the additions and exceptions given below.
2. Supplementary reading at least equal in amount to the textbook work.
3. Board and map work.
4. Constant reference to events of modern history.

#### *Suggestions.*

The study should center upon:

- A. The lives and deeds of great leaders.
- B. Dramatic incidents and romantic movements.
- C. The lives of the peoples who have contributed to our civilization.

Each pupil should be provided with a good ancient history and a good medieval and modern or European his-

tory. In addition the room should be furnished with many of the simpler histories, biographies and books of travel. It should also have maps, atlases and magazines of current history and geography, as the *Geographic Magazine*, *Travel* and the *Literary Digest*.

Class assignments should be topical and in conformity with the chapter on "The Teaching of Any Topic" as given in this program. The books in the hands of the pupils should not be studied page by page and the "recitation" ought to occupy less than one-third of the time. Much of the material in these books should be omitted so that the teacher may select the parts suitable for the work of this year. After preparation the teacher, orally, should present the new topic, should direct the class to the proper sources and should guide pupils in their study. The vocabulary of the ordinary textbook in ancient history or European history is beyond the comprehension of first-year classes.

Every teacher should also have the detailed outline of this course, with accompanying bibliography, given in Institute Circular No. 90.

### *I. The Beginnings of Culture, 10 periods.*

*A. The Tree Dwellers.* Show here how man separated himself from other animals by inventing language and simple tools and bequeathing these to his descendants. It was the period of the individual.

*B. The Cave Dwellers.* At this time man invented fire and clothing. The cave life made society desirable, produced the clan and modified man's physical form.

*C. The Lake and Sea Dwellers.* Man found a new source of food supply and overcame the barriers that had confined him to a restricted home.

Sufficient material for the above topics will be found in elementary readers, in the introduction to various an-



cient histories and in books of travel, geographical readers and magazines. In each case the approach should be through the backward peoples of today who live under these primitive conditions. Then it should be shown that this condition was once universal.

## II. *The White Race, 10 periods.*

A. *The Herdsmen.* Consider the domestication of animals as told in the introductory chapters of ancient histories and in the encyclopedias. Show the changes in bodily form that evolution and domestication have brought to the horse and the dog. Study the life of the herdsmen of our own western plains and of Australia, also that of the Arabs and the South African cattlemen. Recall the Biblical stories of tribal life. This period developed from the clan, the tribe, ruled by a patriarch and by making constant the supply of food, rendered advance in culture possible.

B. *The Temperate Lands.* The beginnings of civilized life were doubtless in the tropics where the struggle for natural existence was easy but the time came when restless and ambitious men having forced their way into temperate lands found there conditions of life that made rapid advance possible.

C. *The Farmer.* Study the work of Luther Burbank and others who show how foods and fruits are developed from wild stocks. Recall the history of the potato, tobacco and Indian corn. From the encyclopedia and other sources teach the origin of our common fruits and vegetables. Then show that the domestication of plants first made possible a fixed home and the permanent family as we know it now.

D. *To Europe.* In this way a white race had developed in the temperate lands of West Central Asia. This stock multiplied and from this source spread as the more

vigorous families set out to find land for new homes. Some went south into India,—the Hindus,—some south-west into Persia, some west through Asia Minor and founded the southern European nations. Still others went west, north of the Caspian Sea and, as Franks, Teutons and Slavs, became the ancestors of the northern European people. Compare with this the settlement of this country on its seaboard by different races and the gradual winning of the west by migrating families.

### III. *The Other Races, 5 periods.*

A. *The Black Race.* Make some study of the African negro. He has language, fire, simple tools and some domesticated plants and animals but he has remained in the enervating tropics and has been distanced by the white race. His contribution to our civilization has been labor, sometimes free but often slave.

B. *The Yellow Race.* Several days should be spent in making plain that the yellow race has developed a civilization different and distinct from the white race. This civilization has contributed little to our own as the two have seldom come in contact.

### IV. *The Early Nations, 15 periods.*

A. *The Egyptians.* Study particularly the geographic reasons for an early advance in civilization in Egypt. Study also the life of this people, their religion, pyramids, tombs and customs.

B. *The Assyrians and Others.* The special study is of the buildings, the cuneiform writings and the religious ideas that influenced the Hebrew faith and persisted as medieval superstitions.

C. *The Hebrews.* The study of these periods should center about Abraham and the patriarchs, about Moses

and the Exodus and about David and Solomon. Make it evident that the great gift of this race to civilization has been religion. From the Hebrews have come two great religions of today,—Judaism and Christianity,—and from the Semitic cousins of the Hebrews—the Arabians—has come the Mohammedan religion.

*D. The Phoenicians and Others.* They were the first navigators, the first international traders and they gave us our alphabet.

*V. The Greeks, 20 periods.*

*A. Early Society.* This should be a study of the life depicted in the Odyssey. The teacher should select appropriate passages and tell them to the class and the class should read extensively in Palmer's Translation.

*B. Spartan Life.* Briefly present the ideals and customs of the Spartans.

*C. Athens.* Center this study about (1) the dramatic events of the Persian Wars and the leaders Miltiades, Themistocles, Aristides. (2) Pericles and his splendid city. (3) Alcibiades and the Civil War. (4) Great men, thinkers and writers as Socrates and Demosthenes.

*D. Philip and Alexander.* Spend much time on the stories that cluster about these two men.

*E. The Greek Contribution.* Determine that the contribution of the Greeks is in art, literature and ideals of personal freedom.

*VI. The Romans, 20 periods.*

*A. The Early People.* Read Macauley's Lays of Ancient Rome to understand the simple life of a sturdy people.

*B. Hannibal and the Carthaginian Wars.*

C. *Caesar, Master of Men.*

D. *Augustus, the Emperor.*

E. *The Roman Contribution.* Determine that the contribution of the Romans was of their ideals as builders, conquerors, rulers and law givers.

VII. *Christianity and the Hebrew Genius, 5 periods.*

A. *Paul, the Missionary.*

B. *Christianity feared and hated.*

C. *Christianity triumphant.*

D. *The Hebrew Race.* Teach this people as an honest, frugal, home-loving people of high spiritual ideals. They have shown to the world ability in business, commerce, finance and literature.

VIII. *The German Tribes, 5 periods.*

Teach these as wild, virile, restless people with ideals of war and of personal liberty and with high respect for home and the family. Show also that they were drunkards, gamblers and barbarians. Read the first chapter of Taine's *History of English Literature*. Teach their migrations and the destruction of Rome.

IX. *The Arabians, 3 periods.*

A. *Mohammed and the spread of his faith to the Battle of Tours.*

B. *Culture in Spain.* Read the *Alhambra*.

C. *Notation, algebra and astronomy.*

X. *The Dark Era, 17 periods.*

A. *Charlemagne and the Franks.* Use the material in *Eginhard's Life*.

*B. Feudalism.* Read the Idylls of the King and Ivanhoe. Teach ideals of chivalry.

*C. The Medieval Church.* Its splendid cathedrals, the friars and the monks.

*D. The Crusades.* Teach as a great dramatic event. Show what the returning knights brought to Europe from the civilization of the east.

*E. The Great Awakening.* Center this work entirely around inventors, discoverers and reformers, men like Bacon, Copernicus, Galileo, Luther, Loyola.

#### *XI. National Heroes and Modern Nations, 50 periods.*

In each case the genius of each people should be studied through the ideals of national heroes, the present national position and character should be determined and the contribution to civilization recognized.

*A. The French.* (1) Louis XIV and the Empire. (2) The rise of the people and the French Revolution. (3) The cherished ideals of "Liberty, Equality and Fraternity" which solidified the nation during the world war. (4) Napoleon, the Great. (5) The France of Today: Its ideals and part in the war.

*B. The English.* (1) Alfred, the Great. (2) The wresting of power from king and baron. (3) Ideals of the sacredness of chartered rights which caused a nation to rise in indignation at the invasion of Belgium. (4) The British Empire. (5) Modern England: Its ideals and aims in the war. (6) The Scotch and Irish and their contribution.

*C. The Germans.* (1) The Germans and Frederick, a genius in war, unscrupulous, a patriarchal monarch. (2) The Prussians and Bismarck, the empire builder. (3) The Hohenzollerns and William, the war lord. (4) The Germany of 1914.

Note from the above the persistent ideals of systematic obedience, of war glory, and of success at any price which explain Germany's attitude in the great war.

*D. Peter the Great and the Russians.* Peter represents his people: Young, masterful, simple in tastes, avaricious in desires. Show that the present Russian Revolution is the natural conclusion of his efforts.

*E. Columbus and the Spaniards.* The colonizing ideal and an impoverished nation.

*F. Cavour, Garibaldi and the Italians.* Study Italian unity and the present conflict for "Italia Irredompta."

*G. Belgium, the country that gave all.*

*H. The Republics of Central and South America.* Study their racial origin, history and present condition.

*I. Canada.* Our great sister of the North.

*J. American Ideals.*

## *XII. The Great War, 10 periods.*

Study its origin and its story. Show how the ideals and aspirations of the different nations led each to enter the war. Show that this is a world-old conflict for the freedom of nations and the right of individual thought and personal dignity. It is the same contest that animated the Greeks in the Persian Wars, the French in their Revolution, the English in gaining their charters, the Americans in 1776 and the Italians in assuming nationality. Teach that this conflict must be fought again and again and that "eternal vigilance is the price of liberty."

*XIII. Peace, 5 periods.* Study the crushing of the power of Germany and her allies, the terms of peace and the work of the peace conference.



*XIV. Character of Modern Nations and Their Contribution to Modern Life, 5 periods.*

The purpose here is to round up the course by giving pupils a sympathy for other peoples, an understanding of their ideals and an appreciation of their contribution to the world's culture, as: (1) The French, patriotism, thrift and taste; (2) The Germans, work, system and obedience; (3) The English, honesty, endurance, commerce; (4) The Italians, music; (5) etc.

*Bibliography.*

Ancient History: Breasted, Myers, West, Woolfson.

European History: Breasted, Myers, Harding, Webster.

A detailed bibliography is given in Institute Circular No. 90.

UNITED STATES CONSTITUTIONAL HISTORY VI.

*Aim.*

This is a senior course in history required by law of the state and designed to show the origin and development of our ideals of representative government and of personal freedom, and to introduce the pupils to the responsibilities of full citizenship. It is not a course in political or military history, or one devoted to the study of biography or social conditions. The schools which merely enlarge the eighth-grade course in United States history with unchanged content and a longer and harder text are not meeting the legal requirement. The course has nothing to do with the Spanish explorers, with Indian tribes and settlements, with presidential administrations or with military success of leaders. It is, as the name indicates, a course in the constitutional history of the United States.

*Standards.*

1. A study of national problems and policies with their origin and significance through standard textbooks and collateral reading.

2. An interpretation of the world activity for the year through a study of recent current history in its making.

3. Active interest maintained in affairs of local democracy through a first-hand study of town, state and national government and administration.

*Suggestions.*

No. of Exercises.		No. of Exercises.
I		
2	Teutonic Beginnings	
	1. Organization	1
	2. Map of Pupils	1
		{ Town City
II		
5	The Great Charters	
	3. Henry's Charter, Magna Charta, Confirmatio Chartarum	2
	4. Town } History	3
	City }	
III		
4	The Development of Parliament	
	5. The Model Parliament, Divine Right of Kings vs. Parliament Pet. of Rights, Bill of Rights	2
	6. Town } Population and Industries	2
	City }	
IV		
5	Colonial Government	
	7. Land Grants, Spanish, French, Dutch, English	1
	8. European Government of Colonies, Southern, N. E., Middle	1
	9. Town Meeting. Organization of Town Government	3

No. of Exercises.		No. of Exercises.
V		
20	Achievement of Independence	
10.	Colonies Grow Independent	2
11.	Nullification of Charters, Andros' Tyranny	2
12.	Growth of Towns, Town Charters, Assemblies, New Hampshire's share in Colonial Wars	5
	Discontent with Royal Government	
13.	Organization of Forms of City Government	8
14.	Struggle for Independence	2
15.	Declaration of Independence	1
VI		
20	Constitution of New Hampshire and of United States	
16.	Constitution of New Hampshire, History, Sources, Convention, Ratification, Analysis	15
17.	Services Rendered by {Town City	5
18.	Articles of Confederation	1
19.	The northwest ordinance	1
20.	Constitution of United States	7
VII		
16	The Critical Period	
21.	Organization of the Government	3
22.	Washington's Farewell Address	2
23.	Foreign Relations	2
VIII		
9	The Jeffersonian Principles	
24.	Domestic Policy	2
25.	Expansion	2
26.	Struggle for Neutral Rights	2
27.	Town Services, Finance	3
IX		
9	Rise and Growth of the West	
28.	Economic Reorganization	2
29.	City Services, Finance	1
30.	Westward Migration, Internal Improvements	1

No. of Exercises.		No. of Exercises.
	31. Slavery and the Missouri Compromise	2
	32. County, Map, History, Government	3
X		
5	The Monroe Doctrine	
	33. Services Rendered by County, Finance	3
	34. Monroe Doctrine and Panama Congress	2
XI		
9	Federation Processes	
	35. Reorganization and Jackson	2
	36. Nullification, Financial Questions	2
	37. State, Map, History, Government, Population, Industries, Services	5
XII		
27	The Union Saved	
	38. Anti-Slavery Agitation	3
	39. Texas and Mexico	3
	40. Secession	5
	41. Civil War	5
	42. Nation, Map, Government, Offices Filled, Services Rendered, Finance	11
XIII		
27	Constitutional Changes—	
	43. Reconstruction	5
	44. Political Problems	7
	45. Economic Problems	8
	46. Flexing the Constitution	7
	Problems of Peace	
XIV		
22	United States as a World Power	
	47. The Spanish War	2
	48. Imperialism	1
	49. The Panama Canal	1
	50. Treaties, Hay-Pauncefote, etc.	2
	51. History of the World War	16

Each teacher should have also Institute Circular No. 91, which gives a detailed outline of the course.

*Bibliography.**A. For the Pupil.*

- (1) A text in United States History, selected from the following:

Adams & Trent—History of the United States.  
 Andrews—History of the United States.  
 Channing—Students' History of the United States.  
 Fite—History of the United States.  
 Forman—United States History.  
 Hart—Essentials in American History.  
 McLaughlin—History of the American Nation.  
 Muzzey—American History.  
 Thompson—History of the United States.  
 West—History of the American People.

- (2) A text in Civil Government, selected from the following:

Ashby—The New Civics.  
 Beard—American Government.  
 Boynton—School Civics (Revised Edition).  
 Bryce—The American Commonwealth.  
 Dunn—The Community and the Citizen.  
 Fiske—Civil Government in the United States (Rev. Ed.).  
 Flickinger—Civic Government.  
 Forman—Advanced Civics.  
 Guitteau—Government and Politics in the United States.  
 Hinsdale—The American Government (Rev. Ed.).  
 Magruder—American Government.  
 Reed—Form and Function of American Government.  
 Schwinn & Stevenson—Civil Government.  
 Wilson—The State.

- (3) A loose-leaf notebook 8" x 10½". (Filler should include a quire of graph paper.)  
 (4) Outline maps of New Hampshire, New England, United States, North America, Western Hemisphere, the World.  
 (5) The Constitution of New Hampshire.  
 (6) Subscription to a national weekly magazine.

*B. For the Teacher.*

- (1) The above and Bourne—The Teaching of History and Civics.
- (2) Baldwin—The American Judiciary.
- (3) Channing & Hart—Guide to the Study of American History.
- (4) Cushing—History Syllabus for Secondary Schools.
- (5) Farlie—Municipal Administration.
- (6) Goodnow—City Government in the United States.
- (7) Hart—Actual Government.
- (8) Hinsdale—How to Study and Teach History.
- (9) Historical Sources in Schools.
- (10) Howe—The City.
- (11) Martin—Hints on Teaching History.
- (12) Report of Committee of Seven (“The Study of History in Schools”).

*C. For the School.*

- (1) The above and Colby—Selections from Sources of English History.
- (2) Channing & Hart—American History Leaflets.
- (3) Encyclopedia (published since 1910).
- (4) Farrand—American History Review.
- (5) Fiske—Beginnings of New England.
- (6) Fiske—Critical Period of American History.
- (7) Fiske—Discovery of America.
- (8) Fiske—Dutch and Quaker Colonies.
- (9) Fiske—Old Virginia and Her Neighbors.
- (10) Hart—Formation of the Union, 1750-1829 (Rev. Ed.).
- (11) Hart—A Source Book of American History.
- (12) Hill—Liberty Documents.
- (13) Hosmer—Anglo-Saxon Freedom.
- (14) Kendall—Source Book.
- (15) Lodge—A Short History of the English Colonies in America.
- (16) Mace—Method in History for Teachers and Students.
- (17) McDonald—Source Book.
- (18) Nicolay & Hay—Abraham Lincoln.
- (19) Parkan—Struggle for a Continent.
- (20) Steffens—The Shame of the Cities.
- (21) Stubbs—Constitutional History of England.



- (22) Thwaites—The Colonies, 1492-1750 (Rev. Ed.).
- (23) Walker—Essentials in English History.
- (24) Wilson—Division and Reunion, 1829-1889.
- (25) Nelson—History of the World War.
- (26) Manual of the New Hampshire General Court.
- (27) Report of the Thirteenth Census.
- (28) Reports of Town, City, County and State Officers  
(Current).
- (29) American History Review (Magazine).
- (30) American City (Magazine).
- (31) Congressional Record (Magazine).
- (32) Current History (Magazine).
- (33) Community Leaflets of Department of the Interior.
- (34) Bouton—History of New Hampshire, or  
Belknap—History of New Hampshire, 3 vols.
- (35) The New Hampshire Register (Current).
- (36) War Information Booklets.
- (37) A Daily Newspaper.
- (38) Wall Maps of New Hampshire, New England, The  
United States, North America, The World.
- (39) A Local Town History.
- (40) Colby—Manual of the Constitution of New Hamp-  
shire.
- (41) Revised Statutes.
- (42) Adams—An Outline Sketch of English Constitutional  
History.

• ECONOMICS AND BUSINESS PRACTICES VI.

*Aim.*

The general purpose of the study of economics in the senior year is to bring the pupils into actual touch with some of the essential realities of modern social and industrial life. It does not contemplate the technical problems of political economy or commercial law. It does propose to offer to all pupils before graduation an insight and participation in the ordinary activities of business, together with a consideration of some matters relating to personal welfare and success.

*Standards.*

1. A competent teacher. This course may not be assigned to any teacher who has spare time but must be taught by a teacher who by experience, study and preparation is able to deal with the actual problems of citizenship and business. If no such teacher is available, the course should not be given.

2. Satisfactory books for reference and study. Each pupil should have good textbooks on economics and one on business law and practice. The class should gather and put into usable form its collection of reference books and material. In the use of the textbook on economics, little stress should be placed upon generalities and technical terms. From the textbook in law should be omitted the intricacies of commercial law and all studies that are little likely to be within the experiences of the pupils.

3. Project work. In each division of the course, there is to be practical work similar to that given in the following outline under references, projects and excursions.

*Suggestions.*

## GENERAL OUTLINE.

## POSSESSIONS (What we have) :

I. Property	6 weeks	} First Semester
II. Money and Credit	8 weeks	
III. Taxation	4 weeks	

## BUSINESS (What we do) :

IV. Industry	8 weeks	} Second Semester
V. Insurance	4 weeks	
VI. Thrift	6 weeks	

## DETAILED OUTLINE.

## PROPERTY.

Use the school lot or some nearby piece of land as a basis for real estate. Use anything available for personal property but USE IT.

*Real Property.*

## Ownership

## Title

Deeds

Mortgages

Transfer

Assignment

"Registrar of Deeds"

## Wills

Probate Court

Boundary Lines

Rights and Privileges

## Rent

## Leases

Obligations of Landlord and Tenant

Neighbors

Rights and Obligations

"Real Estate Agents"

*Personal Property.*

## Buying and Selling

Bills of Sale

Contracts

Profit and Loss

"Notary Public"

"Justice of the Peace"

## SUGGESTED.

*References.*

Specimen Deeds, Mortgages, Wills, Leases, Contracts.  
Any one of several Home Law Books, etc.

*Projects.*

1. Issue a deed to the Instructor or some member of class of a certain piece of land previously measured—school yard or other piece.
2. Let the buyer mortgage it for a part of its value.
3. Hold a Probate Court to consider the disposition of a will recently probated, etc.

*Excursions.*

1. The plot of land.
2. Lawyer's office.
3. Office of "Registrar of Deeds" if accessible.
4. Probate Court if accessible.
5. Office of real estate agent, etc.

## MONEY AND CREDIT.

Use the School Savings Bank as a basis.

*Money.*

Coin and Coinage  
 Bank Notes  
 Legal Tender  
 Credit  
   Notes  
   Checks  
   Bonds (Liberty)  
   War Savings Stamps

*Banking.*

、 Renting Money  
   Loans  
   Interest  
   Bank Discount  
 National Banks  
   Clearing House  
   Federal Reserve  
 Savings Banks  
 Trust Companies

## SUGGESTED.

*References.*

Types of Money, Checks, Liberty Bonds, etc.

*Project.*

1. Operate a School Bank as an essential feature of the commercial department, etc.

*Excursions.*

1. Visit local banks and observe methods.
2. Talk with bankers about personal qualities necessary in banking, etc.

## TAXATION.

Use the financial operation of the local School Department as a basis.

*Local Taxation.*

Property Tax  
Poll Tax  
Issuing Notes and Bonds

*State and Federal Taxation.*

For ordinary purposes  
For war purposes  
Income Tax

*Indirect Taxation.*

Increased rentals  
Higher prices

*Expenditure of Public Money.*

By the town or city  
By the state  
By the federal government

## SUGGESTED.

*References.*

Local Town and School Reports, Specimen Bonds and Notes, Specimen Tax Bills, Copy Income Tax Questionnaire, Reports of State and Federal Financial Officers, etc.

*Projects.*

1. Determine and draft sources of revenue to run school department. Figure percentage from each source. Determine school tax rate. Compare with rate for other purposes.

2. Form class into a City Council or School District. Issue notes or bonds or both for constructing new school building. Determine annual tax necessary for this purpose and amount each pupil would pay, each holding a different property valuation.

3. Determine the distribution of local taxes for different departments of public administration, as police, health, etc., and show the gain to the individual from community services, etc.

*Excursions.*

1. City Council in session.
2. Tax Collector's office, etc.

INDUSTRY.

Use Local Industries as a basis.

*The Employer.*

Liabilities and obligations

Corporations  
Monopolies

Capital  
Profits

*The Laborer*

Obligations  
Contracts  
Morale

Organized Labor  
Strikes, Boycotts, Sabotage

Wages

*Business Corporations.*

Freight transportation  
Express transportation  
Post office service  
Telegraph and telephone service  
Gas and electric company service



*Government Control.*

Interstate Commerce  
 Transportation  
 Socialism

*International Trade.*

Consular Service  
 Exchange  
 Relations with Europe, South America, and the East

*Business Ethics.*

## SUGGESTED.

*References.*

Government Reports, Books on Commercial Law, Recent Addresses, Documents of National City Bank, New York. Blanks used by transportation and other companies, etc.

*Projects.*

1. Form class into a Stock Company. Consider liabilities of employer to employed.
2. Organize class into a Labor Union.
3. Study transportation with local common utility offices, considering business methods, obligations and service rendered, etc.

*Excursions.*

1. Visit local industries and observe business methods.
2. Talk with business men.
3. Visit public service offices, etc.

## INSURANCE.

Use Insurance on local School Property as a basis.

*Fire Insurance.*

The Policy  
 Method of settlement in case of loss  
 Rates in different sections of city

*Life Insurance.*

- The Policy
  - Participating policies
  - Non-participating policies
  - Life and Term
  - Premiums
  - Dividends
  - Methods of adjustment
- Requirements to obtain
  - Beneficiary
- Annuities
- Legal reserve companies
- Assessment companies

## SUGGESTED.

*References.*

Specimen Policies, Insurance Literature, Mortality Tables, etc.

*Projects.*

1. Study typical policies.
2. Discuss types of insurance as applied to different persons in different stations in life, etc.

*Excursions.*

1. Visit insurance agent's offices, etc.

## THRIFT.

*Occupations.*

- Income
  - Expenditures
  - Savings
    - Investments
      - Sound and unsound
      - Laws that should govern
  - Poverty
- Advancement
  - Qualities necessary

*Leisure.*

Self improvement  
 Reading and study  
 Thinking  
 Recreation  
 Civic responsibilities

*The Family Budget.*

Division of income  
 Form of accounts

## SUGGESTED.

*References.*

Biographies of Successful Men and Women. Inspirational Books, as Conwell's and Marden's. Daily personal and financial advertisements. Magazine financial articles. Family Expense Account—Bookman: D. C. Heath & Co., etc.

*Projects.*

1. Find current yearly income of main occupations in community.
2. Determine preparation required.
3. Determine percentage of work time and leisure devoted by each member of the class. Discuss this.
4. Family accounts kept for a year, etc.

*Excursions.*

1. Talk with successful men regarding their own business or profession.
2. Visit local establishments and estimate opportunities for young men and women, etc.

## SUGGESTED TALKS.

*By Lawyers.*

Common Laws Every Citizen Should Know.  
 Rights and Obligations of Neighbors.  
 How to Buy and Sell Real Estate, etc., etc.

*By Bankers.*

Sound and Unsound Investments.  
 What a Trust Company Does.  
 The Federal Reserve, etc., etc.

*By Business Men.*

The Kind of Help Business Men Want.  
 Government Control of Railroads.  
 Present Business Possibilities in South America, etc., etc.

*By Insurance Men.*

How Fire Loss is Adjusted.  
 Why One Should Carry Life Insurance.  
 Different Forms of Life Insurance Policies, etc., etc.

*Bibliography.*

Elements of Economics—Bullock: Silver, Burdett & Co.  
 Elementary Economics—Ely and Wicker: The Macmillan Co.  
 Elements of Business—Schock and Gross: American Book Co.  
 Commercial Law—Rowe: R.  
 Law for the American Farmer—Green: The Macmillan Co.  
 Lessons in Community and National Life—Judd and Marshall.  
 Laws of Business—Parsons.

## MASTERPIECES OF MUSIC AND ART V.

This is a year's course in acquaintanceship with and appreciation of the masterpieces of architecture, painting, sculpture and musical compositions.

## MUSIC.

*Aim.*

The course endeavors to cultivate intelligent listeners, who may for that reason enjoy a vastly greater range of compositions. The pupil should become familiar with the

style of different epochs so that a work should not be called classic because, as a young lady once remarked, it was "rather long, rather difficult and not pretty." The pupil should also become familiar with music terms generally, whether used as titles of compositions or to describe a movement and, last but not least, she should learn the proper pronunciation of titles, musical expressions and proper names.

#### *Standards.*

The study of fifty musical compositions carried at least to the point of recognition.

#### *Suggestions.*

The theory of music should be studied, but at least sixty per cent. of the time given to the course should be devoted to musical expression and to listening to music, with notes and comments, historical, biographical or of interest otherwise, accompanying the selections played.

It is suggested that each pupil keep for herself a record of all music played in the classroom, together with the notes and comments, and pictures appropriate to the subject which may be obtained in a variety of ways: in advertisements of music records; in music and other magazines; in the daily and Sunday papers; in the "Perry Pictures." Pupils should also be encouraged to read the current notes and comments on concerts, recitals, composers and performers to be found in the foremost daily papers.

As more and more schools are coming to depend on music records for this work, which indeed would be impossible without them, a list of suggested records is here offered for convenience, to be added to or varied by the teacher at his discretion. These records are given the Victor catalogue numbers but the same records and other desirable ones may be obtained from the Columbia and other phonographic companies.

The following list of books is suggested for reading and reference :

What is Good Music?	W. J. Henderson
Purity in Music,	A. F. Thibaut
The Great Tone-Poets (Bach to Schumann),	F. J. Crowest
A Concise History of Music,	H. G. B. Hunt
Music, How It Came to Be What It Is,	Hannah Smith
The Story of the Oratorio,	Anna W. Patterson
The Story of the Violin,	Paul Stoeving
Hymns and Their Writers,	D. C. Campbell
The Opera, Past and Present,	W. G. Apthorp
The Pianoforte and Its Music,	H. E. Krehbiel
Music Study in Germany,	Amy Fay
Dictionary of Music and Musicians,	Sir George Grove

#### SUGGESTED RECORDS.

##### *Folk Songs and Dances.*

Russian—17001	Kamarinskaia.
63153	Vanka.
	Kolebaluia.
Hungarian—17003	Czardas.
Irish—64259	The Harp that Once Thro' Tara's Halls.
Welsh—74100	All Through the Night.
Scotch—64210	Loch Lomond.
English—17190	The Lass with the Delicate Air.
17086	Morris Dance.
American Negro—74246	Deep River.

##### *Early Church Music.*

61108	Offertorio e Communione.
	(Gregorian High Mass, Sistine Choir.)

##### *Early Counterpoint.*

35279	Sumer is ecumen in.
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##### *Oratorios.*

16980	Dead March ("Saul").	Händel
85103	He Shall Feed His Flock ("Messiah")	Händel
31770	Hallelujah Chorus ("Messiah").	Händel



*J. S. Bach, Height of Contrapuntal Period.*

- 81045 Ave Maria.  
 64132 Gavotte in E Major.  
 17184 Bourree from Suite III.  
 70047 Air for G String.

*Classic Period.*

- 64135 Minuet. *Haydn*  
 17087 Minuet. *Mozart*  
 35576 Chorus from Fidelio. *Beethoven*  
 35268 I }  
 35269 II } Leonora Overture No. 3. *Beethoven*  
 III }  
 88013 Who is Sylvia? *Schubert*  
 64093 Serenade. *Schubert*

*Romantic Period.*

- 31819 Overture—Midsummer Night's Dream. *Mendelssohn*  
 31740 The Two Grenadiers. *Schumann*

*Dance Forms.*

- 17087 Minuet. *Mozart*  
 64132 Gavotte. *Bach*  
 35669 Bourree. *Bach*  
 17083 Tarantella. *Saint-Saens*  
 17174 Tarantella.  
 64224 Mazurka. *Chopin*  
 17003 Czardas.

*Song Form.*

- 35159 Spinning Song. *Mendelssohn*  
 64093 Serenade. *Schubert*  
 87502 Barcarolle ("Tales of Hoffman"). *Offenbach*  
 17181 Lullaby. *Brahms*

*Symphonies.*

- 35243 }  
 35244 } Symphony No. 3 ("Surprise"). *Haydn*  
 35268 }  
 35269 } Leonora No. 3. *Beethoven*

*Overtures.*

31819	A Midsummer Night's Dream.	<i>Mendelssohn</i>
31739	Overture 1812.	<i>Tschaikowsky</i>
	<i>Magic Flute.</i>	<i>Mozart</i>
35148	Bartered Bride.	<i>Smelana</i>

*Descriptive Compositions.*

64076	The Bee.	<i>Schubert</i>
64046	Le Cygne.	<i>Saint-Saens</i>
35464	L'apres Midi.	<i>Debussy</i>

*Further Compositions.*

35007	Peer Gynt Suite.	<i>Grieg</i>
71042	Norwegian Wedding March.	<i>Grieg</i>
35122	Hungarian Rhapsody.	<i>Liszt</i>
35275	Largo ("The New World Symphony").	<i>Dvorak</i>

These are but a few illustrative compositions selected from the great amount of material now available, and should be supplemented by selections from oratorios and operas. It is suggested that some one opera be chosen for detailed study. Attention is also called to Victor Records 35236 and 35237.

*Bibliography.*

What We Hear in Music, Victor Talking Machine Co.  
 The Lure of Music, Columbia Phonograph Co.  
 Story of Musical Form, Lucas: Scribner Co.  
 Standard History of Music, Cooke.

## ART.

*Aim.*

The purpose of this course is to develop an appreciation of the beautiful in the works of man. The course should develop the art attitude of mind towards all forms of human expression, and not restrict it merely to the limited selections of art subjects treated in this course. It should be the constant aim of the instructor to regard the course as a means of developing an essential element in

human nature, the inherent love of the beautiful. This course does not presuppose a studio training or even an elementary course in art expression for either the instructor or the pupil. Such training would, of course, be highly useful. This course does assume, however, the existence of the elemental liking for beautiful objects, and where this elemental liking seems to be lacking, it assumes that it can in a measure be awakened. In both cases this course assumes that a pupil can be led to experience the beautiful in some degree in the presence of that spiritual inheritance of the race expressed in architecture, sculpture, and painting.

#### *Standards.*

This course will require as a minimum of class work, one-half year (18 weeks) or ninety 45-minute periods.

Each pupil should keep a notebook. Illustrations may be kept in the notebook or mounted on separate sheets of paper and kept in a portfolio. Whatever form of recording is adopted should represent the pupil's own individual response to the course. This record should contain no less than one hundred mounted pictures, drawings or tracings, with accompanying explanatory matter neatly and orderly arranged. The record should contain an account of the topics studied, or works of art studied in class, of visits to art museums and other places of art interest, of reports on outside reading, and of data of personal interest to the pupil suggested by the art course. Memory sketches—even though crude—of what pupils have seen will do much to develop the capacity of appreciation.

#### *Suggestions.*

Almost every small community possesses some material for the beginnings of such a course as is here planned. Though local buildings may not have great aesthetic value, elements suggesting earlier and purer forms of

architecture may be found in public buildings and private residences in almost every village. These elements should constitute the point of departure for the course. Inexpensive pictures of buildings which cannot be visited in nearby or remote towns can, without much difficulty, be secured. So far as possible pupils ought to be encouraged to make sketches—even very crudely—and to take photographs of selected local buildings. There is on the market a large assortment of inexpensive prints covering modern, medieval, and ancient art. Current magazines and the supplements of newspapers are profusely illustrated and offer a great variety of subjects. Postcards are frequently worth careful study. Excellent effects can be secured by the artistic mounting of inexpensive prints.

The method of this course should secure first-hand reactions from the pupil. Works of art, either in the original or in some form of reproduction, should be presented first, in order to secure for the pupil a direct impression. Reading about art is not sufficient and it may lessen the fundamental value of this course if permitted for each pupil. To make the course vital and to secure for it an organic connection with the pupil's life, this course proposes to present, first of all, the local material—even if it is meagre—and gradually to introduce more remote material both in place and in time, until the great field of art, present and past, is surveyed.

The course will first introduce the subject of American art, because it is nearer to us than any other art. What we find in it of outside influence will naturally lead to a study of those art influences. This search cannot be carried out in detail, but it can be made to show the pupil main streams of European art influences that have contributed to American art. To progress from effect to cause is a complicated process, but the instructor should not have great difficulty in keeping the main currents of art development through the ages.

Having made the contact between the pupil and the

work of art, and having kept the direction, the instructor should show the relation between art and life. Art should not be regarded as something extraneous to life and optional, but rather as the happiest and the most beautiful way in which life has in all ages expressed itself. The work of the course should be continually correlated with that in literature and history; it may be correlated, too, with music and other arts.

Use literature about art after and not before the pupil has seen the work of art either in the original or in some form of reproduction. Occasionally this method may be reversed, but the value of the course will increase according to the degree in which the pupil can himself appreciatively regard works of art.

This course is planned to give some of the significant architecture, sculpture and painting of the present and past. The instructor will select from the following outline as much as he can use. It is desirable—without going into minute discussion—to show the organic unity underlying all forms of artistic expression. The relations between the various forms of art selected can be shown in broad treatment. A simple presentation of fundamental art principles, namely: fitness, harmony, balance, rhythm, will naturally introduce the course, but only by means of concrete examples.

The outline which follows gives essential kinds and periods of notable art expression. The proportion of time devoted to each main division may be considered elastic. No main topic or sub-topic should be omitted. Certain aspects of art and some important types of art have not been included in the outline which a longer course might include. Individual members of the class may, however, report on these matters as they arise in class discussion. For example, it may be of interest to have a report on Japanese art when the class is considering the work of Whistler.

## OUTLINE OF COURSES.

I. *Nineteenth Century and After* 20 periods

- A. American: *architecture*—local buildings, schools, churches, municipal and government buildings, skyscrapers, railway terminals, etc.  
*sculpture*—works by George G. Barnard, Herbert Adams, Cyrus E. Dallin, Gutzon Borglum, Lorado Taft, Daniel C. French, Frederick W. MacMonnies, Augustus Saint-Gaudens, etc.  
*painting*—Gari Melchers, Winslow Homer, Birge Harrison, James McNeill Whistler, John H. Twachtman, Childe Hassam, J. Alden Weir, Edmund C. Tarbell, Elihu Vedder, John LaFarge, Edwin H. Blashfield, Edwin A. Abbey, John W. Alexander, Wilton Lockwood, Alexander Harrison, John S. Sargent, Thomas Eakins, Ralph A. Blakelock, Homer D. Martin, Alexander H. Wyant, William M. Chase, Thomas W. Dewing, George Fuller, Abbot H. Thayer, George deForest Brush, George Inness, William M. Hunt, Emmanuel Leutze, J. G. Brown, Chester Harding, Thomas Moran, Albert Bierstadt, Asher B. Durand, Thomas Cole, Washington Allston, John Trumbull, Gilbert Stuart.
- B. French: *architecture*—city plan of Paris, public buildings, opera house, etc.  
*sculpture*—works of Rodin, Fremiet, Roty, Barye, Carpeaux, Rude.  
*painting*—Bastien-LePage, Monet, Dagnan-Bouveret, Rosa Bonheur, Cazin, Bonnat, Manet, Lhermitte, Puvis de Chavannes, Courbet, Millet, Corot, Meissonier, Delaroche, Carolus-Duran, Delacroix, Ingres, Gros, David, etc.
- C. British: *architecture*—Bank of England, British Museum, London University, St. George's Hall (Liverpool), Houses of Parliament, Nat. History Museum (South Kensington), etc.  
*sculpture*—works of Albert Gilbert, J. Gascombe John, Alfred Drury, E. Onslow Ford, Hamo Thornycroft, Alfred Stevens, Chantrey.  
*painting*—Albert Moore, Alma Tadema, W. Quiller Orchardson, J. E. Millais, Edward Burne-Jones, G. F. Watts, Edwin Landseer, J. M. W. Turner, etc.



## II. Eighteenth Century

9 periods

- A. American: *architecture*—colonial or Georgian buildings.  
*painting*—C. W. Peale, J. Singleton Copley, Benjamin West, John Smybert.
- B. British: *architecture*—works of Adams (brothers), Sir William Chambers, James Gibbs, John Vanbrugh.  
*sculpture*—J. Flaxman, John Bacon, J. Nollekens, Thomas Banks.  
*painting*—Thomas Lawrence, Raeburn, Hoppner, Allan Ramsay, Romney, Gainsborough, Reynolds, Hogarth.
- C. French: *architecture*—Neo-classic style, Place de la Concorde, Works of Gabriel, St. Sulpice (Paris), Pantheon.  
*sculpture*—Houdon, Pajou, Clodion, Falconet, Pigalle, Coustou (brothers), Bouchardon.  
*painting*—Madame Vigée-Lebrun. Hubert Robert, Joseph Vernet, Fragonard, Greuze, Chardin, Nattier, LaTour, Boucher.
- D. Italian: *sculpture*—Canova.  
*painting*—Batoni, Giovanni Battista Tiepolo, etc.

## III. Seventeenth Century

9 periods

- A. British: *architecture*—The Sir Christopher Wren, Inigo Jones.
- B. French: *architecture*—The Louvre, Versailles, various chateaus.  
*sculpture*—Coysevox, Puget, Girardon.  
*painting*—Lancret, Watteau, Largillière, Rigaud, LeMoyne, Jouvenet, LeBrun, Claude Lorrain, Poussin, LeSueur.
- C. Italian: *architecture*—St. Peter's (Rome).  
*sculpture*—Bernini.  
*painting*—Domenichino, Carlo Dolci, Guido Reni, Salvator Rosa, Carracci, Caravaggio.
- D. Spanish: *painting*—Goya, Murillo, Velasquez, Zurbaran, Ribera.

- E. Dutch: *painting*—Rembrandt, Paul Potter, Jacob Ruisdael, Hobbema, Jan Steen, Vermeer, Pieter de Hooch, Dou, Franz Hals.
- F. Flemish: *painting*—David Teniers, Antoon van Dyck, Jordaens, Rubens.

IV. *Renaissance*

9 periods

- A. Franco-Flemish: *sculpture*—works of Goujon, Pilon, Colombe.  
*painting*—Clouet, Fouquet, Ian Gossaert, Matsys, Froment, Gerard David, Memling, R. Van Der Weyden, Ian van Eyck.
- B. Italian: *architecture*—Certoza (Pavia), Palazzo Vendramin (Venice), Ruccellai Palace (Florence), Piccolomini Palace (Siena), Palazzo Strozzi (Florence), Palazzo Pitti (Florence), Capella Pazzi (Florence), Bargello (Florence), Santo Maria Novella (Florence), San Giorgio Maggiore (Venice), Campanile (Florence), Leaning Tower (Pisa).  
*sculpture*—works of the Della Robbia, Donatello, Brunelleschi, Ghiberti, the Pisani, Verrochio, Cellini.  
*painting*—Michelangelo, Raphael, Titian, Paul Veronese, Il Tintoretto, Correggio, Andrea del Sarto, Leonardo da Vinci, the Bellini, Mantegna, Pinturicchio, Perugino, Ghirlandajo, Botticelli, Fra Filippo Lippi, Masaccio, Fra Angelico, Duccio, Giotto.
- C. German: *painting*—Lucas Cranach, Hans Holbein (younger), Albert Durer.

V. *Gothic*

6 periods

- A. French: *architecture* (ecclesiastical)—S. Etienne du Mont (Paris), S. Michel (Dijon), Reims, Amiens, Beauvais, LeMans, Bourges, Chartres, Paris (Notre Dame), etc.  
*architecture* (civic)—Jacques Coeur's House (Bourges), Palais de Justice (Rouen), Hotel de Clugny (Paris), Hotel de Ville (Compiègne), ramparts of Carcassone.  
*sculpture*—"The vintage capital" Cathedral (Reims), figures on portals Cathedral (Chartres).

- B. English: *architecture*—Hampton Court, King's College Chapel (Cambridge), Henry VII's Chapel (Westminster Abbey), York Minster, St. Giles (Wrexham), Canterbury Cathedral, Gloucester, Lichfield Cathedral (Choir), Chapter House (York Minster), Beverley Minster (Percy Shrine), Carlisle Cathedral (Choir), Wells Cathedral, Lincoln Cathedral, Peterborough Cathedral, Salisbury Cathedral, Westminster Abbey, Fountains Abbey (Cloister).
- C. Italian: *architecture*—Pisa, Milan, Orvieto cathedrals.
- D. German: *architecture*—Strassburg, Cologne cathedrals.

VI. *Romanesque*

5 periods

- A. Italian: *architecture*—St. Ambrose (Milan), Cathedral at Modena, St. Michael (Pavia).
- B. French: *architecture*—Abbey for Men (Caen), Church of St. Giles, Notre Dame (Paris).
- C. English: *architecture*—Cathedrals at Durham, Ely, Canterbury.

VII. *Early Christian*

3 periods

- A. Italian: *architecture*—St. Marks (Venice), San Apollinare in Classe (Ravenna), San Vitale (Ravenna).
- B. Byzantine: *architecture*—St. Sophia (Constantinople).

VIII. *Roman*

7 periods

*Architecture*—San Paolo fuori le mura (Rome), Basilica of Constantine (Rome), Baths of Caracalla (Rome), Tomb of Hadrian—Castle of St. Angelo (Rome), Colosseum (Rome), Arch of Constantine (Rome), Arch of Titus (Rome), Pantheon (Rome), "Maison Carrée" (Nîmes), Aqueducts of the Roman Campagna, Cloaca Maxima, Gateway at Volterra.

*Sculpture*—Bronze horses (St. Mark's—Venice), Equestrian statue of Marcus Aurelius (Rome), Julius Caesar in Toga, Young Augustus (Vatican), Antinous (Vatican), Augustus of Prima Porta (Vatican), Otricoli Zeus (Vatican), Farnese Hercules (Naples).

*Painting*—Mosaics in churches of San Paolo fuori le mura, San Pudenziana, San Apollinare Nuovo (Ravenna), frescoes in the Catacombs (Rome), Aldobrandini Wedding (Vatican), The Battle of Issus—mosaic (Pompeii).

## IX. Greek

10 periods

*Architecture*—Choragic Monument of Lysicrates (Athens), Mausoleum at Halicarnassus (Asia Minor), Temple of Nike Apteros (Athens), The Eretheum (Athens), The Propylaea (Athens), Parthenon (Athens), Temple of Theseus (Athens), Temple of Athene (Aegina), Temple of Poseidon (Paestum, Italy), Lions' Gate (Mycenae).

*Sculpture*—The Laocoön (Vatican), Farnese Bull (Naples), Dying Gaul (Capitoline Museum, Rome), Apollo Belvedere (Vatican), Aphrodite of Melos—"Venus de Milo" (Louvre), Nike of Samothrace (Louvre), Attic tomb reliefs—Dexileos, Hegeso, etc., Alexander sarcophagus (Constantinople), Demeter from Cnidus (British Museum), Apoxyomenos after Lysippus (Vatican), Silenus and Infant Dionysus (Louvre), Marble Faun after Praxiteles (Capitoline Museum, Rome), Artemis of Versailles (Louvre), Hermes and Infant Dionysus by Praxiteles (Museum, Olympia), Nike by Paeonios, Varvakeion Athene (Athens), Balustrade of Temple of Nike Apteros, Caryatids of the Eretheum, Inner Frieze of Parthenon, Metopes of Parthenon, Pediment figures from the Parthenon (British Museum, London), Doryphorus after Polycleitus (Naples), Discobolus after Myron (Vatican), Pediment groups from Temple of Athene, Aegina (Berlin).

*Painting*—Vases with painted designs in black on red and yellow grounds, frescoes from Tiryns, geometric designs, etc.

X. *Egyptian and Primitive* 2 periods

A. Egyptian: *architecture*—buildings at Luxor, Karnak; pyramids at Ghizeh.

*sculpture*—Colossi of Rameses II (Luxor, etc.), The Scribe (Louvre), Statue of King Chefred (Cairo), Sheik-el-beled (Cairo), Great Sphinx.

*painting*—wall paintings from palaces, tombs.

B. Primitive: remains in Mexico, Central America; Stone Henge (England), menhirs (France), cave markings (Dordogne).

*Bibliography.*

The following bibliography is made up of books that are most likely to be found in small libraries containing art books. Each section of the preceding outline is given a number of references bearing directly upon its topics. Both sets of references are necessarily brief because there is a vast literature on the course.

GENERAL WORKS.

A. *On the history of art.*

DeForest and Caffin's *A short history of art* (The Prang Co.).

Lethaby's *Architecture*—Home Univ. Library (H. Holt & Co.).

Lubke's *History of art*, edited by R. Sturgis (Dodd, Mead & Co.). A standard work in two volumes.

Reinach's *Apollo* (Scribner's Sons). The best short work; very compact and fully illustrated.

B. *On specific fields of art.*

Armstrong's *Art in Great Britain and Ireland* (Scribner's).

Caffin's *The story of American painting* (Stokes). An excellent single volume fully illustrated.

Caffin's *American masters of sculpture* (Doubleday, Page & Co.).

Hourticq's *Art in France* (Scribner's). The best single volume in English.

Isham's *The history of American painting* (Macmillan). The standard work.

Tarbell's *History of Greek art* (Macmillan).

C. *On the appreciation of art.*

Brook's *Architecture and the allied arts* (Bobbs-Merrill).

Caffin's *Art for life's sake* (The Prang Co.). A suggestive work which a teacher should read.

Emery's *How to enjoy pictures* (The Prang Co.).

Sturgis's *The appreciation of architecture* (Doubleday, Page & Co.).

Sturgis's *The appreciation of pictures* (Baker & Taylor Co.).

Sturgis's *The appreciation of sculpture* (Doubleday, Page & Co.).

D. *On the technique and theory of art.*

Batchelder's *The principles of design* (Inland Printer Co.).

Dow's *Composition* (Baker & Taylor Co.).

Poore's *Pictorial composition and the critical judgment of pictures* (Putnam's Sons).

Ross's *A theory of pure design* (Houghton, Mifflin Co.).

SECTION REFERENCES.

Inglis, Alexander; *Principles of secondary education* (Houghton, Mifflin Co.). Ch. XVIII—especially Sect. 281.



Sleight, W. G.; *Educational values and methods* (Oxford Press). Ch. IX—a most important educational work for the teacher.

Judd, Charles H.; *Psychology of high school subjects* (Ginn & Co.). Pp. 353-364, 367-369; see also pp. 184f., 201 on the appreciation of literature.

Sargent, Walter; *High school education* (Johnston) (Scribner's Sons). Ch. XVI; see bibliography p. 508.

Sargent, Walter; articles in *The School Review* (Chicago), vol. XXIV. Pp. 107ff. Art courses in high schools, pp. 409ff. Course of study of art in the high school.

## 2. Reproduction in picture form.

The University Prints, Newton, Mass. (catalogue 5 cents).

One-cent size (8 x 5½ inches) half tones.

The Perry Pictures, Malden, Mass. (catalogue 10 cents).

Half-cent size (3 x 3½ inches).

One-cent size (5½ x 8 inches).

Two-cent size (7 x 9) inches).

Seven-cent size (10 x 12 inches).

The Thompson Publishing Co., Syracuse, N. Y. (catalogue 15 cents).

One-cent size (4 x 5) blue-prints.

Ten-cent size (8 x 10) blue-prints, and black and white prints (4 x 5).

Twenty-five-cent size (8 x 10) black and white prints.

Elson Art Publication Co., 2a Park St., Boston, Mass. (catalogue 5 cents).

Carbon photogravures ranging in price, 5 cents to \$8.00 each.

Carbon photographs ranging in price, \$4.00 to \$40.00 each.

Curtis & Cameron, Boston, Mass. (catalogue 35 cents).

Copley Prints; high grade reproductions; rich in works of American artists.

The Medici Society (American Branch Inc.), 12 Harcourt St., Boston, Mass. (catalogue 25 cents).

Color reproductions of very high grade; rich in old masters.

Post Cards, Detroit Publishing Co., Detroit, Mich.

Reproductions in casts.

P. P. Caproni & Bros., 1914-1920 Washington St., Boston, Mass.

3. *Year-Book of the Council of Supervisors of the Manual Arts, 1907.*

Article by Walter Sargent, pp. 43f. The relation of public schools to museums of fine arts. See accompanying illustrations by H. T. Bailey.

4. Outlines for art study.

General Federation of Women's Clubs, Mrs. C. E. Perkins (Chairman), 327 Washington St., Grand Rapids, Mich. (outlines 25 cents).

American Federation of Arts, Leila Mechlin (Secretary), Washington, D. C. (outline study courses in American art; price 10 cents).

American Art Annual (published by Amer. Federation of Arts), filled with information on art activities in the United States.

#### GREEK AND ROMAN LITERATURE VI.

##### *Aim.*

It has long been felt that the Greek and Roman classics should not remain merely for the select few who have the courage and patience in this age of expedition to read them in the original only in intensive and limited form in the classroom; but that it might be possible to pursue in school a Greek and Latin course in English. This is now possible by reason of the large number of literary translations in both prose and verse. English Literature, particularly in poetry, is so saturated with the elements that

made the classics great, that a knowledge of the latter, presenting great literature, great art, great history, great civilization, is a matter of tantalizing concern today. Thus is offered a course in Greek and Roman Literature for non-classical students and, in particular, for those whose school work has specially fitted them to make the home a place of refinement and culture, where there should be pabulum for the mind as well as for the body.

### *Standards.*

This course may be taught only by a teacher who is interested in literature and familiar with the classics. In many school staffs, it would be assigned to some teacher of Latin or of English. The course should not be given, if no teacher is competent for the work.

This is not a new course, and agreed standards of accomplishment may be reached only from the experience of the schoolroom. It is, however, to be a course in extensive reading and at least seventy-five per cent. of the amount covered in the following bibliography should be the work of the class. Appended to the bibliography of both lists of authors are books for collateral reading. These, in the main, are modern works in English based on classic themes or subjects. There will be ambitious students wishing to read extensively from these lists, so it is advised that a minimum of five titles be selected for reading from the combined collateral groups.

### *Suggestions.*

It will readily be seen by even a casual survey of the bibliography below that this course calls for extensive and rapid reading. No time must be wasted in discussion of the minutiae of the selections. A general or skeleton picture of a whole story, book, poem or play should be obtained by the student at one sitting, and this can be supplemented by detail, resulting from a second or third reading,

for such points as style, diction, treatment of subject, mythology, appreciation, memorizing of famous passages or parts, study of civilization, classification, prosody, literary value, cultural value, literary influence, etc.

The teacher will need to display a generous amount of enthusiasm as she guides the class along through this course. The teacher, as usual, will make the course a success or a disappointment, depending on the interest she arouses and maintains. Famous passages should be read in part aloud in class, both student and teacher engaging. This can best be done in the drama, of course. The greatness of some passages is first made clear to the young learner only through the teacher's oral reading.

The teacher should constantly keep in view the need of developing in the class, by the books assigned, an appreciation of the tremendous significance of the Greek and Roman civilizations, the greatness of these in various departments, such as government, literature and art, and their legacies to the modern world.

There are only a few annotated editions available, so a double duty devolves upon the teacher to emphasize or develop the salient points of the text, and make clear the mythological references and pronunciation of proper names. Indeed, constant use should be made of, and reference to, some good compendium of mythology, for the purposes of this course the best being Gayley's "Classic Myths in English Literature" (Ginn). Its stories of the common pagan deities of classic literature should be common knowledge.

It will be left to the teacher's good judgment to make selections suitable in character and extent where "Selections" are specified in the "Bibliography."

The suggestion is made that a minimum of formal examinations be held in this course; the progress of the student will best be tested by his daily class work, where he should be held strictly accountable.

## GREEK AUTHORS.

*Bibliography.*

Homer, *Iliad*, Bryant's translation (verse), Bks. I, VI, XXII, XXIV; (Riverside Literature Series),  
10 periods.

Or

Homer, *Iliad*, Pope's translation (verse), Bks. I, VI, XXII, XXIV; (Riverside Literature Series),  
10 periods.

Homer, *Odyssey*, Palmer's translation (prose); (Riverside Literature Series), 10 periods.

Homer, *Ulysses among the Phæacians*, Bryant's translation; (Riverside Literature Series), 1 period.

Xenophon, *Memorabilia*, or *Anabasis*; Everyman Edition, 10 periods.

Thucydides, *Peloponnesian War*, Bk. II, "The Plague"; Everyman Edition, 2 periods.

Herodotus, Vol. I, Selections, 50 pages; Everyman Edition, 2 periods.

Plato, *Apology*, *Crito* and *Phaedo*; Golden Treasury Series, 8 periods.

Plutarch, *Lives of Cicero and Pericles*, Everyman Edition; or *Lives of Caesar, Brutus and Antony*; Pocket Classics, 5 periods.

Aeschylus, *Agamemnon*, and *Persians*, or *Eumenides* (verse); Everyman Edition, 15 periods.

Euripides, *Alcestis* and *Medea* (verse); Everyman Edition, 20 periods.

Sophocles, *Antigone* and *Oedipus Tyrannus* (verse), Everyman Edition, or same (prose) in Jebb's translation, 20 periods.

Aristophanes, *Acharnians*, or *Birds*; Everyman Edition, 3 periods.

As a substitute for Herodotus and Thucydides above, readings from "Greek Poets in English Verse" by

various translators). Houghton, Mifflin Company, may be used for selections in authors not included in the above list.)

*Collateral Reading.*

Ulysses, Stephen Phillips.  
 Ulysses, Tennyson.  
 The Fire-Bringer, Wm. Vaughn Moody.  
 The Ancient Classic Drama, Richard Moulton.  
 The Cyclops, Shelley.  
 On the Crown, Demosthenes.  
 Odes, Pindar (Myers' translation).  
 Fables, Aesop.  
 Artemis Prologizes, Browning.  
 Ode to Psyche, Keats.  
 Chapman's Homer, Keats.  
 Pheidippides, Browning.  
 Prometheus Unbound, Shelley.

LATIN AUTHORS.

Terence, Phormio, Morgan's translation; Harvard University Press, *5 periods.*  
 And  
 Plautus, Menaechmi, Nixon's translation; Putnam's, *3 periods.*  
 Or  
 Terence, Phormio, and Plautus, Captives; both in blank verse in "The Chief European Dramatists" by Brander Matthews, *8 periods.*  
 Livy, History of Rome, Bks. I, II, Selections, 75 pages; Everyman Edition, *3 periods.*  
 Caesar, Commentaries, Bks. I, III, IV, V; Everyman Edition, *5 periods.*  
 Vergil, Aeneid, Bks. I-VI, and selections from Bks. VI-XII, Conington (prose); Pocket Classics, *20 periods.*  
 Or  
 Vergil, Aeneid, Bks. I-VI, and selections from Bks. VI-XII, Conington (verse); Longman's, *20 periods.*



Cicero, On Friendship; On Old Age; Selected Letters; On Duties; Everyman Edition; Archias, Hinds and Noble, 10 periods.

Tacitus, Germania; Agricola; Everyman Edition, 3 periods.

Horace, Odes and Epodes (prose), Selections; Loeb's Classical Library. 10 periods.

Catullus	} Selections (verse) from Dole's volume by various translators; Astor Edition,	10 periods.
Ovid		
Juvenal		
Lucretius		
Martial		

M. Aurelius, Meditations (Selections, 50 pages); Everyman Edition, 3 periods.

### *Collateral Reading.*

Cicero, Orations vs. Catiline, Bohn Standard Library.

Caesar, Civil War.

Pliny's Letters.

Hippomenes and Atalanta, Landor.

Lays of Ancient Rome, Macauley.

Atalanta's Race, Morris.

Ovid, Bk. I, Dryden.

Vergil's Eclogues, Dryden.

Horace, Satires.

Classic Myths in English Literature, Gayley.

Song of Proserpine, Shelley.

On a Grecian Urn, Keats.

The Love of Alcestis, Morris.

Pan in Wall Street, Stedman.

Lotus Eaters, Tennyson.

Classic Myths in English Literature, Gayley.

## CHAPTER IV.

## PHYSICAL SCIENCES.

## ELEMENTARY SCIENCE I AND II.

*Aim.*

Elementary science, as here conceived, has a place of its own between the nature study in the lower grades and the formal science of the later years in the secondary school.

The nature study period is, in the main, one of sensory experience of natural objects and processes, involving also simple control of the phenomena on the part of the pupil.

The stage of elementary science is one in which the pupil enters upon an elementary investigation of the processes of the world of nature about him as revealed in the manifold application of discovery and invention which have become the common environment of all who live under the conditions of modern civilization. This stage may be thought of as the popular science stage. It belongs particularly to the period of early adolescence, in which the individual is in a period of unusual hospitality to new ideas of a higher order than has previously been the case, but when he is still reluctant and probably unable to comprehend the abstractions involved in scientific generalizations.

*Standards:*

1. The program calls for two half-courses in which are interpreted such phenomena of nature as are within the experience of children.

2. The course cannot be satisfactorily taught if a single textbook on the subject is put in the hands of the pupils for a series of assignments and recitations.

3. The course should include the several branches of physical science as physics, chemistry, astronomy, meteorology and biology.

*Suggestions.*

The outline given on pages 168 to 198 of the elementary program should be the basis of the work, but the room should be supplied with textbooks in elementary science and on the several sciences, with the magazines of science and with the simple apparatus needed.

*Bibliography.*

Chapter XVI, Elementary Science, Program of Studies for the Elementary Schools of New Hampshire.

Textbooks of the type of the Hodgdon Elementary Science, published by Hines, Hayden and Eldredge.

## PHYSICS IV.

*Aim.*

During the last decade probably no subject in the curriculum has enlarged and changed its viewpoint more than science and, especially, physics. Therefore, it seems necessary to state briefly these important changes and to indicate clearly the present accepted principles of science as far as they apply to the recitation and the laboratory experiment.

First, the formal or didactic method of instruction is abolished. This means that recitations merely to show the teacher how much of a textbook the pupil has learned, or to give the teacher opportunity merely to explain what is not understood, or to aid in solving a large number of unfamiliar textbook problems, or to describe numerous unfamiliar applications of principles are not considered sufficiently valuable to justify the attempt to teach science. *The recitation to be worth while must be so ordered that it will impart to the pupils some insight into the meaning and value of science, infect them with the true scientific spirit, and train them to methods of thinking and investigation common to all sciences.*

Secondly, it means that far too many experiments are performed merely "to illustrate this principle," "to verify that law," "to determine the value of that constant," or "to measure something" for the mere sake of acquiring technical skill by formal practice. The deadening effect of merely "going through" a set of formal experiments unrelated to any work in the classroom or to any vital interest of the pupil is appalling. This has been the cause of failure with the use of many manuals such as the Harvard Experiments, the so-called "National Physics Course" and others of a similar purely formal character. All such laboratory work, aimed as it is, consciously or unconsciously merely to impart information or formal discipline, tends to inhibit thought and investigation rather than to incite it and can no longer be tolerated.

*The true spirit of science grows out of the desire to know truth that may have a useful outcome and apply it to get results that are felt to be worth while and hence this spirit can be caught by children only when they investigate, learn and apply in order to get results that appeal to them personally as worthy of their efforts.*

The scientific method is essentially a method of solving problems that present some appeal to the mind. *Therefore, the true way to induct beginners into its use is to confront them with such problems and guide them in using scientific methods in reaching their solution. These problems through which one expects to teach the facts, ideas, laws, concepts and principles of science must be found among those that lie near the interests and experiences of the pupils and can be led up to in such an interesting way that they will appropriate them as their own.*

### *Standards.*

1. The unit in physics consists of at least one hundred and eighty periods of forty minutes each (equal to 120 hours) of assigned work. Two periods of laboratory work count as one of assigned work.

2. The work consists of three closely related parts; namely, class work, lecture-demonstration work and laboratory work.

3. It is very essential that double periods be arranged for laboratory work.

4. The class work includes the study of at least one standard text.

5. In the laboratory the pupil shall perform at least forty individual experiments or thirty projects (see definition of *experiment* and *project* under Chemistry), and shall keep a careful notebook record of them. At least twenty of these will involve numerical work and the determination of such quantitative relations as may be expressed in whole numbers and should not differ widely from the list of starred topics in the syllabus.

### *Suggestions.*

1. *Syllabus of Topics.* \*1—Weight, center of gravity. \*2—Density. \*3—Parallelogram of forces. \*4—Atmosphere pressure; barometer. \*5—Boyle's law. \*6—Pressure due to gravity of liquids with a free surface; varying depth, density and shape of vessel. \*7—Buoyancy; Archimedes' principle. \*8—Pascal's law; hydraulic press. 9—Work as force times distance and its measurement in foot-pounds and gram-centimeters. 10—Energy measured by work. \*11—Laws of machines; work obtained not greater than work put in, efficiency. \*12—Inclined plane. \*13—Wheel and axle, pulleys. \*14—Measurement of moments by the product of force times arm; levers. 15—Thermometers; Fahrenheit and Centigrade scales. 16—Heat quantity and its measurement in gram-calories. \*17—Specific heat. \*18—Evaporation; heat of vaporization of water. \*19—Dew point; clouds and rains. \*20—Fusion and solidification; heat of fusion. 21—Heat transference by conduction and connection. 22—Heat transference by radiation. 23—Qualitative description of the transfer of

energy by waves. 24—Wave length and period of waves. 25—Sound originates at a vibrating body and is transmitted by waves in the air. \*26—Pitch and period of sound. \*27—Relation between the wave length of a tone and the length of a string, or organ pipe. \*28—Resonance. 29—Beats. 30—Rectilinear propagation of light; pin-hole camera. \*31—Reflection and its laws; images in plane mirror. \*32—Refraction and its use in lenses; the eye, the camera. \*33—Prisms and dispersion. 34—Velocity of light. 35—Magnetic attractions and repulsions. \*36—Field of force about a magnet. 37—The earth as a magnet; compass. 38—Electricity by friction. 39—Conductors and insulators. \*40—Simple voltaic cell. \*41—Electrolysis; definition of ampere. \*42—Heating effects; resistance, definition of the ohm. \*43—Ohm's law; definition of the volt. \*44—Magnetic field about a current; electromagnets. \*45—Electromagnetic induction. \*46—Simple alternating current dynamo of one loop. \*47—Electromagnetic induction by breaking the circuit; primary and secondary. \*48—Conservation of energy.

*Note.* This syllabus is not intended to include all the materials for the year's work. It is purposely made short so that each teacher may be free to supplement it in a way that fits his individual environment. It does, however, include all the topics which have by common consent been agreed upon as essential to a first course in physics.

2. *Form of Notes.* The notes made by the pupil on his experiment should contain (a) a full and clear but concise statement of the problem that is to be solved or the question that is to be answered by the experiment; (b) a brief description of the apparatus and materials used; (c) an explanation of the method of procedure; (d) a clearly tabulated statement of all numerical data and results; (e) all calculations that were used in obtaining the results; (f) the conclusions that were reached; (g) a brief



discussion of such sources of error as are profitable for the pupil to consider; (h) the solution of some numerical problem based on the experiment performed.

*Note.* Much time is often wasted in the useless embellishment of notebooks. Pupils should never be allowed to copy drawings from books. All drawings should be made from the objects themselves that are to be represented; and they should show clearly the particular features that are significant in the problem. Occasionally a negative may be made of apparatus difficult to draw and the pupil be encouraged to make a blue print for his notebook. *All notes that belong directly to the laboratory should be made in the laboratory at the time when the work is done and the sheets on which they are made should not be taken from the laboratory until they have been inspected, checked and released by the teacher.*

3. *Equipment.* It must be understood that science is essentially laboratory work and every school must be equipped with a laboratory and apparatus suitable for performing the experiments arising in the study of the syllabus. A minimum equipment list may be obtained from the state department.

The school laboratory should also contain cases and display racks for charts, maps, pictures and lantern slides. Also bookcases for science library, catalogues, illustrations, scientific papers and magazines. Models and sets of apparatus prepared for special experiments. A good projection lantern or *porte-lumière*.

4. *Making of Apparatus.* The making of apparatus by the pupils should be encouraged and the best pieces used in class work. Among those most useful and easily made are the following:

Plumb bobs and pendulums, inclined planes, levers, weights for levers, model of a traveling crane, equilibrium of liquid tubes, model water wheels, model turbine, air

thermometer, metal thermometer, lift and force pumps, demonstration barometer tubes, Boyle's law tubes, convection apparatus, model of hot-water heating plant, distillation apparatus, suspended coils and ampere frame, helices mounted on boards, sounders and keys, resistance coils, primary and secondary coil, Wheatstone bridges, solutions, Leyden jars, discharger, electrophorous, voltaic cells, electrolysis apparatus, electroscopes, sonometers, photometers, optical benches, mirrors, rectangular blocks, camera, hydraulic press, dynamo and countless others, especially in electricity.

5. *The Recitation.* There should always be definitely in mind:

1. The General Topic (*e. g.* Heat). 2. The Sub-topic (*e. g.* Distribution of heat by convection). 3. The Lesson unit (*e. g.* Uses and control of heat in the house). 4. The Lesson Problem (*e. g.* How to start a fire without getting smoke into the house).

At the *assignment of the lesson*, the teacher will find out how much the class already knows about the subject, will ask questions that suggest problems, will request apparatus to be examined, will call for the collection of illustrated material obtained from local sources or catalogues, will forbid the study of any text or premature theories, will set everyone asking questions at home and on the street to discover facts, will require that orderly notes be made of all facts learned or investigated, will call for personal experiences gained through any of the senses that may bear on the subject, and will require each pupil to write and hand in on the morrow a neatly written summary in good English of all that has been learned, together with questions upon topics not clearly understood.

During the lesson conference, the subject matter is organized by the pupils under the direction of the teacher and the lesson problem clearly outlined. Here the aim is to get at the foundation of things and to complete the

chain of efficient causes link by link as far as the pupils are able to go by their own observation and reasoning.

Next different hypotheses to explain the facts observed are advanced and tested by simple experiments. *Here comes in the true function of the laboratory experiment.*

*Then comes the conclusion, the generalization and the application.* The conclusion will usually consist of a written series of statements of facts and phenomena observed, discovered, investigated or verified. The final generalization is a concise written statement in good English of the essential and characteristic principles involved in the problem investigated. Each pupil should prepare one and read to the class. The best may occasionally be decided by vote. Under application, associated or related phenomena are studied and a far-reaching general principle established which is more likely to be remembered and recalled when wanted for the solution of similar problems than it would be if only perfunctorily memorized.

Lastly the topical review outline is placed on the board, each pupil supplying one or more topics and giving details without reference to books or notes.

6. *Laboratory Experiments.* No laboratory experiment should ever be performed unless it is to find out at first hand, by special appropriate observation and experiments, certain essential facts of observation which are needed in the methodical investigation of a certain scientific problem and which can not be found out as conveniently or effectively in any other way. It makes all the difference in the world whether the pupil observes, experiments, measures, examines apparatus or machine and specimens, tabulates measurements and solves problems merely "to do stunts," "to perform experiments," "verify laws," or even "to get a concrete basis for appreciating the principles set forth in the text," or whether he is experimenting to find an answer to some problem in which he is tremendously interested. Thousands of notebooks of the former class clutter

the closets of science laboratories, as the pupils, after a year's hard labor, do not care enough about them to take them home.

It should continually be borne in mind that the finding, for example, of the specific gravity of any substance, the determining of the coefficient of friction of expansion, the verifying of Ohm's law or any other similar experiment has absolutely no pedagogical value unless it is done to answer some vital question of worth-while importance in which the pupil is intensely interested.

If no large commercial, industrial or civic problem is possible, the pupil is always interested in determining the *efficiency* of the particular piece of apparatus which he is using. For example, a pupil feels no great mental stimulus in merely verifying the law of the inclined plane or pulley, but he may become highly interested to discover how far this particular inclined plane or pulley complies with the theoretical law, to discover and compute its loss; that is, to decide upon its efficiency and to compare the efficiency of the two machines in doing the same work.

Under this sort of teaching, the laboratory experiment instead of being abstracted, formal and meaningless to the pupil becomes a necessary step in the answering a real live human problem that the pupil has some actual reason for determining, that is, it becomes a project. Many such laboratory experiments can be found in the problems aroused in observing the household or industrial machines which are in common use, such as fireless cookers, electric flat-irons, sewing machines, electric and mechanical vacuum cleaners, lathes, drills, electric fans, scissors, can openers, fruit presses, thermometers, stoves, furnaces, gas, water and electric meters, ice cream freezers, thermos bottles, household and school plumbing, heating and ventilation, refrigeration, stills, automobiles, gas engines, annunciators, electric gas lighters, bells, fuses, lights, automatic sprinklers, electroplating, electrolysis, civic water supply and pressure, municipal projects and hundreds of other big,

vital, live subjects. The practical pedagogical test for all experiments is this: *Does it interest the pupil in some principle of physics and increase his ability to apply it in other cases?*

7. *List of Laboratory Experiments.* For the above reasons no formal set of laboratory experiments will be issued, but forty of the type outline will be required. Packard's Laboratory Manual, Every Day Physics, Twiss' Laboratory Exercises in Physics and the Experiments adopted by the Northwestern Association of Science Teachers are good examples of live, practical experiments along the latest scientific lines.

8. *Aids to Interest in Physics.* The Weston Electrical Instrument Company of Newark, New Jersey, publish several monographs of great value to teachers. These may be obtained free. The National Joint Committee on the Improvement of Physics Teaching has numerous blue prints, description of new apparatus and devices which may be obtained from the Chairman, Professor J. A. Randall, Pratt Institute, Brooklyn, New York. The large science apparatus houses issue catalogues which are instructive and helpful and should be on file in every science library. Hopkins' Experimental Science, published by Munn & Company, editors of the *Scientific American*, is an almost indispensable book to every school as are also numerous other publications of the same company. Biographies or well-selected biographical sketches of the lives of the great scientists should be easily available. Among the most interesting are Galileo, Copernicus, Newton, Watt, Boyle, Galvani, Volta, Franklin Faraday, Tyndall, Rowland, Hill, Edison, Marconi, and the Wright Brothers. Selections from the works of Davy, Faraday, Tyndall, Fleming, Lodge, Dewar, Michelson and others are not only absorbingly interesting from the standpoint of science, but, also are choice models of English exposition. The *Scientific*



*American* and the *Scientific American Supplement* are extremely valuable, as are also *The Popular Science Monthly*, *Popular Mechanics* and the *Electrical Experimenter*.

A live science club adds much to the interest of the school and affords an excellent opportunity to make new apparatus, do commercial testing and special scientific investigation.

### *Bibliography.*

For professional reading by the teacher, nothing is better than "Science Teaching" by G. R. Twiss, published in 1917 by the Macmillan Company. "The Teachings of Physics" by C. R. Mann, published by the Macmillan Company, is also excellent, as is "The Symposium on the Purpose and Organization of Physics Teaching in the Secondary Schools," published by the editors of *School Science and Mathematics*, 2059 E. 72d Place, Chicago. Government Bulletin, No. 47, entitled, "Teaching Material in Government Publications," is excellent and can be obtained free from the Commissioner of Education, Washington, D. C.

### CHEMISTRY V.

#### *Aim.*

See Physics IV.

#### *Standards.*

1. The study of a standard text with at least 150 pages of supplementary reading.

2. Not fewer than 60 experiments worked out in the laboratory by each pupil and properly recorded in a suitable notebook, or,

3. Not fewer than 30 projects, or,

4. Any combination of 2 and 3 the numerical value of which equals 60. Each project may be equivalent to two experiments.



5. Not fewer than 200 problems in chemical arithmetic, including computations accompanying the laboratory work. It is desirable that problems be recorded in a notebook and be held ready for inspection at any time.

### *Suggestions.*

#### 1. *Definitions.*

*Experiment.* A procedure according to an outline the aim of which is not directly related to the environment of the pupil and usually has as a goal an illustration of some scientific principle without any particular application.

*Project.* An extended experiment motivated. Every experiment may be made a project by extension and application. For illustration, the chemistry of soap making, preparation of alcohol by fermentation, preparation of ether and others, with slight modification, are well adapted for project work. A list of recommended projects is given in Circular No. 92.

#### 2. *Notebooks.* See under Physics IV.

3. *Required Equipment.* Every laboratory should be provided with water, with gas, if possible, and, if not, a gasoline blast lamp and sufficient alcohol lamps; a table for every two pupils and at least one good, well-ventilated hood. Tables should contain lockers and racks for bottles and apparatus when in use.

Tables can be built by manual training class or by any carpenter, at low cost, suitable for all the work necessary in physics or chemistry. Iron sinks, arranged tandem, with tables on each side, closets beneath, and shelves on racks above, admirably answer the purpose. In this way one sink may serve for four pupils.

There must be a sufficient quantity of chemicals and apparatus in the laboratory to meet the demands of the selected work.

4. *Recommendations.* It is recommended that throughout the course especial attention be paid to the common illustrations of chemical phenomena and their industrial, physiological and hygienic applications; that visits be made to chemical works, dye shops, gas plants and the like where possible; that periodicals devoted to the subject be regularly taken for class use; that special reference books and various texts, manuals, catalogues, etc., be kept constantly and easily accessible to the pupils; and that the laboratory be made attractive and workable.

Many communities furnish opportunities for observing well developed chemical operations, such as special water-filtering plants, manufacture of paper, tanning of hides, dyeing of cloth. Whenever possible, a survey of these operations should be carried out by certain pupils interested in some particular line of work. Such a survey might require the equivalent time of a week's work in the laboratory. A record of this investigation should be comprehensively written and presented for approval immediately after the work has been completed.

5. *Laboratory Work.* The chief aim in a preparatory course in chemistry is to furnish first-hand information about well-known materials, their manufacture, properties and use. Therefore, no attempt should be made to gain a comprehensive knowledge of the facts of the science, nor in any way to encroach upon the province of collegiate instruction, but rather to appeal to the experiment instead of the text for answers to questions and to stimulate the reasoning powers of the pupil by constant questioning, supervision and correction. This will aid in training the pupil to observe accurately and draw correct conclusions from his observations.

6. *Lecture Table Demonstration.* The preliminary lecture work may well be confined to those experiments which

are to be done in the laboratory, giving a general description of the method to be used, the object to be attained and the precautions which must be observed to insure safety and obtain good results. The later lectures and demonstrations can be used appropriately in amplifying the work done in the laboratory by parallel but different experiments; in explaining more in detail the principles involved after the class has thought out the main points in regard to them; and in doing any of the experiments for which there is not sufficient time in the laboratory. Subject matter for demonstration may be found in almost any advanced chemistry, but care should always be taken to select that which illustrates and teaches rather than that which only amuses and delights.

#### LIST OF CHEMISTRY EXPERIMENTS.

No.	EXPERIMENT.
1.	Physical properties of iodine. Physical properties of sugar. Note action on heating and degree of solubility in water.
2.	Effect on (a) iron and (b) magnesium when heated in air.
3.	Preparation and properties of oxygen. (Two methods.) Study of by-products in both cases.
4.	Weight of a litre of oxygen. (Standard pressure and temperature.)
5.	Determination of the per cent. of oxygen in the atmosphere.
6.	Preparation and properties of hydrogen gas. (Two methods.) Study of by-products in both cases.
7.	Electrolysis of water.
8.	General study of acids, bases, and salts.
9.	Study of the common indicators.
10.	Neutralization by titration method.
11.	Hydrolysis. Solutions of salts that are not neutral. Water as a real chemical compound.

12. \*Study of solutions, suspensions, precipitates.
13. Relation between temperature and solubility. Note also rate of solubility. Some salts are very soluble but dissolve slowly.
14. Relation of the properties of a substance to its water of crystallization. What commercial significance?
15. Efflorescence.
16. Deliquescence.
17. Preparation and properties of chlorin gas. Chlorin water.
18. Preparation and properties of hydrochloric acid gas and liquid.
19. Preparation and study of two chlorides. Test for a chloride.
20. Preparation of two bromides. Test for a bromide.
21. Preparation of two iodides. Test for an iodide.
22. Comparative study of the chemism of chlorin, bromin, and iodin by displacement.
23. Preparation and properties of hydrofluoric acid. Study of the physical properties of sulphur.
24. Note properties on heating in a test tube. What is the usual relation between viscosity and temperature?
25. Preparation of a crystalline and an amorphorous form of sulphur.
26. Preparation and properties of hydrogen sulphide.
27. Direct formation of two metallic sulphides.
28. Preparation of a sulphite and a corresponding sulphate.
29. Preparation of two nitrates. (Two methods.)
30. Test for a nitrate. Test for a nitrite.
31. Preparation and study of an oxide of nitrogen produced by decomposing ammonium nitrate.
32. Preparation and properties of nitric oxide. Behavior with oxygen. (Air.)
33. Preparations and properties of nitric acid.
34. Preparation and properties of ammonia gas and solution.

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\* Many pupils fail to recognize, with certainty, precipitates and true solutions. Correct methods should be insisted on and the student led to understand the importance of this recognition.

35. Reaction between an ammonium compound and a base (a) in a slightly moist, (b) complete solution.
36. Per cent. of nitrogen in the air.
37. Study of carbon. Physical and chemical properties. Modifications.
38. Detection of carbon dioxide in the air. Physical properties of the gas.
39. Solubility of carbonates in the presence of carbon dioxide.
40. Effect of heat on suspension of carbonates in partial solution.
41. Study of at least two types of fire extinguishers.
42. Study of baking powders.
43. Preparation of carbon dioxide. Acid-carbonate method.
44. Preparation and properties of carbon monoxide.
45. Study of temporary and permanent hard waters.
46. Action of aluminum salts on water containing soluble salts of lime.
47. Equivalent of silver to hydrogen.
48. Equivalent of aluminum.
49. Study of the general behavior of electrolytes and non-electrolytes in solution. Supplemented by lecture experiments and class discussions.
50. Ionization and migration as shown by the study of some electro-plating process.
51. Flame tests for sodium, potassium, strontium, calcium, and barium compounds.
52. Action of metals on certain salt solutions. Displacement.
53. Identification of a few metals by borax bead test.
54. Identification of metals by use of blow pipe. Oxidation and reduction.
55. Oxidize iron to the higher state and test for the presence of "OUS" and "IC."
56. Reduce a solution of iron with hydrogen gas to a noticeable degree.
57. Changing potassium chromate to potassium bichromate and back again. Oxidation and reduction in solutions.
58. Preparation of chromic anhydride, chromic acid, and potassium chromate.

59. Chromium as an acid-forming and a base-forming element.
60. Qualitative separation of lead, silver, and mercury.
61. Qualitative separation of the metals of any other group.
62. Study of the properties of phosphorus.
63. Tests for ortho and meta phosphoric acids.
64. Preparation of two double salts.
65. Preparation of an acid salt.
66. Preparation of sodium carbonate.
67. Study of the preparation and composition of blue print paper.
68. Composition of organic compounds.
69. Study of a few properties of cane sugar. (12 carbon.)
70. Study of a few properties of glucose. (6 carbon.)
71. Relation between starch, dextrin and sugar.
72. Detection of starch by iodine.
73. Study of the relation between sugar and alcohol.
74. Study of the relation between alcohol and an organic acid.
75. Test for an acetate.
76. Study of the composition of photographic materials. Chemical action in exposure and development.
77. Manufacture of hard and soft soap.

### *Bibliography.*

#### *General Inorganic Chemistry.*

- Textbook of Inorganic Chemistry, Hollermann: Wiley.
- Principles of Inorganic Chemistry, Ostwald: The Macmillan Co.
- Modern Chemistry, Ramsay: The Macmillan Co.
- General Chemistry for Colleges, Smith: Century Co.

#### *Organic Chemistry.*

- Textbook of Organic Chemistry, Hollerman: Wiley.
- Textbook of Organic Chemistry, Perkin & Kippin: J. B. Lippincott Co.



*Theoretical Chemistry.*

Chemical Theory for Beginners, Dublin & Walker:  
The Macmillan Co.

Outlines of Theoretical Chemistry, Getman: Wiley.

New Era in Chemistry, Jones: Van Nostrand.

Scientific Foundations of Analytical Chemistry, Ostwald: The Macmillan Co.

Theory for Beginners, Ramsay: The Macmillan Co.

*Physical Chemistry.*

Physical Chemistry in the Service of the Sciences,  
Van't Hoff: University of Chicago Press.

Introduction to Physical Chemistry, Walker: The  
Macmillan Co.

*Industrial Chemistry.*

Outlines of Industrial Chemistry, Thorpe: The Macmillan Co.

*Food Analysis.*

Food Inspection and Analysis: Wiley.

Food Inspection and Analysis: Leach.

*Historical Chemistry.*

History of Chemistry, E. Myer: The Macmillan Co.

Essays on Historical Chemistry, Thorpe: The Macmillan Co.

*Pedagogy.*

Teaching of Chemistry and Physics, Smith & Hall:  
Longsman, Green & Co.

Teaching of Science, Twiss: The Macmillan Co.

## THE COMMON SCIENCES V.

*Aim.*

This course is planned for girls of the fifth high school year. It is assumed that these girls have already had four years of secondary science in concrete form. In their courses in elementary science, in cooking, in household appliances and in nursing and physiology, they have become familiar with many of the manifestations of nature that form the bases of the sciences: physics, chemistry, biology, astronomy and physiography. In these earlier courses, the study has been experimental and concerned with the interpretation and guidance of the phenomena of nature rather than with laws and systems of science. It is the purpose of this course to organize the information of pupils into logical form by considering separately the common sciences. This study should be of special benefit to girls who are not to elect courses in science at college. It will give a proper foundation for the work in nature study as given in the normal schools and for all pupils will give a general familiarity with scientific laws, with the accepted facts of science and with the discoveries of men working the scientific fields.

*Standards.*

Geology, 4 weeks.

Biology, 6 weeks.

Astronomy, 4 weeks.

Physics, 12 weeks.

Chemistry, 10 weeks.

*Suggestions.*

This is properly a textbook course aimed to give a comprehensive view of the field of each science studied. Each topic should be presented by the teacher with simple classroom or field demonstration. The topics should then be organized by the use of the textbook, discussion and other available material and should be tested by complete recitations and not by brief answers to many questions.

In each subject the laws and leading principles should be carefully taught until each subject appears in an organized system. Each pupil should prepare in each subject an extensive notebook, planned with reference to sources as a help in normal school work or for study and revision in later years. Mathematical demonstrations and the details of complicated machines have no place in this course. Each pupil should have a textbook in each of the five subjects and in the choice of these care should be taken to select those that attempt to deal with the subject as a whole, that are descriptive in their character and are distinctly good reading. For this purpose some of the older books are better than new ones which deal extensively in scientific theory, in mathematical proof and in laboratory demonstration of standardized experiments.

### *Geology Outline.*

#### Lessons on home geology.

1. General view of surrounding country.
2. Study of exposed sections.
3. Study of rocks.
4. Study of soils.
5. Study of a stream.

#### Structure of the earth.

1. Materials, rocks.
  - (a) Composition, texture, classes.
2. Arrangement of rocks.
  - (a) Original structure.
    - (I) Stratification, eruptive masses, veins.
  - (b) Subsequent structure.
    - (I) Inclinations, faults, joints, mountain chains, concretions, cleavage.

#### History of the structure of the earth.

1. Theory of the origin and structure of the earth as a whole.
2. Geologic maps and sections.
3. Theory of the history of North American continent.
4. Theory of the history of New Hampshire.
5. Theory of the history of local section.

*Biology Outline.*

1. Groups of animal life: protozoa, sponges and coelenterata, echinoderms, vermes, mollusks, arthropods, fishes, reptiles, birds, mammals.
2. Struggle for existence and the development of higher forms.
3. The laws of evolution.

*Astronomy Outline.*

1. Definitions, fundamental problems and sources of information.
2. The earth.
3. The moon.
4. The sun.
5. The planetary system.
6. The stars and other heavenly bodies.

*Physics Outline.*

1. Gravity.
2. Work and machines.
3. Motion.
4. Pressure in fluids.
5. Water power.
6. Heat.
7. Heat and work.
8. Electric currents.
9. Indirect currents.
10. Electric Power.
11. Sound and Wave motion.
12. Music.
13. Optics.
14. Color.
15. Radiation.

*Chemistry Outline.*

1. Oxygen.
2. Hydrogen.
3. Composition of water and combining weights.
4. Water and solution.
5. Atoms and molecules.
6. Chlorine.
7. Hydrochloric acid—chlorides.
8. Molecular composition.

9. Atomic and molecular weights.
10. Chemical formulas, names, equations and calculations.
11. Sulphuric acid and sulphates.
12. Sodium, potassium and their compounds.
13. Acids, bases and salts.
14. Sulphur and its sulphides, oxides and acids.
15. Nitrogen.
16. The atmosphere and nitrogen compounds.
17. The halogen group.
18. Carbon and its oxides.
19. Calcium and its compounds.
20. Study of production, distribution, use and importance of the chief minerals, such as silicon, boron, iron, steel, zinc, mercury, magnesium, copper, etc.

### *Bibliography.*

#### *Geology.*

- First Book in Geology, Shaler: D. C. Heath & Co.,  
 Geology, LeConte: American Book Co.  
 The Geological Study, Dana: American Book Co.

#### *Biology.*

- Animal Studies, Jordan, Heath & Kellogg: D. Appleton & Co.

#### *Astronomy.*

- Lessons in Astronomy, Young: Ginn & Co.

#### *Physics.*

- High School Course in Physics, Gorton: Ginn & Co.  
 Mann and Twiss: Scott, Foresman & Co.

#### *Chemistry.*

- Morgan: The Macmillan Company.  
 First Principles of Chemistry, Fuller, Brownlee *et al.*:  
 Allyn & Bacon.  
 General Chemistry (Part I), Newell: D. C. Heath &  
 Co.  
 Essentials of Chemistry, Williams: Ginn & Co.

## CHAPTER V.

## MATHEMATICS.

The old program called for freshman algebra, sophomore geometry and a later review of both subjects. The experience of many years has shown that abstract algebra and geometry for pupils of fourteen and fifteen is for many excessively difficult and for some impossible, and these courses have produced the majority of high school failures. The senior review mathematics has ordinarily been an effective course with interested pupils, partly because some pupils have unfortunately been eliminated but more because the pupils have reached a maturity that makes abstract reasoning possible.

The revised program proposes to take advantage of this condition and to put abstract mathematics in the last two years of the program and concrete mathematics in the first two. By the 1916 program, pupils now have in the seventh grade a year of concrete geometry and in the eighth a year of concrete algebra. With this start, it is believed that in the fifth year of the course the most vital parts of both algebra and geometry can be mastered. If not, the work may be completed in the sixth year, together with solid geometry and plane trigonometry. If this seems difficult, it is to be remembered that pupils come to the senior year with a knowledge of many of the geometric constructions and with much practice in the use of the algebraic equations and, in addition, that much work in both algebra and geometry may well be eliminated. In place of the four years in mathematics proposed, schools may, of course, present five or six years but such schools must show that quantitatively five or six years of work has been outlined for accomplishment.

## MATHEMATICS I (CONCRETE GEOMETRY).

*Aim.*

The purpose of this course is to give boys and girls an adequate set of notions of certain of the properties of



space relations in the same way in which they naturally acquire ideas in the fields of other sciences.

The course is one of construction and measurement and discovery and not one of demonstration.

### *Standards.*

Not to exceed nine weeks may be spent in the review of arithmetic and the reorganization of the instruction in mathematics of the earlier grades.

At least twenty-seven weeks should be devoted to concrete geometrical exercises. The work may be based upon one of the suggested texts or upon lesson plans similar to those to which later reference is made.

Each pupil is to prepare a complete portfolio of constructions which for neatness and accuracy will be a credit to himself as well as to his teacher.

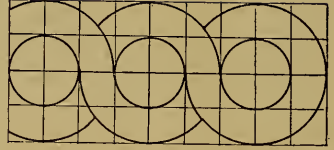
### *Suggestions.*

It is desirable that the work of the year should begin with a brief review of arithmetic. There are two reasons for this. First, the pupils of the first-year high school class usually come from several different schools and a rapid review of known material aids in unifying the class and preparing it for concerted work. Second, it enables the teacher to become acquainted with the mental habits, the educational progress and the natural ability of her pupils. The review should be upon the four fundamental operations, upon decimals and fractions and should be constantly used and constantly reviewed throughout Years I and II. The teacher of mathematics in these years is to be held responsible for the retention of the arithmetic of the elementary schools.

Teachers of mathematics must understand that presentation of concrete geometry in Class I is an entirely different matter from the teaching of the traditional course in high school geometry.

*No formal demonstration is expected or allowed.* Typical high school geometry is logic. Concrete geometry con-

sists of the observation, measurement and drawing of geometrical forms and the recognition of some of the simplest geometrical truths by visual proofs or through measurement or comparison



of concrete figures. Teachers should not begin with definitions of terms but should formulate class-made definitions when definitions are needed by the pupils.

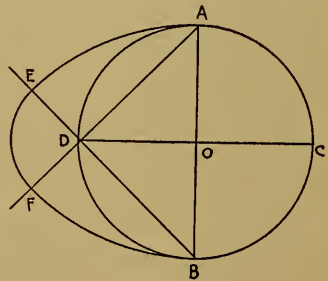
The pupils will need a drawing board, T square, 30-60 triangle, protractor, compass and scissors. But a short time need be devoted to learning how to use this apparatus. The use of the T square may be taught in drawing parallel lines, and the triangle in drawing perpendiculars

For this purpose the pupils should hold the triangle with hypotenuse to the *right* and draw the perpendicular on the *left*. Any objects having right angles may be used as figures

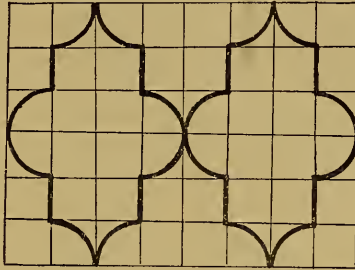


for this drawing. One of the walls of the schoolroom, with its doors, windows and pictures makes an excellent problem.

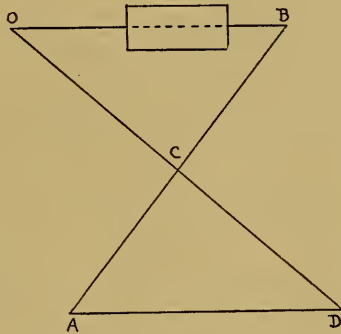
Pupils must be taught to use the compass so as not to make holes in the paper. Bracket designs, spirals, ovals or any of the ornamental figures found in the standard geometries are suitable figures for practice with the compass. This practice should not be continued too long but, as soon as the pupil has gained some facility with these pieces of apparatus, he should be shown some of the



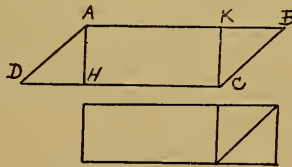
ordinary designs of linoleum and encouraged to make up original designs of his own. These may be colored and of course the drawing teacher will be consulted as to choice of colors. Squared paper is most helpful in all kinds of design work.



The measuring of heights, distance of inaccessible objects, etc., should be done during the fall term while out-of-door work is possible. Any good geometry will give illustrations and methods of these problems. A simple transit should be made and actual measurements taken with tape line of all out-of-door problems.



Parallelograms, triangles, trapezoids and circles should be cut from paper and their areas discovered by comparison with the oblong or rectangle which has already been taught in the grades below. A carpenter's six-foot folding rule will be found most helpful in teaching forms and relations of straight-lined figures.



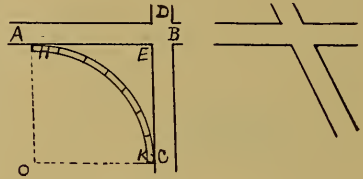
The drawing of arches commonly used in architecture is a most interesting way of teaching geometrical truths and forms. These arches may be found in the windows

of churches and public buildings in any town or city; indeed the number the class will find will be more than it will be advisable to use. Care should be taken not to let this work take more than its share of the time allowance. Dictionaries and encyclopedias will give names and constructions of many of these arches, if they are not to be found in any available geometry text, but the actual arches should be found rather than book representations copied.



The laying out of a round curbing for a street corner is an excellent application of the truths of tangents.

All the high school geometries on hand should be examined for usable material. What these textbooks give as "exercises," "optionals," or "applications" offer a wealth of material through which young pupils may be taught geometrical truths.



The truths of equal triangles are best taught by laying these triangles with the colored kindergarten sticks, and by use of scissors and paper. The following type lesson shows how the truth that "two triangles are equal if three sides of one are equal to three sides of another" may be presented:

Take three colored sticks 2 inches, 3 inches, 4 inches long and lay them on a piece of paper forming a triangle. Compare your figure with that of the student next to you. Compare with others in the class. Is yours the same shape as theirs? Is it the same size? Are they all equal? How many angles has the figure?

What is its name?

(Triangle, Trillum, Trident, Trio, Tri-state).

Make a drawing of your triangle on a piece of scratch paper.

Cut out the triangle you drew on paper.

Compare with those cut by the other pupils.

Complete this statement. "Two triangles which have the three sides of one equal to the three sides of the other . . . . ."

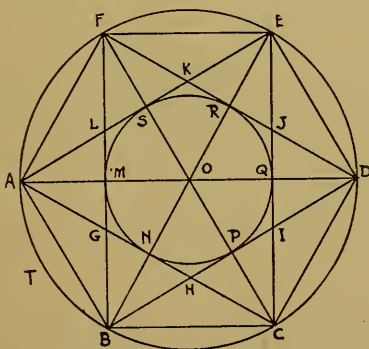
Think of some triangle which you have seen used in constructing buildings, such as brackets for shingling, nailing of rafters together, etc. This property of triangles is most useful in constructions of all kinds.

This lesson plan and the cuts used are from exercises used in the junior high school at Keene normal. Pupils are provided with sheets on which to draw, answer questions, etc. Copies of these papers may be had for use in New Hampshire schools at cost on application to the school.

In connection with this work, teachers should keep the arithmetic constantly fresh in the pupils' memory by measuring exercises requiring the use of simple arithmetical operations. Areas and volumes of standard forms and computations of similar figures and solids will provide an abundance of such arithmetical work.

An excellent review may be given at the end of the course by having the pupils study this figure based on the inscribed hexagon.

Nearly every geometrical truth of any importance may be found illustrated by these lines:



*Bibliography.*

The following texts are suggested :

Concrete Geometry, Nelson: Rumford Press, Concord,  
N. H.

Contains well-planned exercises on proofs of theorems.  
Helpful for reviews.

First Steps in Geometry: Ginn & Company.

Excellent decorative designs, easy arithmetical exercises and out-of-door measurements.

Plane Geometry, Wells & Hart: D. C. Heath & Company.

Large number of excellent designs based on geometric figures. A high school text.

Plane Geometry, Wentworth & Smith: Ginn & Company.

Good compass exercises in introduction. Fine illustrations of visual proofs on page 15. A high school book.

Inventional Geometry, Spencer: American Book Company.

This is a small science primer written years ago by the father of Herbert Spencer and still one of the best.

Concrete Geometry, Hornbrook: American Book Company.

Elementary and Constructional Geometry, Nichols: Longsman, Green & Company.

Observational Geometry, Campbell: American Book Company.

Junior High School Mathematics: Wentworth-Smith-Brown.

There are upon the market a number of new textbooks on junior high school mathematics but these commonly



deal with modified arithmetic. They contain many valuable suggestions but may not be followed closely in teaching this course.

MATHEMATICS II (CONCRETE ALGEBRA).

*Aim.*

The instruction should cause the fundamental conception of algebra to register and become a part of the pupils' working mathematical equipment. Rote instruction which leaves the pupils with merely a set of verbal memories is to be avoided. The pedagogy is the same as that for the arithmetic of the first and second grades.

*Standards.*

In the year, the following subjects should be mastered:

Addition, subtraction, multiplication and division of polynomials, multipliers and divisors not containing more than two terms.

Addition, subtraction, multiplication, division and reduction of fractions, numerical coefficients not larger than 25.

Linear equations of one and two unknown quantities.

Fractional equations containing one unknown, denominators monomial.

Removing of parentheses.

Short methods of multiplication avoiding fractional terms, such as:  $(a^2 + \frac{1}{4}b)$   $(a^2 + \frac{1}{4}b)$ .

Factoring such types as:  $a^2 + 2ab + b^2$

$$a^2 - 2ab + b^2$$

$$a^2 - b^2$$

$$a^2 + 8a + 15$$

$$a^3 - b^3$$

$$a^4 - b^4$$

Solution of quadratic equations of the form of  $x^2 - 7x - 18$  by factoring.

Evaluating simple forms of literal equations.

*Suggestions.*

The equation is the center of the work and it should be used in the solution of very many problems. These problems should deal entirely with actual and familiar situations.

Processes should be taught only when they are actually needed in the solution of the equations which occur in the experiences of the class.

Either in the concrete geometry of Grade VII or in their arithmetic work, the pupils have become familiar with the ordinary formulas of mensuration, such as:

Parallelogram	$A = bh$ or $S = ab$
Triangle	$A = \frac{1}{2} a \times b$ or $a = \frac{1}{2} \frac{ab}{b}$ or $A = a \times \frac{1}{2} b$
Trapezoid	$A = \frac{1}{2} h (a + b)$ or $H \frac{(a + b)}{2}$
Circle	$C = 2 \pi d$ $C = 2 \pi r$ $A = \pi R^2$

Review these formulas by some examples of real measurements.

Recall other principles of arithmetic which can be expressed by formulas as  $I = p \times r \times t$      $t = \frac{I}{pr}$      $r = \frac{I}{pt}$

Amount = interest + principal.

Cost = price times number of articles, etc.

Use small numbers in this work and call measurements to the nearest foot or inch to avoid fractions.

Let the pupils make up expressions such as  $ab + cd - f$  and evaluate them using different values for the letters.

Require pupils to *check every arithmetical process in addition, subtraction, multiplication and division* so that pupils are absolutely sure that the numerical part of their answer is correct, if the method is correct.

After a week of drill in these formulas to familiarize

pupils with use of letters, teach addition. Begin with positive quantities such as:  $3a$   $2mn$   $4x^2$  then take up a

$$\begin{array}{ccc} 3a & 2mn & 4x^2 \\ 4a & 5mn & 10x^2 \end{array}$$

positive and negative, such as:  $-6a + 2x$  *Do not*

$$\begin{array}{ccc} -6a & + & 2x \\ + 4a & - & 10x \end{array}$$

*attempt to explain the reasons* for any rules. Give this rule, "subtract the smaller coefficient from the greater and give the answer the sign of the greater" or any similar simple rule. Have pupils make up a page of these examples and give to other pupils to work. They will like them better than book examples. Each one should do a hundred of these at least.

Place this example on the board:

9 bu. 2 pks. 3 qts. and let the class recall their  
4 bu. 3 pks. 4 qts.

addition of compound numbers. Then write the same example  $9b + 2p + 3q$  and ask them to add it.

$$\begin{array}{l} 9b + 2p + 3q \\ 4b + 3p + 4q \\ \hline \end{array}$$

A few such illustrations will suffice to introduce addition of polynomials. Drill on these until familiar, then add columns containing both plus and minus quantities. Check all addition by adding up and down. *Insist on absolute correctness of numerical work.*

In beginning subtraction place a variety of examples illustrating all possible cases on the board thus:

$$\begin{array}{cccccccc} 5a & 5a & -5a & -5a & 3a & -3a & -3a & 3a \\ 3a & -3a & 3a & -3a & 5a & 5a & -5a & -5a \end{array}$$

Teach one rule. "Think of the subtrahend with its sign changed and proceed exactly as in addition." In the pupil who is visually minded there is no harm in changing the subtrahend or in writing the "changed signs" in small figures above the signs of the subtrahend, using a light

pencil mark, until the process is understood. *Attempt no explanation of reasons.* Competition between rows of pupils on percentage of correctness, etc., will stimulate interest. Drill for a week and for the two succeeding weeks use the first ten minutes of each recitation in review of addition and subtraction.

Any text will furnish the class with simple equations of one or two unknown quantities which can be solved by addition and subtraction, but much more interest will be shown and far better results secured if pupils are encouraged to make up their own examples.

The mystery of algebra disappears when pupils find they can make up just as good examples and problems as the writer of the textbook. They will take delight in setting examples for their classmates as, "I am thinking of a number. If I multiply this number by 7 ( $7n$ ) and then add 2, I shall have 30. What is the number?" Or, "If I multiply the number by 4 ( $4n$ ) and add 10, the sum will equal 22 more than the number."

$$(4n + 10 = 22 + n)$$

Any good algebra textbook will suggest varieties of equations of this class.

Next take up equations containing two unknown quantities. Have the pupils make up equations and give to each other for solution. Introduce problems containing one or two unknown quantities and have pupils make up a great many such problems.

Multiplication follows now very easily. Keep all coefficients small, none over 25. After the pupils can multiply a polynomial of four terms by one of two terms, introduce a few decimal coefficients, two places only, and review addition and subtraction, using decimal coefficients.

Leave division until the latter part of the year.

After pupils can add, subtract and multiply with facility and solve simple equations, take up the same processes with fractions. Use only small numerical coefficients, not larger

than 25, in fraction work, and insist on *constant checking* in all arithmetical processes to produce *absolute accuracy*.

The pupils are now ready for short processes in multiplication. Teach these four:

$(a + b)(a + b)$ ;  $(a - b)(a - b)$ ;  $(a + b)(a - b)$ ;  $(a + 3)(a + 7)$ , and just as you would teach in arithmetic, that 6 is  $2 \times 3$ . After teaching that  $2 \times 3$  is 6, teach that  $a^2 + 2ab + b^2$  may be written  $(a + b)(a + b)$  and the same with the other three forms of factoring.

The other case of factoring, where terms have a common factor, should be taught after division.

Division should follow factoring, beginning with the simplest forms and in long division using no divisor of more than two terms.

Forms like  $a^3 + b^3 \div a + b$  and  $a^4 - b^4 \div a - b$  may be given but not drilled upon with the fulness required by most texts, and all less usual classes of factoring should be omitted.

After division is mastered, review fractions, including reduction to lowest terms, addition, subtraction, multiplication and division, using the factorable forms.

Simple quadratic equations which can be solved by factoring such as  $x^2 + 8x + 15$  should be taught and, if there is time, the substitution of numerical values in formulas and evaluating literal equations of the simple formula type for the various letters, avoiding those involving radicals and quadratics.

### *Bibliography.*

Any modern text in algebra may be used, provided that sufficient additions and eliminations are made. The number of simple problems and examples performed should be very large and should produce habitual accuracy in the use of the fundamental operations. From any book used should be eliminated all unnatural problems, all complex operations, all general rules and most general formulas.

## MATHEMATICS V (ALGEBRA AND GEOMETRY).

*Aim.*

It is believed that the excessive failure in the traditional high school course in freshman algebra and sophomore geometry is due to the fact that these courses are abstract in form and expression and are commonly given to pupils at an age when abstract reasoning is impossible. It is held that these courses are entirely fitted to the development of Years V and VI but not the earlier years. Accordingly, courses in concrete mathematics are given in Years I and II and in abstract mathematics in Years V and VI.

This program assumes that pupils of Class V maturity who have had two years of concrete mathematics will be able in a single year to cover the greater part of the work in mathematics ordinarily given in the first two years of the earlier high school programs and can become sufficiently familiar with the truths of abstract mathematics for all probable needs. It assumes that in curricula where an abstract course is given in Year VI all ordinary high school mathematics may be covered. Schools which do not hold this view may continue to give three courses in abstract mathematics but in that case the third course should continue the subject into fresh fields and should not be largely devoted to review of familiar material. The standards set in this and the following courses are tentative and will be modified as experience accumulates.

Algebra, 20 weeks.

*Standards.*

The elementary operations.

Special methods in multiplication and division.

Factoring and the solution of equations by factoring, and the determination of the highest common factor.

Fractions, including complex fractions and the lowest



common multiple treated in common with the related material on fractions.

Fractional and literal equations.

Problems involving single equations.

Simultaneous linear equations containing two or three unknowns.

Statistics containing positive and negative numbers graphically represented. The graph of a linear equation in two variables. The graph of simultaneous linear equations.

Exponents, including zero, fractional and negative.

Radicals, Surds and Imaginaries. The square root of polynomials and of numerical quantities.

Quadratic equations both numerical and literal.

Simultaneous equations involving quadratics.

Problems involving quadratic equations.

### *Suggestions.*

Much time is wasted in the first course in algebra because in a great many cases the high school teachers are not adequately acquainted with the work, methods and phraseology used in the elementary grades. Now under the new arrangement of the courses in mathematics, it is highly important that teachers know what work has been covered and what work is expected to be covered.

Pupils should be taught the use of graphical methods and the teacher should emphasize the practical application of algebraic equations and formulas. In this course complicated problems and unnecessary processes should be omitted in favor of abundant practice in the useful operations. From most textbooks there may be judicious eliminations.

### *Bibliography.*

First, Second and Third Mathematics, Breslich: The University of Chicago Press.

First Course in Algebra, Hawkes, Luby & Touton: Ginn & Company.

First Course in Algebra, Wells & Hart: D. C. Heath & Company.

Elementary Algebra, Stone & Millis: Benj. H. Sanborn & Company.

Plane Geometry, 16 weeks.

### *Standards.*

The major part of the work of the text Young and Schwartz or the equivalent.

Not less than two hundred original exercises strictly geometric in character.

### *Suggestions.*

A great many of our textbooks begin the subject of geometry with a set of formal definitions, axioms and postulates. It is not a help to high school students to give them at the outset formal definitions or proofs of propositions which appear to them so obvious that they can see no reason for a proof. Teachers must remember that the main object is not to teach the pupils to know geometry but rather to lead them to think geometry. The early proofs should be intuitive, inductive and experimental, gradually leading up to the formal method of proof and it will be found that the pupils will gradually on their own part recognize the advantage of the reasoning process over that of the process of measuring. It will be of great advantage in the teaching of this subject to make the pupils feel satisfied with the early forms of proof. This can best be done by getting the pupils to see the truth of geometric statements through mental or physical inspection of the figures rather than by the long, formal proof. Symmetry, an overlooked subject and one found treated in the latter chapters of most books, is one means of bringing

points, lines and other parts of certain figures into such a relation that the whole situation is grasped by one mental act.

*Bibliography.*

Plane Geometry, Wentworth & Smith: Ginn & Company.

Plane Geometry, Slaught & Lennes: Allyn & Bacon.

Plane Geometry, Stone & Millis: Benj. H. Sanborn & Company.

Plane Geometry, Wells: D. C. Heath & Company.

First and Second Year Mathematics, Breslich: University of Chicago Press.

MATHEMATICS VI (SOLID GEOMETRY AND TRIGONOMETRY).

Plane Geometry, 4 weeks.

The review and completion of the work in plane geometry of the fifth year.

Solid Geometry, 12 weeks.

*Standards.*

Three books of the text Wentworth and Smith or the equivalent, with not less than one hundred originals strictly geometric in character.

*Bibliography.*

Solid Geometry, Slaught & Lennes: Allyn & Bacon.

Solid Geometry, Wentworth & Smith: Ginn & Company.

Solid Geometry, Stone & Millis: Benj. H. Sanborn & Company.

Breslich Third Year Mathematics: University of Chicago Press.

Advanced Algebra, 10 weeks.

*Standards.*

Equations solved like quadratics.  
 General properties of quadratic equations.  
 Graphs of quadratic equations in two unknowns.  
 Solution of equations of degree higher than the second.  
 Synthetic division, Descartes rule of signs: The Remainder Theorem: Newton's method of division.  
 Indeterminate equations of the first degree.  
 Arithmetical and geometrical progressions.  
 The binomial theorem for positive integral exponents.  
 Logarithms, exponential equations and the slide rule.  
 Determinants.  
 Permutations and combinations.  
 Probability.  
 Continued fractions.

*Suggestions.*

In dealing with the graph in the mathematics of the sixth year, the teacher is given an opportunity to give the pupils a taste of methods different from any previously known by introducing a few of the fundamental principles of analytic geometry. For example, the class has plotted a linear equation. Now with this same line have the pupils construct the necessary figure and derive analytically the two point form of the equation, of the straight line and also the equation for the length of this line. The means of check is self-evident. The pupils have had not only an opportunity to apply in a practical way their knowledge gained through plane geometry, but they have had opened to them a new concept that will stimulate a desire on part of those who are to continue their work in the higher branches of mathematics.

*Bibliography.*

Advanced Algebra, Schultz: The Macmillan Company.  
 Algebra for College and Schools, Hall and Knight (revised): The Macmillan Company.

College Algebra, Wells: D. C. Heath & Company.

College Algebra, Wentworth: Ginn & Company.

Second Course Algebra, Hawkes, Luby & Touton.

Breslich Books, I, II and III: University of Chicago Press.

Plane Trigonometry, 10 weeks.

*Standards.*

Trigonometric functions of acute angles.

Changes of the trigonometric functions.

Graphs of the trigonometric functions.

Use of the table of logarithmic functions by the solution of right and oblique triangles.

Relations between sides and angles of oblique triangles.

Area of an oblique triangle.

Relation between functions of several angles.

The solution of trigonometric equations.

*Suggestions.*

The trigonometric functions are first to be shown by means of drawing and actual measurement, and not taught by memory. Pupils should be taught to derive the exact values for the functions of  $30^\circ$ ,  $45^\circ$ ,  $60^\circ$ ,  $90^\circ$ ,  $180^\circ$ ,  $270^\circ$ ,  $360^\circ$ , without the use of the tables. The class should construct a trigonometric Function Indicator. This instrument will show the actual change of values and relations between sides and angles of a right triangle which take place as the acute angles vary between  $0^\circ$  and  $90^\circ$  much more satisfactory than any number of drawings that

can be placed on the blackboard. During the course there should be several outdoor exercises involving the use of the level and the transit. School made instruments will serve for this purpose.

*Bibliography.*

New Complete Trigonometry, Wells or Wentworth.

Elements of Plane Trigonometry, Crockett: American Book Company.

Third Year Mathematics, Breslich: University of Chicago Press.

*Conclusion.*

The requirements will be fully met in algebra, plane geometry, solid geometry, advanced algebra and plane trigonometry by those schools that complete the work of the Breslich Books, I, II and III.

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## CHAPTER VI.

### DOMESTIC ARTS.

*The Aim.*

The purpose of courses in the domestic arts in the public school is primarily vocational because such subjects as cooking, sewing, millinery, household appliances, home nursing, physiology, household organization, and household management, are directly helpful in preparing girls for the vocation of home-making; a vocation which becomes the privilege of ninety out of one hundred women to engage in as their life work. But unlike any other human vocation home-making may be culturally as broadly developmental as any of the so-called professions if the home-maker is early trained through education to follow the historic and



pre-historic footsteps made by the race during the ages in which the home evolved and woman found her supreme place as the mother, maker, and moulder of civilized society.

Making wholesome food for the nourishment of the human body is as much a fine art as painting or sculpture which please the eye, or music which delights the ear.

Creating a hygienic and attractive dress is as much the work of an artist as is decorating a china vase. The fact that it is useful should not detract from the "joy of accomplishment" accompanying its production. "Composing" a neat, satisfying living room or a cool, comfortable kitchen is as much the work of an artist as is the composition of a painting or piece of literature. In fact, it is incomparably more important since the family reared in a beautiful home adds to the sum total of good taste and fine culture in the world. These illustrations are sufficient to justify the belief that making a good home is quite as important for the welfare of the race as is composing a musical classic, writing an enduring poem, or modelling a statue in bronze, and this being so, the art of the home-maker in all of its phases is a liberal as well as a practical art.

The aim, moreover, in New Hampshire public school administration, is so to shape and develop school plans that no girl shall pass from the school into her life work without getting at least two years of systematic work in cooking and sewing. These years are the seventh and eighth, and may be in the elementary school or in the junior high school if the school system has the modern organization.

#### COOKING I (SEVENTH GRADE).

##### *The Aim.*

The aim is to prepare all girls by actual experience (a) to save perishable food products by drying, canning and preserving, or pickling, (b) to cook and serve wholesome food for everyday people, (c) to prepare suitable food for infants and invalids. It is not the aim to teach either the chemistry of foods or theories of nutrition, and the too

common practice in cooking classes of lecturing on food constituents, and their function in the human body is so far beyond the comprehension of high school pupils that it seems only to waste time and effort, and obscure the real object which is to develop through practice the art of canning, cooking, and serving food.

*Standards.*

Since it is proposed to cover the same subject matter in Years I and II, which has hitherto been covered in the freshman year of the four years high school, it is necessary to distribute the requirements given in previous programs and circulars for the ninth grade, so that Year I and Year II may have each their fair part.

CANNING, ETC.

Follow the requirements given in Institute Circular No. 1, Series 1914-15, page 1, A.

SERVING MEALS.

Serve at least two meals per term, the first one not later than November 1st.

*Suggestions.*

See Program of Studies for Elementary Schools, pp. 212-216.

There ought to be a much larger amount of canning than the minimum set, and there will be if the teaching is effective, for pupils will do additional work at home, or the teacher can make the school equipment serve as a canning center where on Saturdays or after school pupils will can the products of their home gardens.

The meals served must be practical and economical, having due regard for the cost involved.

*Bibliography.*

See Year II below.

## COOKING II (EIGHTH GRADE).

*The Aim.*

See Year I.

*Requirements.*

## CANNING.

Review the canning by requiring each pupil to put up at least two cans under each class, a, b, c, as given in Circular No. 1, Series 1914-15 under A.

## SERVING MEALS.

Serve at least two meals per term.

*Suggestions.*

The twelve meals served during the two years must be systematically planned so that every important class of foods will be made use of. It will be found that all the standard dishes commonly served in the homes of the community can be made use of and some of them repeated if these twelve menus are well thought out.

*Bibliography*, for both Years I and II.

## Pedagogical.

Institute Circulars No.	Series,	Page.	Dealing with:
5	1913-14	1- 4	Cooking.
2	1914-15	1- 2	
57	1915-16	2- 4	
58	1915-16	1- 3	
5	1913-14	5- 8	Menus, etc.
1	1914-15	1- 3	Requirements in general.
2	1914-15	2- 4	Administration.
57	1915-16	4- 8	Methods.
57	1915-16	9-13	Menus.
58	1915-16	3-11	Methods.
66	1916-17	1- 2	General.

COOKING FOR THE SICK. (PART OF THE COURSE IN NURSING  
AND PHYSIOLOGY IV.)

*The Aim.*

To give pupils experience in preparing cooling drinks and nutritious, easily-digested foods suitable for sick and convalescing people.

*Requirements.*

Pupils must prepare one or more of the foods or drinks in each of the five classes given in Institute Circular 59, Series 1915-16, page 17 and following.

*Excursions.* The class must take at least one excursion each term as suggested in Circular 59, page 5.

*Experiments.* The experiments given in Circular 59 and numbered from 1 to 26 are to be carried out in full and the observations, methods, apparatus and conclusions in each case must be recorded in a notebook used only for this purpose. This notebook must be completed at the end of each experiment and will be called for by inspectors.

The class project given on page 9 is an important one and each class must prepare a set of bottles containing the constituents of a quart of milk.

COOKING FOR THE WELL. (PART OF THE COURSE IN HOUSE-  
HOLD MANAGEMENT VI.)

*The Aim.*

This course covering not more than six weeks and involving about ten practical cooking projects and an equal number of laboratory demonstrations is intended to teach only so much of the so-called science of dietetics as can be made use of in an intelligent selection and combination of food materials.

It is properly a part of household management because the buying and raising of food is a very important factor in economical housekeeping and market prices often bear little relation to food values.

### *Standards.*

Pupils must compute many menus based on what they have eaten for a meal or on such menus as are served by the pupils in years I and II.

There must be not less than four excursions to markets, cold storage plants, bakers, etc., for the purpose of getting familiar with the available food supply, its cost, how it is handled, etc.

### *Bibliography.*

Circular No. 74, Series 1916-17, gives a working plan with considerable detail and must be followed in its essentials.

## COOKING III AND V.

In these years, there is no school work in cooking but, as in sewing, there must be constant home work and the teacher must ascertain that this is actually being done.

At least a portion of one period a month should be devoted to class discussion of home cooking projects, plans and results.

## SEWING I (SEVENTH GRADE).

### *Aim.*

The aim is to give each girl experience in making substantially everything she wears and to do this by always working on some project which at the end gives a useful, usable product.

There is absolutely no excuse for the senseless, unpedagogical sampler which from the start was a device of that

type of school mind which sees nothing apart from formal rules and logical definitions. The six weeks September and October agony over "stitches" is another manifestation of the exploded theory of "deferred values," getting ready to do something where the getting ready and the doing ought to be coincident.

The first lesson in sewing for girls of this age, whether they have had sewing in school previously or not, must be a productive effort on a real piece of work. It may be hemming a towel, or better, making an apron or cap, and there is nothing to prevent starting immediately on a simple, everyday dress. There is no inherent sequence in sewing as there is in Euclidean geometry. The only pedagogical law that governs here is the law of interest which requires only that the pupil recognizes the need of some useful article; that the material for making this is at hand, and then that the teacher proceeds directly to show the pupils how to do the work. See Institute Circular No. 1, Series 1914-15, page 3. Also, No. 66, Series 1916-17, page 2.

### *Standards.*

Pupils during Year I must complete at least one project from each of the following classes:

#### CLASS A. UNDERWEAR.

Chemise, nightgown, corset cover, drawers, combination underwear, bloomers.

#### CLASS B. OUTSIDE CLOTHING.

Blouse, shirt waist, summer dress, petticoat, kimono, child's dress.

#### CLASS C. KNITTING.

Wool mittens, helmet cap, scarf.



## CLASS D. DARNING AND PATCHING.

Stockings, gloves, sweater, and all kinds of mending on underwear or outside clothing. (This is not to be on mere pieces of cloth, or discarded stockings, but on real articles which need to be repaired because they are to be used.)

## SEWING II. (EIGHTH GRADE.)

*The Aim.*

See Year I above.

*Standards.*

During Year II each pupil must make at least one article not previously made from each of classes A and B; must continue darning and patching as needed, and make one article or more from each of the following classes:

## CLASS E. BEDDING, ETC.

Pillow cases, sheets, towels, a patchwork quilt, a braided rug.

## CLASS F.

Woolen dress, outside winter garment, knitted sweater.

## CLASS G. EMBROIDERED WORK, ETC.

Curtains, table runners, splashers, furniture covers.

*Suggestions.*

If sewing is approved for any given school on the old four-year high school basis, the work to be accomplished in the first year of the program must be a full equivalent of that outlined here for both I and II.

For the half-courses in cooking and sewing, at least two double periods per week are required throughout the two years. About one-half of the time should be given to each

subject by a reasonable distribution rather than by a fixed schedule. There should be no period given to sewing during the canning season.

Where school work in cooking and sewing is delayed until the seventh and eighth grades, it is hardly possible to do the full work planned without some increase in the time just allotted for these courses. In all schools, the work in both subjects should begin at least two years earlier, as the fifth and sixth grades are particularly satisfactory years for the beginning of work in cooking and sewing.

### *Bibliography.*

See Program of Studies for Elementary Schools, Third Edition, 1916, Chapter VIII:

#### SEWING III-VI.

Sewing as an accredited part of the program with unit recognition ends with the above outlined work for Years I and II but, as home work, under the direction and helpful suggestions of the teacher, there ought to be a continuation of useful sewing throughout the high school. It may not be done on school time, however, for it is no longer justifiable to continue teaching the subject. Every girl should make at least one dress a year for everyday use. Each girl, should, of course, make her graduation dress. In addition, she should each year remodel some garment that has become worn or through changes in style has lost its attractiveness. This work should include the cleansing and perhaps the dyeing of the goods.

The work of Years III to VI must be so organized that class time is not expended in re-teaching sewing, but teachers must guide and encourage pupils in home work to make certain that the instruction and practice of Years I and II are resulting in housewifely activities. School inspectors will be directed to determine that this is actually being done. It is suggested that in each of the above years a

portion, at least, of one period a month be allotted to class consideration of home work, with an exhibition of results. At this time, the pupils should present their sewing difficulties to the class and teacher for solution and desired work should be planned in accordance with the changes dictated by fashion.

#### HOUSEHOLD APPLIANCES III.

##### *Aim.*

The chief aim is to make girls familiar with the equipment of a modern home by actual study of such equipment. This cannot be done from books but must be accomplished by means of personal investigation and detailed examination of the utensils, machines and devices which the home-keeper is constantly making use of.

A secondary aim, but an important one, is to furnish concrete experience with applied science, heat, electricity, sound, light, chemistry, bacteriology, etc., thereby laying a real foundation for science. The science, however, must grow out of a familiarity with the device through which it is applied, *e. g.*, the S trap in the sink drain is studied for the sake of what it accomplishes in a hygienic way. It is undesirable to study the scientific principles of a laboratory device which has no useful connection with anything. "We really retain only the knowledge we apply."

##### *Standards.*

There should be the equivalent of one well-planned, purposeful excursion each week to see various forms of household equipment and appliances either in actual use or in salesrooms, shops or factories where the parts can be seen and the plan of construction understood. This is the most important part of the course because it is the center around which the recitation is planned as well as the source of information upon which the conclusion of the lesson depends.

Pictures of a furnace or pump or stove cannot be substituted for personal investigation of a real furnace, pump or stove.

Pupils are required to keep a neat, orderly, condensed notebook in which are to be recorded the facts the pupil has gathered from these excursions and not the second-hand information the teacher has delivered in lecture form.

Each of the nine classes of topics given in Institute Circular No 5, Series 1914-15, pages 3 and 4, must be studied according to the general plan outlined for classes A, B, D and F in Circulars Nos. 5, 17, and 18, Series 1914-15.

A textbook in household physics, so called, cannot be substituted for this course in household appliances. It must be a course based on investigations through excursions and the teacher must so plan and conduct the course.

### *Suggestions.*

See Institute Circulars Nos. 5, 17 and 18.

This course must not spread itself over the formal side of chemistry, physics, bacteriology, zoölogy, and the like, but must stick to its text which is *household appliances*, *i. e.*, the tools, equipment, devices, apparatus, etc., of a modern, comfortable home.

### *Bibliography.*

The circulars above named and a variety of books on elementary science, catalogs of household equipment, etc.

## NURSING AND PHYSIOLOGY VI.

### *The Aim.*

This course is designed to prepare the home-maker for intelligently meeting the emergencies which are likely to arise in the home (first aid), to care for sick and convalescent members of the family when a professional nurse is

either unnecessary or unprocurable and what is equally important to provide living conditions such that good health may be promoted. This last implies good air, good water, simple, wholesome food, clean surroundings, suitable clothing, good personal habits, proper exercises, reasonable recreation, etc.

As a secondary aim, it has for its object a reasonable familiarity with the parts and function of the human body, that is, as a result of the study of what to do in a drowning accident plus a study of the need of good air and hence good ventilation under normal conditions, the pupil must be led to know the general function of lungs and air passages and finally the general anatomy of the respiratory system.

The pedagogical order here is pathology, physiology, anatomy and to reverse this is to teach a formal science before the pupil knows its applied side.

“Contrary to common educational theory and practice, the practical technological side of science should precede its purer forms.”—G. Stanley Hall.

### *Standards.*

The four major divisions of this course are respiration, circulation, nutrition and nerve transmission. Circular No. 94, Nursing and Physiology, Part I, gives a practical working plan for the division, respiration. Other circulars will be issued covering at least circulation and nutrition. Circular No. 59, Feeding the Sick, is planned to meet the requirements of the nutrition so far as this year's work in nursing is concerned, and Circular No. 74, Feeding the Well, although written to help in presenting the course in dietetics which is a subordinate part of the household management course, may also be used in a general way when the physiology of nutrition is being considered in its relation to health and disease.

*Requirements.*

There must be at least the following experiments in Circular No. 59 carried out by the pupils and concisely written up in a permanent notebook used only for this course, Nos. 1, 2, 3, 4, 5, 6 and 7. The second series, Nos. 8, 9, 10 and 11, must also be carried out fully in the laboratory.

The class project on page 9 should be worked out and the results properly displayed in suitable bottles properly marked.

Two class projects given as experiments 12, 13 and 14 must be worked out in a similar manner to that for milk.

The experiments on eggs, Nos. 15, 16 and 17, are required to be performed and written up.

The digestion experiments, 18 to 26, may be divided into two or three groups and assigned to different divisions of the class, each carrying out their own assignment and reporting on it with suitable demonstration so that the other members of the class will get the result of the work of each division.

This laboratory work is not of secondary importance. It is fundamental and must be given its necessary amount of time. It is infinitely more important than cataloguing the bones of the skeleton or memorizing the names of the tissues and glands.

There must be systematic development of chest and abdominal breathing and records of chest expansion and its development for each pupil.

In conformity to plans suggested in Circular No. 95, each pupil must be taught by practice to perform the manipulations essential to resuscitation in drowning accidents and must be taught the method of determining pulse beat, temperature, breathing sounds and, so far as possible in a general way, to interpret the meaning of these observations and determinations.

Each class must investigate and be able to explain the New Hampshire laws relative to contagious diseases and



must know the powers and duties of local and state health officers.

The meaning of quarantine laws, so far as the home and school are concerned, must be well known. The class should write to the Secretary of the State Board of Health for such information as it needs and cannot get locally.

Every teacher must have on her desk a copy of the laws, rules and regulations of the state on matters of disease, hygiene, etc.

#### SCHOOLROOM VENTILATION AND TEMPERATURE.

There must be a record of the classroom temperature for the domestic arts classroom, at least, and it ought to be made the business of the domestic arts department to have general oversight of the heating, light, and ventilation of the school building in which the work is carried on.

Teachers are required to have on their desks and to make constant use of circulars of the state department and in particular to base their work in this course on Circular No. 94 and subsequent related circulars.

Notebooks sufficient to enable the inspector to know whether or not this work is thus carried on must be kept by the pupils and must be up to date and in the schoolroom daily.

#### *Suggestions.*

This is a laboratory and investigation course. The teacher must plan her lessons to conform to the outline here given and must know where pupils may readily find the needed material and references for a proper study of the topics assigned.

#### *Bibliography.*

New Hampshire State Department Circulars.

State Laws, State Board of Health Bulletins relative to sanitation, hygiene, contagious diseases, etc.,—State Board of Health, Concord.

Pure Food Laws, etc.,—State Board of Health, Concord.

Contagious Diseases of Domesticated Animals,—Commissioner of Agriculture.

Pure Food Laws and Regulations of the United States,—Department of Agriculture, Washington.

First Aid (Red Cross booklet).

Civics and Health,—Allen.

A Variety of Texts on Physiology and Hygiene.

#### HOUSEHOLD ORGANIZATION V.

##### *The Aim.*

The course in household organization may be either a semester course or a course covering an entire year according as the program for any given school is approved. The same general plan will answer for either case, however. The household organization course is the first of two general courses having in view the problems that would confront a young home-maker about to enter upon her duties. It involves first, getting the home organized and in shape to be run. The second course, that of household management, deals with actually running the home after it is organized.

There is abundant material for a full year of very profitable work in this course if the teacher breaks loose from texts and follows the course which the instinctive nest-building, home-planning tendency dictates.

#### PLAN OF HOUSE.

##### *Standards.*

Each pupil must either (a) make plans and proper estimate of cost for remodelling an existing house, for instance her own home, or (b) make plans for a new, modest, comparatively inexpensive house, such as she might like to live in but one which an income of \$1200 a year could be reasonably expected to maintain.

Such plan must include a lot of land sufficient in size to afford room for a garden 50 feet by 100 feet, or larger. These plans are to be pencil drawings drawn to one-fourth-inch scale, giving basement and floor plans, together with a plan of the lot with house, garden, lawn, shrubs and trees located, this plan being an one-eighth-inch or one-sixteenth-inch scale as seems best.

From this point on the method of procedure will be substantially the same under both plans. After a proper arrangement of rooms is decided upon, the problem of painting or staining the woodwork, tinting or papering the walls is first to be solved. The whole plan should be treated from a simple, artistic point of view with due regard to moderate expense.

#### EQUIPMENT.

Here is a chance to apply in a definite case the knowledge of household equipment and appliances derived from the sophomore year course. It involves the problem of heating apparatus, kitchen equipment, bathroom fixtures, laundry arrangements, and the general furniture and furnishings of the entire house, having in mind the general decorations worked out for the various rooms.

#### GARDEN AND GROUNDS.

The modern home should have proper surroundings. There should be a sizable garden including vegetables, fruit trees, small fruits, a moderate amount of shrubbery and flowers. The planning of the garden should become an actual home project in gardening so that each domestic arts girl taking this course will actually plan, plant and care for a home garden.

The order in which this work is taken up should conform to the seasons. Heating is a fall subject, gardening a spring subject. The other factors in the course may be taken up at almost any season of the year.

There must be an itemized estimate of the cost of the furnishings and equipment, the data being derived from actual selection of as much of this as possible from local stores or from catalogues of metropolitan department stores, etc.

Each pupil must plan the details of a kitchen garden suited to the situation, and must decide upon the ornamental shrubs, trees and flowers that are to be used for beautifying the lawn.

#### LAUNDRY.

In these courses, the cleansing of garments and household textiles is not to be taught as a half-semester course in theory but by practice and instruction throughout the six years. In the first two years, this will be connected with the making and remodeling of garments and with the linen of the dining room. In the third year, in the household appliances, the machinery of the laundry will be used and studied. In the fourth year, in the subject of nursing and physiology, and in the last two years the courses in household organization and household management give full opportunity for the practical study of all kinds of laundry operations.

#### *Suggestions.*

The general plan contemplates getting the home in shape to be run. That is, in planning the house, whether remodeled or built new, equipping it suitably and preparing it for occupancy. It must be a home such that the income that will be assumed in the home-management class later on will be adequate for support and maintenance.

The teacher may derive the right point of view by thinking of the merchant who is about to start a new business. He first decides upon a location. He either takes an existing building and remodels it or builds a new store. He next selects the fixtures for the store and installs them.

He then buys a stock of goods and displays them on his shelves and in his windows. All this is done before the time of opening his store to the public. This is his store organization. After this comes the business of managing his store. The same general idea carried into the organization and management of the home is what we have in mind in the two courses, household organization and household management.

*Bibliography.*

See Household Management VI.

HOUSEHOLD MANAGEMENT VI.

*Aim.*

The course in household management may be either a semester course or a course covering an entire year according as the program for any given school is approved. The household management course takes up the work where the household organization ends and involves the idea of actually managing a home.

Each member of the class should endeavor to put herself into the position of that confronting the average young housekeeper after she has selected and equipped her house. It should be based upon the very same idea that this girl had in mind when working out her particular project in household organization. It should have for its basis a reasonable assumption as to income, this, of course, resulting in an intelligently worked-out budget, apportioning this salary to the usual recognized divisions of household management.

The teacher must endeavor to secure such an interest in this project that the pupil will plan as seriously and enter into details as clearly as would be the case if she were actually planning and budgeting for real home-keeping. This is not a difficult task if the problem is earnestly and seriously presented from a practical point of view.

*Standards.*

Each pupil must prepare for herself a budget based on assumed incomes of \$1000, \$1200, and \$1500 respectively.

This budget should not be conventional class work and each pupil should not arrive at the same identical conclusion, nor should this conclusion come from a textbook published when prices were fifty per cent. lower than at present. *It should be the result of each pupil's personal study of her own assumed problem* and must be based on prices that are up to the minute. The teacher and class will decide upon general divisions for the budget but details are for each pupil to work out according to her own home experience, taste, and good sense.

To prevail upon the girl who loves a horse better than she does an automobile to figure up-keep, gas bills, and insurance on a motor car when she ought to be figuring on hay, oats, and curry combs, is to attempt the impossible. It is part of the fatally formalistic fallacy of schools which, after the manner of a clothespin manufactory, attempt to turn their product out all of one size and form. It can be done with birch clothespin wood. It can't be done with human beings.

The annual income should not only be divided to provide for food, fuel, clothing, education, amusement, improvement, etc., etc., but each of these sums of money should be entered as the working capital of an equal number of accounts kept in the ledger or in a card system devised to be simple and at the same time comprehensive enough to give the main items of expense connected with managing a home. In many respects, a simple card system is more desirable for this work than the ledger. The cards should be so ruled as to give debit and credit columns, with a third column to show the available balance at any given time. Budgeting may be taken up first and completed on the basis of such information as pupils can gather or it may be developed more slowly, the major



items being first determined, leaving a portion of the income undistributed for the later items as they arise. Either method will work out satisfactorily.

Each pupil must budget the assumed income and start some form of household accounting simple enough to be easily kept but comprehensive enough to show in the end how her proposed outlay in each division corresponds with the amount set aside for the division.

Ruled notebooks, or a card ledger, may be used, but whatever the system it should show at any time just how expenses are totaling and what balance is left.

SAMPLE OF CARD RULING.

FOOD.		Dr.	Cr.		
Date.	Apportionment.	Paid Material.			
		Groceries.	Meat, Milk and Fish.	Total.	Bal.
Sept. 1	\$200.00	Flour, \$10.00	\$4.75	\$14.75	\$185.25

There should be a summary card for each item apportioned in the budget, and there may be cards under each of these on which the details of transactions are recorded. Each pupil at the end of the year must have a complete set of accounts showing just what has become of every dollar originally budgeted. It will be found possible to work this by weeks, or months, probably the latter.

Food, clothing, interest, taxes and repairs, fuel, education, charity, etc., are among the important divisions of the budget.

Each pupil must present a summary of the estimated yearly quantity of food required per family or per person, *i. e.*, flour, meat, milk, sugar, fruit, etc.

Each pupil must similarly estimate the amount of fuel, the cost of clothing, kind and cost of papers, magazines, books, or music, etc., to be bought.

## FOOD.

One of the important subjects to be studied is food materials and foods. What was taught as reliable dietetic information ten years ago is, in the light of recent investigation, inaccurate and of small value.

Undoubtedly there will be a science of dietetics some day which will compare favorably with the science of medicine, but at present feeding the human race is, at best, an experimental art, and at worst, it is just eating three times a day. (See Circular No 59, Series 1915-16, pp. 1-3. Also Circular No. 74, pp. 1-3, etc.)

The actual problems of the home in buying and cooking food, in producing as much as possible in the garden, and in combining such foods into well-planned menus giving variety and a sufficient quantity, are the ones the high school senior should study.

There is no demand for anything more than an occasional lesson in cooking. Every menu plan, however, as a part of the proposed home-making, must be based on present-day prices, must be economically planned, and must be seasonable and reasonable.

Study the markets weekly. See what is most economical at the time, and for this purpose let the food study cover the whole year, but it must receive only one period per week of school time.

## MILLINERY.

It is not desirable that millinery be regarded as a subject separate in itself and with a distinct place in the program for formal approach, study and conclusive deductions. This would be possible only if hats were as changeless in style as fractions and irregular verbs. In the sewing classes, when the spring hat season approaches is the time for an intensive week for retrimming of actual hats which must be worn for the season. Old hats and the material and trimming for new ones should be brought to the classroom for purposeful work. This study may be

repeated in the fall. In the two following years, the teacher at the proper season should aid by advice and direction and may devote a part of a single day to class assistance and instruction.

In Years V and VI, a more formal course may be given, with a careful study of fitting colors and appropriate forms and economical arrangement. The work may be made an integral part of the course in household organization and household management but in either year not more than three weeks of time should be given.

### *Suggestions.*

Circular No. 74 must be made use of in determining the food requirement of the home. A subsequent circular will be issued covering clothing, education, amusement, vacation expenses, fuel, etc.

This course, if properly appreciated by the teacher, cannot fail to give to the senior high school girl a point of view towards the whole art of making and managing a home, which will not only make the course interesting, but will develop an attitude of mind favorable to her later success as the head of a home. If it does this it will do more for the future welfare of the world than any other course within the range of a girl's education.

Teachers should encourage pupils to get their data first hand from parents, merchants, manufacturers, managers of public institutions, etc.; in fact, from every available source where knowledge exists relative to any item of administration entering into home-making.

### *Bibliography.*

It seems unwise to list here texts for household organization and household management. No single textbook should be used, for these are not recitation courses. Most publishers have books that deal with varying phases of these subjects and a library of these should be in the school and constantly used for information and for com-

parison. In addition, the household papers and magazines furnish timely discussions of the organization and management of the home and should be studied with discrimination.

*General Reference Books:*

Canning, Preserving and Jelly Making.	Hill.	Little Brown & Co.
The Business of Housekeeping.....	Taber.	Lippincott.
Canning and Preserving.....	Powell.	Lippincott.

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## CHAPTER VII.

### COMMERCE.

Any commercial curriculum designed to satisfy the popular demand for commercial education and to meet the immediate need of pupils must of necessity be not only vocational but of a somewhat narrow "trade-school" type. This is unfortunate because at the age when secondary school pupils decide upon their high school curricula they are neither themselves qualified to choose wisely nor is any parent or teacher able to determine what aptitudes will unfold during the next four years or what circumstances will develop in the pupil's surroundings which will make any particular vocation desirable or satisfactory. Nevertheless, the attraction of the office and store and the immediate, even if meagre, cash returns, together with the appearance of gentility when contrasted with really productive work in the shop or on the farm or in the household, have created an abnormal demand for this type of education and, while it is unquestionably true that today there are in New Hampshire at least three times as many high school pupils enrolled in commercial courses as can hope to find satisfactory and profitable employment, many school authorities have thought it necessary to ignore the most elementary truths of pedagogy and provide for this real, even if unwise, demand.

If village high schools and those so located that their graduates cannot find clerical employment must offer "trade" courses along commercial lines, the curriculum should be made sufficiently broad to provide a fair education for the two out of three who will not make use of their commercial training other than temporarily.

Ninety girls out of every one hundred actually do become home makers. It is logical, therefore, to provide ways in which the largest possible number may receive systematic domestic arts training. For this reason alone all commercial courses for girls ought to provide as a concomitant to the commercial subjects the regular home making subjects of the domestic arts curriculum.

If this is objected to on the ground that we are thus bringing together two vocational courses, the answer is that while a domestic arts course is in fact a vocational course, it is unique in that what is a vocation to the home maker is also broadly and generally developmental in its relation to the origin and evolution of the modern home and hence is in all respects as much a classic with respect to that greatest of all human institutions, the home, as are the ancient languages to modern literature or the discoveries of Newton and Archimedes to modern science. Consequently, a well organized domestic arts curriculum is both a practical and a liberal arts curriculum.

#### *Aims.*

1. A commercial curriculum must teach the language of the world of commercial activities. Therefore, the curriculum includes that special form of written language, stenography.

2. It must develop the technique of the commercial arts such as the use of the typewriter, adding-machine, duplicator and the other machines and appliances of the well equipped office.

3. It must develop familiarity with the everyday methods of account keeping as practiced in stores, rail-

road offices, insurance offices, banks and municipal departments; methods which make use of modern devices, of multiple column ledgers and of cards and loose-leaf systems, etc.

4. It must deal with methods of office organization, such as filing, cataloguing, indexing, follow-up work, graphing, etc.

5. In addition to the above, there must be real live courses designed to acquaint the pupil with the great world commerce; its routes of travel and means of transportation and communication; its ways of adjusting debit and credit. This requires a study of commercial history, commercial geography, of tariffs, subsidies, reciprocal trade agreements, of capital and labor and, in general of as many as possible of the typical relationships of individuals, corporations and nations as the time available and the qualifications of the teacher will permit.

6. To sum up, review, and test the whole, there should be a genuine course in office practice, whereby the pupil may acquire through experience competency for effective work in a permanent office position.

7. The five courses which follow in detail are the ones named in the recommended curricula of this program. It is believed that the course given elsewhere under the name Economics and Business Practices, even for pupils in the commerce curriculum, is of more value than the traditional textbook course in commercial law. Schools which prefer the older course in commercial geography and political economy and in commercial law will find them outlined in the program of 1912.

### *Standards.*

#### TYPEWRITING.

At the end of one full year's work, that is, at the end of the first semester of Year IV, a speed of twenty words per minute after deducting one-half point for each error.



At the end of the second full year's work, that is, at the end of the first semester of Year V and thereafter, a speed of 30 words a minute after deducting one point for each error.

#### STENOGRAPHY.

At the end of the first full year, that is, at the end of Year IV, sixty words per minute after deducting one point for each error.

At the end of the second year, that is, at the end of Year V and thereafter, a speed of 100 words per minute after deducting two points for each error.

Definite standards for commercial courses, together with tests of determination and suggestions on classroom procedure, are given in Circular No. 93. This circular should be on the desk of every teacher of commerce courses.

#### *Suggestions.*

##### BOOKKEEPING, ARITHMETIC AND TYPEWRITING III.

There are two elements in this year's work, bookkeeping and arithmetic with detailed recitations, and typewriting with single periods for three days in the week.

Bookkeeping will in most cases need to be based upon one of the texts or bookkeeping systems common in our schoolrooms but it is highly essential that the course should be broader and more modern than any textbook. Both teacher and class should actually be familiar with the methods of bookkeeping used in the stores, factories and offices of the community. There should be much study of commercial paper of all kinds and of the practices which prevail daily in business operations.

Inspectors will be required to determine that classes know the methods of accounting employed by local business men.

The arithmetic should not be studied as a thing apart but as a tool to be kept sharp for constant use in the solu-

tion of the problems which arise in the recording of business accounts, that is, in bookkeeping. Textbooks should be in the hands of the pupils for reference, for review and for advanced study, and much class time should be devoted to instruction, to practice and to drill, but the study and the instruction should be upon the principles needed for the solution of the business problems of the bookkeeping lesson. The practice should be upon forgotten mathematical processes which now are again needed. Drill on the essentials should be constant but should be for brief daily periods only.

Teachers have long thought of typewriting as necessarily associated with stenography. In its early stages, there is no connection between the two and it is very desirable that all pupils should early be acquainted with the manipulation and use of the typewriter. The first work on the typewriter should not be delayed beyond Year III and for commercial pupils a good start should be made with the typewriter before a beginning is made in stenography. During this year, there should be an intimate connection between the work in typewriting and the course in English, since in the composition of English III there should be much instruction and practice in actual letter writing. After what little preliminary instruction and guidance is needed, the beginner should secure his practice in the writing of actual letters and so provide a real motive for learning the typewriter. The standard for this half-year is ability to produce without difficulty satisfactory typewritten letters.

The beginner upon the typewriter longs for accomplishment and will gain rapidly in speed and accuracy when he knows that he is actually producing something of acknowledged use and value. If instead he is obliged to spend hours in writing and rewriting nonsensical phrases which work out some one's theory of the logical order of introducing human fingers to the several letters of the key-

board, interest soon dies away and the first element in effective habit formation is lost.

From the first, the practice upon the typewriter is to be supervised and insistence placed upon correct habits of manipulation.

BOOKKEEPING. ARITHMETIC, STENOGRAPHY AND TYPE-  
WRITING IV.

Through this year, a double period is provided for work in these four branches of commerce. The bookkeeping and arithmetic should continue as in Year III until a point of mastery is reached.

Until the middle of the year typewriting will have little connection with stenography but should develop as an art in itself. In any office, the transcription of stenographic notes is but a small part of the regular work required. Seldom, if ever, should pupils be required to copy legal documents, court cases and other stock material. Instead, the typewriting should produce actual forms needed for the school or for other organizations. Among these should be real programs of coming social events, records, reports and class lists and syllabi for the teachers. Every school can find abundant real material ready at hand and teachers should list the products of the typewriting classes exactly as the teachers of manual training list the projects made in their classes.

The work in stenography is the most important part of the work this year. It is to be emphasized that in learning stenography the pupils are acquiring a new language and the pedagogy is that common in language instruction to beginners. The teacher of stenography should study the literature which deals with the pedagogy and psychology of teaching reading in classes of beginners and should be entirely familiar with the principles of habit formation through drill.

## COMMERCIAL GEOGRAPHY AND HISTORY IV.

Rather commonly this course has consisted of a half-year of recitation from a textbook in commercial geography, followed by a similar half-year of commercial history, and the course as a whole has had little real value.

The subject is best taught when there is a maximum of investigation and a minimum of formal recitation. In general not over 30 per cent. of the total time involved should be given to recitation. The remainder should be devoted (a) to local investigation of industries and occupations, (b) to reference-book study, (c) to correspondence with manufacturers, importers, United States Consuls, United States departments in Washington, etc. Each pupil is to select, work up and prepare a paper on one subject from each of the following classes :

A. *Foods*: Cereal crops, vegetables, fruit, meat, tea, coffee, cocoa.

B. *Clothing*: Cotton, woolen, flax and hemp, silk.

C. *Building Materials*: Lumber, stone, brick, lime and cement, iron and steel.

D. *Transportation*: By water, rail, auto trucks.

E. *Local Industries*: Each pupil must work up in detail at least one local industry and must prepare a paper covering this investigation.

Many schools make commercial geography and commercial history a thing of life by collecting information from all over the world. It is especially important at this time to keep in closest touch with the changed and changing commercial relations growing out of the new place the United States now occupies as a World Power.

This subject should be something different from the very excellent work that has long been done in grammar schools. It must be real high school investigation commensurate with the ability of the high school pupil.

The two subjects of the course should not be separate but taught as one. Each pupil will, of course, have a text-book in commercial geography and one in commercial history but, in place of a page by page study and recitation, the work will be by topics similar to the main ones given above and from the text on history as well as that on geography, information will be sought.

STENOGRAPHY AND TYPEWRITING, SPELLING AND CORRESPONDENCE V.

In Year IV, by much practice, the technique of both typewriting and stenography has reached a reasonable degree of perfection. During this year it is necessary to increase the speed until office standards are reached. In stenography, this should be accomplished by the end of the year; in typewriting, by the end of the first semester. For the remainder of Year V and for the following year, slight attention should be given to typewriting as a process, but the typewriter should be in constant use as a means of expression and record, and pupils should be held to standards of speed and accuracy. This may be done through practice in business correspondence.

Commonly in commerce curricula, much time is given in the first year of the program, that is, in Year III, to drill in penmanship and spelling. It is proposed here that during Years III and IV the pupils should be required to write legibly and to spell ordinary words correctly but that little class time be devoted to drill upon these subjects. The reason for this is that the development of pupils of the average age of those enrolled in these years is such that attempts at drill, review and organization of systems are not effective and the results are not permanent. In Years V and VI, most pupils have reached a period of permanent adjustment. These are the first years since the pupil left the sixth grade when formal instruction in penmanship and spelling can be made worth while. In these years, the rules of spelling may be taught and applied,



and intensive systematic practice in penmanship will produce results much as it does with somewhat older students in private commercial schools. For Year V, the program should provide double periods for two days each week.

#### OFFICE PRACTICE, STENOGRAPHY AND TYPEWRITING VI.

It has been completely demonstrated that under competent teachers the standards set for stenography and typewriting can be reached at the end of two full years of high school work. Schools which find they are not accomplishing this should reorganize their commerce courses under capable teachers.

No school with three courses devoted mainly to formal instruction in either of these two subjects will be approved. The course of this final year should be the fruition of the curriculum. The office practice should be under actual business conditions and may not be a name behind which is concealed still more unmotivated drill on keys, forms and outlines.

A stenographer or office clerk is of no more value in an office than a neostyle or an addressograph or any other mechanical machine, unless she thinks. A large number of graduates in commerce go into business offices and are found to be mechanical machines only. Their work is absolutely correct, if some one touches the right keys in the right order. This course is designed to remedy such a condition.

Large schools should provide for this course offices with the full modern equipment of a business office, including the usual office machinery, office appliances and office equipment. In addition, these schools should take over the actual business of the school or of some department of the city or town and in performing the operations should be held responsible for creditable results.

In smaller towns where there are fewer opportunities for this office practice, there are still abundant opportunities for actual clerical work at the school or elsewhere, in homes,



offices or stores. This may include the optional or regular transcription of letters for the professional or semi-professional men of the village, the keeping of records for societies and organizations, the balancing of accounts at the village store and similar work which a live teacher, who knows her town, will be able to find. Inspectors will determine that wherever this course is given, work of this nature be actually done.

*Bibliography.*

Spelling Efficiency: Wallin.

The Teaching of Spelling: Suzzallo.

The Teaching of Handwriting: Freeman.

Educative Process: Bagley, pages 328 to 331, Macmillan.

Piano Playing: Hofmann, Doubleday, Page & Co.

The Teaching Process: Strayer, pages 4-50, Macmillan.

The Psychology of Learning: Thorndike.

The Psychology of Skill: Book.

Journal of Educational Psychology: Pyle, Vol. V, pages 247-258.

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## CHAPTER VIII.

### AGRICULTURE.

In the elementary program, home gardens, with school supervision and instruction, are emphasized throughout the six years. This work should continue in the high school at least through Years I to IV. During these years, gardens are included among the B Subjects. If the courses outlined for the elementary school have been well presented, little additional instruction should be needed from high school teachers. The organization of the school, however, should carry forward the work under the interested supervision of the teachers and with constant corre-

lation with the school work in other subjects. The school fair or exhibit of productions is a valuable factor in the development of school spirit and school recognition.

In Part II of this program on page 48, the statement is made that French is recommended in Years I and II for all programs of approved secondary schools but it may be replaced by two well-organized courses in agriculture. In many rural schools this is necessary and probably desirable. There are two ways of meeting this proposal.

1. For French I and French II, there may be substituted Horticulture and Soil Study III and Wood Work III, as these courses are described later in this chapter. One course should not be given in the first year and the other in the second but the horticulture and the carpentry should continue together throughout both years, with daily exercises. This course in horticulture may be taken by both boys and girls but girls may replace some of the farm carpentry by additional projects in dressmaking. Pupils who complete the above subjects will be prepared for advanced work as they come to Year III.

2. Schools may present a program for Years I and II which in each year provides the following unit courses:

Concrete Mathematics,	5	days	5	periods
United States History,	5	days	5	periods
Elementary Science,	5	days	5	periods
Manual Training or Domestic Science,	2½	days	5	periods
Gardening,	2½	days	5	periods

This is similar to the regular program proposed on page 41, except that elementary science is increased from three to five days a week and the full outline given in the elementary program for science in Years VII and VIII must be covered. In addition the work in gardening must be entirely definite and must follow the outline given in Circular No. 94. In place of two and one-half days a week given to each subject, the work should be distributed to fit

the seasons but would call for daily exercises in one or the other of the subjects.

The second plan is not as economical as the regular one or the first one given above, and should not have general adoption. The other plans permit entrance to Year III with advanced standing in two traditional high school subjects, mathematics and either French or agriculture. This plan permits such advanced standing only in mathematics.

The Federal law through the Smith-Hughes fund makes fundamental requirements as given below and allows schools which fulfill the requirements to be reimbursed in part for expense incurred.

(a) Pupils taking subsidized courses must be fourteen years old or over, hence, as ages average in the public school, must be at least in the ninth grade.

(b) Schools must be in session twenty-five hours per week, which is interpreted to mean five full hours of recitation, laboratory or field work per day for five days in the week.

(c) One-half of the pupil's time, that is, twelve and one-half hours per week, must be devoted to agriculture and related subjects. The other twelve and one-half hours may be devoted to non-related subjects such as English, history, mathematics, science, modern languages, etc.

Schools which do not care to qualify for Smith-Hughes aid may present an agricultural curriculum which fully meets the requirements given in Chapter I of Part I of this program. It must present at least four full units in agriculture together with one or two courses in farm wood and iron work.

The Smith-Hughes Act is distinctly a piece of vocational legislation, designed to fit young men for life on a farm or for further education in agricultural colleges. This does not mean a narrow or a one-sided education, for the law allows, and New Hampshire practice requires, that approximately one-half of the high school curriculum in agriculture shall be given to subjects that are commonly accepted as an es-

sential background to good citizenship. More than this, the study of agriculture itself, its processes, related sciences and, in particular, its history are quite as "cultural" as are the records of villainous old despots who have drenched the earth with blood and whose doings have constituted a considerable part of the Ancient History taught. Indeed, the history of civilization is more accurately read in the study of agricultural development than in any other known record. The courses in agriculture take the pupil back into the middle period of barbarism and lead him on through a path of constructiveness rather than destructiveness to the most recent time and culminate with the triumph of the art of modern agriculture in the production of food sufficient to feed the world. Agriculture is preëminently the occupation which makes for peace and develops resourcefulness.

A systematic, even though brief and incomplete, story of man's accomplishment in the field of agriculture must result in a more liberal attitude of mind towards present-day industrial problems and must tend to develop citizens capable of participation in their solution.

All teachers in agriculture and all teachers responsible for the garden work of Years I-IV should study with care Circular No. 94.

#### HORTICULTURE AND SOIL STUDY III.

##### *Aim.*

This course aims to teach the practice of horticulture (see definitions on page 1, Institute Circular, Series 1915-16, No 46). The soil study of this year is largely preliminary and more or less incidental. Gardening is the chief business of the year. The garden must be in size worth while, and in crops be suited to the needs of the locality. It must be worked out in plan in the classroom and planted by the pupil under the teacher's supervision. A home project worthy of recognition must, if the season is favorable, yield a crop value of at least seventy-five dollars.

*Standards.*

## SIZE OF PROJECT.

No garden less than seventy-five by one hundred and fifty feet (about one-quarter acre) can be accepted as satisfactory.

## TIME APPORTIONMENT.

	Classroom "Recitations."	Laboratory work preparatory or supplementary to field work.	Field excursions, field project work and outside investigation.
Fall Term.	Not more than 15%.	Not more than 10%.	Not less than 75%.
Winter Term.	" " " 75%.	Not less than 25%.	Included in laboratory time.
Spring Term.	" " " 15%.	Both combined, 85%.	

*Suggestions and Bibliography.*

See under next course.

## WOOD AND IRON WORK III AND IV.

*Aim.*

To give boys sufficient experience in practical work in wood and iron so that they can do all of the common jobs of construction and repairs occurring on the farm in the ordinary course of farm administration.

In general, this consists of carpenter work, repairs on farm tools and machinery, simple forms for concrete construction, cabinet work in the way of repairs and in particular, sufficient blacksmithing to sharpen and re-set horse shoes, mend chains, sharpen drills, etc.

The old-time farmer knew how to turn his hand to a multitude of constructive processes from whittling a "bow pin" to adzing an ox yoke. The old-time farmer's boy learned to do these things under his father's direction. These experiences, involving simple hand tools and necessitating the exercise of much ingenuity as ways and means

had to be discovered and devised to meet new conditions, were in fact the most effective factors in the education of the farm-reared boy of a century ago and they account for the acknowledged capacity of the great industrial pioneers who laid the foundations for our national success in business enterprises. The aim of the school should be to develop similar constructive effectiveness in both boys and girls of the present day. The real school workshop where useful things are made is the one place where "inventiveness" and the power to solve whatever mechanical problem arises by means of such tools and materials as are available, can be taught, through practice, at a time when pupils are receptive to such instruction.

### *Standards.*

Two unit courses in shop, wood and iron work are proposed, but are here discussed together since one year should not be given to wood and one to iron. See under suggestions.

Standards are best expressed negatively for these courses. These courses should have absolutely no trace of either the "joints" and formal "exercises" of the obsolete Russian manual training system or of the diminutive "models" of the original Sloyd system.

Again pupils should not build so-called model farm buildings to a scale of one-eighth full size. Such work is manifestly make-believe and belongs to the realm of Gulliver's Travels.

On the positive side it may be stated that no work should be done which is not a part of some project which the pupil knows is useful and which he knows is to be used on the farm, in the home or in and about the school.

There is no education in merely making shavings and sawdust for the sake of getting accustomed to the use of a plane or saw. There is education, however, in getting the "hang" of a plane or saw while making a useful thing that the pupil knows is needed.



*Suggestions.*

There is no excuse for treating wood working and iron working as separate courses so far as time is concerned. If a boy needs to put a new spoke into the wheel of a decrepit wheelbarrow and the tire needs to be made shorter and re-set, it is just the time to drop the spokeshave and chisel and fire up the forge. If he has made a new wood for a whippetree today, then tomorrow is his day for putting on the irons.

Naturally the first year's work lays the stress on wood-working while the second year gives larger emphasis to the iron work.

The following projects are suggested as typical of many which the successful teacher by personal conferences with pupils and parents will discern to be actually needed at the homes. The very best evidence of a well-conducted course is the fact that each pupil has a different project meeting the peculiar needs at his home and the worst possible condition is when the inspector finds each pupil working on a predetermined series of "models" designed to give an alleged "sequence" either of processes, or tools, or both.

## WORK IN WOOD.

Neck yoke, spreader, evener, whippetrees, wagon tongue, wagon or sleigh shaft or cross piece, wagon body, cart body, wheelbarrow, smoothing harrow frame, cultivator frame, nest boxes, trap nests, dry-mash hoppers, brooders, feed boxes, drinking fountains, milking stools, axe handle, cant-hook wood, wagon jack, apple heading press, apple and potato sorter, bean sorter, school exhibit boxes, seed testing devices, window boxes, cold frame or hot bed accessories, flats for transplanting, tomato racks, mosquito screen frames, book racks, tables, bins, and an interminable line of minor repairs at home and in the school.

## WORK IN IRON.

Any and all ironing which is part of any project in woodwork. In addition, heading and threading bolts, and tapping nuts for special uses, mending chains, putting rings and hooks on chains, recalking horse shoes, welding broken rods, welding iron or steel, or a combination of the two, sharpening or even "new steeling" a plow coulter, making a grab-hook for a chain, making bridle chain for a sled or bridle shoe for a wagon, forging and tempering cold chisels, punches, stone drills, making a knife blade, upsetting an axe, drawing out smoothing harrow teeth, etc.

Quite likely it will prove that the projects omitted from this list are of more importance than those given. No school will follow any pre-arranged list item by item, for farm equipment upkeep follows no law and breakage and new needs are not in alphabetical order.

The real situation may be summed up as follows: (a) find out what is most needed on the farm from which any pupil comes, (b) together with the pupil and, if possible, the parent talk over the best way of supplying the need, and (c) go directly and persistently to the task of doing the job.

In terms of pedagogy, a, b, and c are the impression, organization, and expression of the deformed formal steps in teaching. (See Appendix B.)

*Bibliography* for courses in Year III.

Pedagogical Helps and Suggestions as to Methods for Courses in Year III.

Institute Circular No. Series	Pages	Especially applicable	School Year
14 1913-14	1 to 4	General	All
16 1913-14	1	Horticulture	III
17 1913-14	1 to 3	Horticulture	III
18 1913-14	1 to 2	Horticulture & Field Crops	III-IV

19	1913-14	1 to 2	Horticulture & Field Crops	III-IV
6	1914-15	1 to 2	Horticulture	III
7	1914-15	1 to 2	Seed Study	IV
20	1914-15	2 to 3	General	
21	1914-15	2 to 5	Field Crops	IV
46	1915-16	1 to 3	Horticulture & Soil Study	III
47	1915-16	4	Field Crops	IV
56	1915-16	9 to 14	General	All
17	1913-14	4 to 14	Gardening	III
6	1914-15	2 to 6	Orcharding	III
17	1914-15	1 to 6	Tomato Projects	III
46	1915-16	1 to 13	Horticulture in part	III
56	1915-16	1 to 16	Horticulture in part	III
83	1917-18	3 to 18	Horticulture	III

Of these numbers, 56 and 83 are perhaps the most important so far as the horticultural element in the work of Year III is concerned, but the others are not to be neglected in the work of Year III.

The teacher is advised to own and make constant use of G. Stanley Hall's rather expensive but well-nigh indispensable two-volume work, "Adolescence." It is an inexhaustible pedagogical gold mine, but it is not to be read page after page throughout its 1400 pages. It is a reference book for teachers, who desire to become "artists rather than artisans." Its index is very complete. Chapter I, Growth in Height and Weight; Chapter III, Growth of Motor Power and Function; Chapter XII, Adolescent Feelings Toward Nature, etc.; Chapter XVI, Intellectual Development and Education, are particularly helpful in lifting school men and women out of the deep rut of formalism. These should be read and re-read many times. The greatest drag on educational progress consists in the fact that teachers and school administrators fail to study the literature of their profession. Hall's writings tend strongly to break up mental adhesion and clear the way for new, healthy growth and function.

## FIELD CROPS AND SOIL STUDY IV.

*The Aim.*

There is only one aim here, namely, the production of better crops of the standard grains, grasses, vegetables, etc., than the average of the best farmers in the region. If the school fails to accomplish this the teacher is unequal to the occasion and the future of agricultural practice in that community is not likely to be much, if any, improved by making the study of agriculture a part of the school program.

Science applied to agriculture is either effective, or it is not. The higher institutions teaching agriculture either equip their graduates to produce better results in field and barn, or they do not. If they do, then the teacher of agriculture in the secondary school can demonstrate a better practice of the art of farming than that of the average farmer, and if he can do this himself, he must be able to get his knowledge of how to do it across to his pupils, or he is a failure as a teacher. If he is competent both as a practitioner of a better type of farming and as a teacher, then his pupils on an average must reflect his competency in the superiority of their projects in field crops. The logic, the common sense, and the justice of this is self evident and the success and permanence of agricultural education in secondary schools rests upon the outcome as shown by quantity, quality, and economy of crop production through the medium of the home project.

Let no teacher deceive himself on this point: brilliant classroom work which fails to function in larger crops of better quality than those produced without the aid of such instruction, will never stand the acid test of public opinion for any great length of time, and it never ought to do so.

*Standards.*

The minimum size of field crop project is one-half acre and a reasonable expectation is that very few pupils will

have less than three-fourths of an acre while at least half of the class will have a full acre.

On the side of "labor income" a sophomore boy well instructed and properly supervised with a fair season, ought to realize not less than \$100 for his home project work in field crops, that is his personal income after paying for seed, fertilizers, team hire, etc., ought to amount to the sum named.

It may happen, however, in common with other farm enterprises in the locality, that the pupil's income is reduced to zero by frost, drought, or other uncontrollable influences, for these are hazards to which farming is unfortunately exposed.

There is another standard which inspectors will report on but which is hard to state in definite terms. It is the standard of a reasonably clean culture. This means comparative freedom from weeds and grass, and proper care of the crop at all stages of growth. A potato or corn field infested with ragweed or kale is not "reasonably clean," but an oat field with considerable kale going to seed is unavoidable on many farms.

Corn, beans, potatoes, etc., with many missing hills show either lack of proper testing of seed, or lack of vigilance when the crop was first cultivated, for at that time re-planting was possible.

### *Suggestions.*

Well-prepared land, carefully planted with tested seed, and intelligently fertilized either with manure or chemical fertilizers, or both, and the crop frequently cultivated and occasionally hand hoed, will go a long way toward insuring a good crop, but there are pests to fight, dry seasons to combat by up-to-date soil cultivation. A potato crop may be lost for lack of spraying at a critical date. Close following of the weather condition may enable the wide-awake boy to shock his corn and save it from frost. It is in these exceptional circumstances that the real teacher

and the real pupil win out where the thoughtless and careless fail.

*Bibliography.*

Institute Circular.

No.	Series	Pages	Dealing with	Year
14	1913-14	5 to 22	Fertilization	IV
18	1913-14		Injurious insects	III-IV
19	1913-14		Plant diseases	III-IV
21	1914-15	6 to 22	Crop	IV
47	1915-16	1 to 9	Field crops	IV
56	1915-16		Field projects	IV
7	1914-15	4 to 13	Soil types, etc.	III-IV
46	1915-16	5 to 7	Soil physics	IV
83	1917-18	6 to 7	Soil types	III

No. 56 is the most important circular of the series so far as presenting a plan for real projects is concerned and teachers must make this and No. 21 basic in organizing the classroom and field work of the field crop course.

The study of soils is made to cover two years but is largely incidental to the courses in horticulture and field crops. The subject for Year III is to be handled in a very general way, getting the pupil familiar with the two or three types of arable soil most common in the vicinity of the school. It is the time to increase the pupil's ability to identify in the field the soil with which farmers are dealing.

In Year IV, however, there should be considerable practical laboratory investigation and demonstration of the physical properties of soils. There is little occasion for high school laboratory work on the chemistry of soils for the reason that chemistry gives us very meagre information as to the crop-producing capacity of a soil.

Physical properties are of paramount importance so far as laboratory demonstrations go. The one practical contribution that chemistry can make is the determination of



acidity and this is practiced only when there is a rational interpretation of the result. (See circulars of the New Jersey Experiment Station.)

#### ANIMAL HUSBANDRY V.

##### *The Aim.*

To make the pupil familiar with feeds and feeding, and with breeds and breeding, (a) by means of actual feeding projects with poultry, swine, cows, sheep, etc., (b) by excursions to farms or fairs where standard animals may be seen and studied, (c) by scoring according to accepted methods whereby special points of merit are specifically seen and evaluated and breed types learned.

##### *Standards.*

There must be home projects of sufficient size to make possible a labor income of \$100 or more. This means, at least, fifty hens, ten sheep, a half dozen pigs or more, or a pair of steers or a heifer or two.

It all depends upon how the project is managed, however, for pigs carelessly fed, or hens neglected, may easily result in loss rather than gain.

Whatever the financial result may be there is a quality standard which means much even if there is little money gain. Well-kept farm animals, clean and healthy, are a means of education to any boy. To care for and think about, and kindly treat a domesticated animal is to cultivate a wholesome mental attitude not alone towards these animals but towards the whole world of living things including mankind. A child with a pet animal or a youth with a useful farm animal means a man with right thinking along humane lines. It means human living under hygienic conditions if the health of the stock has been thought about.

Inspectors will look quite as carefully into the conditions under which animal husbandry projects are carried on as into the matter of financial gain. A financially profitable

project conducted under unhygienic conditions or with little regard to the comfort of the animal, ought to be less creditable to a pupil than a project showing a much smaller profit but where the health and comfort of the animal has been well provided for.

### *Suggestions.*

Animal husbandry projects ought to be continuous through the year V and VI, that is, a project with hens, sheep, swine, cows, etc., should not be started and continued for a few months to be abandoned as are courses in geometry, or Latin, or literature, but should become a part of the regular home work of the pupil, especially if the project is successful. A pig project may start with one brood sow, but it ought not to end there. There should be breeding, feeding, and selling, and incidental to this are such practical problems as butchering, smoking bacon, hams, and shoulders, salting down the fat parts, rendering lard, making sausage, etc. All of this is reasonably to be expected of an adequate course in agriculture if such a course is to become a factor in improving the practice of farming. For additional suggestions study carefully Circular No. 56, pp. 7 to 16.

### *Bibliography.*

#### Institute Circular.

No.	Series	Pages	Dealing with	Year
56	1915-16	8	A general plan	V
72	1916-17	3 to 9	Henhouse construction	V

#### FARM ENGINEERING V. (FIRST HALF YEAR.)

### *Aim.*

This course aims to give the pupil actual experience in measuring, computing, drawing maps and plans, preparing schedules of material and specifications for the numerous

construction projects involved in farm organization and management.

The old-time courses in land surveying and leveling, which some of the academies of forty years ago gave, came quite as near being courses in applied mathematics as many of the recent efforts in that direction. Today boys and girls in secondary schools will profit when the compass, plane-table, level and transit give real meaning to angles and triangles, and when a few measurements which can be made are by mathematical computation made to yield yet other dimensions which are inaccessible.

Arithmetic, geometry, trigonometry and algebra are all made use of in an effective way wherever surveying is rationally taught.

The subject is vocational in that it deals with the everyday needs of farm practice as lines are run, areas computed, maps made, levels determined and grades established. It is educational in a general sense because it makes the formal mathematical sciences such as trigonometry, geometry, algebra, etc., understandable from their concrete applied side. In fact, about the only curricula in the secondary schools which make possible a truly pedagogical procedure in mathematics are those dealing with agriculture and mechanic arts.

### *Standards.*

The course in land surveying must include chain or tape determination of areas, plane-table traversing, mapping and computations, compass and chain surveying, leveling and, when instruments can be had, transit surveying.

It is advised that each pupil be required to construct for himself (1) a substantial plane-table with small compass inset and a sturdy tripod on which to mount it; (2) a simple water level or a spirit level with suitable sight, a leveling rod and range rods. These projects can be made a part of the wood and iron work courses if other construc-

tion projects run short or they can be planned and supervised by the teacher but made as extra home or school shop work.

Each pupil must make a survey, either chain, compass or plane-table, of his home farm or of some farm that is for sale and compute the area, map its division such as fields, pasture, forest area, etc., this to be a part of the farm organization course or possibly of the farm management course if this seems better.

The class must be taught to compute areas both by triangulation and by traverse table computation, the latter, of course, when compass or plane-table is used.

There are many useful problems in dividing land up into proportionate parts. Some of these may be worked out.

Each class must be given an opportunity to work out one good project in leveling either to establish grades for drainage or to determine possibilities of gravity water supply. These cannot be book problems but must be based on an actual survey on some farm where such work is actually needed, even though it is not likely to be carried out at present. There are interesting problems connected with the magnetic needle and its variations, as well as with the establishment of a true meridian at any place. Old deeds, the date of whose survey is known, can often be found and courses determined from which the change in the magnetic meridian can be discovered.

#### CONCRETE CONSTRUCTION.

Each class must have an opportunity for making plans, constructing forms and building some worth while project in concrete.

There is no place here for the diminutive, make-believe projects. Every community is in need of sidewalks, curbstones, watering troughs, steps to public buildings, etc., and will usually provide the raw material if the teachers and class will do the constructing.

Most schoolhouses are in need of basement floors, vaults, retaining wells, steps, fence posts, etc., and there are few farms from which pupils come which do not need a watering trough, septic tank, silo foundation or some other convenience into which concrete enters. The live teacher and live class will find plenty of chance for making real things rather than to construct "models" of bridges, troughs, fence posts, tanks, etc., on a one-eighth scale.

It is quite possible for some schools to make forms for concrete block making and to make a supply of blocks for some purpose such as a blacksmith shop or the underpinning for a work shop.

Mixing concrete is an art dependent on some very definite principles of science and the difference between good, durable work and work that is unsatisfactory depends largely upon three factors: (1) the kind of material used, (2) the proportion in which the materials are used, and (3) the skill with which these materials are mixed and rammed into the forms. The pupil should go out from this course knowing the why and how of the process well enough to take charge of and turn out a good job.

#### MISCELLANEOUS OPPORTUNITIES.

Measuring and computing wood, lumber, standing timber, hay, coal, ensilage, earth excavation, fills, establishing road grades, etc.

#### *Suggestions.*

In addition to what has been said it is well to point out that the old-time course in mensuration which many of us struggled with in Greenleaf's National Arithmetic was a course in applied mathematics just such as is contemplated here except that the old course had the data all given in the problems presented. This course involves many of the same computations but it insists upon making the problems real and requires the pupil not only to measure and esti-

mate but also to test the results of his computations, so far as possible, by actually doing things. The old way was chiefly a matter of intellectual accomplishment. The new adds the motor element of hand work, of construction, of utility. The former had no obvious relation to human needs, the latter makes human well-being fundamental.

The old plan ended for the most part with some memorized rules and certain skill in the use of figures. The new starts with facts obtained first-hand and gives the pupil a chance to know why he figures on  $62\frac{1}{2}$  pounds of water per cubic foot, or 550 cubic feet of hay per ton, etc., and it clinches the knowledge thus discovered by incorporating the result in the muscles as well as the brain. Psychologically, we must remember that motor habits persist long after the mental factor which contributed towards the habit has faded past recall and equally important is the fact that the motor habit has the power of reviving the faded mental factor.

#### FARM MACHINERY V. (SECOND HALF YEAR.)

##### *Aim.*

This is a very practical course designed to familiarize the pupil with the tools and mechanisms found on a modern farm.

It involves three factors: (1) a study of actual machines in operation to see what they are designed to accomplish and how well they are doing the work; (2) a study of the various adjustments by means of which the character, quantity and quality of work performed is varied to meet differing conditions; (3) the discovery of the most common defects and failures due to wrong adjustment, weakness, etc., to see what precautions are necessary to guard against these failures and what must be done to restore worn parts.

The course should cover every device commonly used on the farms in the region about the school from simple machines like the cultivator or corn planter to the most com-



plicated such as cream separator, threshing machine and tractor.

The pupil must know by experience how to adjust and prove the rate of seeding of hill, drill or broadcast seeders; must be able to control the amount of fertilizer to be distributed; must know how to determine the speed of threshers, cream separators, grinding mills, saws, etc., and be able to control the speed of gas engines or other motors.

The vagaries of automobiles, so far as human wisdom permits; should be inquired into and the processes involved in the ordinary up-keep of valves, cylinders, bearings, batteries of the gasoline motor should be learned through actual experience supplemented by verbal or written instruction.

The major aim must be to instruct pupils as to reasonable care of farm machinery: how and when to oil, take up wear, babbitt boxes, clean, paint, etc.

It is probable that the depreciation of farm tools when not in use is nearly as great as when in use, partly because many machines are used only a few days per year but more because of the condition in which the machine is put away or unfavorable surroundings where it is stored.

### *Standards.*

Each class must study in detail and first-hand such tools under the following heads as are in use on the farms in the country.

- A. *Plows*, walking, sulky and tractor.
- B. *Harrows*, disk, cutaway, spring tooth, acme, smoothing, etc.
- C. *Seeders*, broadcast, drill, hill, check-row.
- D. *Fertilizer Distributors*, manure spreader, lime spreader, etc.
- E. *Cultivators*, Planet, Jr., "fourteen" tooth, two-horse, two-row.

- F. *Harvesting Machines*, mowing machine, reaper, thresher, corn binder, ensilage cutter, potato digger, corn husker, hay rake, hay loader, horse fork.
- G. *Power Generators*, gasoline or kerosene engines, steam engines, electric motor, tractor, water motor.
- H. *Transportation, etc.*, automobile, truck, farm wagon.
- I. *Electric lighting and water pumping outfits.*
- J. *Dairy Devices*, milking machine, separator, churn, butter worker, milk bottler, cheese-making equipment.

### *Suggestions.*

The local farm machinery agent is a valuable man to cooperate with. A half day spent in actual work helping to set up a variety of machines and a study of the catalogues and instructions for assembling these will give a greater knowledge than weeks spent in studying about machines in general.

How are the parts assembled? How held together? What safeguards to prevent nuts becoming loose? These are the things one needs to know in selecting machinery.

The draft of machines varies considerably and often the farmer is overloading his team without knowing it. Does the plow draw harder than the disk harrow?

How does the biggest load of hay compare, as a load for a pair of horses, with a cord of green wood?

Does a mowing machine require as much power to operate it as does a spring-tooth harrow?

A clevis dynamometer as part of the equipment of an agricultural school is needed in answering such questions.

### FARM ORGANIZATION VI. (FIRST HALF YEAR.)

#### *The Aim.*

The course in farm organization is a half-year course and must be kept distinct from the course in farm man-

agement. The two make up a year's work but are not to be given combined.

This course in farm organization is best planned when the teacher has in mind the problems which would confront a young man about to embark in the business of farming. It involves all of the planning incident to buying a farm, remodeling its buildings, or building new, deciding upon the type of farming best for the given situation, studying the land, outlining a suitable rotation of crops, selecting farm stock, machinery, seed and fertilizers, and deciding upon the amount of help necessary to run the enterprise when the time comes. In short, it is concerned with every detail involved in getting the outfit selected and in shape to be operated.

This will be best accomplished by requiring each pupil to assume as his particular project the task of organizing such a farm as he would like to own and manage, keeping the magnitude of the enterprise within such reasonable limit as a moderate capital of say two or three thousand dollars would warrant. In most cases it will be best to have the pupil deal with the re-organization of the farm on which he lives, or study the condition on some farm nearby which is for sale.

#### *Standards.*

The pupil must be led to consider himself as actually entering into the real task of putting such farm into shape to be farmed as he would do it.

(a) There must be a map of an actual farm that the pupil is studying. (This is work for the farm engineering class to take up at the very start of that course.) The fields, pastures, needed drains, etc., must be shown on the map.

(b) There must be measurements made and a plan of the existing building drawn to scale. Upon this plan the work of remodeling must be based. Estimates of cost must be made and verified as far as possible.

(c) The type of farming must be worked out in general for tools and equipment, rotation of crops, plan of buildings, etc., all are affected to some extent by the kind of farming proposed.

(d) The equipment must be selected, not from a textbook, but from the farm machinery dealer, or from catalogues of manufacturers. Costs must be determined.

(e) The kind and amount of farm animals proposed, and the probable cost must be decided upon.

(f) There must be a preliminary study of market, shipping facilities, roads, etc., as a basis for an intelligent choice of the kinds of farming.

Inspectors will call for plans, estimates, maps and written papers covering the divisions above outlined and will require pupil to show notebooks in which they have recorded the data they have collected.

### *Suggestions.*

Make the planning as real as possible by requiring each pupil to collect information from local farms, from dealers in equipment, from carpenters, masons, etc.

Do not let the pupils spend time on planning and furnishing the house except so far as parts of it relate to the man's part of management.

Domestic arts classes cover the home planning and the teacher of agriculture should work with the teacher of domestic arts thus getting both a farm and a home organized.

It will be seen that this course reviews all of the preceding courses; for example, that on soils, horticulture, field crops, animal husbandry, forestry, farm engineering, farm machinery, etc.

### *Bibliography.*

There is a vast amount of material available and fortunately it has not been formalized, peptonized and devi-

talized by textbook makers. It is found in catalogues of farm machinery and seed catalogues; in agricultural magazines and papers; in bulletins and reports of experiment stations and in agricultural encyclopedias and reference books.

Better than this, just what is needed by these boys is known by scores of good farmers in the region about the school.

Every agricultural fair has valuable exhibits of almost everything essential to the farm, cattle, crops, tools, tractors, fertilizers, feed, etc.

The Commissioner of Agriculture for New Hampshire has reports and the Deputy Commissioner issues market letters and both will gladly answer any reasonable number of questions which agricultural pupils may ask.

The world is so full of facts and figures relative to the topics of this course that it is a pedagogical sin to turn to the index of a textbook to determine whether it is profitable to grow potatoes in Coos County or to sell milk in Concord.

This course to be worth while must be a project course. Therefore, half of the time devoted to it should be spent in gathering facts and opinions, inspecting farms, herds, tools and buildings, making approximate surveys of fields or measurements of farm buildings, drawing plans and maps, making out schedules of lumber needed for repairs or for new construction.

The other half should be spent in lively discussions of the facts and figures brought in by the class, arguments as to proposed plans, etc.

Topics may be assigned whenever need arises but to debase this course to the level of cut-and-dried general classroom work divorced for the most part from anything specific and personal and practical, is to defeat its purpose entirely and it would better not be given at all.

*The Aim.*

This course takes up the work where farm organization ends and involves the idea of actually running the same farm that has been organized.

Each pupil will have his own problems to solve and the success of his solution will be determined largely by the reasonableness of his estimated expenses and probable income.

Each pupil must endeavor to put himself into the position of the owner and manager of such a farm as he has organized and should draw as many of his facts and figures from his own home experience or from the experience of the best farmers in his neighborhood as possible.

If he has had a successful animal husbandry project he can use this experience. If he knows of successful farmers near by, he can get much valuable data from them as to labor cost for farm operation, yields of crops, value of products, etc.

One of the very large factors in a successful farm enterprise is a rational rotation of crops suited to the given soil and meeting the needs of the particular type of farming proposed.

The farm map should definitely show how and when this rotation is to be managed and should cover years enough to meet the needs of the farm.

*Standards.*

Each pupil must keep good, readable notes giving the facts he has gathered up and their sources.

He must write up the reasons for his proposed crop rotation and set forth his expectations as to expenses and income.

There should be in permanent shape for inspection at any time, as the work progresses, notebooks giving the



common per acre yield of the standard crops he is to raise and a detailed statement as to how he proposes to improve the fertility of his land or improve his farm animals or get better strains of seed.

There must be at least one good report of the way the pupil would market his products.

Each pupil must keep a set of farm accounts along with his farm management project. The entries must be those decided upon as representing reasonable expenses and income for the operations involved. Farm account keeping should be in very simple form such in fact as could be kept by every farmer without involving too much detail.

Each pupil will be required to carefully study and write one essay on a subject to be selected from the following list:

The farmer's interest in good roads.

Local taxation of farms as compared with other businesses.

The Grange as a help to the farmer.

How to improve a herd of cows.

Tuberculosis and how to guard against it.

Does the Tariff favor or injure the farmer?

Does milk selling pay?

What crop produces the most profitable fodder for cows?

Is poultry farming profitable?

### *Suggestions and Bibliography.*

See course in Farm Organization.

#### ROAD BUILDING VI. (ONE-HALF YEAR.)

The day of irresponsible road repairing is rapidly passing and a new order of intelligent effort is beginning to show results in the form of highways over which it is reasonably comfortable to ride and whose surface and grades make it possible to draw much larger loads of farm products and merchandise.

The science and art of the highway engineer has brought about some very substantial results but there is yet, in cities and villages, as well as small towns, much of the old wasteful, hopelessly unintelligent repair work which year after year scrapes mud from the gutters into the roadway and piles dirt and turf over rocks.

*Aim.*

A course in road building in the high school is justified on the well-known principle that habits, good or bad, are easiest formed and most persistent when acquired during the mid-adolescent years from fifteen to eighteen.

If at this time boys see and take part in the old-time annual riot of road repairing, so called, they will strongly tend towards perpetuating the methods with which they are familiar, but if the public school can, by an appeal to their developing intelligence show that heaping sods and dust in the roadway is not making a road, or that dumping a load of sand in a hole from which standing water cannot escape is not permanently overcoming the difficulty, or that leaving side ditches without an outlet for the water they collect is not providing drainage,—if the school can get these facts and others home to the receptive mind of the boy, it will strongly tend to discount the influence of the bad practice he sees about him.

The aim, then, is to show the horrible examples of "road fixing" that are still too prevalent; to examine roads constructed by competent engineers; to point out the differences between good and bad roads, and to discover the engineering process by which satisfactory roads are built.

The course must acquaint the pupil with the local road building material and show how it ought to be combined to produce good gravel roads, for these will always be the kind of rural road which can be afforded.

The cost of building and maintaining must be investigated: (a) from local construction; (b) from the reports of the State Highway Commission; (c) from other engi-

neering sources. At the same time there must be a reasonable interpretation of the town's ability to bear tax burden so that plans may be worked out for a general system of permanent highway improvement. The state has plans for the progressive construction of a series of improved highways and main crossroads. In a similar way the class should chart all roads of the town and devise plans for the systematic improvement of the main thoroughfares and most needed highways.

Actual methods of road construction, improvement and upkeep must be made evident to the class by numerous excursions to places where work is being properly done under the direction of engineers or road builders.

#### *Standards.*

The class must make surveys and establish grades figuring cuts, fills, etc., and make plans for the improvement of at least one-fourth mile of road near to the school. It will be best to take some road that is likely in the near future to be improved. It may be possible through coöperation with local or state road agents or engineers to have this work of the class become a part of the plan of work adopted by the town, and if so, the school will have become a real factor in public improvement as should be the case.

Each pupil should be given as a definite problem, a piece of road on which he is to report from time to time relative to work needed to keep it in good order thereby showing to the class the need of constant inspection and timely repairs as a matter of economy.

#### *Suggestions.*

If possible make arrangements with the highway authorities so that the class may actually take charge of a definite section of road near the school, doing all of the work of improving and keeping it in repair year after year, the town or city of course furnishing material and teams. A quarter or half mile is probably a desirable project.

*Bibliography.*

The State Highway Commission Reports and Bulletins.  
National publications of various kinds.

Any good reference book on road building.

Note: The best lessons, however, are *object lessons* of good, bad and indifferent roads and an on-the-spot discussion of their differences.

## FORESTRY VI. (SECOND HALF YEAR.)

*Aim.*

The aim is to encourage pupils to look upon the forests as an important part of the farm to be intelligently handled, having proper regard to its preservation and use.

The course must be made practical by giving each pupil, if possible, an actual project in reforesting or thinning or otherwise improving forest areas.

*Standards.*

The class must study the problem of seed collection and get samples of seeds from each of the important forest trees in the region. It may be possible to collect some of these in quantity sufficient to be of commercial value or at least enough to test for germination and perhaps raise a few seedlings.

The process of setting out seedling pines must be taught by practice, for on almost every farm there is land which ought to be producing timber, and pines set out by high school pupils will be large enough to convert into lumber before the pupil is fifty years old. A little foresight and assistance may very well lay a foundation for a substantial income later in life. Many New Hampshire towns at small expense can buy some poor farm on which the buildings have been burned. The class could easily reforest with young pines, an acre a year. The care of these pines and of other wood growth, would furnish the class with a field

for action. If this plan were continued for a series of years the income from the town forests would aid materially in the support of the schools.

Each pupil should be shown how the home wood lot can be economically managed or a lumber lot thinned and improved.

There should be some practical work in scaling logs and in estimating standing timber.

Brief investigation of the kinds of timber in local forests and the rate of growth of each kind with some actual determination of the age of trees, etc., are necessary in this course.

### *Suggestions.*

There is no textbook that can be made the basis of this course. It is a new and rapidly developing subject in this country and the reports and bulletins of State and National boards, bureaus and commissions contain all the reference material needed, if the teacher works out a practical list of topics for investigation.

## REFERENCE BOOKS IN AGRICULTURE.

### GENERAL.

The Farmer's Cyclopedia: Doubleday, Page & Company.

Every high school in which agriculture is taught should have in its reference library this cyclopedia.

The opening paragraph in the introductory to the set is as follows: "Practically all of the matter in the seven volumes of this series is taken bodily from the bulletins, circulars, annual reports, year books and other documents of the Department of Agriculture and the Experiment Stations of the United States and Canada."

There are numerous references throughout the volumes to the original sources and for these alone the work is invaluable to teachers and pupils.

## HORTICULTURE.

Garden Farming, Corbett: Ginn & Company.  
 Market Gardening, Burkett: Ginn & Company.  
 Market Gardening, Lloyd: J. B. Lippincott Company.  
 Orchardng, Sears: J. B. Lippincott Company.

## FIELD CROPS.

Productive Farm Crops, Montgomery: J. B. Lippincott Company.

## ANIMAL HUSBANDRY.

Productive Poultry Husbandry, Lewis: J. B. Lippincott Company.

Common Diseases of Farm Animals, Craig: J. B. Lippincott Company.

The above are not *textbooks* suitable for secondary school courses. They are, however, very valuable for the reference table.

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 CHAPTER IX.

## MECHANIC ARTS.

The program of studies for the elementary schools of New Hampshire in Chapter XVII gives suggestions for manual training for Grades V, VI, VII and VIII. The last two of these grades are now coming to be included in the high school system as a Junior High School and therefore require some consideration in this program.

## MANUAL TRAINING I AND II (GRADES VII AND VIII).

This is the age (12.5 years to 14.5 years) when boys have a strong tendency to investigate the phenomena of nature's



forces as they act upon and through the material world, but it is more than this,—it is the age when boys begin to make things that can be used to harness these forces. It just precedes and foreshadows the inventive-creative period and prepares for it by causing the boy to imitate in his own way, the devices, machines and contrivances which adults are making use of in their daily employment.

Manual training in this stage of the boy's development ought to concern itself with making many things, useful from his standpoint, as—double runners with safety brake and steering wheel; hand carts large enough to use yet simple enough to be easily within the pupil's constructive power; a threshing machine, if he is a farm boy, with which he can actually thresh out turnip, cabbage, beet and radish seed raised in his garden and to be used in next season's planting; a water wheel if he lives near a brook, one large enough to drive this threshing machine or to pump water or run a jig saw or grindstone; a windmill, though not particularly useful, will fascinate a boy if he builds one and it may serve the important purpose of helping to disclose to the boy, himself, some unusual tendency towards mechanical inventiveness.

The farm-reared boy has abundant opportunity for doing odd jobs at repairing farm machines and equipment and the ages here provided for are the very ones during which the foundation for resourcefulness in adapting means to ends is laid. A new spoke in a wheelbarrow, a new spring in a door lock, a new frame for climbing roses, a new leg in a chair, a cupboard for the pantry, a toboggan, skis, anything and everything which is manifestly useful and, if possible, has some complications in its make-up that baffle and yet excite a determination to accomplish the result some way,—these are the things the teacher must plan with his class.

“Never saw or plane a piece of wood unless it is to be used in a project in a way which the pupil foresees.”

Find what your pupils want to make, but do not try to

make every boy think he needs trousers-hangers for his knee breeches or a coat-hanger for his jumper.

“Don’t try to teach a boy to plane a straight edge on a three-inch sandpaper block with a twelve-inch jack-plane.” It cannot be done and it is futile even if accomplished.

Do not bother about blue prints. Make something and learn about reading plans later.

#### SUGGESTED LIST OF PROJECTS.

The following is a list of some things which boys have shown a desire to make. They are not classified by grades and could not be. They are not in any sense of universal value and are only attached to this course in order to suggest the type of thing which makes good project work.

Box and cover, lamp table and drawer, bookcase, dressing table, small desk, piano bench, plant stand, small stool, moulding board, drawing board, T-square, clothes chest, tool chest, simple to elaborate chair, sewing table, typewriter table, case of drawers for card system, bill files, bulletin and pamphlet boxes, whippetree and neck yoke, axe handle, hand-cart, wheelbarrow, hammer handle, plane body and handle, marking gauge, bench stop, poultry feeder, trap nests, box trap, grain boxes, egg cases and carriers, milking stool, wagon cross-bar or wood axle, grindstone bench, cheese press, butter-maker, butter stamp, cart body, wagon body, hayrack, harrow frame, plow beam, ox yoke, farm sleds, hotbed sash, portable hen-house, swine house.

MECHANIC ARTS III, IV, V AND VI (GRADES IX, X, XI AND XII).

#### *Aim.*

This curriculum is both vocational and educational in a general sense. It deals with pupils from 14.5 years to 18.5 years of age. The first two years of this period is the

time for making up permanent psycho-physical adjustments and hence is a time for getting right motor habits through sensible constructive work in wood, iron, textiles, etc.

It is most emphatically not the time for aiming to get skill and productive efficiency. "The short-sighted method which falls back on mechanical routine and repetition to secure external efficiency of habit, motor skill without accompanying thought, marks a deliberate closing in of surroundings upon growth."—Dewey, *Democracy and Education*, pages 58-59.

To divorce thinking (mental organization) from doing (motor expression) is to break up the biological order of reaction to environment common to all animal life from protozoa to man. For all ages below 18 certainly manipulative expertness, habituated motor response, efficient production, movement minus mind,—the whole evil brood of movements (expression) under automatic control such as economic efficiency demands is a pedagogical sin for which no school system and no true teacher can assume responsibility. It is defying nature's laws and imposes the penalty of motor precocity and its inevitable correlate, arrested intellectual development.

Hall has this to say concerning the years from about fourteen to sixteen: ". . . . now again comes a greatly increased danger . . . . that over precision, especially if fundamental activities are neglected, will bring nervous strain and stunting precocity." Again: "machinery has relieved the large basal muscles and laid more stress upon fine and exact movements that involve nerve strain."

The public school dealing as it does with youth under the age of eighteen years has no right to prematurely automatize its pupils by training them through the use of commercially productive machinery in which the really intellectual elements of the processes are incorporated in the gears, cams, levers, etc., of the machine, the operator being degraded to a mere handler of raw material.

To illustrate: no one doubts the economic efficiency of a quick change gear mechanism on an engine lathe; a few easily acquired adjustments according to the directions on the plate, the movement of a lever or two, and the desired thread or cutting speed is assured, but how about the boy who is not only learning how to cut a thread but is at the same time fitting himself to meet in full his duties as a doer of the world's work?

As a matter of fact he has become an attachment of the lathe. He moves the lever as directed but knows nothing of the ratio of the gears or the application of proportion involved. When he comes to a problem not provided for in the lathe mechanism he is helpless.

An old style lathe with a peck of change gears stacked up in a tool box is vastly better for a school shop than a lathe with the most elaborate mechanism man has yet devised because the former mentalizes every movement and keeps *impression* and *expression* closely connected through the *organizing* capacity of the central nerve system; it keeps the intellectual element in the foreground; it makes workers who think as they work.

No one would regard a Weymouth lathe, with its back knife swiftly and accurately turning out balusters, as a suitable tool for a school shop because a few experiences in putting the stock into the machine and drawing forward the knife are all that are required to become an operator of this lathe. The Weymouth lathe or its equivalent is highly desirable as a tool for production but is a total failure as a means of developing resourcefulness on the part of its operator.

It must never be forgotten, so far as education under the age limitations of the public school is concerned, that the method and aims of the commercial shop with its automatic machinery, its high speed processes and its "efficiency" organization, is totally unfit for meeting the needs of adolescent pupils for the reason that in such shops production is the all-important aim, machines being the

dominating factor in securing this production. Under such circumstances, men are necessarily relegated to the position of machine tenders,—human mechanism synchronized with the movements of the machines which they are required to keep supplied with raw material.

The school shop, therefore, must not be equipped, organized or managed after the manner of a modern, high-pressure, commercial shop.

Again and as a corollary of the above, the commercial shop cannot be made an adjunct of the public school under the mistaken notion that the practical part of the pupil's education can best be given amid adult workmen under expert foremen and on highly perfected machinery where labor is so divided and specialized that each man has only one small part of a whole to do.

The aim in education for pupils of public school age is not to encourage premature automatic control of movements but rather to secure the widest possible freedom on the part of each pupil in devising and trying out reasonable ways of doing things. This develops the power to utilize whatever agencies are available in the solution of any problem that may arise.

This aim is justified on the well-known psychological principle that "the domination of habit means the arrest of development," which means that motor activities,—doing things,—must be kept under a high order of brain control thereby effectualizing the distinctly human accessory muscles of hand, wrist, arm and eye by tying them up directly with their corresponding nerve endings within the higher human parts of the brain thereby delaying the final stage of automatic control which is a stage of arrested development, a stage that will come all too soon at best.

To short circuit nerve control of hand movements by an early turning of the inflowing currents towards the lower nerve centers is to dwarf, cripple and dehumanize rather than to develop and humanize the worker. The blighting effect of such premature vocationalization of adolescent



youth is perfectly evident in the dull eye, tensionless body, listless movements and prematurely aged face of the child worker in shop and factory where machines and methods are adjusted to about as high a pitch as adults can endure.

The inventive-constructive instinct in the human race, an instinct which enables man to change the crude natural materials about him in ways to better serve his needs, "must have developed in an environment where it was useful," and hence the nurture and normal unfolding of that instinct in each individual will best be accomplished by a curriculum founded on construction with simple tools and machines which require a very large outlay of human nerve and muscle for their successful use. The more brain and muscle required, the greater the educative value. To put hot metal in a press or drop forge, where the machine itself predetermines in every detail what the result will be, requires little intelligence to start with and develops none in the end, but a forge, anvil, vise and hammer made use of in shaping the very same useful article both requires and develops intelligence.

A wise old chimpanzee could probably be trained to tend the drop forge but not to heat, forge, temper and test in the blacksmith's shop.

It demands and develops normal intelligence to make a satisfactory mortise and tenon when constructing a chair or table, but a low-grade moron could be trained to operate a mortising and tenoning machine.

It is neither necessary nor desirable to equip our mechanic arts shops with complicated and dangerous wood-working machinery or with highly-specialized, metal-working machines. Tools for wood, a speed lathe for pattern making, forge tools for iron, a planer, engine lathe, drill and plain milling machine for the machine shop are the chief requirements in New Hampshire school shops. On these the pupil may be taught to do all of the work ordinarily required in constructing useful projects that are well worth while and which call for the use of a high order of intelligence in their planning and manufacture.



It is a well-recognized fact that the all-round machinist who has learned his trade in a general repair shop, where a great variety of jobs have to be done on comparatively few machines and where human ingenuity must devise ways and means for making these machines serve, is the most valuable man that can be secured for a real job in a manufacturing plant. The same thing is true in the school shop,—the pupil who has had to devise, contrive and scheme to get the desired result may have spent much time in getting the result but as compensation for the extra time he has developed gumption, that invaluable quality which overcomes obstacles and succeeds in spite of difficulties.

#### SHOP WOOD WORK III.

##### *Aim.*

The aim in this work is to make something of commercial value, that is, the projects must be such as would satisfy the requirement of the user if it were put on the market for sale. It must be a real article of use.

In making this, two starting points are possible; (1) Something actually present in the shop may be reproduced item by item with or without drawings, or (2) the general plan of the project may be developed by the pupil partly from something he has seen in use and partly from his own notion as to what will best serve the purpose he has in mind.

In either case it is the teacher's business carefully to go over the whole matter with the pupil, discussing with him the use to which the finished product is to be put, the materials proposed, the methods of construction, finish, etc., and the advisability of attempting the project.

Much of the educational significance of projects in wood work lies in the adaptation of the work proposed to the power and capacity of the worker and there has been quite as much damage done by under-estimating the pupil's power as by over-estimating it.

Repeating the trivial projects of the elementary school manual training has brought disrespect for high school construction courses from both pupils and public. A high school pupil who takes the mechanic arts course must spend the time given to shop work on projects which are worth while and which are fully up to the pupil's constructive powers, otherwise the shop becomes for that pupil a place for squandering valuable time.

A whisk-broom rack may be an appropriate project for a sixth-grade boy (it is doubtful if it excites much enthusiasm in any grade) but it is about as poorly adapted to the high school pupil as a game of marbles must be to a star baseball player. A Morris chair, a substantial table, a good-sized tool chest or cabinet, a wheelbarrow, a violin case, a music cabinet, etc., are useful, of good size, require good workmanship, involve fundamental principles of construction, need staining, filling, varnishing, etc., and are likely to be wanted by part of the class.

It may happen that no two boys want to make the same thing but it is more likely that a whole class will divide into two or three groups, each group being interested in the same kind of project. However this may be, the pupil should really desire to make the thing he decides on.

### *Standards.*

It is not possible and perhaps not desirable that definite requirements be established.

Some pupils work slowly and require twice as long in exactly the same construction as another pupil. Some projects are very exacting and take much time, while another project, of equal worth when completed, requires less work.

The real standards to keep in mind are: (a) whether or not the pupil is making good use of his time; keeping busy and taking a real interest in his work; (b) whether his work is as good as he is capable of doing. There must be a sliding scale in giving credit for work on projects and

the teacher must know his pupils well enough to mark justly according to both capacity and effort.

In general, there is too much loafing and too little accomplished in the mechanic arts shop and the remedy lies in getting pupils to become personally interested in doing good work and in getting a project completed in order that a new one may be undertaken.

### *Suggestions.*

It is best at the outset to have each pupil consider and write down a list of, say, a half dozen, wood-work projects which he desires to work on during the year. These lists will be of great value to the teacher in planning for the year's work and in giving advice to individual pupils.

### CLASS PROJECTS.

It will usually be true that the school is in need of a great amount of construction of various kinds which the class will be glad to do. This work should always be given the right of way, for no work accomplished gives greater returns to both school and class than the practical repairs and construction about the building or in working equipment.

### DRAWING III.

#### *Aim.*

The drawing required in this course is to be related to the projects undertaken. Drawing boards, T-squares, dividers, scale and pencil are to be in the shop ready at a moment's notice to be used whenever a detail of construction needs to be shown in a drawing. It is probable that two hours a week if properly made use of will give ample experience for pupils to make the working sketches and drawings necessary for their own use or to enable them to read drawings already made. The aim is not to prepare draftsmen but to give the ability to express ideas in the

language of working plans or to read that language and get the ideas involved.

There should be no time spent on tracing or inking until towards the end of the year at which time one or two tracings and a few blue prints should be made.

The drawing in this course is purely supplementary to the construction and must be given by the shop teacher in the shop and at such times as a pupil or group of pupils actually need the aid that such drawing can give to the construction in hand.

### *Standards.*

Every project of importance must be sketched and the essentials drawn to scale.

These are to be pencil drawings for actual use and must be kept in portfolios where the inspector can readily see them.

## PATTERN MAKING AND MOULDING WITH RELATED WOOD TURNING AND DRAWING. YEAR IV.

### PATTERN MAKING IV.

#### *Aim.*

It is expected that the course will give pupils sufficient practice in pattern making to enable them to understand the more common types of patterns and their moulding requirements and possibilities. To make this course effective all patterns made should be for a purpose; that is, they should be made because some project which is being undertaken requires castings and therefore must have drawings made and patterns prepared.

Under the time limitations in school administration it seems necessary to take up pattern making in Year IV and machine work in Year V. Consequently, projects requiring castings must be planned early in Year IV so that part, at least, of the needed patterns can be made and the cast-

ings procured ready for the machine work early the following year.

There is no more excuse for "exercises" in pattern work than there is for "joint" making in wood work and the traditional "pipe joint" which is not often needed and almost never machined and threaded stands on the same false footing as the dovetail joint and its kindred time and interest killers, which the formalism of the pedagogue has imposed upon the plain, everyday, constructive processes whenever and wherever he has reluctantly admitted these as school activities. The pedagogy of the practical arts can be stated in a paragraph as follows:

Select as a project something that is needed for a definite purpose; construct this as real workmen would do with the material and tools available; and when it is completed use it as it was designed to be used. If it is adequate for the purpose, the effort was successful. If not, it must be charged up as a failure.

#### *Standards.*

Pupils must be able to make mouldable patterns, with the necessary core boxes, for projects equivalent to the following, which along with many others have been made in New Hampshire schools during the last fifteen years: electric motor, one-half horse power or more, power pump, speed lathe, gas engine, jack screw, portable forge, grinder, power hack-saw, power drill, furnace grates, etc.

#### MOULDING IV.

##### *Aim.*

Pupils completing this course must know how to prepare suitable flasks for any pattern which they have made; must be able to prepare the sand, cores, and all other materials needed and must be fully capable of going to the moulding bench and completely get a mould ready for the metal. This must include making necessary cores, baking and putting them in place.

*Standards.*

Standards are sufficiently indicated above under *Aim* with the additional caution that inspectors will require classes to demonstrate this ability by actual tests and the teacher must know that the moulding bench is ready for use whenever such a demonstration is asked for.

*Suggestions.*

There should be more attention given to moulding and it should closely accompany pattern making. Most of our schools are not equipped for handling all of the class at any given time on one particular type of work, nor is it desirable that they should be. The class should be free to follow the needs of the project rather than tied down to a fixed daily schedule.

Whenever a pupil has need to go to the lathe to shape some part of his pattern, that is the time for him to go there. When his pattern is ready for the shellac, the finishing room is his workroom. If a core box has been made he should test it by making and baking the core, and when all is ready and the final test of mouldability is to be made, the moulding bench must be put in order and the mould made. Such work makes a minimum shop equipment of maximum educational efficiency and demands good class and shop organization.

In addition to this, after the pupil has "tested and tried," failed and finally succeeded in getting the art of moulding into his muscles as well as mind, he should go to the foundry where his casting is to be made and observe how practical moulders handle such work. In most small foundries, such as schools are likely to go to for their castings, it will be easy to get a small space where each pupil may finally make the mould in which at least one of his castings is to be poured.

Experience shows that it is not at all difficult to make arrangements and to find foremen ready to assist and give



practical suggestions. It is stretching a good thing to an unreasonable length, however, to assume that each pupil ought to handle one side of a ladle of the melted iron used in pouring, nor should he be expected to help change the furnace unless the school has a furnace; in this case it is a part of his work just as cleaning up his bench and wiping the tools are a part.

Pattern making and moulding are among the most highly educative courses in a mechanic arts curriculum if the patterns are contributory to worth while projects. Formalized, however, into stereotyped "exercises" and imaginary "sequences" these courses fall flat because they are without a real motive.

#### WOOD TURNING IV.

The speed lathe educationally considered is of small value. It trains hand and eye, to be sure, but pattern making with its use of simple tools is so much more effective in this regard that the lathe's contribution is almost negligible.

The lathe is merely a tool for producing certain results on wood. It is useful, therefore, in both cabinet making and pattern making as a means to a given end within the project.

There are a few simple manipulations which the pupil should rapidly acquire. After this he should use the lathes, not to cover a given amount of time daily for a prescribed number of weeks but rather to get out certain needed parts of circular cross section which cannot otherwise be readily produced.

The essential thing to learn is the proper relation of the edge of the chisel to the revolving wood to insure *cutting* instead of *scraping*.

At least seventy-five per cent. of all pupils in our mechanic arts curriculum who for the past five years have been "taught" the use of the speed lathe have finished the course without ever discovering the meaning of a tangen-

tial cutting position for either the gouge or the skew chisel. They locate the rest at or below the level of the lathe centers, hold the chisel nearly level and scrape away the wood until the edge of the chisel is too rounded to even scrape.

This scraping process has its place when the parting tool is used or in bringing patterns down to exact measurement but in roughing stock down to approximate dimensions and for finishing cuts other than on patterns the lathe chisel is, or should be, a cutting tool, peeling off shavings in ribbon form rather than grinding the wood away in dust.

The handle of either gouge or skew chisel should be held nearly or quite as low as the operator's hip. This carries the cutting edge high up on the wood, cuts long shavings from the wood, leaves a smooth surface and makes it possible to keep chisels sharp.

#### *Standards.*

Standards are well indicated above. The lathe chisel must *cut* and leave a smooth surface which requires little or no sandpapering.

There is no excuse for turning useless "models" like the pin tray, napkin ring, goblet, etc., on which so much time has been wasted. Either the pupil has or has not a project in cabinet work, pattern making or other purposeful construction, which requires wood turning. If he has such need, then is the time to show him how to handle that particular piece of work. If, on the other hand, there is nothing for the wood-turning lathe to do, let it stand still. Do not try to invent excuses for wood turning when there is so much highly educative hand work in pattern making, moulding and forging waiting for every pupil.

#### DRAWING IV.

What has been said under this head in the wood-working course applies here but in addition the teacher must recognize the greater difficulties involved in reading drawings

for patterns. This is in part due to cores and core box making and in part to the demands which moulding makes upon the pattern maker.

It is hard to see in the drawing all of the special adaptations which must be made to enable the moulder to get the pattern out of the sand. This ability to read plans follows and grows out of the ability to draw plans which in turn comes from experience in constructing and drawing closely combined as the work progresses.

This succession is strictly in harmony with the origin of the constructive and representative powers as they evolved in the race and as they unfold in the individual. Making things preceded making a plan of something to be made and this in turn preceded turning the plan over to a second individual to be by him comprehended and the thing constructed.

*Manual training* in the lower grades is mostly a matter of direct reproduction of a thing known with a little sketching to overcome difficulties as they arise. *Wood work* in the mechanic arts curriculum associates the drawing very directly with the project but introduces the element of planning ahead of construction thereby working out an idea into a picture or working plan then producing the thing in material form. In pattern making the pupil will need still further to develop this pre-planning, bringing in more and more detail until the drawing is complete enough for another workman, who does not know what this draftsman had in mind, to read in the plans, elevations, sections, etc., the latter's ideas accurately enough to make a pattern precisely such as the draftsman would make if he were making his own pattern. This last process of reading a drawing is really the ultimate end and aim of teaching drawing. It does not require great technique in drawing. A simple sketch, with accurate measurements indicated, may serve every purpose.

## FORGING IV.

*Aim.*

The forge shop with its equipment of simple hand tools is in all respects the most educationally effective laboratory in the whole range of school activities. The reason is disclosed in the previous general discussion of aims, namely, the lack of complicated machines which supplant human thinking and the use of just such hand tools as primitive man used to hammer and cut and burn his way onward through an adverse, antagonistic environment.

Pre-man's first move towards the human was when he augmented the power of his hand with a stone hammer; his next was when he developed this hammer into a stone cutting tool; his next was when he discovered the usefulness of fire. Much later he discovered ways of extracting and using metals so that his stone axe, hammer, chisel, knife, spear, etc., became metal tools. Hence it is that our constructive instincts, which are the results of these primitive utilizations of nature's materials and forces, are best nurtured and developed by activities closely related to these early ones. Nor can the recent inventions of civilized men ever take the places of the simple hand tools in bringing mind and muscle of adolescent pupils into adjustment.

Fill the school shop with steam hammers, drop forges, moulding machines and presses, mortise and tenoning machines, turret lathes, automatic screw cutting lathes, surfaces and moulders, etc., and its usefulness in education would approach zero. Such a shop would serve chiefly to train, not to educate, automatic human machines to be coupled up with automatic shop devices and would unquestionably aid bolshevism and hinder Americanization.

*Standards.*

There should be very little, if any, forging apart from projects. The twisted hasp, staple, unused link, the rod headed, but headed for no purpose,—the whole wall case

full of "models" which the instructor brought home from college, together with his herbarium and insect collection, is pitiful proof of the inadequacy of the higher education as a preparation for teaching high school pupils how to do things. The teacher of athletics alone comes from his college training filled with the notion that the way to teach boys how to accomplish results is to show them how to do a thing and then never quit until they can do it as well as he or better.

Most forging projects connect up with something that is being made in the wood or iron-working shop. To iron a sled or sleigh, a cart or wagon body; to make bolts for planer or milling machine bed; to forge and temper lathe and planer tools, or make chisels and parting tools for the speed lathe; to mend broken chains, rods, bars and braces; to sharpen and temper stone drills; to forge cold chisels, reface hammers, make punches, etc.,—these are the types of work which a well-planned course in forging will provide.

Pupils must leave the course knowing how to temper steel for various uses, how to weld iron or iron and steel and how to case harden and anneal.

There is no time for chipping and filing unless some piece of useful work requires it.

#### MACHINE SHOP PRACTICE V.

##### *Aim.*

The aim is to construct projects of real use and value which require in their making the use of engine lathes, planer or shaper, drill, grinder, etc.

Facility in the use of these machine-shop tools is to be acquired through using them in shaping the metal parts of projects.

Here again, as in *Household Appliances* or *Farm Tools*, the structure of the tool and the function of its parts is

not the aim. These things will be learned as the machine is used in the process of making things.

How to turn a true cylinder, or taper, how to surface a metal disk, face a pulley, cut a thread, bore a cylinder, is most economically and effectively taught when the part operated on is known to belong to some previously planned project requiring certain exact dimensions and the fine adjustment of the lathe or grinder essential to producing the desired result becomes a serious matter with the pupil because he wants the project to stand the test of use.

If an electric motor is being made it must, when completed, show an efficiency at least equal to that of motors put on the market by commercial manufacturers.

A school-constructed gas engine must develop power as economically as similar engines from commercial shops. These are real motives for painstaking, accurate work.

#### APPLIED SCIENCE.

Again the aim in a mechanic arts course is to teach science in its applied forms. The pupil does not learn numerous laws relating to the flow of currents of electricity, of magnetic fields, or memorize formulas; he does, however, construct a motor or generator according to prepared plans and in the process of winding, insulating, connecting, adjusting and testing he discovers many facts relating to the direction in which the coils must lead, the amount of wire needed, the complete insulation necessary, the accurate adjustment of the shaft and bearings, etc.

In forging and tempering tools for lathe, planer and drill he discovers many facts relating to the physical properties of steel under different treatments.

There are many applications of mathematics, physics and mechanics which give the pupil a retainable grasp on the principles involved. This is the inventive-creative age for boys and the constructive activities should recognize and appeal to these instinctive tendencies.



*Standards.*

Standards are so closely tied up with the kind of projects that definite requirements cannot be stated. A degree of accuracy and finish, satisfactory when making a jackscrew, would not be passable on parts of a gas engine or electric motor. The standard of workmanship must conform to the accepted practice of good shops, on similar grades of work, and this the teacher must know from actual experience in commercial shops. This is why the Federal Board for Vocational Education insists upon two years of actual shop experience for all teachers of shop subjects.

Now, while numerical standards cannot be established either as to quantity or quality of work, it is nevertheless true that the State Department, through its inspectors, will insist upon a reasonable output of projects of really superior quality.

A reasonable output is one that keeps interested pupils busy during the shop hours and any inspector or even the casual observer can readily determine whether this is the case or not.

## RECORDS.

Some form of card *project record* must be kept, showing the number of hours each pupil has put on a given project, and this should indicate in a general way the kind of work, *e. g.*, lathe work, drilling, planer work, hand work, assembly, testing, etc.

The project card can be best made up from an individual pupil card where, day by day, each pupil furnishes the data of his own labor.

The class in shop management, if there is such, or if not, each class during some definite periods devoted to shop management, should prepare plans for these records and devise ways of keeping them.

Inspectors will call for card or other records which will be sufficiently definite for them to determine just what

each pupil has had in way of experience on each machine in the shop or in other processes involved in the construction of projects.

#### STOCK RECORDS.

It is desirable to know accurately the cost of the materials which enter into a project and also to know what supply of materials are on hand in the shop.

The *project record* should show the former and the *stock record* the latter.

There should be an inventory of tools and stock at the end or beginning of each term and a record of each kept in permanent form.

#### *Suggestions.*

Suggestions have been freely given already but a reinforcement of those relating to *projects* is needed.

The teacher must recognize the continuity of Years IV and V. Many of the pattern-making projects in Year IV must be continued and the castings machined and assembled. These projects follow the class. There are others, however, which may become interclass projects; for example, it may be decided to make a forge for the blacksmith shop or a power drill for the machine shop. Now the plans may originate with the senior class; the patterns may be made by sophomores, juniors and seniors by selecting according to the difficulties involved; the lathe and planer work may be either junior or senior jobs; the gear cutting, grinding and fine work on bearings, etc., may be given to the seniors as will most of the assembling. In this way the three classes become one, so far as this project is concerned.

It is very desirable that an occasional rush job be planned. Let us assume that the janitor needs a barrel truck for wheeling out the ash cans and wants it within a day or two. The wood is in the plank, the straps and

rods are in bars, the wheels and boxes are yet in the form of pig iron at the foundry.

Here is work for the four classes. Let a senior make a sketch with dimensions for the wood work, another senior or a junior may draw a working plan for the wheels and yet another pupil sketches the bearings or shoe. Within an hour freshmen may be ripping out the frame; sophomores heading and threading the rods; a junior may be turning the bearings on the axle and in two hours the pattern may be under way and every part in process of construction. When patterns are ready a pupil or group may go to the foundry and mould them so that quite likely at the end of one day the foundry will have poured the castings. Drilling, machining, glueing up the frame, ironing and finally painting the iron and shellacing the whole may keep parts of four classes busy for whatever time is necessary. It is often a revelation to the teacher to discover how much work can be accomplished under the stress of unusual interest.

A new change gear for a lathe can be made another rush job, as can also making and ironing a set of whipple-trees, building a wheelbarrow, double runner, etc.

These are special projects that enliven and make real the activities of the school shop but, like spice in food, too much is quite as bad as none at all.

#### PROJECT POSSIBILITIES.

The only limitations on size and complexity of school-shop projects are: (a) the mechanical equipment of the shop, (b) the experience and ability of the teacher, and (c) the expense involved. With shops equipped as required in New Hampshire an engine lathe or planer of small size or a twenty-inch, back-gearred drill could be built.

A ten-horse power gas engine or a five-horse power electric motor or generator is easily possible. Speed lathes,

complete with counter shaft, grinders of various kinds, vacuum cleaners, portable forges, delivery wagons or sleighs, a two-horse farm wagon or set of sleds, hand or power pumps and, as a sort of masterpiece in correlation with the electrical construction course, a self-contained electric generating house-lighting, water-pumping power plant complete from kerosene engine to storage battery and motors and pumps,—all of these and many others are reasonable possibilities. It only requires a competent, courageous, industrious teacher to manage it all. The pupils have abundant mental and manipulative capacity for such work. It only needs developing into power.

#### ELECTRICAL CONSTRUCTION V.

##### *Aim.*

This is not a course in the *theory* of electricity. It cannot be taught in a physics laboratory and no textbook has yet even attempted to cover such a course.

The work starts with actual construction of:

- (a) Devices for generating electricity, primary batteries, magnetos, dynamos.
- (b) Devices for conducting, insulating, transforming and rectifying the current generated.
- (c) Electric bells, motors, electro-plating apparatus for using the current.
- (d) Storage batteries for holding the current for future use.
- (e) House wiring in its commercial aspects.

##### *Standards.*

Institute Circular No. 96 gives the requirements for this course with a detailed outline for the guidance of teachers.

##### *Suggestions.*

It requires a teacher who has had experience in shops where electrical machinery and devices are made and who

is willing to teach boys how to stand at the bench and do things rather than sit in classroom seats and hear lectures about how things ought to be done.

The theory of electricity, so far as entered into, is a secondary matter and crops out from time to time after a device is constructed or is in process of construction and it only appears here because of its technological bearing upon the way the machine or device operates or responds to the current or the current develops from the mechanism.

#### STEAM FITTING V (OPTIONAL WITH ELECTRICAL CONSTRUCTION).

Steam fitting vocationally offers excellent opportunities for employment and it also has a relatively high educational value.

The aim is to make the course distinctly constructional and it must deal with actual steam-heating projects.

#### *Standards.*

Circular No. 97 outlines a definite course and suggests ways and means for making it both vocational and educational.

The standards are qualitative, chiefly, since definite amounts of work are hard to specify. The projects must be real and the related mathematics and physics must center about the project and not wander off into the field of formal science.

Teach as much mathematics and physics as is useful to the steam fitter and makes him an intelligent worker, able to plan and lay out jobs as well as to fit and erect.

#### *Suggestions.*

See Circular No. 97.

#### APPLIED PHYSICS V.

In the mechanic arts curriculum the constructional courses in forging, machine work, electrical construction

and steam fitting constantly bring to the surface fundamental principles in physics but always in their technological aspect. It is desirable that these everyday shop experiences be organized in the pupil's mind but it is futile to attempt this through the traditional textbook and laboratory course in physics with its logical or historical treatment of physical phenomena.

The pupil who is wrestling with the problem of building a transformer discovers that the wires which lead into these devices have no actual material connection with the wires which lead out and yet currents get through in some way and may be changed very materially in voltage. Any alert human being wants to know the reason for this. It is just the time to look into the matter of induction and to work out experimentally, or otherwise, the conditions which control these changes.

In constructing generators or motors, Ohm's law, Lenz's law and other important principles governing the behavior of electrical currents are involved in winding the coils. Now when the pupil is actually wiring a motor the significance of these laws can be understood, hence these related parts of physics should be taken up in the shop as the wiring progresses. In annealing and hardening steel the magnetic properties of this metal determine the optimum temperature at which to quench, therefore at the forge, when hardening a lathe tool or softening an arbor blank, is the place and time for demonstrating the value of this fact of science.

It will be seen that much of this course in physics has to do with the heat treatment of steel, which involves the molar and molecular properties of iron,—with the strength and conductivity of metals and in general with energy as manifested in heat and electricity but always with the practical applications uppermost in the pupil's mind.



## INDUSTRIAL HISTORY V.

*Aim.*

This is a "related subject" course and designed to give the pupil an intelligent comprehension of the development of the mechanical industries, their tools and materials and their relation to human welfare.

*Standards.*

The course should be one of investigation rather than one in which the condensed information of some text is accepted as final. Topics should be assigned and reading references given so that the class can gather ideas from a variety of sources and organize these ideas into conclusions that are their own.

## MACHINE WORK VI.

*Aim.*

There is nothing particularly new in the general aim this year. New machines, especially the milling machine, are used and the projects are developed to correspond with the new possibilities of the shop and increased power of the pupil.

Pupils should go out from this closing year fairly familiar with the fundamental processes of wood and iron working. They should feel competent and at ease when planning and executing a piece of work on lathe, planer or milling machine but there should be no serious attempt at securing rapidity. To be able to do the job well is the important thing. Speeding up at this age means a poor quality of work. Speed comes later.

Machine shop managers want these boys to come from the school able to do "head work" as well as to manipulate a machine. If he can mount the work in the machine intelligently, adjust the tools properly and work to plan and

measurement, the particular degree of efficiency required in the shop will be shown him as he gets accustomed to his job.

### *Standards.*

To turn out jobs of good workmanship.

To be "ingenious" in devising ways and means.

To keep machine and tools in good working order.

To know how to read and follow drawings.

To follow instructions cheerfully when instructions are given.

To be able to explain just what is being done and why.

These are some of the important things.

In addition, the elements of shop organization and management should be taught and whenever possible pupils should be selected to assume the responsibility for managing the work on some definite project.

There can be no make-believe or make-shift projects in this course. Everything undertaken must be of "commercial use and value."

Projects must be difficult enough to tax the capacity of the shop and the powers of the pupil well up to their limit.

Pupils of this age are capable of doing a man-sized job in man fashion so far as quality is concerned and they are making their final adult adjustments and are, therefore, forming permanent motor habits of the accessory organs. These habits must be right so far as quality goes and to insure this quantity production must be kept somewhat in the background.

## MECHANICS AND MECHANISMS VI.

### *Aim.*

This *related* course aims to insure a working knowledge of certain natural phenomena resulting from gravitation chiefly: motion, velocity, force, mass, work, power, energy, friction, etc., are the fundamentals of this science. But

in this it is the *applied* rather than “*pure*” science that must be taught.

Power evolution and transmission involves a knowledge of engines, motors, etc., of pulleys, belts, gears, sprockets and chains.

The amount of horse power generated or transmitted or used up by machines of various kinds is a subject for practical investigation.

How wide a belt is required to run a given main shaft with its accompanying machines? Does the velocity of the belt have anything to do with this answer?

What size of pulleys is required to get certain speeds of lathes starting from a given motor pulley?

How long must a belt be to connect pulleys of certain sizes whose centers are a known distance apart?

What is the surface speed of varying sized cylinders actually to be turned in the engine lathe?

What must be the size of cone pulleys to get certain speeds for wood turning and yet make use of a belt of constant length?

How are gears to be proportioned to get certain definite results?

These are types of questions to be answered by this course.

It involves mathematics, laboratory experiments, drawing, designing and actual measurements, tests and computations in the school shop as well as data obtained from shops, factories, and power plants outside.

#### SHOP MATHEMATICS.

This course can be included within the time set apart for mechanics or it can be made a unit course in itself. It must be a course in which mathematics is applied to shop work and shop equipment. It must include arithmetic, algebra, trigonometry and geometry and may very properly be extended to include the elements of calculus.

## APPENDIX A.

## BIBLIOGRAPHY,—EDUCATION AND PSYCHOLOGY.

*School Administration.*

- |  |                      |         |
|--|----------------------|---------|
| *Public School Administration.....                 | Cubberly.            | H. M.   |
| Administration of Public Education<br>in U. S..... | Dutton & Snedden.    | Mac.    |
| Classroom Management.....                          | Bagley.              | Mac.    |
| *Educational Administration.....                   | Strayer & Thorndike. | Mac.    |
| *Administration of Educ. in a De-<br>mocracy ..... | Hollister.           | Scrib.  |
| Management of City Schools.....                    | Perry.               | Mac.    |
| *High School Administration.....                   | Hollister.           | Heath.  |
| *Summary of the Cleveland Survey..                 | Ayers.               |         |
| Rural School Management.....                       | Wilkinson.           | Silver. |
| School and Class Management.....                   | Arnold.              | Mac.    |
| The Curriculum.....                                | Bobbitt.             | H. M.   |
| *Classroom Organization and Control.               | Sears.               | H. M.   |
| *The Discipline of the School.....                 | Morehouse.           | Heath.  |

*Secondary Education.*

- |   |                   |        |
|---|-------------------|--------|
| The American High School.....                     | Brown.            | Mac.   |
| Principles of Secondary Education.                | Monroe.           | Mac.   |
| Secondary Education.....                          | Inglis.           | H. M.  |
| *Methods of Teaching in High Schools.             | Parker.           | Ginn.  |
| Psychology of the High School<br>Branches. ....   | Judd.             | Ginn.  |
| *An Introduction to High School<br>Teaching. .... | Colvin.           | Mac.   |
| *The Educative Process.....                       | Bagley.           | Mac.   |
| Supervised Study.....                             | Hall-Quest.       | Mac.   |
| High School Education.....                        | Johnson & Others. | Scrib. |
| Problems of Secondary Education..                 | Snedden.          | H. M.  |
| *High School and Class Management.                | Hollister.        | Heath. |

*Elementary Education.*

- |  |                       |                |
|--|-----------------------|----------------|
| Elementary Education.....                      | Keith.                | Scott For.     |
| *Psychology of the Common Branches.            | Freeman.              | H. M.          |
| *How to Teach.....                             | Strayer & Norsworthy. | Mac.           |
| Types of Teaching.....                         | Earhart.              | H. M.          |
| How to Teach the Fundamental<br>Subjects. .... | Kendall & Mirick.     | H. M.          |
| Socializing the Child.....                     | Dynes.                | Silver.        |
| The Rural Teacher and His Work..               | Foght.                | Mac.           |
| *Motivation of School Work.....                | Wilson.               | H. M.          |
| Classroom Management and Methods.              | Betts.                | Bobbs Merrill. |

*History of Education.*

*History of Education in the United States. ....	Dexter.	Mac.
*A Student's History of Education..	Graves.	Mac.
*History of Education (3 vols.)....	Graves.	Mac.
*Encyclopedia of Education (5 vols.).	Monroe.	Mac.
Brief Course in the History of Education. ....	Monroe.	Mac.
A Text Book in the History of Education. ....	Monroe.	Mac.

*Principles and Philosophy of Education.*

The Vitalized School.....	Pearson.	Mac.
*The Teacher and the School.....	Colgrove.	Scrib.
*The Teacher's Philosophy.....	Hyde.	H. M.
*The Ideal Teacher.....	Palmer.	H. M.
What is Education.....	Moore.	Ginn.
*Democracy and Education.....	Dewey.	Mac.
Textbook in the Principles of Education. ....	Henderson.	Mac.
Education for the Needs of Life....	Miller.	Mac.
Schools of Tomorrow.....	Dewey.	Dutton.
*Principles of Education.....	Bolton.	Scrib.
*Principles of Educational Practice..	Klapper.	Appleton.
Principles of Education.....	Ruediger.	H. M.

*Educational Sociology.*

Introduction to Educational Sociology. ....	Smith.	H. M.
The School as a Social Institution..	Robbins.	Allyn.
*Education and Industrial Evolution.	Carlton.	
*Social Development and Education..	O'Shea.	H. M.
Social Principles of Education....	Betts.	Scrib.

*Measurements.*

Mental and Physical Growth.....	Terman.	H. M.
*The Measurement of Intelligence...	Terman.	H. M.
*Educational Tests and Measurements.	Monroe, DeVoss, Kelly.	
		H. M.
*Measuring the Results of Teaching.	Monroe.	H. M.
Statistical Methods Applied to Education. ....	Rugg.	H. M.
Educational Measurements.....	Starch.	Mac.
The Scientific Meas. of Classroom Products. ....	Chapman & Rush.	Silver.
*Methods and Standards for Local School Surveys.....	Bliss.	Heath.
Measuring the Work of the Public Schools. ....	Judd.	Cleveland Survey.
Measurement of Teaching Efficiency.	Arnold.	S. Mandel.
*Introduction to the Scientific Study of Education.....	Judd.	Ginn.

*School Hygiene.*

*School Hygiene.....	Dresslar.	Mac.
*Health Work in the Schools.....	Hoag & Terman.	H. M.
School Hygiene.....	Shaw.	Mac.
*Hygiene of the School Child.....	Terman.	H. M.
*Growth and Education.....	Tyler.	H. M.
*Play and Recreation.....	Curtis.	Ginn.
*Healthful Schools.....	Ayers, Williams, Wood.	H. M.

*Vocational Education.*

*Examples of Industrial Education..	Leavitt.	Ginn.
*The Vocational Guidance Movement.	Brewer.	Mac.
Readings in Vocational Guidance..	Bloomfield.	Ginn.
Twenty-fifth Annual Report of the U. S. Commr. of Labor—1910.		
Vocational Education of Girls and Women. ....	Leake.	Mac.
Vocational and Moral Guidance....	Davis.	Ginn.
Prevocational Education.....	Leavitt & Brown.	H. M.

*Psychology.*

*Essentials of Psychology.....	Pillsbury.	Mac.
How We Think.....	Dewey.	Heath.
*Outlines of Educational Psychology.	Pyle.	Warwick & York.
*Educational Psychology, — Briefer Course. ....	Thorndike.	Col. U. Press.
*Youth, Its Education, Regimen and Hygiene .....	Hall.	Appleton.
The Learning Process.....	Colvin.	Mac.
How to Use Your Mind.....	Kitson.	Lippincott.
Introduction to Child Psychology..	Waddle.	H. M.

The two following books consist of about thirty pages each, but are invaluable for teachers who wish to aid pupils to learn how to study. They should be read by every high school teacher.

*How to Study Effectively.....	Whipple.	Public School Pub. Co., Bloomington, Ill.
*Training Pupils to Study.....	Wilson.	Warwick & York.

The starred titles indicate works which the compiler of the above bibliography thinks most valuable for the busy teacher or superintendent or for the one who must purchase his own books.



## APPENDIX B.

## THE ART OF TEACHING.

## INTRODUCTION (IMPRESSION).

*The Art of Teaching Stated in General Terms.*

Herbart's "five formal steps in teaching" need *deformalizing* and restating in order that they may become more a matter of understanding and less a matter of rule-of-thumb with teachers. Practical pedagogy is coming more and more into harmony with biological facts and its principles need re-examining in the light of these facts.

*Fundamental Properties of Living Matter.*

There are three primordial properties of living protoplasm, namely, sensitivity, conductivity and contractility. In the simplest forms of animal life these properties are diffused throughout the substance of the cell (study the reactions of the amœba). As higher forms of life appear groups of cells or special organs become differentiated and set apart for (a) receiving external impressions (the effect of contact with environment), (b) conducting and modifying such impressions within the organism and (c) contracting, or securing movement, in ways favorable to the well-being of the organism (reaction to environment). (b) means adjustment; (c) means adaptation. Hence we have (1) sense organs: (cilia, tentacles, antennæ, eyes, ears, etc.); (2) conducting tissues: (nerve cells and fibres, nerve centers, etc.); (3) contracting tissues: (muscles). These three original properties of protoplasm are the basic factors determining the way in which any animal, from amœba to man, responds to the influence of environment. In one-celled animals (the protozoa) all of the functions of movement essential to survival and reproduction are

general properties of the protoplasm, whereas in many-celled animals these functions are more or less separated and performed by groups of cells which are called organs, *e. g.*, the eye, the optic nerve, the biceps muscles, etc.

Concretely restated this means that the environment directly or indirectly comes into contact with a living animal (impression). The comfort, safety or even survival of this animal depends upon its reaction (behavior) with respect to this particular environmental influence, but that part of the animal receiving the impression (the cilia of the paramecium, the tentacle of the hydra, the antennæ of the lobster, the eye of man, etc.) is generally not the part which can so act as to favor escape from danger or to assist in securing food or otherwise to respond in beneficial ways, hence the immediate effect of impression must be conducted to such organs or parts as are capable of making an appropriate response. This conduction in many-celled animals is by means of nerve cells or tissues or equivalent organs.

It is not enough, however, merely to conduct the effects of impression, the message must be brought into organized, meaningful relationship to the animal as an organism in order that the contractile tissues (muscles) may give expression to movements which are appropriate and necessary.

The following schematic statement will help to fix the points above briefly stated:

Properties of Living Protoplasm.	Sensitivity.	Conductivity.	Contractility.
Differentiated tissues and organs in higher animals.	Sense organs.	Nerve cells and fibres. Nerve centers.	Muscles.
Environmental relationship and reaction of the organism.	Sensation.	Transmission.	Movement.
Pedagogical equivalents.	<i>Impression.</i>	<i>Organization.</i>	<i>Expression.</i>
Prest. Elliot's descriptive definition of the educative process.	"To observe accurately,	to group, compare, relate, to infer justly and	express cogently."

## ARGUMENT (ORGANIZATION).

*The General Principle Involved in Experience and Habit.*

The higher animal organisms through experience acquire the general habit of reacting to environment in ways favorable to well-being, otherwise through the "elimination of the unfit," they sooner or later cease to exist.

*Education as a General Proposition.*

Education in its most general sense has to do with the acquisition of habits of appropriate response to any and all situations. It involves two major factors, namely:

(1) *Adjustment.*

This is the subjective phase and includes all changes within the organism which permanently affect chiefly (a) the sensitivity or impression receiving power and (b) the conductivity or organizing power.

(2) *Adaptation.*

This has to do with relationship between the organism and its environment and is chiefly a matter of (a) the organizing power, and (b) the expressive power.

*A Concrete Illustration of Adjustment and Adaptation.*(1) *The Situation.*

A comparatively inexperienced individual and an automobile which has suddenly and for no obvious cause ceased to function.

(2) *The Individual's Present Available Knowledge.*

He has some present *adjustment* derived in part from a study of high school physics and in part from actual experience with a simple gasoline engine used at home. He also knows in a very general way about batteries, conducting wires and connections, and spark plugs. Accord-

ingly, he has certain items of knowledge about the mechanisms under the hood of his machine. He is not, however, sufficiently adjusted to master at once the situation.

(3) *The Acquisition of New Knowledge.* (1) The battery is tested by turning on the lights and sounding the horn, or if a gravity-testing device is available the electrolyte is tested and the battery determined to be all right. (2) The wires and connections are followed and found to be in proper order. (3) The spark plugs are examined and found whole and clean. (4) The gasoline tank is examined and found to be half full.

The limit of this individual's adjustment with respect to automobiles we will assume has been reached and he is not sufficiently adapted to the situation to solve the problem.

Now two possibilities lie ahead. He may walk home or he may acquire new knowledge in some way. Many, and perhaps most, attempt to acquire this new knowledge by telephoning to a garage, describing the symptoms as fully as possible, receiving in return suggestions as to new tests or advice as to further procedure. There are others, however, who proceed "pedagogically" by further adjusting themselves through a process of getting new impressions by various experiments or by further organization of what they already know.

In the first process, that of getting new impressions, one may try advancing or retarding the spark or he may uncover and look at the timer, or make random changes in carburetor or clean up the electrical connections. Under second heading, that of further organization of his knowledge, he may review all of his own experiences and so much of that of others as he can recall, that is, he may think about it.

Either process may solve the problem or both may fail.

All of this is an attempt at getting new impressions

which may help to locate the difficulty and hence facilitate a better organization of knowledge.

Thus far we have been dealing almost entirely with the operator of the automobile. We have seen how he tries to adjust himself to meet the demands of a situation with which he is not familiar. Now we have to follow him as he organizes bits of new experience with what he already knows, thereby establishing such a relationship between himself and his environment that the result becomes a solution of the problem of starting the automobile; that is, we are tracing how the man adapts himself to his adverse environment.

The facts are as follows: The motor turns over normally; the battery is working; the wires seem properly insulated and connected; the spark plugs show no defects; there is gasoline enough in the tank but the outstanding fact is that there are no explosions in the cylinders.

The carburetor has a device such that it can be "flooded" and the operator has been told that it facilitates starting, especially in cold weather, if this device is manipulated so that gasoline overflows. He operates the device but gets no overflow; repeated trials result the same. Here is a new fact of observation (*impression*). What effect has this on the facts already possessed? What can his organizing powers do with this fact?

There is gasoline in the tank at the rear of the machine but none in the carburetor. Where is the trouble located? Is the pipe leading from the tank to the vacuum feed clogged? By disconnecting this supply pipe from the feed he can by means of his tire pump and a yard of electrician's tape, force air back into the tank if the pipe is clear. Trial shows that air does not bubble back through the gasoline. He applies more pressure and at last cleans the tube.

A new fact impressing itself through the sense of sight as the carburetor failed to flood is organized with existing knowledge, thereby creating a new *adjustment* within



the nerve mechanism, results in the possibility of a new *adaptation* to environment. The air pump impresses upon the senses of hearing and touch two facts: first that of an obstruction, and second that of the sudden removal of the obstruction.

This *adjustment* is initiated by the *impression* of a sudden flow of air through the supply pipe. It is developed by mentally *organizing* the new fact into the existing knowledge with the resulting prediction, "Now the motor will start," and is completed when the operator gives expression to the new faith that is in him by assembling the parts and cranking the car.

The foregoing introduction, it is hoped, will be of service in working out a rational plan of school procedure as teachers guide and assist pupils to develop their natural capacity into actual power for doing the world's work.

#### *The Five Formal Steps.*

It was said at the outset that the Herbartian "five formal steps need deformatizing." The reason for this statement lies in the fact that the so-called five steps are neither *five* in number nor *steps* in sequence. The processes overlap in point of time and are not separate and distinct as to character. The divisions are artificial in large measure and hence the teacher in attempting to follow their lead is sure to fall into the error either of dividing into parts that which is a whole or of presenting as a whole that which needs separating into parts.

The "five steps," in the days when a series of six readers, two geographies, a grammar and two arithmetics constituted the working weapons against which for ten years the elementary school pupil was constantly on the defensive, no doubt tempered the wind to the shorn lamb and under such bleak and severe conditions, afforded a much-needed protection against the prevalent type of recitation concerning which Parker says: "The common practice of using the class period for mere repetition of



material learned in the textbook is one of the most pernicious sources of waste and lack of interest to be found in school.”\* This applies with even greater force to the elementary school than to the high school. Today, however, when supplementary material, not only in printed form but as pictures and specimens of products, is available in such profusion and is of such convincing quality, and when excursions bring pupils into the immediate environment of the simple activities of home, shop, farm, store, etc., as well as the more complex operation of manufacturing, there is no excuse for recitations of the type described nor do the “five formal steps” necessarily obviate this “pernicious waste.”

The person who is most suitably educated under present-day conditions is the one who has acquired the power to respond appropriately to the largest variety of situations as they arise. In securing conditions favorable to the development of this power the teacher will be guided best by regarding the educative process in its biological relations, *i. e.*, the way in which human as well as other living organisms naturally act.

Chapter XXI of the Program of Studies for Elementary Schools of New Hampshire, Third Edition, 1916, deals with “The Teaching of Any Topic.” This chapter is a concise statement of a modified form of the Herbartian “five formal steps” and has been found helpful by many teachers inexperienced and experienced. It will continue to be used and hence a comparison of the three plans seems desirable.

Herbart's Classification.	Chapter XXI Plan.	Biological Basis.
I Preparation.	Preparation. }	I Impression.
II Presentation.	Presentation. }	
III Comparison and abstraction.	Assimilation. }	II Organization.
IV Generalization.	Organization. }	
V Application.	Recitation.	III Expression.

\*Parker: Methods of Teaching in High School, p. 424.

The correspondence in the above are approximate only but sufficiently equivalent to justify the tabulation. A brief statement will aid teachers in comparing the processes.

*Preparation* so far as the pupil is concerned stands for recalling impressions which previous experience, direct or indirect, have made a permanent part of the pupil's mental stock in trade.

*Presentation* has to do with the teacher's effort in guiding, directing, suggesting, etc., in order that the pupil through his own experience may add new impressions susceptible of being organized with the recalled impressions. The teacher deliberately plans an environment likely to give the pupil experiences from which desired impressions, chiefly new but obviously related, are likely to result.

*Assimilation* is the pupil's opportunity for the closest possible contact with this specially arranged environment. This step, perhaps more than any other, shows the artificiality of the Herbartian scheme. The process is largely one of impression getting, notwithstanding, it has a considerable element of organization scattered throughout. Again there is no real line of separation between assimilation and organization. Both assimilation and organization properly fall under that beneficial device of school-room administration known as supervised study by means of which the teacher directs the pupil by questions and suggestions.

The two "steps," *assimilation* and *organization* cover the grouping, comparing, relating and inferring as given in Prest. Eliot's descriptive definition of the educative process. These steps are so inseparable in action that to disconnect them in thought is only a trick of logic which works to confuse the young teacher and is of no particular value to the experienced teacher.

The Herbartian steps III and IV are likewise one process mentally. They are concerned with *comparing*,

*relating* and *inferring* and hence are part of the whole process of organization which in turn is the tendency of the central nerve mechanism of educable animals, man in particular, to delay reaction to a given situation by keeping the newer accessory parts of the brain in circuit instead of referring sensations to the old, fundamental nerve centers governing instinctive and automatic responses.

#### CONCLUSION (EXPRESSION).

Any recitation in any subject whatsoever is made up of three parts, namely:

##### I. *Impression.*

The phenomena of the natural world of matter and energy, the written or printed page, the spoken word, pictures, music, tools, mechanisms, etc.,—in a word the sum total of environment,—as in innumerable ways, it acts upon the pupil.

##### II. *Organization.*

(a) Recalling and reviewing previous impressions or the results of previous impressions. (b) Combining with these past experiences the related new impressions derived through I in order that the new may be interpreted and by combination both the old and the new be made more available or of greater worth. This is a process worked out by the nerve mechanism and depends upon the characteristic property of nerve tissue which enables it to retain in some unknown way the results of previous impressions in such form that the organism may make use of the data of past experience in dealing with present situations.

### III. *Expression.*

Making an appropriate response (reacting) to a given situation, this response being based upon similar impressions previously experienced but modified by any new elements which I and II have shown to be peculiar to the present situation.

Oral and written language, sketches, drawings, arithmetical or algebraic solutions, geometrical demonstrations, manipulation of plastic materials, paintings, constructions in wood, metal, leather, textiles, bodily movements in plays and games, etc., etc., are all means of giving expression to the net result of impression and organization.

## APPENDIX C.

CODE OF PROFESSIONAL ETHICS ADOPTED BY THE NEW  
HAMPSHIRE STATE TEACHERS' ASSOCIATION,  
OCTOBER 22, 1915.

## I. DEFINITION OF TERMS.

It is desirable that there should be a general professional agreement as to the designations to be given to members of the teaching profession in the State according to the functions which they perform. It is not well that there should be no fixed designations with the result that the general public uses such terms as "professor" indiscriminately. The following designations are, therefore, recommended and it is hoped that different official bodies, qualified to do so, will eventually give them their sanction.

1. The title of the officer having charge of general education in the State of New Hampshire should be the Commissioner of Education.

2. His deputies should be called Deputy Commissioners of Education.

3. The head of the New Hampshire College of Agriculture and the Mechanic Arts should be called President and persons holding chairs in the institution should be called Professors according to such grades as the college authorities from time to time specify.

4. The title of the heads of the Normal Schools should be Director.

5. A professional educator engaged in the supervision of local school systems should be called Superintendent, and his assistant in the work of general supervision should be called Assistant Superintendent.

6. A person whose sole duty is directing both teachers and pupils in a special department of school work should be called a Supervisor.

7. The head of an approved secondary school of the first class should be called Head Master.

8. A school officer having the supervision and control of teachers and pupils in an elementary school or of a secondary school below the grade of first class should be called Principal.

9. The teaching force of the New Hampshire State College and the Normal Schools should be called the Faculty and that of secondary schools should be called the Staff.

10. The title of Professor should be reserved for teachers holding chairs in colleges and graduate schools.

## II. RESPONSIBILITY.

1. The proper conception of education being to develop all the powers and faculties of body, mind and spirit, with which a child has been endowed by the Creator, the first duty of teachers is to safeguard and bring to the highest state of perfection the physical, intellectual, æsthetic, moral, social, and so far as possible, the spiritual endowment of their pupils.

2. As the teacher must necessarily stand *in loco parentis*, in rather large measure, the duty of teachers to parents is to seek their acquaintance, to coöperate with them in the education of their children, to become informed of the home life and conditions by friendly visits, and in all other respects to manifest an interest in the individual child. Above all, a teacher should be frank, as well as sympathetic, in dealing with parents. Criticism by parents should be received with courtesy and patience.

3. The duty of teachers to the community is to be loyal to those in authority over them. In case of a conflict of educational ideals, between teachers and trustees or school boards, while they should recognize the fact that the school authorities must direct the general policy of the



school, it is the duty of teachers to be loyal to their professional ideals, to protest against any violation of professional ethics, and in extreme cases to resign, stating their reasons to the community.

While never exploiting their position, teachers should always maintain a progressive conservatism of thought and action, dignity of character, honesty of purpose, and should take an unqualified stand for the best in education and in social life.

### III. THE DUTIES OF TEACHERS TO FELLOW TEACHERS AND TO THE PROFESSION AT LARGE.

1. It is the duty of every teacher to regard every other teacher as a fellow craftsman and as entitled to all the rights, courtesies, and emoluments that usually obtain in other professions, with recognized standards.

2. It is unprofessional for teachers to criticise co-laborers and predecessors, as such procedure tends to weaken the confidence in which the work of our profession is held by the community.

3. All teachers should actively affiliate themselves with professional organizations and should acquaint themselves with the proceedings of the State Association and should interest themselves in its activities.

4. It is an essential part of the ethics of the profession that teachers should constantly familiarize themselves with its recognized and authoritative literature.

5. Since they are rightly regarded as examples to pupils, teachers should always so conduct themselves that no just reproach may be brought against them. Where liberty of conscience is not concerned, they should stand ready to make personal sacrifice, because of the prejudices of the community in which they live.

6. It is unprofessional for teachers to tutor pupils of their own classes for remuneration.

7. It is unprofessional for teachers to promote the in-

terests of canvassers and other salesmen, either directly or indirectly, by writing testimonials of their wares.

8. It is unprofessional for any teacher to lend himself to any scheme of self advertising.

9. It is unprofessional to call for or to allow the use of substitutes, except for serious illness or for other grave reasons.

10. A clear understanding of the law of contracts is incumbent upon all teachers. Since teachers should scrupulously keep whatever agreement they make, they should refuse to sign a contract unjust and humiliating in form.

11. It is unprofessional for teachers to resign during the period for which they have been engaged. They may rightly ask to be released, by giving notice of not less than four weeks, but must in case of refusal abide by their contract. Superintendents should not attempt to induce teachers to leave positions immediately before the beginning of the fall term or during the first or last month of the school year.

12. It is unprofessional for a teacher to underbid a rival in order to secure a position.

13. It is unprofessional for a superintendent or other school officer to offer a position to a teacher without first conferring with the superintendent under whom that teacher is employed.

14. It is highly unprofessional for a superintendent or other school officer to visit, with a view to employing, a candidate at work, without the permission of his or her superintendent. When visiting schools, the visitor should never disarrange the work of the day.

15. It is unprofessional for superintendents and teachers, in their relations with publishing or supply houses, their agents or salesmen, to give just grounds for the suspicion of obligations tending to influence the purchase or adoption of books or supplies in favor of any particular agent or firm.

16. The indiscriminate writing of general recommendations for pupils or teachers is unprofessional.

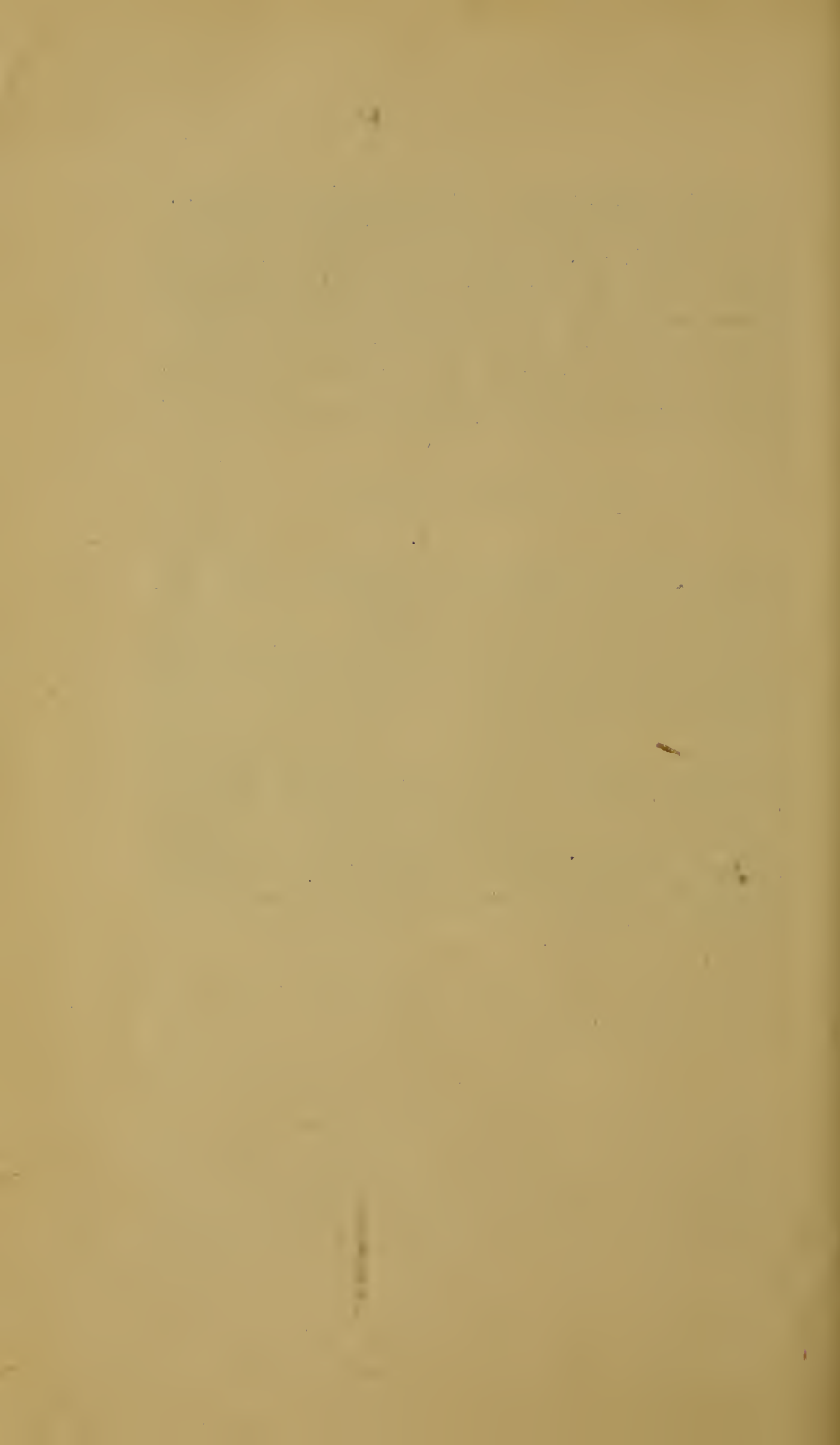
17. Teachers should at all times be ready to assist one another by giving information, counsel, and advice, and by such services and acts as teachers can perform without detriment to themselves or their work. Such reasonable service should be regarded as a professional duty for which remuneration beyond actual expenses should not be accepted.

#### IV. TEACHERS AS CITIZENS.

1. It is incumbent on teachers loyally to acknowledge all the duties and obligations of citizenship, and to discharge them both in letter and in spirit.

2. Because of their peculiar position, teachers should especially regard themselves as guardians and promoters of the physical, moral, social, and spiritual welfare of the community in which they live.

3. Teachers are and should be the servants of the people, without regard to distinctions of political party, religious faith, or other matters which are brought into issue and upon which individuals honestly disagree. Teachers are fully entitled to liberty of conscience, but it is unprofessional for them to become partisans upon issues which divide the community.





This book is loaned to the School District by the State.

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Teachers will please take notice and leave it in the School  
Library when they discontinue service in the School.









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