



Creating the Nation's first BioPark

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Letter From the Desk of David Challinor
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Spring with all its blossoms has arrived in Washington, and I would like to begin this letter with a quote from Tennyson's Locksley Hall: "In the Spring a young man's fancy lightly turns to thoughts of love." You recall that last month's letter postulated that only humans seemed to care about how they evolved, and I described the efforts of paleoanthropologists to trace human evolution back as far as possible. I suggest that falling in love is another phenomenon found only in Homo sapiens. This letter will consider facets of love between the sexes, how it might have evolved, and the lack of evidence that the state of being in love as experienced by humans exists elsewhere in the animal kingdom; male/female bonding in other animals for reproduction purposes seems entirely controlled by hormone-release cycles.

First, what do we mean by falling in love? The dictionary defines it as passing into a specific state. Most of us probably have experienced love and were quite aware of being affected. Although specific symptoms vary by individual, most people in love experience such feelings as excitement, enjoyment, sensuality, pain, euphoria, anxiety, distraction, fantasy imaging, and occasional doubts, but these diverse reactions seem to tumble through the psyches of smitten humans, male and female, without logic or reason. Physiologists still do not understand the mechanism that triggers the attraction of one person to another, but one theory hypothesizes that after a suitable interval following initial contact, a chemical change in the brain is triggered by the release of cerebral phenylethylamine (PEA). This compound is closely related to amphetamine, a common stimulant that can produce euphoria in people. I want to emphasize that the cause of any increase in the brain's level of PEA is still not understood, but such a chemical reaction as a cause or effect of falling in love does not seem far-fetched.

Ethologists (scientists who study behavior) have spent considerable time mapping courtship in humans and how it has evolved. From the study of the earliest discernible phase of human pair formulation, evidence indicates that humans are disposed to long-lasting marital relationships. The feeling of being in love is as old as humans; it has been celebrated in song and poems in all known cultures. Eibl-Eibesfeldt, who has spent his life observing and publishing on human behavior, has found that even those groups considered culturally remote by the western world are well acquainted with romantic love.



If, as I postulate, falling in love is an innate human behavior, then a biological stimulus for this attraction must have evolved. In trying to investigate the background for the evolution of the state of being in love we, as humans, are in the difficult position of being biased by our own humanity. Most humans know what it feels like to be in love, but our often irrational behavior when in that condition is hard to explain. Just as humans can test hypotheses on causes for animal behavior even though we cannot converse with the animals, likewise we may have to await the arrival of an extraterrestrial intelligent being to provide an unbiased explanation of our behavior. Nonetheless, some interesting explanations have been proposed. First, humans are the only mammal whose reproductive efforts are not completely controlled by hormones. All the great apes, for example, can breed only when the female is in estrous, a condition hormonally induced. Although female Homo sapiens' ability to conceive is hormonally regulated, she is receptive to males at all times. Having achieved this unique condition among mammals, the sex act has evolved as a bonding device as much as a reproductive one. When a female is no longer fertile, for example, this act becomes solely a bonding one.

If this is indeed the case, it seems to indicate that humans have evolved towards long-term relationships. The female, however, has a bigger investment in such a relationship, at least while she is fertile, because of the psychic and physical energy required to bear and raise children. Her reproductive strategy would be to find the male that would allow her to produce the best offspring. To achieve that goal, once she has fallen in love she attracts the male by displaying coy resistance. This behavior forces the male to work hard to win the female. The female can thus test the male's willingness to invest his resources and talents in the relationship.

Females, because of their greater investment, are generally more selective than males in choosing a mate. Males, however, are normally more willing to initiate a relationship, but their willingness seems directly dependent on their self-esteem. Thus, if the female is strikingly attractive and the male with a low self-image considers his chance of success too low, he will often break off contact to save face.

Behavioral scientists and physiologists are still puzzled about what mechanism, in either sex, stimulates the condition of being in love. In the case of many human chemical reactions, such as the release of adrenalin, there are probably multiple causes: visible, aural, tactile and even olfactory.

I suggest that our sense of smell may play a role in the initiation of courtship, despite our inability to be aware of its very existence. For example, all mammals, including humans, can discriminate between about 10,000 odors by means of approximately a thousand odor receptors in the nerve tissue of our nasal cavity. These protein receptors are located in the olfactory epithelium, a piece of tissue about 1/2" thick located behind the bridge of the nose. A molecule with an odor traveling up the nostril or from the back of the mouth contacts the appropriate receptor, which then passes the message to the nerve cell just behind it; this fires the smell signal to the brain via the olfactory bulbs which sort the signals to one identifiable odor. This system is much more elaborate than that used by our eyes, which have only three receptors tuned to blue, green or red. These receptors in turn send visual signals to the brain, which processes them to distinguish the hue of what we are seeing from many thousands of others.

Thus we are really more dependent on our sense of smell than we realize. Mothers and nursing infants provide a good example. The nursing finds the nipple by smell, and a mother can identify her infant by smell alone. We have all heard the explanation for a couple's separation as "the chemistry just was not right," and there may be more to this explanation than is immediately apparent. The brain coordinates the myriad olfactory signals it receives and registers a specific smell, which retains its associations more vividly and for longer times than does any visual image. Marcel Proust, in the volume titled "Cote de Chez Swann" of his five-volume work A la Recherche du Temps Perdu, records how the smell of madeline cookies, which he loved to eat as a child, brought back associations and memories. We must also recognize the weaknesses in our smelling ability, which is at least ten times less sensitive than that of a dog, and which can fail us with lethal consequences as in the case of being unable to detect poisonous gases such as carbon monoxide.

Even though humans' extraordinarily precise sense of smell may have some weaknesses, it still might be a small component of our falling in love. The idea may seem farfetched, but a few molecules released into the air through one's skin or exhaled as carbon dioxide could be part of what is needed for our protein odor receptors to pass to our brain the daunting message that he/she is the one for me!

Enormous progress is being made in the study of how our senses work, but we tend to consider our olfactory capability inferior to our other senses. Rejoice in the spring blossoms, be aware of your nose's capability, consider the role the sense of smell might play in falling in love, and treat this important sense with the respect and pleasure it deserves.

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