

Creativity: a multi-faceted phenomenon by Donald W. MacKinnon (1970—note early date)

Many are the meanings of creativity. Perhaps for most it denotes the ability to bring something new into existence, while for others it is not an ability, but the psychological processes by which novel and valuable products are fashioned. For still others, creativity is not the process but the product. Definitions of creativity range all the way from the notion that creativity is simple problem-solving to conceiving it as the full realization and expression of all of an individual's unique potentialities. One would be ill advised to seek to choose from among these several meanings the best single definition of Creativity, since creativity properly carries all of these meanings and many more besides. Creativity is, indeed, a multi-faceted phenomenon.

What I am suggesting is that we think Of Creativity, not as a theoretical construct to be precisely defined, but rather as a rubric or a chapter heading under which a number of related concerns quite naturally fall. Conceived of in this way, there are at least four major aspects of creativity which deserve attention: (1) the creative process, (2) the creative product, (3) the creative person, and (4) the creative situation. Each of these can be formulated as a question to which empirical research, if it has not already done so, can provide some answers: (1) What is the nature of the creative process? What are the qualities and kinds of psychological processes by which creative solutions to problems are achieved? (2) What are creative products? By what qualities can they be identified? (3) What are the distinguishing traits and characteristics of creative persons? (4) What are the specifications of the creative situation, the life circumstance, or the social, cultural, and work milieu which facilitate and encourage the appearance of creative thought and action?

THE CREATIVE PROCESS

Those who have been fortunate enough to experience moments of high creativeness, as well as psychologists who have sought to understand the process whereby creative solutions to complex problems are achieved, are in remarkable agreement as to how the creative process is to be described. Both have noted certain distinguishable phases or stages in the process. Those that I would emphasize are the following: (1) a period of preparation during which one acquires the elements of experience and the cognitive skills and techniques which make it possible for one to pose a problem to himself, (2) a period of concentrated effort to solve the problem which may quickly be solved without much delay or difficulty, but which perhaps more often involves so much frustration and tension and discomfort that, out of sheer self-protection, one is led to (3) a period of withdrawal from the problem, a psychological going-out-of-the-field, a period of renunciation of the problem or recession from it, a time away from the problem that is often referred to as a period of incubation, which is followed by (4) a moment of insight that is accompanied by the exhilaration, glow, and elation of the restructuring "a-ha" experience, and (5) a period of verification, evaluation, elaboration, and application of the insight that one has experienced.

The creative process starts always with the seeing or sensing of a problem. The roots of creativeness lie in one's becoming aware that something is wrong, or lacking, or mysterious. One of the salient traits of a truly creative person is that he sees problems where others don't, and it is this that so often makes him unpopular. He insists on pointing out problems where others wish to deny their existence. A constantly questioning attitude is not an easy one to live with, yet in its absence many problems will not be sensed and consequently creative solutions of them will not be achieved. It has been said of Einstein that a part of his genius, like that of all great creative thinkers, was his inability to understand the obvious.

Creativity, although presently much emphasized in psychological research and in the thinking of many intelligent persons, as evidenced by the theme of this conference, has been one of the most neglected topics in the history of mankind. For far too long the creative process was thought of as inherently mysterious and unanalyzable, and the creative person as too sensitive and precious to be subjected to study. Today the creative process is recognized as scientifically researchable, and the creative person as capable of being assessed as any other human being.

It is misleading to refer to the creative process as though it were a single, unitary process. The term

should be thought of as no more than a convenient summary label for a complex set of cognitive and motivational processes, and emotional processes too, that are involved in perceiving, remembering, imagining, appreciating, thinking, planning, deciding, and the like. Such processes are found in all persons, not merely in a chosen few, though obviously there are wide differences in the quality of these processes as well as in the degree to which persons are creative.

There are several factors that serve to block or inhibit a person's creativeness, first among them being the failure to see a problem where one exists. He who is overly satisfied with himself or with the situation in which he finds himself will be blind to shortcomings in himself or in his surroundings. Some measure of dissatisfaction with the present state of affairs—because it isn't clear or is incomplete or is in some sense disturbing—is a prerequisite for any attempt at transformation and improvement. There is the necessity in the creative person for what the poets have called "divine discontent" and what Voltaire chose to call "constructive discontent."

But becoming aware of a problem either by sensing it oneself or by having it pointed out by another will not insure that the problem will be solved creatively or even that it will be solved at all. There is the necessity that the problem be properly perceived and correctly defined. When it is, the very statement of the problem carries within it hints or suggestions as to how it may be solved. Improperly formulated, the problem may appear to be insolvable and, indeed, because of that very fact alone, it may be so. The first task, then, for one who is going to solve a problem creatively is to make a sufficient analysis of the complex situation, narrowing-down and simplifying it, until the crucial difficulty in the task is isolated.

Since most problems are neither clearly perceived nor correctly defined, the first task of a creative person, after becoming aware of a problem, is to see it in a light different from that in which it is originally presented. He must, in other words, be cognitively flexible, capable of reorganizing and restructuring the problem so that possibilities of the solution are carried within the new reformulation of it, if he is ever to solve it creatively.

Another important factor that may hamper attempts to solve problems creatively is the amount and availability of information or knowledge pertinent to the solution. Obviously, too little information or unavailable information will impede or even make impossible the solution of a problem; one must have the relevant and necessary information if the problem is to be solved. It is equally true, however, that too much information can interfere with the attainment of a creative solution. An excessive input of information can produce a state of what has been called "mental dazzle" which makes the problem look more complex than in actuality it is.

In many fields of endeavor the day has long since passed when the "primitive" is likely to be highly creative. In our scientifically and technologically advanced society the well-trained and highly educated professional must possess a large body of expertise. But, as just noted, too much knowledge can be a dangerous thing for creativity. It is not by chance that most of the major inventions have been made by persons who have not been experts in the field of their inventions. The expert, all too often, "knows" both on theoretical grounds and on the basis of empirical findings that certain things are not so or just cannot be done. The naive novice ventures what the expert would never attempt, and often enough succeeds. Some of the most creative scientific achievements have been accomplished by men who, trained in one field, enter upon another, there to formulate new problems and execute novel experiments with the expertise gained from earlier training and experience but at the same time with the naive perception of a stranger in a foreign land. The creative person is one who in his intellectual endeavors reconciles the opposites of expert knowledge and the childlike wonder of naive and fresh perception.

As a result of our training as well as of our experience most of us are disposed to approach any problem with as analytical an attitude as we can muster. We would be ill advised to do anything else, yet paradoxically, efficient, economical, and analytical perception is sometimes the enemy of creative insight. Analysis disassembles a whole into its parts, separating out from one another the elements of a problem. At a certain stage this is necessary, if progress is to be made; but in the course of analyzing a problem certain attributes which pertain to the phenomenon as a whole may be destroyed with the danger that eventually one "cannot see the woods for the trees." What is then needed, if there is to be a creative

reorganization, is a compensating, free, spontaneous look at the whole situation, a naive and childlike apprehension of what is there. Such an attitude encourages the use of imagination in the form of analogies, and similes, and metaphors which are so crucial in the insightful reorganization of any problem.

There is much more to say about the creative process; other aspects of it will come to view as we turn our attention to the other facets of creativity.

THE CREATIVE PRODUCT

Anything that is experienced or made by man—an idea, a work of art, a scientific theory, the design of a building—may be a creative product; but if they are to qualify as true creations they must first meet certain criteria.

The first requirement of a creative product is novelty; it must be original. But novelty and originality need further specification, for one must at once ask, within what frame of reference or range of experiences is the product original—that of an individual, or of a group, or of mankind. Much that a young child experiences and many of his ideas will be new to him and in that sense creative for him, but if these experiences and ideas are had by practically all children they are not creative products for the society in which the child lives. Similarly, a man may think a thought new to him, yet it may be one of the most common thoughts in the whole world. Thus the creativeness of a product when judged in terms of novelty, originality, or statistical infrequency is always relative to a given population of products. Those that are most creative are the ones that are novel or original in the experience of an entire civilization or of all mankind.

Mere novelty of a product does not, however, justify its being called creative. There is a second requirement, namely, that the product be adaptive to reality. In other words, it must serve to solve a problem, fit the needs of a given situation, accomplish some recognizable goal. And this is as true for the expressive arts as for scientific and technological enterprises; in painting, the artist's problem is to find a more appropriate expression of his own experience; in dancing, to convey more adequately a particular mood or theme, etc.

A third requirement that a fully creative product must meet is that the insightful reorganization which underlies it be sustained, evaluated, elaborated, developed, and communicated to others—in other words, the creative product must be produced.

These, as I see it, are the three absolute criteria of a creative product. There are additional and, if you will, optional criteria. The more of them that are met, the more creative the product, for, though there may be many correct solutions to a problem, not all solutions are equally good. Some are more elegant than others. Thus there is a fourth criterion, met by a truly creative product, which demands that the answer which the product yields be an aesthetically pleasing one. The solution must be both true and beautiful.

The fifth and highest criterion for a creative product is seldom met since it requires that the product create new conditions of human existence, transcending and transforming the generally accepted experience of man by introducing new principles that defy tradition and change radically man's view of the world. Products of this level of creativeness would include the heliocentric theory of Copernicus, Darwin's theory of evolution, and Freud's psychoanalysis.

A distinction is frequently made between two kinds of creativity and creative products—artistic and scientific. Artistic creativity, it is said, results in products that are clearly expressions of the creator's inner states, his needs, perceptions, emotions, motivations, and the like. In creating them he has a deeply moving emotional experience or encounter. In scientific creativity, it is argued, the product is unrelated to the creator as a person, who in his creative work acts mainly as a mediator between externally defined needs and goals, operating on some aspect of his environment so as to produce a novel and appropriate product, but he adds little of himself or of his style as a person to the result. Such a description of scientific creativity is, however, more appropriate to technological and inventive activity in which the

affective life of the worker plays relatively little role. In the highest reaches of science as well as of art it seems clear that there is a connection, albeit a mysterious one, between affectivity and the creative process. In the arts, the great productions appear to be exquisite attempts to resolve an internal turbulence. In the sciences, the important theoretical efforts seem to be personal cosmologies as much as anything else (witness Einstein, the prime example; Sherrington, Cannon, Born, Schrodinger, and others). The validity of the creative product thus is almost (but not quite) incidental to the forces driving its expression. And the forces are largely affective. There is another sense in which the distinction between artistic and scientific and technological is often obliterated, for surely there- are domains of creative striving in which the practitioner must be both artist and scientisttechnologist; architecture would be a good example. Great architectural designs are surely expressions of the architect and thus very personal products, at the same time that they impersonally meet the demands of external problems. Surely, however, creative products are not limited to the realms of art and science and technological invention, but include such intangibles as those educational, social, business, and political climates which permit and encourage those who are in them to develop, and to express to the full, their creative potentials. In some cases even a person may be thought of as a creative product. These are the persons who have been variously called, by Goldstein and Maslow, the self-actualizing person, by Jung, the individuated person, by Rogers, the fully functioning individual, by Fromm, the productive character, and by Rank, the artist, the man of will and deed who makes a work of art out of his own life.

THE CREATIVE PERSON AND THE CREATIVE SITUATION

The other two facets of creativity, the creative person and the creative situation, I shall discuss together rather than separately, for it is to the answering of these two related questions that the researchers in the Institute of Personality Assessment and Research have contributed most directly and importantly. Our present concern with creativity is the most recent expression of the continuing research objectives of the Institute, namely, the delineation of the characteristics of individuals, who, in their personal lives and professional careers, function with high effectiveness, and the discovery in the life history, in the present life circumstance, and in the structure personality, of those factors which contribute to and make possible personal and professional effectiveness.

Although our researchers have revealed differences among creative workers in the several fields we have studied, our most impressive finding is the large number of attributes which they share in common. I shall therefore, and especially in view of the constraints of time, limit my remarks to a presentation of a few of the more salient characteristics of all the creative groups we have studied, emphasizing what is most generally true of creative persons.

Few would doubt that it is the events of the early years of life, and the social and intellectual climate in which a child grows up, that are most crucial for the nurturing of creative potential. However, again due to the constraints of time, in discussing the creative situation, I shall restrict myself to suggesting, mindful of the traits of creative persons, ways in which colleges might structure the curriculum and provide intellectual climates most likely to foster the creative potential of their students.

Creative persons are, in general, intelligent, whether their intelligence is estimated from the quality of their accomplishments or measure by standardized tests. Yet we have found essentially zero correlation between the measured intelligence of our creative subjects and the judged creativeness of their work; and, similarly, little relationship between their academic performance both in high school and in college, and their judged creativeness. One obvious implication of this finding is that a college which desires to nurture creativity should perhaps start by examining its admissions policy. If it wishes to admit mainly those who will do well academically it should, as most colleges in the past have done, give preference to those whose grades in high school are good and whose scores on tests of scholastic aptitude are high, since it has been repeatedly shown that these are the best predictors of academic achievement in college. If, however, a college seeks students with creative potential, it will inquire about the creative accomplishments of its applicants during the high school years or even earlier, for these are the best predictors of creative achievement in college and thereafter.

A certain level of intelligence is required for satisfactory academic achievement in college, and we should

not delude ourselves into thinking that we can lower drastically the level of intelligence required for admission and still have students capable of meeting the standards of higher education as we have known them in the past. Traditionally there has been an overemphasis on intellect and aptitude in college admissions. The need to right that imbalance by giving more weight to factors of interest and motivation is clear; it is important, however, not to move so far as to substitute a new imbalance for the old. Non-intellective factors are no more the sole determinants of creative performance than intellective factors were in an earlier day thought to be, but they obviously need to be taken into account in selecting students.

Creative persons are independent in thought and action, and it is this independence of spirit that may well account for the lack of correlation between their high school and college grade-point averages and their subsequently demonstrated creativeness. Typically, they earn high grades in courses which interest and challenge them and poor grades in those that do not. Thus I would suggest that in selecting students at both the graduate and undergraduate levels more attention be paid to the pattern of grades earned rather than to mere grade-point average or rank in class.

Since it is a fundamental characteristic of those with creative potential that they are strongly motivated to achieve in situations in which independence of thought and action are called for and have much less interest or drive to achieve in situations which demand conforming behavior, as much opportunity as possible should be provided for independent study and research. All too often, however, in most colleges independent study is restricted to honor students, and while they too can profit from such a program, there would seem to be little justification for excluding from such opportunities the very students likely to profit most from them.

Creative persons are open to experience both of the inner self and the outer world. As between perceiving (becoming aware of something) and judging (coming to a conclusion about something) creative persons are on the side of perception, receptive, and seeking to know as much about life as possible. Their perceptive attitude expresses itself in curiosity; it is the hallmark of their inquiring mind. Moreover, creative persons are discerning, observant in a differentiated fashion; they are alert, capable of concentrating attention and shifting it appropriately; they are fluent in scanning thoughts and producing those that serve to solve the problems they undertake; and, characteristically, they have a wide range of information at their command. From an associationistic viewpoint, creativity is putting the elements of one's experience into new combinations, and the more bits of information one has and the more combinations that are formed, the more likely it is on purely statistical grounds that some of them will be creative.

Colleges can nurture and reward the perceptiveness and curiosity of their students by providing a wide variety of courses of study. All too often, though, they curb the far-ranging interests of their students by demanding that an excessive number of units of study be taken in the major subject. In all education, and especially in professional education, an openness of mind, and thus the creative potential of students, can be fostered by a broadening of their experience in fields of study beyond their specialty. Such wanderings should be encouraged, for they provide the student with that range of information and knowledge without which the highest levels of creative achievement are unlikely to be reached.

The creative person's perceptive openness to his inner life, to his feelings and emotions, to his imagery and symbolic processes, and to much that in others remains unconscious, provides not only multiplicity and richness of experience but also the experience of conflicting opposites and at times even of chaos. But without such psychic turbulence combined with an independence of spirit, one is not likely to grow creatively. We who are teachers need constantly to remind ourselves that students who combine these traits will often enough act in ways that are disturbing to us. What we need at such times is some of the tolerance that they show, if we are genuinely to support and encourage them in their creative striving.

Creative persons are intuitive both in their perceptions and in their thinking. Keenly perceptive as they are, they do not remain unimaginatively focused upon what is given by the senses. Rather, they immediately grasp the deeper meanings, the implications, and the possibilities for use or action of that which they experience.

Traditional emphases in education—rote learning, learning of facts for their own sake and unrelated to other facts, repeated drill of material, precise memorization—are often enough valuable and required, but they contribute little to the nurturance of the processes of intuition and, indeed, seem almost designed to inhibit them. If intuitive powers are to be strengthened, quite different exercises are required, for example, transferring of training from one subject to another; searching for common principles in terms of which facts from quite different spheres of knowledge can be related; developing a feeling for analogies, similes, and metaphors; seeking the symbolic equivalents of experience in the widest number of sensory and imaginal modalities; engaging in imaginative play; training in retreating from the facts in order to see them in larger perspective and in relation to more aspects of the larger context thus achieved.

Creative persons prize most highly the theoretical and the aesthetic. Their valuing of the theoretical is congruent with their intuitiveness, for both orient them to seek a deeper and more meaningful reality beneath or beyond that which is present to their senses.

The theoretical value is the highest value in scientific and scholarly research. One of the best ways for a professor to nurture the theoretical interests of his students is to engage them in his own researches, and not merely as laboratory assistants or technicians, but as full-fledged collaborators in all phases of the research and most importantly in its conceptualization and planning. An even better way of fostering the development of students' theoretical interests is, of course, to encourage them to formulate their own problems and to design and execute their own researches.

The truly creative person is not satisfied with the solutions to his problems unless they are also aesthetically pleasing—unless, to use the mathematician's term, they are elegant. The aesthetic viewpoint permeates all of the work of the creative person, and it should find expression in the teaching of all skills, and disciplines, and professions if creativity is to be nurtured.

The Swiss psychologist Carl Jung described human nature as ruled by a law of complementarity: the tendency for every trait of man's conscious and manifest personality to be matched or complemented by its opposite in his unconscious and undeveloped self. Those aspects of self and experience which are unconscious and unexpressed in man partake of these characteristics for one of three reasons: either they have been neglected because conscious attention was never paid to them, or they have been repressed or suppressed because to experience them would be too painful, or they have remained undeveloped and unexpressed because the conscious ego, the person, is not yet mature enough to experience them. To experience what is unconscious and to give expression to it in a fully conscious manner is not easy and often enough painful and frightening. Consequently, most persons live a sort of half-life, giving expression to only a very limited part of themselves, and realizing only a few of their potentialities. In contrast, the creative person has the courage to experience the opposites of his nature and to attempt some reconciliation of them in an individuated expression of himself.

The most salient mark of a creative person, the central trait at the core of his being is, as I see it, just this sort of courage. It is not physical courage of the type that might be rewarded by the Carnegie Medal or the Congressional Medal of Honor, although a creative person may have courage of this kind, too. Rather, it is personal courage, courage of the mind and spirit, psychological or spiritual courage that is the radix of a creative person: the courage to question what is generally accepted; the courage to be destructive in order that something better can be constructed; the courage to think thoughts unlike anyone else's; the courage to be open to experience both from within and from without; the courage to follow one's intuition rather than logic; the courage to imagine the impossible and try to achieve it; the courage to stand aside from the collectivity and in conflict with it if necessary; the courage to become and to be oneself.

If my assessment of the creative person is correct, our task as educators, whether we be parents or professors, is not so much to teach creativity as it is to encourage our charges by ourselves being those creative persons in whom the opposites of our nature have been reconciled, creative persons with whom they can identify. Thus we each would become an educator in the original meaning of the word—one who brings forth or educes from another that which exists as a potentiality within him through being an

example of that which is desired.

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