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Scope of Study: At the present time demand far exceeds the supply of young people entering scientific work. This is possibly due to two factors: (1) the increasing number of positions available in this area, and (2) the apparent complacency of youth towards science. This shortage has brought about a public demand to "stimulate interest in science." As this demand has been directed toward the school systems, educators should be considering the following questions: (1) What are interests?, (2) What are some factors that influence interests?, (3) Are there implications for the schools?, and (4) What methods may be employed to stimulate interests in science? This report is based on these questions. Materials used were publications dealing with interests and recent scientific periodicals.

Findings and Conclusions: Lasting interests are formed early in life. Unless our science program is developed in the lower elementary grades, intensified study at the upper levels will do little (percentage-wise) to increase the number of young people who will choose careers in science. Perhaps the most important factor in this area is the science teacher. Contact with a teacher who practices good scientific attitudes will aid the student in developing his own attitudes. Interests are stimulated by a variety of methods, no one of which might be termed a universal method.

ADVISER'S APPROVAL

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STIMULATING INTERESTS IN SCIENCE

By

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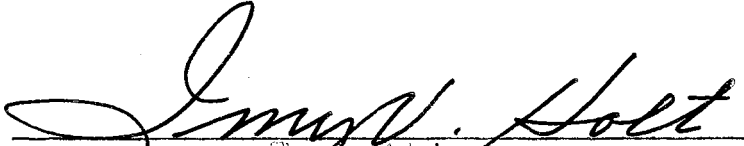
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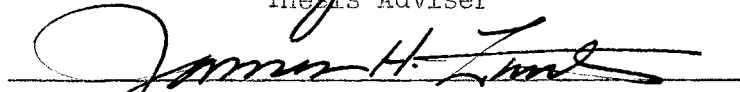
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## CHAPTER I

### INTRODUCTION

The youth of today find themselves in a more complex world than existed a generation or even two decades ago. In this atomic age scientific advances are producing rapid changes. Boys and girls have become so used to the phrase, "we live in an age of science," that they are prone to take it as a matter of course and never stop to reflect on the premises which lie back of such a generalization. Little thought is given to the fact that it took scientists more than thirty years to prove Einstein's theory of relativity. Atomic energy has created a new and extensive branch of the scientific field.

At the present time demand far exceeds the supply of young people entering scientific work. This is possibly due to two factors: (1) the increasing number of positions available in this area, and (2) the apparent complacency of youth towards science. This shortage has brought about a public demand to "stimulate interest in science." As this demand has been directed toward the school systems, educators should be considering the following questions: (1) What are interests?, (2) What are some factors that influence interests?, (3) Are there implications for the schools?, and (4) What methods may be employed to stimulate interests in science?

This report is based on the above questions. Through this study the writer hopes to obtain information which will enable him to make

a practical approach to the problem. Although each teacher has methods of his own, this material may be of benefit to others.

## CHAPTER II

### THE MEANING OF INTERESTS

The word interest is derived from the Latin word, interesse, which means "to be between," "be different," "be of importance." Interest can be described as that "something between" which secures some desired goal, or is a means to an end which is of value to the individual because of its driving force, usefulness, pleasure, or general social and vocational significance. Some interests are dynamic in character and may even change from day to day. Interests that are lasting require some type of stimulation to keep them alive. If no satisfaction is obtained, interest in a vocation or subject lags and may disappear altogether. Psychologically, interest is a motivating force that leads to action. This implies that many of our actions are due to interests. Dr. Strang states:

Interest is closely allied to the self--the physical, psychological, social, and ideal self. One's feelings, aspirations, needs, and hopes for the future are important to him. Consequentially they are invested with interest. The closer the interest is to the center of the individual's concerns, the more intense it becomes. In brief, interest stems from the needs and values of the person--from what is important to him. It is a product of many facets of his personality.

Intelligence and achievement interact with these personality factors to create interest. We usually like to do the things we can do well; we get satisfaction from functioning as we are capable of functioning. Other things being equal, the greater our interests, the more rapidly we learn.<sup>1</sup>

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<sup>1</sup>Ruth Strang, "Interest as a Dynamic Force in the Improvement of Reading," Elementary English, XXXIV (1957), p. 170.



There are wide individual differences in interests; in fact, every person has a unique pattern of interests. Complexity of interests parallels complexity of personality. We can define a person by his interests. Individuals likewise differ in the intensity of their interests.

The terms interest and attitude often are used together to express an individual's pattern of reactions toward himself, his physical environment, his associates, and the situations in which he may find himself. Interests and attitudes have much in common. Except as certain potentials can be considered to be inherited characteristics, a person's interests and attitudes develop from early childhood onward as a result of experience.

Interests and attitudes are personal. Although one or another group may seem to possess similar interests and to give evidence of likeness in attitude toward this or that factor of environmental experiences, each member of the group can be regarded as evincing his own particular interest in, or attitude toward, a person, thing, or condition. His interest or attitude may be influenced, of course, to some degree by his association with other members of the group.

There are differences as well as likenesses, however, between the connotations of these terms. An interest can be interpreted roughly as a motivating force that stimulates an individual to participate in one activity rather than in another. As a result of influences outside himself, he may engage in certain behavior in which he personally is not interested. A situation of this kind may reflect a habitual attitude on the part of the individual to be willing to satisfy the interests of others rather than his own. Left to himself, he might act very differently.

Lester and Alice Crow explain the interaction of interests and attitudes:

The term attitude refers to a person's feeling toward other people, conditions, or situations. Attitudes are specific and born of experience. They are personal and tend to reflect themselves in the individual's relations with his fellows. Certain attitudes become so habituated that they influence much of an individual's behavior.

A motivating interest that has resulted in successful achievement in a particular situation may become the basis of a pleasant attitude toward the elements that constitute the situation. Lack of success in attempts to realize a felt interest may lead to the development of unpleasant attitudes, biases, or prejudices toward the people or things comprising the situation that resulted in failure to achieve. Moreover, a strong attitude may give rise to an equally strong motivating interest. One difference between interest and attitude, however, must be kept in mind. Given an opportunity to express an interest, an individual usually is conscious of his interest in expressing it; contrariwise, an individual's attitude may be consciously recognized by himself, or he may be unaware of the real attitude that influences his behavior.<sup>2</sup>

Recognition of the importance of the attitudes and interests which students develop as a concomitant of school activities has led to increased attention to their development. It is no longer defensible to plan classroom activities solely in terms of subject-matter, leaving to chance the development of attitudes and interests.

Interests are sometimes considered as one of the basic conditions necessary for learning. This stems from the fact that the more interesting the material to be learned, the more easily it will be learned. The factor of interest is closely related in nature to that of symbolic drive and reward, on the one hand, to that of belonging on the other. In the process of growing up we establish goals toward which we strive. The nature of these goals will depend upon how we have been trained or conditioned by our parents and by the society and culture in which we live.

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<sup>2</sup>Lester D. Crow and Alice Crow, Adolescent Development and Adjustment (New York, 1956), pp. 201-202.

Some of us strive to outdo the other person; some of us strive to serve the other person. Most of us have before us the central aim of making a living through business or professional activity. Subject-matter which relates to one of these goals, which brings us closer to its attainment, is more interesting than subject-matter which is quite unrelated to our ambitions or needs.

## CHAPTER III

### FACTORS THAT INFLUENCE INTERESTS

The many factors that influence interests may be grouped in the broad categories of psychological factors, physiological factors, and environmental factors. As an individual is considered an organic whole, these factors are of necessity interacting forces. There can be no clear-cut distinction made that will be suitable in all cases. The writer has attempted to separate and group his findings in this manner; another writer might place some of the items in different categories.

An individual's interests constantly undergo changes. Interests become relatively fixed as a person approaches adulthood. When an adult is asked what his special interests are, he can list those which have become habitual aspects of his personality. Interests are associated with a continuing purpose rather than with a passing experience or a chance stimulation arising from some object or event. True interests are a coordinating, motivating aspect of life. Interests are not predetermined by heredity, nor are they excessively resistant to new influences. Initial interests can be modified; new interests can be built. Much depends on the opportunities for developing them.

Interest is selective; it determines which of the many things that lie within our field of perception we will pay attention to. It also regulates the degree of our attention and the span of our attention. Interest integrates and organizes experience. It relates specific

behavior to some goal that seems important to the person.

### Physiological Factors

The amount of interest and the manner in which it is expressed is due in part to physical differences of children. The pre-school child's interests center around the home and family associates and activities. He shows an interest in discovering the purpose or meaning of his surroundings in relation to himself. Interest patterns follow those set by family members or his playmates. Children of both sexes are interested in playing with simple toys provided for them. Even at this early age there are differences among children's interests. Some children will prefer one toy; others will be disinterested in the same toy. The same holds true for different types of games. Interests of pre-school children are very similar for both sexes unless differing interests are encouraged by adults.

After the child starts to school his interests broaden and take on a more definite pattern. Self-centered interests change to include interests connected with other people, usually teachers and classmates. A greater interest is shown in organized play activities with others of his own age. Early interest in hoarding favorite toys takes on a more definite form of interest in collecting stamps, pictures, string or anything that may appeal to him. Children of early elementary school age become interested in creating things that will attract attention from their peers or elders. It is for this reason that the interests seem to lean to construction and creativity. They become interested in watching television and reading stories at their mental level. The differences between girls' and boys' interests begin to arise in this period. Both

boys and girls still like plenty of action, but boys seem to enjoy the more strenuous activities. During this period an interest in "gang" activities develops among boys and one of "best pal" interest among girls. Each of the sexes is interested in activities that exclude the other.

Insight about interests of the next age group can be gained from Clarence G. Moser's description of a boy in early adolescence:

The zest with which the early adolescent does an errand is equalled only by the speed of a turtle on a July day. This boy can do the chores around his home with three or four adults to prod him, though he can do similar chores all day at a friend's house and enjoy them. But a man is being born. Arms and legs are defying sleeves and pants to keep up with them. Favorite adults are being imitated. Even his hair renews its acquaintance with the comb and the pomade, when some cute new girl moves into the next block.<sup>1</sup>

It is during this age that interest in new games and new skills is high. Boys have an increased interest in the world of science. Girls of this age group have the same types of interest as boys, although they have acquired them earlier.

There are some children whose physiological development proceeds at a much faster rate than that of the group as a whole. Such boys and girls may seek connections in the church or in some special neighborhood activities where there are other boys and girls with more mature interests. If there are several others in the grade at school who have more mature interests also, the adjustment may result in the acquisition of close chums or in the formation of small cliques. There is also the child who is less mature in his or her interests than the other boys and girls of the group. This child often develops an attitude of indifference toward

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<sup>1</sup>Clarence G. Moser, Toward Understanding the Boy in Early Adolescence (R. E. Somme, Publisher Maplewood, New Jersey, 1955), p. 1.

the activities of the group as a whole, but may be able to find comfort and the needed friendship in activities with any others of the group who likewise reveal a less mature interest.

The child's physical condition will have something to do with the formation of interests. Physical vitality is connected with optimism, curiosity, and gripping interests. The half-well person does not develop normal interests.

### Psychological Factors

An interest is a feeling which accompanies some activity that is taking place. Psychologists usually use the word interest in a positive sense. If the feeling which accompanies the performance of some particular activity is pleasant, we say that the individual is interested in that activity. F. L. Ruch explains it this way:

The origin of interest in the experience of the individual is probably very complex. Two important factors in the development of interest are recognized by psychologists. In the first place, those activities which are easy for the individual are likely to be the most interesting. For example, if you have a high native ability for music, you are more likely to find music interesting than is the individual who is born with poor musical aptitude. The factor of social approval is also very important in steering the development of our interest. For example, you might possess the complex of native abilities necessary to accurate marksmanship, but if you have been trained by your parents or at school that it is cruel to shoot animals, i.e., that the shooting of defenseless animals is not a way of gaining social approval, the chances are that you will not become interested in hunting as a sport. On the other hand, if you possess these abilities and associate with people who are interested in hunting in a culture in which hunting is socially recognized as a principal way of getting food, then the chances are very strong indeed that you will develop a keen interest in hunting.

Interests, once they have been formed, may be expressed directly or indirectly. One of the most common means of indirect expression of interests is through reading about the activities pertinent to your interest. Other indirect expressions of interest are found in motion pictures and radio programs.

Human goals may be classified according to the importance that they have in our lives. If a goal seems well worth attaining, we say that it has a high degree of value. When a goal seems scarcely worth attaining,

we say its value is small. If it is something to be avoided, we say it has a negative value.<sup>2</sup>

The child's general interest in self-improvement and self-realization may be reflected in his reading. He wants to identify himself with characters who are vigorous, brave, sincere, kind, helpful, successful. Biography, historical novels, true-to-life accounts of adolescents which show their strivings and frustrations, their achievements and satisfactions, their thoughts and actions in the modern world--all these types of material reinforce the young person's drive toward self-realization. Certainly the dynamic force of interest should be more fully used in the development of reading ability, and in personal development through reading.

The psychological principles of readiness, exercise, and effect indicate that there is a close relationship between interest, attention, and effort. The teacher must stimulate interest. The pupil must be prepared for the work he is to undertake. The pupil must be in a state of readiness to act along desirable lines. When the pupils are in a state of readiness to act and the act is accompanied by satisfaction, learning results and habits of thinking and acting are formed as a result of exercise and study.

One of the measures of the vitality of the experiences gained in school is the extent to which the experiences lead to desirable interests and habits which endure into maturity. Interest and motivation are very closely related. It is well recognized by successful teachers that when work is properly motivated and based upon the interests of the subjects

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<sup>2</sup>Floyd L. Ruch, Psychology and Life (Chicago, 1941), pp. 88-89.



it appears easier to the student. When the student is interested in a task, his attention remains close to the marginal context and does not fluctuate far from the general pattern. Interests should be considered as selective in nature because they focus attention within a marginal field. There is a direct relation existing between interest and amount of learning because learning is largely dependent upon the attentive response of the subject.

There is a saying that interest breeds ability and ability breeds interest. From this it seems that it would be impossible to be interested in a task if one knew nothing about it. Although interest is related to ability, a person who has high interest in a subject may have no special talent in that field. A child is observed as displaying a keen interest in music, but this does not mean that he will be able to play in the band.

Some teachers make the mistake of assuming that motivation is a simple process of arousing interest. Students are supposedly motivated when the teacher arouses enough interest to secure the pupils' willingness to talk about a certain idea. These teachers are not really creating motivation; they are simply stimulating interest which is very superficial.

#### Environmental Factors

Each individual's system of values is derived from his early environment. We develop our values by a process of learning from others with whom we associate. The home usually conditions many human responses. The school likewise conditions responses. In some cases, a child may receive a different set of values at home as compared to the set he

receives at school. Sometimes a child will discard home influences and seek approval of persons outside the home. Consequently, the child will accept their values. The fundamental thing is that we strive for the approval of certain persons whose relations with us please us, and their ways tend to become our ways. We develop interests similar to those interests of our associates.

A child who has advanced at the same pace as the average in his physiological development but who, for some social or cultural reason, is unable to participate in activities which interest his group, faces a real problem. Racial, religious, and social conflicts between the practices or ideals of the home and those of the group bring about this condition. An individual who is unable to change his pattern of interests in harmony with the interests of the growing boys and girls with whom he is thrown, in and out of school, is going to be faced with a difficult adjustment problem, and this problem is likely to affect his school work, his attitude toward his home, and other phases of his personal and social life.

Most responses of children or adults have been caused by past experiences between them and their environment. The same holds true for interests. Our numerous interests are not inherited; they are acquired by means of a wide range of experiences to which the individual reacts favorably or unfavorably.

A. M. Jordan has grouped interests as follows:

Interests, the pleasant feeling tones attached either to the activity or the goal, may for purposes of study and emphasis be divided into two groups: Intrinsic and Extrinsic. If interest is attached primarily to the activity, it may be called intrinsic; if primarily to the goal, extrinsic. Intrinsic interests arise out of inherited body needs such as thirst, hunger, sex, activity or because they continue or fulfill habit-patterns already well formed. Extrinsic interests arise out of interpersonal relations such as praise or competition or out of a social

system which grants prizes or rewards for achieving certain goals.

The advantage of intrinsic interest in school work resides in its continuance under its own power. Intrinsic interest is self-running. It is achieved by studying carefully the life interests of children.

If life interests are known some opportunity for expression can be furnished in the school situation. Many attempts have been made in recent years to catch and hold the interests of school children in their areas of instruction. One school expanded the adventurous interest in boats to a study of the first boats, their manner of propulsion, the effects of boats on civilization, the lanes of commerce, down to the modern ocean liner. Some of the children built boats; others decorated them. By and large it was the children's activities. It was they who wrote to the great ship companies for details about ocean liners; it was they who built models of triremes as well as of modern boats; and it was they who figured out the lanes of commerce. To them the project was significant. It fulfilled their interest in adventure. Another illustration appears in writing English compositions. In writing descriptions of places it is well to take the class to some high point overlooking the village or town and there make notes of what is observable from that position. These notes are then expanded into a unified whole written from one point of view. In science, the sky is literally the limit. A trip to a planetarium which shows with vivid clearness the immensity and complexity of our starry firmament may give a lift to the whole general science course. Indeed those science teachers who themselves have been able to catch the wonders of modern science experience little difficulty in arousing the imagination of students.

Extrinsic interests are centered either in the goal or outside the activity itself. Mainly they administer to the learner's ego status. Because he surpasses the records of others, excels another in a race, and receives rewards or praise which others do not, his attitude towards himself is improved. In addition to ordinary observation of the effects of competition, rewards, et cetera many experiments have been performed which show their stimulating effect beyond question. There is some evidence also that rivalry with one's own past record is a motivating influence.

Praise and reproof also may become a motivating influence. Its effect is, however, conditioned by the attitude felt by the learner. If the learner holds the praiser in high regard praise and reproof may have a substantial effect. There is no doubt about the efficacy of extrinsic interest to increase motivation. Sometimes it may be even more potent than intrinsic interest itself.<sup>3</sup>

Grouping interests in this manner brings out the close association between interests and motivation. It re-emphasizes the fact that if we are interested in a subject, we are motivated toward that subject; if we

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<sup>3</sup>A. M. Jordan, "Intrinsic Versus Extrinsic Motivation in Learning," High School Journal, XXXVI (December, 1952), pp. 77-78, 81-82.

receive proper motivation, we become interested. The science teacher will have to keep this fact in mind. He should encourage expressed interest and attempt to arouse what some call "latent" interest.

## CHAPTER IV

### IMPLICATIONS FOR THE SCHOOL

By implication, the democratic ideal calls for the development of interests. A person becomes democratic in spirit only as enthusiasm is kindled for doing so. Impulses, ideals, likes and dislikes, color our outlook on life and determine whether we will display social or anti-social conduct. Man learns and functions as a unified being. The increasing of worthy interests, along with development of thinking, may be set up as a major goal of education.

Many interest tests or inventories have been prepared to aid the administrator in planning a program that will lead toward this goal. One method is through the use of an "interest finder." In this method a questionnaire seeking the likes and dislikes of pupils is used. Jersild and Tasch employ the following questions:

My three wishes:

What I'd like to learn more about at school:

What I don't care to study about:

What I like best in school:

What I like best outside school (that is, away from school, when I'm not at school):

What I like least at school:

What I like least outside school:

What I want to be or do when I grow up:

The most interesting thing I have done at school during the past week:

One of the happiest days in my life:<sup>1</sup>

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<sup>1</sup>Arthur T. Jersild and Ruth J. Tasch, Children's Interests and What They Suggest for Education (New York, 1949), p. 91.

A more specific method is the use of the interest inventory. Strict adherence to test results should be avoided.

Many counselees consider interest tests somewhat of a joke if advice is to be based upon the scores themselves. The forced choice of an item when the examinee feels no preference for one or the other, choice of items about which his knowledge is limited, the transparent relationship of some items to certain occupations (as selling items to sales work), and the seeming irrelevance of some items to any occupation seem ridiculous to many examinees. They lose confidence in the counselor who obviously relies heavily on measurements derived from these items. But when they perceive the test as a means to explore their reactions to life situations and the counselor as a professional person who uses tests as a systematic procedure for exploring reactions instead of an absolute measure of interests, they gain confidence in him.<sup>2</sup>

Baker, in a study of elementary teachers, found:

Of fifty-one two-year graduates, thirty-two took at least one course in botany but none in zoology or biology. Sixteen took at least one course in zoology but none in botany. Some students carried twelve quarter hours' work in zoology and none in botany or biology, while others carried the same amount of work in botany but none in zoology or biology. Although the school from which these students graduated offers courses in general biology for elementary teachers, only two of the two-year graduates and only six of the four-year graduates took these general courses.<sup>3</sup>

This points up the fact that a better science background must be required for elementary teachers. They (the teachers) should be shown that a more adequate background of science would increase their confidence in working with boys and girls. Teachers, being no different from other people, tend to emphasize what they are most interested in. Teachers and administrators who are aware of, and stimulated by, scientific phenomena is the first requisite for a program of science education. The teacher who says, in explanation of the lack of a science program in her classroom, "No, we don't have much science. I guess I'm just not

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<sup>2</sup>A. W. Foley, "Appropriate Use of Interest Inventories," The Personnel and Guidance Journal, XXXIII (1955), p. 510.

<sup>3</sup>Emily V. Baker, Children's Questions and Their Implications for Planning the Curriculum (New York, 1945), p. 150.

interested." puts her finger on a fundamental, if not the fundamental, shortcoming in her program of science education. If the teacher is stimulated by a child's excitement concerning the environment and is willing to and capable of stimulating the child's curiosity, learning will occur.

Traditionally, schools have emphasized the learning of facts and the acquisition of skills, leaving to incidental learning the development of interests and attitudes. We cannot rely on the incidental or accidental growth of interests or of attitudes. The modern curriculum should focus attention on these attitudes and interests. Attention to pupil interests does not mean abandonment of other goals and objectives. In many cases it will enable teachers to do a better job with materials and experiences ordinarily included in science courses. For many pupils it likely will mean that more emphasis be placed upon practical and everyday aspects of science and less upon highly technical information.

Many of our one-year high school science courses are too brief and yet too ambitious in scope to lead to permanent changes in the way students think or in the attitudes they develop. Adaptation of courses to meet individual differences permits variation according to the requirements of a particular class. Adaptations are made on the basis of interests. Once the prospective mechanic or housewife is convinced that an understanding of chemistry will be useful in later life, more interest will be shown in this course.

The first reaction of authoritarian teachers to the need for guiding the development of attitudes is to assume that procedures that are not particularly effective for teaching facts and skills may be used to develop abiding interests and values. Some science teachers tell their

students that oxidation-reduction reactions are interesting and wonder why the students are not convinced. They give their students ready-made judgments. The learning activity must be organized with a view to the development of the attitude the teacher seeks to develop. Unless interest, or a favorable attitude, is a part of thinking, its value to the person will be limited.

If the teacher is interested in developing an abiding interest in science, topics and material should be selected that are on the student's level of interest. Attitudes and interests are not developed in response to the teacher's commands. They grow only as students participate actively in experiences which lead them to develop these attitudes and interests. The effective teacher should take advantage of the care that has gone into the preparation of the modern textbook without allowing the textbook author to indirectly direct the class.

Not only must the curriculum be appropriate for the student, but the teaching must be of such quality as to inspire the student's respect for the worthwhileness of the work he is doing. To arouse in boys and girls a genuine interest in improving their ability to study we need more than devices to motivate them; we need the kind of inspired teaching that helps these adolescents to see meaning in the problems they are seeking to solve.

Kimball Wiles gives these views on helping the "uninterested" child:

We have all seen children who appear to be uninterested. They sit in the classroom and say little. They watch what is going on, but as far as we can see they show very little reaction to it. When they are asked to offer suggestions they make no reply. They take up seat space, and that is about all, it seems, that they are contributing to the classroom situation.

Sometimes, as we follow these youngsters out into the community, we find that they display the same lackadaisical attitudes in their relationships with other boys and girls in out-of-school activities. If



they are on the playground, they have to be forced to take part in activities. What can we do for an "uninterested" child?

Any hope that we have of helping him is based on two beliefs: One is that all children want to take part in what is going on around them. The other is that his seeming lack of interest in out-of-school or in-school activities may have come about as a result of so many failures that he has lost any hope of success. Making these two basic assumptions is the starting point in helping the uninterested child.

One of the first steps is to put the child at ease. If he has failed so many times that he has lost confidence in himself, our task is to convince him that other people are anxious to help him and want to see him succeed. Much of the responsibility for developing this type of atmosphere in the classroom rests with us. If we can demonstrate these qualities in our relationship with the pupil and not evidence our discouragement or dissatisfaction with his lack of success, we may gradually build the willingness to venture. If we stress in our relationships with boys and girls the necessity for trying to do our best in every situation and for profiting from mistakes as well as from successful achievement, we provide additional encouragement. When "uninterested" boys and girls begin to feel that they are accepted and that they can learn from mistakes as well as from successes, they will gradually move out of their self-imposed isolation and become active in the group. These first steps may take a long time.<sup>4</sup>

This type of child deserves more attention in our educational systems. However, this may not be the future scientist that the public wants.

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<sup>4</sup>Kimball Wiles, Teaching for Better Schools (New York, 1952), pp. 259-260.

## CHAPTER V

### METHODS USED TO STIMULATE INTERESTS IN SCIENCE

Many methods have been proposed and put into practice which supposedly will stimulate interest in science. Whether this is temporary or lasting interest which is created is yet to be determined. There are three possible ways children may experience learning. These include direct sensory contact, pictures or some other forms of representation, and oral or printed words or symbols. Oral or written words mean very little to the student unless he has something to associate them with. The term "cell" has very little meaning to the student who has not seen a picture of it. It takes on more meaning when the student is able to view a cell under a microscope.

Some sensory aids that are important in science teaching include models, charts and posters, science films, exhibits, microscope and telescope, specimens, and science literature. Perhaps reading might be classified as the most important skill necessary to learn science. As each new subject is taken, the student finds himself confronted with a multitude of new terms. It is important that he be proficient in the use of a dictionary. Most science books have an excellent glossary as an aid for the student. It will benefit the student and make the subject matter more interesting if he is able to understand what he reads. The author has found it helpful to prepare a list of combining forms and prefixes of words used in a biology text. By discussing these "terms"

at the beginning of the course, the student becomes familiar with some of the words he will encounter as he proceeds with his reading.

Demonstrations may be used to evoke interest in science. The instructor should be reasonably certain that the demonstration will work before he presents it to the class. Whenever possible an element of surprise should accompany the demonstration. There are several experiments that fall into the surprise category. The instantaneous change in color of an iodine-starch reaction is an example of this type of demonstration.

Science clubs, science fairs, and similar group activities are now being used to promote interest in science. It has been found that students who enter these activities maintain an interest in science. The experiences gained in these groups would be classified as direct sensory contact experiences.

Katherine Hill comments on the science program of the lower elementary grades:

The teacher who is stimulating in the area of science will provide opportunity for creativity. At times, periods of active, physical creativity on the part of a child are interspersed with contemplative efforts. A kindergarten teacher recognized this more quickly than her student teacher one day as five-year-old Nancy sat in a chair staring into space, while all the other children were involved in obvious physical activity. The student teacher became so concerned about Nancy's quietness that she inquired of her several times as to why she wasn't working as the other children were. At last, Nancy, on the verge of utter exasperation said, "Can't you see I am working? I'm thinking!"

Allowing children to follow creative bents requires patience, guidance, faith, and good humor on the part of a teacher. But we know that one of the surest ways to kill interest in science is to pay little heed to a child's creative efforts. Soon his physical, verbal, and mental attitude becomes, "What's the use? At least, what's the use in school? I'll wait until school is over to find out what I want to know." Creativity is one of our most precious assets in a democratic society. Perhaps we should ask ourselves "Am I requiring too much conformity? Am I allowing enough time and space for the creative resolution of interests in science phenomena?"

We see, then, that this question of the school and the child's

science interests is not a simple one. A consideration of the question causes us to review not only our total science program, but our total efforts in the education of elementary-school-age children. Because we have turned our attention to this problem briefly, perhaps each of us will make an effort to evaluate our part in helping children resolve and further their interests concerning scientific phenomena in the world around them.<sup>1</sup>

From this it would seem that the best way to stimulate a young child's interests would be to encourage his natural curiosity for science. Some schools have a "share and tell" period for this age group. The children bring an object of interest to school and tell what it is and where they obtained it. If the teacher will record these contributions, it will aid her in understanding the child's interests and in planning ways to develop further interests.

In some schools the science rooms are used for other classes. Some teachers develop interest by deliberately leaving apparatus set up in these rooms. The remains of one-time demonstrations often may be more effective than a well-planned display. Many companies have educational divisions that supply free posters concerning recent happenings in science. If these are displayed in a conspicuous place, they will stimulate some interest.

High school students are interested in current developments in science. The teacher should spend considerable time on these topics and not become a slave to the textbook. Too often current science is not studied until completion of the text material. Sometimes the science teacher can create some interest by writing a column on current science for the school newspaper.

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<sup>1</sup>Katherine E. Hill, "The School and the Child's Science Interests," Science Education, XL (1956), pp. 205-206.

Interests may be awakened through field trips. This is another example of direct sensory contact learning--the student sees subject matter that can not be brought into the classroom. It is here the student connects a word symbol to a direct object. For example, if I write about a "zok", the reader will not understand; if a "zok" is pointed out to a person the word symbol takes on meaning.

The teacher should be aware of the fact that although a certain method works in one situation, it will not necessarily work in all situations for all teachers.

## CHAPTER VI

### SUMMARY AND CONCLUSIONS

Lasting interests are formed early in life. This would indicate that unless our science program is developed in the lower elementary grades, intensified study at the upper levels will do little (percentage-wise) to increase the number of young people who will choose careers in science. Elementary teachers should be required to have a greater knowledge of science. Elementary teachers (and all teachers for that matter) tend to stress subject matter most familiar to them. Perhaps a part of the answer to this problem is to departmentalize the lower grades. A teacher whose primary interest is science will undoubtedly impart more science facts and create more science interest than the teacher whose primary interest is history.

Provision of science materials is a "must" if interests are to be stimulated. In some communities, the school may have to do an excellent job of public relations if it is to sell the taxpayers the idea that science material is just as important as athletic equipment.

Instructors should be aware of specific interests and should encourage them. Interest inventories in addition to personal observation should be employed.

Perhaps the most important factor in the school system is the science teacher. Children sometimes contract interests as easily as they do diseases if the proper vector is carrying them. A teacher who displays

little enthusiasm for the subject he is teaching will create little interest in that subject. A student may even develop a dislike similar to that of the teacher. All teachers should keep this fact in mind. Contact with a teacher who practices good scientific attitudes will aid the student in developing his own attitudes.

Lasting interest in science is not created over a short period of time. Interests are stimulated by a variety of methods, no one of which might be termed a universal method.

## BIBLIOGRAPHY

- Arnold, Felix. Attention and Interest. New York: The Macmillan Co., 1910.
- Baker, Emily V. Children's Questions and Their Implications for Planning the Curriculum. New York: Bureau of Publications, Teachers College, Columbia University, 1945.
- Crow, Lester D., and Crow, Alice. Adolescent Development and Adjustment. New York: McGraw-Hill Book Company, Inc., 1956.
- Foley, A. W. "Appropriate Use of Interest Inventories." The Personnel and Guidance Journal, XXXIII (May, 1955), 510-12.
- Garrison, Karl C. The Psychology of Adolescence. New York: Prentice-Hall, Inc., 1946.
- Hill, Katherine E. "The School and the Child's Science Interests." Science Education, XL (April, 1956), 203-06.
- Jersild, Arthur T., and Tasch, Ruth J. Children's Interests and What They Suggest for Education. New York: Bureau of Publications, Teachers College, Columbia University, 1949.
- Jordan, A. M. "Intrinsic Versus Extrinsic Motivation in Learning." High School Journal, XXXVI (December, 1952), 76-83.
- Moser, Clarence G. Toward Understanding the Boy in Early Adolescence. Maplewood, New Jersey: R. E. Somme, Publisher, 1955.
- Ruch, Floyd L. Psychology and Life. Chicago: Scott, Foresman and Co., 1941.
- Strang, Ruth. "Interest as a Dynamic Force in the Improvement of Reading." Elementary English, XXXIV (March, 1957), 170-76.
- Wiles, Kimball. Teaching for Better Schools. New York: Prentice-Hall, Inc., 1952.
- Young, Kimball. Personality and Problems of Adjustment. New York: F. S. Crofts and Co., 1947.



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