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THE LIMITATIONS OF THE QUANTITATIVE TECHNIQUE IN TEACHING AND A SUGGESTED TECHNIQUE FOR THE QUALITATIVE

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CHAPTER I

THE PROBLEM INTRODUCED - TECHNIQUES OF RESEARCH

Education as a Science. - The triumphant stride of education as it marches into the kingdom of the pure sciences belies the troubled heart beneath its academic robes. Once admitted within the portals, the mask which hides the countenance of real endeavor falls away, and the uncertainty of the value of the attainment takes its place. This momentary discomfiture, although often prophetic, is natural, and is immediately superseded by the assurance of a battle well fought.

Now after two decades the exhiliration and newness attendant upon victory are passing away, and the clouds of doubt are foregathering, even as they have through all the ages, whenever a singleness of outlook characterized the dominant philosophy. The first crude embryonic stirrings of science matured, and its many times great grandchildren have refined the technique of their forebears with an assiduity at once commendable and censurable, commendable because of the good it accomplished, and censurable because of its shortsightedness. The obviousness of the former

is perhaps responsible for the latter. In order that this maximum of worth may be preserved, it is necessary to determine its limitations, and to ascertain if there is as effective complementary technique for the non-scientific.

Before the problem can be fully stated, the vagueness which is attached to certain terms must be eliminated. The use of the word "limitation" instantly suggests boundaries, or a degree of exclusiveness beyond which any given word, concept, idea, has no meaning. This fact is in no way indicative of the weakness of the thing concerned; rather is it a sign of strength. For when anything is thinned to become all inclusive, it loses that specific character which is the essence. Concepts once blurred by too inclusive application produce a confusion which results in an indefiniteness that makes for wrong thinking and generalizations.

If the essence of that which can be scientifically treated is its mathematical measurableness, then anything which cannot be entirely so measured should under no circumstance be classed or treated as such. This is not to say that there is anything having no mathematically measurable parts but that that part of it which is so measurable does not constitute its essence, when essence means that which makes a thing intrinsically what it is, or that without which anything loses its identity.

At this point the objection may be made that being mathematically measurable does not constitute the essence of that which can be scientifically treated. There are, of course, numerous other criteria for the scientific, such as objectivity, capable of being experimented upon, recurring, controllable; but all that which is mathematically measurable must perforce have all these other characteristics, too. One more objection to making this the criterion might be that infinity only is its limitation, and that having this virtue makes it all inclusive. However, the fact that mathematics has no way of measuring infinity, in whatever way it finds it, is in itself a limitation calling for a supplementary or complementary technique.

Quantitative Defined. - In narrowing itself to this measurable criterion the scientific obviously deals with quantity only. In other words, quantity is how much, and lends itself to mathematical measurement. For example, an inch, a quart, a pound, a dollar, a degree, are all units of measurement regulated by mathematical standards and dealing with quantity alone. Since science can proceed only through the use of measurement and nothing except quantity can be measured, the term quantitative is synonymous with the term scientific and is more adequate, because more specific. Since scientific data can be accrued only through the use of measurement, the term quantitative is synonymous with the term scientific

and is more adequate because more specific. Which does not mean that the term scientific cannot be used to interpret the measurable data in any field. Not in all instances, however, do these measurable data constitute the essence of the subject matter under consideration.

Qualitative Defined. - Common usage in language and experience has coupled the terms quality and quantity. Quality expresses what kind: it identifies and evaluates, and does not lend itself to mathematical measurement. All names such as chair, table, carbon, Jones, book, man, child, express quality on the side of identification. Evaluation means comparison on the basis of experience.

Justice, beauty, tolerance, fineness, goodness are concerned with quality in respect to valuation. There is no mathematical unit of measurement for such qualities, nor are they expressable in quantitative terms. The scientific method has no concern with the qualitative, for the essence of scientific method is mathematical measurement. Science, as a whole, while employing the scientific method as its basic technique, uses that part of the qualitative which identifies, as a cataloguing device for the sake of common understanding. Valuation is of no more concern to quantitative procedure than was the truth of their premises to the formal logicians. Yet the fact that the qualitative is omnipresent makes its recognition in a systematic manner an essential

of a complete interpretation of a life situation. The quantitative has a technique systematized and working; its limiations have been indicated. The qualitative is lacking in technique and is unsystematized.

However, the last decade of education has been devoted to that part which does lend itself to quantitative technique exclusively and efficiently enough to warrant its inclusion in the realm of pure science. Now, having basked in the security of scientific facts for some time, the discomfiture indicated at the beginning of this discussion is burning itself into its consciousness with insistence to be recognized.

Having lived in a house of systematized organization and department, education does not feel comfortable in the disorganization and intangibility of the qualitative, although it realizes its necessity as a complete interpreter of its aims, objectives and purposes. An analysis of an actual teaching situation over a period of time in terms of the quantitative and qualitative, in order to indicate the oscillation by which one becomes the complement of the other, with a suggested method for the qualitative, which shall be as definite as that already known as the scientific method, should fill a felt need on the part of education.

Techniques Used in the Development of the Problem. - During the research the techniques employed were the historical,

comparative, and case history. For the comparative, standard tests were used: questionnaires, conferences, and a control group were utilized for case history. The historical technique was employed for the purpose of orienting the problem. Critical analysis was used as a check on comparisons and evaluations.

The Need for the Study. - The need for the present investigation is threefold: methodological, administrative, and theoretical. In method, the failure of the qualitative to develop a systematic technique has caused a stretching of the scientific technique which has devitalized it and given no fundamental interpretation of pedagogy. Before the resultant confusion in method can be dissipated, such a qualitative technique must be divised. Administratively, the scientific method has suggested procedures which work in the bulk, but which thwart the advance of the individual. For example, we are in full possession of tools for accommodating forty-five to fifty pupils in a classroom, but we do not have any tool for assuring the individual pupil in such a classroom the degree or amount of attention that he would receive in a smaller class. Theoretically, the tangle which has resulted from a one-sided interpretation of an essentially social problem cries for dissolution immediately in order that progress may not be impeded.

The Problem Stated. - The problem of this study is to indicate the limits of the quantitative technique in teaching, and

to suggest a technique for the qualitative. Restating this in the terms of the definitions for qualitative and quantitative given above, the total field of education cannot meet the mathematically measurable requirement which is the essence of that which is scientific. Nor can that part of education which is its essence be interpreted in quantitative terms alone. Therefore, the use by education of the qualitative is essential.

Part I of the study is devoted to the theoretical and rational treatment of the problem. Part II contains one application of the suggested technique to an actual teaching situation or a practical illustration of the principles of the techniques in practice. Part III gives the final synthesis and restatement.

CHAPTER II

METHOD - A FUSION

Before the different aspects of the problem have been considered separately, an analysis of method as a whole shall be made. Teaching demands the use of various techniques - an investigation into the nature of method should reveal the lines of demarcation for these techniques.

The Nature of Method. - The word method is seldom used without a limiting or qualifying word, which in turn limits the implications of the word taken by itself. For the purpose of this discussion, it is necessary that method be analyzed in its own right. Is it a single technique derived from a single source, or is it a composite technique arising from a dual source? Method shall be considered in relation to the (1) Dewey analysis [1], (2) the Thorndike formula for the scientific, (3) facts, and (4) prejudices.

A word of explanation as to the reason for selecting these particular concepts for consideration is in order.

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[1] John Dewey, How We Think, Chapt. VI. Boston; D. C. Heath and Company, 1910.

The Dewey Analysis of a Complete Act of Thought. - Not all analyses incorporate a method, but the Dewey analysis does. It is an instrument for detecting points at which errors in the solution of a problem are most likely to occur. It does not limit itself to any particular kind of subject matter but is applicable to any problem in any field, education, science, economics, mathematics, religion, or philosophy.

Should an examination of the complete thought process itself disclose the use of quantitative-qualitative factors, then the soundness of the original contention is established, and there are points at which the quantitative ceases and the qualitative enters in teaching.

In order that the investigation may be clearer a brief outline of this analysis is presented in the five steps which Dewey suggests:

i. Felt need or difficulty
ii. Location and definition
iii. Suggestions for solution
iv. Development of one suggestion
v. Observation and experimentation

The Thorndike Formula for the Quantitative M-O-V-I-E. The Thorndike formula in relation to method must be examined, for it is the outstanding formula for the scientific. The quantitative technique may be represented by Thorndike's interpretation M - O - V - I - E, mathematically measurable, objective, verifiable,

impartial, and expert. The last two items are not quantitative in the sense that the first three are, i.e., any material which lends itself to objective, mathematically measurable, and verifiable techniques could be handled by no other than an expert in an impartial way.

The Thorndike Formula in Relation to the Dewey Analysis. In order that the relation of the quantitative and the qualitative may be more clearly seen in terms of method the Dewey analysis and the Thorndike formula shall be compared. Which is to say that when the relative positions of the quantitative and qualitative have been ascertained in respect to the complete thought process the significance of each is made more apparent.

The first step of the Dewey analysis has quantitative implications meeting the Thorndike requirements so far as the need is concerned. All needs, as aspects of the environment, such as chairs, mathematical problems, people, and books, are objective, mathematically measurable, and verifiable. But the recognition and designation of feeling them as needs, cannot be explained in terms of the Thorndike formula.

Location and definition likewise contain qualitative and quantitative implications. The word location, taken in its physical sense, can be expressed in quantitative terms. For example, a lawyer with the problem of delinquency to be solver in a particular case may locate the difficulty in terms of the home

environment, the actual living conditions. On the other hand, he may find the difficulty in a personal physical handicap. These are both quantitative pieces of information and the resultant definition is quantitatively derived. Taken in another sense, a lawyer may discover no quantitative elements which completely define or locate his problem and he has to infer his definition from the facts he is able to assemble, - some of which may be quantitative, some qualitative, - but in this instance, the actual locating or defining is a qualitative procedure.

Suggestions arise out of a general background and apply to a particular situation, and through application become general truths. In so far as these suggestions are based on concrete evidence they are quantiative; in so far as inference is their determiner, they are qualitative.

The development of a suggestion is likely to be predominantly quantitative - although the nature of the difficulty and the manner in which it has been defined will determine to some extent the character of the suggested solution. The reason it is likely to be quantitative is that the solution must be within the control of the investigator and therefore will consist of tangible materials.

The Quantitative-Qualitative Implications of the Dewey Analysis. - Throughout the whole analysis then there is a check counter-check of quantitative, qualitative technique, and no thought

is completed without the use of both.

Induction and deduction frequently find themselves as limiting words for method. Induction is the handmaiden of all that is scientific, for the scientific method does not pretend to be anything else than an inductive procedure. For many years deduction, too, held sway as the only method. The respective failure of each in the realm of human satisfaction is due to their separate use as a complete interpretative technique in a particular situation. Reference once again to the analysis of a complete act of thought reveals the interplay of induction and deduction throughout, with step number three (suggestions for solution) needing both together. This implies that scientific solutions must consider the deductive as well as the inductive forces that control thought.

The Nature of a Situation. - Perhaps the one word that has come to mean science and the quantitative, *sine qua non*, is the word fact together with the position in which one discovers it, namely, situation. Method is getting facts out of a situation determines to a large extent the nature of the facts. So if one can show that here, too, method is a fusion of the quantitative and the qualitative one is in a fair way toward being safely able to suggest the importance of the qualitative.

Fact. - Ask the layman what he understands by the word fact and he will tell you "something that I know is so." That

is, his definition contains the elements of direct or vicarious experience as being the tests of the validity of a thing. Etymologically, the word fact implies the same experiential basis, - the idea of doing, action either remote or present.

With the division in method, which came with the birth of modern science, one becomes aware of a parallel refining of factual knowledge apparently regulated by the extent to which the elements of the new methods are verifiable, accurate, recurring, measurable, objective, and controlled. This refining process has become so inextricably bound up with scientific technique that nothing but a scientific fact is a fact.

The delimiting of the field of fact to the facts of science excludes those which might be included on the basis of experiences in general. Is it necessary to do so in order to be positively sure that progress is in the making? In short, one is brought face to face with the question of the value of those facts of experience which do not meet the requirements of scientific facts.

Whitehead [2], in stating that "there are no brute, self-contained matters of fact capable of being understood apart from interpretation as an element in a system," sounds the knell for the possibility of absolute objectivity. That is, even scientific

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[2] A. N. Whitehead, Science and the Modern World, New York: Macmillan Company, 1929.

facts in becoming are governed by our intentions and by their kind. The set resulting from this condition causes a culling out and directing, which in themselves may constitute an interpretation, a bias, a prejudice, a preference, which ideally are violations of the method.

Are we to be misled by the immediate measurableness of certain present occurrences and recurrences into the belief of the non-validity of the immediate measurableness of certain other present occurrences and recurrences? Is the equi-relation of cause and effect in regard to one set of occurrences proof that the progressively determined relation of cause and effect in another set of occurrences is not valuable?

To put the question another way: Are quantitatively measured occurrences the only valid facts? Eddington says: "Science has to select from the whole domain of experience that portion only which is capable of metrical interpretation." Number alone means very little unless we identify it with some category of direct experience, or as the Gestalts have it, quantitative measurement is but a superstructure on qualitative and direct observations. Again, Bridgman[3] states: "Anything quantitatively conceived and treated in the absence of qualitative aspects is irrational. Quantities abstracted from qualities

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[3] P. W. Bridgman, "The New Vision of Science," Harper's Magazine (March, 1929) 442-451.

are arbitrary, which make it impossible to reason from one quantity to another."

There is a quality aspect of a pragmatic fact. Scientific facts may be pragmatic, but do not have to be. One could say that their pragmatic value is an additional attribute rather than a resultant of their being scientific. The question is whether this qualitative aspect which may be genuinely experiential, though unmeasurable in the scientific sense, is any less a fact than the facts which are products of scientific technique.

If one again calls in the layman, one discovers him as firm in his convictions of qualitative facts as of quantitative ones. Qualitative facts, per se, are according to the scientific mind to be stamped as mere speculations or prejudices. That is, qualitative considered alone has come to be associated with humanism in its untechnical sense. Put another way, personal preference, desire, bias have colored the quality of the fact. Quantitative, scientific facts may be so colored as was indicated in the discussion of pragmatic facts. Does this render them less factual?

Adams makes the statement [4]: "A value concept is impossible of prediction in the scientific method." This sounds

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[4] J. T. Adams, "Henry Adams and the New Physics," Yale Review (December, 1929), 283-302.

strangely like the cant of the modern logicians to the effect that the formal logicians are not concerned with the truth of their premises in the social sense, but merely with their implications in a mathematical sense. It seems to the writer that such an attitude is a requisite for the production of quantitative facts; but that education, ethics, government, or other idiosyncratic and unique facts are not essential as genuine products of experience is ridiculous.

If one has vicarious and direct experience as the basis of all factual knowledge, does one enlarge the field to such an extent as to make it meaningless? Rather, the writer feels, does it give meaning to a field that viewed exclusively from either the quantitative or the qualitative aspect has no meaning.

The task obviously is that one must ascertain the points at which neither quantity nor quality is sacrificed for the other. The manner in which this may be done is largely determined by the attitudes of the wielders of both types of facts. There must be quantitative experts and there must be qualitative experts, for the psycho-physical organism is so constituted that singleness of purpose is attained through singleness of technique. Then there can be a factual amalgamator, a sifter of quantitative and qualitative, who recognizes the need for synthesis, if complete or rounded factual knowledge is to be possible. An analysis

of quantitative and qualitative is in order and must be pursued if a complete understanding of the question of facts is to be had.

There seem to be three factors relevant to the discussion and necessary before solution is possible; the nature of inference in knowledge, the nature of thought, and the nature of the situation.

Inference. - All knowledge involves an element of inference; there is no knowledge presented directly to the mind. In passing from one fact to another there is an element of risk in the thinking. That is, a leap has to be made. Logic is the statement of the devices by which risks of thinking are reduced and regulated as far as possible. There are two ways of meeting these risks: (1) The primary control is not in the control of the process of inference, but in control of the data themselves. Control can be had by postponing the completion of an inference or the acceptance of the conclusion suggested naturally by the subject matter until the material has been reorganized. (2) By regulating and controlling the process of inference itself. We can develop a technique for getting material and for judging it. After getting psychologically this subject matter, syllogistic arrangement may help, for suggestion gives an idea of conclusion. The meaning must be tested, and deductive forms must be stated to give conviction.

There must be some elements or qualities in subject matter which make it possible to control result by control of the process leading to it. Subject matter is capable of being made coherent or orderly by mind because the subject matter itself has certain qualities. Physical qualities and desires for inference enter into the process of inference.

Most words refer to physical and mental phenomena. But there has been an accretion by the use of meanings in going from these to other meanings. In the case of some or all if a relation of physical facts is made for a purpose, the meanings of these words "and" and "but" are equivalent to conjunctions which show the relation of physical existences. Fact seems equivalent to existence or event, but upon examination there is a difference between fact and existence. That is, usage of fact in "the fact that, makes fact point to a mental something equal to the content of a proposition." "That so and so is true is a fact." Matters of fact or existencies are matters of fact when they enter into inferential use.

The division of the nature of thought which concerns us primarily is that involving induction and deduction. These have a direct bearing on the question of inference. There is need for regulating the subject matter from which one's inferences operate. This defines the significance of induction; it is the securing of subject matter which is as safe as possible from which

to reason. On the other hand the deductive function is concerned with the relationship between the subject matter from which we reason to the conclusions drawn which serve to test the security of the conclusions. Deduction is sensing of whole problem; induction is sensing the selection of certain data for the end. (Thought is not pursued further than to show the relation between past knowledge and present needs.) Deduction has certain functions which are peculiarly its own, and which have signficance for the matter at hand. It is the intermediary step in relating a particular observation to a body of law; it states and places the relation of immediately acquired facts to past knowledge. In reasoning one need not go back to gathering materials for factual data, but may use certain principles, connect ideas, and by mutual contacts unify and discover new facts.

Prejudice. - A situation is a certain pervasive quality that runs through all the subject matter of our thinking. It is a set of qualitative distinctions. They are what make it unique. In every situation there is something which is not symbolic - the pervasive element. Much thinking is futile because it does not arise from the felt qualities of the situation. The thing must feel right. The immediate quality of a situation (complexes, prejudice, sorrow) tends to color and direct thought. A technique is necessary, but it must be felt and produce feeling.

If human beings were not concerned but merely cognitively surveying reality, there would be perhaps no qualitative sense of things. The scientist and poet have the same felt quality but are able to abstract and state different meanings. Scientific thinking grew out of and must return into qualitative subject matter to be tested and to be significant. The subject matter as subject delimits its own number of qualities; theoretically the number is infinite, and only one particular quality need be felt in any single situation.

Inference in itself has a qualitative aspect. Thought in concerning itself with both induction and deduction and depending for its initiation on a felt difficulty depends on the qualitative for its perpetuation as well as its existence.

Quantitative aspects are those which are measurable and therefore controllable by the use of certain tools or devices. Ancient science lacked these tools and devices and was, therefore, weak in the ability to break up and analyze subject matter. Perhaps this explains the tendency that modern science has to neglect the qualitative and eulogize the quantitative. Certainly the method which it uses concerns itself with the quantitative only, - accuracy, control, recurrence, and statistically representable facts. However, the fact of its dependence on hypotheses that must be qualitatively conceived, and the fact that false hypotheses point to new truths verifiable according to scientific

technique cannot be overlooked.

The third step in Dewey's Analysis of a Complete Act of Thought has a suggestion which promises to be fruitful. This step, the suggestions for solution, in order to be executed, involves the use of both induction and deduction. It represents in fact an oscillation between these two and is representative of what actually takes place in the development of any solution whether the solution ultimately is hypothesis or law. The qualitative and quantitative aspects are both present in this process, and have to be if it is actually carried out.

Every quality has a quantitative element, and every quantity has a qualitative element. But each is unique, or individually characteristic. Quality has a psychological foundation and is variable; quantity has a psychological foundation and is relatively stable. We have a technique, analyzed and meticulous for the latter, but we have none such for the former.

Facts, invariably products of experience, consequently share in both the qualitative and quantitative. Every fact is a dual entity in its characteristics and in its existence. Unless this is understood, no fact can be adequately scrutinized.

The implications in this discussion are plain to see: A qualitative technique which is something more than just what

something else is not, is beginning to take shape. Which is to say that although quality is a variable which eludes mathematical measurement, it should be capable of a technique which is as accurate a gauge of its meaning and limitation as is the scientific method of the quantitative. The object of this study is to develop such a technique.

CHAPTER III

THE QUANTITATIVE EXPANDED

Its Significance in Teaching

The Quantitative Redefined. - In order that the quantitative may be better understood in relation to the specific problem under discussion, this chapter is devoted to its exposition in terms of a hypothetical teaching situation. It may be well to reiterate that the essence of scientific method is mathematical measurement, and that its other characteristics, objectivity, verifiability, and impersonalization are by-products of this fundamental. No attempt will be made to indicate anything except the quantitative aspects of a situation.

Standard Tests in Relation to the Quantitative. - When, in a given class, all students are subjected to Standard Tests in English, arithmetic, reading, and intelligence, the instructor has utilized a number of the available objective methods for placing the student. The results of such tests are mathematically computable. Their structure is as objective as de-personalization, constant retesting and numerous cases can make it.

The Accumulative Record in Relation to the Quantitative. - To increase the effectiveness of any teaching situation a knowledge of student activity affiliations, academic standings, living conditions, and certain other personal background information can be had in terms of the scientific method. This effectiveness is a qualitative consideration and shall be considered in a later chapter, but the compilation of this data can be carried on under conditions set forth in the scientific method. Student academic standings as standings are mathematically computable. Student activity affiliations can be mathematically tabulated, while living conditions also have objectively measurable aspects.

Textbooks and Informal Objective Tests and the Quantitative. - The use of specific textbooks makes possible the use of objective tests based on them and the mathematically measurable features of these tests have already been indicated. Whenever textbooks are employed, specific objectives can be indicated, and the attainment of those objectives tested, measured, recorded. The text itself constitutes the field and its limitation involves the control.

The traditional division of any subject matter that is to be taught into preparation that includes establishing the setting and assigning; presentation which includes procedure; application, or testing accomplishment in assimilation and generalization, remains to be interpreted in terms of scientific measurement.

Preparation, Presentation and the Quantitative. - In establishing the setting, a teacher must be cognizant of past performance, course objectives, and time limitations. In so far as past performance can be measured by chapters covered and objective tests, just to that extent can it be scientific. Assigning, too, has its quantitative features - amount to be covered and time at disposal. Presentation which bases itself on scientific finding in respect to eye movement, physical condition in the room, the laws of learning, and biological data, is scientific.

Application and the Quantitative. - Some clue as to how application is measurable in a quantitative sense has already been suggested. When objective tests on the subject matter covered can be administered under conditions necessary for scientific procedure, then application will be quantitatively determined. Furthermore, all application which can be observed and verified is possible grist for the scientific mill.

It can be easily seen, therefore, that there is no single part of a teaching situation which does not lend itself to some extent to scientific interpretation. The contention is that when all this is done, no subject matter can be said to be learned or taught. The next chapter will consider that apsect of a teaching situation which does not lend itself to quantitative interpretation.

CHAPTER IV

THE QUALITATIVE EXPANDED

Its Significance in Teaching

The Qualitative Redefined. - After touching all the phases of a teaching situation and finding each of them responsive in some degree to the scientific method, to review them in terms of different technique may seem a trifle superfluous. As has been said, however, the sum total of the maximum efforts of the quantitative does not completely explain a teaching situation. It is in recognition of this fact that this chapter is written. The approach is identical with the preceding chapter, no attempt is made to do other than indicate the specific use of the qualitative. In order to re-focus the attention qualitative is defined once more as that whose essence is evaluating and distinguishing.

Qualitative Does Not Destroy Effectiveness of Quantitative Standard Tests. - Let it be noted at this point that the recognition of qualitative implications in a teaching situation does not in any way influence the existence or functioning per

se of the quantitative implications. In administering various Standard Tests for the purpose of placement the qualitative enters in a number of ways. For example, one day the subjects come into a testing room which is perfectly set, scientifically speaking, and the test is administered in accordance with the printed directions accompanying it. While the subjects are working, the examiner does nothing except keep accurate account of the time and proctor to prevent cheating.

Another day the subjects enter the testing room, are greeted in an informal way by one of the examiners, and are here and there requested to assist in the distribution of the tests not to the exclusion of the examiners, who likewise aid in the matter of distribution. Preceding the test, some one of the examiners explains in an informal manner the purpose and function of the test in terms of the subjects' careers and personal needs, and indicates in a brief way the success and failure of these tests in doing what they set out to do. All groups of subjects present some one or all of the following characteristics - experience in writing, Standard Tests resulting in an attitude of fear, ridicule or indifference, no experience resulting in eagerness, dread, or quandary, and vicarious experiences resulting in a mixture of the results of direct experience and no experience. All these characteristics involve evaluation and are therefore qualitative. A specific illustration

of what is meant in this connection is manifest in the following: A group of 300 subjects was being tested by a Standard Arithmetic test. Over half these subjects had had experience in Standard Tests. A group of fifty was sitting near each other and something in the test struck them as funny. There was no particular outward manifestation of this but the tabulated results showed them so low in this test that they were recommended to hospital classes at no small expense to them and the school. After a lesson or two in the hospital classes the instructor, who had been employed for the semester, discovered that the group was not in any way deficient in this subject. A qualitative attitude had influenced a quantitative result which could have been avoided by a qualitative technique in the administration of the test. If, during the test, the examiners move through the room, in no way specifically assisting the subjects, but in every way portraying sympathetic awareness and tolerance, the test loses none of its scientific accuracy, and the attitudes of the subjects, stabilized through adequate explanation and understanding supervision, become more nearly a constant, not a variable.

To complete the picture of the qualitative in a teaching situation, its direct relation to preparation, presentation, and application must be indicated.

Preparation in Relation to the Qualitative. - In getting

a group "set" for a certain subject, or establishing a "feel", no formal textbook, required notes, or direct memorization can be used exclusively without violating some one of the laws of learning. This fact eliminates the possibility of complete objectivity. Depending upon the academic level, "feel", which indicates student attitude toward a subject, is established by means of conferences, questionnaires, projects. There are, of course, certain aspects of a questionnaire which are objective and whose objectivity could be checked in another way, but a questionnaire used to bring out an attitude must be both quantitative and qualitative. An example of one such questionnaire in English literature on the college level is given below by way of illustration.

Questionnaire

1. When you think the word literature, what occurs to your mind first?
2. What form of literary expression do you enjoy most?
3. To whom or to what do you attribute your taste in literature?
4. What is responsible for your dislike of certain forms of literature?
5. List six books you have read in the last year that were not required.
6. Can style in writing be acquired?
7. What should you most enjoy doing in this course?

These conferences and questionnaires made the students aware in a systematic way of the qualitative nature of their attitudes and made the instructor aware of qualitative differences in respect to background, prejudices, social consciousness, and initiative.

Projects which capitalize backgrounds (before the student reaches school or on a particular level in school) in such a way that the students feel their worth in terms of present and future needs provide opportunity for individual and collective growth. Growth is the progressive realization of the inter-relation of environment and individual capacity to individual desires in the sum total of experience. This fact of envisaging the whole from the pupil's angle and from the point of view of the objectiveness of the course, is a distinctly qualitative procedure. Furthermore, unless tolerance is an active ingredient in the process, it could never take place, and tolerance is likewise a qualitative factor. Tolerance is the willingness to entertain in an understanding way the legitimacy of another's opinion.

Presentation in Relation to the Qualitative. - The qualitative features of general procedure are those indicated as characteristic of the preparation. The additional feature of accumulating a background must be explained. The student is constantly adding to his background throughout his life. This

is not limited to strictly academic accumulation, but refers to the total sphere of his activities. Anything is background when tomorrow becomes today. The academic side of the student's life contains the common element which for the space of his school years serves as a synthesizer. But it is the stuff of which the unidentical elements are made that contains the hope and challenge for the development of individuality. The so-called extra curricular affiliations, living conditions, and social life of the student are vital constituents of his accumulating background, which must become part of the accumulating background of the instructor in order that they may be utilized in the initiating and developing of class activities leading to the acquisition of style and the establishing a sense of value and awareness of need. Likewise the guidance of accumulating background in terms of the whole life span of the student is perforce a qualitative process. A knowledge of accumulating background is gained through the use of questionnaires and conferences for the most part. The qualitative implications of these have already been indicated. The presence in any degree of intolerance in respect to this fact is a sure way to nip it in the bud.

Specific mention of classroom conduct should be made before procedure in terms of the qualitative is completely interpreted. Informality based on mutual confidence, mutual learning,

mutual understanding is the keynote, a qualitative list for the most part and possessing all the aforementioned characteristics.

Application in Relation to the Qualitative. - The qualitative distinction in application comes through the voluntary contributions from students and through the qualitative variation in the non-voluntary contributions. A further test is in the degree and quality of the carry-over. This latter can in part be ascertained through use of the quantitative method.

Wherever a teaching situation is, there also are problems to be met, and these problems are soluable only through a teacher recognizing those parts which are quantitative and those which are qualitative and using a technique based on a synthesis of the two.

CHAPTER V

THE APPRECIATION OF ENGLISH LITERATURE

An Application as Experimentally Determined

The Term Experiment Justified. - Before beginning the subject matter proper of this chapter, an explanation of the term experiment must be made. A great deal of confusion has arisen through the promiscuous use of the word. A scientist would throw out of court any experiment which could not be controlled throughout in such a manner that another scientist could pursue the same experiment with the identical results. In short, experiment in the eyes of a scientist is a quantitative procedure or else it is not a legitimate experiment. In the original sense experiment meant a trial for the sake of proving or disproving something doubtful. As has been stated in the preceding chapters, qualitative elements are not controllable in the scientific sense, and yet we do experiment with them in order to prove or disprove something doubtful. This chapter contains the report of an experiment which has quantitative features and qualitative ones. Whenever the quantitative features appear, every attempt is made to have them conform to

the standard formula for scientific procedure - whenever qualitative features occur they are treated as such.

In order that the subject matter of this chapter be thoroughly understood further elaboration of this point may prove helpful. The discussion found in Chapter II, pages twelve - fourteen, concerning fact is pertinent and extremely important in an understanding of the manner in which experiment is used in this chapter. Just as there are facts other than scientific facts, so there is experiment other than quantitative. Facts derived by inference need not be any less facts than those derived by measurement. So far as experiment is concerned, if we limit it to scientific, we eliminate the possibility of entertaining the idea of experiment with anything whose essence is qualitative. For example in the case of delinquency cites on pages ten - eleven of Chapter II the lawyer certainly experiments with his qualitative data as well as his quantitative, otherwise the case would remain unsolved. It is with these statements as its premise that this chapter is written.

Appreciation in Teaching. - To speak of teaching "appreciation" seems in itself a violation of definition. It is like saying that one can teach another to taste. Teaching destroys the thing itself. If this is true, it is queer that the word "appreciation" finds its way as a prefix to so many courses in the curricula of every type of school from the pre-school to the college. Is this indicative of a realization of a lack or a felt need, and does it represent a groping in the dark to meet this need? On one hand one hears the cant of the Litterateur, "Youth has lost the desire to enjoy good literature for its own sake." On the other hand one hears, "Expose them to the best; give it to them and they must see its value." The idea expressed in still another way is, "They must learn to like it, whether they want to or not." Accordingly several generations of youth have had prescribed doses donated at specific intervals in the span of their school life, - with here and there a rent in the cloak of monotony in the form of a set debate, a stereotyped play, an assigned composition.

Definition of Appreciation. - Appreciation of anything constitutes the ability to evaluate it. Clearly, there are two elements in this definition: humanness on the ability side; im-

partiality and intellectual integrity on the side of evaluation. By including humanness, provision is made for the existence of individual differences in training and native capacity, which is to say that enjoyment of anything is tempered by these two factors. Evaluation involves careful appraisal for the purpose of ascertaining the worth of anything. The process could not take place except through comparative experience. That is, anything has value in relation to something else not necessarily in the same category. When one limits appreciation to a special subject, then one evaluates it in reference to the various branches of that subject. For example, in appreciating literature one experiences its various forms and then appraises them in relation to individual enjoyment, group enjoyment, authority, which in turn is the result of long time enjoyment through direct and vicarious experience.

General and Specific Aims of the Experiment. - The general aim of the experiment was to develop an appreciation for English Literature by means of a course of collegiate level. The specific aim was to test two methods of teaching which the writer has called the quantitative and quantitative-qualitative. The theory underlying these two forms has already been explained. Their relative positions as to strength and weakness in an actual teaching situation should afford a safe basis for confirming the technique of

the quantitative and developing a technique for the qualitative.

Setting of the Experiment. - The experiment was carried out in a teacher training institution over a period of three years. Specifically, the years 1927 to 1930. The students consisted of freshmen, juniors, and seniors. Each section of the course had an enrollment of twenty-five to thirty-five students. There were one freshmen class, two junior classes, and a class composed of juniors and seniors each year. The course for each class lasted twenty weeks of three periods each.

All entering students were subjected to certain standard tests. The results of these tests were available for the total group of four hundred women students involved in the experiment prior to the beginning of the course. The tests used were the Monroe Reading, Columbia English and Otis Intelligence. The following summary table gives a picture of these results.

(For Table I, see following page)

TABLE I

THE TOTAL GROUP IN TERMS OF STANDARD TEST RESULTS

Section	Range	Monroe Reading	Columbia English	Otis Intelligence
	Q^3	139.5	146.3	59.6
	Q^2	127.5	129.2	53.6
1	Q^1	111.6	113.2	48.2
	R^1	97.5	96.8	42.9
	Norms			
	8th grade	80		
	12th grade	118		
	Freshmen		167	
	Q^1		146	
11	D^1		125	
	College			53

Section 1 of the latter indicates the results in the three tests for the total group examined. Section 11 shows the student norms for the above tests. For example, the adult norm for Monroe Reading is 116 which lies between the first and second quartile of the scores made by the group examined in this instance.

In order to further ascertain the characteristics of the group, the following questionnaire was administered. The times at which the questionnaire was submitted and filled out varied with the different classes. In two instances the whole class answered it during class time, in one class it was done through conferences, in still other classes it was taken home and completed outside the classroom.

QUESTIONNAIRE

Accumulative Record: Personal, Academic, Social

Name Class Course
Where born?

Home address

Father's occupation
Mother's "

Number in family
Church member Check (v) for yours; cross (x) for father, (o) for mother

EDUCATION:

Elementary Education: Where?
District School
Consolidated School
Village School
City System

Secondary Education:
Consolidated
Village
City System

College:
Business
Technical
Normal

EXTRA CURRICULAR:

High School Stu. Gov. Sorority Publication Y.W.
Normal
Athletics, Dra. Clubs

AMUSEMENTS:

High School Travel Radio Movies Theatre Dancing
College (where) (where)
Concerts

SELF HELP: Kind of Work? H.S. Normal

During School
During Vacation

The following tables (II - IV) indicate the results for the questionnaire in terms of the whole group concerned in the experiment.

(Tables II, III, IV follow)

TABLE II

THE EDUCATIONAL AND CULTURAL BACKGROUNDS OF

400 WOMEN STUDENTS AND THEIR PARENTS

Figures on 400 students	District	Second-ary	College	Travel	Radio	Dancing	Grange	Church
Father	255	Vill.89 City 10	48	50	275	20	118	250
Mother	91	Vill.250 City 24	22	78	275	30	118	300
Student	300	Vill250 City 50	400	133 Senior Washing ton trip	350	250		300

Explanatory Notes:

1. Educational figures represent the upper level in education, 255 fathers had a district school education only.

2. Travel is called travel when it extends out of the state.

3. Church figures mean church membership.

TABLE III

THE EDUCATIONAL BACKGROUNDS OF THE PARENTS OF

400 WOMEN STUDENTS

400 students	Skilled	Unskilled	Merchants	Executives	Professional	Farmers
Father	70	55	36	25	8	178
Mother	7	3	9	1	9	1

Skilled: Railroad employees, contractors, bank employees, salesmen, workmen, mechanics, printers

Unskilled: Laborers, janitors, clerks

TABLE IV

SUMMARY DATA OF THE SELF HELP, YEARLY SCHOOL COST AND

EXTRA CURRICULAR ACTIVITIES OF 400 WOMEN STUDENTS

Self Help	No.	Extra Curricular Activities	No.	Cost Estimate per Yr.	
Working for board and room	50	Sorority members	134	Minimum	$ 40
Cooking own means	100	Student Government; active membership	80	Maximum	1200
Clerking or other work	50	Athletics	80	Median	500
		Clubs	150		
Total	200				

Analysis of Student. - From these tables it can be seen that the students have had almost no opportunity for cultural contacts - out of a class of thirty-five, not more than three could have seen professional, legitimate drama; not more than ten would have been out of the State, or even to the large cities of the state.

It mattered not to which class the student belonged, four-fifths harbored a feeling of a need to meet, assimilate, and return an instructor's viewpoint in order to get through any single course.[1] They viewed with consternation the possibility of no textbook, no class notebook, no dogmatic routine in the way of reading lists, memory passages, outlines and word lists. What would they ever do when it came time for examination? "There's a catch in it somewhere" was the attitude. In the second place, two-thirds of the students felt a definite resentment against the subject in general, and in particular with respect to poetry, the drama, and the essay. Any mention of the word "classical" brought a positive physical and mental slump. In the third place, three-fourths of the students when presented with the opportunity of "letting go" in writing could do nothing, owing, it seemed, to two factors: (1) in the case of those just out of high school, - to over editing on the part

[1] See Questionnaire, page 38.

of teachers, in order that a standard be met within a specific limit of time; (2) in the instance of seniors and juniors, to fact number one plus the practically exclusive use of objective tests during the years of their professional training.

An astounding proportion of these young people does not attend teacher-training institutions because of any love for teaching, nor do they stay after their first year because of any love for teaching; but an encouraging percentage of them developed an interest in the practice of it when let alone.

These tables indicate that between thirty and thirty-five out of every hundred of the girls belong to local sororities and of that proportion one-half live in sorority houses. Two out of ten students engage in some voluntary form of athletics, while between five and seven out of every fifteen students work for board or room, or both, and have little, if any leisure time. For each of these groups mentioned, the range of activities is strictly characteristic of the group and not overlapping. The interest of the students not included in these groups consists of wishful aspiration toward the other group, complete inertia, or exclusive academic preparation. The common social experiences of all these groups are (1) cinema, (2) the Lyceum course, and (3) classes.

It so happened that the writer started with junior and

senior students, and was partially cognizant of the situation, social and academic, as sketched above. In outlining the results it will be necessary to suggest definite periods of time, but these are not to be interpreted as dogmatic.

Section I

The qualitative and quantitative can be seen interlacing the total experiment in Section I, while Section II represents the quantitative only.

Preparation - Establishing the "Feel". - Two or three class periods were spent with the expressed aim of ascertaining inhibitions in respect to the subject and special phases of it. After conviction had gripped the group of its right to set the approach and to regulate the paths of inquiry, there was comparatively little difficulty in securing expressions of opinion. The breaking down of these inhibitions and suspicions took the form of a recognition of the essential humanness of all forms of literature based upon universal desire and need of every individual to express himself in some way, and the variety of mediums chosen for this "expressing." This recognition came through an examination of themselves and their friends; and with it came a realization of writing as a perfectly natural manner for certain individuals to sense and to establish their parts in society. Likewise the

realization developed that this expression of a necessity is peculiarly characteristic of the age in which it is written, and finally, that the endurance of these contributions is dependent on their essential humanness. Supplementing this recognition came opportunities for oral and written discussions of types of literature liked and disliked. Emphasis was placed on the fact that anything written was literature and that individual tastes in respect to any of its manifestations were not only legitimate but natural, and that the only requirement was an intelligent justification of a particular like or dislike in order to de-personalize or objectify it enough to convey its worth to another.

The length of time that it took to have each student get this attitude varied, and in some cases extended throughout the twenty weeks. In each instance, however, the first two weeks were definitely devoted to it. Individual conferences completed the inoculation, so that each student sensed his rights.

The importance of these conferences in securing total knowledge of the students can hardly be overestimated. A word as to their organization and administration is essential to an understanding of the final results.

In the beginning of the course, specifically within the first ten days, after the wall of defense had been broken and voluntary requests for individual attention had begun to come, the

instructor outlined a possible program for individual conferences. The conferences were in no sense of the word academic check-ups, but simply informal meetings of student and instructor in which anything at all might be discussed. This literally was the case: academic problems, social problems, or a mutual exchange of opinions on a variety of subjects results.

Each student was scheduled for a conference on a ten-minute ratio with an appointed frequency of once in four weeks, but with provision for more if the need were present. Attendance was voluntary, the only dogmatism being that if the student intended coming he should come at the time scheduled. In the three years over which this experiment spread, there were but six conferences cut.

The instructor kept a card index of all the students with a record of each student's academic program, organization membership, and whatever personal information of accumulative value that might result from the conference. This latter information was never written down in the presence of the student. Practice revealed that complete inhibition invariably followed such procedure. Two hours a day were given over by the instructor to these conferences.

Importance of Conferences. - Conferences have, of course, been used since time immemorial, but their inadequacy has been, that

on the college level they were too frequently conducted by some one other than the instructor and were practically only academic in character; and on the secondary level conferences were held only in the case of the problem child or the superior child.

The results from these conferences can be tabulated as follows:

1. Better understanding of course objectives
2. Greater poise in classroom
3. Originality in thinking and response
4. Social adjustment to all aspects of normal school life, academic, living, organizations
5. Increased professional consciousness
6. Biographical information as indicated in preceding tables

Presentation. - Following these two weeks came an investigation (lasting perhaps six weeks) of the subject matter of literature with the individual student's present likes or dislikes once again as a starting point. The ultimate aim was a realization of the all-inclusiveness of literary subjects, the best work being a product of observations and reflections of writers on their immediate environs. Accompanying this several stories and novels based on the legends surrounding the North Country (i.e., the northern part of the State of New York) were mentioned by the

instructor, and gradually student contributions of folk legends of rare beauty and wit were volunteered. Stories that came out of lumber camps, mill towns, isolated farming districts, which the children had learned to forget or suppress in shame for the sake of a literature far removed from their horizons, came forth shining in simplicity and vividness. Several periods were devoted to relating in oral and written form, the results of delving for these stories. The local papers were interested and published several. Then later the fact that an author had come up from New York City and had gathered a few such stories to put into a very popular collection of short stories quickened the interest. The part of the instructor in this process was to establish connections with recognized masterpieces for the purpose of illustrating the similarities. In this way there evolved in the minds of the students a feeling of friendliness and familiarity with the old, born of subject identity between the new and the old. Through a compilation of the findings of each student, an initial survey of the subject matter of the commonest forms of literature was made. The transition from subject matter to mediums for expression was a natural one and suggested by the students through their efforts to "get across" the folk lore of their own localities.

The instructor's activities at this juncture divided themselves in three directions. First, to give through the medium of choice selections a feeling for the relation of subject matter to

form. Secondly, to initiate the beginnings of a written style through (a) a taste for words in respect to meanings, and sound, (b) the need of letting oneself go and putting oneself back of any writing. This latter (b) was done through a study of the "living sides" of a number of great poets, dramatists, essayists, modern and classical, with the idea of illustrating the value of identifying one's personality with whatever one wrote. Personality was considered the natural possession of every period. Third, to encourage any initiative which expressed creative awakenings from the critical viewpoint of a reader or the construction angle of a writer. At the end of this period, which approximated two months, the instructor had in her possession truly lovely bits of literature, poems, essays, short stories, criticisms, and an unrecordable mass of volunteer remarks showing a breadth and variety of reading that was astounding.

Devices are odious beyond compare; the same one should never be repeated as such. They must of necessity be suggestive. But it may be of practical worth to cite one or two ways in which style for example was developed. On entering the classroom (which it might be well to add was informal, the pupils sitting where they chose, and the instructor often sitting with them) the instructor would place at random on the blackboard a list of twenty-five or so words, comprising nouns, adjectives, adverbs, pronouns, and the students jotted down ideas that these words prompted, then

developed any one of these in any way they chose. Again a series of phrases or sentences depicting a situation might be placed on the board, and this situation developed in any form the student saw fit. For example, one such was: Dark sombre eyes; a dessert (desert); a camel. Or again twenty-five or more words were placed on the board and the direction given to use any five of them in four lines expressing a rainy day. In the beginning with this latter type of work, the idea given was a simultaneous experience, i.e., they were not asked to write about a rainy day when it was perfectly glorious outside. In the later stages of style development, the use of imagery was encouraged and succeeded to the extent of adequately meeting a request from the principal for Christmas poems in May. The theory underlying the whole process was that recognition of style came through experiencing it. In addition, each student used to place words of special poignancy in a sort of personal dictionary, which assisted in vocabulary building. The instructor used from time to time to suggest words and to commend the habit.

The last leg of the course was suggested by the students and constituted the writing of a five-act play by all the members of the class, based on the material collected in respect to the legends of the locality. The class met as a whole twice a week. The plots (main and sub), the characters, and simultaneously the

background had to be developed but the various acts were worked out by small groups of from three to five students meeting during a third class period weekly. All the students were, however, included in some group and assigned from choice to some special angle of the task by the groupd head. As has been said, the class met three times a week by requirement, but there were notices all over the bulletin board calling the various groups together for one thing or another, many, many times outside the regular class meeting. These meetings in every instance were called by the students themselves. In the construction of this play there was a thoroughness in the study of dramatic construction through the reading of old and new dramas that would do credit to an English specialist. Furthermore, there was an investigation into the related forms of literature, poetry, the novel, and short story in order to gain an insight into proper proportions that was remarkably profitable.

The instructor wrote the conclusion, withholding the same until the very end, but obviously working along with the students, in order to reveal methods of attack and experience simultaneous stimulation. During this play construction period, one recitation a week was devoted to acquainting the students with human bits concerning modern actors, authors and books, offering the student freedom of access to the instructor's personal library. They were also given some bases for recognizing the worthwhile in current

literature.[2] Through all of this, were strong intimations of the connection in a human way with the great classicists. For example, what is the relation between the modern "ten best sellers" idea with the criterion of Samuel Johnson "the test of a book is its popularity?"

The method used in the freshman class in literature was essentially the same, except that the point of attack was through a critical evaluation of the cinema, and the final unit was individual one-act plays based on dramatic incidents found in the newspapers. The cinema, as has been indicated, was a common experience to all students. Through observation, magazines, and leisure time, conversations, likes and dislikes in respect to performance and performers, were pronounced. With the natural interest as a basis there was no lack of enthusiasm in pursuing a research into the whys and whereforesof the present conflict in taste. A thorough overhauling of the making of actors, scenarios, and pictures resulted. This led with equal ease into an investigation of the related legitimate drama and its literature, the adapting of novels, and thence through all the realm of written expression.

Section I in Terms of the Quantitative and Qualitative. - Whenever one admits unmeasurable factors in the mathematical sense

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[2] Louise Dudley, The Study of Literature, pp. 322-324. Boston: Houghton Mifflin and Company, 1928.

to the body of one's conclusions in respect to an experiment, those conclusions are not scientific. A list of these in reference to the preceding section is given below.

1. Information on backgrounds which depended upon the "subject's opinion" rather than objective data.

2. Introspection, retrospection and inspection in respect to literary likes and dislikes, thus enabling the student to gain a perspective of himself and the course, amounting to envisaging the whole

3. Importance attached to instructor attitude as influencing accomplishment of course objectives: tolerance a requisite

4. The anticipation of attitudes and their results as governing the development of the course. This required initiative and awareness on the part of instructor and students.

Following is the list of the quantitative features of this section of the experiment:

1. The use of objective tests in placement (mathematically measurable)

2. The use of standard criteria for the measurement of good literature (expert and objective)

3. Tabulating in respect to background, which could be objectively obtained

4. The periodic checkups

Application - Carryover. - The problem of this study is to indicate the points at which the quantitative ceases and the qualitative enters in teaching and to suggest a technique for the latter. The two methods have been included in this experiment. Section II illustrates the result of the use of the quantiative alone, Section I the use of the quantiative-qualitative. In all fairness to the students it ought to be said that the people of the community wanted the play actually staged in the local theatre, but it was too near the end of the school year to do it and do it well. Furthermore, it should be stated that at least one of the one-act plays was staged successfully. The most gratifying results came from students who had not previously discovered themselves, those who had been considered dull, light-headed, and shallow. In seventy-five per cent of the cases an increase of so-called extra curricular activities tended to broaden the outlook of the student in such a way as to increase this interest specifically and generally; two-thirds of the students engaged in self-help from necessity, showed by their work that a lighter schedule had benefited them.

Section II

The Use of the Quantitative Alone. - Paralleling this course, another class in the appreciation of English literature was started, and the technique used was straight lectures, pre-

scribed reading lists, a survey text, a notebook to be handed in, and objective tests only. In short, only that subject matter which could be quantitatively measured was utilized. This was a freshman class comparable to the freshman class in the other section of the application and rated by the same standard tests. This year (1930-1931) after two years had elapsed, both classes were tested for the following factors: Retention, and carry-over as represented by books read, magazine habits and writing style. This was checked in terms of library withdrawals based on number and kind of books and written book reviews. The books read by the quantitative-qualitative group showed widened horizons, variety of type and maturity of choice; the level of the quantitative group was comparable to its entering reading level. Style in the quantitative group was practically non-existent, whereas in the quantitative-qualitative group style was apparent without exception.

The following lists were compiled from all the individual lists of books submitted by the students covering a period of three months' summer reading. The magazine lists are those read regularly by the students in the various sections. Most students read two monthly and one weekly magazine.

Books and Magazines of Section I and Section II

Two Years After the Course

Section I	Section II
Magazines	**Magazines**
Good Housekeeping	Good Housekeeping
Saturday Evening Post	McCalls
Reader's Digest	Photoplay - Screenland
Cosmopolitan	Cosmopolitan
Harper's	College Humor
Literary Digest	Ladies Home Journal
Woman's World	Love Story
Atlantic Monthly	True Stories
Ladies Home Journal	
New York State Teachers' Magazine	
Books	**Books**
The Woman of Andros	We
The Bridge of San Luis Rey	At the Foot of the Rainbow
The Cathedral	Heidi
The Royal Road to Romance	Gay Neck
My antonio	Valley of Giants
Wild Geese	Hans Brinker
Strange Interlude	Exploits of Elaine
Last of Nightingales	
The Fool	
Death Comes to the Archbishop	
All Quiet on the Western Front	
Story of Philosophy	
Transition	

Conclusions. - Considering the two sections of the experiment, one finds that it is possible to have the essence of teaching be quantitative. Which is to say that when the quantitative features of a certain type of teaching are removed, it ceases to be

teaching. This is seen specifically illustrated by Section II. On the other hand, one finds that both the student and the product are lacking as measured by both quantitative and qualitative criteria through the exclusive use of the quantitative. A study of any of the many objectives of education, the Seven Cardinal Principles for example, reveals the use of qualitative terms such as value and worth. Section I of the experiment demonstrates the use of the quantitative and qualitative in such a manner that the removal of either would destroy its essence as teaching. In other words, attitude, appreciation, enrichment need qualitative-quantitative teaching.

The next chapter will outline a suggested technique for the qualitative which may be used together with the quantitative to insure a positive correlation between academic results and educational objectives.

CHAPTER VI

A - E - T - I - A : CONCLUSIONS

Perhaps it is being American in the worst sense to use a slogan in concluding what purports to be a serious attempt to meet a critical need. On the other hand, slogans are psychologically correct; properly conceived, their sticking value is assured. The title of this chapter is, therefore, explained if not justified.

The problem posed at the beginning was, to indicate the points in a teaching situation at which the quantitative ceases and the qualitative enters and to suggest a technique for the latter. By means of critical analysis, empirical demonstration and comparison, the relative positions of the quantitative and qualitative in respect to a teaching situation have been shown.

It must be remembered that the qualitative technique in no way displaces the quantitative, but it complements it in a teaching situation. In fact, it is found necessary in a complete explanation of any social situation.

A-E-T-I-A in Relation to Thorndike. - A-E-T-I-A signifies accumulating background, envisaging the whole, tolerance, initiative, and awareness. A comparison of the implication of these with the implications of a typical formula for the quantitative is now in order. There is no partiality meant in selecting the Thorndike M - O - V - I - E. It is well known and seems to embody the specifications of all the formulae preceding and succeeding it. The chief criticism lodged against it, that the last two items are superfluous, does not throw it out of court on the grounds of omitting that which all other formulas contain.

In order to measure mathematically any subject matter, it must be isolated and must be treated in relation to what it is at a specified time and under specified conditions. In taking cognizance of an accumulating background, the possibility of isolation and time limitation is removed. There are aspects of an accumulating background which are quantitative, but bringing the total moving phenomenon to focus on a situation, which itself is constantly shifting, is not scientific. Yet failure to take cognizance of this accumulating background, both as a fact in the life of the student, and as a need in the technique of the teacher, stunts individual growth, makes learning a forced extrinsic rather than a voluntary intrinsic process, and makes a liability out of what should be an asset. Growth is the progressive realization of

the interrelation of environment and individual capacity to individual desires in the sum total of experience.

Science in dealing with objective matter alone excludes the entrance of anything other than experimental data from its field. To anticipate the results of any problem undergoing experimental, and therefore objective, treatment, is to violate the definition and meanings of the terms. That is, for a scientist to envisage the whole and modify his techniques accordingly would be tantamount to declaring himself unscientific. But for a teacher to fail to envisage its relation to the present and future needs of the student's life as a whole is to stultify learning and growth, not to mention definitely curtailing any carry-over.

In demanding verifiable results, quantitative experts must perforce be intolerant of all matter which is not recurring, controllable, and mathematically measurable. The attitude of the scientist must necessarily be skeptical in respect to problems presenting themselves to his consciousness. The teacher on the other hand who faces problems skeptically or who is intolerant of intangible factors loses that hold of informality based on mutual confidence which is the keynote of classroom procedure. Unless the teacher manifests tolerance in respect to the qualitative implications of the quantitative facts concerning his students and in respect to those qualitative facts which cannot be quantitatively

determined, such as tastes, dispositions, attitudes, and morals, his chances of encouraging and actualizing individual and group growth are nihil.

Initiative as an item in a qualitative formula means utilizing concomitant learnings and concurring events as suggestions for procedure. Science, through conscientious eliminations of happenings without the definite field of its investigation censures all initiative which trespasses against this demand. If by impartiality is meant impersonalization and a reiteration of objectivity, then the conflict which arises between it and the qualitative is apparent enough. If, on the other hand, it is meant to signify an attitude, then it is itself a qualitative mathematically unmeasurable characteristic. Again if being impartial implies the disregard of all but specific factors playing on a particular bit of matter, then its conflict with initiative is apparent.

Awareness is an embracing term; total awareness, while having certain quantitative aspects, physical conditions, mental conditions, specified objectives, is distinctly qualitative in considering and being sensitive to all value manifestation and growth indication. Unless a teacher is aware in this sense, a devitalized learning situation arises inevitably, for individual satisfaction, which is the test of the extent of learning, is not given opportunity to crystallize. If by "expert" is meant extreme

specialization to the highest degree of skill in one field, then expertness could certainly not be a criterion for the qualitative, which demands sensitiveness on both the horizontal and the vertical planes.[1] As in the case of the other elements in the qualitative technique, there are quantitative features involved, but the use of these alone without an awareness of the qualitative fails to give an adequate description of the needs of a teaching situation.

The Points at Which the Quantitative Ceases and the Qualitative Enters. - The points at which the quantitative ceases and the qualitative enters in a teaching situation are those which elude the quantitative technique and yet without which the situation remains incompletely interpreted. In establishing a "feel" for any subject, which is part of preparation, the utilization of projects, accumulating backgrounds, a certain type of questionnaire, and conferences excludes the possibility of mathematical measurement as a complete technique. Any procedure which has in it a process whose results cannot be scientifically recorded is not a quantitative procedure. Any teaching situation in which the teacher fails to take cognizance of the accumulating backgrounds of the student or fails to envisage the work as a whole in terms of course objectives, teacher limitations, and students' desires cannot be termed a learning situation. Yet the inclusion of these

[1] Peter Sandiford, Educational Psychology, p. 150. New York: Longman, Green Company, 1928.

factors makes it impossible to interpret the whole in quantitative terms alone. Application, which is testing accomplishment in assimilation and generalization, likewise fails of complete interpretation by the quantitative. If the student is prevented from generalizing without sufficient objective data at his command, his initiative and exploratory impulses are curtailed in such a way as to choke voluntary contributions before they are born and violate one of the fundamental laws of learning which states that satisfaction, not annoyance, should accompany the process. This latter fact, of course, governs the extent and degree of assimilation. Yet if generalization does take place anywhere along the line, its results cannot be mathematically tabulated.

Education strove for many years to become worthy of being admitted into the realm of science. Through adapting certain of the materials of its content to the criteria of the scientific (quantitative) method, education succeeded in gaining admittance. Its energies since have been devoted to increasing the extent of content that might be treated by the scientific method. The failure of education to do this satisfactorily in the eyes of scientists, educators, and students produces a quandary that calls for immediate solution. Through an analysis of method in general, and specifically in relation to (1) exact definitions of the quantitative and qualitative, (2) the Thorndike formula for the quantitative

and the Dewey analysis of the thought process, (3) inference, (4) fact, (5) situation, the writer of this study has sought to indicate the need of recognizing that both the quantitative and the qualitative are required in a teaching situation. An example, The Appreciation of English Literature, was chosen to form the basis for the suggested technique for the qualitative and as a concrete illustration of the quantitative-qualitative features of an actual teaching situation.

A - E - T - I - A arose as a result of analyses of numerous teaching situations over a period of years. It is constructed specifically as the technique for teaching to supplement the scientific technique which has already been formulated. In many instances it will be found, even as has the scientific technique, applicable to a variety of situations involving both the teacher and the learner, the object and the subject. The point is that no teacher can completely teach anything without using both the quantitative and the qualitative. The fact that the qualitative has been a matter of chance, individual preference, and experience has hampered its systematic development and caused the quantitative already in specific form to be used in place of it. The consistent use of the quantitative and the disorganized, sporadic use of the qualitative has given rise to a situation unsatisfactory to all concerned, - teachers, students, scientists, philosophers, psycholo-

gists.

Growth, which is the progressive realization of the interrelation of environment and individual capacity to individual desires in the sum total of experience, is possible only by a systematic use of both the qualitative and the quantitative. The need for a systematic technique for the former provoked this study and the success of its application in a variety of fields has furnished the impetus for its writing.

BIBLIOGRAPHY *

Books

Ayres, Clarence. Science, the False Messiah. New York: Bobbs Merrill Company, 1927. Pp. 295.

Barry, Frederick. Scientific Habit of Thought. New York: Columbia University Press, 1927. Pp. xiii + 358.

Bigelow, Maurice A. Sex Education. New York: Macmillan Company, 1916. Pp. 251.

Bode, B. Conflicting Psychologies of Learning. Boston: Heath and Company, 1929. Pp. 305.

Bogoslovosky, B. B. Technique of Controversy. New York: Harcourt, Brace Company, 1928. Pp. viii + 266.

Book, W. F. How to Succeed in College. Baltimore: Warwick and York, 1927. Pp. 192.

Bosanquet, Helen. The Family. London, 1915. Chapt. 7, "The Basis of the Modern Family"; Chapt. 10, "The Psychology of Family Life."

Bragdon, Helen D. Counselling the College Student. Cambridge: Harvard University Press, 1929. Pp. 147.

Broad, Charles Dunbar. Scientific Thought. New York: Harcourt Brace, 1923. Pp. 501.

Buchanan, Scott. Possibility. New York: Harcourt, Brace, 1927. Pp. 198.

Burnham, William. The Normal Mind. Boston: Appleton and Company, 1924. Pp. 191.

Burtt, Edwin. Metaphysical Foundations of Modern Psychology Science. New York: Harcourt, Brace, 1926. Pp. 110.

Cannon, Walter B. Bodily Changes in Pain, Hunger, Fear and Rage. New York: Appleton Company, 1929. Pp. 404.

* Unless otherwise stated, all references cited have been read in full.

Clarke, E. L. Art of Straight Thinking. New York: Appleton Company, 1929. Pp. 470.

Conger, George P. New Views of Evolution. New York: Macmillan Company, 1929. Pp. 470.

Crawford, C. C. The Technique of Study. Boston: Houghton Mifflin Company, 1928. Pp. x + 354.

Dewey, John. Characters and Events. New York: Henry Holt and Company, 1929. Pp. 861.

_____ The Child and the Curriculum. Chicago: University of Chicago Press, 1902. Pp. 50.

_____ Democracy in Education. New York: Macmillan Company, 1916. Pp. 275.

_____ Educational Essays. London: Blackie and Son, Ltd., 1910. Pp. 150.

_____ Experience and Nature. Chicago: Chicago Open Court Publishing Company, 1925. Pp. 350.

_____ How We Think. Boston: D. C. Heath & Company, 1910. Pp. 175.

_____ Human Nature and Conduct. New York: Henry Holt and Company, 1922. Pp. 250.

_____ Interest and Effort in Education. Boston: Houghton, Mifflin Company, 1913. Pp. 90.

_____ Logical Conditions of the Scientific Treatment of Morality. Chicago: Chicago University Press, 1903. Pp. 225.

_____ The Need for a Recovery of Philosophy. New York: Henry Holt and Company, 1917. Pp. 280.

_____ The Philosophy of John Dewey. New York: Henry Holt and Company, 1928. Pp. 295.

_____ Psychology and Philosophic Method. Berkeley: University Press, 1899. Pp. 140.

_____ Psychology and Social Practice. Chicagp: University of Chicago Press, 1901. Pp. 185.

_____ Quest for Certainty. New York: Milton Balch & Company, 1929. Pp. 340.

_____ Reconstruction in Philosophy. New York: Henry Holt & Company, 1930. Pp. 260.

_____ School and Society. Chicago: University of Chicago Press, 1899. Pp. 105.

_____ Schools of Tomorrow. New York: E. Dutton & Company, 1915. Pp. 280.

_____ Sources of the Science of Education. New York: Horace Liveright, 1929. Pp. 150.

_____ Studies in Logical Theory. Chicago: University of Chicago Press, 1903. Pp. 260.

Dimnet, Ernest. Art of Thinking. New York: Simon & Schuster, 1928. Pp. 216.

Downey, June. Creative Imagination. New York: Harcourt, Brace & Company, 1929. Pp. 230.

Eddington, A. S. Science and the Unseen World. New York: Macmillan Company, 1929. Pp. 91.

Elliott, H. Process of Group Thinking. New York: Association Press, 1927. Pp. 77.

Follett, Mary P. Creative Experience. Chicago: Longmans, Green & Company, 1924. Pp. 301.

Frasier, G. W. and Others. Experiments in Teachers College Administration. Baltimore: Warwick & York, 1929. Pp. 80.

Gilman, Charlotte. The Home, Its Work and Influence. New York: Macmillan Company, 1903. Pp. 180.

Goode, Carter V. Teaching in College and University. Baltimore: Warwick & York, 1929. Pp. 557.

Gordon, R. G. Personality. New York: Harcourt, Brace Company, 1927. Pp. 300.

Hamilton, E. R. The Art of Interrogation. New York: Harcourt, Brace Company, 1929. Pp. 65.

Herzberg, Alexander. The Psychology of Philosophers. New York: Harcourt, Brace Company, 1929. Pp. 228.

Hollingworth, Leta. The Psychology of the Adolescent. New York: Appleton Company, 1928. Pp. 227.

Hudelson, Earl and Others. Problems of College Education. Minneapolis: University of Minnesota Press, 1928. Pp. xvlll + 450.

Hughes, Percy. Concept Action in History and in Natural Science. New York: Columbia University Press, 1928. Pp. 95.

Jones, Jane Louise. Personnel Study of Women Deans in Colleges and Universities. Contributions to Education, 1928. Pp. 155.

Keyser, Cassius. Science and Religion. New Haven: Yale University Press, 1929. Pp. 95.

_____ Pastures of Wonder. New York: Columbia University Press, 1928. Pp. 208.

Kidd, Benjamin. The Science of Power. Boston: Putman Company, 1918. Pp. 301.

Kilpatrick, William H. Education for a Changing Civilization. New York: Macmillan Company, 1927. Pp. 143.

Krutch, J. W. The Modern Temper. New York: Harcourt, Brace Company, 1929. Pp. xvi + 249.

Lloyd-Jones, Esther M. Student Personnel Work. New York: Harper & Bros., 1929. Pp. 253.

McKown, H. C. Extra Curricular Activities. New York: Macmillan and Company, 1927. Pp. 617.

Mathews, Lois K. The Dean of Women. Boston: Houghton-Mifflin Company, 1915. Pp. 356.

Meanns, Hugh. Creative Power. New York: Doubleday Doran Company, 1929. Pp. 395.

Newlon, J. H. Creative Supervision in High School. Department of Secondary School Principals, No. 25, 1929. Pp. 20-31.

Ogburn, W. F. Social Changes. Chicago: University of Chicago Press, 1928. Pp. 235.

Ogden, C. K. and Richards, I. A. The Meaning of Meaning. New York: Harcourt, Brace and Company, 1923. Pp. 153.

Patrick, George T. W. Psychology of Social Reconstruction. Boston: Houghton, Mifflin Company, 1920. Pp. 301.

Piaget, Jean. The Child's Conception of Causality. New York: Harcourt, Brace Company, 1930. Pp. 309.

_____ The Child's Conception of the World. New York: Harcourt, Brace Company, 1929. Pp. 397.

_____ Judgment and Reasoning in the Child. New York: Harcourt, Brace Company, 1928. Pp. 260.

_____ The Language and Thought of the Child. New York: Harcourt, Brace Company, 1926. Pp. 246.

Pillsbury, Walter B. Psychology of Language. New York: Appleton Company, 1928. Pp. 306.

Rignano, Eugenie. The Psychology of Reasoning. New York: Harcourt, Brace Company, 1923. Pp. 336.

Ritchie, A. D. Scientific Method. New York: Harcourt, Brace Company, o923. Pp. 150.

Schneider, H. W. Science and Social Progress. Archives of Psychology, 1920.

Trow, William Clark. Scientific Method in Education. Boston: Houghton, Mifflin Company, 1925. Pp. 159.

Vaihinger, Hans. The Philosophy of As If. New York: Harcourt, Brace Company, 1924. Pp. 370.

Whitehead, A. N. Process and Reality. New York: Macmillan Company, 1925. Pp. 290.

_____ Science and the Unseen World. New York: Macmillan Company, 1928. Pp. 285.

_____ Aims of Education. New York: Macmillan Company, 1929. Pp. 125.

Periodicals

Bradshaw, Francis F. "The Interview: A Bibliography." The Journal of Personal Research, V, (July, 1926), 100-103.

Brandenburg, G. E. "Developing the Personal Interview." Industrial Psychology, 111 (Mary, 1927), 229-236.

Buell, Bradley. "Interviews, Interviewers, and Interviewing." The Family, V-VI (May, 1925) 86-90.

Clark, E. L. "Value of Student Interviews." Personnel Journal, Vol. 5, (July, 1927), 204-207.

Clow, Lucia B. "The Art of Helping Through the Interview," The Family, VI (July, 1925), 129-132.

Cook, L. B. "Specific Mindedness," English Journal High School Education, (January, 1930), 19-36.

Cooper, W. J. "Education for a New America, Biography." NationalEducation Association Journal, (1929), 24036.

Deffenbaugh, W. S. "Significant Movements in City School Systems," U. S. Bureau of Education 5 C (1929).

DeMeyer, J. E. "Where is Education Going?", American Childhood, 14:3, (June, 1929).

Dillard, J. H. "Education and Information," School and Society, (November, 1930), 30*742.

Douglass, H. A. and Others. "Controlled Experimentation in the Study of Methods of College Teaching." University of Oregon Publications. Eugine, Oregon: University of Oregon (1929), 1:VII, p. 52.

Edmonson, J. B. "Extent to which Standardization is Aiding Articulation of Units in the Public School System," School Life, (September, 1929), 15: 1-3.

Finney, Ross. "False Analogy," National Education Association Journal, (January, 1929).

Fraser, E. "New Job for the Public Schools," Good Housekeeping, (October, 1929), 89: 34-35.

Freeman, F. N. "Creative Education and the Science of Education," Elementary School Journal, (September, 1929).

Freeman, E. M. "Criteria for Judging a Science of Education," School and Society, (July 13, 1929), 30: 48-52.

Haldane, J. B. S. "Scientific Calvinism," Harper's, (October, 1929).

_____ "The Sciences and Philosophy," Harper's.

Kilpatrick, W. H. "American Schools Today," Times Education Supplement, (November 9, 1929).

Kilpatrick, W. H. "Limitations of Scientific Method," Teachers College Record, (December, 1928).

Laird, Donald A. "Case Studies in Mental Problems of Later Adolescence, with Special Reference to Mental Hygiene of College Student," Mental Hygiene, VII (October, 1923), 715-733.

Mehus, M. E. "Open Mind," The High School Teacher, (October, 1928), 5:25, 1-2.

Morgan, J. E. "School of Tomorrow," National Education Association Journal.

Newlon, J. H. "Expansion in American Education," School Executives Magazine, 48, (July, 1929), 507-508.

Patterson, S. W. "Trends," Independent Education, 2 (January, 1930), 18-20.

Raup, R. B. "Relation of Philosophy and Science to Education," Journal of Educational Research, (October, 1929).

Reynolds, K. J. "New Purpose in Education," Sunset, 62 (January, 1929), 18-19.

Rugg, H. O. "American Experimental School," Teachers College Record, 30, (February, 1929), 407-424.

Sangren, P. V. "Participation of the Classroom Teacher in Educational Research," Education Administration and Supervision, 15 (November, 1929), 593-601.

Snedder, O. "Finding the Best in Education," Independent Education, (April, 1929).

Sturtevant, S. M. and Strang, Ruth. "The Daily Schedule as an Aid to Advisers," Teachers College Record, XXIX:1 (October, 1927).

Swift, R. F. "Education for a Changing Environment," International Journal of Ethics, 39 (April, 1929), 324-340.

Thorndike, E. L. "Education for Initiative and Originality," Teachers College Record, (November, 1927).

Waitt, R. E. "Pleas for More Appreciative Cooperation Between Scientists and Philosophers," Education, 49 (May, 1929), 513-521.

Woodbridge, F. E. "Education and Evolution," Teachers College Record, (January, 1929).

Woodworth, R. S. "Psychological Experience with the Interview," Journal of Personnel Research, IV, 162-166.

Bulletins, Yearbooks

Black, W. W. Place of Thinking in the Child's Schooling. Indiana University, School of Education. Bulletin 5, 5-10. (November, 1928).

Cardinal Principles of Education. U. S. Bureau of Education, No. 35, 1918.

Edwards, Richard H. Factors in Student Counseling. Ithaca, New York: National Council on Religion in Higher Education, 1928, pp. 131.

Haggerty, M. E. Education and the New World. Indiana University School of Education. Bulletin 5, 49-60. (June, 1929).

Leatherman, Zoe E. and Doll, Edgar A. Study of the Maladjusted College Student. Ohio State University Studies XI, No. 2. (July 30, 1925), p. 56.

Moore, Bruce. The Personal Interview: An Annotated Bibliography, No. 13. (February, 1928). Personnel Research Federation, New York.

Reeves, F. W. and Russell, J. D. Some Aspects of Current Efforts to Improve College Instruction. Bulletin of the Bureau of School Service, I (December, 1928). Lexington, Ky.: Bureau of School Service, Univerity of Kentucky, p. 96.

Reynolds, O. Edgar. Social and Economic Status of College Students. New York: Bureau of Publications, Teachers College, Columbia University, 1927.

Seashore, C. E. Learning and Living in College. University of Iowa Studies in Education, Vol. ii, No. 1. Iowa City: University of Iowa, 1927. p. 124.

Thorndike, E. L. Adult Learning. Institute Educational Research. New York: Teachers College, Columbia University.

Yearbook No. VII of the Department of Superintendent. 1929. Washington: Department of Superintendence, p. 472.

Yearbook No. XIII of the N.A.D.W., 1926. Pp. 109-126.

Yearbook of the National Education Association, 1929. Washington: Division of Publications, pp. 154-159.

Yearbook No.XVI of the National Society of College Teachers of Education, 1928. Chicago: University of Chicago Press, Pp. X + 118.

Yearbook No. XVII of the National Society of College Teachers of Education, 1929. Chicago: University of Chicago Press, pp. vi + 178.

Yearbook No. XVIII of the National Society of College Teachers of Education, 1930. Chicago: University of Chicago Press, pp. x + 254.

APPENDIX

Sample Tests