The Creative Process

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e-Book 2016 International Psychotherapy Institute

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We have, I think, just engaged in quite a dizzying leap. Although many people take for granted that creativity is a unitary phenomenon, that the same or similar factors operate in creative accomplishment in any field, my leap from poetry to science still has probably been a heady one. Horses represented as emblematic of the ethos of the time are strange companions with levotartrates, electrons, the Faraday and Maxwell-Lorentz laws, and genetic reduplication, despite the intrinsic similarities of the creator's thought. Moreover, much remains to be filled in and clarified about the nature and operation of the mirror-image processes. Before proceeding with more technical matters and data, therefore, I shall give an account of the overall nature of the creative process. In the course of this narrative I shall provide a picture of the subjective side of creative thinking and the manner in which the creative process, for both the artist and the scientist as well as other types of creators, is the mirror image of the dream.

The creative process begins in waking life. It begins in a state of awareness of external environment and physical circumstances, and a state of conscious intention as well. Regardless of the field in which the creator carries out his activities, he begins his task with the intention of creating something clearly in mind. No one creates anything without deliberately setting out to do so. While the creative intention of the artist is clear and well known without the need for special elaboration, the scientist's creative intention does require some clarification. Objectively it appears that the artist produces something new and valuable and he knowingly sets out to do so, while the scientist looks for and finds something not truly new but an entity previously existent in nature. From a subjective point of view, however, this distinction does not apply; the scientist in his quest for discovery is often interested in creating or producing something new and valuable in much the same way as the artist. Psychologically, the difference is primarily that a scientist does not think of producing something made by himself alone, but something which was, in essence, made by nature. Although constructing a theory imparts a greater sense of personal responsibility for the product than verifying an hypothesis by experiment, both types of scientific activity can involve a strong intent to find, or to produce, something strikingly valuable and new. From this subjective viewpoint, the creative process takes place in scientific activity whether the scientist is developing a theory or working primarily on experimental verification, or whether a

discovery is made by means of serendipity. The serendipitous finding gets established because the scientist wants to make something new of information appearing by chance.

The intention to create must be both deliberate and very strong. Many factors deter creative achievement, factors involving both the limited and refractory nature of materials and the sometimes limited and refractory nature of social recognition. By and large, persons engaging in creative activity have this strong intention and motivation, for reasons derived from upbringing, heredity, group factors, and the complexities of the social ethos. The idea of automatic or unintentional creating is an impossibility. Even the seemingly automatic creations of so-called visionary poets Blake and Coleridge are no real exception, since they were conscious and strongly motivated poets before any visions or poetic lines appeared in their dreams. Surely their waking motivation to create pervaded their dream experience as well. Moreover, in the case of Coleridge's opium state and of Blake's dream, the resulting poems involved later extensions and later revisions and changes, respectively.[1] Despite the poets' public claims, conscious effort, intent, and creating entered into the stage of writing out the poems.

The creator begins with a high degree of knowledge of his field. The scientist has learned the technical knowledge available and he is capable of understanding complicated theories and laws. A creative scientist, in other words, must have a high level of what is usually designated as "intelligence" and he must have applied himself to obtaining as much of his field's information and knowledge as possible. Although scientific creations sometimes come from persons who switch from one scientific discipline to another, such persons usually are those who absorb a good deal of information in relatively short periods of time. The theories of certain historians of science such as that of Thomas Kuhn strongly suggest that scientific breakthroughs can often come from persons who shift between scientific fields.[2] Such shifting may provide the investigator or theorist with a specially broad perspective on a sister field because he learns it from the "top," so to speak, and doesn't get embroiled in technical complications and details. He may bring new models of thought and techniques to his new field. There may also be emotional factors. Depending on the circumstances of the shift, such factors as loss of previous position, disillusionment, or other crises may produce exceptionally strong motivation to create in the new field.[3] Nevertheless, he still must become highly knowledgeable about the models, data, and problems of his adopted field; there is no reason to believe that interdisciplinary shifting in itself confers magical powers.

Creation in the arts also requires a good deal of specialized knowledge. The type and degree of knowledge required vary a good deal, depending on the artistic field, and in some fields the type of intelligence required differs markedly from that ordinarily measured by IQ tests. Although the high degrees of technical knowledge needed for science may not be necessary in the arts, a certain minimal knowledge is mandatory. Despite the tendency of creative writers in particular to derogate the need for formal education and knowledge in their field, it is still necessary for good writers to attain considerable knowledge of word use, word nuances and meanings, and enough familiarity with common speech and with literature to produce something interesting and new. Good writing requires, at a minimum, the capacity to recognize cliché and banal phrases. There must also be a capacity to recognize banal and cliché literary themes, although some highly creative writers do seem to have been able to avoid repeating previous literary constructions without always knowing that they were doing so. Higher levels of literary sophistication and even formal education become necessary, depending on the nature of the literary creation and the intended audience. In music and the visual arts, the minimal requirements for successful creating involve rather high levels of technical knowledge. Knowledge of music theory and some degree of competence in performance has generally been necessary for musical creation; knowledge of art history, art materials, and technical matters of design, drawing, color, and visualization seems basic for creation in the visual arts. Primitives and idiot-savants, of course, have appeared in all artistic fields; it is possible that the great Shakespeare did not have very much literary education, although as an actor he surely had a good deal of familiarity with the theater. Successful creation with limited knowledge or with a limited technical background is, however, more the exception than the rule, even in artistic fields. Despite the appearance of the occasional so-called primitive, knowledge and creating are generally linked. Unusual capacities to perform without knowledge and education may be due to specific types of genetic factors, or to other unknowns, but these capacities lead more often only to successful performance or successful problem solving rather than creating.[4] Producing something new involves going beyond what is already known or accomplished and, although there are exceptions, creative persons have generally known when they have achieved this. They have, in other words, possessed enough information to recognize that they have produced creations.

Given a baseline of knowledge and technical competence, the creative process begins with the creator's interest in discovery, of which there are many types. The creative scientist is interested in

discovering something about the nature of physical reality, but again—although he is generally not aware of this—he is interested in discovering something related to himself. Even a complicated technical problem has some particular psychological meaning: this can range from the symbolic significance of the behavior of enzymes and mold spores, molecular structure, a principle of falling bodies, or a discrepancy between the law of gravitation and the law of magnetic induction to the more general significance of finding that laws in nature conform to some regular order as an indirect means of reassuring oneself that one's seemingly chaotic internal psychological processes are also in order or are capable of being so. Symbolic meaning, it must be emphasized, is always complex in such cases and it never corresponds to simplistic formulations such as sublimated anal or oral impulses. The emotional need of finding order in nature is almost always important for a scientist, creative or not. Physical scientists tend to be intimidated by internal psychological experience; unlike the artist, the physical scientist tends to take the internal psychological world for granted and to turn for exploration to the physical world. In a deep emotional sense, physical scientists seem to doubt the reality of the external physical world and therefore to explore it in order to obtain reassurance about its regularities, principles, and ultimately its actuality. In creative scientists, this need for exploration and reassurance amounts to passion. The artist, on his side, tends to be intimidated by the external physical world. He takes its laws and regularities for granted, and tends to assume without question that the physical world will operate with little intervention from him. Sometimes he even may intellectually and philosophically doubt its reality, but he has little need to explore these doubts. His explorations concern the reality of the internal psychological world. He doubts the reality of this world and he is also less intimidated by it than the scientist. For the creative artist, the creative process is an attempt to discover the nature of his and other's internal psychological world including the following: the structure of emotional processes, the perceptual impact of external physical reality, the nature of interpersonal relationships, the roots and springs of language, the structure and impact of internal and external sound and rhythm, the structure and impact of imagery and visual forms, and the impact of social reality.

The creative process is motivated by the creator's interest in discovery. This interest in discovery begins the process and continues at every step of the way. Though the artistic creative process sometimes begins with an inspiration, that is, a dramatic idea or insight, such an inspiration is merely the stimulus for embarking on a process of discovering. Almost never does the creative artist know very much about

the product he will eventually create. Not only are the details lacking at the start, but some of the most crucial elements—crucial both for him and for his audience—will be discovered during the course of the process of creating.[5] In art, the initial element or, to use Beardsley's term, "the incept,"[6] usually consists of a word or a phrase, a series of phrases, an overall structure or theme, an image or a visual form, a succession of sounds or rhythms, or an outline of a plot. These are far from completed ideas ready to be spelled out, but they are elements that the creator is interested in exploring. The creative process itself is the means and method of exploring these concepts.

As the artist begins to work out his initial idea, as he begins to execute the work of art, he discovers and develops the ramifications and the implications of the early ideas; then, new ideas occur along the way that instigate new quests for discovery in their own right. And the discoveries the artist makes are discoveries about the nature of experience and about the nature of the medium he is working with as well as discoveries about himself. A poet, for instance, may explore all the ramifications of a particular linguistic phrase and its connections to the things that it denotes. In the poetic creative process I have documented, the poet explored the idea of the horse with the horse's ramifications in mythology, in the modern ethos, and in the poet's own personal life. Concomitantly, he explored the implications and ramifications of certain words connected to horses, such as "gait," and discovered exciting integrations between words and experience.

During the course of this process of discovery, the creative person engages in a good deal of fantasy. This is so for both the scientist and the artist, although elaborate personal fantasy is more characteristic of, and more related to, the artistic creative process. The scientist's fantasies are often highly concrete and they suggest analogies and applications to abstract phenomena in science. When the creative leap occurs, these fantasies often enter into the homospatial process; elements of the fantasy become superimposed upon the mental images of natural phenomena. As I shall describe in chapter 10, the musician and the visual artist also often have fantasies involving concrete elements that are subjected to the homospatial process. Very likely, the literary creator's fantasies are the most personal of all. "His Majesty the Ego," as Freud put it,[7] or the creator himself may manifestly appear more often in the fantasy of literary creators because the literary art often devolves on stories having definite actors or agents. Freud was surely correct in suggesting that daydreaming or fantasy played an important role in creation, but he was incorrect in assuming that creative thinking consisted merely of disguising these fantasies in an

acceptable form.[8] Creative fantasy, moreover, is quite different from ordinary fantasy and from the processes operating in dreams.

Creative persons have daydreams involving thought processes similar to nocturnal dreams just as anyone else does. But the thinking that goes on during the creative fantasy is not the same as that in dreams; it is the mirror image of dreaming. While engaged in creative fantasy or imagining, the creator uses abstract types of thinking a good deal. His thoughts may rove freely, but he is constantly alert and prepared to select and relate his thoughts to the creative task he is engaged in. He is oriented to discovery. Although he is not necessarily aware of doing so, he relates elements in his free-flowing thoughts to the dramatic themes, characters, situations, or to the visual forms, sound patterns, theoretical issues, and mathematical formulae he is struggling with. Even when he seems not to be thinking about the problem directly, the circumstance leading to the popular belief in the J importance of the Unconscious in creativity, he does, at the moment of a creative conception, engage however briefly in focusing and in an act of will that consists in actively formulating by means of janusian ior homospatial thinking as well as other abstract types of cognition. Moving away from thinking about a creative task, either resting or taking on some distracting activity, has many psychological functions but there is no reason to believe that it instigates unconscious work on the problem. When ideas arise suddenly in a rested or distracted state of mind, they do not arise fully formed from the Unconscious. Only the intention to solve the problem can be said to be unconscious at such moments; the creative thinking, however briefly it flashes, is conscious.[9] Unlike primary process or dreamlike manifestations of the Unconscious in waking life, such as the classically described jokes, slips of the tongue or pen, or other automatisms, there is neither condensation nor displacement in creative leaps of thought. Rather than disguising wishes and disrupting conscious thought, the mirror-image processes integrate unconscious wishes with solutions to a problem or task. The creative process moves in a direction opposite to that of the dream} abstract modes of cognition work toward unearthing and discovery rather than expression and gratification of wishes alone. Creating moves from free, wandering thinking to fixated solutions and constructions within a product. Unconscious processes do not push into and disrupt the creator's awareness; they are, in a sense, pulled by the mirror-image forms of cognition.

It would be a mistake to focus on creative fantasy as the only, or the major, mirror-image-of-dreaming manifestation in creation. Creation in any field does not consist of an isolated event or a single

act, but it results from a long series of circumstances, sometimes occurring in an unbroken chain or sequence but often interrupted, reconstructed, and repeated over a period of time. The process of creation begins with the conscious selection of a task and a factor to be explored. Both janusian and homospatial thinking sometimes appear full-blown at this stage. The janusian process, usually occurring earlier than the homospatial one, may appear rapidly in the earliest phase of creation, the incept then consisting of an actively constructed simultaneous antithesis. In scientific creation, an initial problem may be formulated in just such terms. For instance, a scientist thinks the following: the law of electromagnetic induction and the law of gravitation, though appearing to be opposites, are really the same. Now, how can I go about proving this? When Einstein said that the idea of dealing with two different cases here was unbearable to him, it could indicate that at some point he consciously structured the initial problem in such a manner. In poetry, the idea that sexuality and violence are the same could be the incept instigating the task of creating a poem. With one of my subjects (see description of the circumstances in chap. 10), this particular janusian thought did in fact stimulate a poem about nude bodies on a beach and dead bodies in the gas ovens of Auschwitz. Janusian thinking thus frequently instigates a succession of thoughts and acts, and further janusian as well as homospatial conceptions occur along the way. Leaps of thought occur and unconscious material is revealed, particularly in art, but unlike the dream, consciousness or at times a sense of heightened consciousness is in full sway.

From a subjective point of view, the heightened sense of consciousness during the course of the creative process constitutes a distinct mirror image of dreaming. While terms such as "expansion of consciousness" are clearly figurative rather than literally descriptive of a psychological state, they convey the quality of intensity, the sense of increased comprehension, and the freedom from boundaries of time and space. I shall return to discuss the determinants of this state in a later chapter (chap. 12) but a further clarification of its subjective nature is warranted here. Intense concentration is characteristic of several phases in the creative process. Not unlike the type of concentration necessary for high levels of performance in any activity, from sports to strictly intellectual tasks, the intensity seems to be greater under conditions of exceptionally strong motivation such as that in the creative process. Every facet of a visual scene, every nuance of a musical tone or of a word or phrase, and every aspect of a scientific theory or experiment is explored and kept in focus at several particular stages of the creative process. Certain aspects of the heightened sense of consciousness and a subjective quality akin to dreaming arise from this

factor of intense concentration. Just as dreaming occurs in a state where attention to external stimuli is suspended and there is intense concentration on internal psychological phenomena, creating also frequently involves intense fixation on mental images, thoughts, and constructs. Capacity for such intense concentration is a necessary factor in successful creating in any field. Although these states of intense concentration are similar to dreaming, they are also the obverse of dreaming. They are appropriately designated as heightened states of consciousness in opposition to the physical unconsciousness or sleep in which dreaming occurs. All the creator's conscious faculties are operating optimally and intensely, and there is the capacity to translate observations and thoughts immediately into action and tangible production. The heightened state of consciousness is highly pleasurable and it is both similar and opposite in form and function to dreaming, a reflection or a mirror-image state.

The specific mirror-image processes, janusian and homospatial thinking, tend to dominate a large portion of the creative process and to contribute to aspects of the heightened conscious state. Often, the steps in both processes are drawn out and extended. Motivated to discovery, the creator first senses or discerns some discrepancy, gap, or hiatus in the body of knowledge, beliefs, and practices pertaining to his field. Often in science, the creator gradually clarifies critical polarities, antitheses, and oppositions involved and later formulates an idea that they operate or exist simultaneously. Part of the scientific creative process consists of identifying the salient oppositions connected to a particular problem (see chap. 8) and many worthless ones are discarded along the way. Similarly, the creative artist discards many oppositions and equivalences among oppositions that are banal and cliché. While the creative artist may not formulate oppositions quite so gradually or specifically as the scientist, he, like the scientist, must have the previously mentioned technical knowledge and, more broadly, sufficient knowledge of human experience in order to know what technical matters and elements of experience are most widely held to be valid and true. In order to formulate that factors thought to be opposite or antithetical are actually simultaneously operative or true, the creative person must be deeply aware of what is generally known or believed. In the homospatial process, too, discrete elements often are chosen a considerable time before being actively superimposed or fused and conceived as occupying the same space. Such discrete elements may be identified and chosen because of their personal significance to the creator, because of an artistic or historical tradition, or because of their social, technical, philosophical, or political importance. Thus, the poet chose horses and riders both because of his personal preoccupations and

because of the ageless human interest in the qualities of animals. The elements in Winston Churchill's political metaphor "iron curtain" must have derived from Churchill's long preoccupation with war and with iron as a metal of war. The curtain aspect may have been derived from his own, and the traditional English, interest in the theater, or in the curtain as a symbol of the home. The elements in the scientific metaphor "black holes in space" all derive from long-standing concerns with color, space, and emptiness in the field of physics, although the idea of "black holes" may have had some previous personal connection for the metaphor's creator, John Wheeler, with coal mines or with coal mining in the environment of his childhood and adolescence in Youngstown, Ohio. After choosing or becoming aware of the discrete elements—elements that linguists call the "ground" of the metaphor— there may be. an immediate active fusion or superimposition, or a delayed one. Depending on the salience of the elements to the total context, since really effective metaphors seldom stand alone,[10] a new identity becomes articulated as the culmination of the homospatial process.

As the creative process continues to move from disguise and disorder to illumination and order, as it moves from personal preoccupation to generic and universal concerns, as it involves increasingly heightened states of consciousness and awareness rather than the restricted focus of the sleeping mind, it proceeds in a reverse direction from dreaming. And, as a mirror image, it bears resemblances to dreaming. There tends to be more sensory imagery than ordinary thought processes, more periods of seemingly undirected thought and suspension of awareness of physical surroundings, intense affectual experiences of heightened anxiety or heightened enjoyment and pleasure not often connected with ordinary waking thought, and a quality of vividness in the final product, in artistic creation especially, that is similar to the vividness in dreams. There are periods when the creator lets his thoughts run freely while he suspends critical judgment and there are periods of sheer playfulness. There are gratifications and fun in discharging impulses and feelings of all sorts: anger at an imagined oppressor, sexual fantasy involving imagined scenes and circumstances, fancied mastery of a difficult physical task. And there seems to be some form of pleasure associated directly with the use of sensory imagery itself. Some of these factors in the creative process arise from the same psychological needs and functions operating in dreams and many can be traced to the factor of unearthing unconscious processes as well as to other factors that I shall describe later (esp. chaps. 9, 11, 12).

Despite the overall similarities between the creative process and dreaming and some of the shared

differences from ordinary waking thought, ordinary logical processes play a consistent and a crucial role. Deductive and inductive logic, analogic and dialectic thinking, and other rationalizing processes enter into the overall construction of the creation and play some role in crystallizing creations into tangible forms. Much of the creative process consists of elaboration, execution, and the attempt to differentiate and to clarify through language, symbols, and tangible constructions. Much of creation arises from hard systematic labor, the drive to perfect an entity roughly produced. This aspect of the creative process derives from the creator's intense motivation to persist, to master reality, and to discover. The constant shaping, differentiating, and clarifying for the purpose of communication to others yields new discoveries to the creator himself. Competition also plays a role. There is often competition with others who both previously and currently have persisted in a similar task. Vying with historical and contemporary colleagues, both for personal recognition and achievement and for the gratification of discovery itself, is a strong motive in creative people.[11] Again, as a reversal of dreaming, the creative process consists of highly motivated and directed behavior rather than voluntary thought processes passively received in sleep.

The directed push toward discovery and clarification persists to the culmination of the process. When a literary artist experiences discoveries about words and language as well as arrives at personal insights about himself and the characters and experiences he is writing about, he arrives at an end point. These discoveries, more than any other factor, dictate the judgment that a particular creation is finished and complete. Even though there may be doubts, the feeling or sense of discovery allows the artist enough gratification to stop. Usually, writers describe this sense as finding out what the poem, novel, short story, or play is "saying." Although visual artists and musicians do not generally use this term, their comparable goal might be expressed in such terms as finding out what the visual creation is "showing" and what the musical piece is "sounding," respectively. For the scientist, of course, the matter of discovery is more straightforward and clear: his goal is reached when he discovers a specific fact, law, or theoretical structure, and he is able to define the means for a consensus of his peers to recognize this discovery. It is not generally realized, however, that he also discovers many things along the way which give him some gratification but which he seldom, if ever, emphasizes. These discoveries include adventitious information about people and nature, improvement of personal technique and proficiency, as well as glimpses into the way his own mind and the minds of his colleagues operate. Discovery in conjunction

with creation, regardless of how extensive or important, is gratifying for all types of creators.

After an artistic work is completed, or a scientific discovery attained, feelings and experiences continue. Further insights about the discovery or further insights into what the work is "saying," "sounding," or "showing" occur and these may lead to new preoccupations and ideas for further works. Although such insights about an artistic work are generally aesthetic in content, for instance an equilibrium between certain colors and forms, or between loss and gain, or between sound patterns in a sonority, they are sometimes explicit personal insights about such matters as struggles with self-defeating tendencies or particular ^personal. emotional constellations. By and large, aesthetic and personal insights parallel and enrich each other. Although scientists do not generally experience personal insights following a discovery (except perhaps for social scientists), they do sometimes question themselves about their own motivations and personal investments in particular objective matters. As artistic works are more directly and fully connected with particular individuals than are scientific discoveries, however, artists tend to have more overt and extensive personal feelings about them. Some artists, writers especially, have described to me conscious feelings of sadness after the completion of every one of their works. Citing a manifest analogy between the production of a novel or other artistic work and the birth of a baby, they emphasize the feelings of transitory sadness connected with the simultaneous loss and achievement of bringing forth a creation.

Just as the creative process is the mirror image of dreaming, it is similarly a mirror image of certain types of psychopathological processes. Both dreams and psychopathological symptoms arise from primary process operations, but creations arise from secondary process ones. Symptoms function to keep unconscious processes and content out of awareness, but creative thinking by and large operates in a reverse direction. Also, because the creative process overall results in improved adaption to reality, it functions in reverse direction to psychopathological symptoms. Creating increases understanding of reality and overcomes impediments. Symptoms are always impediments and psychopathological functioning always consists of inability to cope with, and to change, external or internal reality. Symptoms are banal and static, creations are unique and dynamic. Creative people, in other words, need not, by any manner or means, be sick. Though creative thought patterns do seem to resemble some forms of pathological thinking, such as those in schizophrenia, they do so only in mirror-image fashion. Schizophrenic ambivalence, neologisms, splitting, and autistic timelessness and spacelessness are

superficially similar but opposite both in function and contextual structure to the creative processes I have described. Shared in common between psychological illness and creativity is the factor of conflict, but, as I shall clarify in chapter 9, the relationship is complex.

Several famous creative people have been severely ill with a form of psychological disease, either neurosis, psychosis, or personality disorder. There is, as I stated in the introduction, a widespread belief that genius and insanity are very closely allied, but this generalization has arisen not from data but from dramatic cases. Creating does involve high degrees of anxiety and it can intensify psychological illness, because the unconscious material unearthed and the kind of insights achieved during the creative process are not of the sort to produce permanent relief of symptoms. But in the main, creating does not depend on psychological dysfunction or disease. As mirror-image processes, schizophrenic and creative thinking are more similar to each other than they are to ordinary forms of thinking; it may therefore be easier in some ways for a person suffering from schizophrenia to shift into using creative thought processes. This, however, can only occur at times when anxiety is reduced enough to use these processes, times when the schizophrenic person can tolerate the increased anxiety they produce. Creating is such a socially valued activity that persons suffering from schizophrenia may derive enough gratifying and protective reinforcement merely from engaging in such activity. Working at creation in the arts or in high level mathematics and science may provide enough social reinforcement so that anxiety is reduced and logical and adaptive thought is consistently possible. On the other hand, creation may only be attainable when anxiety is reduced as a direct result of psychological equilibrium produced by other factors in their lives. Or benefit may be derived merely from the structure imposed on their thinking by the stringencies of intellectual activity itself. Under all these conditions, healthy functioning may lead to creative activity.

In the arts, it appears that certain historical epochs and certain types of social factors have favored the incorporation into subject matter of the preoccupations of psychologically disturbed people. Art concerned with paranoid themes or with phantasmagoric content has been more popular at certain periods than at others. In times of extreme social upheaval, such as in the twentieth century, intense concerns about sexual identity, violence, rebellion to authority, and family interrelationships come more to the fore in art. Whether such concerns are matters of psychopathology is not for persons living in the current milieu to decide.

Knowledge, fantasy, drive for discovery, intense motivation and concentration, and pleasure and gratification characterize the creative process. The creator formulates his task or problem under the influence of his own unconscious interests and concerns. He suffers anxiety and unearths some of the unconscious content connected to the initial task. Psychopathology plays no causative role, except possibly in the choice of theme and subject matter. Essentially, psychopathology must be overcome for effective creating. Although differing mental states occur during the course of the creative process, which may in some cases evolve over years or decades, the creator is always under the influence of a deliberate desire to create. The creative process begins in waking life and ends in waking life. Some aspects of the phenomenon may occur in dreams and in sleep, and primary process thinking may play a role at certain points. It may help facilitate fantasy, sensory imagery, and childhood associations. Dream content and themes may develop and extend themes of waking thought and may often facilitate mastery of technical tasks through representations allowing for mental focusing, repetitive practice, and even for wish-fulfilling success. Such dream content and experiences may be directly influential on waking life. Theme progressions and developments such as the previously discussed representation of the mother carrying the grandmother in the poet subject's dream help promote creative work and transformations. However, despite traditional beliefs that dreams manifestly reveal important themes, and despite the practice of some artists to keep dream diaries and to use actual dream content in their work, dream material does not have an intrinsic or a direct function in creating. Starting from actual dreams or using dreams as subject matter has no special advantages. Abstract thinking predominates overall and two particular thought processes, janusian and homospatial thinking, which are the mirror images of such dream processes as making all opposites equivalent and transcending the ordinary boundaries of space, function in reverse direction from the dream. These processes serve to arouse the creator, and their results arouse those who perceive the creations as well. That art and creativity stimulate and awaken us is both literally and figuratively true.

Notes

1 See Bartlett, "Dreams and Visions," *Poems in Process,* pp. 62-77.

2 Kuhn, Structure of Scientific Revolutions, esp. pp. 174-210.

3 A number of scientific discoveries have occurred at a point in the discoverer's life when he had suffered an important setback or loss. Metchnikoff discovered phagocytosis after having lost his position at the university (see M. Fried, "Metchnikoff's Contribution

to Pathology," *Archives of Pathology* 26 [1938] :700-16; Freud discovered the "key" to dream interpretation after having a disappointing experience relating to one of his patients (see E. H. Erikson, *Identity: Youth and Crisis* [New York: Norton, 1968], pp. 197- 204); Semmelweis discovered the cause of puerperal sepsis when his admired teacher died of an infection contracted while performing an autopsy (see W. J. Sinclair, *Semmelweis: His Life and His Doctrine* [Manchester: University Press, 1909], pp. 48-50).

4 See discussion of creativity in an idiot-savant in D. S. Viscott, "A Musical Idiot-Savant; a Psychodynamic Study, and Some Speculations on the Creative Process," *Psychiatry* 33 (1970) :494—515.

5 Some aestheticians, such as Benedetto Croce, propose that the creation occurs completely in an artist's mind. This proposal, like claims by artists that a creation occurred all at once in a dream, ignores the critical making and creating that occurs during writing, painting, experimenting, etc.; see B. Croce, *Aesthetic As Science of Expression and General Linguistic,* trans. D. Ainslie (London: Macmillan, 1909). Also, for data regarding the creator's interest in discovery, see J. W. Getzels and M. Csikszentmihalyi, "The Creative Artist as an Explorer," in *Human Intelligence,* ed. J. McV. Hunt (New Brunswick, N.J.: Transaction, 1972), pp. 182-92; J. W. Getzels and M. Csikszentmihalyi, *The Creative Vision: A Longitudinal Study of Problem Finding in Art* (New York: Wiley, 1976).

6 Beardsley, "On the Creation of Art," p. 291.

7 Freud, "Creative Writers and Daydreaming," p. 150.

8 Ibid., pp. 152-53.

9 The psychological circumstances here can best be understood in the context of the functioning of repression. A common instance is losing or forgetting some article of importance, such as a key or valuable paper. The more one strives to find such an article, the more difficult it is to find. This is because one is struggling directly against repression, the repression that caused the forgetting in the first place. When, however, one turns to another task or else rests in some way, the location of the lost article eventually comes into consciousness. The explanation is that, through rest or distraction, the ego has become strengthened and therefore repression is relaxed because the anxiety or conflict producing the need for repression is either lessened or else can be more easily faced. So, too, the creator is blocked on a problem because some conflict or anxiety is involved in its unconscious meaning or structure. He turns away from the task and, when in a relaxed ego state, he overcomes the anxiety and solves the problem through creative cognitive processes. Another contributory factor may be that the time lapse and distraction allows for inessential elements of the problem to drop away. It should be emphasized that the explanation here sharply contradicts the classical formulation of an "incubation" phase in the creative process (see Wallas, *Ait of Thought).*

10 Although metaphors are often quoted out of context, a full appreciation of them usually involves some knowledge of their original meaning. Thus, we cannot appreciate "iron curtain" without at least knowing that it applies to a state of partial hostility between people or nations. Restoring metaphors to a context is one of the goals of poets who revivify cliches and dead metaphorical expressions.

11 See Rothenberg, "Autobiographical Drama," for a formulation of O'Neill's oedipal competition with Strindberg as a factor in literary influence; see also H. Bloom, *The Anxiety of Influence* (New York: Oxford University Press, 1973), for some elaborations and further applications of this type of phenomena.