

observations and opinions

HUMAN CLONING AND THE DIGITAL REVOLUTION

I found myself worrying about a small fatherless sheep named Dolly. An identical copy of an adult sheep cloned at the Roslin Institute, Dolly made headlines around the world, with looming anxiety about human replication. Be careful not to let anyone steal your bodily cells. It may soon be possible to make an identical copy of you, just by obtaining a few cells from your body. Your duplicate will have all your attributes except age. If you'd like a picture of yourself as an infant, take a few of your cells to a cloning laboratory and wait a while.

Hot debates on whether to regulate against human cloning are occurring all over the world. A public opinion poll asking who should be copied and who should not indicated that copies of Einstein and Marilyn Monroe would be appreciated but an extra Hitler would not.

This is not the first time we have

coveted replication or feared it. We have been living in an age of mass replication since the Industrial Revolution brought mass production. Ask yourself if you own anything that was not produced by mass replication. Your shirt, shoes, pens, and wallet were made with this technology. Although some fashion-conscious persons of a certain temperament might claim "Mine is hand-made", not only the cloth, thread, and dye making up their outfits but the scissors, needles, and sewing machines used to fashion them were all products of mass replication.

Human beings try to replicate everything they encounter, including themselves (*Homo replicus*). We have attained material wealth by mass replication technology and compromised ourselves and our society by sharing our massively replicated copies. Genetic engineering, with its brilliant development, has now brought us means of replicating living organisms—a feat once confined to

the realm of God. Thinking about human replication reminds me of our irresistible urge for the apple of Eden.

Yet we are interminably anxious about annihilation of our species, as foretold in science fiction. We needn't have worried so much in the past; as long as we could find safe places where we could distribute and hide our bodily cells or genetic codes here and there in the galaxy, our genetic information would be replicated. Our affection and sympathy for rare, disappearing animals, reflected in our fondness for TV programs such as "Nature" and "Wild Kingdom," is associated with our wish to protect our own species from extinction. But the technologists' notion "Why protect? Just replicate!" those disappearing animals makes us recognize our species' dreadful egoism.

When wo children are struggling to have the same cute pet, is the most reasonable solution to give each of them a copy of the pet? If so, is sharing by replication also the best solution for a woman torn between two lovers?

By the way, is it really possible to replicate human beings by mass technology? Although genetic engineers and biotechnologists might answer "yes," most psychiatrists and psychologists would answer "no". A person created by cloning would grow up experiencing entirely different interactions with his or her unique environment, and become a completely different being, at least mentally. What truly mental beings we are! How ironic it is that a genetic engineering concept founded on the assumption that a living organism is merely a combination of genetic sequences has finally proved that the human mind cannot be defined merely by a combination of genes.

Be careful though. Remember that computer technology is threatening to replicate the human mind, even massively. If the Industrial Revolution meant mass replication of physical objects by manipulating material, and genetic engineering means mass replication of organic objects by manipulating genes, then the digital revolution must mean mass replication of the product of human mental activity—i.e., the mental object. Digital technology undoubtedly replicates more efficiently and accurately than other types of technology. Empowered by virtual reality and global networking technology, the digital revolution is trying to reconstruct, not just our mentality, but our entire environment, in cyberspace.

In fact, what is essentially replicated, even in mass production and genetic engineering, has always been the harmonious internal architecture, the information, embedded in an object rather than the object, or material container, itself. (We cannot create even 1mg of an atom.) By constructing cyberspace, the digital technology of mental replication is rapidly overcoming its dependence on the physical container. Everything that reaches cyberspace could simultaneously exist everywhere in cyberspace, the realm of ultimate replication. The next thing Prometheus steals from the heavens and delivers to earth may be replication technology.

We are not the first generation to

be concerned about the side effects of mass replication. Early in this century, a renowned European writer, Walter Benjamin (1892-1940), addressed the issue of authenticity in art, saying that the unique atmosphere of the work of art is destroyed by mechanical reproduction[1]. Benjamin warned that just as a work of art can be stolen, so can the unique atmosphere of our reality. If the Grand Canyon is reconstructed as virtual reality in cyberspace, will our profound affection for it endure? Once a digital clone of the human mind reaches cyberspace, will it rob us of our own atmosphere? I think this is possible—in fact, not merely possible. The terrifying invasion of cyberspace into the territory of the human mind has already begun.

A boy who can calculate so rapidly that he would have been regarded as a genius in the past is no longer considered a genius today, now that even the smallest electronic calculator works better than his mind. We are bewildered by our children's acclamation of a small cyberpet, Tamagotchi. Even partial replication technology has confused us by replicating a part of our mentality, our pleasure in nurturing—even without holistic or biologic cloning. An Italian product, "Digital Fish," swims, grows, and mates. If you forget to feed them, the fish will die. The beloved 16-year old cyberidol, "Koyko," a human-machine hybrid from Japan, has a perfect physical appearance and personality, and grows. Recording a best-selling music album, she has now entered the real-world marketplace to compete with her organic counterparts. She has recently announced that she will publish her own nude album, eagerly awaited by her fans, as soon as she reaches adulthood. Of course, what Kokyo replicates in cyberspace is part of the human mind, our pleasure in admiring celebrities.

In the near future, everything we know will be built into cyberspace. With this fearful capacity to replicate physical, organic, and mental objects, we may soon have a pig with the mind of Socrates. Although the technology for replicating the human mind is still immature, it can vigorously attack our

unique atmosphere. All the replicable parts of the human being will eventually merge in emptiness. It is a matter of our very existence.

Paradoxically, the same technology that is threatening our authenticity is raising a primary question about human existence: "What is the source of the unique atmosphere of human beings? It may not be our capacity for calculation or memory, which has already been replaced by information technology. Isn't it the infinitely unexplainable capacity of our psyche for love and affection, myth and imagination, wisdom and creativity? Doesn't our unique atmosphere come from our capacity to recreate ourselves eternally, a capacity that cannot be explained by combinations of its components?"

Mass replication of uniform human population is vigorously encouraged by our societal society. Those in charge in modern times do not welcome creative, anarchistic people who are too venturesome and idiosyncratic to be good workers. Neither will the conqueror in cybertimes.

Hercules relieved Prometheus of the painful punishment of having his liver pecked by eagles everyday. Can the unique atmosphere of the human mind be relieved from the disastrous invasion of mass replication technology? Unfortunately, we do not know. Something we do know is that we should look for relief, not in our arrogant intellectual determination to explore the components of the mind again, but in the warm profound qualities of the mind that enable us to be real human beings.

*Ju Han Kim, M.D., Ph.D.
Center for Clinical Computing
Boston, Massachusetts*

[Address correspondence to the Center for Clinical Computing, 350 Longwood Avenue, Boston, MA 02115 (jkim@clinquery.bidmc.harvard.edu).]

Reference

1. Benjamin W. The work of art in the age of mechanical reproduction. Illuminations. New York: Schocken Books, 1969.