

# Myths of Mind

*There are a thousand forms of mind.* (Rumi, in Shah, 1968)

The apparent unity of the human mind is a myth, a false belief unsupported by external or experiential evidence. This fact has been hammered out in external form over the last 400 years in the West, although it was well known in other cultures and earlier times—e.g., the above statement of Rumi (1207-1273), who was born in present-day Afghanistan, and lived in Baghdad and present-day Turkey, points towards a multiplicity of mind. What has been difficult in our culture has been the elucidation of the nature of the illusion, the tracing of the architecture of the prison.

The recognition of the dilemma is old: Shakespeare's darkly perceptive Richard II remarks:

I have been studying how I may compare  
This prison where I live unto the world:  
And for because the world is populous,  
And here is not a creature but myself,  
I cannot do it; yet I'll hammer it out.  
My brain I'll prove the female to my soul;  
My soul the father: and these two beget  
A generation of still-breeding thoughts,  
And these same thoughts people this little world  
In humours like the people of this world,  
...  
Thus play I in one person many people,  
And none contented: sometimes am I king;  
Then treason makes me wish myself a beggar,  
And so I am: then crushing penury  
Persuades me I was better when a king,  
Then am I king'd again: and by and by  
Think that I am unking'd by Bolingbroke,  
And straight am nothing: but whate'er I be,  
Nor I nor any man that but man is  
With nothing shall be pleased, till he be eased  
With being nothing.

Richard is locked into a prison of discontent, a fragmented assortment of “people.” He compares his mind to a marriage of his “male” soul and “female” brain, or essence, and his internalized Adam and Eve create a “people” of thoughts, who are “still-breeding” ever more thoughts. These thoughts are differentiated as to their “humours,” or psychological characteristics, much as the apparent selves of the peoples of our World. The self of Richard is as a king, who, like the historical Richard and the character in the play, is a king deposed. This apparent kingly personality is an illusion, a king who is “nothing.” The end state of Richard’s transformation is to nothingness, his death in prison in the action of the play; but the poetry alludes to a more internal, psychological framework of meaning.

Such is a sophisticated experiential view of the human mind at the dawn of the modern era, a view of multiplicity of mind of which the West would be heedless for centuries. We can view the context of the play by leapfrogging over historical signposts. While the historical Richard II was murdered in 1400, the 15th century saw the flowering of the Italian Renaissance, the discovery of Western Europe of the New World, the large-scale expulsions of Moslems and Jews from Spain, the expansion of exploration and subjugation by Europeans of Africa. The 16th century saw the Reformation in Europe, the conquest of large parts of the New World, and the births of such individuals important to the history of science as (Francis) Bacon, Brahe, Descartes, Kepler, Galileo, Harvey, and Vesalius. Some years after attending in 1601 a performance of the play *Richard II* on the eve of an insurrection by the Duke of Essex whom she subsequently executed, Queen Elizabeth expressed her horror of self-recognition: “I am Richard II, know ye not that?” The headlong rush of cultural development after the era of Shakespeare led to the Counter-Reformation and the Enlightenment. This era saw the reduced importance of organized religion and the old aristocracies, social and political revolutions for some, and slavery for others, and the emergent development of a world economy linking Europe, the Americas, the Islamic and Black Africas, Russia, the Turkish Empire, and the Far East. In this rush up to the present moment, the invention of science is recognized as exerting a profound influence, an externally verifiable body of knowledge on the natural world and the workings of our internal worlds.

Much of the success story of science has been in the physical sciences, the study of non-organic phenomena. The scientific method combined with the invention of analytical and geometrical fields of mathematics led to advances in mechanics, electromagnetism, chemistry, and quantum mechanics. Applications of these sciences took the form of ever more sophisticated technologies, culminating in the information technologies of today, which impinge directly on the life sciences at the levels of genetics, neurosciences, and the cognitive sciences. The origin of the scientific view of the mind is well exemplified in the writings of the Enlightenment philosopher David Hume (1748). Starting with Hume, we review aspects of our understanding of the human mind that are essential for our Human Journey.

### **The Mind as Blank Slate**

Hume proposed individual faculties of the mind acting on mental contents of *impressions* and *ideas*. Impressions were the “more lively perceptions” associated with sensory perceptions, feelings, and the will. Ideas or thoughts (or concepts) were the “less forcible or lively perceptions” upon which the understanding or reasoning faculty acted. Each idea could be resolved into a set of simpler ideas copied from a preceding impression. The human mind was a *blank slate* onto which sensations (impressions) were stored, and from which concepts (ideas) could be constructed to form more complex thoughts. Hume believed that simple ideas were bound together by “some universal principle, which had an equal influence on all mankind,” as evidenced in the observed similarities of ideas that could be expressed in different human languages. He proposed three principles of connections between ideas as universal properties of mental functioning: resemblance, contiguity in time or place, and causation. Hume’s emphasis on causation was an attempt to translate Newton’s theories of the mechanical universe into a mentalistic billiard-ball interaction of ideas. Because ideas (according to Hume) were nothing more than associations of past impressions, our every-day knowledge, such as is epitomized in the statement that “the sun will rise tomorrow,” can at best express only a probabilistic truth. In contrast to Shakespeare’s metaphors, there is no human soul

and no human essence—their begotten progeny of thoughts is reduced to a memory bank of sensations.

Hume's ideas were precursors to the evolutionary ideas of Darwin a century or more later, inasmuch as Hume emphasized the similarity between the reasoning of human and non-human animals. Hume's predecessor Descartes had argued that animals have no minds, that they were machine-like and lacked sensations and passions. On the contrary, Hume stated that non-human animals were similar to humans in experiencing pain and fear, and that their patterns of learning and inference as well as their emotional and cognitive abilities were similar to those in humans. The effect of discipline and education on animals, when combined with reward and punishment, results in the ability to produce "any course of action, the most contrary to their natural instincts and propensities." Whereas Descartes regarded a sound belief to derive from sound observation and reasoning, Hume emphasized the psychology mechanisms that lead us to believe and the effect of non-rational factors on beliefs. Whereas earlier Western philosophers had considered humans to be designed by God and to hold a status qualitatively higher than other animals, Hume described mechanisms of mind that were common to both humans and other animals. Hume did allow that animals could not reason as could some humans, but he was of the opinion that neither children nor the "generality of mankind" could reason. While animals acquire knowledge based on observation and what we term today conditioning and indoctrination, Hume asserted that other parts of knowledge called instincts were derived "from the original hand of nature" and were not improved by either the longest practice or experience. Such concepts were a precursor to Darwin's research that so intimately linked humans and other animals.

Rather than interpreting the human mind in relation to a particular theological belief, Hume interpreted the human mind in the context of observations of the natural world. In what was a "shock" to his contemporaries, who generally believed that human beings were the special creation of God and wholly distinct from other living organisms, Hume was proposing models of mental faculties akin to instincts that were similar in form, at least in some respects, between animals and humans.

Attempts since the 18th century to develop a science of human psychology have taken paths reflecting different, and sometimes unconscious, assumptions. An

“objective” psychology was developed, culminating in the behaviorist and reductionist approaches of the mid-20th century. The first attempt to objectively relate physical stimuli to mental experiences was undertaken by Ernst Weber (1795-1878, German). He performed experiments to measure the threshold of a stimulus needed to detect a sensation for touch and kinesthesia (the experience of one’s muscular states), and described a just noticeable difference, which is the amount by which two physical stimuli are required to differ on some physical scale in order to detect a sensory difference. Gustav Fechner published a book on the elements of psychophysics in 1860 that laid the groundwork for a developing, objective science of psychology. These men employed an analytical, reductionist approach by confining their scope of inquiry into human psychology to the simplest possible phenomena. Through such an approach, they hope to discover principles that might govern more complex aspects of human nature.

Wilhelm Wundt (1832-1920, Germany) founded a laboratory for psychology in 1875. Wundt proposed that there was a psychophysical parallelism between physical and mental events. His early studies were concerned with sensation and perception, which included introspective reports from observers to describe their mental states as physical stimuli changed. His later, less influential work attempted to study cultural aspects of psychology, including mythology, literature and the arts. It was his earlier, more reductionist approach to psychology that exerted broad influence on the subsequent developments of the science. William James (1842-1910, United States) was a contemporary of Wundt, who, like Wundt, regarded psychology as a component of philosophy. Both Wundt and James emphasized the primacy of human consciousness in constructing any psychological or philosophical understanding of human nature. It was, however, James’ description of habits that had great impact on the next generation of psychologists, including his student Edward Thorndike. Reminiscent of Hume’s descriptions of animal learning and instincts, James considered habits that were acquired by humans and other animals either through inheritance as instincts or by education as acts of reason.

The new science spread to England in the person of Francis Galton (1822-1911), who was a first cousin of Charles Darwin, and who described individual differences in

intelligence both in terms of inheritance and nurture. In France, Alfred Binet and collaborators constructed a first broadly used test of intelligence in 1905.

An important theme in this early development of the science of psychology that acquired momentum with succeeding generations of psychologists was that of behaviorism. The behaviorists were so inclined to construct an objective psychology that they banished the subjective, introspective contents of minds—perceptions, feelings, and thoughts. Only observables that could be measured in an experiment were accorded any degree of reality. An important school of behaviorism developed during the 19th century in Russia, culminating in the career of Ivan Pavlov (1849-1936). Although Pavlov was awarded a Nobel Prize for his research on digestion, he is best known today for his research on classical conditioning. By associating the sound of a bell with the feeding of a dog, the dog could be trained to salivate when only a bell rang. This was an excitatory form of conditioning, as the mere sounding of a bell could excite a reflex in the dog in the form of the act of salivating. But if the bell were rung many times without presenting any food, Pavlov observed that the dog would stop salivating. If the experimenter then fed meat to the dog the next time the bell was sounded, the dog again began to salivate at the sound of a bell. This was an inhibitory form of conditions, in which the dog would learn to inhibit the act of salivation when no food was presented, but would remove the inhibition when meat was again presented. Pavlov's research on classical conditioning became very well known through Europe and the United States, although his other lines of research on conditioning and indoctrination would be very little known until the post-Korean War research of William Sargeant on indoctrination in prisoners of war (link to elsewhere?).

Meanwhile, Edward Thorndike (1874-1949) created an American school of what would be called behaviorism through his studies on cat behavior. John Watson (1878-1958, United States) adopted a radical view of behaviorism in which he carried John Locke's associationism and blank-slate theory of mind into an empirical framework: "Give me a dozen healthy infants, well-formed, and my own specified world to bring them up in and I'll guarantee to take any one at random and train him to become any type of specialist I might select—doctor, lawyer, artist, merchant-chief and, yes, even beggarman and thief, regardless of his talents, penchants, tendencies, abilities, vocations, and

race of his ancestors.” B. F. Skinner (1904-1990, United States) generalized the Pavlovian conditioning to a theory of operant conditioning. This behaviorist theory was particularly severe in its elimination of subjective mental attributes, and was based on the assumption that all mental attributes were fictitious. Unfortunately for the true believers in behaviorism, the explanatory power of operant conditioning was inadequate in accounting for language acquisition and the new approaches of the humanistic and cognitive psychologists in the 1960s-1970s. Another theme in the development of a modern Western psychology was the emphasis on the unconscious mind. There is ample evidence of a sophisticated understanding of unconscious processes in the mind among Eastern thinkers (in Sufism and Vedanta literature) and mystical schools of Judaism (Kabbalah). In formulating his psychoanalytic theories, Sigmund Freud (1856-1939, Austria) borrowed from these sources as well as from concepts of thermodynamics derived for physical systems and extrapolated to mental systems. In the generation following publication of Darwin’s theories of evolution, Freud viewed human beings as a part of the natural order, subject to the same laws as non-human animals and inorganic systems. Nineteenth-century physicists such as Helmholtz had proposed that physical energy was conserved, i.e., it could never be increased or decreased in a closed system. While Helmholtz himself in his neurophysiological research was very careful in the absence of evidence not to generalize this conservation law to biological organisms, Freud posited a reservoir of internal psychic energy that was conserved, but which could take different forms. Such pathologies as neuroses could be understood by Freud as a sudden transformation of psychic energy. The reservoir of unconscious psychic energy he termed the “id.” As with today’s adaptation of computer science to computational theories of the mind, Freud was using then-current concepts borrowed from the physical sciences to construct an energetic theory of the mind.

Freud emphasized sexuality as the determiner of both human neuroses as well as the stabilizer for normal mental health. Subsequent psychoanalytic researchers and clinicians concluded that Freud had pursued a reductionist approach in relating all human mental functioning to sexuality. Carl Jung (1875-1961, Switzerland) proposed an alternative theory of the unconscious mind, the collective unconscious, which was a reservoir of archetypes. An archetype was a definite form in the unconscious that was

present always and everywhere. The collective unconscious contains these archetypes universally in every person, and is transmitted through inheritance. The Jungian archetypes also have precursors in older Eastern sources, some of which were explicitly considered in Jung's writings and lectures.

By the 1960s, the distance between the behaviorists and the psychotherapists could hardly have been broader. The behaviorists regarded all theories of subjective phenomena to be meaningless, while the psychotherapists constructed theories of mental processes based on concepts from the physical sciences, what might be termed the "spiritual psychologies," and on introspective intuition. At this time, the scientific mainstream developed a middle course in which theories of mental function departed from strict behaviorism to adopt concepts of internal mental processes. This work did not rely on a theory of the unconscious per se, but worked with these internal mental processes to construct a cognitive science. At the same time, the neurosciences have emerged with new measurement tools to search for physiological correlates to the concepts of mental function introduced by the cognitive scientists. Finally, the advances in genetics dating from the discovery of the molecular structure of DNA (Watson and Crick, 1953, England) to the identification 50 years later in 2003 of the millions of units in the human genetic code bode major future advances in scientific understanding of how the mind/brain functions.

This middle course of investigation has involved the study of mental abilities that are most distinctly human, and has led linguists and psychologists to the study of human language. Because language tokens are so easily observed and because language is the attempted communication of human thought, the study of language has been widely regarded as an excellent means of studying human thought. Recent attempts to construct a theory of human cognition have further developed insights provided by language. One such insight is the fact that there appears to be a specialized language faculty for the acquisition of language. This insight has led to the proposal of other specialized mental faculties.

## **Mental Modularity**

Hume and his successors developed the idea of a mental faculty as a general problem-solver. Such a faculty is termed a *horizontal* faculty. A horizontal faculty is one appropriate for many different kinds of tasks whereas a *vertical* faculty is one specialized for a single task. A person may have a memory for faces, names, music, geography, basketball players of the 1990s, movies starring Arnold Schwarzenegger, and so forth. Because a person has a memory capacity for so many different types of objects and events, we might think that memory is a horizontal faculty rather than there being a specific memory faculty for faces and another memory faculty for geography. Horizontal faculties may include memory, imagination, attention, sensibility, and perception. Alternatively a mental faculty may be *vertical*. For example, the memory of a face may be particular to the visual recognition of human faces, and may have little in common with the memory of a word or of a song. The psycholinguist Jerry Fodor has made important contributions on the modules of mind (Fodor, 1983).

One insight from the study of language is the innateness of a body of information. A child is born knowing the “universal grammar” from which is constructed the grammar corresponding to the language heard by the child. This provides a scientific context for understanding how there are some truths that human beings innately grasp. The language faculty, according to Fodor, is an excellent example of a vertical mental faculty, because it is strictly concerned with language. The older psychologies based on the blank-slate model of the human mind failed to explain how humans could learn so many different things in such a short time with a minimal amount of internal mental structure—only associations between sensations were permitted according to principles of association (i.e., principles of learning) such as those of Hume. The proposal that there exists an innate language faculty specialized to the task at hand appears necessary to account for the ability of the human child to become an expert language user in a short period of time.

Psychology has often freely borrowed models and analogies from the physical sciences; hence, the computer as a metaphor for information processing has found its way into theories of human cognition. A horizontal faculty might be akin to a general-purpose computer that can solve any problem as long as it is fully specified by the

programmer in terms of a set of instructions, i.e., its software. A vertical faculty is akin to a specialized computer that is constructed by a programmer/hardware designer to do just one thing, e.g., a primitive speech recognition system for automated telephone answering machines to detect a speaker's word from a limited single-word vocabulary: "One," "Two," "Three." The answering machine is designed to execute different actions depending on the acoustic input. Any other acoustical utterance (such as "Please help me") is not understood by the system.

A computer interacts with the environment to accomplish some meaningful end, as long as the environment is represented in a manner appropriate for the computer to utilize the information. In the case of a simple speech understanding system, the "input system" represents the current status in the physical world. The data comprising the state of the environment are provided by a transducer: in this case, the microphone. The transducer is distinct from the "input representation" in the sense that the input representation translates the information from the transducers into a form meaningful to the central processor of the computer. This input representation of the speech understanding system is the digital representation of the acoustic utterance stored on a memory chip. Given this representation of the world, the central computational processes form inferences concerning the world and accomplish goals. In this case, the speech understanding system must decide whether the utterance was a "one," "two," "three," or none of the above. The computer also has a *Deus ex machina* in the form of the computer programmer, who designed the software, so that the computer "knows" what these goals are.

Applying this metaphor to the "machine-like" aspects of the human mind, the human mind is composed of cognitive systems that are computational in nature. Like the computer in the above paragraph, there are general-purpose, central cognitive systems that act on arbitrary types of mental representations, input systems that provide representations of the world to the central processors, and transducers that provide sensations of aspects of the physical world in which the human being is immersed. Like the computer for many tasks, we may consider that we carry around a little master "programmer" inside our mind who specifies our goals and the means to achieve them. Our self is a programmer in this sense. This view is appropriate for any mental tasks that

are machine-like, or computational in nature, but there is a general problem: an infinite internal regression would result because the existence of such a little programmer would require the presence of a new little programmer to create the first, and so forth. This analogy must break down at some level of this recursion [*link to future recursion discussion*]. The machine-like model of the mind is crudely incomplete as a description of human nature, although it is successful in understanding the sequential processing of the human mind. The holistic, or non-sequential, activity of the mind cannot be accounted for by this approach.

The most basic transduction stage in the human body includes sensory systems for vision, audition, touch, smell, and taste. The input representations of vision and audition, the two dominant sensory systems in terms of neural processing in the human brain, are each constructed only after specialized processing by functionally distinct parts of the brain.

The higher-level input system Fodor considered is the linguistic representation pertaining to language. When we hear spoken language, we process the perceived sound in a different manner from when we hear music, or a car in the distance, or the sound of a cricket in a field. This is a distinction between a transducer, which is the auditory system in this case, and the input representation, which is the linguistic representation. The language faculty also includes a production system, which for most people is speech production—the linguistic representation must also control articulatory mechanisms controlling the vocal tract shape and phonation in voiced sounds using the vocal folds within the larynx. Fodor classifies language as a vertical faculty because the nature of the processing is unique for language and it is innate.

Such input systems are modules of the mind with the following properties:

1. *Input systems are domain-specific.* The number of input systems might be estimated by listing the number of perceiving systems (hearing, sight, touch, taste, smell) plus language. Fodor has something more general in mind, namely, that “there are [a variety of] highly specialized computational mechanisms in the business of generating hypotheses about the distal sources of proximal stimulations.” For vision, there might be separate modules for color perception, shape analysis, shape embeddings in three dimensions, and higher-level modules for guiding body motion, or recognizing a face.

The vision faculty then becomes an assemblage of modules that are in some sense organized hierarchically.

2. *The operation of input systems is mandatory.* You cannot help seeing a face as a face; thus the input system has no flexibility in creating its output representation from a given stimulus input. You cannot decide *not* to hear the sound of a cave bear although you may choose (at your peril) to ignore it.

3. *There is only limited central access to the mental representations that input systems compute.* Ask someone to look at his or her watch and tell you the time; that person does so. Now ask the person, without looking again, to describe the shape of the numerals on the face of the watch. The person will be unable to do so, despite having just looked at the watch. The problem isn't forgetting or inattention, but rather a lack of psychological access to the lower-level visual information. Similarly, language has intermediate layers of representation that are inaccessible to conscious detection. We are hearing sound-source properties, or reading patterns of black letters on white background, and in neither case are we aware of many of the details of the perceptual properties transduced by the ear or the eye. Our ordinary state of consciousness contains multiple layers of unawareness, and that is why it is so fast.

4. *Input systems are fast.* A modular system is fast because it is specialized to perform a limited set of operations on the information provided. In contrast, problem-solving in cognitive tasks is slow. Fast processing of input is consistent with mandatory processing.

5. *Input systems are informationally encapsulated.* Information encapsulation refers to the hiding of information from processes external to the input representation. There is nothing that a human or non-human animal's higher-level thoughts and emotions can do to prevent the action of a simple reflex once it is initiated. For example, I rub a particular place on my pet dog's abdomen, and his rear leg reflexively jerks back and forth. This vigorous muscle activity takes place while the dog is otherwise quite relaxed. That's information encapsulation in action. A reflex has all the information required to perform its action. Fodor argues that such modules as language and vision are truly encapsulated in the sense that cognition can only access their "output" representations. This means that there are parts of our mind that we cannot "open up and look inside of,"

either to observe their contents or modify their associated processing, much as my dog cannot modify the reflexive behavior of his hind leg.

6. *Input systems have a fixed, genetically specified neural architecture.* A view of the mind as composed of a multiplicity of modules is associated with an underlying view of the brain as composed of specialized neural centers, of which the design is encoded in the human genome. For example, a particular gene is responsible for a severe speech and language pathology (Bower, 2001). Afflicted members struggle to control their lips and tongue to form words and to make use of grammar. Pathologies such as brain aphasias for speech have highly detailed effects dependent on the particular neural tissue (i.e., the part of the brain) that is damaged. Such aphasias and other neural disorders are further evidence for the specificity of neural architectures for particular types of cognition, and are often indicators of specialized mental capabilities. As an example in another domain, a recent report of *amusia* describes a patient with normal hearing, speech and language, who had intensive musical training, and was able to read music, but was unable to perceive music, hearing it as structured noise (Travis, 2002).

## **Evolution and the Mind**

The input representations of the mind comprising perception and language are constructed in a modular manner. We are specialized to detect changes in our environment and to respond immediately to such changes. Everything about modularity of mind suggests an emphasis on speed of processing and fast response to features detected in the environment. On the other hand, what distinguishes humans from other animals includes the ability for rational thought, to draw inferences, to make judgments based upon highly disparate observations, and to form goals for actions based on our intellectual and emotional states. This suggests other forms of mind that are global rather than modular in form, and that rely on information from any source rather than limited by strict encapsulation of information. A description of these aspects of our mind is not reducible to the analogies that scientists have drawn based on how computers and machines function. Some sense of the properties of such central systems of mind can be obtained by negating the properties listed above of the mental modules: central

psychological processes may be domain general, under volitional control, slow in operation, and capable of multiple layers of feedback and relationships with other psychological, physical, and emotional processes. Examples of such central psychological processing include deciding whether to change jobs, deciding how to remodel a home, producing a creative work of art or science, or planning a major change in one's life. Information from highly disparate sources may be relevant to such decisions.

One approach to understanding these more internalized dimensions of mind is evolutionary psychology, which seeks to explain the operation of the mind according to Darwin's theory of evolution. In this view, the human mind was designed by the same processes of natural selection that shaped the evolution of species. Human beings have minds adapted to the hunter-gatherer societies that flourished through much of the chronology of our species. The earliest skulls identifiable as those of an archaic *homo sapiens* (modern human) date from 300,000 years ago in Africa, Europe, and Asia. A rough estimate for the invention of agriculture is 10,000 years ago, which is approximately 3% of 300,000 years. Thus our ancestors have been hunter-gatherers for 97% of the period of the modern human species. As a result, "our modern skulls house a stone-age mind" (Cosmides and Tooby, 1997). The human mind is composed of a collection of instincts, each represented by specialized neural circuits, which are common to each human being and are the product of evolutionary history up to the present moment. The mind is thus an assemblage of disparate "selves," each specialized for a particular adaptive problem.

Natural selection is the engine of Darwinian evolution. Natural selection is the process by which any traits of an organism that foster superior replication tend to diffuse throughout the population of that organism over many generations. Darwin recognized that such a principle could result in the design of complex organisms without the need for a designer. Natural selection is an appropriate tool to solve adaptive problems. Such adaptive problems are those that recur during the evolutionary history of a species, and they are problems that affect the reproduction of an individual in a species. Because most human generations existed as hunter-gatherers, it is the problems faced by hunter-gatherers that are adaptive and that might have been solved by the process of natural

selection acting on the design of the human mind. Such adaptive mental faculties might include specialized minds for reasoning, emotion, and social relationships between members of small human groups.

Biological faculties with indications of complex engineering are unlikely to have occurred accidentally, and the theory of evolution proposes that they were shaped by natural selection. For example, the eye is a marvelous organ of vision that appears optimized, in an engineering sense, to perform its functions to enable the organism to “see.” The comparative analysis of species suggests that the eye developed in a number of different organisms in an independent manner. Belonging to one such lineage, the human eye, derived from the mammalian eye, the avian eye, the reptilian eye, the amphibian eye, the eye of the fish, and so forth, is understood in evolutionary theory as an organ that has been shaped over long periods of evolution. Understanding the evolution of the eye is thus understanding the engineering of a complex system in reverse. An organism living in the oceans would have had some benefit by sensing the light from the sun filtered through the water to the eye. In fact, out of the immense scale of electromagnetic waves from radio waves to ultraviolet waves, our human eye has its peak sensitivity to the range of blue wavelengths at which the transmission of light through water is a maximum. If the early evolution of what was to become the human eye had occurred on land, it is likely the range of visible wavelengths would be very different from the range that exists now. There are no indications that the human eye is continuing to evolve: for example, the ability to detect the near infra-red part of the electromagnetic spectrum would seemingly be invaluable for humans to see the heat radiated by other animals in the dark.

Reverse engineering involves understanding how an organ or faculty works by understanding what its function is. By first understanding that an eye is an organ of sight, we can begin to understand how the eye works. If we mistakenly believed that an eye was an organ to digest food, we would be unable to understand how it works.

Evolutionary psychology considers the evolution of mental faculties in parallel to how species evolution considers the evolution of physical organs such as the eye. By understanding the function of a mental faculty, whether vertical or horizontal, evolutionary psychology seeks to understand how the faculty works and how it

originated. A belief in natural selection implies that the human mind has been engineered to maximize the number of copies of the genes that created it. If a small, random adaptation to a human mental faculty increased the likelihood that the human would live longer and produce, or care for, more offspring, then natural selection tends to produce more individuals with that adaptation. Thus the function of a given mental structure or organ is determined by its survival value to the human species. The psychological processes of conditioning and indoctrination may have played roles in forming the stone age adapted minds, and indeed these processes may themselves have been formed by the action of natural selection. One fact supporting this argument is the extreme sensitivity of humans to the use of conditioning and indoctrination. They would not be so omnipresent in human affairs if these did not have an important function(s). But that does not mean that these processes are adaptive, necessary, or even beneficial for contemporary life. We can understand them better by understanding what role they may have played in the development of the modular faculties of the mind.

The human mind in this evolutionary perspective is worlds apart from the blank-slate of the behaviorists. If there is a genetic basis for human cognition, then there is what Cosmides and Tooby call a “psychic unity of humankind.” Indeed, this phrase is reminiscent in some respects to the collective unconscious that is the basis for Jung of the human intellectual, emotional and spiritual aspects of human nature. Both the psychic unity of humankind and the collective unconscious share an assumed innate basis, presumably transmitted via the human genome. Both define internal structures and functions of the human mind.

The notion of Cosmides and Tooby is a funny kind of psychic unity because it is based on a multiplicity of highly specialized minds, which has been called a “squadron of simpletons” (Ornstein, 1991). Evolutionary psychology via the mechanism of natural selection has a difficult time explaining the general aspects of consciousness and the mind. Because evolutionary psychology is explicitly constructed using the computational theory of mind, its current attempts to explain consciousness include that it is non-existent, localized to some neuropsychological functioning, unknowable, or an emergent property of a sufficiently complex network of brain-mind. These descriptions of consciousness resemble the blind men’s descriptions of their experience of an elephant in

the famous story of Rumi. An elephant belonging to a traveling exhibit had been stabled near a town where no elephant had been seen before. Four curious citizens, hearing of the hidden wonder, went to see if they could get a peek at it. When they arrived in the stable, they found that there was no light. The investigation therefore had to be carried out in the dark. One, touching its trunk, thought that the creature must resemble a hosepipe. The second felt an ear and concluded that it was a fan. The third, feeling a leg, could liken it only to a living pillar; and when the fourth put his hand on its back, he was convinced that it was some kind of throne. None could form the complete picture, and of the part which each felt, he could only refer to it in terms of things that he already knew. The result of the expedition was confusion. Each was sure that he was right; none of the other townspeople could understand what had happened or what the investigators had actually experienced (Shah, 1964).

A qualitatively different approach to understanding consciousness focuses on the observation that “the core of subjectivity—the ‘I’—is identical to awareness” (Deikman, 1996). Awareness is the grounds on which the processes of cognition and emotion are manifested. While the existence of a normally functioning brain may be necessary for the existence of awareness, the core of the person is the “I”, the subjective essence. Philosophical and scientific investigations of the mind in the West have tended to ignore this introspective center, this observing self. It should be no surprise that the resulting cognitive theories are limited to computational mechanisms, those constituting the common framework of assumptions of our era. Arthur Deikman adapts a traditional story summing up this quandary:

A group of travelers forded a river. Afterwards, to make sure everyone had crossed safely, the leader counted the group but omitted himself from the count. Each member did the same and they arrived at the conclusion that one of them was missing. The group then spent many unhappy hours searching the river until, finally, a passerby suggested that each person count their own self, as well. The travelers were overjoyed to find that no one was missing and all proceeded on their way.

Like the travelers, Western psychology often neglects to notice the one that counts. Until it does, its progress will be delayed.

Global aspects of the mind cannot be described by the evolutionary psychology theory as resulting from natural selection. It cannot be the case that every trait of a mind or an organism is specifically selected. Chomsky described the language faculty by analogy to a physical organ, and such an analogy applies to other mental faculties as well. A problem for Darwinian evolution, expressed using winged flight as an example, is that there is no apparent selectional advantage for a primitive wing not yet capable of flying or gliding, and its early primitive form would have been more of an impediment than an advantage to the organism. There would thus have been no advantage for replication in the early stage of its development. The general problem is also present in the early stage of the development of mental faculties—it is similarly difficult to understand how an incomplete language organ would have conferred a selectional advantage for early humans. These are problems for other properties of the mind as well. (A recent argument for early evolution of the wing is that it was to assist birds in running up an incline by functioning as a spoiler does on an airplane wing—to *prevent* flight).

### **Theory of Mind**

At the basis of human social relationships is the ability to understand one another. A human being not only has personal desires and beliefs, but also is able to know the desires and beliefs of others. It appears that essential parts of these abilities are innate to our human nature and are shared across our species, and that these abilities are modular in important respects.

The capacity for human imitation is expressed by an infant at 5 to 8 weeks old—e.g., infants imitate the mouth openings and tongue movements of an adult. The infant at age 2-4 months seeks out face-to-face interactions. By 12 months, an infant will follow the direction of the gaze of an adult, and recognize the object that the adult is looking at. By 18 months, the child understands the intentions behind some actions of adults—if an adult “fails” to perform a set of actions with toys, the child can imitate the “successful” performance of the actions. By 2 years, the child engages in pretend play with adults and in solitary play. The emergence of pretend play tends to coincide with the child’s language use of words that refer to internal mental states, e.g., seeing a dog or wanting

some milk. This is understood by some scientists as evidence for a child's *theory of mind*, which signifies the child's capacity to attend to the mental state properties of others. The term *theory of mind* has become standard, although it is misleading in that it represents a capacity or a faculty, and does not necessarily mean that the child has theories as such. An additional complication is that some psychologists *do* hold that the child develops theory of mind as a scientist develops a theory, and the term *theory-theory* represents this approach. An alternative proposal is that the theory of mind mechanism is innately specified as a cognitive module of the mind. The above chronology of the infant's developing capabilities is explained by these theorists as the emergence of a specialized module for mental representations, rather than as the development of learned behavior.

Basic aspects of the theory of mind mechanism are expressed in an experiment called the "Sally and Ann false-belief task":

Sally has a marble that she places in a basket and covers, and then departs. While she is gone, Ann removes the marble from the basket and places it in the box. A child to whom this scenario is presented then is asked to predict where Sally will look for her marble when she [Sally] returns. To correctly predict Sally's behavior, it is necessary to take into account both Sally's desire for the marble and Sally's belief concerning the location of the marble. In this scenario, Sally's belief is rendered false by Ann's tampering. Therefore, to succeed in this task, the child must attribute to Sally a belief that, from the attributer's point of view, is false. (Leslie, 2000)

An adult watching this scene succeeds in the task by understanding that Sally still thinks that the marble is in the basket in which she initially placed it. Therefore, the adult predicts Sally will look in the basket for the marble when she returns. Similarly, most normal-functioning children of 4 years are successful in the task, in understanding that Sally believes the marble is in the basket even though the children know that Ann moved the marble to the box. However, most normal-functioning children of 3 years are unsuccessful at this task: they predict that Sally will look for the marble in the box, because that is where they know that Ann moved it.

The task is interesting to us because it shows how even 4-year-olds can attend to the mental states of others that cannot be held, seen, heard, or felt. This is a distinctly human ability on a par with our commonplace use of language appropriate to a given situation. A young child possesses an internal system of representation called the *theory of mind mechanism* that is capable of representing the mental states of the self or other. This theory of mind mechanism is thought to be present in younger children at the stage of pretend play. Suppose a child's mother holds a banana to her ear, and pretends the banana is a telephone, thus beginning a pretend conversation. The normal 2-year-old understands and can imitate this form of play. A theory of mind mechanism requires four kinds of information to build the mental-state representation: an *agent* (**Mother**) possessing an *attitude* (**pretends-true**) towards a *content* ("**it is a telephone**") regarding an *anchor* in the physical world (**banana**). The mother pretends-true of the banana that "it is a telephone." This approach supposes that the 2-year-old has mastery of the concepts of agents and of agents having attitudes—which later encompass beliefs and goals—and of anchors distinct from attitudes. Just as the universal grammar underlying language acquisition is innate, these concepts necessary to the theory of mind mechanism are also thought to be innate because they appear too complicated to be learned at such a young age (this is the poverty-of-the-stimulus argument used in language acquisition).

If the 2-year-old possesses a theory of mind mechanism, then why does the 3-year-old fail the Sally and Ann false-belief task? One proposed answer is that the 4-year-old possesses something else alongside a theory of mind mechanism that the 3-year-old does not possess. This extra mechanism is called *selection processing*, which allows the 4-year-old to succeed in the task of attributing the false belief to Sally by inhibiting the true belief (that the marble is in the box where Ann subsequently placed it). The 4-year-old knows that not all beliefs are true, but the 3-year-old has not acquired knowledge of this essential aspect of belief. The default attribution of a belief is that it is true—we tend to believe something that we are told even if we have no particular evidence to the contrary. Thus the 3-year-old holds the default belief that Sally will believe that the marble is in the box in which the 3-year-old knows it is—this is the 3-year-old's current reality. The 4-year-old understands that Sally's beliefs are different,

because Sally was not in the room when Ann switched the marble. Thus the 4-year-old is able to discriminate between his or her own true belief and Sally's false belief.

The theory of mind mechanism is absent or developmentally delayed in autistic children, even though it is not delayed in children with impairments of general intellectual capabilities associated with mental retardation. Thus the deficit is specific rather than general. Autism is a disease of genetic origin with behavioral symptoms of impaired social skills, language delay and other impairments of verbal and non-verbal communication skills, and lack of pretend play. An autistic child is often diagnosed by age 3 years. Autism is likely, at least in part, a pathology of the theory of mind mechanism. Except for encapsulation, the properties of the theory of mind mechanism are in common with many of Fodor's properties of mental modules, and autism may represent a lack of functioning of the module. Deaf children with hearing parents tend to have developmental delays in acquiring the theory of mind mechanism, while deaf children with deaf parents tend to have little or no delays. The reason is thought to be that the deaf children with deaf parents share a common language, sign language, and the use of language is important in communicating thoughts to the child concerning internal mental presentations such as desire and belief. Deaf children and hearing parents do not share a language unless the hearing parents learn to sign, and, even then, their skills are nearly always rudimentary as in the case of an adult learning any other second language (barring those exceptional individuals who are language *savants*). This implicates common origins, at least in part, for a child's acquisition of language and a theory of mind.

At a more basic level, postulating an innate module for the theory of mind mechanism involves such concepts as agent, and the internal mental representations possessed by agents. The concept of an agent is also implicit in evolutionary psychology's view of human nature. Agents are objects in the environment that may be inanimate or animate, inorganic or organic. The idea that the human mind has innate categories for agents is consistent with how natural selection would have shaped a mind. An ambulatory agent is likely to be an animal, and possibly a food source for the early human or for some other predator. Non-human animals also have specially adapted minds for representing the internal mental representations of other animals. This is so for

the chimpanzee. The chimpanzee or dog can follow the gaze of a human towards an object but the chimpanzee does not appear to generally understand what the person knows about the object of the gaze. This is true for dogs as well, and their theory of mind mechanism may underlie the special bond between humans and dogs. For specific tasks, the dog and the human hunter may have a shared understanding if, for example, both are gazing at a pheasant. While non-human animals have evolved specially adapted minds to cope with their environment, no animal besides a human can succeed in anything like the Sally and Ann false-belief task. Perhaps the absence of language in non-human animals is part of the explanation inasmuch as the example of the deaf child raised by normal-hearing parents suggests that the absence of the language faculty produces delays in acquiring a theory of mind. The animal mind has evolved the concept of agent, and possibly other concepts, but lacks the agent/attitude/content/anchor set of concepts that comprise theory of mind as mediated by language. These appear to be unique to human minds in our world.

The adaptive benefits for human groups from the acquisition of a theory of mind mechanism would have enhanced the social cohesion of early human hunter-gatherers. This acquisition provides a certain type of “mind-reading” in the sense that we can often understand the desires, beliefs and goals underlying the actions of other humans.

Our stone-age minds adapted in response to short-term concerns—e.g. avoiding caves in which bears may be present and killing bears when possible. The mental modules act fast on a limited input representation of the world, and Darwinian natural selection provides the design engine. Unlike our hunter-gatherer ancestors, much of our world is artificially constructed and subject to rapid transformation through social, ecological, and technological interventions of human origin. Our modern environment is thus resistant to the long-term operation of natural selection, so that the process of human evolution in the Darwinian sense may be completed, at least in the absence of some large-scale natural or humanity-related catastrophe that would destroy the global ecosystems. Such a destruction might be a human generated form of punctuated equilibrium, in which the succeeding world would have an accelerated evolution through natural selection, but it might be a world without humans. Our present ecological and social problems—for example, global warming and the systematic inequalities between developed and less-

developed societies—are characterized by slow-acting, large-scale effects that our adapted stone-age minds are not well equipped to comprehend. Heedlessness is easy and convenient in the short run but a psychological and societal prison in the long run. We are uniquely at risk because we are the first species in the history of our planet with the power to eradicate our entire species, in addition to the power to eradicate many other species. Such mass extinctions have happened in the past, but never due to the actions of a single species. This theme has been explored in science fiction literature since the 1950s—see, for example, *A Canticle for Leibowitz*, by Walter Miller, but general awareness of this possible outcome remains low.

The conscious evolution of which Rumi writes is mandatory today. Human beings are not particularly fast or strong or hardy, but human beings do have large brains and highly adapted minds and emotions. Human language and the theory of mind mechanism are species-specific faculties of mind, which also act on the stage of the global or holistic mind. A contemporary exponent of conscious evolution, Idries Shah, described a psychology (Shah, 1978) that is distinct from Western psychology and builds on these faculties. Such a psychology involves an “awareness of reality training,” which is an ability to “identify with and detach from another person so completely as to feel and see as if one does it by means of, or through the other individual.” Another psychological function acting over human social groups is the “sensing of the relative characteristics of people and situations, in order to be able to assist in the harmonization of these and other elements to help enrich all the participants in cognitive capacity.” We do have sufficient language to begin to interpret such remarks according to concepts of empathy, trust, and service to one another, but our Western sciences have not devised the methods to study these phenomena. Because the common framework of assumptions for our society is based on science and its current framework of assumptions (see the above remarks on theories of consciousness), these additional faculties, assuming that they exist, remain latent as far as applications to the problems faced within our society. Among the limiting factors are the scarcity of individuals with such extended human faculties, and the generally deficient abilities of the rest of us to apply the knowledge that we already have. But as Rumi instructs—so, necessitous ones, increase your necessity!

## Myths and Group Cohesion

The final soliloquy of Richard II quoted above occurs just before Richard's murder in his prison cell in the Tower of London. His soliloquy continues,

...And these same thoughts people this little world  
In humours like the people of this world,  
For no thought is contented. The better sort,  
As thoughts of things divine, are intermix'd  
With scruples and do set the word itself  
Against the word:  
As thus, 'Come, little ones,' and then again,  
'It is as hard to come as for a camel  
To thread the postern of a small needle's eye.'  
Thoughts tending to ambition, they do plot  
Unlikely wonders: how these vain weak nails  
May tear a passage through the flinty ribs  
Of this hard world, my ragged prison walls.  
And, for they cannot, die their own pride.

One of Shakespeare's reference points is his contemporary audience's familiarity with the New Testament. Jesus invited the children to come to him because the Kingdom of Heaven belongs to them, whereas he also said that it is easier for a camel to pass through the eye of a needle than for a rich man to enter the Kingdom of Heaven. No man can be contented until he is nothing, he must die before he dies. Richard contrasts his location in prison with the prison of his body, in which his disabling ambition and pride of self must die. In pointing the way towards the modern era, Shakespeare's poetry used the symbols of the teachings of Jesus as a given, but absent the cloak of a religious framework.

Another reference point at the beginning of the soliloquy uses a symbolic language: the male soul and female essence from which all created thoughts emerge. This idea is in common with Sufi Illuminist philosophy, as in the writings of Suhrawardi (1145-1234) translated by Clarke (republished, 1980). In discussing these writings, Shah (1964) paraphrases: "All created things are the outcome of an interchange between the two principles which are called essence and soul." Suhrawardi compared the need for a first death of nature and will before one's physical death in order to gain the circumstances of the "next world" to the statement of Jesus that no one can see the

kingdom of God without being born from above. Both Shakespeare and the Suhrawardi Sufis combined three concepts: the manner in which the multiplicity of self is created, the need for a psychological death before one dies, and the Christian concept of rebirth before entering the “Kingdom of Heaven.”

With Shakespeare, people cherish the plays they do not understand. It is no accident that Shakespeare would juxtapose a secular and political story of the deposing and murder of a murderous king with a psychological characterization, combining insights from Christian and Eastern sources. Kings and queens and royal courts make up the comedies, histories, romances, and tragedies in the Shakespeare folio.

Ted Hughes points to a great theme that dominates Shakespeare’s work. In an early play such as *Romeo and Juliet*, prior to the emergence of the theme, the pair of lovers are doomed not by their own faults but by the faults of others. The theme emerges in the two long poems, *Venus and Adonis* and *The Rape of Lucrece*. In the first poem, the love goddess attempts to rape the beautiful young man Adonis. Venus is also the Queen of Heaven and the Queen of Hell. She is Hecate, goddess of witchcraft, and Isis, mother of all the gods; she is Nature herself. Adonis is a puritanical youth who rejects her advances. Venus is angered and kills Adonis, from whose blood a flower springs up. In the second poem, Tarquin, a lust-possessed king, rapes and thereby kills his severely puritan young wife Lucrece. Tarquin became king by killing the rightful King, who was his father-in-law. By destroying Lucrece, Tarquin destroys the kingship within himself. The two poems are complementary across the genders, and oscillate between loving female and vengeful male. These polarities of king and queen, and love and hate are combined in all possible permutations among the plays. What the plays pursue is the gap between the two poems. What happens to that blood-stained flower that was Adonis, is that he is transformed into the murderous Tarquin. This transformation is the central theme of most of the Shakespeare plays. This moment is discovered in the person of Hamlet, who is Adonis, half-possessed by Venus, refusing to be transformed completely into Tarquin. What remains shocking about Hamlet even after five centuries is that Hamlet acts in full consciousness of who he is and who he is not. One might say that the Hamlet of the fourth and fifth acts of the play is the observing self, described earlier from the work of Deikman, a self who is yet unable to collect the various selves as they

complete their fates. Throughout the plays, the great soliloquies are nearly always spoken by the murderous Tarquin, as, for example, Richard II. Othello begins as Adonis possessed by Venus, and the play dissects the moment he is turned into Tarquin with the external murderous intent of Iago (who is internalized within Hamlet). Macbeth concerns the self-horror at discovering his transformation from Adonis into the murderous Tarquin. Lear is transformed in the first act and then gives up and lets the forces run their course: the worst fool is an old fool, because he has become old before he has become wise.

The great theme also resides with the conflicts of his times in England, which exploded later in the 17th century into the Civil War. The temporal struggle was between the radical Calvinism or Puritanism and the Reformed Church, headed by Queen Elizabeth, only recently severed from the Catholic Church by Henry VIII. Elizabeth was the embodiment of the, old pre-Christian goddess of England. Whereas Mary Tudor identified with the destructive aspect of the love goddess and was herself murdered, Elizabeth explicitly constructed herself in mythic terms as the Fairy Virgin Queen and managed to hold her country together through a long reign. The great theme did find its real expression. The puritanical Oliver Cromwell took power and the English king was murdered. Alongside the Puritan revolution were the revolutions of the English renaissance and the emergence of science. Amongst all this chaos, a new man was needed for England to survive, and that man was Hamlet.

Beyond the contemporary events, Hughes describes the work of Shakespeare as a “perfect example of the ancient Universal shamanistic dream of the call to the poetic or holy life.” Elsewhere, Hughes (1994) describes Shamanism as a barbarized, stray descendent of Sufism, commenting that the “Sufi stream comes to surface in the most unexpected places. Many forlorn puzzles in the world, which seemed to suggest that some great spiritual age somewhere in the Middle East had long since died and left indecipherable relics and automatisms to trouble our nostalgia, suddenly come into organic life in this book” [referring to *The Sufis*, by Idries Shah].

There are numerous correspondences in Shakespeare of ideas from Occult Neoplatonism, a movement that scholars such as Frances Yates describe as beginning at the dawn of the European Renaissance in Florence, Italy. Hughes (1994) described Occult Neoplatonism as a branch of “wisdom that made available everything in man’s

psychological history that Catholic orthodoxy and Protestant militancy excluded. The new synthesis, therefore, was open on principle to the religious, spiritual and philosophical systems of the earlier world, and of the world outside Christianity.” The Catholic orthodoxy and Protestant militancy refer to the political movements that Elizabeth I balanced during her reign. Neoplatonism is associated with individuals such as Roger Bacon, Raymond Lully, and Paracelsus, and with practices such as Rosicrucianism, which are also linked to the Suhrawardi Sufis. Among contemporaries of Shakespeare linked to Neoplatonism in one way or another are Giordano Bruno, who visited England in 1583 and was later burned at the stake in the Inquisition; John Dee, the court mathematician and astrologer of Elizabeth and possibly the source for the character of the magician Prospero in Shakespeare’s *The Tempest*; Ben Jonson, who used Rosicrucian themes in his plays; and Francis Bacon, whose book *New Atlantis* was a major influence on the founding of the scientific Royal Society in 1660. There is a substantial psychological distance between Elizabethan times and our own. In the age of Elizabeth I, Neo-Platonism and science were new currents, and it was unclear the extent to which Bruno or Bacon might be considered exemplars of one or the other, or both. In contrast, we take their scientific contributions for granted because science is the dominant culture of our age, whereas even the term Occult Neoplatonism is apt to cause a certain raising of eyebrows.

Ted Hughes, a Poet Laureate of England, noted some correspondences that must have caught Shakespeare’s attention in the vast complex of ideas and methods collected under the name Occult Neoplatonism. He concluded that “Shakespeare’s mysterious lifeline link of affinity with the Sufism of Islam may be partly explained by these Hermetic Occult Neoplatonist secret societies.” They were secret because the ideas were a superstition to the materialist, an absurdity to the scientist, and sensible men wouldn’t have anything to do with it. The set of ideas stirred occasionally over the following centuries, especially at times of revolutions, in the poetry of Goethe, Blake, and Yeats. These correspondences, which are suggestive of a more general dynamic that might act in other times and places, include (Hughes, 1994):

1. The idea of an inclusive system that reconciled Protestant and Catholic faiths in an integrated vision of union with Divine Love;
2. The idea of a constructed mythology based on archaic mythological figures that became a personal language of a new metaphysical formulation;
3. The idea of a collection of mythological and historical figures charting the inner world of human nature—in particular, of spiritual conditions and moral types;
4. The idea of the system as a theater;
5. The idea of the images as internally structured poetic images with multiple meanings;
6. The idea of as-if-actual visualization as a first practical essential for effective meditation;
7. The idea of meditation as a conjuring by ritual magic of hallucinatory figures with whom conversations are held;
8. The idea of drama as a ritual for the manipulations of the soul.

Hughes characterized Shakespeare's own "radical myth" as remaining true to itself, "almost with the integrity of an organism, as it evolved." Without reference to past formulations except at a general dynamic level, one can note present-day similarities: we must learn what it is we have to reconcile between our external, socially-constructed world and our inner selves; we have new mythological (including science fiction and fantasy) and historical figures in our contemporary stories; and we have new forms of communication and entertainment based around new information technologies. People continue to read Shakespeare, and absorb his plays on stage and in movies due to their "Moses basket effect." Like the basket that protected the infant Moses when his mother floated him down the Nile river to escape death, the protection factor built within the plays ensures that they are sufficiently entertaining to pass along to the next generation. This is an essential ingredient common in other important myths and stories.

Shakespeare's poetic voice emerging within these plays belongs to the deepest philosophical tradition of poetry that our Western culture has produced, and this voice

addresses our essential human nature. Ambiguities abound in Shakespeare outside the folio, as evidenced by the controversy over its authorship. Some take the authorship controversy along with the internal evidence within the plays as a sign that there existed in Elizabethan times “a group engaged in using literature for the injection of developmental ideas into the 16th century” (Scott, 1983).

Hughes (1994) elsewhere paraphrases an answer of a Hopi woman to an anthropologist (asking why Hopi songs are short) in the observation that meaning—because we all know so thoroughly the mythology of our system of shared understandings—is the life of our people (i.e., the Hopi people), and nothing needs to be explained. Hughes uses this observation to define *mythology*: it is the picture language invented to “embody and make accessible to casual reference the deeper shared understandings which keep us intact as a group—so far as we are intact as a group.” This is an interesting definition of mythology because it is neither religious nor literary nor cultural, but rather anthropological. A useful myth maintains social cohesion within a group. The largest group is all of humanity, so that the myths that point towards the deepest understandings are those that apply to all humanity. Such myths would exist at a more basic level of functioning than the tribal or cultural identifiers associated with the myth, so that the same essential story might be continually retold and updated to serve the current needs of a particular group. Useful myths, including teaching stories, are important because they provide a tool to assist us in knowing our essential self, which is different from the multiple selves who people our minds.

In our human journey, we need not all begin to study Shakespeare. The example is pertinent because it points to a record of cultural evolution in action, and possibly a directed action at that. As Rumi wrote, “New faculties arise in accordance with need.” The plays of Shakespeare were a new tool of understanding to the people of the Elizabethan age; they formed a mirror in which people could see themselves—much like the mirror in the play in which Richard II sees himself. Like the contemporary teaching stories introduced by Idries Shah, which are described as “templates to which we match our behavior” (Deikman, 1982), the plays appear to have a similar effect. The sources of the stories underlying the plays were themselves drawn, in part, from yet older collections of teaching stories. Such teaching stories, which are introduced in Shah

(1968), provide a tool to observe the antics of our various selves, whether or not these selves are reducible to the modules of mind that scientists are currently delineating, and thereby attenuate the controlling power that these antics have over our possible further conscious evolution.

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