

Is Jung's Theory of Archetypes Compatible with Neo-Darwinism and Sociobiology?

R. S. Percival

Introduction

Carl Gustav Jung claimed to have proven that all humans carry within their subconscious minds the propensity to produce and appreciate behavior, symbols, and images biologically inherited from our distant ancestors. All of our most powerful emotions and their associated behaviors, from romantic love to nationalism, are said to derive their intensity and form from these unconscious propensities. Jung called these propensities "archetypes"; they formed the "collective unconscious."

The propensities are actualized in the development of the personality, in the presence of certain triggering circumstances, in such a way that the complex of attitudes and behavior formed are in a life-enhancing equilibrium. Jung called this process "individuation." He emphasized that complete individuation, in which the archetypes are fully developed and integrated into a balanced, wise personality that is both profoundly happy with a sense of a deeply meaningful existence, is a rare phenomenon. More frequently, the archetypes are either stunted or lopsided in their growth and expression because of inadequate experiences. Nevertheless, archetypes, if properly cultivated, contain wisdom, balance, and meaning because they represent millions of ancestral experiences. Jung regarded the archetypes as additions to the then recognized instincts.

The intellectual background to Jung's theory spans thousands of years, so I will only give a brief sketch. Prompted by the problem of how knowledge is possible, others before Jung had argued that the human organism is born with propensities to learn and interpret the world of experience in certain ways. Socrates in the *Meno* argued that the teacher does not imprint knowledge but is rather a midwife of knowledge that the pupil's soul already has even before birth, but simply cannot recall. Kant (1787) argued that the structure and very possibility of experience depended on our possessing a priori categories of space, time, and causality. Schopenhauer (1819) continued Kant's theme and, initially through Hartmann (1867) and later directly, seems to have been the most important influence on both Freud and Jung in their development of the theory of the unconscious mind (Magee, 1973).

R. S. Percival, ~~Journal of Social and Evolutionary Systems~~

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Jung's problem was slightly different: how are we able to react in a way that is emotionally appropriate to universally important life-events that we have never experienced before? How does one act with respect to older people? How does one act in the presence of the opposite sex? How does one act when surrounded by a crowd of people all doing the same thing, such as a political rally or a religious congregation? Jung used the apparently disparate realms of myth and psychotic experiences as independent justification for the postulation of certain innate propensities to powerful emotional experiences to explain how one knows how to respond in these and other circumstances.

Jung's theory of archetypes and the collective unconscious is an interesting and daring theory. It has been subjected to much criticism, which caused many to abandon it. Recently some have attempted to revive it by deriving it from sociobiology. However, my thesis is that this daring revival does not save the theory of archetypes from the charge that it is painfully at odds with neo-Darwinism and therefore cannot be taken as derivable from or supported by sociobiology, because sociobiology presupposes neo-Darwinism. I will also argue, though more cursorily, that the proponents of Jung's theory fail to meet scientific standards.

Despite the promise of the theory of archetypes to escape the errors of environmentalism, it is Lamarckian in its conception of biological transmission and in its implied theory of learning. At the time when Jung created his theory, Darwinism had already shown itself to be a very powerful explanatory theory, but Jung completely ignored its relevance, and this undermined his theory. Followers of Jung and some of his critics have tried to defend Jung from the charge of Lamarckism, using for the purpose Jung's own completely inadequate comments.

Meanwhile, Popper has argued that the most informative theories we know were created by thinkers who dared to stick their necks out and assert something that might clash with experiment or observation. The more a theory says, the more it rules out and vice versa. In Popper's analysis of scientific method, the class of statements describing spatio-temporally defined events that we may produce in an experiment or observe and that a theory rules out is called the theory's class of potential falsifiers. They are potential falsifiers because if accepted we are obliged logically to deny the truth of the theory (Popper, 1935/1959, Secs. 21, 22, and 28).

The theory of archetypes is almost metaphysical (nonscientific) in Popper's sense since it is extremely sparse in potential falsifiers. Almost whatever particular instance of publicly observable behaviour we describe, the Jungian can always accept it and retain the theory without fear of inconsistency. However, although a failing, this does not mean that the theory is without merit. The best and most informative theories have often been inspired by a non-testable metaphysical theory. Democritus' metaphysical theory of atoms inspired Dalton's empirically testable theory of atoms, or the theory of dark matter, which until recently could not be tested.

But Jung and his followers—until recently—were content to reproduce Jung's original theory, applying it to new situations. There was no attempt to bolster the information content of Jung's original schematic formulation, to make it empirically testable. Nor did Jung attempt to compare his theory with rival theories outside the psychoanalytic school. This last failure follows from Jung's positivist approach. He thought that his arguments and evidence provided direct positive proof of his theory, and such an approach naturally fosters the idea that other theories and their arguments are just a distraction.

Recently, there have been a few attempts to show how Jung's theory is not only compatible with Darwinism (Storr, 1973; Stevens, 1982), but must be made a part of the outgrowth of neo-Darwinism: sociobiology. Stevens (1982) and others (Hall & Nordby, 1973) argue that Jung's theory of archetypes anticipates and makes sense of sociobiological concepts and theories, and that this new science confirms Jung's theory. However, these attempts fail because they misunderstand the Darwinian criticism, confusing it with the Lockean criticism of innate ideas, and because neither the origin nor the development of Jung's archetypes lends itself to a sociobiological explanation. Some of Jung's archetypes are reproductively neutral or are, as with the Animus and Anima, arguably maladaptive with respect to genetic reproduction. Moreover, the goal of archetypal development—profound happiness, wisdom, and a meaningful existence—may be marginally incompatible with genetic survivability, and therefore not susceptible to a neo-Darwinian explanation.

1. Jung's Departure from Freud

What was the problem that led Jung to invent the theory of archetypes? Jung developed his theory at first to account for contents of dreams that, in Jung's view, Freud's theory of dreams was unable to deal with. (As we will see, Jung soon extended the theory to account for other phenomena.) Freud's theory of dreams, as expounded in *The Interpretation of Dreams* (1900), asserts that every dream is caused by a repressed wish that the dream represents as fulfilled. The wishes are reducible to either aggressive or sexual instinctual impulses.¹ These frustrated instinctual impulses make use of residues of the day's experience to produce a symbolic visual representation of their satisfaction. The symbolic form of the satisfaction is a disguise to get passed what Freud called the censor, another name for the super-ego or conscience, and to save the sleeper from waking. A dream, for Freud, then was a substitute gratification of impulses that are denied satisfaction in overt action because they contravene the dictates of conscience. More abstractly considered, Freud thought that a dream is a special way in which the psyche displays its general tendency to discharge tension.

Dream analysis thus consisted in explaining the dream completely in terms of the subject's personal memories and fantasies. Jung, however, reports that some of the dreams he analyzed could not be explained or interpreted in this way. The content of these dreams could not be reduced to the dreamer's personal experience—whether sensory memory or fantasy. Jung's split with Freud centered on the interpretation of one of Jung's own dreams.

I was in a house I did not know, which had two storeys. It was "my house." I found myself in the upper storey, where there was a kind of salon furnished with fine old pieces in rococo style. On the walls hung a number of precious old paintings. I wondered that this should be my house, and thought, "not bad." But then it occurred to me that I did not know what the lower floor looked like. Descending the stairs, I reached the ground floor. There everything was much older and I realized that this part of the house must date from the fifteenth or sixteenth century. The furnishings were medieval; the floors were of red brick. Everywhere it was rather dark. I went from one room to another, thinking, "Now I really must explore the whole house." I came upon a heavy door, and opened it. Beyond it I discovered a stone stairway that led down to the cellar. Descending again I found myself in a beautifully vaulted

room which looked exceedingly ancient. Examining the walls, I discovered layers of brick among the ordinary stone blocks, and chips of brick in the mortar. As soon as I saw this, I knew that the walls dated from Roman times. My interest by now was intense. I looked more closely at the floor. It was of stone slabs, and in one of these I discovered a ring. When I pulled it, the stone slab lifted, and again I saw a stairway of narrow stoned steps leading down into the depths. These, too, I descended, and entered a low cut cave cut in to the rock. Thick dust lay on the floor, and in the dust were scattered bones and broken pottery, like remains of a primitive culture. I discovered two human skulls, obviously very old and half disintegrated (Jung, 1963, p. 155).

When Jung reported the dream to Freud, Freud focused on the two skulls as the most important symbols and pressed Jung for his associations to them in order to discern an unconscious death wish against two people in Jung's life.

Privately, Jung totally rejected Freud's interpretation, preferring his own non-sexual and non-aggressive interpretation:

It was plain to me that the house represented a kind of image of the psyche—that is to say, of my then state of consciousness, with hitherto unconscious additions. Consciousness was represented by the salon. It had an inhabited atmosphere, in spite of its antiquated style. The ground floor stood for the first level of the unconscious. The deeper I went, the more alien and the darker the scene became. In the cave, I discovered remains of a primitive culture, that is the world of the primitive man within myself—a world which can scarcely be reached or illuminated by consciousness. The primitive psyche of man borders on the life of the animal soul, just as the caves of prehistoric times were usually inhabited by animals before men laid claim to them (Jung, 1963, p. 156).

Jung saw this dream as representing his self—which, Jung says, he had neglected in his association with Freud. Jung had adopted Freud's imposing theoretical structure and in doing so had eclipsed his own thoughts. Although Jung fails to make quite clear what the function of this dream was, he often asserted that most dreams act, not to discharge tension as in Freud's most general view, but rather to restore equilibrium to the personality or a current mental attitude.² Indeed, Jung regarded the tendency of the psyche to maintain equilibrium as a basic psychological law in his system, in the sense that most of his hypotheses make essential use of this idea. The restoration of equilibrium was as basic in Jung's system as the discharge of tension was in Freud's system. Presumably, Jung would say that his dream was trying to compensate for Jung's excessive identification with Freud by presenting a rich symbolic representation of Jung's own mind.

This dream led Jung in 1910 into an intense study of mythology and archaeology. In the course of these studies, Jung was impressed by the universality of certain symbolic themes. Certain symbols could be seen in all societies, and for Jung this was a confirmation of his developing theory of the archetypes and the collective unconscious. His theory asserts that these symbols—in myth and dream—are inherited by every human being from our distant, primitive ancestors. This was not inheritance by tradition, but by biological transmission. Jung was so convinced of the connection between myth and dream that he thought a detailed knowledge of mythology in its widest sense was essential to interpret dreams properly (Jung, 1964, p. 57).

2. Explanatory Power

Why did Jung reject an explanation in terms of tradition? The hypothesis of the biological transmission of the archetype supposedly explained why even historically separated societies had some of the same symbols and why some dream contents were irreducible to personal experiences.

Jung allegedly found confirmation of his theory in the transference experiences of his patients, in which they projected symbolic interpretations on to Jung that could not be related to their personal experiences and aspirations, etc. Apparently some of his patients had fantasies that portrayed Jung as a magician or a wicked demon, or as a savior. (Jung says the patients need not consciously see the doctor this way; he is simply depicted so by the fantasies coming to the surface through free association.) The patients were insistent that the fantasies had some basis in the doctor and were not wholly their creation—an indication, Jung thought, of their independence from personal experience (Jung, 1943, pp. 64-65). In addition, Jung claims, schizophrenic patients had fantasies and behavioral symptoms that contained mythological material supposedly inaccessible to them in their personal experience.

Jung's general conclusion was that the same set of symbols occurred in mythological form in all societies—in dreams, in transference, and in mental symptoms. Jung argued that if the producers of myths, dreams, transference phenomena, and mental symptoms were unconnected by linguistic communication (either one to the other, or by a common source of information) and yet share a set of symbols that have not been derived from personal experience, then these symbols must have been inherited biologically: "they reproduce themselves in any time or any part of the world—even where transmission by direct descent or 'cross fertilization' through migration must be ruled out" (Jung, 1964, p. 58).

3. Definition of the Archetype and Collective Unconscious and the Problem of Inherited Ideas

One can argue that Jung eventually settled for the following conception of the archetype: a biologically transmitted, environmentally triggered, developmentally timed, psychic-equilibrium-sustaining propensity for intensely emotional fantasy, myth, and other behaviors that is essential in the formation of any individual personality. In this section I want to focus on the greatest problem that Jung's first formulations of this conception presented for him: the assertion that ideas can be biologically inherited.

When Jung propounded his theory of archetypes, most scholars accepted that ideas could not be inherited. Jung was aware of this possible objection to his theory and tried to define the archetypes so as to avoid this criticism: "I do not by any means assert the inheritance of ideas, but only of the possibility of such ideas, which is something very different (Jung, 1943, p. 65).

Many have assumed that Jung was defending himself against Darwin, but this is far from apparent. He could have been defending himself against Locke. However, Jung does not make this clear, for he mentions neither Darwin nor Locke anywhere in connection with this criticism. In such a case, we can usefully take each interpretation separately and

see how well each does against the criticism. (I take up this Darwin/ Locke issue in Section 6 below.)

Nevertheless, mindful of his critics, Jung repeatedly repudiates the idea of the inheritance of images or ideas. But he was not careful in his formulation. Often, on the same page, the archetypes are defined not only as the "possibilities" for symbols, but also as simply "symbols" and "images," present in the unconscious of every human mind and inherited from our ancient ancestors (Jung, 1943, p. 65). At other times they are "thought-forms"; then, "as much feelings as thoughts" (p. 66). That Jung incurred much criticism from Lockean is hardly surprising.

However, in order to thoroughly assess Jung's theory, we ought to allow him some leeway. What did Jung regard as his clearest formulation of the archetypal hypothesis? He was fond of comparing the form of the archetype with the axial system of a crystal:

The axial system of a crystal preforms the crystalline structure of the mother liquid, although it has no material existence of its own. This first appears according to the specific way in which the ions and molecules aggregate. The archetype in itself is empty and purely formal, nothing but a *facultas praeformandi*, a possibility of representation which is given a priori. The representations themselves are not inherited, only the forms, and in that respect they correspond in every way to the instincts, which are also determined in form only. The existence of the instincts can no more be proved than the existence of the archetypes, so long as they do not manifest themselves concretely. With regard to the definiteness of the form, our comparison with the crystal is illuminating inasmuch as the axial system determines only the stereometric structure but not the concrete form of the individual crystal (Jung, quoted by Stevens, 1983, p. 46).

By "possibilities," Jung must mean constraints on possibilities, plus certain propensities for the entities (ideas, myths, etc.) with these constraints to be realized. Jung must strengthen his hypothesis in this way, since every idea that a person has presupposes the possibility of having it, but not every idea, surely, is the realization of an archetype. But at least to Jung's satisfaction he had cleared himself of the charge of resurrecting the theory of innate ideas. Jung also included in the class of archetypes all instinctive patterns of behavior.

4. The Unconscious

Jung distinguished two "layers" of the unconscious: the collective and the personal. This distinction crystallized Jung's disagreement with Freud. For Freud, according to Jung, there was only a personal unconscious: "The personal unconscious contains lost memories, painful ideas that are repressed (i.e., forgotten on purpose), subliminal perceptions, by which are meant sense-perceptions that are not strong enough to reach consciousness, and finally, contents that are not yet ripe for consciousness" (Jung, 1943, p. 66).

Jung argued that according to Freud's theory, in which the unconscious consists exclusively of repressed contents, if repression were completely removed the unconscious would be completely emptied of its contents. Repression, Jung says, cannot be completely removed, but even considerable mitigation of its activity makes no impression on the unconscious, for it continues as before producing dreams and fantasies. Jung reasoned

that there must thus be another source for these propensities, and this source was the collective unconscious.

The collective unconscious is that part of the unconscious which is common to everyone and whose contents do not derive from personal experience, but from the typical experience of our ancestors. It only emerges late in the psychoanalysis, after the personal aspects of the unconscious have been brought to the surface—just when, according to Freud there ought to be no further revelations.

Jung later retracted, though not forthrightly, a part of this account of his difference with Freud, saying that Freud was in fact the first to recognize these non personal elements of dreams, which Freud called “archaic remnants” (Jung, 1978, p. 57). However, Jung thought that Freud regarded these dream contents as psychologically inert and without relevance, just as in the biology of the individual the appendix is no longer of any use.

But Jung startlingly misrepresents Freud on this issue. Freud anticipated a large part of Jung’s theory of archetypes in *Totem and Taboo* (1913) and in *The Ego and The Id* (1923, p. 28). There Freud accounts for religion, morality, and a social sense by the hypothesis that repeated ancient experiences of an Oedipal conflict between sons and fathers were deposited in the form of a father-complex in the minds of sons and biologically inherited. This father-complex is what Freud called the super-ego, the conscience, an agent that is far from being psychologically inert.

Meanwhile, Jung held the personal unconscious and the collective unconscious to be mutually exclusive—whatever belongs to one is excluded from the other. We will see that this poses a problem in the construction of a coherent theory of the origin and transmission of the archetypes. Having established that according to Jung a propensity to have ideas conforming to certain constraints is what is inherited—not the ideas or images as such—let us look at the supposed process whereby they are acquired by our ancestors.

5. Origin of the Archetypes and Creativity

Jung thought that a useful byproduct of his theory of myth and dream formation was a theory of creativity. However, this attempt only helps to show the weaknesses in the archetypal theory. Jung had the very provocative idea that not only all the great scientific ideas but, indeed, all great ideas had their origin in the collective unconscious, the repository of humankind’s ancestral experience. In other words, the creative powers of any specific scientist, for example, were in fact illusory. Newton, Einstein, Bohr, Schrodinger, etc., did not create theories but rather discovered them ready made in the spontaneous effusions of the collective unconscious. Jung adduces the idea of the conservation of energy as an example of an idea already formed in the minds of humans by the experience of our primitive ancestors. Robert Mayer, Jung assures us, did not create the theory: “[I]t is very important to realize that the idea was not, strictly speaking, ‘made’ by Mayer. Nor did it come in to being through the fusion of ideas or scientific hypotheses then extant, but grew in its creator like a plant” (Jung, 1943, p. 67). Jung takes as support for his conjecture that Mayer was not a physicist, but a physician.

The explanation of the genesis of creative thoughts is a very attractive goal, and the reader is made eager to share Jung’s “insight.” But the reader must be disappointed with the journey and the destination, for his argument is very weak and its result is, after toying

with an ultimate explanation, simply to shift the problem of creativity back to previous generations. Jung's explanation proceeds thus: "if we apply our theory here, the explanation can only be this: the idea of energy and its conservation must be a primordial image that was dormant in the collective unconscious (1943, p. 68). (Clearly when Jung speaks of "ideas" he did not distinguish between the theory and the concept of energy and its conservation. Presumably he meant that both theory and concept are inherited from our ancestors. But this is hard to square with the phrase "primordial image." Nevertheless, I will assume he meant both theory and concept.)

Jung's argument for the above quotation is surprisingly poor. He asserts that the "proof of this can be produced without much difficulty" by pointing to the fact that "the most primitive religions are founded on this image," the "dynamistic religions whose sole determining thought is that there exists a universal magical power about which everything revolves" (1943, p. 68). Here we have an interesting analogy, but it is part of a metaphorical argument that is uncontrolled by logic. Jung allows himself to adduce a long list of metaphorically related more or less ancient ideas in the hope that this will make obvious that primitive people already had the theory of the conservation energy. Among the list of fairly disparate symbols, the most suggestive is the Buddhist and primitive notion of metempsychosis—the transmigration of souls. Jung says this notion implies "unlimited changeability together with constant duration." This may be so, but the Buddhist notion is obviously not equivalent to the law of the conservation of energy, since it applies only to human souls; Jung needs an argument to link this with "psychic energy"—whatever that is—and this in turn with energy as understood in the law of the conservation of energy. At most, Jung's list shows only that people already had an idea of persistence in the presence of change, and the idea of an energy that pervaded all of space and time. But to go from these ideas to the idea that the total amount of energy in the universe is constant is a creative leap. Even such an imaginative thinker as Descartes did not discover the law of the conservation of energy—even though he thought that the total quantity of motion was constant.

Jung concludes his list: "So this idea has been stamped on the human brain for aeons. That is why it lies ready to hand in the unconscious of every man" (1943, p. 69). But why, the reader is tempted to ask, should Mayer be the one who discovers the idea, and not, say, Descartes? Jung's answer is far from enlightening: "[C]ertain conditions are needed to cause it to appear. These conditions were evidently fulfilled in the case of Robert Mayer." (1943, p. 69). Jung's followers have failed to supply the missing detailed specification of these conditions. But such details are necessary to make the theory empirically falsifiable.

Actually there is a perfectly adequate explanation of Mayer's readiness for his discovery that refers to the influence of an ancient philosophical tradition and a problem situation. As R. J. Forbes says, Mayer was convinced from his youth of an adage of the Greek atomists: out of nothing nothing comes; nothing becomes nothing. Mayer refused to believe that the kinetic energy of a falling body, which had existed in potential form before the fall, ceased to exist on reaching the ground; he thought it must have been transformed into some other type of energy, what we would now call heat. Mayer thought that there were different forms of energy, including magnetic, electrical, and chemical, that could be transformed into each other, but none of these transformations entailed any loss in the total amount of energy in the universe (Forbes, 1963, p. 358).

experiences, he is forced to readmit a creative contribution from the individual in the form of "fantasy-ideas."

Jung earlier had taken the fact that Mayer was a physician and not a physicist as evidence for his hypothesis of archetypes. But the unwitting re-introduction of an individual's imagination also undermines this point. We are asked to believe that Mayer, a modern physician, was unable to create any ideas; but his primitive ancestors, presumably unhindered by specialist knowledge of medicine, developed the idea of the conservation of energy through a typical fantasy.³ As we have seen, the fact that Mayer specialized in medicine did not exclude him from philosophical tradition.

Jung's next conjecture is no better and actually contradicts this hypothesis: "There is nothing to prevent us from assuming that certain archetypes exist even in animals, that they are grounded in the peculiarities of the living organism itself and are therefore direct expressions of life whose nature cannot be further explained" (1943, p. 69). Such a hypothesis is clearly unfalsifiable and perhaps cannot even be made falsifiable by a suitable interpretation. As I indicated above, metaphysical theories can be very useful in science, but only if they constrain the range of empirical theories that must take their place (if we are to increase the information content of our sciences). Notice that Jung neglects even to specify which "certain" archetypes he is alluding to. More damaging is that the hypothesis simply does not solve the problem for which it was developed: it leaves the problem of creativity unresolved. If archetypes are a peculiarity of organisms as such and all creative ideas are archetypes, then all creative ideas arose simultaneously with life, a consequence that seems clearly false.

Moreover, attributing archetypes to life as such is an ultimate explanation and thus virtually decrees an end to investigation. Given that the hypothesis is also unfalsifiable, Jung effectively safeguards it from correction. Neither can Jung be saved from the charge of inconsistency, since he does not present these ideas as possible alternatives. After espousing the ultimate explanation that does without fantasy, he reasserts the hypothesis that the archetypes are derived from repeated experiences. (Strictly speaking, the two hypotheses are not contradictory. But they become so when we add what can be taken as background knowledge: that fantasy-ideas are not grounded in the peculiarities of the living organism; surely molluscs, ants, and so forth are incapable of fantasy.) Of course, Jung could say that only some archetypes are peculiar to life itself and that these do not require fantasy for their formation. But characteristically, he remains reticent about this class of archetypes: no where does he define this class or explain how its elements are related to the class of fantasy-generated archetypes.

Jung wanted a deterministic account of fantasy. He could not countenance the possibility that people sometimes create ideas that cannot be predicted, even in principle. Mayer's theory, like all the great theories in science, was radically new. In retrospect it can be seen as appropriate to the problem that prompted it, but its emergence could not have been deductively predicted from its problem situation, or indeed any previous condition of the world.

As Popper argues, the greatest difficulty for scientific determinism is that presented by the lack of "predictability of unique achievements," such as Mozart's G Minor Symphony. This task seems to be impossible even in principle (Popper, 1982, p. 42). Another argument of Popper's can be put, very roughly, this way. If a future new idea is predicted now then it is known now and therefore cannot be new in the future. Popper's

argument allows for the prediction of the form of an idea that will be new in other respects in the future.

Jung was struck by how "alien" some of his patients' fantasies seemed to them. Jung relates dreams of his in which figures say things to him that "I do not know and do not intend, things which may even be directed against me" (1963, p. 120). In Jung's methodology this fact contributed to the proof that these ideas are derived by inheritance from our ancestors. But the strangeness or alien feeling of a new idea can be easily explained on the assumption that it is in fact a radically new idea, an idea that could not have been predicted.

One must also take into account what Bartley (1990) has called the "unfathomableness" of our knowledge. Any item of theoretical knowledge has implications and ramifications that are truly infinite, and thus obviously far beyond our full comprehension. We should not be surprised, therefore, that our creations are not fully determined by our intentions, which they may actually subvert. It is generally true that our productions, whether theories or practical inventions, go far beyond our ken. Did the first man to use a wheel or a lever see all the future uses of the general idea? (Incidentally, I believe that inventions have this quality because they are theoretically interpretable, and thus may be said to have logical and information content.)

The strangeness of radically new ideas accounts for the frequent phenomenon of people's sincerely believing that they hear voices from gods or other spirits. Often our ideas are appropriate to the problem in hand; they are ideas that we have been searching for. But sometimes they are more free-floating, less constrained by our conscious intentions to find a solution to a problem, and these are the ones that we could suppose are from some outside source, especially if they are radically new. Such thoughts, not surprisingly, are more likely to occur in a dream. Moreover, all our theories go far beyond our comprehension because their logical and information content is infinite. We may therefore embrace theories that seem to further our interests, only to find that some of their consequences actually go against us, but this does not mean that there is something in us fighting against us. (On the unfathomable content of theories, see also Popper, 1974, and Bartley & Radnitzky, 1987.)

6. Lockean and Neo-Darwinian Critique of Jung

Jung was constantly at pains to defend himself against the charge that he was countenancing the inheritance of ideas. As we have seen, he asserts that what is inherited is a propensity to entertain ideas conforming to certain constraints. However, whether Jung should be interpreted as defending himself against Locke or against Darwin is unclear. I intend to argue that whether the antagonist is Locke or Darwin, Jung's defense fails.

6.1. The Lockean Critique

Jung must have been familiar with Locke's book *An Essay Concerning Human Understanding*, and its influential critique of the idea of innate ideas. Locke's critique has been undermined by subsequent research, but relative to Jung's theory it is still quite powerful.

Jung's archetypes concern ubiquitous features of life. Everyone has a mother, a father, is born and dies; everyone encounters the opposite sex; has to deal with malicious persons (the demon); meets wiser old people etc. Should we be surprised that all societies throughout history have symbols to denote these important features of the world? This is no more surprising than that all societies have a symbol for water or fire. Therefore, from a Lockean point of view, which attributes all ideas (and therefore all symbol systems) to the individual's perception of the external world, we should not be surprised to learn that a schizophrenic has dreams that uses symbols that can also be seen in the relics of ancient Sumer: everyone uses these symbols. The ancient Sumerians developed what is thought to be the earliest form of writing, using cuneiform characters. Now, if a schizophrenic with no knowledge of cuneiform texts produced a lot of these symbols in proper grammatical order, that would be surprising. However, Jung did not show that any such sort of thing happened.

One might think that a Lockean account would have difficulty in accounting for what Jung takes to be a fact: that the archetypal symbols in presently separate societies are fairly similar in form and meaning, although Jung himself admits that they are far from uniform. But a sophisticated Lockean could point out that all human beings, and therefore their societies, seem to have evolved from a single symbol-using ancestor population in Africa, *Homo habilis* (Eccles, 1989).⁴ Remaining true to Locke's distaste for innate ideas, the sophisticated Lockean could say that the symbols connoting typical and important events and circumstances could have been handed down through tradition along the various offshoots from this original society. [Editor's Note 1: But this cultural diffusion model is highly controversial. An alternative that is neither Jungian nor Lockean is a "fractal" perspective, which suggests that the application of intelligence to roughly equivalent environments produces analogous symbolic structures.—PL]

6.2. The Neo-Darwinian Critique

Jung's theory of archetypes is logically incompatible with the neo-Darwinian theory of adaptive evolution.

Lamarckism is the doctrine that all adaptive evolutionary change takes place through the biological inheritance of goal-directed, acquired characteristics; neo-Darwinism asserts that all adaptive evolutionary change takes place through the natural selection of non-goal directed, genetically determined variation.⁵ Lamarckism and neo-Darwinism, as stated, are not strictly contradictory, but they are contradictory given the assumption/observation that species do show adaptive change, an assumption that Jungians share with neo-Darwinians. Jung's theory of archetypes implies Lamarckism in the narrow sense since it asserts that "fantasy-ideas" acquired in an individual's personal experience can be biologically inherited by the individual's descendants, and that these archetypes are adaptive acquisitions. The theory of archetypes, therefore, implies that neo-Darwinism is false.

Jung's theory of archetypes is perhaps not incompatible with Darwin's pre-genetic formulation of natural selection. But with the development of the genetic theory of inheritance, Jung's theory can be seen to contradict very powerful postulates of biology: the central dogma of molecular biology and what Dawkins (1982) calls the central dogma of embryology. These postulates contribute essentially to a theory of great explanatory

range and, apart from some interesting alleged counter-instances, has yet to be refuted. [Editor's Note 2—Though the role of classic neo-Darwinian dynamics in evolution is hotly disputed—e.g., see articles by such authors as Barham and Goertzel in this *Journal* in the past few years. I, incidentally, am strongly Darwinian on these issues, meaning that I see appropriate function in an environment—survival—as a regulating principle that overlays the interesting structural dynamics that engender organic characteristics, including ideas.—PL]

Let us remind ourselves what neo-Darwinism and Lamarckism are committed to. Darwin supposed that the great variety of life forms derived from a common ancestor. To get from the original life form to today's variety of adaptation Darwin postulated that all life forms had three characteristics:

- 1) heredity (like begets like);
- 2) natural variation (progeny differ slightly from parents);
- 3) multiplication (produces more than one offspring).

Thus, parents always give rise to children that are, though similar, slightly different from themselves and each other, and tend to produce more than one offspring. The variation is natural in the sense that it is completely independent of the environmental conditions of the individual organism. It is also independent of the needs of survival and reproduction of the organism.

If variation is independent of the environment and the needs of the organism, then probably these processes would have produced a mass of short-lived maladaptive organisms. This second problem is solved by Darwin by the natural selection of incremental improvements of bodily and behavioral traits. Each extremely small natural variation in a trait that increased the chances of reproduction of an organism and survival to puberty tended to be inherited; each natural variation that decreased chances of reproduction tended to be eliminated. This statement of course needs to be qualified.

1. The series of incremental changes may not be an unbroken series of improvements: there may be some detrimental steps so long as these do not lead to extinction.
2. A detrimental but non-lethal trait may emerge and survive by association with an at least equally beneficial trait.
3. Traits may escape elimination simply because they are reproductively neutral, neither increasing nor decreasing chances of reproduction.

Nevertheless, Darwin conjectured rightly that even complex organs could have arisen by an unbroken series of extremely small variations each marginally more similar in form and usefulness to the organ than its predecessor. Darwin thought this was highly important to answer Paley's argument. Paley's argument pointed to the absurdity of supposing that complex structures like the eye arose through chance. Paley had correctly seen the improbability of the eye's being formed all at once, but Darwin pointed to the incremental improvements leading to the eye, each one of which was quite probable in the context of its immediate predecessor. Darwin declared that if an organ was discovered that could not have arisen in this way, he would have rejected the theory: "If it could be demonstrated

that any organ existed, which could not possibly have been formed by numerous, successive, slight modifications, my theory would absolutely break down" (1859/1972, p. 219).⁶ Darwin was aware of the imperfections of adaptation noted above and strengthened his argument against Paley by pointing out that imperfection itself was more plausibly a sign of natural selection than of divine design.

Because of media misrepresentation, I ought to emphasize that Darwin's theory is still intact and a powerful explanatory theory. Eldridge and Gould (1972) proposed an interesting theory of punctuated equilibrium, which sees evolution as characterized by long periods of stasis punctuated by relatively fast periods of evolution. But as Dawkins argues (1986, Ch. 9), this is an interesting gloss on Darwin's theory that maintains Darwin's gradualism. The dispute between Eldridge and Gould on the one hand and their opponents on the other is a dispute about the rate and continuity of evolution, not its gradualness. What Eldridge and Gould rightly criticize is constant speedism, not gradualness. [Editor's Note 3: Indeed, Gould himself has said that his theory of punctuated equilibrium is compatible with "the fundamental feature of Darwin's vision—direction of evolution by selection"; see his "Darwinism and the Expansion of Evolutionary Theory," *Science*, 23 April 1982, pp. 380-387. —PL.]

Lamarck's account is similar to Darwin's with one major difference. Lamarck's theory had no use for natural variation. Instead, all variations were produced by what is called the principle of use and disuse. If an organ were used it grew in size or strength; if disused it shrunk or became weaker. Actually, Lamarck gave this principle, at the time commonly held, a more specific form: in striving for something an organism purposively brings about changes in itself which make its subsequent strivings more efficient. The classic illustration is the inheritance by a blacksmith's son of his father's large arm muscles acquired through the practice of his trade. In Lamarck's account the variations are all directed toward a goal, unlike Darwin's natural variation which is undirected, but simply differentially eliminated after being produced. [Editor's Note 4: Darwin's approach may be refined to say "undirected by the environment"; the extent to which the development of organic characteristics is directed by internal structural variables is currently the subject of much discussion—see Editor's Note 2 above—and is captured in Donald T. Campbell's distinction between random and blind generation of variation. Both are undirected by the environment, but blind generation entails internal structure.—PL.] Lamarck then supposed that all these goal-directed improvements were inherited (at least to some degree) by all the organism's descendants. Each organism was striving to climb a predestined order of evolution from simple, imperfect organisms to more complex and more perfect organisms with humans at the top.⁷

After Darwin, the main argument against Lamarckism was expounded by the German biologist August Weismann. Weismann argued that two independent processes of cell division begin with the fertilized egg: one leading to the adult body, or soma; another leading to the germ cells. Weismann thought that there was no way in which the soma could affect the germ cells, pointing out that germ cells are set aside early in development and if they are destroyed they cannot be replaced, making the organism sterile. As Maynard Smith points out, this is a very poor argument; since there is no early setting aside of the germ cells in plants and since all the energy and material for germ cell growth comes from the soma, there is plenty of scope for the soma to affect the germ cell (Maynard Smith, 1986, p. 10). However, Weismann's contention has yet to succumb to a general refutation.⁸

Neo-Darwinism now incorporates a molecular theory of genetic inheritance that clears up the lacunae in Weismann's case. The two postulates of the theory of particular interest here are the central dogma of molecular genetics and the central dogma of embryology. The central dogma of molecular genetics, as stated by Crick, is that genetic information may be translated from nucleic acid to protein but not vice versa. As Maynard Smith has said, this central dogma is an explanation of Weismann's theory (1986, pp. 20-21).⁹ This principle allows information to pass from DNA to messenger RNA to protein, as happens in the construction of body-cells, and even from RNA to DNA (reverse transcription), but rules out the translation of information from new protein to DNA.¹⁰ Thus, even if Jung's fantasy-ideas were coded in the form of the amino acid sequences of body-protein, which I doubt, this code could not be translated into a heritable form in the DNA. Of course, this leaves room for a route via RNA, but this seems very unlikely. The coding of learning experiences in brain RNA was a popular theory in the sixties and early seventies, and it was subjected to a great deal of experimental testing which refuted it. In any case, some mechanism would have to transfer the change in brain-RNA to the germ-line DNA. The strongest contender for a biological substrate of learning is the modification of neural networks in the brain—not through the creation of new proteins but through the long-term potentiation of post-synaptic connections. (Eccles, 1989, pp. 147-157).

Jung's theory is also incompatible with the facts of embryology. As Dawkins points out, the genetic code is more like a recipe than a blueprint (1982, p. 175). In the case of a blueprint and its product, one can translate in both directions; but with a recipe one cannot reconstruct the recipe from its product. Embryological development involves a highly complicated sequence of chemical reactions the precise timing of which is controlled by the DNA "recipe." Different genes are "switched on" at different stages. The switching on and phenotypic effect of any one of these activated genes is the result of the interaction of its consequences with those of hundreds of thousands of other genes plus changing environmental factors. Now, since different combinations of genotype and external factors can produce the same phenotype, a mechanism internal to the organism cannot tell from its phenotype which part of its genotype is responsible for any aspect of its phenotype. Even if some mechanism could discern a gene that, if altered, would produce the given acquired aspect, how could it know solely from a single body how to alter the gene in order to pass on a genetic copy of the acquired character? Why should feet-callosities acquired through running give rise to feet-callosities in subsequent generations rather than, say, larger noses? Why should experiences of wise old men (or some subjective reaction) systematically produce fantasies of wise old men in future generations? An acquired characteristic might alter the genotype in such a way that descendants even lost the ability to acquire the characteristic. (See Barlow, 1961, for more.)

Thus there is no mechanism that could scan the typical fantasy experiences of an individual organism and translate this into the genetic code and therein pass them on down the generations.

7. Recent Attempts to Exculpate Jung's Theory: Stevens and Storr

Stevens and Storr, the first a practicing Jungian psychotherapist and the second a critic, have independently accepted Jung's comments as a defense against Lamarckism. Stevens'

approach is perhaps the more interesting in that he tries to marry Jung's theory with the new theory of sociobiology. We will see that Stevens' and Storr's support of Jung is based on a confusion of two issues: (1) are ideas inherited or are *dispositions* to ideas inherited, and (2) the quite separate issue of whether Lamarckism or neo-Darwinism is true. To be more precise, the confusion has been between the inheritance of precisely defined characteristics versus the inheritance of propensities to experience and behavior conforming to certain constraints on the one hand, and the Lamarckian/neo-Darwinian issue on the other. This confusion is common to many standard textbook commentaries on Jung.

Stevens (1982, p. 18) writes that

Jung's most effective counter to the charge of Lamarckism was the distinction which he made between what he called the archetype-as-such and the images, ideas, feelings and behaviours that the archetype gave rise to. The archetype-as-such is the inherent neuropsychic system—the innate releasing mechanism—which is responsible for patterns of behaviour like the zig-zag dance, or patterns of experience like falling in love, when an appropriate member of the same species is encountered in the environment.

And Storr (1989) first quotes Jung:

Again and again I encounter the mistaken notion that an archetype is determined in regard to its content, in other words that it is a kind of unconscious idea (if such an expression is permissible). It is necessary to point out once more that archetypes are not determined as regards their content, but only as regards their form and then only to a very limited degree. A primordial image is determined as to its content only when it has become conscious and is therefore filled out with the material of conscious experience. (Jung, 1938/1954, "Psychological Aspects of the Mother Archetype," in *Collected Works*, Vol 9, Sec. I, p. 79)

Here Jung is keen to distance himself from Freud's theory of unconscious ideas, something that Jung regards as perhaps self contradictory, and to stress that archetypes are constraints on certain ideas.

But Storr incorrectly uses such a quotation to draw the following conclusion:

This formulation disposes of the accusation sometimes brought against Jung that he was a Lamarckian ... What is inherited is a predisposition, not an idea; a predisposition to create significant myths out of the common stuff of day-to-day human experience; just as one might say that a human being inherits a predisposition to react emotionally to the opposite sex (Storr, 1989, p. 35).

One might as well say that Lamarck was not Lamarckian because he asserted that a giraffe inherits not a precisely formed neck, but simply a disposition to grow a longer neck. (Even in Lamarck's system, not all aspects of an organism are inherited: some are acquired in its own life-time.)

Both Stevens and Storr miss the point of the Darwinian criticism, which does not hinge on whether Jung asserted that ideas or dispositions to entertain ideas are inherited. Neo-Darwinism rules out the inheritance of acquired characteristics in general, whether these are muscles, skills, ideas, or dispositions, determined in detail or only constrained by certain parameters.

Stevens' and Storr's point of view can be understood only if they thought that the inheritance of ideas or images would have to be Lamarckian. But why should they think that? Perhaps because we might often assume that all our ideas and images (or their distinctive features) are acquired in the lifetime of the individual through external stimulation alone, a common empiricist assumption dating back to Locke. However, logically, neo-Darwinism can easily countenance the inheritance of images, even if determined in content, provided they are produced by natural variation.¹¹ Variations in these images would then have to be produced independently of the organism's needs and its environment. Thus Jung was wrong to say that the suggestion that variable images could be inherited is absurd (Jung, 1964, p. 57). (Jung had earlier thought that individual experiences could be inherited, see, e.g., 1928 and 1943.) But neo-Darwinism cannot countenance the inheritance of even one acquired disposition.

In defending Jung, one might say that nowhere does he say that a fully developed archetype is acquired in the lifetime of any individual ancestor. But parts or enhancements of each archetype are acquired during the lifetime of individual members of the class of our ancestors. Jung does not say this in so many words, but he implies this logically by what he does say and by some trivial assumptions. If an archetype is an accumulation of fantasy experiences of many individuals over generations, then for each member of the series of individuals one can say that he or she either contributed a part or enhancement to an as yet incomplete archetype or actually completed the formation of the archetype. In either case an acquired addition or enhancement to a proto-archetype is still an acquired characteristic. Such characteristics are acquired, to reiterate, through repeated experience-induced fantasies. In saying in addition that they are inherited, Jung contradicts neo-Darwinism.

This logical point also poses a problem for Jung's distinction between the personal unconscious and the collective unconscious, which are supposed to be mutually exclusive. If archetypal evolution has stopped, then Jung has no problem in saying they are mutually exclusive now. But while the archetypes were being formed through accumulated experience, there must logically have been countless experiences (or enhancements or parts of experiences) which were both personal and collective as they were being incorporated into the collective unconscious.

Of course, one might interpret Jung's theory in terms of the Baldwin effect, which occurs when the environment selects in favor of sensitivity to a particular stimulus in such a way that variations eventually arise that no longer need the stimulus for expression. The stimulus brings out into the open, in other words, characteristics that would have remained hidden from selection pressures without the stimulus. The Baldwin effect has been used to explain many seemingly Lamarckian processes—although we must note that no complex organ or behavior has yet been explained this way, only simple non-functional mutations in flies (Wills, 1989, pp. 304-308). Thus one might suppose that when Jung spoke of the sun-hero fantasy being aroused by stimulation from the sun, he could be interpreted as meaning that in this way a proto-sun-hero fantasy became exposed to selection pressures which eventually produced the sun-hero archetype proper and which might then occur quite spontaneously in dreams, etc.

However, this sympathetic interpretation does not fit. Jung stressed that the archetypes were impressed on the mind by the experience-induced fantasy-ideas: "The primordial image is a mnemonic deposit, an imprint, which has arisen through a condensation

of innumerable similar processes" (1921, p 556). Clearly, Jung saw the direction of causation flowing from experience—even if, as we saw, the sensory impression is alleged to be distorted before it assumes the form of the archetypal image (as in the sun-hero derived by distortion from the experience of the physical sun).¹² But Darwinian natural variations arise independently of the environment of an organism's genes; thus they arise independently of its sensory experiences. According to neo-Darwinism, then, neither experiences nor fantasy-ideas can be impressed or "imprinted" on the organism's brain in a heritable form.

In his recent biography of Jung, Stevens tries to make light of Jung's assertions about images being engraved or imprinted on the mind: "Fortunately, they are easily dropped, since they are irrelevant to the archetypal hypothesis" (Stevens, 1990, p. 38). This retraction may serve, intentionally or unintentionally, to save Jungians from embarrassment, but it does not save Jung's theory. Of course, one can define the archetypal hypothesis as that part of the theory unrefuted so far. This saves the Jungian from sound criticism, but also obscures that the Jungian has dwindling resources.

8. Jung and Sociobiology

Stevens argues that Jung's theory of archetypes anticipates the new science of sociobiology associated with the work of Wilson (1975) and Dawkins (1976). (Interestingly, he makes no mention of either W. D. Hamilton or R. L. Trivers.) However, as we have seen, Jung's theory is Lamarckian.

To rebut this charge, Stevens has to show two things: (1) that Jung's Lamarckian assertions can be dispensed with without emasculating the theory so much that it becomes compatible with sociobiology by becoming simply an uninformative implication of it; (2) that the particular archetypes that Jung postulated could have evolved by numerous successive slight modifications produced by natural variation each of which was advantageous (this would be the strongest type of neo-Darwinian explanation, ruling out neutral and harmful but non-fatal intermediaries).

Why cannot Stevens simply drop the Lamarckian elements and keep the rest? With anatomy one can easily attribute functional parts, the eye for seeing or hand for grasping, for example. This clear function is obviously related to their reasons for existence—and these parts of the anatomy clearly exist—whatever the specific mechanisms of their evolution. But when one comes to less publicly inspectable phenomena such as anima, wise old man archetype, and demon symbols, which all require interpretation, then I think the mechanism of their evolution is relevant, though not decisive, to the question of their existence.

However, Stevens does not adopt this approach. Instead, Stevens draws on the work of Lorenz, Tinbergen, and Harlow on animals, Bowlby on human infants, and Chomsky's theory of universal innate grammar to argue that Jung's theory of archetypes has been vindicated by modern research into the biological basis of our nature. The thread of Stevens' argument runs like this: show an analogy between an archetype and a characteristic shown by ethologists or psychologists to be innate; conclude that the archetype has evolved by a neo-Darwinian process. This is a non-sequitur, and one that is also aggravated by the tenuousness of the analogies.

Bowlby (1969) in his by now well known work showed that the attachment between infants and mothers was mediated by innate response patterns. Goal-directed behavior systems in the mother and child operate cybernetically to bring about the mutual attachment. Thus smiling, staring, crying, babbling, and laughing in the child bring about parental feelings and behavior which is appropriate and continuously adjusted to the child's needs. For Stevens, this is the manifestation of the mother archetype—he finds (1982, p. 70) in this the modern vindication of Jung's central axiom of psychological development: the drive to equilibrium. Stevens also sees this as Jung's anticipation of the application of cybernetics to psychology—Stevens stressing Jung's foresight since there was no cybernetic science at that time, according to Stevens. The goal of the manifestation of an archetype is thus to restore balance, to act as a compensation for some neglected aspect of the person.

Although we associate the science of cybernetics with Norbert Wiener and his book *Cybernetics, or Control and Communication in the Animal and the Machine* (1948), it cannot be readily traced to one individual. And in any case, the idea of teleology and homeostasis controlled by feedback in biology was already being elaborated toward the end of the 19th century by Claude Bernard in his *Lectures on the Phenomena of Life in Animals and Plants* (1878), the German physiologist Eduard Pfluger's *The Teleological Mechanics of Nature* (1877), and a professor of mechanical engineering, Felix Lincke, in "The Mechanical Relay" (1879). Contrary to Stevens' suggestion, the concepts of feedback and goal-directed behavior thus were already part of the intellectual atmosphere in which Jung was working.

Further, the modern theory of feedback distinguishes between the "regulator problem" (staying near a fixed state) and the "tracking problem" (following closely a given trajectory), whereas in Jung's system such a distinction is obscured by the idea that the personality strives not only for equilibrium (regulator problem) but for growth (tracking problem). The human personality for Jung is thus at the same time likened not only to a thermostat, but to a heat-seeking missile. This is possibly an interesting avenue for research or clarification. But as for Stevens' claims about Jung and a cybernetic view of human psychology, the most one can say is that Jung's view is at least compatible with sociobiology.

Meanwhile, to adduce Chomsky's theory of universal grammar as corroboration of the Darwinian evolution of complex innate psychological structures is not without its problems. Hattiangadi (1987), for example, has argued that Chomsky's theory posits an essentialistic innate mental structure, and is therefore non-Darwinian. A neo-Darwinian viewpoint would lead us to expect that different subspecies would have different innate grammars. Even slightly different grammars will of course generate very different sets of sentences; but members of different races who speak the same language pick out the same set of sentences as grammatical.

Moreover, Chomsky (1972, p. 68) explicitly denies the possibility of giving a progressively evolutionary explanation of the emergence of language: "There is no more of a basis for assuming an evolutionary development of 'higher' from 'lower' stages, in this case, than there is for assuming an evolutionary development from breathing to walking; the stages have no significant analogy, it appears, and seem to involve entirely different processes and principles." But if language did not evolve incrementally from earlier characteristics, then it must have emerged as a single mutation, say 20 or 40 thousand

years ago. We would then expect to see a significant minority of humans with a total inability to learn a language. But we do not.

But my main point here is that the evolutionary difficulties of Chomsky's theory detract from any corroboration it could give to Stevens' Darwinian view of archetypes.

The patterns of innate behavior discovered by Lorenz, Bowlby, Harlow, and Chomsky of course can be called "archetypes," but this only shows that the concept of an archetype divorced from Jung's theory is general enough to apply to any innate behavior. Jung's theory of the origin of archetypes and the specific archetypes he posits is quite a different and more controversial matter.

If Jung's theory were truly Darwinian, he might have said something like the following about the evolution of fantasy: The human organism generates fantasy-ideas. Some of these are determined (or conditioned) by the organism's genetic code. Thus different individuals will produce different fantasies (even if similar). Some of these fantasy-ideas will contribute to the reproduction of the genotype of the organism that has them, whereas others will lower the reproduction of the genotype. Therefore, fantasy-ideas that enhance reproduction will tend to be inherited and passed on down the generations. At least some of the dreams, fantasies, and so forth that humankind has now may well have been those that contributed to the survival of our ancestors. For example, dreams about falling seem very common. We can see how such complete dreams could have evolved from more rudimentary fantasies by numerous successive slight modifications. Such a fantasy may have kept our tree-dwelling pre-hominid ancestors clinging tightly to the trees in which they lived and slept.¹³

Now Jung might have said something like the above, but he did not. (Strangely, even Stevens proffers neither this nor indeed any adaptive explanation for this common dream, seeming perfectly content with its indicating our origins in trees and its being inherited from this period.) In fact, nowhere in Jung's writings is there any full-blooded Darwinian explanation of the many archetypes he postulates. Nowhere do we see a Darwinian explanation of the evolution of the archetypes of the wise old man, or the demon, showing how each successive slight variation in the direction of a demon archetype could have been selected for its enhanced reproductive survival value. Indeed, Jung often says things which rule out the evolution of archetypes by numerous successive slight modifications. For Jung, archetypes represent "the revival of possibilities of ideas that *have always existed*, that can be found in the most diverse minds and *all epochs*" (my emphasis) (Jung, 1931, para. 320). Interestingly, this denies not only the neo-Darwinian evolution of the archetypes, but any kind of archetypal evolution. (Such a passage can be explained on the non-evolutionary Platonic interpretation of Jung's theory of archetypes, since Plato's types were eternal, unchanging forms to which thought can conform. However, as we have seen, Jung most often also speaks of the origin of archetypes in an accumulation of experiences.) Even Lamarck's theory posited a sequence of evolutionary steps. We must conclude, then, that either Jung's theory is non-evolutionary, or it is Lamarckian. Either way, it is fundamentally at odds with the new science of sociobiology.

9. Can Any of Jung's Archetypes Be Given a Neo-Darwinian Explanation?

Stevens maintains that the archetypes can be given a Darwinian explanation, but surprisingly does not even attempt to provide one. I cannot find any truly Darwinian

explanation of Jung's archetypes in the literature. But such explanations must be forthcoming if Jungians such as Stevens are to maintain that Jung's archetypes are Darwinian. In the case of the human eye one can see how a rudimentary predecessor, one that only indicated the presence of light, would be of some use. Moreover, one can construct a series of incremental improvements in shade discrimination, color, and depth perception, and so on leading to the modern eye. However, what reproductive value can a one percent demon archetype have? This is perhaps unfair, since there is another possibility. The demon archetype may have evolved from either a non-demon archetype or even from some non-archetypal propensity. But Stevens supplies no such explanation.

An example of a supposed archetype that seems to bear no relationship to genetic reproducibility is the image of a tube descending from the Sun, an image Jung reports to have observed in the fantasies of a paranoid schizophrenic and in medieval paintings of the Virgin Mary. Jung says that the idea behind this image is that the wind descends from the sun, an idea common to the whole of classical and medieval philosophy. Jung assures us that the patient, an ordinary clerk, was probably unaware of this philosophical tradition. Apart from the obvious difficulty in showing that these have any connection, how could the image of a tube descending from the Sun have any reproductive advantage? On the other hand, such an image may be reproductively neutral and so fail to be eliminated. A more interesting case for my purposes is an archetype that would lower reproductive potential.

Jung conjectured that in every person there is an archetype corresponding to the opposite sex. In males it is called the anima; in females it is called the animus. This consists at least in part of an a priori anticipation of the character of the opposite sex. It is in this respect an aid to the mutual understanding of the sexes. So far the anima and the animus seem to have adaptive value. The individual is already prepared to recognize and react appropriately to members of the opposite sex.

But Jung adds to this archetype an element that seems maladaptive. For he supposed that the archetype not only embodies an understanding of the opposite sex, but also the traits of the opposite sex, and that this could lead to difficulties:

In men, Eros, the function of relationship, is usually less developed than Logos. In women, on the other hand, Eros is an expression of their true nature, while their Logos is often only a regrettable accident. It gives rise to misunderstandings and annoying interpretations in the family circle and among friends. (Jung, *Collected Works*, Vol. 9, Sec. II, as quoted by Storr, 1983, p. 111).

Now human babies have an extraordinarily long period of dependency on the family. Therefore, any incipient development of an archetype that had a destabilizing effect on the family would tend to be eliminated, for children would have less chances of reaching the family during child-bearing age. Thus Jung's animus seems at odds with a Darwinian explanation. (Of course, Darwinian theory does not rule it out completely. Maladaptions do occur in organisms. Perhaps this one has yet to be eliminated by natural selection.) At very least, one can hardly say that the Animus and Anima fall neatly into an adaptationist account.

Let us explore some further examples to see if they are more amenable to a sociobiological account. Do the actions of young male primates, even ungulate males, suggest that they have an "old man" conception? The young males are attracted to the

old males, act repeatedly as if they are fascinated by them, and steadfastly maintain association with them. Does the devil archetype correspond to the "monster phenomenon," comprised of vigorous aversive reactions to disfigured conspecifics? (Witness horses spooking violently from moose or donkeys.) Might these patterns of behavior give us a clue about what fairly simple proto-human archetypes looked like? One percent of an old man archetype might correspond simply to paying attention to older males and thereby learning appropriate behaviors—paying attention to an old male is vitally important to being safe and being able to imitate appropriate behavior; paying attention to Old Mother may be inappropriate. One percent of a demon archetype may correspond to a tendency to fear and avoid disfigured conspecifics. Such a tendency would contribute to survival by the avoidance of diseased, crippled, or, in general terms, reproductively risky mutations. However, Stevens does not cover these possibilities. Instead, he asserts that the demon archetype (the "Shadow") is based on our need for enemies, racial prejudice, hierarchy, and fear of the strange—quite a mixed bag of traits. These are allegedly essential for social cohesion, and have been selected in the course of evolution because of this. At junctures like this Stevens' tenuous analogies plus group selectionism let him down.

Individual Happiness and Survival versus Genetic Survival

Stevens' work is representative of the failure to distinguish among individual, group, and gene survival and reproduction.

Stevens is not alone. Most people pay lip service to Darwinism without understanding it. The popular conception of Darwinism is encapsulated in the phrase "for the good of the species." For example, people commonly suppose that fish school because there is safety in numbers and that this contributes to the survival of the species. Many wildlife programs are replete with such comments. However, schools are not formed because each fish has an intention (reflex or goal) to do so; this is rather an unintended consequence of each fish trying to swim between two other fish. A fish between two other fish has more chance of surviving an attack from predators. Moreover, schooling actually makes life easier for predators.

Group or species selectionism was actually vaguely taken for granted among biologists until Wynne-Edwards (1962) propounded an explicit version, which then goaded other biologists to express more forcibly the individualistic bias of Darwin's theory. Observing that members of a species of bird, the yellow-shafted flicker, can produce up to 71 eggs in 72 days when each egg is removed as it is laid, but the same bird normally only lays a clutch of six to eight eggs, Wynne-Edwards argued that this restraint of reproduction was for the good of the species for it avoided the exhaustion of resources through overpopulation.

Two of the most important responses to Wynne-Edwards were those of David Lack (1954; 1966) and Hamilton (1964). Lack pointed out that birds will produce an optimal number of eggs based on the most that can be raised to a fertile age; thus, this is not a question of avoiding overpopulation. (There has been one qualification to Lack's theory.¹⁴) Hamilton's theory is a general response to group or species selectionism. Introducing the concept of inclusive fitness, it explains sacrifice of individual reproductive success (altruism) between kin, and also shows why it does not extend to the species as a whole. Suppose a nepotistic gene disposes its bearer *X* to help a sibling. *X*'s sibling has

the same one half probability of carrying the nepotistic gene as would *X*'s offspring. Genes would thus be rewarded via construction of bodies that not only reproduce themselves and help their offspring to reproduce, but also help their collateral kin to reproduce. But the selective advantage to a gene declines the more distant the relative. As J. S. Haldane said: "I would give my life for three brothers or nine cousins!"

The group selectionism in Stevens' work is a serious flaw in his attempt to interpret Jung's archetypes in terms of sociobiology. The archetypes are adaptive for the individual: properly developed, they bring deep meaning and harmony to the individual's life. However, in the gene-centered view of natural selection, a human body and its behavioral dispositions is a duplicating machine made by and for genes. We have the bodies and behavior that we do have because that kind of body and behavior enhances the "copyability" of the genes that produce them. What is adaptive for the individual in terms of pleasure, wisdom, life-span, harmony, or a meaningful life is therefore not necessarily adaptive for the genes. In the sociobiological account of altruism, for example, an individual sacrifices its own life for the lives of others because in doing so copies of the individual's genes in those others are then more likely to leave even more copies in the future than if the individual had not sacrificed itself (Hamilton, 1964). Stevens would have to show that the harmony or meaningfulness evoked by the flowering of a Jungian archetype would enhance genetic reproducibility. Perhaps genetic reproducibility is enhanced in some circumstances by marginal sacrifices of meaningfulness or harmony.

Another avenue for Stevens, as mentioned above, would be to show that the archetypes are reproductively neutral. However, if this approach is adopted, then apart from this stricture, exactly what archetypes are postulated would be arbitrary.

Or the terms "meaningful life," "wisdom," "happiness," and so forth could be redefined by Stevens as that which contributes to genetic reproduction. If one were to find that an interpretation of the old-man archetype were counter to inclusive fitness, then Stevens could deny that that was the true archetype. But this would raise the question of how much of the original theory had been retained.

Bowlby, on whom Stevens rests much of his argument, overlooked this puzzle because of his ambivalence over group-selectionism versus individual-selectionism in his characterization of instinctive behavior, to wit: "certain of its usual consequences are of obvious value to the preservation of an individual or the continuity of the species" (1969).

The same ambivalence is evident in the writings of other Jungians; e.g., Hall & Nordby actually assert that "all archetypes must be advantageous to the individual or race; otherwise they would not have become part of man's inherent nature" (1973, p. 44). And De Meira Penna (1985) simply assumes that the archetypes can be assimilated into sociobiology as a product of Lamarckian evolution. Surprisingly, she assumes that the archetypes can be incorporated into sociobiology just as altruism was.

Stevens does not confront the problem of individuals making marginal sacrifices of meaning and happiness for marginal increments in genetic reproducibility because he sees Darwinian selection as group selection: "Darwin changed all that—through one tremendous insight, namely, that the guiding principle governing the structure and function of all living organisms is, quite simply, the survival of the species" (Stevens, 1982, p. 23). Given Jung's emphasis on the importance of the individual, Stevens' opting for group selectionism rather than the more individual-orientated gene-selectionism of Dawkins et al. is odd.

10. Cautionary Note on all Darwinian Explanations of Psychological Features

When attributing a function to some feature of an organism, one has to try and think of possible alternative non-functional reasons for its existence. George Williams (1966, pp. 8-12) makes this point, stressing that evolutionary adaptation should only be invoked as a last resort, after other explanations in terms of physics and chemistry have been found insufficient. Williams uses the example of flying fish: the fact that they invariably fall back to the water should not be thought to require an explanation in terms of adaptation.

Williams' point can be generalized. All functional structures, designed or naturally selected, will have incidental aspects that serve no purpose. Pick any machine, and one will be able to make a long list of features that are not specified in the design, but which are necessary concomitants of the structure. The fact that the screen on my television set is soluble in hydrofluoric acid, or the fact that the set heats up its surroundings when used, are not part of the design as such, but simply incidental features of it. That one can make long lists of such features is not so surprising if one reflects that any object has an infinite number of aspects. Some of these will be due to laws of nature; others have to do with where and when the machine was made, etc.

Perhaps dreams serve no purpose, but are simply complex invariant concomitants of the human nervous system. Any system that processes information is characterized by noise. How can a Jungian distinguish a meaningful adaptive dream from the noise that the human brain presumably creates? Yet this may nonetheless be possible: my point is that Stevens and others who wish to explain the Jungian Archetypes in terms of evolutionary adaptation must try to make this distinction. I do not want to be too discouraging. One can attribute functional significance to a characteristic without knowing the specific function. A good example of this was the lateral lines of fish, which completely baffled scientists at first. This organ shows a structural constancy within taxa and a high degree of histological complexity. These features encouraged those studying this organ to discover its precise function. Eventually, painstaking work showed that the lateral line is a sense organ similar to the basic mechanism of audition.

11. Concluding Comment

Jung was right to stress the quite sophisticated readiness of the human organism from birth for certain learning experiences, and Stevens is right to applaud him for maintaining this stance even through the powerful rise of behavioristic psychology inaugurated by Watson (1913), just three years after Jung had begun to develop his theory of archetypes. Stevens has shown that Jung's emphasis on our innate cognitive/emotional equipment has been corroborated by modern research. But showing that something is innate does not automatically show it to be Darwinian, a non-sequitur that neatly characterizes Stevens' project. Even if we decide to test for the presence of other complex innate emotional patterns that show themselves in dreams and the like, I think that the supposition that Jung's theory of archetypes is neo-Darwinian must still be substantiated. The possibility is still open for anyone to try to supply a neo-Darwinian explanation of all of Jung's archetypes or of any new ones conjectured by workers in this field.

Notes

1. When Freud first wrote *The Interpretation of Dreams*, he was of the opinion that even the aggressive impulses could be reduced to sexual impulses. Only later (*Beyond the Pleasure Principle*, 1920) did he posit an independent aggressive drive acting against the pleasure principle—"Thanatos." Incidentally, the introduction of an autonomous "death instinct" could be seen as the abandonment of the sexual wish fulfillment theory of dreams.

2. "The general function of dreams is to restore our psychological balance by producing dream material that re-establishes, in a subtle way, the total psychic equilibrium" (Jung, 1964/1978, p. 34). A rather amusing example of this approach is described in "The Archetypes of the Collective Unconscious." Jung says that one of his patients was presenting him with a difficulty. Over a series of consultations Jung noted that his conversation with her was becoming excruciatingly futile, his interpretations seemingly missing the mark. One night he had a dream: "I was walking along a country road through a valley lit by the evening sun. To my right, standing on a steep hill, was a castle, and on the topmost tower, on a kind of balustrade, sat a woman. In order to see her properly I had to bend my head back so far that I got a crick in the neck. Even in the dream I recognized the woman as my patient" (Jung, 1966, p. 112). Jung says that if he had to look up so much in the dream, he must have been looking down on his patient in reality. His dream was telling him that if he were to pay his patient more respect, the treatment would progress. When he did so, "the treatment shot ahead beyond all expectation." Typically, Jung does not bother to canvas other possible interpretations. This is characteristic of Jung's method—to seize upon the first interpretation as the unique and comprehensive interpretation. But even to a novice at dream interpretation, all sorts of possible meanings spring to mind. Perhaps the dream was warning Jung that if he paid the patient too much respect, then painful consequences would follow. To the untutored the dream might simply have been portraying the woman as a pain in the neck. Jung is impressed by finding countless confirmations of his interpretations, and he is keen to present many examples of cases in which his interpretation fits the evidence. However, as Popper has argued, the fact that a theory fits the evidence provides no support and certainly no proof of the theory in question.

3. The Jungian may retort that the idea of the conservation of energy was not developed by one individual through insightful fantasy, but through an accumulation of fantasy experiences of many generations, each adding something to the memory until it became a fully fledged archetypal memory. Let us analyze the possibilities here. Think of the successive fantasy experiences that lead to the eventual archetype. Either each pre-archetypal fantasy is fully developed or is incomplete. If it is fully developed by each individual, then the archetypal hypothesis is redundant. If each fantasy is incomplete, then it is simply a part of the archetype. There are two problems with this. If it is a part of the archetype, then at what point in its construction does the archetype contribute to survival? A Darwinian adaptationist explanation requires that an evolved item be useful in its earliest incipient form. (For example, an eye with 1% sensitivity and resolution is better than 0.5% sensitivity and resolution.) But what use is a 1% sun-god or mother symbol? Even if this problem can be overcome, the Jungian still faces the following difficulty. If each successive generation adds an improved part to the proto-archetype, surely this in itself amounts to a creative act, and we are again making the archetypal hypothesis redundant for the explanation of creativity. So again there is then no reason to deny Mayer's creativity.

4. In the 1960s the Leakey family discovered at Olduvai in Tanzania and at Lake Turkana in Kenya hominid fossils indicating a dramatic increase in brain size and a corresponding stone tool culture. *Homo habilis* represents a rapid evolutionary branching from its parent population of *Australopithecus africanus* at about 2.5 million years ago. Not only was there a rapid increase in brain size (about 40%), but there appears to have been exceptional growth of brain regions concerned with the production and interpretation of speech, the Wernicke and Broca areas

respectively. Tobias and Holloway mapped this differential growth of the brain with their special techniques for making endocasts of fossil skulls. There appear to have been two other branchings at about the same time from the original *A. africanus* stock—*A. robustus* and *A. Boisei*, both of which became extinct about one million years ago. The technique of tracing mitochondria back in time also supports the theory that all current humans had a common female ancestor in Africa.

5. Darwin did make some concessions to Lamarckism. He thought that unusual organisms like the flightless ostrich had to be accounted for, and argued that many generations of disuse of an organ (like wings) could lead to the loss of its function (1859/1972, pp. 175-182). But these concessions have been shown to be completely unnecessary. And even Darwin thought that the influence of use and disuse had been overestimated and that natural selection was dominant. Moreover, there was no evidence of the inheritance of injuries.

6. Many writers have been completely led astray in the interpretation of Darwin's theory by their neglect of Darwin's emphasis on these "numerous, successive, slight modifications." Even such outstanding scientists as Fred Hoyle have misrepresented Darwinism in this way. Hoyle compared the chances of evolution developing a complex organ like the eye to the chance of a hurricane blowing through a junk yard accidentally constructing a Boeing 747 (Hoyle, 1983, p. 19). Clearly this argument of Hoyle's ignores the crucial element of numerous, successive, slight modifications, each of which likely has some small evolutionary advantage in its context.

7. Wills (1991, p. 68) is keen to distance Lamarck from the simple theory of acquired characteristics, but he at least sees, though not consistently, that Lamarck's theory implies the inheritance of acquired characteristics. On the other hand, Dawkins' presentation of Lamarck (1986, p. 301) is a little unfair in the other direction, for although Lamarck's theory implies that some types of acquired characteristics are inherited, namely those whose impact on an organism is useful, it actually rules out the inheritance of injuries. This is because, first, injuries would not have a useful effect on the organism, and second, the accumulation of injuries over generations would be in conflict with Lamarck's hypothesis of an upward ladder of being. For the purpose of this essay I will follow Dawkins and take Lamarckism to mean that all adaptive evolutionary change is by the inheritance of acquired characteristics (certainly this is appropriate in considering the evolutionary significance of Jung's archetypes, which he presents as beneficial to humankind.)

8. Popper has an interesting argument against Weismann's theory. If the germ cell and the soma are different, Weismann's conclusion may be true. But what of a bacterial cell: the germ cell and the soma are identical. So characteristics acquired by the organism may be transmitted in a heritable form to its descendants. However, this would not be truly Lamarckian because many of the heritable changes would not be adaptive (see note 7 above); and one would still need natural selection to explain the appearance of new organic characteristics. Hence, even though Weismann's theory is refuted at this level, neo-Darwinism remains standing.

9. Though Maynard Smith also points out that Weismann's theory could still be true most of the time even if the central dogma were false, because most acquired characteristics would not involve the synthesis of new kinds of protein.

10. The central dogma allows the following transfers of sequence information:

- 1) RNA to RNA. This is used by certain viruses such as the flu virus and the polio virus.
- 2) DNA to DNA. This is normal replication.
- 3) Directly from DNA to protein. Under special conditions in a test tube, single-stranded DNA can act as a messenger.
- 4) RNA to DNA. This is used by retro-viruses, such as AIDS.

11. There is a problem with the inheritance of precisely determined traits. For example, geneticists would attribute one's precise height not only to one's genetic make-up, but to the

environment of that genetic make-up. (Part of that environment would be the concentration of vitamins and minerals in the individual's body.) Similarly, if we wanted to develop a genetic theory of ideas, we would have to look at the interaction of the genetic dispositions to ideas and their environments. (Logically this need not consist of other ideas and experiences; it may possibly be other aspects of the environment.) But my point is that as long as the ideas are not wholly acquired from the environment, neo-Darwinism can deal with them.

12. This interpretation of Jung follows from Jacobi's account of Jung, specifically Jacobi's remarks about the etymology of the word "archetype." The word dates from classical Greece and means "prime imprinter," usually referring to the original manuscript from which other copies were made: "The first element 'arche' signifies 'beginning, origin, cause, primal source principal,' but it also signifies 'position of a leader, supreme rule and government' [in other words a kind of 'dominant']: *the second element 'type' means 'blow and what is produced by a blow, the imprint of a coin ... form, image, prototype, model, order, and norm', ... in figurative, modern sense, 'pattern underlying form, primordial form' [the form, for example underlying a number of similar human, animal or vegetable specimens]*" (my italics) (Jacobi, 1959).

13. Carl Sagan (1977) performed a statistical study of the dreams of college students. The following themes were reported in descending order of frequency:

- 1) falling;
- 2) being pursued or attacked;
- 3) repeated attempts at performing a task;
- 4) sex.

Interesting, although lending themselves to a Darwinian explanation, none of these are identical to a Jungian archetype. This should lead us to suspect that Jung's archetypes cannot be given a Darwinian explanation.

14. Nelson showed that gannets, who normally only lay one egg, are quite capable of incubating and rearing two eggs if an extra one is experimentally added. Lack's response was to suppose that the optimum clutch size of one egg evolved in conditions which no longer obtain. See Dawkins, 1983, "Constraints on Perfection."

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About the Author

Dr. Ray Scott Percival is organizer of the Annual Conference on the Philosophy of Sir Karl Popper, and Associate Editor of the *Popper Newsletter*. He also reviews philosophy books for the *New Scientist*.