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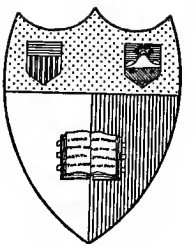
A school system as an educational laboratory.



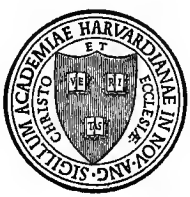
THE HARVARD-NEWTON BULLETINS

NUMBER I

A SCHOOL SYSTEM AS AN EDUCATIONAL LABORATORY

BY

WILLIAM SETCHEL LEARNED, PH.D.



CAMBRIDGE, MASS.
PUBLISHED BY HARVARD UNIVERSITY
MAY, 1914

PREFATORY NOTE

To this Bulletin its projectors at Harvard and Newton attach special significance. It records the beginnings of an enterprise in which the Harvard Division of Education hopes in part to realize one of its fundamental aims — the solution of educational problems through research in the schools. The program of investigation the Bulletin presents is suggestive; and as this program is gradually elaborated and carried out either in Newton or elsewhere, it promises to yield results of objective value. Of equal importance is the coöperative scheme by which it is proposed that these results be reached. The study of school problems is not solely a function of university investigators, but of all teachers; and that teachers share the scientific labor which educational progress now demands is essential both for the sake of the school and for the sake of the teachers themselves. Dr. Learned has himself traced, in a study about to be issued by the Harvard University Press, the growth of teachers in Germany, as a class, toward the genuine professional freedom and mastery which such sharing produces. This Bulletin records what is probably the first attempt in America to make a school system its own educational laboratory.

A second Bulletin in this series is shortly to follow, setting forth the results of the effort to secure scales for the measurement of eighth grade English Composition. The results of other studies now in progress will be published in subsequent issues.

These Bulletins are the outgrowth of an agreement, now of six years' standing, between the School Department of the City of

Newton and the Division of Education of Harvard University. But for the breadth of view of the Newton School Committee and the generous interest of Mr. Joseph Lee, this coöperation could not have taken its present productive form.

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A SCHOOL SYSTEM AS AN EDUCATIONAL LABORATORY

I. GENERAL CONSIDERATIONS

The conception implied by the title of this paper has its warrant in the belief that education, especially during the past decade, has steadily strengthened its claim to be regarded as a science; which implies the further belief that certain " best " or standard methods for its processes can properly be determined and formulated only under experimental conditions. If these beliefs are justified, the question at once arises: How can educational operations be subjected most speedily and accurately to experimental treatment? The answer to this question has hitherto been attempted in a variety of ways. University teachers of Education and psychologists who have concerned themselves primarily with the educational aspects of their field have made more or less systematic invasion of certain schools or classes with a degree of " coöperation " on the part of the teacher that has varied from a simple permission to experiment to a more or less willing participation in the tabulation of results under minute instructions. Certain superintendents, principals, or teachers have occasionally discerned problems, organized and carried out tests, and formulated results. In at least one instance a school system has established a laboratory, engaged a trained psychologist, and placed the schools at his disposal for the investigation of educational problems. To such varied, unrelated, and haphazard efforts is due the present array of reliable results which have been won by formal experiment at home and abroad. This array is

by no means insignificant under the circumstances. The question is: Can the circumstances be improved ?

Aside from the incidental and heterogeneous character of such experiment as has hitherto been made, there exists a further difficulty which at times is most discouraging. Experiments once or many times fruitfully carried out produce little immediate reaction in general practice. Theorists in schools of education note the point, and incorporate it into their lectures. Beyond this progress is slow. It is indeed fortunate for a school system if even the superintendent keeps abreast of the really scientific literature of his profession. Even when this is the case the campaign has but just begun. Provided the new idea is not capable of such commercial exploitation as will induce the book or supply companies to undertake the education of the teachers, this education must be accomplished by the patient but relentless insistence of the administrative and supervisory officers. Not infrequently it proves impossible unless the teachers can be taken young and unprejudiced, and actually be trained to the new point of view. For this the rapid changing of administrative officers in most of our school systems allows but little chance, and the progressive superintendent often faces what must seem to him a well-nigh hopeless task.

It appears, then, that in the present state of things, professional progress in education depends upon two clearly distinguishable sets of individuals. The first is a group of genuine and usually lifelong students of education who have won their training through arduous experience and concentrated effort. To these are due the novel insights and the major inspirations for educational advance. The second class consists of more or less conventional practitioners, well above the average in personal character, but singularly distinct from the first class in their professional attitude. Among this class of teachers the notion of education as a profession is rudimentary. Their work has been taken up without great thought or preparation. It may be relinquished with equal ease and would preferably be relinquished by very many for almost any other occupation with like

hours and salary. As the necessity gradually appears of making it a life work, interest and devotion usually increase, but with a strongly personal center. One teaches English, or Latin, or the seventh grade, or is a principal, not as coöperating in a thoroughly comprehended whole, but because he chances to fill that niche, and he does it well because his self-respect demands that he be master in his own house. When he has properly defended his department, given a round answer to his critics, and commiserated feelingly with parents about the uncertainties of pedagogical procedure, he considers his duty done. With his modest economic basis assured, routine soon hems him in; a breach develops between that routine and his own inner life, and his leisure hours together with his long vacations go primarily to satisfy his tastes. In short, he has no profession. An absorbing and consuming vocational passion such as is the glory of the artist, the physician, and even sometimes of the lawyer — of any one, indeed, who through years of hard technical training must vividly picture to himself the ultimate significance of it all — this for him does not exist. He has undergone no technical schooling, has made no sacrifices, and is professionally unattached. How can he feel attracted to the fellowship of men from whom, as from himself, nothing has been required ? How can he fail to feel a certain scorn for an occupation in which his crude and unskilled attempts have been blindly commended and supported ? This failure to involve the whole man in his work reacts directly upon his attitude toward progressive movements and new ideas. Without training that is genuinely scientific, he is proverbially conservative; scientific criticism is taken personally and worries him; a really radical question has often ceased altogether to trouble him except perfunctorily. In many cases he is wholly inaccessible to change from without, and is apparently powerless to accomplish it from within. There is, usually, however, an abundance of good will together with a genuine desire to serve; it is the drill in certain mental attitudes, the background of training, the habit of objective insight that is lacking.

Of course these two groups shade from one into the other by imperceptible degrees. Not all teachers are wholly one or wholly the other. Nevertheless the two poles of tendency are clearly discernible and their separation constitutes a fundamental weakness in modern American education. What course of development will best and most quickly abolish this essential dualism of attitude and capacity? Is it possible to replace the present tandem of enthusiastic expert and inert colleague or assistant by a team with similar training and a strong and intelligent professional sympathy?

There are thus two problems the solution of which seems to be fundamentally important in securing the sound and rapid advance of education: first, how to get educational processes conclusively tested by competent observation under experimental control; second, how to professionalize the whole number of practitioners engaged in education for the sake of a quick and efficient response to a steadily improving educational system. Before setting forth suggestions for this purpose the writer would like to point out an analogy and a contrast observable in a sister profession which has had precisely the same problems to face and which has gone far toward their solution.

Society demands that medical or surgical skill be indefinitely duplicated in individual practitioners. Healing is not usually projected from an intelligent center at a distance through a less intelligent agent on the spot. It is of no great moment to a patient that his doctor belongs to a society of good doctors unless he is professionally in their class. Conscious of this the medical profession has laid and does lay the greatest emphasis upon an adequate and, as nearly as possible, uniform training among its members. At least two years of college, four years of medical school, and one or two years of hospital practice constitute to-day the accepted standard of preparation in that profession.

The effect of this training in the two directions suggested by our discussion is of course obvious and complete: every physician so trained is master both of his material and of a thoroughly scientific method which habitually determines his diagnosis and

prescription. He reports his exceptional or striking cases through his medical journals in terms which place the facts reliably before his colleagues. He himself in turn is in a position fully to grasp and act upon the most highly specialized investigations of the medical school or laboratory. The village physician feels himself the complete intellectual comrade of the metropolitan specialist; their ways diverge long after a lasting professional sympathy and understanding has been established.

In these respects the teaching profession is wholly analogous. Though not as completely as the physician, yet essentially and increasingly, the teacher works directly with individuals, and society will eventually demand that adequate knowledge and skill be fully duplicated in every teacher. How is a child entrusted for the better part of each day to an ignorant, unskilled, and careless teacher in a greatly better case than the patient exposed to a sham doctor? It is very probable also that a training of equal length and appropriateness would accomplish for the teacher what the physician secures from his. He would become master of his material and of a scientific method in solving his problems; he would report reliable and valuable contributions to professional knowledge in a form intelligible to others similarly trained; and he would be in a position, and would be disposed, justly to evaluate and act upon the findings of others when so contributed.

At another point the medical profession affords an instructive contrast to that of the teacher — one which reveals an advantage for education of which almost no systematic use has yet been made. The physician works as an individual at an independent enterprise; hence the possibilities for making the vast mass of accruing experience available for the medical profession as a whole have been limited — dependent upon voluntary reports or the pickings of compilers. It is obvious that the remarkable strides recently witnessed in medicine and surgery could never have been accomplished on this basis, and the extensive development of hospitals and their intimate relations with bodies of investigators in medical schools testify to the present depend-

ence of medical science upon organized treatment and experiments. Education, on the other hand, enjoys the benefit of an incomparable organization. Lacking the power to provide a skilled tutor for every child, we have gathered as many as possible under the same instruction, and when the number of skilled teachers failed even then to meet the growing demand for education, we have endeavored, through an elaborate system of supervision of the unskilled, by the skilled, to make experience and ability tell to the utmost. This complex organization will doubtless be retained, even if the number of skilled teachers should rapidly increase; economy, the modern division of labor in education, and good school psychology all support it. Here then the science of education has, and has long had, ready to hand all the conditions for progress which medicine and surgery have had so laboriously to build up, and from which they have reaped their finest fruits.

Unhappily almost no conscious and systematic use of these conditions for the purposes of discovery has yet been made in education. It is as if a great hospital should proceed forever administering the same remedies in the same way, refusing or ejecting all genuine problem-cases, and aware of no obligation to make its experience systematic and profitable for the future. Changes in education are at present much more likely to follow the proposals of some plausible but subjective reformer than to be the result of careful and repeated tests under varied conditions; and the critical professional attitude which the intelligent physician habitually assumes toward his problems and procedures has been conspicuously absent.

II. The Newton Experiment

(*a*) *Preliminary*

Under the impulse of such general considerations as these, the writer, in February, 1912, put before the chairman of the Division of Education at Harvard a proposal intended as a step towards reform, and shortly afterwards the same proposal was laid before the Superintendent of Schools at Newton, Mass., who

was at the time an associated lecturer at Cambridge. Both of these gentlemen displayed great interest and confidence in the plan; and with their coöperation and the generous assistance of Mr. Joseph Lee of Boston, who shared the expense, a definite arrangement was made. It was our idea to organize in the Newton School System a Department of Educational Research which should be constantly and intimately in touch with the University Department of Education. The director was to be a regularly appointed official of the Newton Schools, and was at the same time to retain his status as Research Fellow in the University. This joint relationship was deemed an essential part of the plan and proved to be of great value. On the one hand it guaranteed that the work which should be undertaken would receive close criticism from a point of view not usually allowed its due weight in the treatment of practical school problems; on the other hand that very point of view would be subjected to continual modifications from contact, not with an artificial practice-class or school, but with actual operating conditions in a large public school system. The already existing coöperation between the Newton School System and the Harvard Division of Education greatly favored the plan. In accordance with a suggestion made by Dr. Spaulding, Superintendent of Schools in Newton, the students in Professor Hanus's Courses in School Administration had been engaged in the study of school problems in Newton since 1910. Competent graduate students had worked in coöperation with Newton principals and teachers on the problems actually arising in the schools.

The duties of the director were conceived to be twofold: his first and most important business was to assist the teachers in the school-system in their efforts at independent criticism and investigation of their own work and of the educational procedures going on about them. The purpose was to meet them individually, by grades, by schools, or, in the high schools, by departments, — wherever a teacher or group of teachers could be found ready to analyze and attack either self-suggested or recommended problems. The director was to assist by criticism, suggestion,

reference to literature of the topic, and by communicating the work and results of others; by furnishing a public, as it were, for the many experiments and reforms with which most progressive teachers begin the year, but which usually prove abortive from sheer lack of nourishment or from failure to arrange the conditions and to foot up the results in a scientific fashion. The second main activity of the director, distinctly subordinate to the first, was, of course, to conduct independent studies of his own, or such as were of interest mainly to the superintendent and supervisory staff. It was the intention, however, that even these should be discussed with all who could possibly have an interest in them in order to emphasize everywhere the method and attitude with which educational problems should be approached. It will thus be seen that the primary purpose of the undertaking was not the achievement of scientific results directly, but rather the encouragement and stimulation of the teachers themselves to a new view of the possibilities, opportunities, and obligations of their position.

The writer, as first incumbent of the new position, began his duties in September, 1912, and continued until March, 1913, when circumstances necessitated his withdrawal to undertake an educational investigation of a somewhat different nature elsewhere. It was not, however, without keen regret at leaving so prosperous and so absorbing an enterprise that his connection with it was severed.

The undertaking was fortunate from the beginning in having an unusually favorable environment. At Newton a highly selected class of teachers has been rendered progressively more effective by considerate and generous management as well as by the intelligent application of a genuine merit system of promotion which places a well-recognized premium on devoted and efficient service and gradually removes the incompetent teacher. In addition to this the actual purpose in view was by no means new to these teachers. Several of the schools had already undertaken somewhat prolonged studies either in connection with student investigators from the University or independently, and

not a few of the principals had made personal studies of value or were then engaged in them. Most of these had been undertaken at the instance of the superintendent, Dr. Spaulding, whose belief in this phase of a teacher's work has been equalled only by his skill in getting concrete and practical results from it.

(*b*) *General Results*

A somewhat detailed review of the program which was laid out at the beginning of the year, together with a statement of the progress made up to March, 1913, is appended to this report. It is only necessary, therefore, at this point to note those general features of our experience which appear to have value for future work of this sort.

1. *Participation to be Voluntary*

It was made especially emphatic from the outset that participation in the work proposed was voluntary and should not interfere with school work. This is not the ideal for an ultimate policy, but at the beginning it was necessary. The whole proposal rests on the belief that conscious analysis, comparison, and experiment in procedure should be fundamental to a professionally-trained teacher. It may not ever be formally compulsory, but the time must come when these abilities will cease to be incidental in the selection and survival of instructors. A seriously intelligent teacher when once given the proper training and the correct point of view must fairly bristle with problems arising out of his daily practice. When given a method he will select and attack these sympathetically and with the energy of the discoverer that he is. Without such a point of view or such training it is obvious enough that a teacher had better continue to imitate himself or others and to maintain his established routine than undertake to experiment merely for experiment's sake.

The most frequent objection to participation was lack of time. In some few cases this was an unmistakable cover for lack of interest, or for a conservatism unfriendly to novel points of view; in the case of others this objection was sincere but would have

been out-weighed by a clearer appreciation of the purpose of the plan; in still other cases teachers had in their devotion so overloaded themselves with duties of apparently immediate importance that to ask more was out of the question. All this could be changed by (*a*) a practical program of investigation adjusted variously to the problems of the local groups and individuals, and as far as possible suggested by them; (*b*) skillful direction and organization; and (*c*) a gradual shift in perspective as to what is important. If through successful work of this sort it can be shown that a teacher, a department, or a school can speedily analyze and correct its own faults and advance its procedure over that of others working passively, a school system could well afford to recognize the economy of this phase of educational work and provide due time for it. Apart from the tangible results so achieved the mere attitude of mind — positive, tentative, progressive — that is capable of producing such results would denote a wholesome transformation in the body of teachers as compared with the present situation at large.

2. *Organization should be intimate with the regular work of the school.*

Upon the plan and spirit of its organization rests very largely the success of the proposal. It is suggested that school officers and teachers learn to treat their problems objectively and critically, and it is expected that the habit of mind thus acquired will originate and clearly set forth many new problems. It is obvious, therefore, that all that is done in this way must be fused with the passing problems of school or teacher, and must be directed by the same hands that guide all other school work. It was impossible to perfect such an organization at once as the proposal was too new, even to principals and supervisory officers. It would be a mistake, however, longer to defer a definite organization of principals for this purpose. To lay all responsibility upon the special assistant in the work is directly to defeat its intent. So conducted, it becomes a thing apart, of interest to a few only. Both principals and teachers are likely to view its

demands not as illuminating and ultimately lightening their tasks, but as an unwelcome addition to their burdens. A director capable of success on a broad scale in this way must have powers that are rare indeed. The principal, on the other hand, undertakes such leadership, not as a new and unrelated task, but as expressing in a given case how he expects all work in the school to be approached and conducted. The special director is his assistant and adviser, as already described, to save him time and keep him from mistakes. At regular conferences the principal discusses with his teachers the methods and results of the studies undertaken, and gradually gathers up the conclusions in definite form for publication. In high schools this naturally falls to department heads as well as to principals. Groups of principals have their own problems to treat in a similar fashion among themselves with the superintendent as their leader. The superintendent, of course, studies and coördinates the returns from all sources, and sees to it that the general effort is properly focused and utilized. Some such arrangement as this seems likely to afford the best foundation for a profitable use of the school organization in the direction suggested. It cannot be too clearly pointed out that what is sought is not an elaborate scheme for cultural improvement which is the aim of reading circles and the more or less abstract lecture courses common among teachers; what is proposed is nothing other than that the school system work in a professional manner at the intelligent solution of its every-day problems and at making its experience available for future use.

3. *Certain aids for this new form of effort are almost indispensable to success.*

(1) Regular conferences and discussions. The chief purpose of the organization is to rid the improvement of educational technique of its incidental and desultory character; to make each step well-won lead to the next at a definite time, thus conserving the accumulating interest and sense of achievement. Skillful management of these meetings on the part of principal, depart-

ment head, or superintendent is essential to save them from drought. Immediate publicity and recognition for good work of this nature done by teachers together with a disposition to put results into operation at once so that the fruit of their labors may appear, cannot fail to stimulate a sound interest and faith in the importance of such conferences.

(2) Liberal use of the printing press or duplicating machine and of clerical assistance. This should not be at the teacher's expense either in point of time or money. The mere physical labor of providing copies of charts and tests for studies in arithmetic, for example, is sufficiently prohibitive to wreck the project completely if expected from the teachers. They must be encouraged to shape their brain work to the ends in view, and every reasonable material assistance should be freely provided. The facilities at Newton are complete in this respect and have been very generously used. So likewise in respect to clerical assistance. A few hours of mere routine labor in correcting, checking, or tabulating results, causes the enthusiasm of the busy teacher to ooze rapidly away. Some of this work cannot be safely entrusted to a novice, but much of it, on the other hand, can readily be hired, and wherever possible such assistance should be provided. A teacher whose time and interest are thus economized will respond with great readiness where his personal oversight is indispensable.

(3) A professional library, work shop, and record room should soon form an important feature of every school's working equipment. This should grow as the studies made demand it, and should exist only in so far as it is used. However, any school long pursuing the policy here outlined would soon find that a collection of general professional books and periodicals possessed an increasing importance for its staff. At Newton such a general center for the entire system should be established at once at the Technical High School. It would naturally be the headquarters of the director of this work. It would contain all the material bearing upon the studies undertaken hitherto, and should provide the periodicals and reference literature which may be of

use in work now under way. It should, of course, be freely accessible to every teacher in the system.

In conclusion the writer may be permitted to reiterate his personal confidence in the importance of the undertaking and in its success. The proposition that an institution manned by trained teachers should contain its own corrective and means of progress is little more than to demand that it become thoroughly conscious at all times of what it is doing; that is, that its procedure be clearly analyzed as to aim, method, and result. If this is done, comparison, experiment, and improvement will follow almost of necessity. The lack of such analysis is at present everywhere evident. Teachers work in a fog both as to their aim and as to their accomplished results, and it takes but little sophistry for the tyro to prove that his practice is as good as that of the expert. The persistent and systematic application of a scientific method to the every-day problems of instruction ought gradually to change this, and to compel a teacher to require of himself definite and accurate thinking.

It is a question how far this training can be got in the preliminary preparation for teaching. The traditional normal school course or college department of education surely offers little that is calculated to develop this point of view. At Harvard this is fortunately no longer the case. An arrangement of some years standing with Newton has given students of education at Harvard unusual opportunities for dealing with problems directly, and this arrangement will no doubt shortly be extended to include other neighboring school systems.[1] There is every reason why the training in normal schools should likewise shift its emphasis. It seems clear, however, that no amount of previous preparation can take the place of continual experiment in the actual course of instruction. This is nothing but the exercise of professional attitude which every professional practitioner should continually maintain towards his work. It should be possible in a progressive system for an ambitious teacher to abandon for

[1] This extension is already in part accomplished. — EDITOR.

a year, say, half of his usual program and devote his extra time to special investigation in the local schools under the direction of the superintendent. Many teachers who are real students of education would gladly forego a part of their salary in exchange for time for this purpose, and the reaction on the system itself would be most beneficial. A body of teachers trained in this way would soon find themselves in a position to effect satisfactorily a complete critical survey of the educational conditions in their city. This is where such a task belongs. Expert judges from abroad have their places, but the continuous critical study of the service rendered by the schools to the community is the obvious duty of professionally trained teachers in their organized capacity. And it is probably true that the growth of a professional spirit among teachers will be measured justly by the extent to which their organized activities abandon exclusive devotion to economic warfare and self-protection in favor of devotion to the professional aspects of their work.

The conditions of success in developing a school system as an educational laboratory are primarily an intelligent and sympathetic superintendent and supervisory staff; beyond these, a school board that can be persuaded to allow teachers time and the needful material assistance. As has been said, the teachers must be led and not driven; such work is a matter of insight, not of conformity. When the way is made reasonably plain and possible, most teachers prefer growing to vegetating. At Newton this was conspicuously true, and it is a pleasure to close this brief review of our mutual enterprise with a hearty tribute of appreciation to the intelligence, devotion, and courtesy of the Newton teachers.

PROGRAM OF WORK AT THE NEWTON "EDUCATIONAL LABORATORY"

The achieved results of the six months' work at Newton would seem inexcusably small if measured by formally completed studies. Many things were undertaken, and but one or two minor projects were carried through. It must be remembered, however, that the chief object was not immediate experimental results, but the development of an organization capable of producing important results continuously. Obviously the maximum of success would be but a preparation for later work and would go for nothing unless properly followed up. This will account, therefore, for the comprehensive program which was laid out, much of which was untouched. For the same reason the writer feels justified in discussing the program at greater length than might otherwise seem appropriate. It was all conceived with reference to this particular undertaking, and may still prove suggestive for this or other similar enterprises. It is a great satisfaction to know that the work at Newton is going forward under most competent direction and in full harmony with the original design.

The following list includes all the topics undertaken during the year or seriously considered for later investigation.

1. Differentiation in the treatment of pupils on the basis of the capacity they show for independent work. History; geography; arithmetic.
2. The most advantageous disposition of a study period. (Subperiods at intervals, especially with intervening night, *vs.* unbroken periods.)
3. The most advantageous disposition of reviews in a given material.
4. Comparative tests of various methods for speed in teaching special topics; e. g., Long Division; English Grammar in High School.
5. How can a school assist in encouraging and refining the avocations of its pupils ?
6. The development of a typical, uniform character-analysis based on the relations incident to school life. Hence also: the analysis of all phases of school life with a view to the opportunities they may afford for the display of definite characteristics in the pupil.

7. The development of a method for the scientific study of individual problem-cases, whether of instructional, disciplinary, or other nature.
8. The closer articulation of High School and Grammar School.
   (*a*) In General Organization.
   (*b*) In English.
   (*c*) In Science.
   (*d*) In History.
9. The analysis into fundamental abilities of aggregates now usually rated as units; e. g., English, mathematics, etc.
   Also: The invention of tests and scales for the objective measurement of these abilities. Hillegas Scale. Eighth Grade Scale.
10. The division of labor in teaching: the organization of class-work to permit the larger use of conspicuous abilities in the teacher.
11. Effect of regulation of periods on quantity and quality of work.
12. A psychological analysis of successful teachers.

1. *Differentiation in the treatment of pupils on the basis of the capacity they show for independent work. History; geography; arithmetic.*

The significance of the topic lies in the very general tendency to mass a group of thirty or forty children and create arbitrary standards suited possibly to the average pupils, but usually to no actual pupil. The result is a procedure which bores and discourages the bright minds at the same time that it fails to provide adequately for the dull.

It was proposed to discover whether all idea of uniform requirement could be abandoned; whether on the basis of certain definite evidence pupils could be selected who could be trusted to do independent work in a given subject, reporting as required either on regular topics or special personal assignments and excused from much of the class drill; whether such treatment was a stimulus and benefit to the pupils so chosen, and whether it would make possible a more successful treatment of the remainder. In case the treatment was found successful, it was proposed to note those features which appeared most promising as well as the difficulties most likely to interfere with success.

This topic was discussed at several conferences at the Bigelow School, and two teachers undertook to try out the plan. Condi-

tions were particularly favorable as the underlying idea of individual treatment has long received unusual emphasis in Newton practice. One teacher began Roman History with a group of six pupils in grade VI, using an interesting biographical reader. Their preparation was made in their own time, and the lesson was recited to the teacher during a study period; once a week the members of the group rehearsed their knowledge for the benefit of the class. The result was a marked development in the interest and initiative with which they undertook to handle easy historical topics independently. The other teacher organized a special volunteer group of seven for advanced work in arithmetic in grade V. Their work has been characterized by persistent energy and enthusiasm. Their gain both in power and in knowledge has been exceptional for that grade, and their reflex influence on the remainder of the class has been stimulating. Both of these experiments were in progress in March when the writer left Newton. An accurate report of the complete results will doubtless be made later.

2. *The most advantageous disposition of a study period. Subperiods at intervals, especially with intervening night,* vs. *unbroken periods.*

This study was intended to demonstrate the practical application of a well-known psychological principle — that of the subconscious ripening of impressions, if repeated at intervals, into a clearer whole than when gained with a single prolonged effort of attention.

It was proposed to divide a class in history into two groups of pupils, one of which should agree to an unbroken study period of one hour on the day preceding the recitation; the other should agree to divide an hour equally between the day of the recitation and the day before, but to cover the entire lesson on each occasion. The groups were to be made up as nearly equal in ability as possible on the basis of past ratings. Note was then to be taken, both in written and oral work, of the comparative effect of the two methods of study. After a two months' trial the groups were to be reversed and the results noted.

The experiment was not tried at Newton. It is a promising problem both for its absolute interest and especially as an object lesson to young students who receive all too little specific practical instruction as to the nature of their mental processes.

3. *The most advantageous disposition of reviews in a given material.*

This topic likewise received no treatment at Newton. It is, however, an exceedingly important problem. Moreover it is one of those numerous studies which involves almost no extra labor on the part of the teacher, but only careful arrangement and systematic control. It would be a simple matter to alternate the disposition of reviews in a class that is dealing with a fairly homogeneous material by giving now monthly, now weekly, and now brief daily quizzes on the foregoing matter. By keeping conditions clearly distinct, and by repeating the process with the same group, the most favorable plan would appear, at least for that teacher. At present nearly every experienced teacher follows a practice asserted to be the " result of experience." As a matter of fact, however, it is almost invariably the product of subjective opinion instead of objective experiment; and personal preference, or convenience, or exaggeration plays a large part in it.

4. *Comparative tests of various methods in teaching special topics;* e. g., *Long Division; English Grammar in High Schools, etc.*

This study embraces an almost endless series of problems in the technique of instruction. Its significance rests in the fact that in most schoolrooms to-day the actual conditions under which any given procedure takes place are slightly analyzed, and the results secured are measured only in the grossest fashion. An actual questionary from several experienced teachers in one school as to how long it took to teach long division resulted in answers varying from one week to six months!

The purpose in each case is to discover at the outset exactly what conditions exist, then after following a fixed and carefully

planned procedure for a limited time, to determine with as great exactness as possible the result.

Preparations were made for tests on two topics; long division in the elementary school and English grammar in the high school. In the first problem it was proposed to test each class in a Newton elementary school with preliminary tests for the earlier processes as soon as the class was declared to be ready to begin long division. For this purpose the Courtis standard tests in addition, subtraction, multiplication, and short division were to be used as prescribed for those tests but not ignoring the errors. As soon as the status of the class had been determined in this fashion, the teacher was to commence her instruction following any plan that she wished, with the sole precaution that she have it thoroughly analyzed in advance and in writing; she was also to keep an accurate record of the amount of time given to the subject, the outside work required of the pupils or done by them, and the absences occurring in the class during the trial period. As a measure of the progress of the class it was planned to use tests devised for the purpose and so constructed as to present the steps in the development of the subject progressively; a class half way through the subject should be able to go at least half way through the test. It was thought that several equivalent tests using different figures, but constructed in the same way would, if used in similar sequence, furnish a measure of progress which could be accurately expressed.

The first task was to construct and try out this test in a large number of classes. This was still in progress when the writer left Newton. The draft below shows the test at its latest stage. It still needs thorough proof and revision before it can be said to be reliable.

(1)	(2)	(3)
23) 46 (2	31) 57 (1	22) 264 (12
46	31	22
	26	44
		44

(4)

```
21 ) 2772 ( 132
     21
     ---
     67
     63
     --
      42
      42
      --
```

(5)

```
31 ) 65509 ( 2113
     62
     --
      35
      31
      --
       40
       31
       --
       99
       93
       --
        6
```

(6)

```
312 ) 65832 ( 211
      624
      ---
      343
      312
      ---
       312
       312
       ---
```

(7)

```
304 ) 127680 ( 420
      1216
      ----
       608
       608
       ---
         0
```

(8)

```
33 ) 6726 ( 203
     66
     --
      126
       99
       --
       27
```

(9)

```
2213 ) 713558 ( 322
       6639
       ----
        4965
        4426
        ----
         5398
         4426
         ----
          972
```

(10)

```
798 ) 780444 ( 978
      7182
      ----
       6224
       5586
       ----
        6384
        6384
        ----
```

(11)

```
9706 ) 5824787 ( 600
       58236
       -----
        1187
```

The series of problems presents in order a simple division without remainder, another with remainder, a two, three, and four-figure quotient in order, a three-figure divisor, a quotient with final zero, and a four-figure dividend, a quotient with medial zero, a four-figure divisor, a problem in large digits, and a quotient with double zero. Problem (9) stood formerly before (7) and (8), but proved to be harder than either of those. To avoid confusing the operation by hard multiplications and carrying, both divisors and quotients in the first nine problems were made of digits 1 to 3, except in problem (7) where 4 was needed to secure a four-figure divisor. Tests nearly equivalent can be constructed by rearranging the figures. Each should, however,

be carefully tried out in comparison with the first before being adopted.

It was expressly intended not to apply the completed test as a speed test, although a record was to be made of the time taken. The pupils were instructed to work deliberately and accurately. This principle seems fundamental in the first tests of all newly-learned processes.

The long division study should have immediate and important results. It should lead at once to the requisition of a standard test-achievement in prior processes before a class is allowed to take up a given topic. It affords a fine opportunity for characterizing certain methods as well as for disclosing the inefficiency of certain teachers — a kind of inefficiency heretofore very difficult of proof. At Newton the systematic conduct of the study is hampered considerably by the fact that individual instruction has well-nigh obliterated class lines; it is rarely that a class as a class is ready to begin a new topic. Still there are usually considerable groups that move together. With careful coöperation of the principals the tests might be extended to individuals — the ideal arrangement. In this case they would afford a reliable basis for comparing the progress of pupils when taught as individuals under present conditions, and when taught in groups.

The other topic of this nature for which plans were laid had to do with the teaching of English grammar and rhetoric in high school; especially in so far as this was involved in the correction of written exercises. The significance of the topic lies in the prevalent heavy drain on the teachers of English for corrections in written work which, to a considerable degree, are felt to fail of their purpose. This failure may be due, among other causes, to (1) wasteful correction, unattended to by the pupil, and therefore producing no reaction; (2) too much correction — the " proof-reading " type that shows up all errors and leaves merely an impression of general and usually large deficiency; (3) unsystematic correction that, although not correcting too much, fails to concentrate on the easily discovered habitual errors of

the pupil; (4) a lack of clear, specific explanation and illustration in preparing for correction; (5) a failure to institute definite habit-exercises focused on a short, well-selected program of faults.

In view of this the following experiment was proposed. Two divisions of first-year English, classified as nearly as possible to an equal grade of ability, were to be tested once or twice with the same set of exercises. The papers returned were to be analyzed minutely for the kind and number of grammatical errors contained in them, and from this array a program was to be drawn up of certain specific faults to be eliminated or specific excellencies to be developed, during the trial period — say, four months. Thereupon Division I was to proceed by the usual method with periodical themes fully corrected by the teacher and revised or rewritten by the pupil. Division II was to proceed as follows: The teacher was to make no corrections whatever except in class in the presence of the pupil, thus securing a heightened interest and attention under the most favorable conditions. The "proof-reading" idea was to be wholly abandoned and the work was to be concentrated on the program referred to above. All points in the "program" were to have thorough and repeated treatment and illustration before the pupil was held responsible, and he was to be troubled with no others. For practice and correction all pupils were to bring in daily or write in class, a very brief paragraph in illustration of the points previously discussed. The correction was to take various forms: the rapid reading and discussion by the teacher of a few random papers; the same of papers by the worst or best minds in the class; the careful pairing of individuals and the exchange of papers either in class or over night, followed by discussion of the program-errors discovered or of appeals from the writers; the rapid projection of several papers on the screen with reflectoscope and criticism of program-faults; the occasional turning over of all the papers to the best fifth or fourth in the class and the discussion on the following day of a selected set chosen by them. A further

device of doubtful though possible service would require each pupil to manufacture corruptions to contrast with his own correct usage.

The idea of the whole procedure is to assume nothing, to prepare for everything, to get rid of all unnecessary words, to isolate clearly each desired point until at least 75 per cent of the class know it, to make corrections short, sharp, and incisive at the moment of the greatest interest, to utilize the pride and emulation of the pupils themselves in criticism which is clearly understood and within their power, to get the correct usage started as a habit, and by means of all this to reduce technique to it lowest terms and allow a pupil in his longer efforts to concentrate almost wholly on the content.

At the end of the trial period it was proposed again to test the two groups once or twice with the same exercises and to compare them in respect to, (1) their performance on the "program" and, (2) all other items. On the basis of these results in turn a new program was to be made and, reversing the divisions, another four months' trial undertaken.

This study was not formally taken up at Newton. It was found desirable to test out the various devices suggested before attacking the general problem and this preliminary work was in progress in March when the writer left.

5. *How can a school assist in encouraging and refining the avocations of its pupils?*

The teachers in a Chicago high school were recently surprised at finding an unassuming junior the winner at an amateur contest in aeroplane construction, and a sudden newspaper hero. The school had been wholly unaware of the lad's real life, and with proper, but unconscious irony the newspaper accounts of his life failed to mention that he had attended a certain high school for three years. The situation is wholly characteristic. An attempt should be made systematically to discover and utilize a pupil's avocations, to recognize and dignify them when of educational value, to find ways of promoting them in the

school that the pupil may feel that his pet plans will there receive their due. Clever teachers everywhere have, of course, done this at times already; it needs, however, to be made a systematic school function. No plan was worked out for treating the topic experimentally. Effects might show in improved marks, reduced absences, better discipline, and various other ways. The topic was not undertaken at Newton.

6. *The development of a typical, uniform character analysis based upon the relations incident to school life. Hence also: The analysis of all phases of school life with a view to the opportunities they may afford for the observation and development or suppression of definite characteristics in the pupil.*

The most striking and hopeful feature of recent educational progress has been the tendency to hold both school and teacher responsible for the problems of the individual pupil. A quick and accurate recognition of individual traits, resourcefulness in planning their successful treatment, and skill and consistency in conducting this treatment — these constitute one phase, probably the most important phase, of the new demands made upon the school to-day. To meet them successfully implies a vastly different technique and equipment from that characterizing the system which treated all pupils more or less alike. The attempt to inculcate in the pupil an arbitrary kind and amount of knowledge has given place to a recognition of the many factors that combine to influence a pupil's growth, and the school is called upon to discern and dominate these factors.

To do this intelligently and on a large scale the information necessary to the proper handling of a given pupil must be available in greater fullness and precision than heretofore. We must have accessible in systematic form all the important facts that might properly modify the school's action toward a given child. These should constitute the private, professional information by which the school and teachers are guided, and, if well worked out, would furnish the first reliable basis of record for many phases of educational investigation. To be of the greatest ser-

vice such information should be comprehensive. It should give the essential facts of the pupil's entire life, certainly of his entire school life; it should preserve the mature judgments of all responsible persons who have had to do with his education; it should record in clearly understood terms his growing abilities, difficulties and tendencies, as well as his conspicuous achievements or deficiencies in all important directions; it should, finally, give due weight to the pupil's environment and to those influences of home and society, whether good or ill, which the school has hitherto almost wholly ignored. To accomplish this such a record requires an unusual organization in order to secure a maximum of results with a minimum of bookkeeping.

The completed study of the topic might, therefore, result in a stout booklet intended to accompany the child from the beginning of the elementary school through his high-school course, and to be in the possession of the school wherever the child might be. It would usually be accessible only to the teachers and officers of the schools, and its contents would be treated as confidential. The content of the record would be planned somewhat on the following lines:

OUTLINE OF CHARACTER-ANALYSIS

1. Temperament.
2. Mental Traits. Motives. Attitude.
3. Moral Traits (*a*) personal, (*b*) social.
4. Physical Traits. Physical history.
5. Home life and environment:
   - *A*. Birth, race, education, occupation, financial condition, social status, and religion of the father and mother; character of the family life and surroundings; brothers and sisters.
   - *B*. Nutrition, sleep, home-work, outside work, amusements, friends, and companions of the child.
6. Mental achievement:
   - *A*. Formal education, with relative excellence.
   - *B*. Extra-school performances: reading, literary productions, collections, mental games; linguistic, musical, and artistic acquisitions.

7. Social achievement:
   Membership or leadership in churches, societies, clubs, teams, and class organizations; popularity with friends and school-mates.

8. Physical achievement:
   Sports, games, and contests engaged in; strength and development records.

9. Congenial occupations:
   Preferred pursuits in leisure.

10. Clearly-marked abilities and tendencies.
    The foundations of an adequate prognosis.

The information called for in the above outline is of two kinds: a small portion of it relates to facts that are more or less stable and require but occasional revision; for the balance there should be provision for annual entries even though these are not always made.

The proposed nature of the entries constitutes an important feature of the device and is what has made the systematic study of the topic a fruitful one in this series. To leave definition and descriptive judgments of this kind to the individual teacher is to court the same confusion, variety, and vagueness that have characterized all such attempts in the past; it furthermore ensures neglect because of the difficulty of originating adequate terms. The nomenclature must be completely worked out in advance and incorporated in the proposed record. It then becomes comparatively simple to provide spaces where, in successive years, the appropriate terms can be checked off by the observer.

The invention of an adequate terminology becomes, therefore, the chief task. Dealing as it does with a child's life under certain conditions, and used by observers familiar with those conditions, it seems obviously appropriate that this series of terms should be based chiefly upon the specific concrete reactions of the child under these conditions. Every term used should, of course, be as suggestive as possible, but to be thoroughly reliable it should be based upon an abundance of illustrations which

leave no doubt as to its meaning. In order to provide for the various important phases of a child's behavior it may often be necessary to invent purely technical expressions. Thus a child may be said to exhibit " formal attention " when he presents all the outward marks of attention, but reveals to the questioner no knowledge of that to which he was supposed to attend.

The careful analysis of pupil behavior in a well-chosen and significant terminology may lead to a further interesting enquiry, Where are these traits best revealed ? What department or phase of work shall be held responsible for revealing them ? How can work be modified or new work undertaken with a view to developing such and such traits ? To some teachers, especially to high-school teachers trained to the purely intellectual point of view, a serious, systematic answer to these questions is likely to prove illuminating.

One form of studying this topic consisted in giving all instructors in a high-school department a provisional trait-list by which they were to mark separately several pupils known to the entire group. Conferences over such character-cards led not only to a fresh illustration and closer definition of terms, but frequently also to surprising disclosures from teachers as to how certain items of behavior were interpreted, and as to what they thought their own procedure should or should not reveal. Careful analysis of this sort is rare, yet nothing could come nearer the heart of the whole teaching process.

When completed the terminology would appear in the character-book in classified form with positive and negative traits together. A brief definition should be given with each term, but a manual of terms with full definitions and illustrations from observed behavior should also be available for reference. The following specimens will serve to show the nature of the system and its use.

Years or Grades									*Qualities*
4	5	6	7	8	9	10	11	12	Attentive: receptive to instruction; ideas are clearly taken in. Concentrative: capable of prolonged voluntary and critical mental application; strains attention to rework and improve what is received. Quick: naturally swift in reaching correct conclusions; " sees the point " intuitively. Fluid attention: attends readily, but is unable to fix attention continuously; is baffled by any difficulty; mental " quitter." Suggestible: borrows ideas and opinions from others; offers no criticism or opposing ideas. Coöperative: works well with others for a common end; has " team-sense." Sociable: disposed to be friendly and agreeable in company; frank, companionable, and acceptable to others; is a good " mixer." Corrigible: reacts well to correction; is reasonable in attitude and profits by the experience.

It will readily be seen that the labor involved in keeping up such character-books is negligible. Possessing a clear and comprehensive terminology any thoughtful teacher should find the making of these character-records of her pupils an interesting and simple task. Only such traits as are unmistakable are recorded and on the basis of a year's acquaintance these ought to be verified repeatedly. Facts dealing with the pupil's out-of-school life will, of course, have to be sought. Every observant teacher knows many of these already, but the knowledge dies when her connection with the pupil ceases. The purpose of the character-book is to accumulate and hold such knowledge for future use. What could be more enlightening, for example, than a fairly careful record under section nine of the above outline, noting the spontaneous activities of a child during vacations, or on Saturdays, or after school in the afternoon, through a period

of ten years ? If done in a significant way, as we can soon learn to do it, such a record would be invaluable to a vocational adviser. In the high school where one teacher deals as it were with fragments only of one or two hundred pupils changing each semester, the case is difficult. Here the character-book would be the mental treasury of the grade adviser. Ideally his group should not be larger than fifteen or twenty pupils. These could be studied, visited, and mapped without difficulty. Till this ideal is reached such information as can be had should be kept. Especially should this be done in all problem-cases, say the poorest fifth of the enrollment. Or the system might first of all be devoted to the *best* fifth of the school.

The value of such a record as an educational document scarcely needs to be pointed out. Detailed records of a few hundred pupils in the light of their college work, and later careers would certainly prove of great assistance in settling some important questions. It is, however, the immediate usefulness of the character-book that is most appealing. Manifold problems that block the way of teachers and principals in the handling of children as they make their way through the grades, would disappear at once in the light of the recorded observations and experience of earlier teachers. Furthermore, the continued necessity for recording experience would define methods and emphasize aims hitherto but vaguely conceived. To that peculiar type of individual who holds that teachers in general are not to be trusted with such information because it prejudices their treatment of the child, the writer has nothing to say. Untrustworthy teachers doubtless exist as do untrustworthy representatives of all professions. This attitude, however, would strip a teacher of all his professional material, deny the sincerity of his purpose, and make any but chance success on his part impossible.

At Newton the character analysis was undertaken by seven groups of elementary teachers and one group at the Technical High School. The teachers at the Peirce School under Mr. Reed went at the subject most seriously, proceeding slowly and seeking to verify each step. Elsewhere the director conferred with

the groups and took a less exhaustive method in the hope that at least a provisional terminology might be devised and put into use before the end of the year. Of course any set of terms whatever can only be provisional, as their refinement and improvement is an almost infinite task. The writer's change of plans, however, prevented the formulation of the tentative results at once. It is hoped that they may soon be issued in a trial form that will invite further criticism and elaboration.

7. *The development of a method for the scientific study of individual problem-cases, whether of instructional, disciplinary or other nature.*

The aim of this study is to work out for education a " case-system " of study and instruction comparable to that which has given the study of the law and of medicine its modern effectiveness. Subjective and sentimental pedagogy abounds, but its usefulness is past. We need the facts to direct us further; the facts presented systematically and truthfully, and stripped of all unnecessary verbiage. It should be possible for a young principal at his wit's end in dealing with a recalcitrant pupil to assemble quickly a whole literature of similar cases stating briefly but accurately the conditions, the treatment, and the results, all in concrete detail, from the actual experience of successful school men. A teacher puzzled over an otherwise normal child that can't spell should know where to turn with hopes of finding the suggestion that will aid him. It should be possible to saturate a student of education with material of this sort, setting forth in a standardized terminology trustworthy evidence on all phases of education. It should be possible in a given school system, when conducted by a properly trained staff, to compile almost automatically records of the treatment of all cases having educational significance, and to turn these to account both at the source and elsewhere. At present there is much citing of cases in pedagogical literature, but chiefly of favorable cases selected to prove a thesis, while an enormous current of true, unpartisan experience is daily drifting by unchronicled. All that is neces-

sary is careful analysis and the organization of economical forms in which to cast such experience; practice and the printing-press will do the rest.

A study of this kind demands precisely such a laboratory treatment as is here proposed. It could probably be worked out successfully only under such conditions, for its success lies wholly in the adequacy and directness with which it formulates and attacks the practical problems of the school. A dozen principals, each asked to state his problem-cases on a provisional printed blank and then to discuss it in conference, would speedily develop the forms in which these comparative experiences would prove most helpful, and in so doing would simply organize and clarify the procedure from which, even at present, they derive their major inspiration in mutual contact. The same treatment could, of course, be applied to class-room problems by groups of teachers. In both cases the timeliness of the topics and the prospect of putting the results of the discussion to an immediate test or use would ensure vigorous interest.

In such larger matters as school organization or the social relations of education it would be necessary to extend the scope of the study. It is highly desirable that the mature experience of successful school men on a large number of important subjects be assembled in comparable and useful form without making it necessary for each contributor to write a book in order to record it. For this purpose also there is need of carefully devised forms which would reduce the information to common terms. By means of such forms and with the coöperation of a selected group of experienced and successful observers of education, truths innocent of personal coloring and little influenced by conscious selection would gradually emerge.

This subject was discussed somewhat at Newton but never seriously undertaken. The following specimen is intended to suggest a possible mode of treatment.

PRELIMINARY BLANK FOR DATA IN CASES OF DISCIPLINE

Observer, *John Doe* Subject, *Discipline* Class, *Lying*

1. *Offender:* status in school and community; background and environment.
2. *Statement of facts* in the case, uninterpreted.
3. *Case for the defense:* point of view of the offender in full; every known or suspected element of provocation should be included, and the utmost effort made, on the part of the observer, to assume the motives, outlook, training, and limitations of the culprit, bearing in mind that, in the given combination of these factors, it was most natural for the boy to do as he did.
4. *Case for the School:* who is the injured party — the school, the teacher, the pupils, or the boy himself? Formulate the nature of the injury to the party involved. Is it a vital injury or a mere formal error? Can it be made good by punishment?
5. *Immediate purpose of any treatment:* contrition, true view of offense, better motives, fear, compensation, deterrent example?
6. *Immediate treatment proposed:* how likely to accomplish the desired result; chances of failure; effect temporary or permanent; will the total result tend to kindle better feelings?
7. *Ultimate purpose:* does the case require a course of systematic training to effect a permanent change?
8. *Training proposed.*
9. *Results.*

8. *Closer articulation between the high school and the grammar school.*

This perennially attractive study proved, as it developed, to contain more promise of immediate results than any other that was undertaken. Four phases were considered: first, that of general organization; second, that of English; third, that of Science; and fourth that of History. The initiative in each case was taken by a group of teachers in the high school, but hearty support was secured from the elementary schools also.

It should be said in reference to all of these efforts that the relations between the high schools and the grammar schools at Newton make a study of this sort unusually fruitful. The high schools enjoy the enviable distinction of having provided for the great majority of the school population of secondary age in New-

ton, and of actually holding them. The percentage of grammar school pupils who go to high schools varies from 80 per cent in some grammar schools to 100 per cent in others. The high schools enroll over a quarter of the entire school attendance. This fact makes the problem of articulation more generally felt and also more susceptible of solution here than where these conditions do not prevail. Moreover with this steadily increasing flow from the lower to the higher institution the mutual relations of the teachers and officers in both have become more intimate, until one feels that he may rely definitely upon an intelligent and whole-hearted coöperation.

In respect to general features of organization criticism was based on the alleged fact that the work of pupils in the first year of high school showed marked deterioration as compared with the work of the same pupils in the last year in the grammar school. As a possible cause for this certain obvious contrasts in the two institutions were cited: the physical environment in the high school is strange and bewildering to a new pupil, many recitation rooms take the place of one; the new social influences are distracting, strange comrades and teachers intimidate; the supervision is greatly relaxed, and the new liberty leads to license; methods of work are different, the many teachers fail to reach the pupil as the one did before; responsibility is unsettled; classroom practice has now changed, much now depends on written work and examination — both comparatively unfamiliar; methods and standards of the college-trained teachers are unlike those of the normal graduate; subjects of study are new and their schedule is confusing. Such are some of the unfavorable conditions with which a pupil entering high school is confronted, and which may be responsible for his delayed adjustment and his inferior work. The grammar school, on the other hand, was criticized for the rigidity of its organization, the slight responsibility that it imposes on the pupil, its preference for formal correctness over a freer but more genuinely educative content. Two problems seemed to be involved: first, to what extent is this apparent maladjustment actually reflected in lowered per-

formance on the part of the individual pupils ? and for how long ? Second, is it possible to make such modifications in the eighth grade and in the first year of high school as shall make the transition from grammar school to high school natural and successful ?

The projected treatment of these questions was as follows: In the first problem:

(*a*) Comparison of average individual ratings of first-year pupils for the first quarter with their ratings for the first and last quarters of the eighth grade; also comparison of ratings before and after the eighth-grade-high-school summer vacation with ratings of the same pupil before and after the seventh-eighth grade vacation.

(*b*) Analysis of the daily or weekly ratings of first-year pupils for the first quarter to discover the direction and speed of variation during the quarter.

(*c*) Special investigation of marked cases of deterioration to determine in how far the conditions are typical or exceptional.

These special studies were begun, but have not yet been completed. Such evidence as has thus far been received appears to indicate that the alleged deterioration is not typical and has been exaggerated.

The second point dealing with possible modifications in the two institutions awaits the consideration of a special group of teachers and principals chosen to make a thorough study of conditions and to devise such modifications. One step already taken seems to have fully justified itself. This was the appointment in each of the two Newton high schools of a teacher fresh from the work of the eighth grade to act in a sense as sponsor for the first-year pupils, to represent them in the meetings of the teaching staff, and, in general, to study high school conditions with a view to modifications in their interests. These teachers have filled a difficult position with intelligence and tact, and have been of much assistance in bringing about an understanding. It is intended, of course, that they return to their grammar grades after the one year in the high school, and that other eighth-grade teachers take their places. This process dovetails the two

schools together in a sense, and reacts as favorably upon the various eighth grades as upon the high schools. It would be of great value, were it physically practicable, for high school teachers in certain branches, particularly in English, to undertake instruction in the seventh and eighth grades. High school teachers in general are much in need of a broader perspective in judging the growth and requirements of a child's mind.

Certain other modifications in the high school régime seem well worth a trial. First, the concentration of at least two and preferably three of a pupil's subjects in one hand and in one room during the first half-year seems feasible and likely to lessen the present confusion in the mind of a beginner. Second, the collection and scrutiny at least weekly, and at first possibly daily, of each beginning pupil's class records from all teachers should take the place of the present plan which defers a general round-up until five weeks after entrance. Such accounting invariably takes place daily in the grammar school, and the contrast may well prove demoralizing to the pupil not trained to the new policy. Third, teachers in the first year would profit by a little systematic training in making their lesson assignments reasonable, clear, and minutely detailed, in avoiding too free a use of the loose " college " method in the class-room, and in adopting more of the " follow-up " tactics of the grade teachers until the lesson of personal responsibility is fully inculcated. Fourth, the partial restriction, for first-year pupils, of their liberties in the building would appear a desirable transitional expedient until they have had time to realize the traditions and ideals of their new environment.

Similarly for the grammar school the introduction of certain characteristic high school methods would appear to be advisable. First, the partial introduction of departmental instruction, requiring the pupils to pass from room to room. Second, the provision for large freedom of movement about the building for eighth-grade pupils, the development in them of greater personal responsibility for the preparation of lessons, and the provision of opportunity for greater personal initiative and inde-

pendence in school affairs. Third, the conscious anticipation in the grammar school of class-room methods and devices used in the high school; these to be agreed upon in conferences between teachers from both schools. To bring about the fullest understanding there should be, in addition to the above measures, frequent mutual visiting and conference between the teachers in these grades.

Such are the main conclusions thus far reached in the consideration of this phase of the topic. It is important that they be elaborated and revised, with a view to immediate experimental introduction.

Mention should be made, in this connection, of a plan suggested by one of the grammar masters, and at once put into practice by several of them. As soon as the earliest reports as to the work of their respective pupils in the high schools were received by these masters an interview was sought by them with all those who seemed not to have fulfilled reasonable expectation. Knowing the pupils thoroughly these gentlemen were usually able to determine speedily where the difficulty lay, and in their reports to the high-school principals they often made it possible to remedy the trouble at once.

The second phase of the articulation problem was undertaken by the two high-school departments of English. Starting from the claim, already quoted, that the work of first-year high-school pupils was inferior to their work in the grammar school, the following specific criticisms were formulated: first-year high-school pupils suffer from (*a*) ignorance of formal grammar, (*b*) inability to write and speak correctly, (*c*) inability to grasp the central thoughts of a reading selection, and (*d*) from the effects of an uncorrelated course of study in literature. Four specific problems were developed from a consideration of these conditions: first, does ability in oral and written English, shown in the grammar school, fail to persist in the first year in the high school? second, are the standards of achievement in composition in the grammar school and high school properly graded and mutually understood? third, what can be expected of the successive grades

in the development of power to grasp the central thoughts of reading selections ? fourth, how can the choice of reading matter in the grammar school and high school be systematized ?

As a basis for the study of the first and second of these questions a set of themes, written without previous preparation by all the first-year high-school pupils was sent to the grammar schools to be rated by the teachers who had taught these pupils in the eighth grade; these themes having first been privately rated by the high-school teachers. Similarly a complete set of themes from the eighth-grade teachers, was sent to receive the ratings of the high-school teachers. The last readers, — the grade teachers in the first case and high-school teachers in the second, — were asked to indicate their corrections in full on the papers.

It was soon realized that as a true indication of progress or deterioration on the part of pupils these single bits of off-hand writings were of little value. As a comparative revelation of the standards prevailing among the two groups of teachers, however, the results were of more interest, and the comments and corrections furnished material for a program that should lead to a better mutual understanding. The following table shows the results of the ratings:

DISTRIBUTION OF THEME-RATINGS

I. *First-year High School Themes*

(Figures indicate the percentage of the total given to each " mark ")

By Teachers in.....	A	B	C	D	E	F	Totaling
(*a*) High Schools....	8.5	27.	39.1	17.5	6.3	1.6	100%
(*b*) Grammar Schools	2.1	18.7	44.6	24.3	7.8	2.5	100%

II. *Eighth-Grade Themes*

By Teachers in.....	A	B	C	D	E	F	Totaling
(*a*) High Schools....	5.1	21.	30.	22.9	15.	6.	100%
(*b*) Grammar Schools	4.9	13.8	35.6	23.6	14.	8.1	100%

The themes so rated were returned to their respective schools and carefully studied, and at a subsequent conference of all the teachers concerned the chief points of variation were brought up and discussed. At this conference the suggestive proposal was made that a permanent committee, with representatives both

from elementary and high schools, be appointed to correlate in detail the work in English of the two systems. As appeared from the discussion, the work of this committee was conceived not as a single task, but as a permanent function. A part of its duty was to serve as a clearing-house for the whole department. The detailed needs of each of the twelve grades were to be analyzed, and then, through this central committee, any special piece of investigation or preparation done by any teacher for his own classes was to be made available in print for the whole department, especially for those doing similar work. A plan of this kind obviously contains important possibilities if well worked out. The combination of great freedom and flexibility with a wealth of illustrative and supplementary material continually coming in, might be organized in the interests of an effective economy. The notion of systematically pooling the results secured by many workers in doing the same task has nowhere received due recognition in education.

A further proposal with reference to closer articulation in English was to the effect that for each pupil in the city a composition portfolio be provided that should contain uncorrected samples of his composition taken twice each year and preserved for reference, comparison, and experimental purposes. Certainly such an array throughout the twelve years of a pupil's development would be very instructive.

Other conferences on the problems undertaken by this group were in prospect as the writer left Newton, and will be reported in subsequent bulletins.

Study of the articulation in science between the grammar schools and high schools was begun by the two high-school science departments; their chief problems were formulated as follows: first, is the lack of reasoning ability in elementary science due to the failure of the grammar schools to develop the requisite ability, or may it be that power to reason in technical terms (ohms, amperes, density, etc.), cannot fairly be expected of beginning pupils whatever their ability in reasoning with simple terms? second, is correlation between the grammar school and the high

school in respect to topics in elementary science practicable and desirable? If so, third, what topics may be most profitably undertaken by the grammar school?

In regard to the first of these questions it seemed possible to devise a test that would be of some assistance. Such a test would consist of a series of problems involving all the important types of reasoning process used in high-school courses in science. The problems would appear in two forms: first, expressed in the purely technical terminology of science, and second, in terms familiar to any child who has had arithmetic. It was designed to submit the test so prepared to all high-school pupils who had had or who were taking physics; also to submit the problems of the simple series alone to all first-year high-school pupils and all pupils of the eighth grade. From the double test for physics pupils it was thought that the effect of unfamiliarity with the terms might appear in proportion to the brevity of their work in the subject, and by the single test it was desired to compare the reasoning ability in the eighth grade with that in the first year of the high school.

The study proceeded as far as the construction of a test, a part of which is given below.

Specimen Problems from the Reasoning Test

I. 1. Price varies directly as quantity, quality remaining the same. If 12 bushels of potatoes cost $9.60, what will 16 bushels cost?

2. Volume varies directly as absolute temperature, pressure remaining constant. If 50 cc. of gas have a temperature of 273° A, what will be the volume at 283° A?

II. 1. How much will 15 quarts of berries cost at 12 cents per quart?

2. Current strength (ampere) equals electric pressure (volt) divided by the resistance (ohm). If one volt will send 2 amperes through a certain resistance, how much current can be sent through a wire of the same resistance by 110 volts pressure?

III. 1. Time varies inversely as the number of men employed. Six men can do a piece of work in 4 days; how long would it take 10 men to do the same work?

2. Volume varies inversely as the pressure. How many cubic feet of gas at 15 lbs. per square inch pressure can be obtained from a gas tank of 10 cu. ft. capacity in which the gas is under a pressure of 165 lbs. per sq. in.?

In history the need of better articulation was suggested by the fact that pupils come up for American history in the high school with an attitude of mind that indicates that the point of view from which history is approached in the high school — the only point of view from which it can profitably be approached there — has been largely anticipated in the grammar school, with resulting loss of interest and profit in the high-school course. The problem appears to be to plan a course for the school system as a whole, in which, at each repetition, the peculiar function of history at the given age and state of development of the child shall be clearly emphasized. Thus a predominantly biographical and inspirational treatment in the eighth grade would seem to contrast properly with the analytical and pragmatic treatment in the high school. The problem is a good one though somewhat difficult. It was discussed at Newton, but has not as yet been followed up.

9. *The analysis into fundamental abilities of aggregates now usually rated as units;* e. g., *English, mathematics, etc. Also: The invention of tests and scales for the objective measurement of these abilities.*

This study also includes an almost indefinite number of subproblems the importance of which is apparent to any teacher or school officer who seeks to free himself from the error of personal variation in his judgments of the educational progress of a pupil. The subject was begun with a test to determine the practical efficiency of the Scale for the Measurement of Excellence in English Composition devised by Professor M. B. Hillegas of Columbia University, and reported in the Teachers College Record for September, 1912. Accurately stated the object of the test was to determine the extent to which the use of a standard scale of comparison will produce uniformity in the ratings assigned to a given set of exercises in English Composition.[1]

[1] A report of this study and of the enterprise to which it led is contained in Leaflet No. 115, Feb., 1914, of the New England Association of Teachers of English.

Fifty one-page exercises were secured in about equal numbers from the fourth, fifth, seventh, and eighth grades in the grammar schools, from the sophomore and senior years in the high schools and from a class of mature "transfer" pupils promoted to special work in the high school without having completed all the work of the elementary school. These papers were sent in succession to fifteen teachers, five from the fourth and fifth grades, five from the seventh and eighth grades, and five from the high schools, with the following instructions: "Rate each paper on the scale of 100 using as a basis your own standard of good English prose composition." After being rated in this way by all of the teachers, the papers were sent around again accompanied by a typewritten copy of the "scale," and the same teachers were now asked to mark each paper according to their estimate of its position in the scale.

The results of the ratings may be summarized as follows: Marking without the scale, the judges assigned to the papers values which varied among themselves from 30% in one case to 85% in another; the average extreme variation of all fifty papers was 58%. When assigned with the scale the ratings varied from 18% in one case to 73% in another.

As a practical means for the measurement of excellence in English prose composition the test showed that the Hillegas scale, though promising, was clearly preliminary and inconclusive, as the first attempt of this sort could hardly fail to be. It is a "blanket" scale covering everything that may be included in the term "merit," and expressed, in its lower and middle terms at least, in samples that are but slightly comparable with the usual school product. Its chief virtue is the thoroughly scientific character of its construction; its chief fault is that under the most favorable conditions it still admits a legitimate variation of 25% — a minimum which swells to 50% in rating specimens to which its samples are unsuited, or when the scale is hastily or carelessly applied. That it will considerably reduce the limits of variation which appear in a purely subjective rating has been conclusively shown in the Newton tests.

The results of the test left the decided impression of considerable latent worth in the idea of a scale in spite of the difficulties attendant upon its elaboration. It was determined, therefore, to proceed at once with the construction of a scale which should remedy the apparent defects of the Hillegas Scale and be suited to practical use in the Newton schools. As the greater part of the work connected with this "Newton" scale has been done under the supervision of the writer's successor, it seems proper to defer all discussion of it to a later bulletin.[1]

10. *The division of labor in teaching: the organization of class-work to permit the larger use of conspicuous abilities in the teacher.*

The intent of this topic reaches somewhat further than what is known as departmental teaching, although that is one form of such division of labor. The question is whether, both in the grades and in high school, gifted teachers with unusual abilities, say, in oral class-room instruction, teachers who by force of strong imagination and powers of compelling thought can greatly stimulate pupils, — whether such teachers should not be encouraged to conserve their powers and energy for that purpose. Many such teachers can without difficulty hold the attention of sixty or seventy pupils and secure a strong reaction, but if held responsible for all the work of that number they would find the task impossible. The experiment would seek to determine whether, by associating with such a teacher a young and possibly inexperienced assistant who would work under her immediate direction and relieve her of routine duties, bookkeeping, correction of papers, etc., a larger number of pupils might not, for their essential instruction, be brought into contact with her strong and impressive personality. Such an arrangement would be especially suited to the grades, and might prove an admirable method of training teachers fresh from the normal schools.

[1] This bulletin, by Mr. F. W. Ballou, will contain four scales for the measurement of eighth-grade compositions, one in narration, one in description, one in exposition, and one in argument. Each sample in the scale will be accompanied by a paragraph of analysis. The bulletin will be issued by the Harvard University Press during September, 1914.

In the high school, provision for such specialization would make it possible for each of three or four teachers of Latin to develop that phase of instruction in which he was naturally most adept. At present a pupil must submit to the same instructor both where he is strong and where he may be wholly weak and uninspiring. It might prove possible, on the other hand, eventually to secure expert service from each of several such teachers by further specialization.

11. *The effect of the regulation of pupils' program-periods on the quality and quantity of their work.*

Previous to September, 1911, pupils in the two Newton high schools had been permitted to register for from seventeen to twenty periods of work weekly, according to individual ambition or circumstances. After a careful study of conditions there had seemed good ground for the belief that many pupils were attempting too much work, and that a regulation of periods would both improve the quality and increase the amount of successful performance. For this purpose the courses were laid out as if for five years instead of four, requiring thus an average of about fourteen periods per week which was termed "normal work." To this program all pupils were restricted except such as failed in no subject and the average of whose ratings was at least 10% above the passing mark of 70%; such pupils were allowed to take an additional subject as long as they maintained those conditions. Revision of the work of all pupils was to come at ten-week intervals.

To determine the actual effect of this ruling Superintendent Spaulding suggested certain comparisons as follows: first, comparison of the work of 189 sophomores in 1910–11, before the change, with the work of 167 sophomores in 1911–12, after the change; second, comparison of the work of 162 pupils as sophomores in 1910–11, before the change, with the work of those same pupils as juniors in 1911–12, after the change. All exceptional or uncertain cases were thrown out of account. For each pupil there was ascertained under the contrasting conditions:

(1) the number of points he attempted to earn by enrollment;

(2) the number of points he did actually earn;

(3) the number of points for which he originally enrolled and in which he failed; this was termed " gross waste ";

(4) the number of points in which he failed, less such points of failure as occurred in subjects that, according to the new ruling, he was compelled to drop during the year; this was termed the " net waste ";

(5) the percentage that the " net waste " constituted of the points earned;

(6) the average quality of all his work for the year.

In addition to these items the percentage of the class who won over 70% on eighteen periods of work or more, was secured in each case, and, finally, there was taken the percentage of each group securing over 70% regardless of the number of hours. Presented in tabular form the results were as follows:

COMPARISON OF PUPIL-PERFORMANCE BEFORE AND AFTER THE LIMITATION OF PERIODS

Comp. I	189 Soph's 1910–1911 / 167 " 1911–1912	Comp. II	162 Pupils as (1) Soph's '10–'11 / (2) Junior's '11–12
	Average Number of Points[1]		
20.57 / 18.58	Attempted		20.82 / 18.89
18.36 / 16.64	Earned		19.06 / 16.90
1.95 / 1.70	Gross waste		1.67 / 1.77
1.59 / 1.20	Net waste		1.41 / 1.33
8.66% / 7.21%	Net waste is of points earned		7.40% / 7.87%
73.77 / 73.70	Average quality		75.13% / 72.98%
61 / 45	Percentage of superior performance (Over 70% on more than 18 hours)		63 / 41
72 / 70	Percentage over 70% regardless of number of hours		74 / 71
	Balance of Gain or Loss		
Loss 1.99	Points attempted		1.93 Loss
Loss 1.72 (9.4%)	Points earned		(11.3%) 2.16 "
Gain 1.45 (Dec.)	Average waste per point earned		(Inc.) .47% "
Loss .07%	Average quality		2.15% "

It will be seen that, when tested on these three groups of pupils, the plan of limiting periods failed at every point except the one in the first comparison that showed a gain (decrease) of 1.45 points in the average waste per point earned. Especially striking is the drop in quality in relation to the number of periods, termed above " superior performance." No one can assert, of course, that the showing made here finally condemns the new

[1] A " point " is one hour of recitation per week through the year.

plan; it should be verified repeatedly with other groups before acceptance. The study does, however, disclose the precarious foundation upon which apparently sound educational judgments may sometimes rest.

12. *A psychological analysis of successful teachers.*

This topic is so wholly unexplored that to record it here seems scarcely warranted. It was, however, seriously considered, and, had time allowed, would have been undertaken. The idea is, of course, merely a new application of the form of investigation now familiar at the psychological laboratory of Harvard University. The personal characteristics of successful teachers are, on the whole, fairly uniform as judged by common experience. That they should be susceptible of definite formulation in terms of psychological reaction would not be at all surprising. Were it possible to arrive even at negative results, and to determine characteristics that are not compatible with success, the usefulness of such knowledge would not be slight. The study, however, is one that depends chiefly on university experimenters and can hardly be considered appropriate for the investigation of teachers themselves.