Mind, Evolution, and Computers

Joseph R. Abrahamson

Science deals with knowledge of the material world based on objective reality. It is under constant attack by those who need magic, that is, concepts based on imagination and desire, with no basis in objective reality. A convenient target for such people is speculation on the machinery and method of operation of the human mind, questions that are still obscure in 1994. In The Emperor's New Mind, Roger Penrose attempts to look beyond objective reality for possible answers, using, in his argument, the theory that computers will never be able to duplicate the human experience. This article attempts to show where Penrose is in error by reviewing the evolution of men and computers and, based on this review, speculates about where computers might and might not imitate human perception. It then warns against the dangers of passive acceptance when respected scientists venture into the occult.

Science is defined as systematic knowledge of the physical or material world. Such study and understanding are the province of a minority of humankind and are under constant attack by those who want or need magic to give purpose and meaning to their lives. Such people attack science even in areas where a vast body of evidence supports a scientific position (for example, the theory of evolution). However, they press their strongest attacks in those areas where objective knowledge is limited, and definitive answers are not yet available. A prime example of an area where such answers are not yet available is the mind—what it is and how it works. Many such magical thinkers would like to separate mind from matter, and they develop odd concepts in which consciousness can exist without intrinsic material structure. With this vision of reality, they state that it will not be possible for humans to build a computer that can duplicate the consciousness of a human mind. I submit that such thinking is in error, even though some of its proponents are men of scientific training and great accomplishment.

A few years ago, a book by Roger Penrose, one of the world's most eminent physicists, was published. On the first page of chapter 1 of his book The Emperor's New Mind, Penrose (1989, p. 3) asks a few amazing questions:

The question of whether a mechanical device could ever be said to think—perhaps even to experience feelings, or to have a mind—is not really a new one. But it has been given a new impetus, even an urgency, by the advent of modern computer technology. The question touches upon deep issues of philosophy. What does it mean to think or feel? What is mind? Do minds really exist? Assuming that they do, to what extent are minds functionally dependent upon the physical structures with which they are associated? Might minds be able to exist quite independently of such structures? (emphasis mine).

To be fair to Penrose, he does state that his point of view “is an unconventional one among physicists and is consequently one which is unlikely to be adopted, at present” (p. 4). Penrose is a renowned physicist. His book is a tour de force in both the writing and the reading because it attempts to define mind and then show how it will not be possible to build and program a computer to duplicate it. In this endeavor, he deals with many tools of science, including quantum theory, cosmology, mathematics, and algorithms. However, after reading his long and difficult book, I am left with the conviction that this scientist is not entirely comfortable with objective reality, the basis of science and reason, but is looking for some nonobjective, nontangible something to explain aspects of reality that are not yet understood. It is a method of thought that I refer to as magical.
prove to be incomplete.

Penrose has a lucid discussion (p. 296) of quantum-level effects and their relationship to the classical-level effects that exist with the reduction of the state vector. At the end of this discussion, he states, “I believe that one must strongly consider the possibility that quantum mechanics is simply wrong when applied to macroscopic bodies...or, rather that [the various quantum phenomena] supply excellent approximations, only, to some more complete, but as yet undiscovered, theory” (p. 297). I agree with his suggestion that there is a larger or comprehensive theory that encompasses quantum theories or even general relativity and quantum theories. The fact that relativity, which is local, and quantum mechanics, which is nonlocal, have never been found to be in conflict would imply that each is part of the same larger concept. Indeed, if Einstein were correct in his view that nature is, at its base, simple, then there would have to be a larger, unified theory. However, I fail to see the logic in suggesting that the pieces of this theory that we now have are wrong as they stand.

In addition, although “descriptions of quantum theory appear to apply sensibly (usefully?) only at the so-called quantum level...” (p. 296), quantum effects do apply insensibly and for the most part nonusefully at the macroscopic level. This virtual disappearance of measurable quantum effect is explained by the vast numbers of particles that act together in forming the things such as the tables and chairs we deal with in the macroscopic world and that together cancel out almost all the “quantum weirdness” that is obvious when dealing with individual particles. A rough analogy that I use in my book (Abramson 1992) deals with the lack of gross movement in a large body at rest, something not seen in the individual particles that make it up. To use Penrose’s analogy, we do not see a cricket ball in two places at once for this same reason.

The quantum effect residual in the macroscopic world is so infinitesimal
appears to be deterministic. In addition, although quantum effect in the macroscopic environment is, therefore, insensible, its importance rests at the philosophical level that I infer interests Penrose. I propose (Abrahamson 1992) that this minute uncertainty effect eliminates the possibility of perfection or absolutes in the sensible world we inhabit. However, I cannot accept his argument that the postulated comprehensive theory will invalidate or change the necessary mechanical function of the animal brain in its production of consciousness. (He states, “I believe, also, that we shall need this new [comprehensive] law if we are ever to understand minds!” [p. 298].)

I venture a proposal about what mind might be (Abrahamson 1992). My description of mind is based on the fact that attributes do not exist in a vacuum and that mind is a function of the material central nervous system. It further assumes that this attribute of mind is part of the real world and is devoid of magic.

I use consciousness and mind almost interchangeably because cognition, thought, and feeling are not possible without consciousness. When one is trying to determine whether an injured human brain has any element of consciousness, the tests used always relate to whether the patient can sense; that is, is he or she able to respond to sound, touch, light, and so on. It is the afferent pathways of the brain that are used to test for this attribute. It is my theory that there is no center for consciousness but, rather, that consciousness is the by-product of the evolutionary process by which our brains integrate our various sensory input to give us our vision of the world in which we exist. Consciousness is the synthesis of our sensory input, an attribute of the functioning of our central nervous systems. The integrating area is probably at the base of the brain in the reticular substance because destruction of this area leads to permanent loss of consciousness. Consciousness ceases to exist when the physical machinery that creates it breaks down. There is no evidence to suggest that mind can exist without brain. The fact (commented on by Penrose) that a child might ask (p. 448), “What happens to each of our streams of consciousness after we die?” is not evidence that consciousness exists when our brains turn to dust. Poetry is wonderful, but it serves a different purpose than logic, and one cannot be substituted for the other. Childish questions are childish, and their use in this context suggests a need for magical thinking, or theology.

Again, early in his book, Penrose discusses theories concerning the possibility that computers might be developed in the future that would have human-type understanding and feeling. As I read his pages, I thought he had missed the point. I believe that to deal with this question, one must separate understanding from feeling. One must also understand the evolutionary process that created humans and computers if one is to discern their similarities and differences.

Humans have wants and needs, which evolutionary processes have
Computers have been built by humans. We have given them no mechanism for evolution, and even if we did, computers would have no evolutionary pressure to seek sources of energy. Humans supply electricity for them, so there would be no survival value in their obtaining their own. Without belaboring the point, the same arguments could be made for all the drives and feelings of humans. Why would a computer develop a drive to reproduce even if some evolutionary mechanism were built into it? Humans handle reproduction for it. It is therefore absurd to comment on the fact that a computer will never feel love or that it will never be impelled to write poetry. These are human drives that are related to the need to attract a mate or to express individuality, neither of which is of any use to a computer. They are the product of physical machinery and chemical processes. For example, if one gives a cow testosterone, her maternal caring for her calf ceases. Give estrogen to a bull, and he will mimic a cow’s maternal responses. These feelings in cattle and humans developed under evolutionary pressures and are obviously useful in survival of the respective species. A computer has no mechanism or need to develop such feelings. Obviously, computers will never acquire human passions.

However, what about consciousness? We have, from the beginning, been building sensors into computers, and we are vigorously working to amplify and improve this technology. We want computers that can respond to verbal commands and be able to read text, even handwriting. This capacity requires sensors—eyes and ears, so to speak. With the involvement of computer technology in audiovisual projects and robotics in manufacturing, the ability to hear and see becomes more important. It is not hard to visualize sensors for smell and texture as the use of automation in industry expands.

The point is that we are building computers with ever-more sophisticated sensors and processors. We are learning to use multiple processors and are developing fuzzy logic to emulate human thought. I do not think it impossible that at some unspecified level of sophistication, the integration of this sensory input might not begin to produce in the computer something similar to human consciousness, or mind. This line of thinking is, of course, only a theory, but it is one not based on magic.

There are vast numbers of magical thinkers in the world around us, people who in the name of any one of a number of gods want to destroy rationality and science. It is important to be particularly aware when one of our own attempts, in however subtle a manner, to suggest this magic should supplant or even be used to embellish reason and logic.

References

Joseph R. Abrahamson is a retired pathologist living in San Diego, California. Current interests include inquiring into the nature of reality as described by modern theoretical physics and probing the dangers that religious fundamentalists pose to a free democratic society. He holds academic degrees from Stanford University (B.A., 1949; M.D., 1955) and the University of Southern California (M.S., 1951).