Time, Space, and Causality

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I have presented the evidence and described the mirror-image processes; the task is now to understand and to establish the nature and extent of what has been achieved. Have we indeed discovered the cause or causes of creativity? How do the mirror-image processes operate, precisely, to produce creations? Considering the matter of arousal in the creative process emphasized earlier, what is the evidence for such arousal and how does it function in created products? Are there other qualities of the mirror-image processes, beside their arousal function, that lead to the production of creations?

I shall, in this and the following chapter, be concerned with the answers to all these questions. To some extent, the full answers await further empirical research, but something needs to be said now about the nature of the mirror-image processes in relation to creations and to creativity. Their role and their extensiveness must be pinned down and clarified more precisely. In these two chapters, therefore, I shall relate the mirror-image processes to the factors intrinsic to the definition of creation that I stipulated in the introduction to this book, the factors of newness and of value. Some of the relations have already been outlined or implied earlier, particularly in chapters 3 and 8, and those I will primarily expand or make explicit. Others that may be surprising I shall spell out for the first time now. I have held some of this back because of the logic of the exposition, but I will also confess that I have exerted some prerogative to reserve a few surprises for the end. My purpose has neither been to outrage nor to irritate but really to render the discussion somewhat isomorphic with its subject matter. As suspense is the stock-in-trade of the creative artist, am I not obliged, in a scientific analysis of his work, to do him the slight homage of following his precepts? A request for indulgence.

One word of warning, however: the discussion in this chapter might, for the scientific reader, seem too philosophically oriented both in tone and in terminology. Though I believe, and I hope to show, that so-called philosophical matters are important with respect to creativity,[1] I am also aware that some find such matters tedious and digressive. These latter I urge to skip to the next chapter now, perhaps to return later to this one after digesting the material at the end. The philosophically minded may consider this chapter long overdue and may have skipped to here already.

While there are many ways of defining creations and creativity, I have chosen to be guided by what are perhaps the most stringent definitions of all; creations are both *new* and *valuable* and creativity is the state or capacity through which a new and valuable entity or quality is brought into being. Consequently, I have focused fairly steadily on creations that are generally considered to be among man's most valuable achievements, those in art, science, religion, philosophy, and other intellectual endeavors. I admit it is not necessary to be so stringent about the matter; one could provide some suitable criteria for what is valuable that encompass a far broader range of activities. Sheer productivity could be considered valuable, and in the narrow sense that people produce particular things that never existed before, one could start with the assumption that productivity and creativity are synonymous. Also, internal psychological experiences are new and valuable for the person experiencing them. There are creative cooking, creative discourse, and creative performance in sports, physical labor, and other areas. However, such broad criteria for the valuable seem too relative and intangible, and I have deemed it difficult to obtain a scientific consensus about them. Consequently, I have been left with a definition of creations and creativity that comes close to excluding everything but the achievements of genius. Genius stands virtually alone as the unchallenged perpetrator of creations,- only the products of genius are widely accepted as unquestionably valuable and truly new. As Kant said, "Genius is the talent (or natural gift) which gives the rule to Art."[2] The relationship between genius and the new and valuable is actually reciprocal: when a product is hailed as being an unquestioned creation, its author or producer is designated as a genius. To some extent, the matter is completely circular and tautological; I bring in the word "genius" only to highlight the nature of the task I must consider. One way of asking the question here could be: have we found the cause of genius?

To some extent, I have tried to meet the challenge of such a question by citing the works and testimony of unquestionable geniuses such as Einstein, da Vinci, Michelangelo, Rembrandt, Picasso, Darwin, Freud, Pasteur, Poincare, Nietzsche, Kierkegaard, Sartre, O'Neill, Beethoven, Mozart, and others. But I seriously doubt if my severest critic or the strictest methodologist would require that I limit my discussion of creation and creativity to the works and acts of the very few such as these. Moreover, the idea of genius as the only true creator goes beyond the requirements of a strict definition of creativity and of creation, because the term "genius" suggests certain factors of genetic endowment, extraordinary intellectual capacity, and the repeated production of highly valued thoughts and works. Such factors

need not enter if we focus merely on the production of any single creation and on creativity either as a potential for, or a state of, bringing forth creations.[3] After all, it is hardly necessary to answer all the questions about genius or to be limited to considering the extraordinarily high levels of success associated with genius; nor is it actually clear that genetic endowment or extraordinary intellectual capacity is required for every type of creating.[4] More to the point in the present consideration is the question of whether we can speak of finding the "cause" of creativity in any sense, whether it be the workings of genius, creativity taken broadly, or the appearance of a single creation. For in raising the question of finding the cause of creativity, we are confronted with the problem of the "new" and of "newness" as intrinsic to the definition of a creation.

Causation and Newness

Creations are new; to create is to bring forth something new. While it is common and lexically accurate to use the word "creation" merely to refer to something made or brought into being, we are not interested in that elemental use of the term in our researches. Shoes, automobiles, and other more advanced products of our impressive technological age are surely all made and are brought into being, but, unless they are individually or categorically unusual and unique in some way, they are seldom classified or studied as creations. We make further demands: seldom are we satisfied for an unusual entity to be merely different; to be studied and appreciated as a creation, we expect it to be unprecedented. It is the unprecedented aspect of an entity "brought into being" that captures our imagination and, along with the entity's value, leads to the honorific designation of "creation." For the term has been used to describe the beginning of the world and of life, and we tend to believe that both the initial creation and creations made by humans share an essential attribute of newness.

New, think about the word "new." What is the sense in which we mean it here? In what way is something new? I have connected "new" with the quality of being unprecedented but surely alternate meanings and interpretations come to mind: (1) Nothing is really new under the sun,- things that seem to be new are merely reappearances of past substances or forces (remote, obscure, or forgotten). (2) Things are merely new in a particular context; something that already existed in another context is brought to our awareness or into our sphere, and therefore seems to be new. For the native bushmen of Australia, almost everything in the civilized world is considered new, including what has existed for

centuries. (3) New things result from combinations and recombinations of things that existed before. Perfectly respectable are all of these alternate interpretations of "new," and all provide an approach to much that is considered new in human experience. Scientific discoveries may surely appear to be new as a result of these factors and a good deal of what appears as new in artistic and intellectual creations also results from one or other of them. Possibilities for shifting contexts are almost limitless in art, and, a far cry from the naiveté of the native bushmen of Australia, sophisticated art audiences have been exposed to newness resulting from a shift of context throughout the history of art. Shift to a classical mode during the Renaissance, a shift to primitive modes during modern times, and the more specific context shifts in the experiments of the dadaists in the 1920s, and the continuing present emphasis on "found" art (natural objects presented in the artistic context) come immediately to mind. Moreover, all of these alternate interpretations produce no difficulty with respect to the problem of finding a cause of creativity. They all refer to traceable factors that can account for the appearance of the new.

If we accept these interpretations of the manifestation of newness in art, in science, and in other areas of tangible creating, both the homospatial and janusian process decidedly do cause many aspects of creations. For, inducing surprise in an observer or producing the unexpected—effects intrinsically linked to both processes—are the critical features underlying all three interpretations of the manifestation of the new. If what is new depends on already existing factors being combined or recombined, or reappearing, or appearing in another context, or all three, then surprise and the unexpected play a very important role. We call something new either because we are surprised to see it appear in an unfamiliar context, or we never expected it or knew it existed, or it is the unanticipated result of a combination or recombination of known factors. Indeed, important aestheticians and psychologists give the element of the unexpected a prominent place in their theories of art.[5] And scientific discoveries are often called creations because they are so completely unanticipated and surprising.

Both of the mirror-image processes of thought lead directly to surprising and unexpected effects. What could be more surprising than the simultaneous antitheses resulting from janusian thinking? How could one be taken more immediately off guard than by an assertion that the complete opposite or antithesis of an inviolately held belief, fact, or proposition is true? And then, not only is the opposite or antithesis of the inviolate original considered to be true and valid, but its truth does not actually

challenge the validity of the original! In like manner, what could be more surprising than the manipulations of the homospatial process? When, in our experience, do we ever find two or more discrete entities occupying the same space? When, except in the creative process, is it ever imagined? Nothing in human experience can compete with janusian and homospatial thinking for producing the element of surprise. Two tenets of human experience and thought that have been held throughout history and culture are (1) something cannot be true and not true at the same time, that is, contradictions always invalidate one another; (2) two or more things cannot at once occupy the same space.

Although janusian and homospatial formulations do not, as I have emphasized, necessarily appear directly in creations, their transformations and ultimate effects retain an implicit and intrinsic element of surprise. Literary tragedies, for instance, arise from a janusian formulation of antithetical elements, such as freedom in slavery, pride in humility, or triumph in defeat. When these antithetical qualities are revealed and elaborated as a tragic novel or play unfolds, there is always an element of surprise, the culmination and overall impact of the suspenseful journey the creator has given us.[6] Effective metaphors resulting from homospatial thinking or from janusian and homospatial thinking operating together always produce surprise when first encountered and often continue to do so on later encounters. Think, for example, of what would have been the initial impact of metaphors such as "black holes in space" or Marianne Moore's famous "the lion's ferocious chrysanthemum head"[7] with their overtones of impossible contradiction and equivalence. The more one thinks of a literal equivalence between a lion's head and a chrysanthemum flower or of actual holes in outer space—overtones and implications that must have played a role in their initial impact—the more surprises and interesting connotations appear.

Both homospatial and janusian thinking produce effects that satisfy interpretation 2 and 3 (above) of the new as combination or recombination of the old, or as the result of shifts of context. Although I have emphasized the integrating rather than the combining function of homospatial thinking, there is no necessary contradiction. Combining is not the same as integration, but the former is still included in the latter. Some degree of combining occurs in producing integrations and therefore the bringing together of previously existing discrete entities in a homospatial conception, and of previously existing opposites and antitheses in a janusian conception, involves combinations or recombinations of the old in the sense of the interpretation 3. Shift of context also is involved. For example, the logical understanding of the janusian formulation leading to "In Monument Valley" is that horses are, in a sense, both human and not-

human. This does not arise from the ordinary context of horses defined merely as animals; the formulation arises only when shifting to the context of how horses spend their lives. For the metaphor "the road is a rocket of sunlight," the road can be seen as this rocket only when shifting to the context of the driver in the speeding car, or from a hill above the road, or from the perspective and context of a war-weary soldier.

Less intrinsically linked to the mirror-image processes is the first interpretation of the new as the reappearance of past substances or forces. Only if we focus on the mirror-image process function of unearthing unconscious material could this interpretation apply. By definition, the Unconscious contains the old, the hidden, and the forgotten or repressed; shared very old and forgotten material reappearing could seem new. Physical and cultural events, facts, and experiences that reappear would, however, not necessarily be included. According to some, the basis of poetry and presumably its newness derive from the "revaloration" of words, reinvesting words with older and more fundamental meanings. With this definition, metaphorization and the mirror-image processes, which make use of literal, concrete, and unconscious qualities of words, could be primarily responsible. For that matter, if metaphors are viewed as interesting and new because they reveal hidden connections between known objects, events, and ideas—a view I consider quite limited—the mirror-image processes would also be primarily involved. Hidden connections usually involve unconscious material and the mirror-image processes function consistently and effectively to unearth such material.

If we use the stricter and more literal definition of the new, the new as the completely unprecedented,[8] the matter of designating the factors responsible for creations—the cause of creativity—becomes far more complicated. Nevertheless, it is necessary to come to grips with the dilemma. For there are surely types of creations that appear to be unprecedented, not in the sense that every single feature is new but in their significant aspects. Every creation must have known or familiar aspects—with the possible exception of creations attributed to a deity—or it would not be understood or recognized. Moreover, much of the value accorded to creations derives from their effective representation of the familiar. Both artistic and scientific types of creations must faithfully present known internal or external reality. Science reproduces exactly both the past and current state of events and laws, and art represents the qualities of sounds or movements or sights or words, the manifestations and functions of ethics and morality, the role of thoughts and feelings and social forces, and the appearance of the changeable and

the inevitable. Nevertheless, in designating something as a creation, we suggest that it is in some way or in some respect truly unprecedented and new. We suggest there is, in some fashion, complete discontinuity from the past. This newness may consist of a new particular factor such as a new sound, a new value, or a new perception of reality. It may, as Hausman suggests, consist of the full presentation of a new form, a form that initiates a new class of entities. In art, such far-ranging newness is most clearly exemplified by the works of Homer, Cervantes, Haydn, Beethoven, Cezanne, Braque, Joyce, Strindberg, Picasso, Schoenberg, and other innovators. This issue is not semantic; regardless of definitions and terms used to discuss creations, we must acknowledge our intrinsic belief in a real or actual unprecedented aspect, and, in many if not all cases, our realization to some degree of what appears as actually or truly new. Surprise is not enough to account for what appears as truly new.[9] For one thing, surprise does not explain the impact. We do not return to a work of art, or relisten to a piece of music, or go again to a well-known play primarily because we want to recapture an earlier experience of surprise, but we do return to such works partly in order to re-experience our initial sense of their newness or novelty.

Over and beyond the experience of newness in the observer or audience, we must consider the newness experienced by the creator. After all, the observer could be deceived; regardless of his belief about the unprecedented nature of a particular creation, he may merely not know enough to be able to detect all its forerunners and precedents. A creation may initiate a new form merely through chance or through selection as a result of complicated but knowable sociological or physical factors. Accidental chisel markings on a sculpture could, for instance, become the herald of a new approach during the proper social and critical climate. We need to turn to the creator, but that too produces a dilemma. Creators constantly tell us, in public statements and elsewhere, that they often do not know the sources of their creations; they experience leaps of thought and a sense of discontinuity in the creative process. In the midst of a train of thought, an idea comes that seems to have no connection with what went before.

Discontinuity is the source of the dilemma. Complications result both from the creator's experience of discontinuity during the course of the creative process and from the discontinuity from the past required for the appearance of something truly new. Complications particularly arise with respect to cause and causation. Causes depend on continuous processes; if a break or discontinuity occurs within a process, it becomes difficult, or perhaps impossible, to identify a cause. If something is truly unprecedented and new, it lacks or is discontinuous with antecedents. And a causative factor must be

antecedent to, or in some way contiguous with, the entity it produces.[10] Put another way: if we were to know the cause of a phenomenon, we would then be in a position to predict its occurrence. For having in our possession a sure knowledge of what has produced the phenomenon, we should be able to predict what will produce it again. But if creations are truly unheralded and new, they are intrinsically unexpected and therefore unpredictable. More important, if there is real discontinuity in the creator's thought during the creative process, we can never predict the occurrence of creative ideas.

In making this point, I am for the present ignoring many distinctions and relationships that would add richness and specificity to the discussion, such as: cause as both a necessary and sufficient condition; cause in relation to correlation; a creation as totally new in distinction to new only in certain aspects; predicting the necessary conditions for the appearance of a creation versus predicting the precise nature and qualities of the creation. I am also ignoring the enormous number of elements, in art especially, that are fully and clearly continuous with antecedents. Much of art is a direct product of experience and a direct reflection of nature and of experience. But this does not account for the new. I will return to some of these matters, but for now I want to press on and examine some direct implications of the dilemma about the cause of creativity.

As I said, cause depends on continuous processes and this is a source of difficulty. What, then, do we mean by "continuous processes" or, for that matter, any type of continuity? Continuity refers to nothing other than continuity in time and space. A causative factor is either continuous or contiguous in space with the entity it produces or it is closely associated or continuous in time. Or, cause and caused are continuous both in time and in space. Time and space. We have arrived at the most basic factors we know. Causality, creativity, everything in experience, must eventually be related to these two basic factors. Let us then look at time and space, each in turn. Particularly, we shall look at the mirror-image processes in relation to time and space and see if we can answer the question raised at the beginning of this chapter.

Time

There seem to be virtually as many approaches to the matter of time as there are years in recorded history. There are distinctions made between clock time and real duration; cosmic and human time or physical and psychological time; actual and possible becoming. There is time considered as motion, time

as duration, time as only an abstraction, time as change, time as aging. There are concerns about measuring time appropriately and there are attempts to reverse time, speed it up, or slow it down. The list goes on and on, but in an interesting development during the current century, philosophers have turned their attention directly to the terms applied to time. They have decried the tendency, in Western thought especially, to spatialize time, that is, taking metaphorical terms derived from spatial relations such as long and short, near and distant, and using them in a literal way to define qualities of time. Since Einstein's discovery of relativity, physicists and philosophers have been particularly interested in relationships between time and space, and they have raised important questions about a real space-time continuum and about the irreversibility of time.[11]

I do not propose to enter here into any of these intriguing questions and approaches to time. Nor do I intend to develop a definition of time that will necessarily satisfy the many issues, metaphysical and scientific, raised in the various approaches. I will merely emphasize some aspects of time that pertain particularly to causality, elemental aspects that can still be considered as intrinsic to time. As the philosopher-scientist Waismann, in a modern paraphrase of Saint Augustine, said: "The queer thing is that we all seem to know perfectly well 'what time is,' and yet if we are asked what it is, we are reduced to speechlessness."[12]

The first aspect of time I will discuss is sequence, or succession. Intrinsic to time, both as an experience and as a notion, is the appearance of sequence. Events clearly follow each other; something comes first and another comes after. We distinguish between these: before and after, then and now; now and later; past, present, and future. We observe sequences in complicated events, not merely noticing that one drop of water falls before another but seeing that long series of events precede and follow one another. Though we sometimes project a sequence onto the elements in a static object, say, when viewing a painting, we are aware (when challenged) of the differences between such a mentally projected sequence and an actual physical or perceived succession.

The second is repetition. Although events may never occur in exactly the same form twice, repetition is intrinsic to time. If the sun did not rise and set repeatedly, we might have observed other regularities defining the passage of time. Without such regularity and repetition, in fact, we would not have developed a sense of time as continuous passage. Some would emphasize change rather than

repetition—that it is the change from light to darkness that denotes passage of time. And surely the occurrence of physical change and aging is one of the most dramatic and poignant aspects of our experience of time. There is no need for contention: both change and repetition are important. But repetition is critical to passage, measurement, and causality. Without repetition, there would be no sense of one event causing another nor would there be any way of determining a cause or even a correlation.

Sequence and repetition are important aspects of time, and both are critical to causality. Both are also decidedly present in the creative process. The creator produces various aspects of his work sequentially and much repetition occurs. There is repetition within the work being created and repetition in his life experience. Time passes, and no one would doubt that it takes some time to produce a creation. Yet it is constantly reported, by creators in every field, that there are experiences of timelessness when actively engaged in creating. How can we understand this?

The generally accepted explanation pertains to attention and concentration. During the course of the creative process, the creator is often deeply absorbed in his work. Light, sounds, even human presences, are completely ignored. If they do intrude on the creator's consciousness because they are sudden, sharp, or persistent, the creator often rouses from his absorption quite slowly and with difficulty and he experiences the change as distinctly distracting or even irritating. Sometimes he experiences an abrupt awareness of his surroundings and of external presences, and there is a transitory feeling of strangeness as he readjusts. One of the first things he does, even while responding to the intrusion, is to check the time on his watch, or to note outside conditions of light or darkness, or to ask what the time is. He has clearly been unaware of, or lost track of, time. That is, he has lost track of measured time, and frequently he has also lost track of duration and of the sense of time's passage. The amount of time passed almost invariably surprises him.

Loss of awareness of time's passage of this type is an experience of timelessness but it is not unique to the creative process. Any type of work or play involving deep or undivided attention and concentration can produce it. Rapt absorption in a work of art of any kind, is particularly accompanied by such a sense of timelessness. Very likely—limited data about the matter exist—a more prolonged and intense type of absorption and concentration occurs during the creative process than during other forms of activity, including active aesthetic contemplation. The factor of arousal, which I shall discuss more fully

in the next chapter, may play a part in producing the intensity. The seclusion and isolation that often is necessary for creative work enhances absorption and intensity, but this interrelationship becomes somewhat circular. The need for absorption and intensity may require seclusion and isolation or the need for seclusion and isolation may produce absorption and intensity as a by-product. Serving purposes in the creative process such as facilitating inner expression or symbolic thinking, the former may incidentally induce the latter. In either case, a sense of timelessness results.[13]

The loss of the sense of time's passage is only one aspect of the timelessness involved in the creative process. Seclusion, intense concentration, and aroused involvement account for the subjective sense of timelessness to some extent, but there is a unique suspension of time during the creative process that is more specific than this. More than a loss of the sense of time's passage, there is an abrogation and a transcendence of the intrinsic elements of time mentioned: sequence and repetition. This transcendence occurs in janusian thinking. For the creator engaged in the janusian process conceives of opposites or antitheses simultaneously, not successively or in sequence. Through simultaneity both repetition and sequence are transcended. When two or more elements are conceived as operating simultaneously, they come neither before nor after. Nothing in this is repeated, but all occurs at once. When two or more elements operate simultaneously, they are outside of the continuing process of repetition, change, and flux we refer to as "time"; the janusian conception is out of time.

Earlier (chap. 7), I quoted Mozart's description of his experience of hearing the parts of a musical composition all at once and that striking description very well illustrates the complex simultaneity in the creative conception. While we have no way of knowing definitely whether Mozart was referring to opposites and antitheses occurring simultaneously, the report conveys the type of time transcendence phenomenon involved in the janusian conception. Not merely a matter of fancied simultaneity—multiple elements seeming to sound or to occur at once—nor a matter of ambiguity tolerance—permitting or actively considering alternative ideas or perceptions in consciousness—janusian conceptions intrinsically involve concomitant conflicting components. When the creator conceives of opposites and antitheses operating simultaneously, he brings complex sequences into a single moment and a single conception. Such unusual experiences as actually hearing extended musical sequences all at the same time account in part for the complexity of Mozart's and others' creations. When Einstein conceived of a man both falling and at rest at the same time, he brought many sequences together: the man falling,

objects near him falling, the man at rest, objects near at rest, magnetic fields, conducting circuits, and so on. The janusian conception does not merely consist of two or more concrete elements appearing at once, but, because opposites and antitheses are abstractions, it necessarily consists of repeated phenomena operating simultaneously. Usually, it also consists of simultaneous sequences. Through this simultaneity time stands still; in standing still, it is transcended.

In conceiving of oppositions and antitheses operating simultaneously, the creator goes beyond the bounds of time. To say that it will rain tomorrow and it will simultaneously not rain tomorrow invalidates temporality. If the statement is interpreted as meaning that it will rain tomorrow at one point in the day and it will not rain tomorrow at another point, this would be designating and conceiving a succession of events. It would not be the structure formulated at the moment of the janusian idea. To say that the sun will rise tomorrow and it will simultaneously not rise tomorrow goes outside of temporality. A conception that the sun rises and, on the same day, that it also does not rise is beyond the bounds of time; factors of logic, information, interpretation, and elaboration translate it into temporal terms.

I say that time is transcended rather than merely negated because, as I have repeatedly pointed out, the creator is in full possession of his logical and rational faculties during the course of the janusian process. He goes beyond time at the moment of the formulation, but he also casts it into meaningful, highly effective, and temporal-connoting terms. Just as opposites and antitheses facilitate transcendence of current ideas and knowledge, simultaneity facilitates transcendence of time. In bringing together opposites, extremes, and polarities, the creator brings together the outer limits of what is known or he moves from the known to the unknown through one of the few means available to the human mind.

The sense of timelessness in the creative process is, therefore, a special one. It is due not merely to intense concentration but to the characteristics of the janusian process, with the specific formulations that are produced along the way. Janusian formulations are out of time, out of sequence and repetition, and the janusian process produces discontinuity.

Space

As with time, there are myriad approaches and considerations with regard to space.[14] A particular

confusion arises even in learned discussions because of the common tendency to think of space in terms of an empty area rather than the all-inclusive "expanse in which all material objects are located and all events occur."[15] Even when focusing exclusively on the latter sense of the term, philosophers and scientists alike have a good deal of difficulty arriving at a consistent definition of the nature of space. In recent years, these thinkers have reconceptualized space in a manner consistent with non-Euclidean formulations and with discoveries about the nature of the cosmos and the universe. The perspective on relativity has replaced Newtonian notions of absolute space. For psychology, a particularly important development has been an emphasis on experiential properties of space such as the idea of "lived space" developed by the philosopher Merleau-Ponty.[16] These philosophical perspectives have, among other things, shown the pitfalls of traditional preconceptions such as describing the psychological experience of space in terms of "inner" and "outer." Space, as an experienced psychological entity, is not delimited by the bodily integument, skin or other body boundaries. Therefore the differentiation between "inner psychological space" and "outer physical space" is always figurative with respect to experience and physical reality. Possibly useful as a heuristic device, the differentiation and the terms "inner" and "outer" must be applied carefully and cautiously, particularly in the formulation of psychological theory.

For the present discussion, I shall adopt an elemental and basic view of space that derives from psychological experience and seems to cut across diverse approaches and definitions. Particularly, the conceptualization pertains both to causality and to the psychological phenomena in the creative process with which we are concerned. It is the view of space proposed by Henri Bergson, as follows: "it is scarcely possible to give any other definition of space; space is what enables us to distinguish a number of identical and simultaneous sensations from one another; it is thus a principle of differentiation."[17] When we speak of space in relation to causality, this seems ultimately the definition we must have in mind. Our knowledge of space derives from differentiation, and the recognition of spatial contiguity between entities or factors also depends on their prior differentiation. For a causative factor to appear or to be understood as contiguous in space with the entity it produces, these entities must first be recognized as different. Moreover, effective or operative differentiation of spatial attributes of elements depends on multiple types of sensation; we require both tactile and kinesthetic senses, for instance, to experience spatial depth.

Space is closely associated with differentiation and sensation just as time is associated with

sequence and repetition. And differentiation and sensation, like sequence and repetition, are consistent features of the creative process. The creator constantly experiences multiple types of sensations during the course of his work, and he incorporates immediate and remembered sensations into the product. He differentiates sensations as well as objects in his environment and he constantly differentiates words, forms, ideas, objects, and sensations in carrying out his work. Yet the creator characteristically experiences a sense of spacelessness during the course of the creative process, just as he experiences a sense of timelessness. Perhaps less dramatic than losing track of time, there are definite though fleeting senses and feelings of disconnectedness, loss of awareness of surroundings and location, and sometimes even a sense of floating and of diffusion. Though intrusions do not usually instigate questions such as "where am I?" nor any checking of location routine analogous to the checking of a watch,[18] the sense of spatial disorientation following an intrusion is often keen.

When, for instance, creative thinking goes on during the driving of an automobile—a very frequent occurrence for some creators—there is sometimes a marked loss of the sense of location and surroundings. While involved in the creative task, driving is carried out automatically, sometimes for miles on end, until there is some distraction or intrusion—sharp curve, honking horn, construction work, another car rapidly approaching an intersection—and a concomitant sense of sharp return to awareness of location and surroundings. When losing track of space in such a manner during driving, the driver is usually amazed afterward at how far he had come without realizing it, how he had managed to drive without noticing where he was or what was around him, and often he then takes great pains to establish his current exact location. Immediately after an intrusion, he checks for road signs, familiar landmarks, or he even stops the car and consults his maps. As with the loss of track of time, he knows that he has passed through space, distance, and location, but he has lost track of it. He has lost track of differentiation and sensation, and he has experienced a sense of spacelessness. When sitting at his desk or walking in the woods, he also loses track of surroundings and location in a similar way, and sometimes he experiences other more general feelings of spacelessness.

Absorption and intense concentration play an important role; these factors induce spacelessness as well as timelessness to some degree. But the homospatial process is a cardinal factor inducing the sense of spacelessness. Because it brings one or more entities into the same spatial location, this process induces subjective experiences of lack of differentiation and of spacelessness. This form of thinking transcends

the intrinsic elements of space. As space is a principle of differentiation, the initially undifferentiated elements and sensations in a homospatial mental conception are not within space, but are, in perhaps the only way available to the human mind, beyond the spatial dimension. Just as the janusian formulation is out of time, the homospatial conception is outside of space or spatiality. Just as the janusian formulation transcends sequence, the homospatial conception transcends differentiation. Moreover, the homospatial conception is out of space or spatiality in a double sense: not only does it transcend the principle of differentiation, but in totally filling the space, or the field, of consciousness, it also transcends space. When space is totally and diffusely filled, there are no longer any internal locations or boundaries. Once the filling reaches the limit of a spatial enclosure, it is on the outside—at least in part—of that enclosure. This filling of mental space or the field of consciousness is one of the factors responsible for the dizzying sense of spacelessness often accompanying homospatial conceptions. It sometimes allows the creator to plumb the very limits of spatial experience.

The subjective feelings of spacelessness and timelessness characteristically experienced during the creative process are therefore chiefly products of homospatial and janusian processes. Neither spacelessness nor timelessness in creativity results merely from intense absorption and concentration nor, incidentally, do either need to result in any way from a mystical type of experience nor the taking of psychedelic drugs, as some have alleged. While drug ingestion and mystical experiences are said characteristically to induce feelings of spacelessness or timelessness, these do not appear to be connected, or directly related, to the processes I have just described.

Cause and Creativity

The janusian conception is out of time or temporality and the homospatial conception is outside of space or spatiality. Operating within the creative process, the janusian and homospatial processes produce discontinuity—in time and in space respectively. As cause is dependent on continuity in space and time, we seem to have come as close as possible to factors operating within the creative process that produce a disruption in causal connection and sequence, a disruption that is associated with the appearance of creations and of creativity.

Also, we can now see that the spacelessness and timelessness characteristic of dreaming are, in an

additional way, mirror images of the spacelessness and timelessness in the creative process. Spacelessness and timelessness in dreams function essentially to preserve the past. These features allow the dreamer to express wishes from various portions of his life in a condensed and disguised manner. Such wishes are thereby kept and preserved in their original form and they neither develop nor change. Timelessness and spacelessness in the creative process, on the other hand, are intrinsic to radical change and creation.

Can we now turn back to the question at the start of this chapter and say that, with the discovery of these two processes, we have found the cause of creativity? We are perilously close to a conceptual tangle. Surely it is fair to say that the homospatial and janusian processes account for many phenomena associated with creating and with creativity. Surely we can now assert that both processes are major conditions for the appearance of a creation and that they set the stage for the appearance of the new. Both of these thought processes together allow the creator to move from what exists and what is known to the limits of knowledge, spatiality, temporality, and experience, and therefore to move into the realm of the unknown. He moves from the familiar to the unconceived, the new, and sometimes the decidedly strange; possibilities for simultaneous antitheses and oppositions allow for unlimited formulating of previously unimagined ideas and entities. If, say, we were ever to derive a clear notion of soul or mind or even behavior, we might find a way to formulate meaningful notions of anti-soul, anti-mind, or anti-behavior, existing or operating or having validity at the same time. Or, with respect to temporality, physicists have already begun to formulate ideas of time both running forward and, with the same characteristics and regularity, running backward.

The homospatial process allows for innumerable formulations of previously unimagined ideas and configurations of physical reality. Think, for a particularly mind-bending example, of what might be derived and discovered about the nature of the universe if one were able to conceive all the discrete elements fused and superimposed and the entire dimension of physical space as totally and diffusely filled. It is entirely likely that only through progressing in such ways from the realm of the known can human consciousness and intelligence reach into the realm of the new and unknown.

In designating janusian and homospatial thinking as major conditions for creation, it is difficult to say how close we have come to a cause. These surely appear to be necessary conditions, but cause in a

strict sense is a matter of conditions that are sufficient as well as necessary. Can these processes account for all the created qualities of a particular work, theory, or discovery? Can we predict that a creation will always result or, more reasonably, occur with significantly greater frequency than would be expected by chance alone? In part the answers must await definitive empirical research. Also, there are other aspects of creations to be accounted for than those I have indicated so far, and I shall attempt to outline those in the next and final chapter. But a general and inclusive answer arises from what I have already discussed and, though this answer still leaves traces of a conceptual tangle, I shall state it now and return to it more fully another day.

Insofar as the specific elements in a janusian or a homospatial conception—the specific opposites, antitheses, and discrete entities—are unique to a particular creator, there are unique aspects of resulting creations that cannot be predicted. Thus, Shakespeare chose the opposites, antitheses, and discrete entities that he used for Hamlet, and the precise appearance of all the specific qualities of Shakespeare's Hamlet could not be predicted. Einstein chose a man falling from the roof of a house, and neither that instance nor all the elaborations and ramifications of Einstein's general theory of relativity could have been predicted. We can, however, describe some of the structure necessary for the appearance of such creations. We can state that we know what is necessary for the appearance of the new. Homospatial and janusian thinking transcend the dimensions of space and time, respectively, and are conditions for the discontinuity with contiguous or antecedent factors that occurs whenever the truly new appears. These thought processes are conditions for producing creations. When they are employed, we can expect with a fair amount of certainty that a creation will appear.

Notes

1 For that matter, I think it is patently true that philosophical matters are important for all scientific discourse.

2 Kant, Critique of Judgment, p. 188.

3 The reader will be aware by now that there will be no direct or extended consideration of genetic, social, or personality factors involved in the capacity to use the mirror-image processes. A direct formulation of the features of a creative personality or of environmental factors in creativity is beyond the scope and purpose of this book.

4 There is, in fact, some evidence that high or very high intelligence, as measured by standard intelligence tests, is not required for various types of creation. Standard intelligence tests primarily measure verbal intelligence, however, and this could account in part for these results, especially in connection with creation in the visual or nonverbal arts. For rather extensive research, as well

as controversy, about this and related matters, see the following: J. W. Getzels and P. W. Jackson, *Creativity and Intelligence* (New York: Wiley, 1962)} F. Barron, *Creative Person and Creative Process* (New York: Holt, Rinehart & Winston, 1969), pp. 39-51; M. A. Wallach and N. Kogan, "Creativity and Intelligence in Children," in *Human Intelligence,* ed. J. McV. Hunt (New Brunswick, N. J.: Transaction Books, 1972), pp. 165-81; M. A. Wallach and N. Kogan, "A New Look at the Creativity-Intelligence Distinction," *Journal of Personality* 33 (1965) :348-69; M. A. Wallach and C. W. Wing, *The Talented Student: A Validation of the Creativity-Intelligence Distinction* (New York: Holt, Rinehart & Winston, 1969).

5 See J. Dewey, *Art as Experience* (New York: Minton, Balch, 1934); Meyer, *Emotion and Meaning in Music,* and more recently, *Explaining Music* (Berkeley: University of California Press, 1973). Also, for an excellent discussion of surprise and the unexpected in psychological and aesthetic theory, seeBerlyne, *Aesthetics and Psychobiology,* pp. 143-49.

6 The Aristotelian definitions of tragedy as based on reversal, along with recognition and suffering, support this.

7 M. Moore, "The Monkey Puzzle," in *Collected Poems* (New York: Macmillan, 1951), p. 80.

8 Hausman has used the terms "novelty proper" and "radical novelty" to refer to this stricter or more pure understanding of newness. Hausman's incisive analysis of the problem of newness in creation is an important background for the discussion here (Hausman, *Discourse on Novelty and Creation).*

9 Berlyne makes this point by citing a passage from the philosopher Home in which Home states that surprise depends on the unexpected while novelty can be appreciated even when it is expected. Home uses the example of a traveler to India who expects to see an elephant but is still moved to wonder when seeing it because of its novelty. Although this distinction between the surprising and the novel is valid, the example is actually not appropriate. We expect to find novelty when confronted with a work of art, seeing a play, etc., but we may still be surprised about the specific details of the novel entity (see Berlyne, *Aesthetics and Psychobiology,* p. 146). On the teleology of surprise, see Rothenberg and Hausman, Introduction, *Creativity Question.*

10 From the time of Aristotle, several types of causation have been recognized and emphasized. For a concise review and discussion of types see H. L. A. Hart and A. M. Honore, *Causation in the Law* (Oxford: Clarendon Press, 1959), especially pp. 1-78. I shall not engage here in a discussion of these alternate types of causation, because the concept of efficient causation I have outlined is of primary interest to the scientist. For the same reason, I shall only focus on antecedent causation rather than teleological causation. Moreover, formulations about creativity in terms of teleology have their own difficulties. See Rothenberg and Hausman, *Cieativity Question.*

11 See R. M. Gale, ed., *The Philosophy of Time* (London: Macmillan, 1968); M. Capek, ed., *The Concepts of Space and Time* (Boston: Reidel, 1976).

12 F. Waismann, "Analytic-Synthetic," in Gale, *Philosophy of Time,* p. 55. Also, see St. Augustine, *Confessions* (New York: E. P. Dutton, 1936), p. 262.

13 The presence of the subjective state of timelessness during the creative process has been a major consideration in regression theories of creativity such as that of Kris (see his *Psychoanalytic Explorations).* Withdrawal of cathexis from the external world, according to Kris, facilitates the upsurgence of regressive primary process modes of thought. And timelessness, a cardinal feature of id and other unconscious processes, holds sway. Such a formulation ironically recreates a problem facing Freud, Kris's direct mentor, in his approach to the interpretation of dreams. For Freud raised the question of whether the pictorial and other representations in dreams resulted primarily from the suspension of conscious perceptual processes during sleep. Resolutely, he pointed out that the need for discharge of unconscious processes, the expression of wish fulfillment, rather than suspension of conscious perception was primary. With respect to the creative process, I follow Freud's type of resolution rather than that of Kris. Janusian thinking, for reasons indicated here, is responsible for the timelessness in creativity, rather

than withdrawal of cathexis from the external world and subsequent regression. Janusian thinking is again not a manifestation of regression and primary process thinking, hut it directly produces an effect of timelessness.

14 See Capek, Concepts of Space and Time.

15 *The Random House Dictionary of the English Language*, unabridged ed. (New York: Random House, 1967), p. 1362.

16 M. Merleau-Ponty, *Phenomenology of Perception,* trans. C. Smith (London: Routledge &. Kegan Paul, 1962), pp. 243 ff.

17 H. Bergson, *Time and Free Will* (New York: Macmillan, 1912), p. 95.

18 It is interesting that, other than compasses and highly technical gadgets which we do not regularly use, there are no everyday instruments for this purpose.