Rules, Know-How, and the Future of Moral Cognition

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Professor Clark’s splendid essay\(^1\) represents a step forward from which there should be no retreat. Our *de facto* moral cognition involves a complex and evolving interplay between, on the one hand, the *nondiscursive* cognitive mechanisms of the biological brain, and, on the other, the often highly discursive extra-personal “scaffolding” that structures the social world in which our brains are normally situated, a world that has been, to a large extent, created by our own moral and political activity. That interplay extends the reach and elevates the quality of the original nondiscursive cognition, and thus any adequate account of moral cognition must address both of these contributing dimensions. An account that focuses only on brain mechanisms will be missing something vital.

I endorse these claims, so compellingly argued by Clark, for much the same reasons that I also endorse the following claims. Our *de facto* *scientific* cognition involves a complex and evolving interplay between, on the one hand, the *nondiscursive* cognitive mechanisms of the biological brain, and, on the other, the often highly discursive extra-personal “scaffolding” that structures the social-scientific world in which the brains of scientists are normally situated, a technologically and institutionally intricate world that has been, to a large extent, created by our own scientific activities. That interplay extends the reach and elevates the quality of the original nondiscursive cognition, and

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I draw this parallel for many reasons, as will emerge, but a salient
reason is that, whatever theoretical story we decide to tell about
"situated" cognition, it must meet the experimental test of, not one,
but at least two important domains of human cognitive activity. A
second reason is to emphasize that Clark's (entirely genuine) insights
about the "situated" character of our moral cognition do nothing to
distinguish it, in any fundamental way, from human cognition in
general, including our scientific cognition. And a third reason is that
each of these two cognitive domains - the broadly scientific, and the
broadly moral - may have a good deal to teach us about the other,
once we appreciate that, and how, they are brothers under the skin.

1. The Role of Discursive Rules

While Clark finds an important role for discursive moral rules, within
the context of the nondiscursive, connectionist, prototype-centered
account of moral knowledge, we must be mindful that the role he finds
is profoundly different from the role that tradition has always assumed
moral rules to play. I do not mean to suggest that Clark is under any
illusions on this score, but many of his readers will be, and so it is
appropriate to begin by emphasizing the novelties that we here
confront. Clark's story on moral cognition is in no way a critique or a
rejection of the recent nondiscursive neural-network models of human
and animal cognition. Rather, it is an important and appropriate

2 For a quick and accessible introduction, see P.M. Churchland, The Engine of
Reason, The Seat of the Soul: A Philosophical Journey into the Brain (Cambridge:
MIT Press, 1995). For a sketch of its applications to moral theory in particular,
see P.M. Churchland, "Toward a Cognitive Neurobiology of the Moral Virtues,"
Topoi 17 (1998): 83-96. For a more thorough and more neurophysiologically
focussed introduction, see P.S. Churchland and T. Sejnowski, The Computational
Brain (Cambridge: MIT Press, 1992). For a more philosophically oriented
introduction, see P.M. Churchland, A Neurocomputational Perspective: The Nature
augmentation of that approach. It is a local reflection of his views on situated cognition in general, as outlined in his 1997 book.³ That more general view is interesting because it finds a significant portion of the machinery available to cognition, and a significant portion of the activity of cognition, to lie outside the brain. It lies in the extra-personal public space of drawn diagrams, written arithmetic calculations, spoken and printed arguments, tools of measurement and manipulation, and extranumery “cognitive prosthetics” of many other kinds as well. The idea is that the brain learns to “off-load” certain aspects of some needed computational activity into some appropriate external medium of representation and manipulation, because the job can there be done more easily, quickly, or reliably than inside the brain. Deploying the familiar grade-school recursive procedures (“write down the 6, carry the 1”) with pencil on paper, to compute large arithmetical sums, would be a prototypical instance of the “off-loading” phenomenon he has in mind, and you can easily begin to generalize from this mundane example. In particular, you can begin to see a cognate role for the linguistic machinery of moral conversation, moral argument, and moral directives.

Now this externalist vision, I believe, is the right way to see the role of discursive representations. But it is vital to appreciate that it involves a major shift away from the avowedly internalist perspective that dominates traditional moral theory of almost every stripe. According to that tradition, to be moral is to have embraced, accepted, or otherwise internalized a specific set of behavior-guiding rules, which stored rules are then deployed in appropriate circumstances as a salient part of the internal cognitive mechanisms that actually produce intentional behavior. (Once these assumptions are in place, the principal philosophical questions are then pretty much fixed: which of the many pos-

Possible rules are the truly correct or morally binding rules? And what metaphysical, apodeictic, or empirical circumstance – e.g., God’s command, a social contract, pure reason, utility maximization, maxi-min choice from behind a veil, etc. – bestows that vaulted status upon them?) What goes unnoticed in this highly general perspective on moral philosophy, at least until recently, is that it surreptitiously presupposes a background theory about the nature of cognition, a theory that we now have overwhelming reason to believe is empirically false, a theory for which we already possess the outlines of a neuronally based and mathematically embodied alternative, specifically, the vector-coding, matrix-processing, prototype-activating, synapse-adjusting account held out by cognitive neurobiology and connectionist AI.

What changes does this new cognitive perspective require? Several. First and foremost, it requires us to give up the idea that our internal representations and cognitive activities are essentially just hidden, silent versions of the external statements, arguments, dialogues, and chains of reasoning that appear in our overt speech and print. That conception is an old and venerable one, to be sure, for it is the constituting assumption of our dear beloved “Folk Psychology.” And it is also a natural one, for, how else should we conceive of our inner activities, save on the model of outer speech, our original and (until recently) our only empirical example of a representational/computational system? How else indeed?

But in fact there are other ways, and ignorance of them has been our excuse for far too long. Nonlinguistic creatures (that is, most of the

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4 The reader will here recognize Wilfrid Sellars’ well-known account of the origins and nature of our Folk Psychology, as outlined in the closing sections of his classic paper, “Empiricism and the Philosophy of Mind,” chap. 3 of *Science, Perception, and Reality* (London: Routledge, 1963). Ironically (from our present perspective), Sellars was blissfully convinced that Folk Psychology was an accurate portrayal of our inner cognitive activities. (I recall finding it advisable to down-play my own nascent eliminativism during my dissertation defense, a meeting chaired by that worthy philosopher.) But Sellars’ conviction on this point notwithstanding, Folk Psychology had invited systematic scepticism long before the present, and for reasons above and beyond the recent flourishing of cognitive neurobiology. See, for example, my “Eliminative Materialism and the Propositional Attitudes,” *Journal of Philosophy* 78, no. 2 (1981), now twenty years old.
creatures on the planet) provide the initial motivating cognitive examples. For it is not plausible to portray them as using the same discursive, linguaformal thought processes that we so routinely ascribe to ourselves. After all, why conceive of all animal cognition on the model of an isolated discursive skill that is utterly unique to a single species? But neither is it plausible to dismiss all nonhuman animals as thoughtless, stimulus-response driven brutes. They are far too clever for that. Plainly, we need a third approach, free from a procrustean anthropocentric romanticism, on the one hand, and from the dismissive deflation of animal cognitive powers, on the other.

2. A Nondiscursive Conception of Cognition

When, in a comparative spirit, we examine the brains of terrestrial creatures – their large-scale anatomies, their filamentary microstructures, and their physiological and electrochemical activities – we find a striking conservation of form, structure, and function across all vertebrate animals, and especially across the higher mammals, and most especially across the primates, humans included. The basic machinery of cognition is the same in all of us, and it has nothing to do with the structure of declarative sentences, with the rule-governed drawing of inferences from one sentence to another, or with the storage and deployment of rules of any kind. Instead, that machinery is wonderfully designed by evolution to subserve the acquisition and deployment of a panoply of skills and abilities.

Those skills include, most obviously, a broad range of perceptual skills, for a creature must learn to discriminate not only colors and shapes, but to recognize such things as the peculiar locomotor gaits of its typical predators and typical prey; the entreaty or hostility in the facial expression of a conspecific; the gathering weariness of an infant, or an adversary; the existence and profile of kin relations and social alliances within one’s group; the opportunities to forge and share in such alliances; and the appropriate occasions to express the commitments – such as defense, comfort, and sharing – that go with those alliances. Perception, plainly, can involve considerable conceptual sophistication.

No less important are the motor skills that must be acquired. A creature must learn to walk, to run, to climb, or to fly, and so forth. But it must also learn to chase its prey, to groom its conspecifics, to fend off an attack, to
make a nest or burrow, to assemble an electric motor, or, if one is an administrator, to do such things as take a company public, or launch the Allied invasion of Normandy. Motor skills, like perceptual skills, can also involve a high degree of conceptual sophistication.

Finally, and not to be sharply separated from the skills already discussed, are the various skills of sensorimotor coordination, the skills of matching one's behavior to one's current perceptions, or of using one's ongoing perceptions to steer and modulate one's ongoing behavior. Importantly, much of one's perception involves the recognition of prototypical processes that unfold in time, such as falling bodies, flying insects, swimming fish, and fleeing mice. Moreover, the perceptual recognition of such processes consists in the activation of a previously learned prototypical sequence of activation-patterns in the relevant neuron population. Accordingly, a creature with sensorimotor coordination can anticipate the unfolding of its perceptual environment, for at least a few fractions of a second into the future, and then steer its motor behavior to suit that anticipated environment. It can dodge the falling body, swat the flying insect, and catch the moving fish or mouse. In this basic capacity for sensorimotor coordination lies the origins of all intelligence, and one obvious measure of the degree of intelligence that any creature has achieved is how far into the future and across what range of phenomena it is capable of projecting the behavior of its environment, and thus how far in advance of that future it can begin to execute appropriately exploitative and manipulative motor behavior. What distinguishes the intelligence of humans from that of all other creatures is not some cognitive discontinuity such as the possession of language. More likely, it is our pre-eminent talent in something we share with all cognitive creatures: we can see farther into the future, and execute motor behavior to exploit that future, than any other creature on the planet.

To complete this thumbnail sketch of the basic and nondiscursive cognitive activities common to all terrestrial creatures, suppose now that many species of animal acquire the ability to play and replay, "off-line" (that is, in some fashion that disconnects them from their normal motor sequelae) the various prototypical sequences of activation patterns - both perceptual and motor - that prior experience of the world has taught them. The reader will recognize these activational excursions as instances of day-dreaming or projective imagination. As launched in specific perceptual circumstances, they will constitute episodes of "vicarious
exploration” of the environment. That is, they will constitute episodes of subjunctive and practical reasoning. We are here contemplating a conception of high-level cognitive activity that is recognizably true of ourselves, but which contains no hint of discursive representations and rule-governed activity. That basic conception is all the more interesting because an explanatorily fertile theory of its general nature (i.e., the vector-processing story of connectionism) is already in place, and because that abstract functional theory coheres very nicely with the implementation-level story of neurons and synapses provided by the empirical neurosciences. Indeed, it was our study of the latter that originally inspired our development of the former.

3. Moral Cognition and the Novelty of Rules

“Oh, very well,” one might reply, a tad impatiently, “so a nondiscursive form of cognition underlies all of the more advanced forms; but don’t we leave that original and primitive form behind when we enter the domain of morality and complex social cognition?”

Not at all. We can see this vital fact immediately by looking at all of the other social mammals on the planet – baboon troops, wolf packs, dolphin schools, chimpanzee groups, lion prides, and so on – and by observing in them the same complex ebb and flow of thoughtful sharing, mutual defense, fair competition, familial sacrifice, staunch alliance, minor deception, major treachery, and the occasional outright ostracism that we see displayed in human societies.5 Most importantly, for the present issue, none of these other instances of complex social order possesses a language, or any other form of external “cognitive scaffolding,” on which to “off-load” some of their social/moral cognition.

5 Appeals to ethology are not always welcome in moral philosophy, but we had better get used to them. The traditionally unquestioned gap between “Rational Man” and “the unreasoning brutes” is no more substantial than is the division, so long revered in ancient Cosmology, between the “sublunar realm” and the “superlunary realm.” For a recent and exemplary exploration of what the animal kingdom may have to teach us about the nature of morality, see A. MacIntyre, Dependent Rational Animals: Why Human Beings Need the Virtues (Chicago: Open Court, 1999).
Their social cognition is conducted entirely within the more primitive and nondiscursive form of cognition we have here been discussing. And so, quite evidently, is the greater part of social cognition in human society as well. Typically, it is only when something goes wrong with our well-oiled social interactions that the discursive scaffolding of rules and moral argument and laws and court procedures is brought into play.

Even when that external machinery does get deployed, it is the original and more basic form of cognition that does the deploying. Rules are useless unless the capacity for reliable perception of their categories is already in place, and such perception depends utterly on the inarticulable processes of vector coding and prototype activation. Moreover, as neural network models have taught us, a perceptually competent network embodies a great deal of knowledge about the general structure of its perceptual environment, knowledge that is embodied in the configuration of its myriad (in humans, $10^{14}$) synaptic connections, knowledge that is largely or entirely inarticulable by its possessor. There is no hope, to repeat the point, that we can capture the true substance of any human’s moral knowledge by citing some family of “rules” that he or she is supposed to “follow,” nor any hope of evaluating that person’s character by evaluating the specific rules within any such internalized family. At the level of individual human cognition, it simply doesn’t work that way.

I have pressed this point, perhaps over-pressed it, partly because I wished to uproot an almost universal misconception about the nature of human moral cognition, but also, and correlatively, because I wish to emphasize the genuine novelty represented by the evolutionary emergence of language and the cultural emergence of discursive rules. Their emergence makes an enormous difference to the character and quality of our collective moral life. They constitute, as Hooker and Christensen would put it, and Clark would surely agree, a new level of regulative machinery to help shape the conduct of our collective affairs, a kind of

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6 C.A. Hooker, Reason, Regulation, and Realism: Toward a Regulatory Systems Theory of Reason and Evolutionary Epistemology (Albany: SUNY Press, 1995). This provocative book presents a general theory of the nested hierarchy of regulatory mechanisms that biological, social, and intellectual evolution have progressively assembled on this planet.
machinery that had never existed before. They provide us with something the other social animals still do not have. First, they provide a medium for the accumulation of useful social doctrine over periods far in excess of an individual human’s lifetime. Second, they provide a system for the collective discussion and local application of that (presumptive) practical wisdom. And third, they enable procedures, consistent across time and circumstance, for identifying and penalizing violations of the discursive rules that (partly) embody that wisdom. They do not bring moral reasoning into existence for the first time, and they do not provide a conceptual model remotely adequate to the phenomenon of moral cognition in single individuals and nonhuman animals, but they do change our lives profoundly.

In fact, as I shall now turn to argue, they change our lives even more profoundly than Clark has urged, and they hold the potential to further transform human life, to a degree and in dimensions that his own discussion does not begin to suggest. Specifically, I believe his own position concerning the importance of extra-cortical cognitive scaffolding holds the key to understanding how human moral progress is not only possible and actual, but still lies mostly ahead of us.

Let me approach these claims by looking at the sorts of rule-based regulative machinery displayed in ancient but post-cursive societies. The Judeo-Christian Old Testament provides a roughly typical example: a handful or two of rules, plus a tradition of rabbis, priests, or village elders to officiate their application and enforcement.

In this case, the rules are the now-curious Ten Commandments, plus some now-highly-uncomfortable Regulations on matters such as the “proper” administration of slavery and indentured servitude (for example, it’s OK to beat slaves senseless, as long as you don’t actually kill them, Exodus 21:20), on the proper treatment of witches (they must be put to death, Exodus: 22:18), and on proper respect for parents (anyone who curses — curses! — his mother or father must be put to death, Exodus 21:17). Collectively, this body of social legislation, from Exodus 20:1 to 23:31, looks less like the divinely delivered distillation of moral excellence it purports to be, and more like a clumsy attempt, by a profoundly poor and primitive people, to maintain social cohesion against competing human societies, to maintain a minimum of social order within the preferred group, and to achieve both aims by instilling stark terror, both metaphysical (the Jealous God) and temporal (prompt
execution), into the hearts of the people to be controlled. This Covenant with God is sealed by His promising, in return for our coerced faith, Divine intervention in and support for the gradual takeover of all neighboring nations and the subsequent geographical expulsion of the "alien" peoples that constitute them (Exodus 23: 20-31). (Whatever happened, one wonders, to the Tenth Commandment, only just laid down, the one that precludes coveting thy neighbor’s house and other belongings?)

Contradictions aside, this body of legislation is curious for a number of reasons; first, for the positive law that it contains. Some requirements now appear just silly, such as the practice of regularly sacrificing goats and young bulls as mandatory gestures of solidarity with Jehovah. Other laws are decidedly darker, as with "Thou shalt not suffer a witch to live" (Exodus 22:18). A law requiring such harsh treatment for nonexistent things seems a needless and foolish luxury, at best, and a palpable cruelty if, at worst, the category was intended to include those women — who claim to hear spirit voices and who engage in opaque practices — whom we moderns would now identify as the innocent victims of schizophrenia, a morally neutral brain disorder. The New International Version of the Bible attempts to finesse this embarrassing probability by offering the alternative translation, "Do not allow a sorceress to live." Unfortunately, with sorceresses also being nonexistent, this leaves the original puzzle about Divine Laws for empty categories untouched, and it prompts the further question, "A sorcerer is OK?)

This legislative corpus is further curious for the laws that it does not contain. For example, there is neither Commandment nor Regulation concerning the proper care and treatment of children. It is hard to imagine a more fundamental need for any society, or a more compelling moral imperative for any adult, than the protection and rearing of the children of one’s community. (Even baboon troops are faithful at doing that.) And yet this ancient legislative corpus, allegedly divine in its provenance, is simply silent on the matter.

Withal, and despite their primitive character, such ancient bodies of extra-cortical cognitive scaffolding surely helped to sustain a much more cohesive, effective, and productive social order than could ever have been achieved in their absence. I have no desire to minimize that contrast. It is enormous. But my principal aim in pointing out some of the more obviously benighted aspects of the Old Testament’s social legislation is to highlight a second contrast, one of comparable magnitude
and importance. Specifically, I ask you to compare the crude and tiny body of extra-cortical social-cognitive scaffolding found in the legal/economic strictures of *Exodus* to the vast and well-tuned body of social-cognitive scaffolding found in the legal and economic systems of a modern country such as England, France, Canada, or the United States.

4. The Contrast Between Ancient and Modern Scaffolding

A body of behavior-controlling legislation adequate to run an agrarian, bronze-age village is not remotely adequate to run a modern industrial nation with its tens of millions of people and its complex, trillion-dollar, high-tech economy. Our legislation must address practices and facilitate activities of which ancient peoples had little or no conception. The regulation of the activities of large corporations, of labor unions, of the stock market, of the nation's banks and interest rates, of agricultural and environmental policy, of pharmaceutical testing and prescription policy, of school curriculums and scientific research policy, of hospitals and penitentiary-systems, of intellectual property and its industrial applications, of court procedures at the civic, state, and national levels, of traffic behavior on our streets and highways, of licensing for electrical contractors, airline pilots, pharmacists, and a thousand other novel professions – these are all matters whose regulation is essential to the health and well-being of modern society, but whose existence went unanticipated by ancient peoples.

The point is not just that we moderns have accumulated more things to regulate than the ancients, although that is certainly true. The important point is that most of these novel phenomena were *created*, partly or wholly, by the initiation of new practices governed by new regulations. There would be no corporations, stock markets, banks, universities, or supreme courts but for the various sorts of carefully regulated human practices that make them possible. The extra-cortical cognitive scaffolding to which Clark has so aptly drawn our attention is now a glittering skyscraper of monumental proportions. It makes the ancient but cognate scaffolding of *Exodus* look like a plaster hut by comparison. We have constituted ourselves into a Leviathan that even Hobbes could not have anticipated.
This contrast, I assert, represents substantial moral progress on the part of the human race. Of the matters addressed by ancient legislation, we have simply put some aside entirely, and we regulate the others far more consistently, systematically, sensitively, and wisely than did the ancients. This much is unsurprising, perhaps. We have the advantage of more than two millennia of additional social experience, and we now have the luxury of well-tuned social machinery, with long institutional memories, devoted to the case-by-case administration of our more deeply informed discursive legislation.

This, however, is but a small part of the progress to which we can rightly lay claim. More important still is the expanding universe of new kinds of social practices, practices brought into existence by the continued development of new sorts of cognitive scaffolding and new topics of discursive legislation. A primitive villager in the Levant could aspire to many things, perhaps, but he or she could not aspire to be a securities investigator, a labor lawyer, a real estate agent, a software engineer, a congressional lobbyist, a child psychologist, a macroeconomist, a newspaper columnist, a law professor, or a researcher into the genetic basis of various diseases. All of these regulated activities, and a thousand others here unmentioned, constitute new contributions to the well-being of mankind, and new dimensions of activity in which people can display excellence, mediocrity, or failure. The high-dimensional web of mutual dependence that now embraces each of us delivers a panoply of goods and services, provides many layers of personal protection to each of us, and affords endless opportunities for self-realization, most of a kind that never existed before.

It may be objected that, even where it is realized, the progress here celebrated is more a matter of our having upgraded the quality and the vitality of the social ocean in which all of us swim, than it is a matter of our having upgraded the personal moral virtues of the average individual human beings who happen to swim in it. With this claim, regrettably, I must largely agree. While the procedural and legislative virtues that constitute a modern nation like Canada or the United States no doubt “rub off” to some degree on its individual people – if only by way of the high standards of the examples it continually sets – the moral character of an average modern North American is probably little superior to the moral character of an average inhabitant of the
ancient Levant. The bulk of our moral progress, no doubt, lies in our collective institutions rather than in our individual hearts and minds.

A relevant parallel here concerns our scientific progress, which has also transformed our world. Here also, the bulk of our progress resides primarily in our collective institutions of research, education, and technology. Some of that accumulated wisdom clearly "rubs off" on the minds of individual humans, if only because the professions they assume often require some expertise in some smallish area of scientific or technological skill. But on the whole, the scientific understanding of an average modern North American is probably little superior to the overall scientific understanding of one of Moses' contemporaries.

Little superior, but still somewhat superior. And small increments are precious because they can yield large differences in the collective quality of life, especially when those marginally improved individual social and intellectual virtues are exercised in an institutional environment that is itself the repository of much accumulated wisdom. This is as true, and as important, in the moral sphere as it is in the scientific sphere. As we remarked in our opening paragraph, the interplay between the personal and the extra-personal levels extends the reach and elevates the quality of the individual's original nondiscursive cognitive activities. Plainly, I assert, there has been real progress here, at both levels of cognition, and in both the scientific and the moral domains. And the dynamic of that progress is much the same in both domains: we learn from our unfolding experience of a world that is partly constructed by our own activities.

5. On the Requirements for Future Moral Progress

You see, once more, where I am going: if we can come this far, why not go farther still? Specifically, if the introduction of extra-cortical cognitive scaffolding gives humans a "leg up" in some cognitive domains; and if the articulation and improvement of that scaffolding, over time and accumulated experience, leads to further improvements in the quality of our cognition in that domain, then why should we not aspire to make further improvements in the character and content of our current extra-cortical scaffolding, so as to make yet further advances in the quality of the cognition at issue?
We may look, once more, at the history of our scientific progress for possible insights on how this might unfold in the moral domain. What sorts of things distinguish modern science from the science of the Egyptians and the Babylonians? Most obviously, we have acquired, in sequence, such things as systematic geometry, the algebra of arithmetic unknowns, modern analytic geometry, the infinitesimal calculus, and modern computational theory. Equally obviously, we have escaped the ancient conceptual frameworks of geocentrism, of earth, air, fire, and water, and of "folk physics" generally. Our extra-personal scaffolding now deploys a new framework of concepts, more penetrating than the old, and more reflective of the world's real makeup.

The social domain shows some of the same sorts of advances. We do use modern mathematics to serve the making of economic policy (think of the Federal Reserve Board and its macroeconomic models), and to sustain the nation's monetary activities on a minute-minute basis (think of the e-network and the computational facilities that underly your use of a credit card at the supermarket checkout counter). As well, our conceptions of proper social behavior have certainly changed. (For example, Exodus prohibits the charging of interest on loans, but modern industrial society would collapse without that crucial practice.) On the whole, however, our self-conception and our social technologies show little of the truly radical change evident in our modern scientific conception of the purely natural world.

That is because, I suggest, the neurobiological, cognitive, and social sciences have yet to achieve the major conceptual advances achieved in physics, chemistry, and biology. Bluntly, the cognitive scaffolding that sustains our social lives is still laboring under the burden of a comparatively primitive conceptual framework. "Folk physics" may be gone from our enveloping institutions, but "folk psychology" is still very much with us, at least in our social institutions.

My point here is not to trash folk psychology: it performs yeoman service for us, and will continue to do so for some time to come. My point is rather that a still deeper conception of the springs and wheels of human nature might perform all of those same services, and many new ones besides, even better than does our current conception.

The geocentric astronomy of Aristotle, Hipparchus, and Ptolemy - to cite a relevant parallel - allowed us to predict the motions of the planets with some precision, and it allowed us to navigate all of the
Earth’s oceans without getting lost by more than a few hundred kilometers. But in other respects, it was a conceptual and technological straightjacket that simply had to be shed if we were to understand the heavens in general. And when it finally was displaced, it opened the door for such novelties as geosynchronous communication satellites, and hand-held GPS (Global Positioning System) devices that will fix your current position on the Earth’s surface to within a meter. That technology, and a hundred others, are now an integral part of our personal and institutional activities: they have been absorbed by, and are transforming, the extra-personal cognitive scaffolding that structures our lives.

Similarly, I suggest, will the continuing development of sciences such as cognitive neuroscience, social psychology, neuropathology, neuropharmacology, and vector algebra (the mathematics of neural nets) eventually become absorbed into the extra-personal, social-level scaffolding that already structures our interpersonal lives. And by being absorbed, it will change that scaffolding, and with it, our moral practices and our moral conceptions. It will afford the opportunity to hone entirely new nondiscursive cognitive skills, as we learn to navigate a social environment containing novel structures and novel modes of interaction. It will permit a deeper insight into the intricate dance that is each person’s unfolding consciousness, and thus make possible a deeper level of mutual understanding, care, and protection. It will reconfigure our court practices, our correctional practices, our educational practices, and perhaps even our recreational and romantic practices.

Clark’s scepticism here notwithstanding, the moral domain evidently offers as much prospect for radical progress as does any other domain of cognitive activity. And such progress will be achieved not because—in a runaway spirit of mad-dog reductionism—we turn our backs on the social-level cognitive machinery. On the contrary. The current office-holder may be tossed out on its ear, but the high-level office will remain. It will then be occupied, however, by a system of concepts and an accompanying vocabulary grounded in a more deeply informed, and technologically more powerful, theory of Human Nature. It will then do all of the old jobs better—those that are worth doing, anyway—and endless new jobs to boot. Accordingly, now is hardly the time to become faint of heart or feeble of vision. The relevant sciences are pregnant
with promise, and their effects on social practice are already being felt. The virtues of extra-personal cognitive scaffolding remain obvious, to be sure. But it is equally obvious that new and better scaffolding might sustain a new and even better moral order. The science alone won’t build it. But we can.