Science, Anxiety and Meaning:
Giving Moral Shape to Our National Life

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I. Introduction

In this brief essay my first objective is to remind us of the ethical significance of science as a human activity. My second and principal aim, however, is to convince you that we have to pay more attention to the moral issues that are always being generated whenever there are exciting developments on the scientific frontier. Moreover, some of these moral issues raise new questions and/or challenges for the formation of public policy. It is important, therefore, to triage these new ethical dilemmas into those requiring attention only by individuals, and those that also require attention from state and federal policy makers. The nature of this latter exercise is, of course, dependent on what one believes regarding the legitimate role of government in our national life.

I am not a scientist. In some ways I have always regretted this, since science is one of the greatest, most important and most creative human endeavors of all time. It must be very rewarding to be part of a great humanitarian effort to alleviate sickness and disease and, in countless other ways, to improve the lot of future generations. In all these latter respects, the scientific endeavor is of enormous ethical significance.

I am, however, one of those non-scientists who have developed an interest in the intersection of science and public policy and, more recently, a special fascination with those issues that arise when particular scientific developments generate a good deal of unease and moral anxiety and/or when such scientific advances force public policy to confront issues on which there are sharp moral disagreements. These are issues generated in the wake of scientific progress which are often overlooked in the excitement of the new possibilities that scientific progress unveils before us. My particular concern, therefore, focuses on the anxiety and moral dilemmas that scientific progress puts before us and, in some cases, before public policy.

Let me begin by stating the obvious, namely: There are always moral dimensions to scientific advances because with every such development we must, at the very least,

decide whether it is moral or desirable to put into practice everything that our new capacities enable us to do. Indeed, one of the oldest moral questions in western civilization is whether or not there are any limits, natural or divine, on the use of our new knowledge. Consider, for example, the destiny of the Greek God Prometheus – the God of Fire. He was the source of great technological advance – and concern for mortals -- but also the source of technologies that could destroy everything. Moreover, Zeus laid down a harsh punishment for Prometheus because his powers came too close to being truly divine (i.e., undermining Zeus' plans). Even in this ancient Greek myth we recognize a number of important themes that will reappear over and over again in Western literature as scientific progress requires us to reshape our understanding of the natural world, our relationship with each other, and what it means to be human. In particular, there are the themes that concern whether the new technology will be used for good or evil and whether we are in danger of human "overstepping" certain divine or other "natural" limits. Indeed, even the desire to triumph over our own mortality competes with the fear of just such a triumph and what it would mean for the human condition.

In this vein today we might consider if it is appropriate to deploy our new knowledge of human genetics to "design" the genetic profile of certain specific individuals (or entire cohorts of individuals), or if this behavior is too "god-like" (i.e. non-human) in character. Once again there are those who look forward to a level of human self-design that would transform the process of evolution, but there are others who are frightened by the prospect. There are, however, much simpler issues that we must also deal with. Should we, for example, restrict our application of our new understanding of atomic energy to peaceful uses? Should we restrict the use of our new genetic technologies to the curing of certain well-defined diseases, or deploy it also in the production of new and deadly biological weapons? Most importantly, we must realize that these are moral, not scientific questions. In dealing with these issues, therefore, we must rely on resources that cannot be supplied by science itself. The continued popularity of the Faust legend reminds us that many human needs, particularly the need to lend meaning to our labors, often require resources that science cannot provide.

Moreover, even though developments in science and technology by themselves may be considered morally neutral, their uses can lend them great moral resonance, either positive or negative. My principal point in this respect is that the moral ambiguity of scientific and technological progress can always be expected to cause a great deal of anxiety, and, as a testament to this fact, we in the West have inherited a large literature of poetry and myth – from ancient Greek poetry, to the ever popular Faust legend, to the many contemporary literary and artistic efforts that address this dilemma.

With every major series of advances in science and technology, a new set of anxieties concerning how best to use these new abilities and how to avoid both undesirable side effects and what some would term "human overreaching" surfaces. Despite these anxieties and concerns, boycotting new knowledge has never been a sustainable or desirable option, but neither is a studied attempt to avoid acknowledging its serious implications for the structure of beliefs that gives our lives meaning and, indeed, may directly impact our health. Our history, therefore, has been characterized by both an accumulating knowledge base and an initial level of anxiety and unease that is only resolved by negotiating new understandings regarding both how this new knowledge will be used, and how we will relate to each other, and, where necessary, by amending our human narrative.

It is my view that the continuing health of the scientific enterprise requires that we both understand and respond to these anxieties and take much more seriously than we do the moral questions that arise. In any case, the more rapidly science advances, the more such ethical questions arise and the more difficult it is to keep our moral bearings. It is not surprising that our age, characterized as it is by an explosion in scientific discovery, is also characterized by unusually turbulent moral seas.

II. The World of Meaning

In order to understand and deal with these anxieties and new moral dilemmas, we must begin by acknowledging that the human need to give some transcendental meaning to one's efforts is a more important, much more widespread, and a seemingly more innate aspect of human behavior than the human curiosity that underlies scientific activity. Indeed, the universal need of human societies to construct narratives of the human experience that lend significance to their efforts and give order and meaning to a world that they do not completely understand is, perhaps, the most intrinsic of all human social characteristics. As William James noted, we seem to have "…an indomitable desire to cast the world into a more rational shape in our minds than the crude order of our experience."

In other words, human beings everywhere feel the need to put their efforts and experiences into a broader frame of reference that endows their activities and social interactions with some transcendental meaning. Some would say this represents the universal human urge to rescue our individual lives from insignificance and to impart fuller meaning to our relationships with each other. In any case, it is clear that it is the human narratives that have been developed over the millennia to meet such needs that remain central to our understanding of what it means to be human and to the ability of human societies to sustain their labors.

Unfortunately, science has rather little to say either about the meaning of our individual actions or of the social customs and traditions that shape the lives we live together. It is the province of myth, or other constructed and/or revealed narratives, to define our place in nature, to give us a sense of purpose, and to provide us some moral guidance. Indeed, it is these myths and/or narratives that make a meaningful life possible since they reflect how we conceive of ourselves as human beings and how we understand the nature and purpose of an ethical human life.

In this context it is important to remember that we have set some of our deepest moral roots in conceptions of virtue and justice that were unrelated either to the mastery of nature or the possession of things. We may or may not be able to develop adequate moral roots more firmly based on materialism and a belief in human competence.

Those narratives that have stood the test of time must be considered among the greatest feats of the human imagination. Even more importantly, however, they have been central to the capacity of human societies to transform the mundane into the meaningful and the wonderful. In a certain way, these human narratives or stories, which are passed on from generation to generation, are like genes in that they keep part of us alive after our individual story has ended and, like germ cells, they can live on connecting ourselves and our efforts to both past and future generations.

In Classical Greek and Roman society it took the full pantheon of gods and their seemingly bizarre behaviors, together with such cultural resources as the Homeric epics, to give order and meaning to what must have seemed to them to be an often frightening and seemingly bizarre world. At other times, for other peoples, the great religions helped to fulfill this function. For example, some of the Western biblical narratives have dealt with the issues of human origin and human destiny through the basic themes of creation, salvation, and redemption, and these have served for some millennia to give meaning to our efforts even in the face of our own mortality. Whatever the current status of these particular narratives, they seem to many to provide a radically different framework for understanding humankind's origin and ultimate destiny than certain contemporary scientific narratives.

The two most basic themes of those human narratives that have survived the test of time are that there is something very special both about the Earth (e.g., it is the center of the universe) and about the moral status of human beings as compared to other forms of life (e.g., Genesis, Chapter 1). Unfortunately, science has dealt a number of body blows, or psychic shocks, to the truth claims represented by such narratives. Copernicus taught us that Earth was not the center of the universe. Darwin taught us that humans

were but one part of a vast evolutionary scheme that included all other animals. Freud suggested that we may not even be masters of our own minds. And, finally, an array of more contemporary developments have demonstrated that the same genetic code underlies all living organisms. Thus, the progress of science seems to have made it harder and harder to satisfy our narcissistic need to feel special. However, my point is that whenever scientific advances seem to cut us off from that common store of human memory represented by the narratives we use to give significance to our experiences and efforts, it creates a great deal of anxiety that, in time, is resolved by constructing new or modified narratives that restore an acceptable balance between ourselves, our efforts and the natural world. This, however, is not a trivial task.

It is a difficult task because in some sense our previous narratives and/or myths, and their associated set of moral implications have been revealed as incoherent and defective. This requires a new set of understandings to be articulated and, over time, adopted in the form of a new narrative. Simply put, events that disturb human memory and narrative, particularly if they diminish the uniqueness of human beings, upset our notions regarding the purpose and significance of our lives. In this latter respect, listen to the words of Russian poet Anna Akhmatova when an existing narrative could no longer be sustained and had, therefore, to be replaced:

> "… Today I have so much to do: I must kill memory once and for all,
> I must turn my soul to stone, I must learn to live again.… "

Moreover, the more dazzling the progress the more humankind is likely to believe that we are indeed completely sufficient unto ourselves and, thus, without any need for any "divine plan" that heretofore provided a foundation for most human narratives. To many this is a rather unsettling prospect and recalls for them Nietzche's warning that if God is dead, anything is permitted.

The challenge of adjusting the human narrative is especially challenging at the current time when we continue to have a great commitment to scientific progress, but no

universally compelling moral framework for deciding how to use those new powers. In the interim, therefore, we can expect a certain amount of anxiety to be widespread. In deciding what we should do, or how we should act, in view of the stunning events taking place daily on the scientific frontier and the anxieties they engender, both scientists and non-scientists (i.e., all citizens) must engage in a negotiated social and political decision process that necessarily involves resources outside of science, such as our received and/or proposed cultural traditions and practices (i.e., how we wish to live together) and other historical contingencies.

III. The Biomedical Frontier

To illustrate further some of these matters, let me turn once again to events on the biomedical frontier which is expanding at such an exhilarating and unprecedented pace. On the one hand, this avalanche of new discoveries fills us with hope as we contemplate the many remaining challenges in the area of human health and nutrition. On the other hand, we must also acknowledge that these advances have been accompanied by a certain level of anxiety regarding the full implications of all this new knowledge for our belief systems, our customs, and the lives we live together. Our emerging capacity to modify life forms, including the human animal, seems to threaten a number of our "old" ideas regarding what is unique about the human species, our moral relationship to other forms of life and the relationship between the generations.

Consider, for example, the realization that we may soon possess radically enhanced abilities to control the genetic profile of future generations. This prospective ability, however exciting to some, requires us to come face to face again with the question of whether there are moral limits to the scope of human activity; and in particular, what moral rights we (however defined) have to sculpt the genetic profile of future generations, create new human capabilities, or alter in advance specific future individuals.

Thus, it should not surprise anyone that such developments, with their potentially radical implications for the human story, are perplexing and anxiety-provoking and even offensive to many. It is, therefore, incumbent on us all, particularly those most deeply engaged in advancing the biomedical frontier, to seriously engage these issues.

Dismissing or ignoring such concerns as simple ignorance is not only a serious intellectual error, but will only serve to undermine the public trust and support on which the biomedical enterprise is dependent. In many cases, the more educated people are, the more concerned they are. What is badly needed, therefore, is a framework that might help us all understand and, therefore, deal with these anxieties so that further scientific discovery can be encouraged and that our new knowledge will be deployed in a manner that will have its greatest human meaning.

In addition, there are ever-persistent calls for public policy to play a direct role in the resolution of these matters. In some sense, this is quite natural since in the U.S. the federal government is by far the largest sponsor of research in the health sciences area, and it must decide on which initiatives on the scientific frontier it wishes to support. In addition, in some areas, such as embryo research, there are those who feel that it is the government's obligation to shape our response to these developments.

IV. A Tentative Framework

As I have pondered these various matters, I have found it useful to focus on three different aspects of the overall set of issues. The first aspect is centered around a very old problem I have already identified, namely, how our basic belief systems evolve in response to our ever-increasing knowledge of the natural world. The second aspect is centered on the relatively new but quite general problem of dealing with morally contested issues within pluralistic liberal democracies. This is a challenge that has only been with us in an operationally serious way for the last few centuries. Finally, I have found it necessary to focus in a special way on a really new aspect of the problem; namely, how we should incorporate the radical implications of our enhanced

understanding of human biology into the belief systems and human narratives that are needed to give meaning to our lives.

a) The Very Old Problem. Since the earliest moments of western civilization, a key issue has been how we are to understand the nature of what it means to be human within the context of a rapidly expanding knowledge base concerning the natural world. Recall, for example, Sophocles' choral "Ode to Man" in Antigone. As you listen to these words, the image you should hold in mind is a shepherd – on a hill – overlooking a farmer (a new occupation) plowing (a new technology) a field below. The shepherd speaks as follows:

> "Many things are formidable, and none more formidable than man…. And he wears away the highest of the gods, Earth, immortal and unwearyingly, as his ploughs go back and forth from year to year…. Skillful beyond hope is the contrivance of his art; he advances sometimes to evil and other times to good…. May he who does such things never sit by my hearth or share my thoughts."

This verse, and countless others that have become part of the western literary tradition, reflect the deep ambiguity that often accompanies technological progress. On the one hand, the development of new knowledge is formidable. That is, such efforts are a genuinely admired form of human creativity. Nevertheless, as the above words of Sophocles reflect, there is always a period of uncertainty regarding the impact of this new knowledge on a wide variety of honored practices, important values, and other existing and longstanding cultural commitments. There is always some uncertainty among some about whether to view scientific progress as a reflection of the fuller flourishing of our humanity, or as nourishing a foolish illusion of humankind as creator of its own life and destiny.

As developments in the twentieth century have taught us once again, new knowledge solves some problems, creates others, and has potential for both great

good and vast evil. Indeed, while almost everyone acknowledges both that we should never confuse what we could do with what we should do and that new technologies can be misused, we often disagree on what constitutes misuse. The ultimate anxiety is how to achieve the promise and hope of new knowledge and to avoid its perils. Moreover, as the Faust legend suggests, our understanding of the natural world alone – no mater how great --- does not even begin to meet certain important human needs.

One needs to acknowledge, therefore, that many persons with great respect and genuine enthusiasm for the continuing contributions of science and technology also may have serious concerns about the on-going capacity of particular human institutions (and nature itself) to survive both advancing science and technology and the associated desires to control all and possess all.

b) The Relatively New Problem. The development in the West during the last few centuries of a political liberalism built on individual liberty and political equality created a relatively new type of challenge to the evolution of public policy in morally contested areas. The challenge for liberal democracies in setting public policy in a morally contested area is to decide which moral imperatives should be reflected in public policies that, by definition, govern everyone. The challenge of living together peacefully despite fundamentally differing views on some moral issues is entirely different and a much more complex matter when we are committed to the freedom of individuals to hold quite different beliefs on rather fundamental matters.

America, for example, is a fascinating and complex nation of religious believers and non-believers of various stripes, with deep commitments to freedom of thought, speech and belief, and firm traditions regarding the non-interference of government in these matters. As a result, when new science and technology raise novel moral issues, as they often do, it can be difficult to construct the right moral or public policy space to deal with the issues. Indeed, it is always a difficult task for public policies to mediate differences on important moral issues especially in the American

environment where we are quite suspicious of government intervention into the realm of our private lives. Thus, public policy faces the daunting task of deciding, not only how, but when the state's power can be exercised in arenas where considerable controversy reigns regarding what is morally worthy.

More generally, we need to remember that the two principal cultural commitments of modern times – at least in the West -- are the active pursuit of our mastery over nature (now including human nature) and the construction of a cultural framework that anxiously seeks to accommodate the multiplicity of interests that arise from a wide diversity of individual circumstances, beliefs, and historical contexts. A continued commitment to the pace of scientific discovery and such moral flexibility, however admirable, is bound to raise the level of moral anxiety among all thinking persons.

Despite the renaissance in moral philosophy, no single approach has emerged that seems sufficiently compelling to everyone that we can anticipate a moment when ethical conflicts can be tidily decided. Indeed, a number of quite coherent and respectable approaches to moral decision-making now exist side by side competing for our allegiance. As a result, as long as people enjoy free association and a capacity to think for themselves, there will be value conflicts that are not due to selfishness, prejudice, ignorance, poor reasoning, etc… Ethical conflicts, therefore, cannot be tidily and uncontroversially resolved in the face of a commitment to moral pluralism. In a morally pluralistic environment, therefore, there are few easy answers to complex issues.

Moreover, it is not uncommon to observe that liberal societies are likely to be more "anxious" than most since many people prefer stability, authority and tradition as opposed to free thinking, individual autonomy, and an open future. For those who seek comfort in a world that appears hostile, unpredictable, dangerous, and where there is no divine order of things, the liberal outlook, which is hostile to stability, may provide little assurance. In this latter respect, recall Nietzsche's observation

that, “If God is dead, anything is possible.” Let me now turn, however, to the really new aspect of the problem.

c) The Really New Problem. The challenges raised by the moral ambiguity of scientific advances has become dramatically more salient at this turn of the century moment when developments in human genetics are threatening to erase the time-honored boundaries between the social and biological, and between the "natural" and the man-made. This is a genuinely traumatic and new development, since we have used these boundaries to tell us, for example, what aspects of the world we experience are potentially under our control and which are not. They define, if you like, our sense of mortality and the ultimate boundaries of the human condition. Little wonder, therefore, that the threatened losses of these "guidelines" make many thoughtful persons somewhat anxious. Indeed, many are alternatively awestruck and anxious about these developments.

There is a wonderful image on the ceiling of the Vatican’s Sistine Chapel where a force beyond human understanding (say, God) reaches out to create humankind (say, Adam.) This basic idea has been central to the creation myths of all societies. Moreover, what many have referred to as the “Genesis problem,” namely, how to decide the genetic makeup of future generations, was a matter to be decided by chance or “other” (i.e., non-human) forces. With the dawn of the genetic age, we are about to have the capacity to extend human control in a radically new way. This ability raises the question of whether such powers will alter, in a fundamental way, the ultimate meaning of being human. Clearly, there are those who believe this new capacity extends and deepens what is a critical aspect of our humanity; namely, the ability to control and shape not only our world, but the world that will be inherited by future generations. Others, however, see the demise of those aspects of the human condition that, for them, defines the most precious aspect of the human species.

In any case, the prospects of deploying these new understandings would require many of us to alter the human narratives that have served to give meaning to our efforts. Many of these narratives, for example, are based on a world view that accepts our mortality, our suffering, and a certain unpredictability regarding our future as an intrinsic part of the human experience. As science progresses, however, our mortal limits seem to expand ever outward as one grim constraint after another seems in danger of falling away. This may be a cause for great celebration, but it certainly requires a revision in many human narratives.

V. In Place of a Conclusion.

What, therefore, must we do? First, we must continue to find ways to encourage scientific progress since scientific developments will remain one important further way to meet our ethical obligations to future generations. Second, one of the great responsibilities facing us in the twenty-first century is to consider the social and human repercussions of our rapidly accumulating new knowledge and the appropriate stance of public policy in this respect. Irrespective of one's views on the ultimate impact, for example, of advances in bio-medical science on the evolving human condition, there seems to be a clear need for all thoughtful citizens to consider the ongoing impact of such developments on those institutions, values and other cultural commitments that sustain our individual and common life, since it is in these areas that science and technology gain moral relevance.

In particular we require both an understanding of the ethical significance of continued scientific papers and the need for more serious conversations between scientists and non-scientists, where both groups leave open the possibility of changing their minds on the appropriate use of our new powers. After all, those driving the scientific frontier ahead and other thoughtful citizens share a common concern with finding a way to deploy this new knowledge in a manner that not only gives it moral content and human meaning, but relieves certain anxieties about the future. In this latter respect, we need to remind ourselves that what makes humans special, if not unique, is

our capacity to put ourselves in the minds of others and to understand what they believe and desire. Scientists, therefore, can put themselves in the minds of non-scientists and vice-versa so that we can understand each other's needs and beliefs better. This is what ethics is all about, and this remains central to our ability to adapt our narratives, our belief systems, and our notions of how we should live with each other to our increased understanding of the natural world. The best of these conversations will include individuals of courage (i.e., able to sustain a perspective,) empathy for the interests of others, perspective (a capacity to identify the key issues,) and the humility necessary to recognize when their mutual views need modification.

Most importantly, however, it has once again become clear that those engaged in thinking carefully about the future of the human condition, like artists, cannot escape the anguish and uncertainty involved in trying to create a better future, especially when the ethical questions go to the heart of what it means to be human. One cannot avoid the task of continuous moral calculation and recalculation. If those advancing the scientific frontier wish to reach out to the public for support, understanding, and trust, they will have to understand and address directly the anxieties that are certain to continue to characterize public concerns and, therefore, public policy.

With respect to both the many exciting developments that lie ahead of us on edge of the scientific frontier and the ongoing discussions that will give moral shape to our national life, we must all do our best to participate
and perhaps even to play a significant role.

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