Whether it is Ground-hog Day, a rainy Easter, or a "dry" moon, a study can be made by which it will be found that the percentage of error discourages placing confidence in the reliability of much of such material.

What, then, should be advised regarding all weather-lore? Just this: Remember every word of it, so there will always be a convenient topic of conversation.

RAUS M. HANSON

THE CLASSROOM LIBRARY MOTIVATES READING AND LEARNING

"Perhaps no stimulation of interest is as great as that which comes from the library corner of a schoolroom," says Miss Marie Sue Riddle, of Waco, Texas. In the November Teacher's Edition of *Child Life* she tells how every teacher may easily set apart a library corner. Simple chairs or benches and tables, a picture, flowers, or goldfish, make it attractive. Picture books, fairy tales, stories of adventure, history, travel, nature or science give variety.

These books may be secured through Parent-Teachers' Associations, benefits or entertainments, individual donations and subscriptions to magazines and newspapers, as well as the public library.

Interest is kept alive, Miss Riddle continues, by the changing of a picture, flowers or books or by putting books on reserve. Interest in the books themselves is created by the teacher reading or telling a part of an interesting story, and allowing the children to finish it themselves, or by reading titles and letting the class discuss what kind of a story each may tell.

There is, alas, as much bunkum, as much of the "stuffed shirt," of the idle ornament and the dull windbag in universities as out of them (the irreverent say more).

—HENRY SEIDEL CANBY.

A TEACHER OF MATHEMATICS COMMENTS ON VIRGINIA'S SECONDARY-SCHOOL CURRICULUM

The practical aspects of mathematics as they bear on the New Curriculum; a project on banking offered as an illustration; the need of frequent drills.

IN a booklet on "Selling Tactics" I found the other day these words, "People are not interested in *things;* they are interested in the *use* of things." I wonder—if we are going to be successful teachers of mathematics—whether, in order to arouse the proper interest in the subject, we should not use selling tactics. The ordinary youth of today is not primarily a thinker, but is much more inclined to be a doer, and if we can arouse his interest sufficiently in doing things, he is willing and ready to learn whatever is needful to accomplish these things. He is not interested in things; he is interested in the use of things. He is not interested in information; he is interested in the use of information.

It is with this thought in mind that I want to take up some phases of the work in mathematics outlined in the New Curriculum for Secondary Schools, chiefly that of the first year's work. You are, I presume, familiar with the principles, aims, understandings, attitudes, appreciations, and automatic responses which are listed at the beginning of this New Curriculum. I wish to call your attention to the more important of them.

Principles of Education

I. The school is an agency of society for its perpetuation and re-creation.

II. Growth processes in individuals and in society are resultants of continuing interaction between individuals and society.

III. Individuals differ in interests, abilities, attitudes, appreciations and understandings, habits and skills, and in capacity to learn.

IV. Growth is continuous.

V. All learning comes through experience.

VI. An individual tends to avoid experiences which annoy and to seek experiences which satisfy.

VII. The school can serve as a creative institution only as it succeeds in controlling through its curriculum the experiences of learners so that cultivated, integrated, and individualized personalities are developed.

Aims of Education

Certain information (technically referred to in the course of study as "understandings") may be summed up as follows: The pupil should have a knowledge of the inter-dependence of all forms of life; of the necessity of man's adaptation to changing conditions; of man's increasing control of nature; of the influence of nature upon the development of plants, animals and civilization; of the orderliness and balance of the universe; of how modern science has transformed ways of thinking and living; of man's increasing control of his social environment; of the relation of the social heritage to man's development; of man's constant endeavor to improve his living conditions; of the relation of the movements of population to man's development; of democracy as a method of living and thinking; of the fact that the masses of men struggle constantly to gain freedom from domination by the few; of the fact that modern people are endeavoring to reorganize human relations; of the fact that government in a democracy rests upon the consent and civic responsibility of the governed; of the fact that government in a democracy is often controlled by forces invisible to the citizen; of the relation of a broad social consciousness to man's development; of the operation of economic factors; of how to choose a vocation; of the operation of modern business and industrial enterprise; of the relation to man's development of humanizing economic and industrial life; of recreation as a creative agency; of the functions of family life; of the relation of health to human development; and of the social function of religion.

Attitudes

Education is intended to develop these attitudes: of inquiry; of creative self-expression; of self-cultivation; of self-integrity; of respect for personality; of critical mindedness; of directness; of open-mindedness; of mental integrity; of responsibility; of generalization; of concentration; of tolerance; of working harmoniously with others; of relying upon orderly methods of gaining social ends; of respect for constituted authority; of constructive participation in social life; and the scientific attitude.

Appreciations

It must inculcate the appreciation of the beautiful, of human nature, of shared activity (co-operation and fellowship), of high standards of conduct, of humor, of the achievement of thinking (logic), of good workmanship, and of nature.

Automatic Responses

It must develop as automatic responses the ability to read, to speak, to write, to listen, to study, and to use quantitative symbols and procedures. Certain automatic responses seem to need further explanation. Thus, the "ability to use the common objective materials and instruments of the social heritage" means perhaps to use the common materials found in the home, such as clothing, foods, furniture, and mechanical appliances; to use with a degree of efficiency the materials used in the school, such as writing materials, phonograph, radio, piano, etc.; to use conveyances of transportation, such as the automobile,

street cars, buses, and trains; to use the institutions of financial, commercial, and social intercourse such as postal, banking, telegraph, and telephone services, stores, hotels, eating places, and hospitals. Again, the "ability to maintain certain objective materials of the social heritage" suggests that one must be able to replace such things about the home as light bulbs, light fuses, buttons on clothing, varnish or paint on furniture, and washers in water spigots; must be able to repair articles around the home, such as screen doors, furniture, and clothing; must be able to make such changes or adjustments on an automobile, as oiling, or greasing, changing tires or replacing minor parts; must be able to care for materials used in recreational activities so that maximum service may be received. Then there are a few of a slightly different kind. The ability to function as a wise consumer; to maintain efficient economic status; to maintain health; to conform to social standards; to respond to situations requiring neuro-muscular skills (automatic responses).

About the time when the old-time standard high school curriculum was breaking up, there appeared an important new book, *Essentials of Algebra,* by David Eugene Smith and William David Reeve. Because a large number of high school graduates who spent a great deal of time in making preparation for entrance into advanced courses in college never actually went to college, the authors held that time might have been spent much more profitably on certain things that would be useful to these pupils out of college.

"There are four topics of algebra," says the preface, "that the average well-educated person of the present day needs to know, whatever his occupation may be. The importance of these topics lies in the fact that they contain the information which the citizen should possess for his everyday reading in current literature, in popular science, in the newspapers and other periodicals of the home, or in the simpler class of technical handbooks. These four topics with which the average well-read citizen—man or woman—is no longer unfamiliar are the *formula,* the *graph,* the *directed number,* and the *simplest type of equation.* These topics, therefore, are fundamental, either for the student who is going to college or for the one who is to enter at once upon a business or a home career."

Part I of this book, called the Chief Uses of Algebra, contained these five chapters:

I. The Formula
II. Graphs
III. Directed Numbers
IV. Elementary Operations
V. Linear Equations with one Unknown

Part II of the book offered the more technical development of the algebraic processes that are required by college entrance boards.

To quote again from the foreword to the mathematical program in the secondary schools: "The tentative course of study here proposed for the first year of the secondary school attempts to achieve the aims of meeting the common mathematical needs, of acquiring that exact quantitative knowledge which underlies material progress, of revealing a little of the power of mathematical thought and the beauty of mathematical form, and also of exploring the abilities and interests of pupils in the special fields of mathematics. This general course, a continuation in procedure of the mathematical studies of the seventh grade, should be a part of the core program of all secondary school pupils.

"Subsequent courses are planned to consist more definitely of logical bodies of subject matter psychologically built around some mathematical objective or related objective, but teaching procedures still provide many activities by means of which children can discover and use the prin-

ciples of this world-wide, world-old body of knowledge. Such courses should be elective, chosen in accordance with the diagnostic results of the first year. With the foundation provided by the general mathematics it will be possible to bring the materials of all special fields of mathematics to bear on each field. For example, the algebra course may be so developed as to utilize materials from arithmetic, geometry and trigonometry, and thus emphasize the essential unity in all mathematics work."

From this we see that the work beyond the first year in mathematics is supposed to be technical subject-matter courses of the type formerly given, but to be elected only by those who wish to satisfy mathematical entrance requirements for college, or those who have a distinct aptitude for mathematics. While the first year's work is to a large extent a summary of the facts of mathematics most useful to the ordinary individual, it will be seen to furnish a sound basis for a further study of the subject.

But before going into the method of presentation, I wish to quote again the Course of Study the summary of the abilities that should result from the activities. The abilities are: to perform accurately the four fundamental operations, addition, subtraction, multiplication, and division, with integers, common fractions and decimals; to use the metric system of measures and weights; to use decimal fractions by means of percentage in ordinary business transactions including trade discount, profit and loss, commission and interest; to use such ordinary business forms as checks, deposit slips, promissory notes and the like; to use mathematical tables; to be familiar with and use simple formulas, and to represent them graphically; to know the meaning of simple equations and to be able to solve them and check results; to recognize simple mathematical figures by name and form; and to make simple geometric constructions by means of compass and straight edge.

With the exception of the purely arithmetical work of perfecting the handling of the four fundamental operations the theory of, and exercises in, the practice of these abilities may be found in Strayer-Upton's *Junior Mathematics,* Book II, as listed below:

Chapter I.	Formulas
III.	Equations
IV.	Measurements—Solving Formulas as Equations
V.	Percentage
VI.	Banking
VII.	Thrift and Compound Interest (Savings Bank)
VIII.	Installment Buying
IX.	Stocks and Bonds
X.	Insurance
XI.	Taxes
XII.	Metric System
XIII.	Geometric Construction, Congruence and Symmetry
XIV.	Ratio and Proportion
XV.	Similar Triangles
XVII.	Positive and Negative Numbers

The one exception is that of Graphic Representation, which is perhaps best treated in Schaaf's *Mathematics for Junior High School Teachers,* pages 116-143.

The method of procedure given in the New Curriculum for obtaining these results is through pupil activities, 119 of which are listed, some textbook to be used as a reference in order to determine the method of procedure in each case. I need mention only a few such activities to give an illustration of the method.

A group of activities concerning formulas:

1. Changing quantitative relationships in rules and tables to formulas.
2. Reading, and interviewing people to find out the uses and values of for-

mulas in the work of health, welfare, the home, business, industry, agriculture, science, etc.

3. Reporting on and discussing the uses and values of formulas in the work of health, welfare, the home, business, industry, agriculture, science, etc.
4. Constructing graphs from formulas and statistical tables to show relations between quantities and to obtain new information about them.
5. Making a graph of the findings of the annual physical inspection of class and school.

A group on Life Insurance:

1. Examining life insurance policies and studying materials in order to learn the terms used, their meaning, benefits derived from insurance, cost of insurance, and other items of information.
2. Studying to find out what the insurance company does with the premiums.
3. Planning and presenting a short play in which class members describe different kinds of life insurance policies they have purchased, and argue the advantages of the choice.

A group on Banking:

1. Making withdrawals from a class bank, using actual forms or forms written by the pupils.
2. Writing an essay on the travels of a check, illustrating with cancelled checks.
3. Borrowing money from a class bank by means of indorsed or secured notes, after studying real notes that have been paid.
4. Having a bank representative talk to the class about the clearing house, and the Federal Reserve System.

A group on Stocks and Bonds:

1. Consulting a stockholder or director for information about organization of a corporation.
2. Listing the reasons for the existence of each local corporation; general reasons for organizing corporations.
3. Bringing to class market quotations from current publications and explaining the entries.
4. Reading market reports of bonds, and explaining the entries (including kinds of bonds).
5. Working examples, solving problems, involving buying and selling bonds, interest, rate of income.
6. Selecting one corporation and following the rise and fall of prices of stocks and bonds in the daily papers.

A group on Taxes:

1. Interviewing parents and county or city treasurer, and reading, to find out how the public through its government raises taxes.
2. Getting a copy of county, town, city, or state budget, discussing the apportionment of funds, and working examples based upon its items.
3. Making graphs to show the tax dollar, to compare the tax expenditure of a decade ago with present expenditures; to compare federal tax expenditure for war with that for peace.

A group on Metric System:

1. Getting acquainted with the metric system by examining protractor edge, meter stick, ruler marked in centimeters and by reading or hearing of records made at Olympic Games, radio wave lengths, laboratory measurements, some food containers, width of movie films.
2. Using the metric measures in drawing

and measuring lines for familiarity; with equivalents in textbook problems; by applying equivalents to life situations.

A group on Geometric Figures:

1. Learning the meaning of symmetry.
2. Making patterns for constructing solid figures.
3. Interviewing instructor in art to find the application of mathematical forms to art.
4. Reporting to class and discussing results of visits and interviews.
5. Learning to handle instruments for constructing mathematical figures.
6. Constructing figures (perpendicular, etc.)
7. Writing essays or making reports on related topics, as: The use of congruence and similarity in design.
8. Finding ratios from corresponding sides of similar triangles.
9. Finding line lengths by using similar triangles.
10. Solving problems involving measurements of line.

A Project Illustrated

An illustration of how projects of this sort may be worked out follows. If I were going to start a class-study of the use and value of banks, I would begin by getting a set of forms from a bank. These forms would consist of signature card, pass book, deposit slip, check book, form of refusal of checks, form of protest of checks, promissory note blank, collateral note blank, notification of discount, notice of note due, bank statement with cancelled checks.

Then I would begin by asking the question, "What are banks for?" and I should probably receive the answer, "Banks are places to keep one's money safe," because that is the primary idea that most people have of a bank, and of course it is one of the uses of a bank. We could develop this then by showing how to use the signature card, pass book, deposit slip, and check book, calling attention to the necessity of keeping a balance in your bank account, and the method of keeping that balance accurately calculated by means of the check stubs. The penalty for not doing this is that a check might be protested or at least refused; the form on which this is done would be shown.

Then I should illustrate the use of a bank account for paying bills by check and for sending money through the mails, noting particularly the advantage of this method over the use of currency.

The second function of a bank is loaning people money. Thus, a bank makes loans for carrying on legitimate businesses: a merchant may wish to borrow money to pay for a stock of goods, the loan to be repaid within 60 days when a portion of the goods has been sold; a farmer may borrow money for fertilizer, expecting to repay when the crops raised by means of this fertilizer are sold; a mechanic may borrow money to buy additional tools for carrying on his trade; a student may borrow to complete his education. But a bank will not ordinarily loan money to pay current bills unless some special emergency exists; that is, a bank encourages thrift rather than the kind of spending necessary for "keeping up with the Joneses."

The methods of borrowing money from a bank are by personal endorsement and by means of collateral. What is meant by personal endorsement? Show this by means of a note blank. What qualifications should the maker and the endorser of a note have in order for the note to be accepted for discount by the bank? First, the maker should be a customer of the bank. Second, he should be an individual of character, and should have the reputation of meeting his obligations promptly. The endorser need not necessarily be a

patron of the bank at which the note is to be discounted, but must be known in the community as able and willing to meet his obligations promptly and as a man of integrity.

Borrowing money on collateral (show blank form for collateral note) involves a knowledge of the kinds of collateral acceptable to a bank: first mortgage real estate bonds; U. S. government, state or city bonds; bonds issued by other corporations that are rated sufficiently high; stocks of various sound corporations, and so on. A bank will loan to a customer on acceptable collateral only a reasonable percent of the value of the collateral.

Suppose we have made arrangements to borrow money from the bank by means of discounting a note either with proper endorsement or on collateral, what is the next procedure? The cashier of the bank has not promised absolutely that the bank will discount our note because he must bring that note before a meeting of the directors of the bank or at least before the discount committee of that board, the board having been elected by the stockholders of the bank to determine the policies and direct the business of the bank. If the character of the maker of the note is satisfactory in the opinion of the directors and if the endorsement or collateral is regarded as satisfactory by them and if the bank has not already loaned up to the percent of its resources which it is allowed by law to loan, the board will approve the loan, and the maker of the note will be notified by the bank (show the form of notification) and the amount of the note less the discount will be placed to the customer's credit in the same manner as if it were a cash deposit. The discount on the note is calculated as simple interest on the face of the note for the time which the note is to run, and this amount is subtracted from the face of the note. The resulting figure, which is called the proceeds, is credited to the customer's account. Notes are usually made for 30, 60 or 90 days. 10 to 15 days before the date upon which the note falls due the customer receives a notice from the bank (show notice form) which states the date on which the note is due, at which time the note must either be paid in full or must be curtailed by a cash payment to the bank of a portion of the note; a new note for the difference between this payment and the face of the old note is given. The discount on the new note of course must be paid. This is usually accomplished by the means of charging the old note to the customer's account and crediting his account with the proceeds of the new note. Some very interesting papers in regard to banking have been prepared by the Educational Committee of the American Bankers' Association located in New York City; one in particular, "How Bankers Serve Us," would be of great value to anyone teaching this subject, and may be obtained by writing to the Educational Committee, American Bankers' Association, New York City.

In intuitive or inventional geometry the simpler constructions with straight edge and compass should be given without logical proof. Homemade instruments should be encouraged. A stiff piece of paper creased (folded once) makes a quick and accurate straight edge. A narrow strip of card board with two or more small holes in it makes a pretty accurate compass. Foot-rule and a small wooden right triangle give a quick and accurate method of drawing parallel and perpendicular lines. For blackboard work a piece of cord serves as a compass and the same piece of cord chalked and snapped against the blackboard makes a perfect straight line. (Smith and Reeves' *The Teaching of Junior High School Mathematics* gives a chapter on homemade instruments.)

The application of proportion to similar triangles gives the pupil an immediate urge to find out things, gives the *use* of the thing, rather than the thing itself, which is what the pupil is interested in. Valuable texts

on this subject are *Workbook in Intuitive Geometry* by Betz-Miller-Miller, and *Geometry for Junior High Schools* by W. Betz. The development of the formula with its quick application to the solution of a number of similar problems appeals strongly to the first year pupil as a time and work-saver and at the same time gives the preliminary introduction to formal algebra.

Comments

The writer has not yet been able to see exactly how this "first year mathematics" is to function as a high school unit or, what is more important, how the teacher can be sure that a reasonable amount of the "Abilities that *should* result from activities used in developing units of work" actually *do* result. This latter appears to me to be the weakness of the new curriculum. While "frequent drills" are mentioned from time to time, there appears to be a chance that such statements are not strong enough to insure that the teacher will give enough of them to *fix* the principles and processes in the pupil's mind. Great stress will have to be placed on absolute accuracy in *all* arithmetical calculations in *all* the work of *all* the units.

Perhaps a workable plan would be to have it definitely understood that all "units of work" involving mathematics be definitely finished by a certain date (say Feb. 1) and that the remainder of the session be given to studying the chapters referred to in Strayer-Upton's book or in Smith and Reeves' *Essentials of Algebra, Part I,* or a similar book which covers the requirements beyond pure arithmetic, thus gathering together the new mathematical information and making it into a concrete whole. If this is done the pupil who goes no further in mathematics will have a real working knowledge of the mathematical principles and practices which will be of most value to him, and the pupil who elects to go further in mathematics will be prepared to undertake the study of formal algebra and demonstrative geometry. In the former he will be led into the formation of a language of symbols controlled and manipulated by a set of more or less arbitrary laws, by means of which when a proper translation has been made into "algebraic language" the solution of a difficult problem is obtained by mechanical manipulation of symbols according to fixed arbitrary laws.

The solution of a problem then depends on two things, first the ability to translate the problem correctly into "algebraic language," and second, the ability to do the mechanical manipulation with absolute accuracy. These two things must be kept to a certain extent separate. Many exercises must be given in translating the language of a problem into algebraic language where the doing of this correctly shall be the whole aim of the exercise. Then it must be shown that all of this translation is vain unless the pupil knows thoroughly the laws of manipulation and can perform these manipulations with absolute accuracy, and many drills must be given in manipulation alone. When the ability to translate and the ability to manipulate have both been mastered, we can then put them together to solve problems. During the learning and practice time each problem should be regarded as two problems: one of translation and one of manipulation, and graded accordingly. But at the last it should be clearly brought out that in practical life "the most important thing is the *correct* result"; hence, if either the translation or the manipulation is incorrect, the solution is valueless.

In demonstrative geometry it must be shown that an inquiring mind will not be satisfied with anything less than a logical proof of the correctness of the methods of construction which have already been given, that such a logical method of proof can be and has been developed, and that our own logical ability will be developed by the proper study of such methods. This attitude

will give a real basis for the study of geometry.

Short cuts and tricks and time-savers in both algebra and geometry are plentiful, and should be searched out and used by the teacher.

HENRY A. CONVERSE

A GEOGRAPHIC PERSONALITY

The geographer believes that places teem with life that gives them local color and individuality. Recognizing geographic personality has a legitimate place in the classroom.

PRACTICALLY all cultural items with which the study of geography is concerned may be spoken of as having geographic personality. A written geographic personality statement is a brief description that gives the outstanding relationships between man and his environment. It includes the unit understandings that are organized around a definite core of thought. These show ways in which the human pattern is related to the natural. In such statements detailed items and minor geographic relationships are omitted, while certain elements in the personality are brought out rather sharply. For example, in the study of Alaska its relative emptiness is pointed out, an attempt being made to account for it; in the study of Denmark a big thing is made of the ability of a dense population, through its inclination to cooperate, to make a living on a relatively lean land; and in a study of a tropical forest area—the Congo, the string of settlements along the river is noted with interest.

The psychologist might well object to the nomenclature "geographic personality" as applied to an inanimate body of material. The geographer believes, however, that certain places are not necessarily spiritless but that they are teeming with life that gives them local color and individuality. The term *personality* as applied to a human being is a thing that is difficult to define, but it is generally conceded as that something which identifies the individual, or that which makes him a being—a person apart from a thing abstract. In written form a personality statement would again include the distinctive thing that bobs up persistently—that which gives character to the being and helps to make him an individual in himself. Hence, a geographic personality must also include the outstanding geographic characteristics of a given product, industry, city, country, or group of countries. It has its place in the classroom, especially when it is utilized in summarizing or in testing exercises. The geographic personality that follows brings out the characteristics of a Western Hemisphere area. It summarizes the outstanding relationships in a given unit. Since many enjoy an element of chance, the following personality sketch is written in the form of a conundrum. Read it to the pupils and ask them to guess the answer or have them read it carefully and write the answer at the end of the paragraph.

This so-called land bridge is in reality made up of a number of separate countries, each facing the ocean. Population concentration is chiefly in the valleys among volcanic mountains. These centers of population are more or less independent of each other, and are separated by broad stretches of unproductive country, inadequately served by transportation facilities. Traffic moves from these isolated population groups to and from the coast, and exchange is made with foreign powers rather than with members within the area. Land usage by people, indisposed to labor, is characterized by a primitive type of subsistence agriculture, by the growing of coffee on the higher slopes, and by the capitalistic production of tropical fruits on the low trade-wind coasts. Exploitation of the forests, grazing of cattle, as well as mining, fit into the oc-

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