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AUTHOR Dart, Peter
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ABSTRACT

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BUS-BATH-BED:
A Rationale for
Irrational Predicate Identifications
In the Service of Creativity

Peter Dart
Professor
Department of Communication and Theatre
McNeese State University
Lake Charles, LA 70609

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ABSTRACT

Creativity theory supports the conclusion that when a person recognizes the isomorphism in an analogic construct, that insight is the essentially creative act. Infraconscious mentation is more likely to produce insightful analogies than are likely to be produced solely by rigorous, willful, and consciously rational mentation, because infraconscious mentation, operating in the mode of magmatic flux generates isomorphic significance by means of *identification of predicates* that offer more opportunities for creative syntheses than are afforded by rational/ logical identification of subjects.Infraconscious mentation can be fostered by adopting conditions common to bus-bath-bed (well known venues of inspiration).

BUS-BATH-BED:
A Rationale for Irrational Predicate Identifications in the Service of Creativity

Premise: *The psychology of creative behavior can help explain how creative people "think up" their break-through ideas.*

What do we mean when we say "creativity?"

Ordinary parlance sometimes indicates that creating can mean merely "bringing into being," as when a machine creates another pair of shoes, or another wheel for a lawnmower. But when we speak of "creativity" as a special activity it is more than just producing something that hasn't appeared before. It must also be innovative, unusual, and unique. To the extent that the result is more easily predicted, it is considered to be less creative; but as it is truly original, and appropriately relevant, it is said to be more creative.

Notice the preceding assumption that creativity requires a product. That product may be an idea, a phrase, a design, or perhaps a theory, as in the creation of Einstein's *Theory of Relativity*. But the product is an entity. "To create" is a transitive verb. "To speak of creating when there is nothing understood as the thing created is not really intelligible." [Perkins, p. 6]

Creativity is a distinctly human activity, and an enriching faculty; "it brings about what is considered--by some people at least, and perhaps by all--a desirable enlargement of the human experience." [Arieti, p. 4]

Because creating produces new things, it is a constantly liberating expansion that keeps us from having to

respond reflexively to stimuli. It frees us from the necessity to live by habit and conformity. It provides us with a wider range and greater subtlety of instruments by which to engage experience.

Perhaps, as many ancient sages have suggested, genius cannot be taught; wit is innate; and creativity is a blessed gift, not to be sought, found, nor developed. But as mysterious as the origins and gestation of creativity may seem, when something comes out of the blue, it can yet be explored, understood, and nurtured. "Eureka!" is an exclamation of surprise, wonder, and joy that is so satisfying it seems to have come from a marvelously divine inspiration. To look such divinity in the face could be dangerous. But this paper proposes not only to look at the origins of creative insights, it assumes that people can develop controlled intuition, that the "divine" ability to come up with better ideas on demand can be planted, nurtured, and harvested. The eureka response does not preclude investigation into the forces of instigation.

To help grasp the concept, draw an analogy between athletic behavior and creative behavior. Suppose that we had a word in English for athletic talent and systems; let's call it "athleticity." What would be a fair definition of "athleticity?"

--Athleticity is the ability to do athletic things.

--Athleticity is the process of producing athletic results.

--Athleticity is a mysterious blessing that some "gifted" people have.

Carrying the analogy a little further we realize that almost everybody is "athletic" to a certain degree. Some of us, depending on strength, agility, motivation, training, etc. are more proficient as athletes than others. While it

is true that none of us, no matter how hard we work, will ever be able to match all world class performances in every sport, it is also true that almost all of us can improve our athletic abilities if we train and practice our "athleticity."

Almost everybody is "creative" to a certain degree. Some of us, depending on experience, motivation, training, etc., are more proficient as creative people than others. While it is true that none of us, no matter how hard we work, will ever be able to match an Einstein, a Picasso, or a William Blake, it is also true that each of us can improve the ability to produce more truly creative products.

If a list is adapted from athletic endeavors and applied to creative endeavors, creative people may benefit from some of the same suggestions that are given to athletes. To be more creative, work hard, do stretching exercises, develop stamina and endurance, determine to succeed. Programs can work to improve creativity just as they can work to improve athleticity. This analogy, by the way, is proposed by David Perkins, the Harvard psychologist who is a current leader in the field of creativity studies.

Here are some of the suggestions and techniques that have been provided by the best thinkers and theorists who have studied creativity most carefully. Although they come from several different fields, usually from some branch of psychology, they have considerable agreement on the basic principles of "How to be Creative."

First of all, creative people think that they are creative and expect to be creative. One of the strongest inhibitors of creativity is the assumption that it is not going to happen. If you constantly go around saying "I wish I were creative, but I'm not. I'll have to leave creativity

to those who are naturally blessed with it," chances are that you will not be creative. Creativity is seldom imposed on people against their wills.

Secondly, creative people not only expect to be creative, they actively and deeply need to be creative. In the several accounts of creativity theories that follow, notice how often necessity and need come up. Our common saying: "Necessity is the mother of invention," is the expression of this essential understanding. Creativity is basically problem solving. The more deeply we need to solve the problem, the more likely that we will work at it until we discover or invent a solution.

Several other factors contribute to creative success, as we will see in the following paragraphs—ability to synthesize things, willingness to keep trying new combinations until one of them "clicks," and dissatisfaction with the mere idea unless that idea can be proven effective in practice. All these and several other conditions favor creative success.

But notice the two most important.

-- Have a positive attitude that expects creative success

-- Have a deep-felt need to solve the problem.

The ability to "think up" insightful phrases, criteria, structures, images, and designs, is a valuable asset, and a skill that creative people need to nurture.

Creativity produces the insight that first sees the validity of the experience, creativity forms an arrangement of symbols and signals that can meaningfully represent that insight to the audience, and creativity helps the audience

recreate the original experience in their own minds and adapt it to their experiences.

Premise: *creativity theory supports the conclusion that when a person recognizes the isomorphism in an analogic construct, that insight is the essentially creative act. In other words, as Koestler and others have continually contended,* "The essence of creativity is to see an analogy where no one had seen an analogy before." [*Act*. p. 201]

Arthur Koestler has written several books that explain the operation of creativity in human behavior. The most important of those books is *The Act of Creation* (1964); others are *Insight and Outlook* (1949), *The Ghost in the Machine* (1968), and *Beyond Reductionism* (1969).

Koestler's theory: creativity results from combinations. The Latin word *cogito* ("I think") comes from the word *coagitare* ("to shake together"). Thus, the words agitate and agitation are etymologically, metaphorically, and isomorphically related to cognition and recognition. According to Koestler, every act of thought is a combination of mental images, impressions, and associations. Creative thought is specially combined; creatively synthesized images, impressions, and associations, are derived from special mental processes and are brought together from rather more distant mental reaches.

Koestler says that the history of science could be written as the history of marriages of ideas which were previously strangers to each other or even considered incompatible with each other. So too the discoveries of art, the truly ingenious and innovative "breakthroughs" of art, are also the result of synthesizing previously unrelated entities. [*Act*, pp. 94-95]

> The creative act is not an act of creation in the sense of the Old Testament. It does not create something out of nothing; it uncovers, selects, re-shuffles, combines, synthesizes already existing facts, ideas, faculties, skills. [*Act* p. 120]

Koestler proposed a new word bisociation to label the synthesizing process and the merged results of that combining process. [*Insight*, p. 36] Bisociation is more than merely "associating" one thing with another. Association does relate separate entities by comparison and by noting that the entities belong to shared categories. But bisociation goes beyond mere camparison and recognition of similarities; bisociation integrates the two entities into a new whole that is somehow more than the sum of the parts.

Synthesis, which almostevery creativity theorist holds to be the essence of creativity, results from combining things. When we synthesize something we place together entities that reconstitute; they do not merely come together next to each other, they merge. After they have been synthesized hydrogen and oxygen become a compound--water.

But water is (for purposes of washing or drinking) something more than merely hydrogen and oxygen. The synthesis of the two elements into the compound has given hydrogen and oxygen significance beyond their individual qualities.

So too, Koestler contends, ideas merge into combinations that have new and greater significance because those ideas have been bisociated by a creative mind. When a creative person finds an analogous relationship between two entities (including images, ideas, qualities, forms, circumstances, uses, etc.) the bisociated parts of the analogy not only

borrow from each other, but they invest in each other and help characterize each other.

> "The greatest thing by far is to be a master of metaphor; it is the one thing that cannot be learned from others; and it is also a sign of genius, since a good metaphor implies an intuitive perception of the similarity in the dissimilar."
> [Aristotle, *Poetics*, 1459a]

Definitions of *isomorphism* come from several branches of the sciences, and each of the definitions carries with it the idea of "intrinsic structural similarity." Biologists label the similarity of appearance or structure of organisms belonging to different species "isomorphic." In chemistry, a close similarity in the crystaline form of substances containing different elements but which have similar composition are said to be isomorphic. In mathematics isomorphism is a one-to-one correspondence between elements of two groups, so that for example, the cipher text *FXEXPF* is isomorphic to *PZMZTP*. In Gestalt psychology isomorphism is the name for the theory that our experiences and the mental processing of those experiences have the same structure. Rudolf Arnheim, a Gestalt psychologist and aesthetician says that according to the principle of isomorphism, "processes that take place in different media may be nevertheless similar in their structural organization." [*Toward a Psychology of Art*, p.58]

> Isomorphism [is a] structural similarity among phenomena pertaining to different physical or psychological media. The psychological kinship of, say, red wine, velvet, and the sound of a violoncello [sic] would be explainable if it could be shown that the physiological stimuli corresponding to these experiences produce effects on the nervous system that resemble each other structurally [that is, produce physiologically similar processes in the cortex]. [Arnheim, pp. 275-276]

Douglas Hofstadter, in his wonderfully provocative and ingeniously isomorphic book *Godel, Escher, Bach,* says that when corresponding structures are imposed on one another in such a way that the relationship is apparent, meaning is generated. In other words, the perception of isomorphisms creates meaning.

Hofstadter says that "An interpretation will be meaningful to the extent that it accurately reflects some isomorphism to the real world" [pp. 52-53], and Gregory Bateson writes:

> "My central thesis: The pattern which connects is a metapattern. It is a pattern of patterns. It is that metapattern which defines the vast generalization that indeed it is patterns which connect." [*Mind and Nature*, p. 11]

Koestler, this time writing in *Beyond Reductionism* makes a similar comment:

> I can recognize a melody, regardless of the instrument on which it is played, and I can recognize the timbre of an instrument, regardless of the melody played on it. There are several interlocking hierarchies at work, each with its own criteria of relevance. One abstracts melody and treats everything else as noise, the other abstracts timbre and treats melody as noise. [p. 201]

Koestler, by the phrase "interlocking hierarchies," indicates "patterns which connect" the isomorphic forms of melody or the forms of sound quality (timbre) without distractions from the other irrelevant forms.

Do we suppose that people can see, feel, or understand some morphic relationship between red wine, velvet, and cello music? Do they apprehend that relationship because the ability is inherited archetypally? Arnheim is suggesting that cello music stimulates the brain in patterns that are structurally similar to the brain patterns stimulated by red wine. Is that a reasonable assumption? Whether the ability be inherited archetypally, or whether it be developed culturally, the creative person may be able to exploit the cognitive pattern.

Some experiences and images of experiences are so intrinsically similar that the intuitive, creative, or artistic person sees an identity of image and meaning. The concept and role of psychological "identification" in creativity is both essential to the original creative insight and the insight that is eventually understood by the audience.

> For example [Koestler continues], the daily course of the sun is viewed as a symbol of human life because the perceptual aspects of rising, increasing, reaching a climax and descending are spontaneously perceived as being structurally similar (isomorphic) to the dynamics of birth, growth, mature power, and decline. [*Beyond Reductionism*, p. 224]

A weeping willow does not look sad because it imitates a sad person. Rather it is an isomorphic image taken empathically from shape, passive hanging, and a structurally similar state of mind and body that we identify with sadness. Empathy is an isomorphic relationship created by correspondingly similar structures of emotions.

As creative people seek the proper materials with which to express their insights, they must find the analogic patterns which connect perceptible images not only to their subjective understandings, but also to the understandings of their audiences.

Premise: *Infraconscious mentation is more likely to produce insightful analogies than are likely to be produced solely by rigorous, willful, and consciously rational mentation, because infraconscious mentation, operating in the mode of magmatic flux generates isomorphic significance by means of identification of predicates; predicate identifications offer more opportunities for creative syntheses than are afforded by rational/logical identification of subjects.*

First of all, the term "infraconscious mentation" is chosen carefully to indicate mental activity below conscious awareness--perhaps including, but certainly not restricted to the Freudian "unconscious," nor is it what is popularly known as the "subconscious" or "subliminal" mental activity, nor is it merely conscious activity of which the individual is unaware. It can be any or all or parts of each simultaneously. By being *infra* (metaphorically) the mentation is somehow below the first levels of alert awareness.

The unconscious mind is an unlimited cavern to explore, and a lode-rich mine. Readiness to recognize significant indications from the images of the unconscious aids creativity. "Lateral thinking" is DeBono's term (as coined in his book *Lateral Thinking*), for what Koestler called "thinking aside," what Guilford in *The Practice of Creativity* called "divergent thinking," and Perkins called "contrary recognition." In each of these instances the speculator attempts to get "off the beaten path" or to "come up with something from out of left field," in order to find

a new answer or a new aspect to consider. "Vertical thinking" is ordinary rational/logical/analytical thinking, but "lateral thinking" speculates without conforming to usual criteria, by deferring judgment, by attempting to break habitual thought patterns. Thinking aside and "underground games" (another of Koestler's phrases) is the use of wide-ranging speculation. One might call it "musing." Musing is at once conscious, yet turned loose to meander along paths structured by infraconscious associations.

Arieti's major work on creativity theory is *Creativity: The Magic Synthesis*. Creative behavior, according to his central tenet, is effected by what he calls a tertiary process that is the bisociated merger of the Freudian primary process (the most unconscious mental activities that seem to be a magmatic flux of psychic energies) with the Freudian secondary process (the ordinary conscious, rational, logical apprehending and decision-making of the Freudian ego). Tertiary process thinking cannot evolve, obviously, without access to the materials of the primary process. The primary process is made available to the secondary process most readily in musing, daydreaming, dreaming, or otherwise speculating in a free flowing mode.

Primary process is the Freudian label for the forces and dynamics that govern truly unconscious mental activity. It is the type of thinking characteristic of childhood, of dreaming, of the way primitive peoples think (especially the Australian aborigine during so-called "dream-time") and characteristic of the way some psychotics think (especially paranoid schizophrenics). Primary process is characterized by extreme mobility of psychic energy so that the motivating impulses of the unconscious (libido) meet few negatives. The energy follows paths of least resistance and gratification is immediate.

As the energy flows, symbolic representations, analogy, a lack of a sense of time, and use of many allusions are also characteristic of primary process. Primary process operates in the id to effect basic impulses (appetites, wishes), and is guided by the Freudian pleasure principle. The creative person--for some reasons not fully understood, according to Arieti--maintains a greater than average accessibility to imagery, metaphor, emphatic verbalization, and other forms related to the primary process.

Secondary process is the name Freud gave to the laws that govern the psychological events of the preconscious or the ego. (The preconscious is distinguished from other parts of the unconscious mind because the conscious ego can draw material [memories] from the preconscious on demand). The ego is that part of an individual's mental apparatus that governs, operates, generates, and regulates conscious voluntary activity. It is the locus of the "will." The ego executes the "directives" originating in instincts, or produced by stimuli, and although it does recognize pleasure as a motivating force, the ego is guided more by a "self-preservation" or "reality principle." In responding to external stimuli, the ego decides when and how they should be avoided or handled or adapted so to maximize their usefulness to the self. In the case of internal instinctual demands, the ego decides which of those "wishes" can be satisfied, which should be postponed--the id is incapable of even considering postponement--and which should be completely suppressed.

The ego uses judgment and intelligence to process the information from the senses, applying logic and reason, to test the reality of experience. The ego blocks the tendencies of instincts that would endanger the self if allowed to be gratified immediately.

Tertiary process is Arieti's term for the combination of primary and secondary processes. The concept of the tertiary process does not exist in purely Freudian theory, but is an "invention" so to speak, of Arieti's. The tertiary process, with specific mechanisms and forms, blends the two worlds of the rational and the irrational. Instead of rejecting the primitive (or whatever is archaic, obsolete, or off the beaten path), the creative mind integrates it with normal logical processes in what seems a "magic" synthesis and from which the new, the unexpected, and the desirable emerge. [Arieti, p. 13]

"Inspiration" is the faculty by which the creative person finds a primary-process form that will hold the content of the secondary process. This accessibility to the primary process may require a state of passivity similar to that of dreaming; but the passivity cannot involve the innovator's whole psyche. On the contrary, it contrasts with the increased alertness on the part of the psyche that deals with the secondary process and presides over the creative synthesis. Thus, in the act of creation, a complicated mental mechanism takes place that combines greater than usual passivity and greater than usual activity. [Arieti, p. 185]

The primary process supplies the creative person with the matrices of free-flowing imagination, providing a mode of presentation which allows meanderings, as well as providing a loose form of organization, that allows the emergence of similarities, suggestions, and partial representations. The secondary process provides the screening and elimination of many suggestions and partial representations, whether in verbal, pictorial, or other forms. The tertiary process ultimately comes into being as a "click," or match, between the primary and secondary processes, which brings about an accepted emerging

representation. Eureka! The new unity is created! [Arieti, p. 186]

> "Because of its archaic nature I have called the main form of immature [primary process] thinking 'paleologic' (from the Greek paleo, meaning old). This form of thinking is not illogical or alogical, but it does follow a logic different from that used by the human being who is awake and healthy. The normal human being as a rule uses the ordinary logic of the secondary process—the kind of thinking that in Western civilization is generally called Aristotelian logic, because Aristotle was the first to formulate its laws. But whereas imagery and endocept [Arieti's term for internalized mental activity such as hunches, musing, etc.] constitute a considerable amount of the mental life of every human being, paleologic thinking is present in normal or average people only to a minimal degree."
> [Arieti, p. 67]

The important principle for our discussion of creativity is that paleologic thinking produces predicate identifications.

In the predicate identifications of paleologic or primary process thinking lie the wellsprings of creative insight, and in the rational-logical treatment and synthesis of those predicate identifications lie the dam and dynamo that turn the well water into power.

The first psychiatrist who studied this anomaly of primary process thinking and attempted a logical formulation was Eilhard Von Domarus (1944). He enunciated a principle which, in slightly different form, read, "Whereas in normal (or secondary process) thinking identity is based only upon the basis of identical subjects, in paleologic (or primary process) thinking identity is accepted upon the basis of identical predicates." [quoted in Arieti p. 69]

The predicate that leads to the identification is called the identifying link or identifying predicate. Obviously this type of thinking does not follow Aristotelian logic, in which only like subjects are identified. The subjects are fixed; therefore, only a limited number of deductions are possible.

For instance, an apple is identified with another apple (both recognized as belonging to the class "apple"). "But in paleologic thinking the apple might be identified with the breast of the person's mother, because the breast and the apple have a similar shape." [Arieti p. 69] In other words, in paleologic thinking the breast and the apple are the same. Or, on the basis of a sound-pun predicate, the apple might be identified with a felonious stock broker because both he and the apple are in ciders, or insiders. *A* also becomes *non-A* (that is, *B*) provided *A* and *B* have a predicate (or element) in common. It is the predicate that leads to identification and equivalence.

At the paleologic level the individual starts to think categorically, or in terms of classes, but these categories are not reliable. Being primary, they are at the mercy of emotions or random associations and do not respect the Aristotelian law of identity; that *A* is always *A*, never *B*. In fact, according to Von Domarus's principle, *B* may be *A*, provided *B* has a quality of *A*. The Aristotelian law of contradiction states that A cannot both be and not be *A* at the same time and place. If a person follows Von Domarus's principle, he may see *A* as *A* and at the same time as *B* (that is, *non-A*) if he concentrates on a quality that *A* and *B* have in common. The Aristotelian law of the excluded middle states that *A* must be or not be *A*; there cannot be an intermediate state. In its tendency to condense several subjects, paleologic thinking neglects this law. Things are often seen as a composite of *A* and *B*. For instance, in

schizophrenic drawings one often sees a human figure that is half man and half woman. [Arieti, p. 74]

Here is the important point: since the predicates of a subject are as infinite as the imagination, it is not possible to predict what type of identification will take place. In fact, the paleologic thinking of schizophrenic patients specifies some of the unpredictable connections that primary process thinking can produce. One patient, reported by Max Levin, believed that she was on a ward "for colored people." Asked why she thought so, she replied, "Because I was brought here by Miss Brown. (the nurse who had accompanied her to the hospital). Another patient believed he was Jesus Christ. When he was asked why he believed so, he said, "I have drunk too much Carnation milk, and I have been reincarnated." [Arieti, p. 80]

Arieti also reports the predicate identification of another patient who, because she was a virgin, knew certainly that she was the Virgin Mary. The patient succeeds in finding at least one element in common between two or more things or persons, and that is enough to warrant complete identification. Obviously this type of thinking is absurd from the point of view of a normal person. The patient focuses on the common element and ignores the rest, which to the patient are irrelevant. What should be only a similarity becomes the basis for making a total identification. The same mechanisms occur in the creative process. [Arieti, p.69]

The creative mind, through tertiary process mentation "latches on" to predicate identifications and makes them significant.

By purposefully generating chance configurations through playful "art-for-art's sake" experimentation, through stochastic trial and error adventures, with

purposeful perversity that breaks out of the prejudice of habit and prudent good taste, by exploratory thinking aside, creative people confront themselves with opportunities for bisociations and significant syntheses.

"You wanna make something out of it?" is the schoolyard bully's taunt. Creative people need to "make something out of" every possible hint; creative people cannot allow the irrational predicate identificatons to remain irrational.

Until the irrational insight is shown to be relevant, however, the creative person is often thought to be weird. Such willingness to be perverse and to be thought "tasteless" requires considerable courage.

Good taste is the refuge of the uncreative. Good taste says: this is the way that has already been accepted as not only satisfactory but categorically imperative. The unconscious knows little of good taste; the id's pleasure principle identifies the wish with its own fulfillment. The creative innovator is not put off by confrontations with new relationships that make the present tense and by definition deny the past perfect, puns intended.

The creative innovator relishes puns, because they objectify bisociated significance, and they keep the mind in a constantly synthesising mode.

A subsequent creative problem arises, however, when the new insight must be made tastefully palatable to those who do not share the creator's original, immediate, and self-evident insight that give the "eureka moment" its validity. Generating new ideas is not as difficult as getting new ideas accepted.

To effect the creative bisociation of images, concepts, vague hunch-like impressions and/or rather full blown ideas, Koestler suggests that creative people need not only to be ready to "muse," but also to be ready to pounce on chance configurations that the primary "magmatic thinking" (Koestler's neologism) might deliver into the control of the logical/critical realm of secondary process thinking. Quoting Louis Pasteur: "Fortune favors the prepared mind," [*Act*, p. 119] Koestler reminds us that readiness to seize opportunities for bisociation, even when we are not alertly aware of being ready, increases the probability of success. The constant and deep-felt need to find a creative solution keeps the problem simmering—perhaps on a back burner accessible only to the infraconscious—-while the top of consciousness is engaged in otherwise practical and pedestrian tasks.

Indeed Arieti makes "readiness" one of his ten conditions that improve creative performance, Perkins' teleological creativity theory absolutely demands the purposeful imposition of quest in the service of creativity, and the *Synectics* theorists have stipulated "detached involvement" (involvement meaning commitment and readiness, while "detached" means relatively free to speculate) as a condition that maximizes creative production.

Premise: *Infraconscious mentation can be fostered by adopting conditions common to bus-bath-bed (well known venues of inspiration).*

A well-known physicist in Scotland once told Wolfgang Kohler, "We often talk about the three B's, the Bus, the Bath, and the Bed. That is where the great discoveries are made in our science."

[Kohler, *The Task of Gestalt Psychology*, p.163]

During partial sensory deprivation as when relaxed in a warm bath, or when rocking in a droning environment (bus), or when in an hypnagogic, hypnopompic, or dream state (bed), the mind is more likely to revert to the primitive matrices that allow images to associate on the basis of predicate values and characteristics. Bus-bath-bed encourage musing.

Bus-bath-bed relax the tension that is inherent in attention and allow the more free-flowing thought processes of the infraconscious to "appear."

BUS

Apparently the droning and swaying motion of a bus is conducive to creative breakthrough. It can happen while the driver of a car is on a long and straight stretch of uninterrupted highway also, but it is more likely to happen if someone else is driving. The monotony of the bus ride lulls the conscious so that the two realms of the mind approach each other momentarily and the hidden activity of the infraconscious can leak through the twilight zone to offer hints to the conscious.

In a letter to a friend, Mozart wrote: "When I am, as it were, completely myself, entirely alone, and of good cheer—say travelling in a carriage, or walking after a good meal, or during the night when I cannot sleep; it is on such occasions that my ideas flow best and most abundantly." [Harman and Rheingold, *Higher Creativity,* p. 33] Darwin wrote: "I can remember the very spot in the road, whilst in my carriage, when to my joy the solution occurred to me." [Quoted by LeBoeuf, p. 53] Carl Sagan reports that whole chapters come to him while he is "sitting on an airplane." [LeBoeuf, p. 72]

Chanting and gently rocking back and forth may effect a "bus-like" condition that aids meditation, or even mystical contact with non-conscious portions of the mind and spirit. Certainly the mystic's use of monotonous sound with swaying is strong evidence that some people find it useful as a way to break through the surface tension of consciousness.

[Here is offered a very personal example: I have found that mowing my lawn, walking behind the mower while I compose an impromptu lecture or "dictate" the content of a paper to myself, is a very salutary bus-like state to help generate insights. When, for example, I was in the process of attempting to discover a better way of explaining the concept of "the whole is greater than the sum of the parts" to my freshman class, I told myself, while mowing the lawn, that what I needed was a "peach" of an idea, and immediately, pear sprang to mind. From that "eureka" moment I realized that a pair of shoes or a pair of gloves is something more than one and another shoe or glove. The concept of "pairness" as a gestalt has been a very handy explanatory device.]

Goethe, Scott, and Burns all composed while on horseback. Swinburne has written of the inspirations that came while strolling.

BATH

One of the most famous of all discoveries took place in a bath. Archimedes realized the significance of displacement, as he settled into his brim-full bath and watched the water overflow. We who speak English will probably use the Greek word "eureka" as long as there are English speakers. Eureka is central to a significant human experience. The eureka moment is the very moment at which we

recognize the identification of predicates. It is the moment we catch the analogy.

Einstein discovered so many of his ideas while shaving ("bath" here extended to bathroom and not necessarily reclining in the tub itself) that he often cut himself in surprise and joy at the discovery. Eureka-glory can be dangerous.

A calm warm bath, especially, provides the restful environment that numbs the senses and thereby the bath diminishes distractions from active stimuli. When the body relaxes in an ordinary bath the mind is freed to wander speculatively.

Turgenev is supposed to have been aided in his writing by keeping his feet in a basin of warm water. [Koestler, *Act*, p. 318] "Experience has taught me," wrote A. E. Housman, "when I am shaving of a morning, to keep watch over my thoughts, because, if a line of poetry strays into my memory, my skin bristles so that the razor ceases to act." [Quoted by Koestler, *Act*, p. 317]

BED

The primordial mechanisms of primary process mentation or "paleologic" thinking, are the mechanisms of dreams and daydreams. Koestler comments:

> Friedrich August von Kekule, Professor of Chemistry at Ghent, who, one afternoon in 1865, fell asleep and dreamt what was probably the most important dream in history since Joseph's seven fat and seven lean cows:
> "I turned my chair to the fire and dozed. Again the atoms were gambolling before my eyes. This time the smaller groups kept modestly in the background. My mental eye, rendered more acute by repeated visions of this kind, could now distinguish larger structures,

> of manifold conformation; long rows, sometimes more closely fitted together; all twining and twisting in snakelike motion. But look! What was that? One of the snakes had seized hold of its own tail, and the form whirled mockingly before my eyes. As if by a flash of lightning I awoke. . . . Let us learn to dream, gentlemen."
>
> [Quoted by Koestler, *Act*, p. 118]

The serpent biting its own tail gave Kekule the clue to a discovery which has been called "the most brilliant piece of prediction to be found in the whole range of organic chemistry" and which, in fact, is one of the cornerstones of modern science. Put in a somewhat simplified manner, it consisted in the revolutionary proposal that the molecules of certain important organic compounds are not open structures but closed chains or "rings"--like the snake swallowing its own tail.[Koestler, *Act*, p. 118] Kekule, by the way, also reported that another of his insights came to him while he was riding a streetcar.

On the night of November 10, 1619, Rene Descartes dreamed the rules that became institutionalized as "scientific" after he published his *Discourse on Method*.

> Dreams occur spontaneously and are always original. When we dream, we lose control of our actions, and as characters of our own dreams we do many original things. Even when dreams repeat certain themes, they present something new in each instance. Unexpected connections occur. Some combinations of scenes and events do not seem to have taken place ever before in nature or in the dreams of other people. On rare occasions dreams have been reported as conductive to the direct acquisition of insights, or even to the formulation of inventive procedures that generally occur in waking life, when the mind has access to the secondary proccess. For instance . . . . the Nobel Prize winner, Otto Loewi, saw the proof of the chemical mediation of nerve impulses in a dream. On awakening he could not remember the dream, but fortunately it was repeated the following night [when he was more careful to awake and take good notes]. Some dreams should not be

> considered as just a reflection of the dreamer's state of psychological pathology or of his health, but rather as psychological attempts to solve conflicts. [Areti, p. 9]

Bed-related activity includes sleep and the dreams that accompany sleep, of course, but it also includes hypnagogic imaging. These are the fleeting auditory or visual images that occur in some persons while they are about to fall asleep. On the other end of the sleep cycle hypnopompic images are those that occur to some people while awakening from deep sleep. And daydreaming can, of course, take place other than in a literal bed.

The history of discovery is replete with instances of people who claim that the creative idea came in a dream or occurred during a period of rest. Perhaps Sir Isaac Newton was not actually in bed when he reclined under the apple tree, but when the apple fell and he recognized the principle of gravity that insight coincided with a restful period. Coleridge has reported that *Kubla Khan* came during an "intense daydream or hypnogogic state" and was composed during "a sort of reverie brought on by two grains of opium, taken to check a dysentery." [Quoted by Koestler, *Act*, p. 166] Because Kohler's physicist acquaintance did not mention the fourth B--booze, this paper does not pursue that mental state and the creative insights that may accompany paleologic thinking brought about by inebriation.

Einstein described how "the basic insight into the relativity of time, to wit, 'the knowledge that the events which are simultaneous for one observer are not necessarily simultaneous for another,' came to him early one morning just as he got out of bed." [Koestler, *Act*, p. 183] Descartes is supposed to have invented analytical geometry while lying in

bed watching a fly crawl on the ceiling. Dimitri Mendeleev, in 1869, "went to bed exhausted after struggling to conceptualize a way to categorize the elements based upon their atomic weights. He later reported, 'I saw in a dream a table where all the elements fell into place as required. Awakening, I immediately wrote it down on a piece of paper.'" [Quoted by Harmon and Rheingold, pp. 30-31]

As was noted above, the kinds of mental acitivities that produce dreams are identical with the kinds of mental activities that produce predicate identifications. [Arieti, p. 70]

> "The period of incubation represents a *reculer pour mieux sauter* [step back in order to leap forward]. Just as in the dream the codes of logical reasoning are suspended, so 'thinking aside' is a temporary liberation from the tyranny of over-precise verbal concepts, of the axioms and prejudices engrained in the very texture of specialized ways of thought. It allows the mind to discard the strait-jacket of habit, to shrug off apparent contradictions, to un-learn and forget—and to acquire, in exchange, a greater fluidity, versatility, and gullibility. . . . The most fertile region seems to be the marshy shore, the borderland between sleep and full awakening--where the matrices of disciplined thought are already operating but have not yet sufficiently hardened to obstruct the dreamlike fluidity of imagination." [Koestler, *Act*, p. 210]

Necessity is the mother of invention and bath-bus-bed are where she is most likely to get pregnant.

Premise: *the mental activity that coincides with bus-bath-bed will be more likely to produce usable innovative insights to the degree the creative person is infused with a need to solve the problem, intends to solve the problem, and is ready to pounce on and to "make something out of" any significance that arises from the new isomoprphic constructs produced by predicate identifications.*

As the tortured souls of schizophrenics show us, paleologic and primary process thinking do not serve us well in a world of everyday interaction with the reality of physics, civics, and economics. To the extent that the creative person maintains a detached involvement, a willingness to let-go the meandering imagination while all the time taking notes for future reference, that creative person can take fuller advantage of the whole mind.

Arieti listed ten conditions that foster creativity. These conditions help keep the mind conduced toward subjective tertiary processes. Eventually, however, the creative insight will have to be tested and evaluated by its relevance to the external and objective world.

ALONENESS Loners--people who are not gregarious extroverts may very well be most likely to come up with the most creative ideas and products. Do not disparage introversion. Solitude encourages introspection.

INACTIVITY During periods of rest and daydreaming, ideas come up out of the unconscious to affect consciousness; seek that "twilight zone" afforded by bath-bed-bus, and try to damp the activities that distract.

DAYDREAMING Let the mind wander. Let the "random" associations emerge but always keep a watch out for something

that can be "force-fit" onto the problem at hand. As the mind wanders, make it wonder how those images that merely occur could possibly be applied to the problem. Productive daydreaming requires simultaneous detachment--turn the imagination loose--and attention (see ALERTNESS below).

FREE THINKING This is not to be confused with Freudian free association, which does not attempt to apply purposefully related images to the problem at hand. Purpose aids creativity. Free thinking uses "stochastic processes" which in the Greek antecedents meant shooting arrows at a target; free thinking does not explore at random, but keeps the target in mind, and stays "in the ball park while exploring left field." (Cf. "thinking aside," and "lateral thinking.")

READINESS Be alert (see below). Pasteur's comment: "Fortune favors the prepared mind," illustrates the attitude most likely to produce creative results. Be ready to pounce on anything that can possibly help, and be extra ready to make things help (force-fit). Arieti specifically says that the readiness is to "catch similarities."

GULLIBILITY Cynicism and criticism nullify a good deal of creative thought. Be ready to assume that anything is good, correct, and helpful. Gullible implies "can be fooled." Let the "stupid" ideas have their time for a while; defer judgment and wait until later to line up all the reasons that the idea won't work. For the time being, believe that it will work. Do not too soon reject an idea because it is perverse, or otherwise in "bad taste."

REMEMBERANCE This is close to imaging in that "remembering-in-advance" (imaging) is as important as remembering what has happened. As important as imaging is, however, remembering and inner replaying of past traumatic

conflicts is very important. Past conflicts provide energizing motivations for current creative work. "What is most important is not the past or present conflict, but the abilty to transform it into creative work." [p. 378]

ALERTNESS As in any other productive activity, one has to be awake and ready to pounce. How can one take advantage if s/he allows the advantage to slip away. Commitment to action, desire to get it done, follow up, a need to prove the truth and appropriateness of the insight assure that the whole mind is in use. By being alert we impose will on the process.

DISCIPLINE The appropriate synonyms here are, control, perseverance, patience. After the 10% inspiration comes the 90% perspiration necessary to develop the systems, the applications, the proof.

And possibly another condition, which not mentioned by Arieti, may nevertheless help.

UTTERANCE By outering the insight, make it objective. Don't let the subjective insight remain individually personal. Mediate the experience somehow so that the images or figurative expressions can give a handle on the idea. Vague or even obvious hunches are not palpable, no matter how impressive they may have been to the one who was visited by the muse. It's not enough to get the idea, the creative person must get it *out*.

For this reason, analogies, metaphors, and other figurative expressions are important as tools to transmit the ideas, just as they were instruments to discover the idea. The infusion of the salient and isomorphic characteristics of the insight onto another set of objects, events, and circumstances gives form to the amorphous insight. The

production of analogies, metaphors, and other figurative expressions induces a pattern which connects the original to a new creation--significance is created in the minds of those who understand for themselves the ineffable insight that came to the discoverer.

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