# Twelfth Oxford Institute for Methodist Theological Studies

## Science, Technology, and Public Policy Working Group

## How Might We Begin Talking When We Are Seated in Different Pews?

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As science unexpectedly emerged as a dominant force in social change during the middle to late twentieth century, the emphasis on political realities - a significant component of the work of Christian social ethicists in the earlier part of the century, especially for the Christian Realism of Reinhold Niebuhr - was supplanted by a new awareness of science as a social force. This is not to say that science replaced the political realities that inform social ethics, but that its dominance made public policy decisions much more complex. This new complexity was further compounded by the growing development and use of technology, a distinct and still emerging off-shoot of the scientific revolution of the twentieth century. In this paper, I propose to re-evaluate the use of a now-lost concept of the Christian realists - that of "middle axioms" - in light of the rise of science as a new force in driving social change. In brief, middle axioms are stated values that bridge the gap between stated principles (such as the imperatives of the Christian faith) and concrete actions.

The methodological consideration of middle axioms as a viable point of discussion in ethical discourse has lost both favor and influence in recent decades. I learned this most forcefully during a recent discussion with a group of clergy, all trained in theology in the past twenty years. When asked about middle axioms, not a single member of the

group was able to confirm that he or she had even peripherally heard of the concept. Some felt that they might be able to inductively or intuitively deduce some idea about the nature of middle axioms, but nothing came immediately to mind for any of them. For me, this served as contemporary confirmation of the work of Dennis McCann in his "A Second Look at Middle Axioms"[1] There, over a quarter of a century ago, McCann wrote, "But what was commonplace a generation ago more recently has become rare."[2] Clearly, since then, concern for the viability of the concept of middle axioms has waned even more.

Yet the problematic issue addressed by middle axioms, that of moving from Christian ethical principles to concrete action in society, has not been alleviated either. The discussion of middle axioms was short-lived. In fact, as McCann points out in his article, the concept was first considered in 1937 at the Oxford Conference on Church, Community and State. The group sponsoring this conference joined with other Christians who were addressing issues of Faith and Order, ultimately forming what we now know as the World Council of Churches. Thus, the active life span of the intellectual discussion of middle axioms lasted approximately only a quarter of a century.

I suggest that the demise of middle axioms was premature. As ethical discourse among diverse parties and the specific ethical decisions they (we) must make have become more complex, a renewed interest in middle axioms may provide places of common ground, where individuals and communities from a wide range of differing ethical perspectives might stand together, if only briefly, in order to productively and

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[1]Dennis P. McCann, "A Second Look at Middle Axioms," *Annual of the Society of Christian Ethics*, 1981, 73-96.

[2]McCann, "A Second Look," 73.

effectively consider issues of public policy and make informed decisions that benefit all.

Reconsideration of middle axioms may also foster new opportunities for discussion amongst various faith- and value-based communities. Initially, middle axioms were an attempt to bridge the distance between the ethical principles of the Christian faith and the much more concrete personal and social decisions that Christian communities needed to make. I suggest that the concept of middle axioms might be broadened further: middle axioms need not reside only within Christian ethical discourse, but may in fact be a mutually beneficial tool for participants in a far broader societal discussion. The range is limitless. The discussion might take place between different religious groups with widely divergent faith perspectives or, on a narrower scale, simply among fellow travelers within the Wesleyan tradition who find their respective interpretations of the faith at odds with one another. Further, the discussion need not be limited only to those with religious perspectives. Middle axioms might allow for effective discourse and the advancement of public policy development in a dialogue between people of science and people of faith. More than at any other time in history, science and scientific concerns are leading our public policy decisions. The significance and power of scientific considerations are shaping, if not controlling, our development of public policy. As the power of the scientific community has exploded in recent decades, this community, like the religious communities we all know well, needs a more imaginative way to produce better and more effective public policy.

Having been most active during the explosion of science (and its outcome, technology) in Western culture during two-thirds of the last century, and being almost presciently aware of the positive and more importantly, negative effects of these two phenomena upon society at large, a mid-century Christian social ethicist, Roger Shinn,

provides an example of the process necessary to productive ethical reflection and effective work in this area. His work not only parallels the explosion of science in Western culture but fosters the necessity for a new global awareness, which is but another of the effects of the scientific/technological revolution. Interestingly enough, Shinn, a direct heir of the Christian Realism of Niebuhr and John Bennett, seldom reflects directly on the methodological constructs of middle axioms. On this point, Shinn's intellectual development confirms McCann's understanding of middle axioms as a nearly lost concept.

In the early 1960's, Shinn asserted that we are "living within a scientific revolution,"[3] documenting his notion of this revolution by listing the effects of science on three areas of society: work, transportation and communication, and health. At no time did Shinn limit his analysis of the effects of science to these areas alone: he chose them simply as helpful, approachable examples of the extent to which science had altered or begun to alter contemporary life, and in the interest of efficiency, I will limit this description primarily to his analysis of the effects on transportation and communication. (Shinn's analysis of other areas was equally forward-looking and exhaustive.) He invited his viewers (this work was initially a series of television broadcasts) and readers to reflect on the tremendous changes in their work lives over the past 150 years. Citing transportation and communication, he noted, for example, that it took seven days to deliver the news to George Washington that he had been elected president.

Shinn measured the comparisons in centuries. Clearly, in terms of human history, one hundred years is not a long time, yet dramatic and quite measurable changes have occurred in this relatively short time. Seen from today's perspective, Shinn was only at the very beginning of the modern scientific revolution in the 1960's and was necessarily

[3]Roger L. Shinn, *Tangled World* (New York: Charles Scribner's Sons, 1965), 13.

unaware of how massive it was to become. For most of his listeners and readers, computers, for example, were unheard of, and now, of course, they are ubiquitous, and their effect pervades almost every aspect of modern life, including this conference. Since Shinn's telecasts, the changes wrought by science in communication and transportation have multiplied geometrically; the same, of course, holds for work and health, the other two areas he used as examples, and for a great many other areas.

The importance of understanding the effect of science and technology grew at the same rate as did the complexity of science itself. Fifteen years after Shinn's televised series, he edited the first volume of *Faith and Science in an Unjust World*,[4] the plenary presentations of the World Council of Churches' Conference on Faith, Science and the Future. Two years later, he published *Forced Options: Social Decisions for the Twenty-First Century*.[5] Other Christian social ethicists also began to focus on issues raised by and in response to a rapidly expanding body of scientific knowledge. And they were far from alone: scientific data not only significantly altered the focus and tenor of public debate, at many points, it defined the debate. The immensity of this revolution was crystallized in Shinn's "Reconsiderations" in the Third Edition of *Forced Options*, which appeared less than a decade after it was first published.

> Has history ever seen a decade that brought such radical change – so unpredicted, so global in impact, so momentous to so many societies and people – as the decade just past? Probably not.[6]

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[4]Roger L. Shinn, editor, *Faith and Science in an Unjust World: Report of the World Council of Churches' Conference on Faith, Science and the Future*, Volume 1, Plenary Presentations, Geneva: World Council of Churches and Philadelphia: Fortress Press, 1980.

[5]Roger L. Shinn, *Forced Options: Social Decisions for the Twenty-First Century*, 1982.

[6]Shinn, "Reconsiderations," *Forced Options*, Third Edition, 243.

Without question, science contributed significantly to the dramatically altered situation confronting people at the beginning of the final decade of the twentieth century and into the early years of the twenty-first century. Science, including its application in society, technology, is a truly double-edged sword, however; while it fosters fresh new possibilities for human enrichment, it simultaneously creates massive, previously unimagined challenges for the entire global population. Shinn's final book, *The New Genetics: Challenges for Science, Faith, and Politics*, continues his ongoing study of the relationship between science and global societies and the methodological significance of science for Christian social ethics, with particular emphasis on the challenges created by technology.

## Science as Control

In *Tangled World*, Shinn explores science simply as it manifests itself, discussing issues more basic than the "social consequences of science."[7] As Shinn points out, "We can distinguish two functions of science: it gives us power to control our world (and maybe ourselves), and it gives us understanding."[8] Describing the social reality of the mid-sixties, Shinn asserts that "control is the more important function to most people."[9] In the half century since he wrote those words, we have seen the use of science as a mechanism of social control increase.

Over the centuries, as science emerged as a field of knowledge, our capacity to control our surroundings increased dramatically. This scientific knowledge was converted into power and continues to be. "Knowledge is power, and power-hungry men seek

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[7]Shinn, *Tangled World*, 16.

[8]Shinn, *Tangled World*, 16.

[9]Shinn, *Tangled World*, 16.

knowledge. Because of scientific knowledge we can do all kinds of things that our ancestors could not do."[10] Shinn knew the power (both physical and social) that science released, but in 1965, he could not imagine the degree of power that science would create and control in a few short decades.

> All the signs indicate that science will be confronting us with decisions that are more perplexing than any we have faced yet. If we think of the importance of electricity, radio and television, and nuclear energy, we are likely to judge that, among the sciences, physics has brought the most portentous changes in recent years. But if we look ahead, we may guess that biology and biochemistry will have the most unsettling effect in the years to come.[11]

Though Shinn spent much effort in the seventies and eighties addressing issues raised by the increasingly sophisticated field of physics and its applications in the forms of nuclear power and nuclear weapons, by the end of the century, he re-affirmed his 1965 "guess" that biology and biochemistry would have the most "unsettling" impact on the future. "Biological science continues its spectacular advances that rival those in nuclear physics and microchips. . . .Almost monthly, new experiments enlarge frontiers of possibility."[12]

## Science as Understanding

Shinn identifies a second function of science as understanding. Basic scientific research is about knowledge – not control, but understanding. Ideally, the scientist seeks understanding and awareness in its most elemental form, rather than control.

However, Shinn recognizes that most people want control more than

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[10]Shinn, *Tangled World*, 16.

[11]Shinn, *Tangled World*, 21.

[12]Shinn, *Forced Options*, Third Edition, 259.

understanding, citing the greater willingness of the U.S. Congress to appropriate money for scientific research that promises some power to control. In general, the politician (and perhaps the voter), motivated by pragmatism, shares neither the scientist's interest in pure research nor the knowledge it brings.[13] But at this point in his reflections, Shinn recognizes and supports the intrinsic value of the research function of science and indeed demonstrates some optimism that love of pure knowledge will spill over into the practical world.

> To the scientist understanding may be more beautiful, more thrilling than manipulation. He loves to seek, to question, to learn. And his understanding infiltrates the entire society. Even those who do not share his sympathies find their attitudes changed because of the knowledge given them by science.[14]

In Shinn's earlier writings, pure knowledge - knowledge formed without the bias of intended use or purpose - seemed possible. However, by 1996, when he wrote *The New Genetics*, he had reshaped his position and provided a more detailed examination of the place of the scientist and science in society. Just as science exploded with astonishing rapidity, so, too, did Shinn's analysis, and much of the developed and mature position he expounds in the mid-nineties began to take shape as early as 1972, in his contribution to *Earth Might Be Fair*.[15]

By the late 1960's, the social implications of and uses for scientific research were generating a surprising amount of concern in a society that until then was accustomed to experiencing what seemed to be apparently boundlessly positive opportunities from

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[13]Shinn, *Tangled World*, 18.

[14]Shinn, *Tangled World*, 18.

[15]Roger L. Shinn, "Science and Ethical Decision: Some New Issues," in *Earth Might Be Fair: Reflections on Ethics, Religion, and Ecology*, edited by Ian G. Barbour, 123-45.

science. In *Earth Might Be Fair*, Shinn addressed the question head-on: "Modern man, long accustomed to seeing science as a benefactor, is rather suddenly asking whether it is a menace."[16] What was once considered a perfect way to solve human ills was increasingly recognized as the source of many of the new menaces confronting the world. As a social ethicist, Shinn attempted to put this growing social awareness into meaningful perspective. He identified two competing characteristics as realities of scientific endeavor: "The first is the ability of science to solve problems. The second is the tendency of science and the technology derived from it to make and intensify problems."[17] By this definition, science, once perceived by society at large as the problem solver, had become the problem itself. Therefore it was, and often remains to this day, difficult for society to see science in the broader perspective that is necessary for genuine ethical analysis. A technological "fix" for issues that might be solved in a painless, if shallow, way by the scientific community is often easier for society to accept, and indeed may be welcomed by a society unwilling to face ethical decisions made agonizing by divided public opinion, belief, or perspective. However, despite any so-called solution from science, the issues inevitably remain and continue to fester among those whose beliefs and perspectives remain unsettled and challenged. For example, as the United Methodist Church, other denominations, and the wider society as a whole continue to struggle with issues of sexuality, and specifically with issues around homosexuality, we may imagine the relief that solid scientific evidence of a "gay gene" would provide many people deeply troubled by the state of knowledge about human sexuality and the current debate that is at least partially informed by that state of knowledge. That relief, however, would likely be short-lived as people began to address

[16]Shinn, "Science and Ethical Decision," 123.

[17]Shinn, "Science and Ethical Decision," 124.

their more fundamental and personal issues, which, in fact, probably brought this question to the forefront in the first place. Indeed, Shinn outlines the process of avoidance that society often takes as it naively relies on science to provide solutions.

> Society likes to turn ethical problems into technical problems, ideological clashes into pragmatic inquiries, basic human conflicts into questions of know-how. Hence society may be unprepared when pragmatic success and know-how betray it by precipitating new ethical agonies, or when science and technology, although solving some problems, produce new problems and expand some old ones.[18]

Shinn contends that if society attributes to science the ability to solve the problems that face humankind, when the great problem solver exacerbates the problems instead of alleviating them, society is shocked and taken aback, even paralyzed, by the dilemma thus created. The reality, however, is that science does not provide solutions to ethical decisions; indeed, science adds myriad complexity to the debate, unless it is itself understood as a social reality.

Shinn therefore attempts to put science and scientists in their proper places, in order that society may directly address the ethical issues raised by science. "The population crisis is largely a crisis caused by science."[19] Scientific advances that enhance many aspects of human life have created the possibility for longer, healthier lives, but they have also created the problem of overpopulation, which did not exist prior to the explosion of scientific knowledge in areas like human health and nutrition. "Today, however, the problem [global overpopulation] has expanded on a world scale, resulting from scientific achievements in overcoming disease and famine. Science also has furnished remedies for

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[18]Shinn, "Science and Ethical Decision," 124.

[19]Shinn, "Science and Ethical Decision," 127.

overpopulation."[20] Shinn typically reflects on many facets of all dilemmas and consequently points out that science might also be able to help to alleviate the problem that it created by enabling advancements in other areas. Even with such even-handed analysis, however, he would certainly contend that the ethical issues remain and must be addressed, and I must agree.

At one level, science may be viewed as value-neutral in making decisions about any particular social problem. Like Pandora, science may open wonderfully mysterious boxes, but once the boxes are open, science cannot close them. "Science opens up new capabilities, but science does not itself determine their use."[21] Science does not and cannot work outside the natural processes of society. By the nineties, Shinn rarely uses the term "pure knowledge." But in this essay, written in the early seventies, Shinn seems to be saying that even if some form of scientific knowledge that had no intended direction or value orientation, the use of that knowledge would quickly fall into the political process, and the knowledge would consequently lose its purity. "Pure knowledge" used for a political or societal end inevitably takes on the value orientation of its handlers.

Shinn also begins to make an important separation between scientists, that is, those who do science, and their fields of inquiry. "The scientist when he projects social goals is likely to project his own cultural prejudices."[22] Scientists, Shinn points out, are not immune to the social realities shared by all human beings; in subtle as well as blatant ways, their cultural and social situations shape their values, so they are inherently incapable of setting those values aside as they pursue the pure knowledge integral to

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[20]Shinn, "Science and Ethical Decision," 127.

[21]Shinn, "Science and Ethical Decision," 130.

[22]Shinn, "Science and Ethical Decision," 132.

scientific research. The scientist inevitably brings his or her values and individual experiences of the world to any discussion of how scientific research might be used. Intentionally or not, the scientist's opinions and desires, which may be subconscious and/or hidden below the surface of discourse, inevitably influence the direction and outcome of any decision in the scientific process.

Thus, the results of science cannot be analyzed outside a matrix of values. Further, as Shinn demonstrates, even the initial inquiry can be tainted with specific value purposes that must be acknowledged. "In the United States, politics already dictates in large part the direction of scientific energies when, out of $26 billion going into research and development, $17 billion comes from the federal government, including $14 billion from the Defense Department, the Atomic Energy Commission, and the National Aeronautics and Space Administration."[23] Here, Shinn begins to suggest that funding sources for scientific research direct the activities of scientists in such a manner that values present when funding priorities are set influence the general direction of research. He is not saying that individual scientists will necessarily direct their efforts or alter their results in order to appeal to those who direct funding sources. Rather, he is suggesting that the social location of science - its almost revered place in society - is not beyond the reach of the intrusion of power politics. This approach does not even begin to evaluate the possible influence of such other major supporters of science as the business community, universities, or foundations on the overall development of scientific knowledge. At this point in Shinn's emerging methodological approach, it seems enough simply to demonstrate that science is not pure; at the least, values and experience influence both

[23]Shinn, "Science and Ethical Decision," 132-33. Shinn notes that the figures he uses were from Stephen Solomon, "Chained Campuses," *New Republic*, September 19, 1970, 12.

scientists and those who fund their research.

In later works, he moves further and unequivocally states that science is, in fact, deeply and irrevocably influenced by values.

> . . .science, as a human enterprise, is value-fused. Some values are inherent in science, especially integrity, accuracy, and openness to evidence. Beyond that, science – above all, big science, which is costly science – expresses the values of governments, corporations, foundations, and universities that sponsor it.[24]

Seldom does Shinn shy away from a debate that has strong implications for his own discipline of social ethics, and he doesn't here, but, as is so often the case with Shinn, he never really takes a distinct position in the discussion. He describes or alludes to all facets of the debate and then places himself somewhere in the middle of the spectrum he has outlined. A very common twentieth-century debate centers on the notion of the "value-free" nature of science. Shinn writes,

> My position has implications for the persistent argument about the possibility of a "value-free" science. This is an important debate, but it is often misplaced. Both sides in the argument make an important case and usually overstate it. Then both sides claim too easy a victory, because they refute a skewed representation of their opponents' case.[25]

In this case, his argument in *The New Genetics*, he places himself further from the "value-free" position than one could have assumed prior to this book, but he resists taking either side, extreme or not, as his own.

Shinn's method of engagement in this debate is significant, because it is so very typical of his style. First, he sets up what he believes to be the strongest case for the "value-free" position. "Among social scientists, the most influential advocates of value-

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[24]Shinn, *The New Genetics*, 148.

[25]Shinn, *The New Genetics*, 78.

free science are probably Max Weber of a generation past and Peter Berger among contemporaries."[26] He then analyzes how critics misunderstand this position and defends it from these specifically misdirected attacks. He summarizes the case. "Their point is that science requires an openness to evidence, whether or not it is pleasing to the scientist. There is a stubbornness about factual data; they do not always fit scientists' wishes or ethical preferences."[27] He then notes that "Weber insisted that the competent scientist (or teacher) give particular attention to the 'inconvenient' facts."[28] Finally Shinn gently offers his own major objection in his typically even-handed manner.

> What Weber and Berger know, but sometimes forget to say, is that science is a social enterprise, supported by industry, government, and foundations. . .However, the social enterprise of science, which greatly influences the direction of research, is value-loaded.[29]

Shinn sees that individual facts in the scientific process may be value-free because data itself is not value-driven, but the social enterprise of science is far from value-neutral or value-free. By now, Shinn contends that the directions taken by research and broader scientific inquiry are inescapably influenced by the values of both the sponsoring institutions and those who do the research. Shinn most clearly states his position in his final book, *The New Genetics*.

> Only in one narrow, though important, respect is science value-free: investigators must, if they are competent scientists, follow the evidence where it leads, even though the evidence may

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[26]Shinn, *The New Genetics*, 78. Shinn explains that he finds the "most interesting debates" "come from the sociologists of knowledge, because they direct their arguments toward public policy."

[27]Shinn, *The New Genetics*, 78.

[28]Shinn, *The New Genetics*, 78.

[29]Shinn, *The New Genetics*, 79.

> refute cherished hypotheses and disappoint ardent expectations. Therefore I oppose two common opinions: one holds that science as a total enterprise is value-free, the other sees science as solely an instrument of power and denies that verification, at some utterly important points, is a value-free process (except for the inherently scientific values of accuracy and honesty).[30]

So science as a discipline must be distinguished from the data resulting from that discipline, in much the same manner as scientists must be distinguished from science. The discipline of science is not free from values.

> The faith that knowledge is good, that the conquest of ignorance is a gain, that increased understanding and power are desirable – all these are articles of faith, not strictly verifiable except within the faith system. At that point, science and theology are comparable disciplines. Both live by faith, and their styles of faith have hazards as well as their promises.[31]

However, Shinn wants more than simply to demonstrate that science is influenced by values. He is also concerned that society might not take its ethical responsibility seriously, might give its power to make important and complex decisions to an elite group that does not necessarily have the skill or training to establish social policy. "Ethical sensitivity is not identical with scientific competence, even though the two qualities sometimes happily coincide."[32] Shinn emphasizes that since all people do not have the same strengths, there is no reason to assume that a scientist's skills in research and inquiry mean that he or she will also be skilled in ethical reflection, although it is possible that both skills might exist in one person. Though both attributes might reside in one person, it does not follow that a good scientist will be a good ethicist. Society must therefore guard against complacency.

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[30]Shinn, *The New Genetics*, 148-49.

[31]Shinn, "Science and Ethical Decision," 133.

[32]Shinn, "Science and Ethical Decision," 134.

Just as some may suggest that science and ethics can be linked, others may deny any reasonable relationship between the two. "The opposite simplification declares, in an excessive scientific detachment and innocence, that science has no responsibility for the consequences of its activity. . . In either case they tend to isolate science from the whole of human social existence."[33] Such separation or isolation will also cause distortions in the creation of public policy.

In his more recent work, Shinn strongly suggests the need for a co-dependent relationship between science and ethics in the establishment of public policy. By the seventies, he had begun to identify the beginnings of this methodological relationship.

> Particularly in the areas of public policy, all decisions have an informational component that is often utterly dependent on scientific inquiry, as well as an irreducibly ethical component that rests in man's commitments and his sense of the meaning of his existence.[34]

Although his thought developed and matured as the effects of science on society became increasingly perceptible, a persistent thread throughout Shinn's thought and career is his almost constant concern that public policy decisions should be made by the public, albeit with significant input from the scientific community. He astutely observed that because establishing methods for making choices is such a complex process, the public often abdicates its rights and responsibilities, preferring to leave such decisions to "experts," who are today most often defined as scientists. The scientific community says either, "We know best, therefore let us make the decisions and do not get in our way," or, "We discover hard, cold facts; that's all. The rest is up to someone else." In either scenario, the scientific community does not interact with the wider community. Shinn

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[33]Shinn, "Science and Ethical Decision," 134

[34]Shinn, "Science and Ethical Decision," 134.

consistently sees this isolation as a fundamental failure in arriving at sound, ethical public policy. He demands that scientists and science (both as disciplinary fields of study and basic knowledge) be neither ignored in making ethical decisions nor permitted to independently make ethical choices for the entire society. Neither extreme is acceptable to Shinn as he attempts to effectively integrate science and ethics into a sound process for public policy decisions.

But, again typically with Shinn, we cannot look to him to clearly delineate the two disciplines. As he writes, "Since scientific and ethical roles interact so intimately, there can be no neat division of labor between them."[35] He goes on to highlight reasons why an intelligible demarcation between the scientific and ethical roles is impossible and suggests appropriate roles for science and scientists in making public policy.

The explosion of scientific information and discovery after World War II heightened the significance of the role of scientists in the public policy process. Shinn points out that:

> It turns out that both the advocates and the opponents of almost any cause can find scientific experts to testify on opposite sides. When the citizen who is not a scientist examines the argument, he may find that he feels utterly incompetent to judge between conflicting testimonies of experts whose detailed arguments he cannot understand.[36]

If science is objective information, and if those who represent its intellectual achievements cannot agree, then the cause of the disagreement must be something other than scientific information. "He [the citizen] may conclude that the argument is understandable less in terms of highly sophisticated scientific knowledge than in terms of

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[35]Shinn, "Science and Ethical Decision," 134-35.

[36]Shinn, "Science and Ethical Decision," 135.

the sociology of knowledge, as described by Karl Marx, Karl Mannheim, and their many successors."[37]

Shinn again makes clear that

> . . .the scientist, like everyone else, is a human being as well as a specialist. As a person, he is influenced by his social situation. His interests and his commitments tell him that a program is or is not good, that it is or is not worth a major effort. And his conviction about the worth of the effort influences his judgment about its feasibility.[38]

In his discussion of the role of scientists and science in public policy decisions, Shinn separates the person involved in the discipline, the scientist, from the field of study, science. He demonstrates what may seem obvious to us but is important to remember: that beyond their scientific specialization, scientists have the same human limitations as non-scientists. Therefore, their contributions to public policy discussions must be placed in proper perspective. They can contribute information that is not readily available or understood by the wider population, but this ability does not imply that they should have free rein in making policy decisions. Though skilled in a specialized field of inquiry that may have major impact on public debate, scientists cannot avoid the bias that is a part of their own humanity. Therefore, their participation in public policy must be divided into two areas: first, their role as providers of significant scientific information, and second, their status as citizens like all others. Each distinctive role must be respected and preserved.

All who act in the realm of science distort the "purity" of science whenever they attempt to deduce the social significance of scientific discovery. After establishing this

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[37]Shinn, "Science and Ethical Decision," 135. The sociology of knowledge became a critical aspect of Shinn's methodological approach.

[38]Shinn, "Science and Ethical Decision," 135.

basic tenet, Shinn continues the analysis by placing science itself in its social context. "It is the even more significant fact that science always operates in a cultural context and that even highly technical scientific *opinions* [emphasis mine] are likely to be influenced by economic, political, ethical, and religious factors."[39] Shinn reminds his readers that there is a difference between scientific fact and scientific opinion. For Shinn, facts have their own independent reality and exist outside society, while opinions, growing out of human experience, are influenced by all the social factors known to humanity.

In defining the limits of scientific understanding and its usefulness in creating public policy, Shinn makes two recommendations. The first concerns the scientific review process and the notion of objectivity.

> First, some institutionalized effort should be made to draw on the judgment of panels of scientists who are a step removed from immediate participation in projects so that some scientific testimony is available from specialists not testifying directly for their own efforts and employers. (To that extent I still see some validity in the classical ideal of scientific objectivity.)[40]

It should be noted here that in his more recent work, Shinn's terminology shifts subtly, but significantly, when he addresses the issues of science and ethics. In his most recent book, he no longer uses the term "scientific objectivity" in reference to scientific information or knowledge. Instead, in *The New Genetics*, he develops a new notion: the verifiability of scientific knowledge. Thus he uses "the term *science*, [italics Shinn's] very broadly defined, to represent two elements of this worldly knowledge." His definition of science addresses information, the results of the scientific inquiry.

> The first is verifiable information. Verifiable does not mean infallible. Scientific knowledge is always subject to

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[39]Shinn, "Science and Ethical Decision," 137.

[40]Shinn, "Science and Ethical Decision," 137.

> revision in the light of further investigation. But verifiable knowledge is open to scrutiny and testing by a wide variety of people; it is many steps removed from arbitrary and capricious assertion.[41]

This emphasis on verifiable information allows additional review and examination by scientists and others. If the data can hold up to careful scrutiny, then it is less likely that it will later prove to be flawed by some methodological or experimental procedure. The scientific community's concern for verifiable knowledge allows Shinn an easy transition to his concern for and insistence on a wider spectrum of scientific judgment.

Shinn's second recommendation for useful scientific understanding is that a broader spectrum of opinion, even in scientific matters, must be solicited. Decision makers falsely assuming that scientific opinion would be the same from all scientists tend to listen to one scientific report and assume that all other reports would be the same. Rather, decision makers must hear from multiple scientific resources to discern the possibly biased nuances of the scientific material presented for consideration. Further, bias tends to be mitigated if opinions are offered by people from various social locations. Since scientific information or expert opinion established in light of that information matters here, then decision makers cannot assume that expertise may be forthcoming from someone in a completely different field. Scientists must be the ones to give expert testimony on science.

Therefore, other differences in social location must be emphasized. Shinn's suggestion that additional input be given by scientists whose expertise is similar, but who are not involved in the specific project or employed by the same organization, allows for increased freedom of opinion and decreased influences from economic security. It might

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[41]Shinn, *The New Genetics*, 74.

be said that for Shinn, a sound decision requires a broad base of input, as evidenced by his suggestions that scientific support for any social policy decision must come from more than one scientist, and that scientific information is best presented by those not directly associated with the project. As an example, Shinn describes a 1969 Congressional debate in the U.S. concerning the scientific-technological reliability of computers used in the Safeguard Antiballistic Missile system. Such issues of reliability, accurate or faulty, led concerned groups to question the societal value of the entire system. Daniel D. McCracken, founder of Computer Professionals Against ABM, testified against the proposed system. "As it turned out – inevitably, I am tempted to say – the Pentagon had no difficulty in finding experts to testify that the computer system was feasible. It did not have to look hard for such experts, because it had them on the payroll."[42]

After proposing how procedural stipulations could broaden the types of scientific testimony and review one should secure, Shinn moves to a methodological recommendation for the population as a whole when addressing matters of public policy.

> The rest of us in the body politic, although recognizing the immense importance of science in contributing to public policy, need not be intimidated into silence on public issues by the prestige of men with knowledge and skills that we lack. Particularly when such specialists are not unanimous, it may be that their opinions flow not solely from their expertise but also from their human prejudices and commitments; and in that area we have as much right to enter into policy making as they.[43]

As a social ethicist, Shinn wishes that society, or "the body politic" as he calls it above,

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[42]Shinn, "Science and Ethical Decision," 137. Shinn ends this section of his essay by quoting from then Deputy Defense Secretary David Packard, who strongly supported the ABM system. Shinn resisted the temptation to note that Packard was the co-founder of the computer company Hewlett-Packard and that after his tenure in the Defense Department, he would return to his computer corporation.

[43]Shinn, "Science and Ethical Decision," 137-38.

will never relinquish its rights and responsibilities when making wide-ranging and ultimately crucial ethical decisions.

Of course, the decision-making group must maintain its scientific advisors and suppliers of information. For non-scientists to dictate scientific procedure to the field of science would be unacceptable. "Science has its own methods of experimentation and verification, and it rightly refuses to defer to external authority."[44] So must it also be with other groupings of people. Societal groupings – voluntary associations, churches, towns, states, etc. – cannot defer to external, unrelated entities in creating their social policies, which are an expression of their ethical underpinning; they must take responsibility for their own decisions. Nor can or should scientists usurp society's decision-making prerogative simply because of their enormous skill in obtaining and explaining scientific information. As Shinn insists, information is but one aspect of the decision-making process:

> . . .science alone does not prescribe the human good. It can, within a social and ethical context, contribute to the good; but it cannot be the sole or final arbiter of the good. No pile of data, if it reaches the moon, dictates an ethical decision or a public policy.[45]

Shinn demands that scientific experts take responsibility within the scientific domain, but he precludes them from using their authority as experts in science to take on other aspects of public policy making. The citizen who happens to be a scientist does not relinquish the rights and responsibilities granted the individual, but he or she may not claim additional authority in areas beyond his or her expertise. Society has a right and a

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[44]Shinn, *The New Genetics*, 77.

[45]Shinn, *The New Genetics*, 77.

responsibility to make its own decisions. Anything less, or more, would be ethically and methodologically unacceptable to Shinn.

An additional question about the relationship between science and public policy is: Are there limits to scientific inquiry that the broader society can or may place on the scientific community? Shinn insists that "science has its own methods of experimentation and verification, and it rightly refuses to defer to external authority."[46] He joins a chorus of scholars who have shared numerous examples of failed attempts at controlling science.

> Religious and political authorities have often erred, foolishly or disastrously, in trying to dictate scientific conclusions. That was the mistake of a papacy condemning Galileo, of fundamentalists refuting geological and evolutionary sciences by quotations from the Bible, of Soviet authorities prescribing the genetic theories of Lysenko. They did not respect the legitimate autonomy of science.[47]

Yet the question remains, "Are there ethical limits that can be imposed on scientific research and discovery?"[48] Shinn suggests five possible answers, to each of which he applies an ethical analysis. His first answer is, "There should be no restraints," which he regards as an appropriate response ninety-five percent of the time. However, the situations that might occur in the remaining five percent (incidences that might call into question the value and dignity of humanity, for example) force him to reconsider his initial support for unlimited research for the sake of knowledge.

His second answer comes, as he states, from his friends in the scientific

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[46]Shinn, *The New Genetics*, 77.

[47]Shinn, *The New Genetics*, 77.

[48]Shinn, "Discussion: Are There Ethical Limits to Scientific Discovery?" In *The Nature of Scientific Discovery: A Symposium Commemorating the 500th Anniversary of the Birth of Nicolaus Copernicus*, edited by Owen Gingerich, 596-604. Washington, DC: Smithsonian Institution Press, 1975, 596.

community, where some researchers recognized that some limits should be placed on the research that they do. Following their lead, Shinn attempts to distinguish between basic and applied research. If that distinction is made, then some restraints might be placed on applied research, while freedom of inquiry might remain open to basic science. By making these distinctions, members of the scientific community hoped that research's ethical failures would occur only during the process of applied research. For the sake of his argument, Shinn accepts this premise, but he still finds this an inadequate response to ethical limits for research. In light of the discussion above, it is no surprise that Shinn points out, even as early as 1975, that he could not differentiate between basic and applied research. He also doubts that scientists themselves could successfully articulate the distinction. Without that distinction, it is not possible to place consistent limitations on one type of research and not the other. The need for an alternative rationale for limitations on research still persists.

His third response assumes that applied research, if definable, may have limitations imposed upon it, but for him, the issue of boundless and unlimited basic research still remains. Commenting on society's prohibition against using biological twins as subjects for experimental purposes, Shinn suggests that: "Thus human dignity imposes some limitations on research. This is not because the knowledge desired would be bad or evil. It is simply not worth the human and ethical cost of the experiment."[49]

His fourth response addresses issues of research that might compromise human dignity or inflict pain. In his third response, he assumed the protection of human dignity as a presupposition. Here, he asserts that when harm will clearly occur, the research must be limited. He now considers unknown, but potential, harm to human dignity as a

[49]Shinn, "Ethical Limits to Scientific Discovery?" 600.

constraint on research.

Shinn's final answer to limitations on research addresses priorities.

> Most of the time we are not deciding, shall we do this research or shall we outlaw it? We are deciding, shall we finance it? Here there are great issues of priorities. These are partly chosen just for scientific reasons; some things are worth financing because they have much more possibility of discovery than others. But some choices have to do with a whole set of cultural values and attitudes. Shall we put a lot of money into research on heart transplants, which probably by their nature can help only a small number of people? Or shall we put the money into other things?
>
> The issue is not prohibitions, but public policy. It simply reminds us that every decision to undertake research, at least expensive research, involves assignment of some of the resources of the society, and our valuations enter in. These valuations are not solely scientific, but cultural, and they may come out of sheer prejudices or may come out of deep convictions.[50]

Only occasionally does Shinn support ethical concerns that directly limit science research. One example is research that harms the subjects without the subjects' approval or knowledge. Like other areas of research, scientific research can be limited on the basis of choices among defined priorities. Such choices are based on values, but the choices do not directly characterize any single research project as unethical. Normally society determines one project to be of more benefit than another. But even these choices are based on societal values rather than on scientific data and information.

Using the work of Roger Shinn as an example of ways in which to engage the realms of ethics and science into a constructive dialogue, it becomes clear that the underlying theme with regard to science as an ethical concern is one of relationship.

> The intriguing and puzzling aspect of the debate is the relationship between the two ends [science and values] of the continuum. I have sometimes said that the second most

[50]Shinn, "Ethical Limits to Scientific Discovery?" 601-02.

> important issue in public ethics is to distinguish between the two. But that distinction is deceptive if it leads to the isolation of the two. So the most important issue is to see their relationship[51]

This relationship between science and ethics is not simply a discussion between two independent aspects of our fields of knowledge. The presence of technology, or applied science as noted earlier in this paper, is a reality in and of itself and alters the dynamics of any discussion or relationship that the separate fields of science and ethics may have.

The twentieth century can certainly be viewed as the century of the most technological advancement in human history to date. Due to technological development, the worldview of wealthy cultures today is much different than it was only one hundred years ago. Much of this technology trickles down to impoverished cultures, affecting their lives and worldview as well. All of this technology creates new ethical challenges for humanity. In the midst of technological abundance, we must remember that social progress is not the direct result of new technologies. Technologies may solve certain problems, but the technologies themselves also create new problems for humanity.

At one level, technology is applied science. Yet, a fuller understanding of technology must include the realization that this is science applied within a social process for a human agenda. Technology is pushing humanity to its limits, yet the magic technical solution to human problems remains beyond our grasp. In the twentieth century, technology rode on a wave of tremendous intellectual advancement. Fields of knowledge became so complex that the need to specialize limited the possibility that any single person could command all the knowledge necessary for making sound decisions. So it was that

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[51]Shinn, *The New Genetics*, 76.

the complexity of society often moved people, undoubtedly including some scientists, to "let the experts decide."

In recent decades, we have seen society allow, and indeed encourage, the "experts" to abduct decision making. How often do we hear from the floor of Methodist conferences that the individuals or committees that are bringing forth proposals to address some issue of public policy are not the experts, and who are we, as Methodists, to stick our noses into areas about which we have no expertise? This approach inevitably paralyzes the church, preventing it from doing its most essential business of bridging the gap between the ethical principles individual Christians are meant to live by and many of the acutely pressing social issues that face our communities and world.

We must develop an awareness amongst scientists, technologists, and the general public that whenever knowledge is used, it is, and must be, used within a matrix of both power and values. It is at that point that we must engage ourselves as people of faith in the discussion. The all-pervasive realm of technology has caused a massive shift in our public discourse. Technology may be considered a concept that began to emerge in the nineteenth century and came of age in the twentieth, but the concept of technology as seen as the application of scientific knowledge for a desired social outcome would have been foreign to Wesley. Clearly, Wesley himself bridged the realms of science and faith. This has been documented at many points,[52] but the pervasiveness of technology as a way of life was simply unknown to Wesley. Only as the church has attempted to address the crucial issues of the last half-century have we recognized that technology is a social process that has been granted powers that not only rival but exceed those of any religious

[52]For example, Frank Collier's *John Wesley Among the Scientists* (New York: Abingdon Press, 1928) and J. W. Hass, Jr.'s "John Wesley's Views on Science and Christianity," *Church History*, 63, 1994, 378-392.

faith community.

Recognizing that the realms of science and technology have sets of values associated with them that rival the value structures of religious communities in general, and Christianity specifically, we must develop methods by which we may enter into fruitful discussion. A renewal of the concept of middle axioms may provide one way by which we might enhance the quality of these conversations. Initially, middle axioms were conceived as a way of moving from general principles to concrete action, and that movement was seen as appropriate solely within the faith community. But public policy is not generally decided within faith communities; rather, in, and perhaps as a result of, our complex mix of value systems, it is determined in the wider society. With a sincere commitment to truly engaged conversation with other communities that form the broader community of discourse, participants must bring to the table not just their own general principles, but also nuanced middle axioms that faithfully represent the essence of their value structures and yet also provide avenues of concrete and valuable discussion leading to eventual consensus for viable public policy.