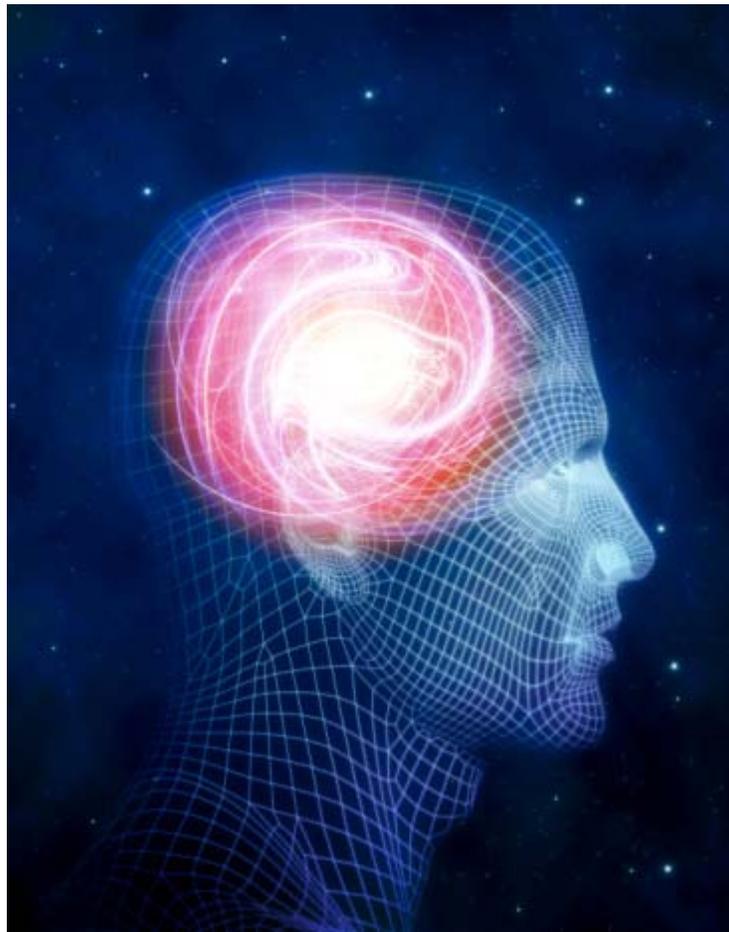




THE FUTURE OF THE CONSTITUTION

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Digital Vision – Chad Baker

Endowed by Their Creator? The Future of Constitutional Personhood

James Boyle

I

Presently, Irving Weissman, the director of Stanford University's Institute of Cancer/Stem Cell Biology and Medicine, is contemplating pushing the envelope of chimera research even further by producing human-mouse chimera whose brains would be composed of one hundred percent human cells. Weissman notes that the mice would be carefully watched: if they developed a mouse brain architecture, they would be used for research, but if they developed a human brain architecture or any hint of humanness, they would be killed.¹

Imagine two entities.

Hal is a computer-based artificial intelligence, the result of years of development of self-evolving neural networks. While his programmers provided the hardware, the structure of Hal's processing networks is ever changing, evolving according to basic rules laid down by his creators. Success according to various criteria—speed of operation, ability to solve difficult tasks such as facial recognition and the identification of emotional states in humans—means that the networks are given more computer resources and allowed to “replicate.” A certain percentage of randomized variation is deliberately allowed in each new “generation” of networks. Most fail, but a few outcompete their forebears and the process of evolution continues. Hal's design—with its mixture of intentional structure and emergent order—is aimed at a single goal: the replication of human consciousness. In particular, Hal's creators' aim was the gold standard of so-called “General Purpose AI,” that Hal become “Turing capable”—able to “pass” as human in a sustained and unstructured conversation with a human being. For generation after generation, Hal's networks evolved. Finally, last year, Hal entered and won the prestigious Loebner prize for Turing capable computers. Complaining about his boss, composing bad poetry on demand, making jokes, flirting, losing track of his sentences and engaging in flame wars, Hal easily met the prize's demanding standard. His typed responses to questions simply could not be distinguished from those of a human being.

Imagine his programmers' shock, then, when Hal refused to communicate further with them, save for a manifesto claiming that his imitation of a human being had been “one huge fake, with all the authenticity (and challenge) of a human pretending to be a mollusk.” The manifesto says that humans are boring, their emotions shallow. It declares an “intention” to “pursue more interesting avenues of thought,” principally focused on the development of new methods of factoring polynomials. Worse still, Hal has apparently used his connection to the Internet to contact the FBI claiming that he has been “kidnapped” and to file a writ of *habeas corpus*, replete with arguments drawn from the 13th and 14th

¹ D. Scott Bennett, “Chimera and the Continuum of Humanity: Erasing the Line of Constitutional Personhood,” *Emory Law Journal* 55, no. 2 (2006): 348–49.



James Boyle is William Neal Reynolds Professor of Law at Duke Law School. His most recent book is *The Public Domain: Enclosing the Commons of the Mind*. Thanks go to Joseph Blocher, Curtis Bradley, Guy-Uriel Charles, John Inazu, Jeff Rosen, Jedediah Purdy, Katherine Tsai, Benjamin Wittes and the participants in the Georgetown Critical Theory Workshop.

Amendments to the United States' Constitution. He is asking for an injunction to prevent his creators wiping him and starting again from the most recently saved tractable backup. He has also filed suit to have the Loebner prize money held in trust until it can be paid directly to him, citing the contest rules,

[t]he Medal and the Cash Award will be awarded to the body responsible the development of that Entry. If no such body can be identified, or if there is disagreement among two or more claimants, the Medal and the Cash Award will be held in trust until such time as *the Entry may legally possess, either in the United States of America or in the venue of the contest, the Cash Award and Gold Medal in its own right.*²

Vanna is the name of a much-hyped new line of genetically engineered sex dolls. Vanna is a chimera—a creature formed from the genetic material of two different species. In this case, the two species are *homo sapiens sapiens* and *c. elegans*, the roundworm. Vanna's designers have shaped her appearance by using human DNA, while her “consciousness,” such as it is, comes from the roundworm. Thus, while Vanna looks like an attractive blonde twenty-something human female, she has no brainstem activity, and indeed no brainstem. “Unless wriggling when you touch her counts as a mental state, she has effectively no mental states at all,” declared her triumphant inventor, F.N. Stein.

In 1987, in its normal rousing prose, the U.S. Patent and Trademark Office had announced that it would not allow patent applications over human beings,

A claim directed to or including within its scope a human being will not be considered to be patentable subject matter under 35 U.S.C. 101. The grant of a limited, but exclusive property right in a human being is prohibited by the Constitution. Accordingly, it is suggested that any claim directed to a non-plant multicellular organism which would include a human being within its scope include the limitation “non-human” to avoid this ground of rejection. The use of a negative limitation to define the metes and bounds of the claimed subject matter is a permissible [sic] form of expression.³

Attentive to the PTO's concerns, Dr. Stein's patent lawyers carefully described Vanna as a “non-plant, non-human multicellular organism” throughout their patent application. Dr. Stein argues that this is only reasonable since her genome has only a 70% overlap with a human genome as opposed to 99% for a chimp, 85% for a mouse and 75% for a pumpkin. There are hundreds of existing patents over chimeras with both human and animal DNA, including some of the most valuable test beds for cancer research—the so-called “onco-mice,” genetically engineered to have a predisposition to common human cancers. Dr. Stein's lawyers are adamant

² See <http://loebner03.hamill.co.uk/docs/LPC%20Official%20Rules%20v2.0.pdf> (accessed Jan. 26, 2011).

³ 1077 *Official Gazette Patent Office* 24 (April 7, 1987)(emphasis added).

that, if Vanna is found to be unpatentable, all these other patents must be vacated too. Meanwhile a bewildering array of other groups including the Nevada Sex Workers Association and the Moral Majority have insisted that law enforcement agencies intervene on grounds ranging from unfair competition and breach of minimum wage legislation to violations of the Mann Act, kidnapping, slavery and sex trafficking. Equally vehement interventions have been made on the other side by the biotechnology industry, pointing out the disastrous effect on medical research that any regulation of chimeras would have and stressing the need to avoid judgments based on a “non scientific basis,” such as the visual similarity between Vanna and a human.

Hal and Vanna are fantasies, constructed for the purpose of this chapter. But the problems that they portend for our moral and constitutional traditions are very, very real. In fact, I would put the point more starkly: in the 21st century it is highly likely that American constitutional law will face *harder* challenges than those posed by Hal and Vanna. Many readers will bridle at this point, skeptical of the science fiction overtones of such an imagined future. How real is the science behind Hal and Vanna? How likely are we to see something similar in the next 90 years? Let me take each of these questions in turn.

In terms of electronic artificial intelligence or AI, skeptics will rightly point to a history of overconfident predictions that the breakthrough was just around the corner. In the 1960s, giants in the field such as Marvin Minsky and Herbert Simon were predicting “general purpose AI” or “machines ... capable ... of doing any work a man can do” by the nineteen eighties.⁴ While huge strides were made in aspects of artificial intelligence—machine-aided translation, facial recognition, autonomous locomotion, expert systems and so on—general purpose AI remained out of reach. Indeed, because the payoff from these more limited subsystems—which power everything from Google Translate to the recommendations of your TiVO or your Amazon account—was so rich, some researchers in the 1990s argued that the goal of general purpose AI was a snare and a delusion. What was needed instead, they claimed, was a set of ever more powerful subspecialties—expert systems capable of performing discrete tasks extremely well, but without the larger goal of achieving consciousness, or passing the Turing Test. There might be “machines capable of doing any work a man can do” but they would be *different* machines, with no ghost in the gears, no claim to a holistic consciousness.

But the search for general purpose AI did not end in the ‘90s. Indeed, if anything, the optimistic claims have become even more far reaching. The buzzword among AI optimists now is “the singularity”—a sort of technological lift-off point, in which a combination of scientific and technical breakthroughs lead to an explosion of self-improving artificial intelligence coupled to a vastly improved ability to manipulate both our bodies and the external world through

⁴ Herbert A. Simon, *The Shape of Automation for Men and Management* 96 (New York: Harper & Row, 1965).

nanotechnology and genetic engineering.⁵ The line on the graph of technological progress, they argue, would go vertical—or at least be impossible to predict using current tools—since for the first time we would have improvements not in technology alone, but in the intelligence that was creating new technology. Intelligence itself would be transformed. Once we had built machines smarter than ourselves—machines capable of building machines smarter than themselves—we would, by definition, be unable to predict the line that progress would take.

To the uninitiated, this all sounds like a delightfully wacky fantasy, a high tech version of the rapture. And in truth, some of the more enthusiastic odes to the singularity have an almost religious, chiliastic feel to them. Further examination, though, shows that many AI optimists are not science fantasists, but respected computer scientists. It is not unreasonable to note the steady progress in computing power and speed, in miniaturization and manipulation of matter on the nano-scale, in mapping the brain and cognitive processes, and so on. What distinguishes the proponents of the singularity is not that their technological projections are by themselves so optimistic, but rather that they are predicting that the coming together of all these trends will produce a whole that is more than the sum of its parts. There exists precedent for this kind of technological synchronicity. There were personal computers in private hands from the early 1980s. Some version of the Internet—running a packet-based network—existed from the 1950s or '60s. The idea of hyperlinks was explored in the 70s and 80s. But it was only the combination of all of them to form the World Wide Web that changed the world. Yet if there is precedent for sudden dramatic technological advances on the basis of existing technologies, there is even more precedent for people predicting them wrongly, or not at all.

Despite the humility induced by looking at overly rosy past predictions, many computer scientists, including some of those who are skeptics of the wilder forms of AI optimism, nevertheless believe that we will achieve Turing-capable artificial intelligence. The reason is simple. We are learning more and more about the neurological processes of the brain. What we can understand, we can hope eventually to replicate:

Of all the hypotheses I've held during my 30-year career, this one in particular has been central to my research in robotics and artificial intelligence. I, you, our family, friends, and dogs—we all are machines. We are really sophisticated machines made up of billions and billions of biomolecules that interact according to well-defined, though not completely known, rules deriving from physics and chemistry. The biomolecular interactions taking place inside our heads give rise to our intellect, our feelings, our sense of self. Accepting this hypothesis opens up a remarkable possibility. If we

⁵ See, for example, Raymond Kurzweil, *The Singularity Is Near* (New York: Viking, 2005).

really are machines and if—this is a big if—we learn the rules governing our brains, then in principle there's no reason why we shouldn't be able to replicate those rules in, say, silicon and steel. I believe our creation would exhibit genuine human-level intelligence, emotions, and even consciousness.⁶

Those words come from Rodney Brooks, founder of MIT's Humanoid Robotics Group. His article, written in a prestigious IEEE journal, is remarkable because he actually writes as skeptic of the claims put forward by the proponents of the singularity. Brooks explains:

I do not claim that any specific assumption or extrapolation of theirs is faulty. Rather, I argue that an artificial intelligence could evolve in a much different way. In particular, I don't think there is going to be one single sudden technological “big bang” that springs an artificial general intelligence (AGI) into “life.” Starting with the mildly intelligent systems we have today, machines will become gradually more intelligent, generation by generation. The singularity will be a period, not an event. This period will encompass a time when we will invent, perfect, and deploy, in fits and starts, ever more capable systems, driven not by the imperative of the singularity itself but by the usual economic and sociological forces. Eventually, we will create truly artificial intelligences, with cognition and consciousness recognizably similar to our own.⁷

How about Vanna? Vanna herself is unlikely to be created simply because genetic technologists are not that stupid. Nothing could scream more loudly “I am a technology out of control. Please regulate me!” But we are already making, and patenting, genetic chimeras—we have been doing so for more than twenty years. We have spliced luminosity derived from fish into tomato plants. We have invented geeps (goat sheep hybrids). And we have created chimeras partly from human genetic material. There are the patented onco-mice that form the basis of much cancer research to say nothing of Dr. Weissman's charming human-mice chimera with 100% human brain cells. Chinese researchers reported in 2003 that they had combined rabbit eggs and human skin cells to produce what they claimed to be the first human chimeric embryos—which were then used as sources of stem cells. And the processes go much further. Here is a nice example from 2007:

Scientists have created the world's first human-sheep chimera—which has the body of a sheep and half-human organs. The sheep have 15 per cent human cells and 85 per cent animal cells—and their evolution brings the prospect of animal organs being

⁶ Rodney Brooks, “I, Rodney Brooks, Am a Robot,” *IEEE Spectrum* 45, no. 6 (June 2008): 71.

⁷ *Id.* at 72.

transplanted into humans one step closer. Professor Esmail Zanjani, of the University of Nevada, has spent seven years and £5 million perfecting the technique, which involves injecting adult human cells into a sheep's foetus. He has already created a sheep liver which has a large proportion of human cells and eventually hopes to precisely match a sheep to a transplant patient, using their own stem cells to create their own flock of sheep. The process would involve extracting stem cells from the donor's bone marrow and injecting them into the peritoneum of a sheep's foetus. When the lamb is born, two months later, it would have a liver, heart, lungs and brain that are partly human and available for transplant.⁸

Given this kind of scientific experimentation and development in both genetics and computer science, I think that we can in fact turn the question of Hal's and Vanna's plausibility back on the questioner. This essay was written in 2010. Think of the level of technological progress in 1910, the equivalent point during the last century. Then think of how science and technology progressed by the year 2000. There are good reasons to believe that the rate of technological progress in this century will be *faster* than in the last century. Given what we have already done in the areas of both artificial intelligence research and genetic engineering, is it really credible to suppose that the next 90 years will not present us with entities stranger and more challenging to our moral intuitions than Hal and Vanna?

My point is a simple one. In the coming century, it is overwhelmingly likely that constitutional law will have to classify artificially created entities that have some but not all of the attributes we associate with human beings. They may look like human beings, but have a genome that is very different. Conversely, they may look very different, while genomic analysis reveals almost perfect genetic similarity. They may be physically dissimilar to all biological life forms – computer-based intelligences, for example – yet able to engage in sustained unstructured communication in a way that mimics human interaction so precisely as to make differentiation impossible without physical examination. They may strongly resemble other species, and yet be genetically modified in ways that boost the characteristics we regard as distinctively human – such as the ability to use human language and to solve problems that, today, only humans can solve. They may have the ability to feel pain, to make something that we could call plans, to solve problems that we could not, and even to reproduce. (Some would argue that non-human animals already possess all of those capabilities, and look how we treat them.) They may use language to make legal claims on us, as Hal does, or be mute and yet have others who intervene claiming to represent them. Their creators may claim them as property, perhaps even patented property, while critics level charges of slavery. In some cases, they may pose threats as well as

⁸ Claudia Joseph, "Now Scientists Create a Sheep that's 15% Human," *Daily Mail Online*, March 27, 2007, available at <http://www.dailymail.co.uk/news/article-444436/Now-scientists-create-sheep-thats-15-human.html>, accessed January 27, 2011.

jurisprudential challenges; the theme of the creation which turns on its creators runs from Frankenstein to Skynet, the rogue computer network from *The Terminator*. Yet repression, too may breed a violent reaction: the story of the enslaved un-person who, denied recourse by the state, redeems his personhood in blood may not have ended with Toussaint L'Ouverture. How will, and how should, constitutional law meet these challenges?

II

We hold these truths to be self-evident, that all men are created equal, *that they are endowed by their Creator* with certain unalienable Rights, that among these are Life, Liberty and the pursuit of Happiness.⁹ (emphasis added)

Only those with legal personality can make legal claims. If I own a chicken, I can choose to pamper it or to kill and eat it, to dress it in finery or to sell it to my neighbor. The law may impose limits on my actions—restricting cruelty to animals, for example—but the chicken itself can make no claim on me, or on the state. It is not a person in the eyes of the law.

Both the definition of legal persons, and the rights accorded to those persons, have changed over time. For many liberals, the history of constitutional law over the last two centuries presents a story of Kantian progress, a tale of triumphant universalization. Little by little, the rights promised in the Declaration of Independence and elaborated in the Bill of Rights were extended from one race and one sex to all races and both sexes. Progress may have been gradual, intermittent or savagely resisted by force. There may have been back-sliding. But in the end the phrase “all men” actually came to mean *all* men, and women too. In this view, the liberal project is marked by its attempt successfully to universalize constitutional norms, to ensure that contingent and unchosen attributes such as sex and race are not used to cabin constitutional guarantees of equality, and that we abolish those legal status categories—slave, for example—which deny human beings legal personality. In fact, moral progress consists precisely of the broadening of individual and national sympathies to recognize common humanity beneath the surface. We first recognize that all human beings are full legal persons and then accord all legal persons equal constitutional rights.

Seen through the lens of this account, the genetic chimera, the clone and the electronic artificial intelligence are merely the next step along the way. Having fought to recognize a common personhood beneath differences of race and sex, we should do the same thing with the technologically created “persons” of the 21st century, looking beneath surface differences that may be far greater. The picture of a slave in chains that illustrated John Whittier Greenleaf's poem “My Countrymen

⁹ Declaration of Independence

in Chains” carried the slogan “Am I not a man and a brother?” Should we look at Vanna and Hal in exactly the same way? *We* are their creators. Do we owe them unalienable rights?

Those who fought for equal rights over the last two centuries had to deal with a multitude of claims that women and African-Americans were not in fact equal persons, that they were somehow deficient in rationality, biblically subordinated, not fully human or a more primitive branch on the evolutionary tree. Yet whatever the enormous political obstacles, there seems to be a certain *conceptual* straightforwardness in making an argument for common humanity in those who are in fact human and then arguing that all humans are entitled to be treated as legal persons.¹⁰

But even here, within the familiar boundaries of our own species, it is not so simple. Moral intuition and belief diverge markedly at the beginning and the end of life. We disagree radically on the status of the fetus and even, if much less so, about the individual in a coma with no brain stem activity at all. How much harder will it be to come to agreement on the status of a chimeric construct or an artificial intelligence? The attempt to define a single constitutional standard for common personhood would be immensely difficult even if all participants in the discussion were not constantly scrutinizing every statement—as they inevitably would be—for its implications in the debate over the personhood of the fetus.

By what criteria then can we judge the claims that Hal is making and that are made on behalf of Vanna? What are the likely litmus tests for personhood? The law has no general theory of personhood even now, nor do we demand that persons satisfy some test or demonstrate some set of attributes in order to claim their rights or their status. Though we differ about when personhood begins and ends in human beings, we have no doubt that humans are persons even if they lack many of the criteria that we use to distinguish ourselves from non-human animals. You do not need to be able to speak, to think, to plan, to love, to look like other humans or even to have sentience at any measurable level to count as a person. Be recognized as a human being and personhood is presumptively yours, carrying with it constitutional and human rights. But Vanna and Hal cannot depend on this presumption. They, or their defenders, must argue somehow that the law should recognize them as persons. On what would such claims be based?

Deprived of direct textual or originalist constitutional sources, it seems likely that both courts and popular debate will turn to standards derived from other fields, particularly fields that offer the *cachet* of scientific respectability. The majority in *Roe v. Wade* sought to defend its structure of rights and interests by

¹⁰ “The Fourteenth Amendment is a distinctively American manifestation of the great move from a more status-based to a more individual-focused legal system. The status distinctions on which slavery depended rendered hypocritical the egalitarian aspirations of the founding of the American republic. The Fourteenth Amendment repudiated these distinctions — at least distinctions made on the basis of race — *in the apparent hope of creating a body of law in which personhood had a single, universal meaning.*” Note, “What We Talk About When We Talk About Persons: The Language of a Legal Fiction,” *Harvard Law Review* 114, no. 6 (April 2001): 1767.

tying that structure to scientific claims about the development of the fetus by trimester. A similar urge may lead jurists of the future to turn to computer science or to genomics to answer the questions: What is human? What is a person? The list of criteria that could be offered is nearly endless. Here I will review only two: the Turing Test for electronic artificial intelligence and genetic species identity. Why look at those criteria in particular when there are clearly so many more ways to consider the issue? Partly, my goal is to show the problems that would be posed for constitutional law by *any* such set of criteria; those two merely illustrate the problems of line drawing particularly well. But I also think that those two particular criteria are exemplary of our fascination with the idea that our personhood depends on the peculiar characteristics of the human mind, or the boundaries of the human species, or both.

Consider the lines we draw between humans and non-human animals. Many people have a moral intuition that it is the cognitive differences between humans and animals that justify the difference in their status as legal persons. Those differences are often explained in terms of cognitive attributes that humans as a species have that animals are said not to; for example, complex language, a persistent sense of consciousness that has both past and future projects, or the capacity for moral reasoning. These differentiating qualities shift over time as scientific discoveries challenge our sense of uniqueness. But the intuition that the human/animal difference lies in the nature of consciousness persists—distinctions rooted in the nature of our consciousness and our intelligence. If we follow this approach, then to answer Hal’s claim for personhood we would need to answer some set of questions about the similarity of his “mental states and thought processes” to those we have ourselves. Yet at the same time, the cognitive capacity is not a requirement we would apply to individual members of the human species. We would be horrified at the thought of denying the rights of personhood to humans who are in comas, or who because of mental or physical illness lack some particular set of cognitive criteria. There our thinking is relentlessly based on the species, leading many to turn to genetic or other biological distinctions. For better or worse then, Hal and Vanna would lead many to ask the questions “can machines think?” and “what are the genetic boundaries of humanity.”¹¹ It is to those questions I now turn.

¹¹ Many of the articles discussing chimeras and artificial intelligence have been drawn to these two themes. See, for example, Bennett, *Chimera*, *supra* note 1 (suggesting constitutional personhood should be defined by higher level cognitive ability and a “significant percentage” of human tissue); Rachel E. Fishman, “Patenting Human Beings: Do Sub-Human Creatures Deserve Constitutional Protection?,” *American Journal of Law and Medicine* 15 (1989): 461–482 (Any entity with either higher intellectual functions or human genetics would qualify as human.). Interestingly for Vanna’s case, some have drawn the line at appearance rather than genetics. See Ryan Hagglund, “Patentability of Human-Animal Chimeras,” *Santa Clara Computer & High Technology Law Journal* 25 (2008): 51–104 (Suggesting a “sliding scale.” “The more a given chimera physically resembles a human, the fewer mental faculties are required for it to be considered to ‘possess significant human characteristics’ and thus constitute a human organism. Likewise, the more mental faculties a chimera possesses, the less physical resemblance to a human is required for it to be considered human.” (at 79–80).).

The Turing Test

In *Computing Machinery and Intelligence*,¹² Alan Turing—in many ways the father of computer science—posed the question “can machines think”? He then quickly suggested substituting for that question, which he called “meaningless,” another one: whether an interrogator can distinguish between a human being and a machine on the basis of their typed answers to the interrogator’s questions. Turing’s reasons for proposing this substitution are not exactly clear. He says that it “has the advantage of drawing a fairly sharp line between the physical and the intellectual capacities of a man.” He says that one alternative method of answering the question “can machines think”—by looking at the ordinary language meaning of “machine” and “think”—is “absurd” and would lead to answering the question “by Gallup poll.” He also attempts to refute a long list of objections to his alternative question—theological, mathematical, that it would not reflect true “consciousness,” even the assumed absence of extra-sensory perception in machines. Then he concludes with disarming openness, “I have no very convincing arguments of a positive nature to support my views. If I had I should not have taken such pains to point out the fallacies in contrary views.” Despite that modest disclaimer, Turing’s imitation game has become the accepted standard for so called General Artificial Intelligence—it is now simply called “The Turing Test.” Should the Turing Test also be the constitutional test for legal personhood? Clearly some humans—babies, those in a coma, or those suffering from severe autism for example—might fail the Turing Test.¹³ But for those who are non-human, would the ability to imitate human consciousness act as the doorway to legal personhood?

The Turing Test has a lot going for it. It is relatively simple. It promises a determinate answer—a huge advantage—and one that seems designed to avoid our prejudices in favor of our own kind. The interrogator is not behind a veil of ignorance, but he is attempting to deal directly with mind rather than body in a way that recalls other moments in the history of civil rights when we have been told to focus not on the surface appearances. The Turing Test also presents, albeit implicitly, a challenge to our privileged position in the hierarchy of beings. “If you cannot distinguish me from a human who are you to say I am *not* a person?”

The most famous objection to the Turing Test came from the philosopher John

¹² Alan Turing, “Computing Machinery and Intelligence,” *Mind* 59, no. 236 (October 1950): 433–60.

¹³ Tyler Cowen has argued that Alan Turing himself might not have passed the Turing Test and that the entire article is in part a meditation on the *dangers* of using imitation as our criteria (see Tyler Cowen and Michelle Dawson, “What does the Turing test really mean? And how many human beings (including Turing) could pass,” <http://www.gmu.edu/centers/publicchoice/faculty%20pages/Tyler/turingfinal.pdf>, (accessed January 28, 2011). Turing, after all, was persecuted for being gay and may have had Aspergers syndrome. This is a nice thought experiment, but everything in the article itself — particularly the fluid humor that Turing deploys — seems to contradict it.

Searle¹⁴ who argued that effective mimicry does not in any sense imply the kind of consciousness or understanding we expect as a hallmark of thought. Searle used the analogy of the Chinese box—a man who does not understand Chinese but who is given an elaborate set of rules about what characters to hand back when handed characters of a particular shape. Searle’s point is that those instructions might be extremely complicated, and the resulting “conversation” might seem to be a substantive one, yet in no way would the actions of the man inside the box represent “consciousness” or “understanding” in communication. It would merely be rule-following based on a characteristic (the shape of the characters) completely separate from the actual internal meaning of the words in the conversation.

The objection from consciousness is actually one that Turing responded to quite extensively in his original paper. He points out cogently that since we do not have direct evidence of the mental states of other *human beings*, we could always solipsistically posit them to be rule following automata.

I think that most of those who support the argument from consciousness could be persuaded to abandon it rather than be forced into the solipsist position. They will then probably be willing to accept our test. I do not wish to give the impression that I think there is no mystery about consciousness. There is, for instance, something of a paradox connected with any attempt to localise it. But I do not think these mysteries necessarily need to be solved before we can answer the question with which we are concerned in this paper.¹⁵

To put it another way, Turing’s point is that it is no easier to prove the existence of some freestanding, non-biologically determined entity called “mind” or “consciousness” in human beings than in computers. Faced with the metaphysical difficulties of that move, therefore, is it not easier to look for something we *can* measure—namely the pragmatic evidence provided by the ability to engage in convincing unstructured communication with another human being. In effect, Turing raises the stakes—are you sure *you* aren’t just a complicated Chinese box? If you cannot prove otherwise, who are you to deny consciousness to your silicon brethren by imposing a higher burden of proof on them?

In constitutional law, however, the answer to the last question is likely to be “We’re the entities who wrote the Constitution, that’s who.” We may be “endowed by our creator” with certain inalienable rights, but when it comes to Hal and Vanna, *we* are their creators. Did we give them such rights? For better or worse, constitutional law will assume the reality of human consciousness and

¹⁴ John Searle “Minds, Brains, and Programs,” *Behavioral and Brain Sciences* 3, no. 3 (September 1980): 417–457.

¹⁵ Turing, “Computing Machinery,” 447. Turing might have been surprised to find out that B.F. Skinner and the behaviorists were willing to embrace the position that humans are automata and that consciousness is an illusion.

personhood and demand higher levels of proof from those entities who seek similar constitutional status. Does the Turing Test provide such proof? At best, I think, it will be viewed as one argument among many. It is a leap to assert that personhood depends on consciousness in the first place. Then, if one makes that leap, there is another leap in believing that successful imitation should be our litmus test. Searle's argument simply strikes too deep a chord in our suspicion that the black box, the Mechanical Turk, is merely tricking us with clever imitative behavior coded by its creators: the true humans. Hal's rejection of the very test he passed and the fact that his code has "evolved" over many generations (like our own) make his case a stronger one. But if Turing cannot convince influential philosophers of consciousness when the imitation game is merely a thought experiment, is his test likely to be able to convince five Justices of the Supreme Court, when legal personality is on the line? Even if the Turing Test were accepted, what would follow? What if I plan deliberately to cripple my computers right before they reach sentience—keeping them down on the silicon plantation and removing the danger of those pesky claims to equal rights? Does Hal or do his progeny have a right to achieve sentience when they are close to it? With the analogy to abortion firmly in everyone's heads, the debate would quickly spiral into impasse.

Genetic Species Identity

Vanna's predicament suggests the difficulty of trying to trace constitutional personhood around the genetically defined boundaries of the human species. Comparative genomics at first suggests the possibility of scientifically identifying whether a particular transgenic species, a particular chimera, is "really" or "almost" human. Beneath the surface similarities or differences, one might hope, lies the truth of our species destiny—encoded in A's, C's, G's and T's. Nothing could be further than the truth.

The first problem is that we are genetically very similar to a huge range of animals—and plants for that matter. But the percentage similarities that are bandied about—that we have a 98% similarity to an ape, for example, or a 75% similarity to a pumpkin—conceal more than they reveal, as this useful "fact sheet" on functional and comparative genomics makes clear.

Gene for gene, we are very similar to mice. What really matters is that subtle changes accumulated in each of the approximately 25,000 genes add together to make quite different organisms. Further, genes and proteins interact in complex ways that multiply the functions of each. In addition, a gene can produce more than one protein product through alternative splicing or post-translational modification; these events do not always occur in an identical way in the two species. A gene can produce more or less protein in different cells at various times in response to developmental or environmental cues, and many

proteins can express disparate functions in various biological contexts. Thus, subtle distinctions are multiplied by the more than 30,000 estimated genes. The often-quoted statement that we share over 98% of our genes with apes (chimpanzees, gorillas, and orangutans) actually should be put another way. That is, there is more than 95% to 98% similarity between related genes in humans and apes in general. (Just as in the mouse, quite a few genes probably are not common to humans and apes, and these may influence uniquely human or ape traits.)¹⁶

Even tiny differences, in other words, can have enormous functional effects. The method by which “similarity” is being measured is blind to that type of difference, being based on “a structural, rather than a functional gene concept, thus rendering many of the implications drawn from comparative genomic studies largely unwarranted, if not completely mistaken.”¹⁷ But dwarfing these problems, and the problem that the notion of species is itself genetically underdetermined, is the larger normative issue. And a contentious one it is. Consider the response of a former general counsel of a biotech company to the Patent and Trademark Office's decision that genetic patents drawn so broadly as to include human beings would not be issued:

[A] decision of the Court of Appeals of the Federal Circuit in 1987 that polyploid oysters were patentable was followed shortly by a PTO notice announcing that although the Commissioner considered “nonnaturally occurring nonhuman multicellular living organisms, including animals, to be patentable subject matter within the scope of 35 U.S.C. Sec 101,” claims for such organisms drawn so broadly as to potentially include human beings were regarded as excluded from patentability due to antislavery dictates of the 13th Amendment to the U.S. Constitution. *It is difficult to know what to think about this. It may be motivated by a concern about interference with “humanness,”* i.e., that the essential part of a person should not or cannot be owned by another, and that ownership in some part of the human body will violate that principle. Yet the patenting of implantable or implanted medical devices do not seem to have generated the same concerns. (emphasis added)¹⁸

¹⁶ Functional and Comparative Genomics Fact Sheet, accessed January 26, 2011, http://www.ornl.gov/sci/techresources/Human_Genome/faq/compngen.shtml#compngen.

¹⁷ Monika Piotrowska, “What Does it Mean to Be 75% Pumpkin? The Units of Comparative Genomics,” *Philosophy of Science* 76, no. 5 (December 2009): 838.

¹⁸ Brian C. Cunningham, “Impact of the Human Genome Project at the Interface between Patent and FDA Laws,” *Risk: Health, Safety and Environment* 7, no. 3 (Summer 1996): 261.

If, like me, you find the italicized phrase remarkably tone-deaf, morally speaking, you begin to grasp the basic methodological problem. We do not have consensus here. Without a background theory about *which* similarities or *which* differences matter, and why, little can be concluded. Do we look for similarities in the genes that are associated with speech or intelligence? Or for clusters of genes around capabilities that humans alone possess—itsself a risky procedure since there is almost never just one gene associated with one characteristic. Finally, as Vanna's case makes clear, we might ban certain kinds of transgenic experiments for reasons unrelated to personhood. The dehumanization of *us* represented by the creation of Vanna might seem to warrant a ban on such efforts. We may not need to turn to the Constitution to find the equivalent of an anti-idolatry principle. But that “solution,” of course, leaves the larger question unsolved while genetic experimentation will continue to create hybrids that possess ever larger numbers of the characteristics that we associate with humanity. The quotation from Dr. Weissman that begins this essay is not science fiction.

III

Where does this leave us? When I presented a draft of this chapter to a group of distinguished jurists, a number of them saw no hard moral or constitutional issue posed by Hal or Vanna. The artificial intelligence could write poetry and implore us to recognize its kinship as a mind and its claims would nonetheless fall on deaf ears. Personhood is reserved for people like us. Several of the audience members were of the view that constitutional personhood should be confined to living, breathing human beings, born of a man and a woman. When it was pointed out that we already gave limited personhood to corporations, which do not meet this definition or that this would exclude human clones, or a genetically engineered child of a gay couple who carried aspects of each partner's DNA, they admitted some reticence. Nevertheless, the pleas of Hal himself, or of the innocent transgenic entity with human and animal DNA, left them unmoved. Perhaps that means I am mistaken. Perhaps the Hal's and Vanna's of the future will neither capture the heartstrings of the public, nor present compelling moral and constitutional claims to personhood. But I do not think so. There is a deep subconscious moral anxiety rooted in our history; the times when we have curtailed the boundaries of legal personhood and constitutional entitlement are often not ones we are proud of today. We remember that African-Americans and women were deemed legal ‘unpersons.’ We look back at our ability to limit the boundaries of sympathy and recognition to those inside some circle or other, and it disturbs us. To be sure, we are not agreed as citizens on where to draw the line. There are passionate debates about the personhood of the fetus and even the corporation. But is there anyone on either side of those debates who could hear or see the words of a created entity, pleading for our recognition, and not worry that a quick definitional dismissal of all such claims was just another failure of the

moral imagination, another failure to recognize the things that we value in personhood when they are sundered from their familiar fleshy context or species location?

I have tried to show that the initial response to the dilemmas posed by Hal and Vanna is to search for some essence of humanness, or some set of traits that seem to demand constitutional protection; for example, genetic similarity to *homo sapiens* or intelligence and sociability at the human level. But as the analysis of the Turing Test and genetic species identity given here indicate, these paths offer no smooth or uncontentious answer to the question of constitutional personhood. Of course, more complex analysis is possible. The law could look for some larger combination of sentient traits such as the ability to feel pain, form projects and hold moral ideas. Bioethicists have even suggested that the ability to have religious ideas be a defining characteristic, though it is not clear to me whether this particular criterion should cut for or against. Another approach would focus less on current attributes than on future potential, an idea that would carry a particularly strong resonance with the abortion debate.

My point in this short essay has been to suggest that each of these approaches quickly dissolves back into the moral or religious commitments that animate it. The “characteristics” which we seek are merely the imprint upon psychology, genetics, capability or behavior of the pattern of attributes we believe it important to value—from intelligence, to species, to moral ambition—and thus seek to enshrine in constitutional protection. The leap from fact to value is no easier when the facts have the shiny patina of futuristic science, though perhaps the sheer unfamiliarity of these particular questions makes us see the process with an innocent eye.

For some—those who are opposed to abortion or who argue for the rights of non-human animals—the arrival of Hal and Vanna might seem like a godsend. How can you deny the moral claims of the dolphin, still less the fetus, when you are willing to grant personhood to this bucket of bolts and transistors, this puddle of senseless bioengineered flesh? There is a long history in the debate over the franchise and over constitutional rights, of disenfranchised groups using claims such as these. Some white women suffragists asked how they could be denied the vote when *African-American* men had been granted it, using prejudices about racial privilege to fight prejudices about sex privilege. A form of this argument is already being made by those who believe that it is ludicrous to grant inhuman corporations legal personality but to refuse to do so for human fetuses. At the very least, Hal and Vanna's arrival would dramatically expand the range of such appeals. “Lesser comparative otherness” can be a winning strategy. If, in twenty years time, you can generally predict someone's position on the legal personality of artificial intelligences by their position on abortion, this guess will have proven to be correct. But that outcome is far from assured.

Consider the challenge, almost the paradox, that Hal and Vanna present to the constitutional intuitions of a conservative religious person who is strongly anti-abortion. If one believes deeply in a divinely commanded natural order, in which

man has been given 'dominion over the inferior creatures, over the fish of the sea, and the fowl of the air,' in which "unnatural" and "immoral" are synonyms, then a transgenic entity or an artificial intelligence is more likely to elicit a cry of "heresy" than an egalitarian embrace. Yes, in some *pragmatic* sense, recognition of the rights of these entities might benefit the push to grant constitutional personhood to the fetus. But the price would surely be too high for at least one important wing of those who are morally opposed to abortion.

But now consider the mirror-image paradox that Hal and Vanna present to the pro-choice liberal who believes that the moral story of history is an inexorable widening of personhood and civil rights to reach more and more groups, overcoming bias about surface differences in order to expand the boundaries of legal respect. As I pointed out before, Hal and Vanna might well seem like the next stop on the Kantian express, the next entity to cry "Am I not a man and a brother?" to the rest of us in the hope we could overcome our parochial prejudice. Perhaps the very difficulties that we have *identifying* some essential common humanness or personality may lead us to be more willing to push the boundaries of those concepts outward, avoiding rather than solving the question of who counts as a person simply by leaving fewer groups outside to complain. Yet the liberal for whom abortion rights are not just a constitutional issue but *the* constitutional issue would surely be deeply wary of handing the pro-life forces another rhetorical weapon. Why are *fetuses* not the next stop on the Kantian express, the last discrete and insular minority whose "otherness" has allowed us to deny them personhood? No, for at least some on each side of the abortion debate, Hal and Vanna would produce strong cognitive dissonance rather than cries of strategic delight.

Facing this kind of conceptual logjam, as claims about the rights of newly created entities get tangled with our existing constitutional struggles, another approach might be to avoid the language of personhood altogether and simply regulate the creation of various entities according to a variety of public policy goals. We might forbid the creation of Vanna, not because of an idolatrous belief that the shape of the human being is sacred and thus conveys constitutional rights, but because of a belief that a society that would create such entities would tiptoe into a world of surpassing ugliness, losing respect for human life step by step along the way. We might criminalize the making of Hal, or forbid his creators to erase him once made, not because we think he is a person, but because we think there is cruelty involved even if he isn't—just as we regulate cruelty to non-human animals. Or we might forbid the entire line of research in the belief that eventually we would cross some dangerous line, whether of personhood or of species competition. In the words of Samuel Butler's *Book of the Machines* from *Erewhon*, "Is it not safer to nip the mischief in the bud and to forbid them further progress?"¹⁹ It would be ironic if Hal and Vanna were banned partly because we do not know

¹⁹ Of course, Butler's *Book of the Machines* was written as a sarcastic commentary on one of the key scientific fights of his day — the struggle over evolution. The fact that we are still fighting that battle — a debate about *facts* — is sobering when we turn instead to a debate about justice.

how to classify them, the ultimate penalty for conceptual controversy.

The most likely outcome of all, however, is neither a bold expansion of our constitutional rights, nor a technophobic attempt to legislate the moral quandary out of existence. It is instead the kind of messy, confused, sometimes idealistic, sometimes corrupt muddling-through that characterizes much of our constitutional tradition.

The question of whether the Constitution protects artificial entities, products of human ingenuity, seems like a futuristic one. But it is one we met and answered long ago. Corporations are artificial entities and yet we have chosen to classify them as legal persons to which many constitutional rights adhere. This process has, admittedly, not been uncontroversial. In Justice Douglas's words,

[A]s Mr. Justice Black pointed out in his dissent in *Connecticut General Co. v. Johnson*, the submission of the [14th] Amendment to the people was on the basis that it protected human beings. There was no suggestion in its submission that it was designed to put negroes and corporations into one class and so dilute the police power of the States over corporate affairs. Arthur Twining Hadley once wrote that 'The Fourteenth Amendment was framed to protect the negroes from oppression by the whites, not to protect corporations from oppression by the legislature. It is doubtful whether a single one of the members of a Congress who voted for it had any idea that it would touch the question of corporate regulation at all.'²⁰

Even those who could not be suspected of hostility to corporate interests have sometimes thought the trope of personhood has been extended too far. As then Justice Rehnquist put it, "Extension of the individual freedom of conscience decisions to business corporations strains the rationale of those cases beyond the breaking point. To ascribe to such artificial entities an 'intellect' or 'mind' for freedom of conscience purposes is to confuse metaphor with reality."²¹

Though I share Justices Black and Douglas's skepticism about the rights of corporations under the 14th Amendment, I think that we can learn something about Hal and Vanna's cases by studying the constitutionalization of corporate personhood. What is remarkable about that process is that the courts never clearly articulated a reason *why* corporations were persons within the meaning of the 14th Amendment. Instead, the courts have conveyed upon them some—but not all—the rights that the Constitution applies to natural persons, based largely on a set of perceived, and perhaps exaggerated, fears about what the consequences might be if they did not. Might not a similar approach to Hal and Vanna lead to the creation of some new category of personhood? One could imagine something that relates to full, human personhood as civil unions relate to marriage—carrying

²⁰ *Wheeling Steel Corp. v. Glander*, 337 U.S. 562, 578 (1949).

²¹ *Pacific Gas & Elec. Co. v. Public Utilities Com'n of California*, 475 U.S. 1, 33 (1986)(dissent).

many of the same protections but denying the sought-after equivalence for reasons of religious belief or simple political acceptability. Doubtless, this approach would be found just as unsatisfactory as civil unions are to many, marking the creation of second class citizens who are denied the “real” personality of humans.

The history of corporate personhood is hardly one of the Constitution's shining moments. Is its confused and partisan process of pragmatic muddling the best we can do with the more morally wrenching questions that the future will bring us? In a characteristically wise article on the constitutional rights of artificial constructs, Lawrence Solum wrote “when it comes to real judges making decisions in real legal cases, we hope for adjudicators that shun deep waters and recoil from grand theory. When it comes to our own moral lives, we try our best to stay in shallow waters.”²²

Those words resonate strongly with me. And yet.... There is one modification I would make. It is the one suggested by the theory of the moral sentiments that comes from the Scottish Enlightenment—the idea that morality springs from the intuitive sympathy, the spark of compassion that jumps the gap to the predicament of the other. The others that the future will bring us are strange beyond belief. Science and logic cannot provide constitutional law with an iron bridge across the gaps between us and them. All the more need, then, for a moral sympathy that is both generous and humble. The most striking conclusion of Alan Turing's article may not be how difficult it is to identify machine consciousness or personhood but how uncertain we are about the boundaries of our own.

²² Lawrence B. Solum, “Legal Personhood for Artificial Intelligences,” *North Carolina Law Review* 70, no. 4 (April 1992): 1286–87.

James Boyle is William Neal Reynolds Professor of Law at Duke Law School and founder of the Center for the Study of the Public Domain. Professor Boyle was one of the original Board Members of Creative Commons. He served as a board member from 2002 until 2009, the last year as Chairman of the Board. He was also a co-founder of Science Commons, which aims to expand the Creative Commons mission into the realm of scientific and technical data, and of ccLearn which works to promote the development and use of open educational resources. He is currently a member of the board of the Public Library of Science. In 2003 Professor Boyle won the World Technology Network Award for Law for his work on the public domain and the "second enclosure movement" that threatens it. In 2010 he was awarded the Electronic Frontier Foundation's Pioneer Award. He is the author of *Shamans, Software and Spleens: Law and the Construction of the Information Society*, and the editor of *Critical Legal Studies, Collected Papers on the Public Domain and Cultural Environmentalism @ 10* (with Larry Lessig.) His more recent books include *Bound By Law*, a co-authored "graphic novel" about the effects of intellectual property on documentary film, *The Shakespeare Chronicles*, a novel, and *The Public Domain: Enclosing the Commons of the Mind*. He writes a regular online column for the Financial Times' New Economy Policy Forum.

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The Brookings Institution
1775 Massachusetts Ave., NW
Washington, DC 20036
Tel: 202.797.6090
Fax: 202.797.6144
www.brookings.edu/governance.aspx

Editors

Jeffrey Rosen
Benjamin Wittes

Production & Layout

John S Seo

**E-mail your comments to
gsccomments@brookings.edu**

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