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CAN CREATIVITY BE DEVELOPED?

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An address prepared for presentation to the Pacific Arts Association, at Asilomar, California, April 1, 1958.

Almost exactly six months ago, the people of these United States were most rudely shaken by the news that communist Russia had placed into orbit the first man-made satellite. By all the expectations that should follow from our supposed scientific and technical superiority, such a thing should not have happened. We, not Russia, should have been the first to accomplish this historical event, which properly stirred the imagination and the admiration of the whole world. What had happened to us? Where was our Yankee ingenuity on which we had prided ourselves? Why did this imaginative achievement occur in a political climate that should have dulled individual thought and initiative and not in a democratic climate where the individual and not the state is the center of human interest?

Needs for Creativity

You know as well as I do about the soul searching and the self criticisms that have engaged our thinking people following the Sputnik episodes. There have been a number of consequences and conclusions, but to me, two things stand out. One of these is that we must realize that the Russian soviet threat is not purely and simply a military one, to be met by military measures. So far as one can tell, the military race has reached a condition of stalemate, which makes open military conflict on a large scale unlikely.

The Russian challenge is now clearly made on all fronts; cultural and intellectual as well as political and economic. At whatever point the Soviet Union can show superiority, it is heralded by them as a victory for the communistic way of life. We should welcome the challenge of competition on the cultural and intellectual levels. Acceptance of the challenge will be one of our strongest sources of motivation for some time to come. It may be argued that there are better and more worthy sources of motivation for striving for excellence. But the truth seems to be that we have been in short supply of other sources, and none could be as urgent as the need for the survival of our nation and our way of life.

The other thing that stands out is our lack of preparedness to meet the intellectual challenge that Russia has thrown in our direction. Somewhere between the days of the American pioneer

and the days of television we have lost something that is of great importance to a people; important not only for their survival but also for their happiness. Your recent ancestors and mine, who crossed this continent to create new homes, faced a multitude of problems that demanded continual alertness and ready adaptability to new circumstances. Each day called for its measure of improvising and each tomorrow called for vision. And, if we can believe the ever-present westerns, adventure lay just around the corner.

Present-day living offers an interesting paradox. On the one hand the satisfaction of our personal, daily needs has been reduced to the point that about all we have to do is to push buttons and turn knobs. If trouble develops, the problems thus created are beyond our scope of information and skill. We dial another gadget and call for an electrician or repairman. Superficially, this would seem to remove from us most of the needs for creative thinking needed in the solution of problems. But judging by the increasing dependence upon the psychiatrist and upon tranquilizer pills for allaying anxieties, one would think that the hazards of living were greater than ever before. What are the reasons? Have we become so unaccustomed to handling our own personal problems that we make big troubles out of little ones? Is our resourcefulness withering from lack of exercise of our thinking apparatus? Or are there, after all, many new and more difficult problems?

Some truth lies in the affirmative answers to all of these questions. I have mentioned the technical problems that we customarily turn over to others to solve for us. The shifting of responsibility for solving personal problems does not stop with technical matters. In this age of specialization, services of all kinds are offered for a price. We need only consult the Yellow pages of the telephone directory; we are encouraged more and more to do so. We have developed a social and economic machine of enormous complexity and proportions. The use of that machine has not been an unmixed blessing. It makes possible a fullness of living never before known by the average person. At the same time, it can be crippling to those who learn to depend too much upon it.

I have been giving just one side of the picture. We are often reminded that the complexity and pace of modern life taxes the individual, often beyond his capacity. While the intricate social machine solves many of our personal problems, it creates many others. It takes some ingenuity to use that machine wisely and advantageously. The machine breaks down in its functioning at many points and is in need of many improvements. Its functioning is never static. It produces dislocations, such as unemployment. It creates new desires. It calls for changes in ways of living. Thus, problems of life are always with us. One unfortunate consequence of the availability of so many kinds of services may be that the habit of over-dependence upon others generalizes too broadly. It is up to us to teach the child that there are still many areas of life in which problems must be faced and in which creative thinking is needed.

The needs for creative thinking arise from sources in addition to those imposed upon us by the Soviet challenge and the complexity and speed of modern living. We have become increasingly aware of the problem of monotony brought about by the machine age in industry. This problem has become intensified by the coming of automation. In this picture, human beings have been allowed to behave less and less like human beings. They have few decisions to make and they have little or no opportunity for constructive and inventive thinking.

By nature we like to make decisions and if we are normal we derive considerable satisfaction from the mastery of problems by productive thinking. Wolfgang Koehler found that even anthropoid apes are delighted with their own inventions, modest though those inventions are. The ape that mastered the stunt of making a long stick by putting together two shorter ones in order to rake in food from outside his cage was not content to accept the food as his only reward. In fact, at the moment, it was not his chief source of satisfaction. He kept playing with his new tool, using it to rake in other things that were of no immediate use to him. The joy of mastery over problems seems to be a deep-seated kind of reward, not confined to humans.

It is no wonder that the modern worker sometimes feels frustrated and unhappy. To the extent that he is lacking the satisfactions that come from mastery over problems, there is a kind of solution.

If he cannot find the opportunities for creative thinking in his work, he should find them elsewhere. It is the whole man that needs to be satisfied. Research has shown that if a man's work does not appeal to his interests and satisfy his psychological needs he can tolerate this circumstance much better if his hobbies do bring the kinds of gratifications he seeks.

Some of our thinkers in social philosophy become alarmed occasionally when wondering how workers are going to use their increasing leisure time. If workers could be given a good taste of the rewards for creative effort and if they consequently turned this leisure time to constructive purposes, we should have little problem from this source. It is often stated that the ancient Greeks were able to experience a flowering of the arts, science, and philosophy because of their leisure time. Why cannot our leisure time be turned to similar uses?

Perhaps the strongest force operating against this kind of development is an unfortunate attitude or climate that has been permitted to develop in America; an attitude that does not favor the arts or, in fact, anything intellectual. Our national heroes have been cowboys, military leaders, baseball players, and even desperadoes. The arts and learning in general have been regarded as not quite masculine and not quite respectable, in some quarters. We have begun to feel the full effects of the anti-intellectual atmosphere. It has gone so far that bright children sometimes feel compelled to conceal their brilliance. I have even heard of parents who have also tried to conceal the brilliance of their children. We hear of college students who feel that they must study on the sly so as not to lose face with their fellows, for example a girl who made Phi Beta Kappa by reading under her bedcovers after the lights in her sorority had been turned out. The term "egghead" has become an epithet in recent years; added to the term "longhair," which is of longer standing. Incidentally, it is just a little difficult to see how both terms can be applied to the same person!

In part, this attitude is a reflection of a general pressure toward conformity. In some instances the democratic ideal has been misinterpreted to mean equality of ability, as if it would be best for everyone if we could all be fitted to the same Procrustean standard of mediocrity. Differences of talent and aptitude may seem unfair, and fair play may seem to call for handicapping those who could excel. This is carrying a supposed ideal much too far. Democracy should mean centering attention on the individual, his rights, and his opportunities. But it does not mean robbing the one to even up things for the other. The stubborn facts of life present us with great individual differences. Instead of attempting to hide this fact, we should give every individual the chance to make the most of what he has and to become the best of which he is capable.

In part the anti-intellectual attitude can be laid at the door of us who teach. Perhaps our own values are in some need of revision and perhaps we also need more courage of our convictions. Recently I was discussing with some fellow faculty members the relatively small recognition received by the superior student of science as compared with the football star. Their reaction was, "Well, the science student does not fill the stadium on Saturday afternoons." I hope they were not serious. Perhaps they only thought they were stating a fact. I do not know. My reply was to the effect that the science student may not fill the stadium but he will fill the rocket ships in the sky above us.

Not the least of the problems that call for creative thinking are those concerned with interpersonal relationships. Imagination in dealing with one's fellows is greatly needed at the personal level, in local and national politics, and on the international scene. Technical progress has made possible a broader margin of survival. The same amount of inventive genius has not been shown in connection with the operations of living together. Until we somehow extend creative thinking in social directions, also, there will continue to be conflict and unnecessary unhappiness.

What Creativity Means

Enough has probably been said thus far to show that in many places in our lives more productive, inventive thinking would be most helpful, if it is not a clear necessity. It is time that we considered creativity itself more closely before we ask whether there is anything we could do to help develop it and to promote its use.

I think of creativity as being something that lies behind behavior; behavior that is imaginative and

inventive. Such behavior can be found in clearest form in the lives of certain people—scientists who make new discoveries and construct new theories; artists, designers, writers, and composers; and architects, designers, and builders. Many of the things that such people produce have never been brought into existence before. We will not quibble over the oft-debated question of whether a thing must never have existed before in order to justify calling the production creative or whether it must be novel in every respect. So long as the person arrives at a product that has novel aspects so far as he is concerned, to this extent I should say he has created. Note that I have only said that there are certain classes of individuals from whom we expect more clearly creative behavior. It is my conception that creativity is not confined to such people, but is shared to some degree by all humanity, if not by other species as well.

I suspect that there are many people who believe that creativity is a gift and that they do not want to attempt to understand it or do not believe that it can be understood. This is probably one aspect of a more general attitude that has been held for centuries regarding the possibility of understanding the human mind in any of its manifestations. There are people still today, who hold up a forbidding hand to the psychologist who attempts to understand human nature and human behavior, just as centuries ago there was resistance to understanding the earth and the plants and uncovering the secrets of the winds, the tides, and the shooting stars. To the psychologist, creative performances, like all behavior, are natural phenomena and we have the capability eventually to understand them. Without understanding them, there is little chance of doing much, if anything, about them, except to accept them fatalistically when they occur and to bemoan their absence when they do not occur. It is true that psychological understanding of creative activity has been slow in developing. Of all behavior, it is one of the most difficult types to investigate, which probably accounts for the slow start that has been made in that direction.

Creativity as An Aspect of Intellect

My own interest in the subject of creativity goes back many years. As a young psychologist, I one time administered to children some of the common IQ tests. One of the things that impressed me was the fact that nowhere among them was much place given to creative performances. It seems to me that intelligent individuals should show their intelligence by being inventive in some way. Some years later, a fellow faculty member from journalism came to me to ask what the psychologists knew about creativity. He was trying to develop creative writers among his students. With much chagrin I had to tell him that there was almost nothing that we psychologists knew about the subject.

It was to some extent these sources of frustration that led me later to investigations in the area of aptitude for creative performance. For the past ten years, with financial support from the Navy and the Air Force, my students and I have devoted considerable effort toward understanding intellectual abilities in general and among them the abilities in the area of creative thinking.[1] In approaching the subject from the standpoint of aptitudes or abilities we do not believe that abilities alone will provide all the reasons why people are creative or not creative. Obviously, motivation and temperamental qualities enter into the picture. Our studies have just recently branched off in those directions also.

I should like to give you some general ideas of the nature of intelligence, as a general setting for the more clearly creative-thinking abilities, for the creative abilities find their natural place among the rest of the intellectual abilities. We discover the different kinds of abilities by a particular statistical method known as factor analysis, which, as a method, will not concern us here. Very briefly and crudely explained, we start out by asking ourselves what are all the different kinds of tasks of an intellectual nature that human beings do? We next ask how well each person can do in performing on each kind of task. Everyone does well on some and poorly on others. No one does equally well on all kinds of tasks. Where the same individuals tend to do well on a small group of similar tasks, we conclude that underlying their performances on these tasks and in common to them is a unique kind of ability involved; a factor. At the present

[1]Under Contract N6onr-23810 between the Office of Naval Research and the University of Southern California.

time we have evidence for nearly 50 such distinctly different intellectual abilities.

When we examine the different factors of intellect, we find that they fall logically into certain classes. They have certain similarities and differences, depending upon the operations that are required of individuals who perform the assigned tasks, upon the kinds of material operated with, and upon the kind of end product.

We might say that there are three known kinds of intelligence depending upon the kind of material involved in the tasks or tests. One kind may be called **concrete** intelligence because the material dealt with is in the form of things that you can see or hear or feel. The objects dealt with may be visual forms with the various properties that visual forms can have or they may be speech sounds or musical sounds, to mention the most common varieties of concrete materials.

A second class of abilities has to do with verbal meanings. We may say that the material is semantic and the general area of ability is **semantic** intelligence. Such abilities are most important in learning to read and in the verbal aspects of arithmetic, so they have tended to dominate conventional intelligence tests. So many school subjects depend upon reading that this is an understandable bias. But such tests have been somewhat unfair to those who excel much more in the concrete intellectual area or in the area to be mentioned next.

A third intellectual area features material that might be called **symbolic.** Tests that indicate abilities in this area are composed of material such as letters, numbers, syllables, and words (where word meanings are of no importance; only spelling). Abilities to operate with these kinds of materials according to rules are of importance in the common subjects of language and mathematics.

A possible fourth area of intellect that can be predicted from what we know would deal with another kind of material, namely, the behavior of individuals. It would be known as **social** intelligence. Understanding one's fellows, being aware of their desires, their thoughts, and their attitudes takes different abilities than those pertaining to concrete objects, verbal meanings, or symbolic material. Different individuals would possibly excel in one or more of these areas but not in all. Excellence in one area could even be coupled with near idiocy in some other, because the factors of intelligence are relatively independent.

There can be inequalities of ability even within the same area, for abilities also depend upon the kinds of operations performed. There appear to be five classes of operations, each of which applies to the four areas just mentioned. One kind of operation is simply that of knowing information; discovering information or rediscovering or recognizing it. Abilities of another class have to do with memory; memory for the different kinds of materials and for different products resulting from the use of those materials.

Two classes of abilities have to do with productive thinking. By productive thinking I do not necessarily mean creative thinking. I merely mean that from given information some new information is produced or generated. Given certain information about weather conditions today we predict the weather for tomorrow. Given certain numerical information we estimate the amount of each ingredient needed in a fuel that will take us to the moon and back. I do not mean to imply, of course, that such calculations are common, everyday operations. I am only giving examples of productive thinking.

The last example represents one of the two classes of productive thinking; the one called "convergent" thinking. The outcome is usually one correct answer. In a mathematical problem the rules of logic are so precise and so binding that with certain given information there can be only one conclusion. Other instances of convergent thinking are perhaps less binding, but if they lead to more than one acceptable answer there is little latitude for deviation. If I ask you "What is the opposite of the word 'good,'" your first thought is "bad," which is the conventional answer, and it would be scored as correct in a test.

But there are other responses that we might regard as fulfilling the requirements of the question. Other words meaning nearly the opposite of "good" are "poor," "wicked," or "faulty." If your problems were to find out how many alternative responses you could think of in this connection, you would be indulging in what we call "divergent thinking." Divergent thinking involves searching

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around or changing direction. It does not necessarily mean flying in the face of convention, but it frequently leads to unconventional results. It is in the divergent-thinking category that we find the abilities most pertinent to creative thinking. It cannot be truthfully said that only divergent-thinking abilities contribute to creative production, for other categories of intellectual resources play their parts. It can be said that creative people are more likely to excel in the divergent-thinking abilities.

Before discussing divergent-thinking abilities in any more detail and completing the general picture of intellect, I should say that a fifth class of abilities comes under the heading of evaluation. We evaluate much of what we do, at almost any step of the way. We evaluate our information, asking ourselves whether it is correct or complete. We evaluate what we remember and recall, asking whether it is a faithful reproduction and whether it is what we need in this particular situation. We evaluate the results of productive thinking, testing whether our answer is correct (in convergent thinking) or whether it is suitable or reasonable, or good or satisfying (in divergent thinking). Self criticism is with us always, whether we realize it or not. It helps us to guide our thinking to profitable ends and to tell us when we have solved our problem and when we need to start over again. Useful as a more or less final step, evaluation is frequently inhibiting when applied too strongly or too early.

Some Divergent-Thinking Abilities

Several abilities account most directly for both the quantity and quality of our divergent thinking in creative performance. Quantity of output is dependent upon our fluency of thinking. Fluency is the facility with which thinking operations proceed or flow. One person may be able to produce 50 ideas a minute while another has difficulty in producing 5. For example, we present to each examinee a plot for a short story and ask him to give as many titles as he can think of for the story in a few minutes. In another test we ask him to give as many uses as he can think of for a common brick. In the form of a figural test, in which figural ideas are called for, we could ask examinees to present as many different border designs as they can in a given time, being given only a few elements such as an angle, a curve, and a circle. It is true, of course, that the creative person rarely works under such time pressures as we apply in fluency tests. The time control is designed to provide equal opportunity for the purposes of testing. It is assumed that the person who can produce most under these conditions has a certain kind of advantage in terms of fertility of thinking also when he has more time. Whether or not this is true can of course be determined by experiment.

Another important aspect of creativity is flexibility of thinking or freedom from rigidity. Our investigations have shown that there are two kinds of flexibility of thinking. One is called "spontaneous flexibility," since it represents automatic changes in direction of thinking even when it is not necessary. Actually, the person who is high on the scale of spontaneous flexibility tends to be flighty and fanciful in his thinking habits. This ease of changing the subject may be bothersome under some circumstances but it gets the thinker around to unusual ideas, some of which may prove to be valuable.

The other kind is called "adaptive flexibility," since it is essential in the solution of many problems. It is also an ease in changing direction of thinking, but it is of a more positive type than that of spontaneous flexibility. In trying to solve a problem, some thinkers doggedly persist in following one adopted approach in spite of failure. They are lacking in adaptive flexibility. Other thinkers under the same circumstances get out of their old ruts, strike off on new approaches, and solve the problems. Being tradition bound is largely a matter of low status with respect to adaptive flexibility.

We test for adaptive flexibility by giving problems that look as if all they need are old types of solutions but that cannot be solved without new and unusual types. We test for spontaneous flexibility by offering the examinee the chance to remain in a comfortable groove or to show a variety of responses. For example, in the test calling for uses of a common brick, the person with strong spontaneous flexibility offers several different **kinds** of uses, such as using the brick as a weight, a missile, a building material, a filter, and so on. The person low on spontaneous flexibility rides a hobby. He may never get beyond using the brick as build-

ing material.

In the creative-thinking area you would certainly expect that a trait of originality would readily appear under investigation. This expectation is sound. Individuals show their originality in test performances of different kinds, by giving novel or unusual responses, by giving far-fetched or remotely connected responses, or by giving clever responses. If we count only the clever responses to the plot-titles test we have a score for originality.

If we ask examinees to tell us what the consequences would be if beginning in 1960 only boy babies were born, and if we accept only far-reaching effects, the score indicates originality.

To give examples closer to the graphic arts, I can mention a couple of similar tests. In one we give a short sentence such as "Ring the bell" and ask the examinee to express by means of simple lines the word "ring" and the word "bell." In another test of this type we ask him to express in single lines the meanings of adjectives, such as "angry," "quiet," and "playful." Many years ago I gave such a test to students in a course on design. The teacher independently ranked her students in the order of what she regarded to be their status in originality. The agreement between scores and ranks was quite good.

In another divergent-thinking type of test we give a very few lines, which could be developed into many different objects by the addition of more lines. When we score the test in terms of the degree of complexity the examinee tended to show, we found that the score measures a trait we call elaboration ability. The same ability is indicated by the extent to which a person can offer details to round out a plan when he is given only the outline of the plan.

Some Motivational and Temperamental Traits Involved

Our analyses indicate that there are basic interests in a number of different kinds of thinking. Some of these are found to be slightly related to performance in tests of fluency, flexibility, and originality and they may also therefore play some part in other creative performances. There are other motivational and temperamental factors that we also find related to test performances.

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IN THIS ISSUE

INTERNATIONAL FEDERATION FOR ART EDUCATION

Invitation extended to all art educators, head masters, school authorities as well as to all institutions and federations concerned with the artistic education of youth in all countries to take part in the Tenth International Congress for Art Education in Basle/Switzerland, held from the 7th to the 12th of August 1958.

With the all-embracing theme: **"Education in the Arts as an Essential and Necessary Part of all Human Education"** this Congress has set the following objectives:

—to convey an impression of the present state of art education in all participating countries;

—to put forth and to clarify the most acute problems of art education;

—to investigate the possibilities of giving art education its due scope in the framework of all types of schools;

—to interest the public all over the world in an adequate artistic education of youth.

For further information write:

Kongress-Sekretariat FEA
Auf dem Hummel 28, Basle, Switzerland.

The person who is a more fluent thinker is likely to be more impulsive, more self confident, and less inclined to be neurotic. He is likely to appreciate creativity and aesthetic expression and to like to indulge in reflective thinking. The flexible thinker is likely to feel a need for variety and to like reflective thinking. The more original person is inclined to be self confident and tolerant of ambiguity, and he likes reflective and divergent thinking and aesthetic expression. The person who is low on originality is inclined to be over-meticulous and to feel a strong need for discipline and for its enforcement. The more original person is not necessarily low on a need for moral conformity, or on appreciation for moral values, in contradiction to a commonly expressed, stereotyped belief. I should remind you that these conclusions come from relationships found with performance in psychological tests. In everyday life there may be somewhat different relationships in the population, and certain individuals may provide dramatic exceptions to any rules that apply in general.

Development of Creativity

The growing appreciation of the need for increasing the level of creative performance in our population has led to some attempts along educational lines. No doubt many of you, as teachers, have also felt that something should be done in this direction. As teachers of art you occupy a unique place in this respect and you may feel that you have some responsibility that goes beyond that of contributing to the development of creative artists. Of all the subjects taught in the schools, art stands out as the one area in which pupils and students not only have some freedom to be creative but are expected to be creative. Those responsible for the teaching of art have a double question: (1) can development of habits of creativity be encouraged in courses in art and (2) can such habits be made to transfer so they will be operative and effective in other areas of intellectual endeavor?

I confess that I am not informed concerning what may have been done specifically with the intention of developing creativity in courses of art instruction. But I might call to your attention some things that are being done outside that field. In scattered places, special courses designed to improve creativity have been given, by teachers in various fields. The number of such courses has increased enormously during the past few years, until, as I have been told, there are about two thousand being offered; in universities, in industries, and in governmental agencies. Such courses have usually consisted of lectures on the nature of creativity and on exercises in creative thinking and problem solving.

A special technique that has been used in this connection is the so-called "brain-storming session" of which you have probably heard. It was designed by Alex Osborn, of the firm of Batten, Barton, Durstine, and Osborn, more particularly for the generation of new ideas for use in advertising. Typically, a small group of individuals comes together for the purpose of thinking up new ideas to meet some need, which has been announced in advance. The atmosphere is completely uncritical and permissive. Anything goes and it is expected that one person's remarks will stimulate ideas in others, so that the net effect is greater output than could be obtained if the same individuals were thinking in isolation. Rigorous experiments designed to evaluate the brainstorming technique have not been reported, but informal impressions are that it increases the production of ideas and trains the participants in useful thinking habits.

Much better than special courses on creative thinking and special techniques would be increased attention to creativity incidental to common subject matter. There are many fields of instruction in which there are opportunities to introduce the student to exercises in creative thinking. This would include courses in science, in the humanities, and in the social studies, as well as in the arts. Some fields, of course, offer more opportunities than others. But in all of them the opportunities depend largely upon how the subject matter is taught and upon the attitudes of the teacher. Understanding the nature of creative performance in terms of the abilities and other traits that contribute to it should be of considerable help in selecting the materials of instruction, the manner of presentation of that material, and the instillation of the appropriate attitudes on the part of the student.

In large part, development of creativity on the part of students will depend upon changed atti-

tudes of both teacher and student. It is reported that in a certain country the respect for textbook information is even greater than it is in the U.S.A. The goal of the student is to memorize the textbook material in order to pass examinations that call for a demonstration of such knowledge. The consequence is that the graduate knows what who said about what, but there is little preparation for tackling new problems, especially where textbook information falls short or is even in error. I do not wish to disparage the goal of acquiring information. It is not the acquisition of information, as such, that is harmful to creative performance, for invention rests upon prior information. It is the attitude toward information that often gets in the way of creative thinking.

A similar statement can be made regarding methods. There can be an over-respect for the sacredness of methods. A woman told me recently of an experience she had as a child in a school in England. The art teacher assigned an exercise and told the class exactly how she wanted it done. Our little girl thought that she saw a much better way of doing the exercise and proceeded to do it in her own way. The teacher caught her in the act and reprimanded her for it. Being stubborn, the little girl proceeded to do the task in her own way while the teacher was not looking. Her end product, incidentally, was later judged the best in the class. But apart from her happier, eventual outcome, the important point is that she had been punished for being unconventional. How many other children are similarly punished for showing originality? How often are conforming children rewarded for their conformity? According to the best information we have regarding the psychology of learning, there should be no surer way of developing habits of conformity and of discouraging habits of creativity.

How many other kinds of blocks are built up against creative effort in the average student? Granting a more permissive climate in which the child learns, since little is expected of him in the way of creative thinking he expects little of himself in this direction. There seems to be a popular opinion that creative performance is the special prerogative of the gifted few who are capable of it. If the child classifies himself as belonging in the non-creative group he accepts his fate and makes

little or no effort to be original or productive. The truth of the matter seems to be that outstandingly creative people simply have in high degree the same abilities that all of us have to some extent. A realization of this fact should be a real stimulus to many youngsters who have been afraid to try their wings for lack of confidence.

Granting that instruction in art offers numerous opportunities to teach habits of creativity, can the development of such habits learned in art courses have any effect upon creative performance in other courses or in life in general? This is a special case of the old educational question of transfer of training. We are familiar with the experimental findings that the learning of habits such as that of neatness in one course often fails to transfer to work in another. We have also been teaching under an educational bias stemming from the belief that learning is highly specific. The belief in the disciplinary value of learning has been at a low ebb for some years. My own view is that we shall have to retreat from this extreme view. Learning does generalize more than some specialists are willing to admit. We shall have to continue to recognize that there are limits to transfer of habits, but there is much transfer.

There is much evidence that the amount and kind of transfer depend largely upon the manner in which the learning takes place as well as upon the similarity of tasks between which the transfer is to occur. If similarity of tasks were the only basis for transfer, the learning of habits and skills of creativity in art would show little application to other areas, in science, for example. It is largely up to the teacher, therefore, to help the student bridge the gap between art and other fields.

It is unfortunate, but to the present time, art has been considered by the average person as a thing apart; a rather isolated field. Instead, art should be regarded as an aspect of living in general. It should help to embellish and to enrich day-to-day activities. There seems to be a growing appreciation of this principle, as demonstrated in the increased attention paid to art in the architecture of buildings designed for business and industrial purposes as well as of homes and public buildings and the attention paid to home decoration. We could go further in those directions. Acceptance of this principle, however, as well as the principle that individuals generally have something worthy of expression would help to bridge the gap between creativity in art and creativity in other areas of life. It will be largely up to the teacher of art to watch for opportunities to help the student to make the connections.

I should like to leave you with some questions to which I think you know the answers. It has been said that there are almost as many human beings living on this planet today as had lived in all historical time before the present population was born. Do we have our share of creative geniuses? Are we living too much on inherited capital? Is there anything we can do about the situation? Of one thing I feel reasonably sure. If we could somehow raise the level of creativity of the average person even by a small percentage, the social consequences would be very great.