

Chapter 14

The Power and Limits of Professional Knowledge (And of the Disciplines that Underlie Them)

Professional Fallibility and the Glut of Information

The sheer quantity of information we are exposed to grows exponentially. So immense is it that no one person can acquire anything but a tiny and diminishing percentage of it. To add to our burden, much of the information generated is disseminated *with* a “spin,” an agenda, a vested interest defining and interpreting it. Much information comes to us from professionals, persons officially certified as possessors of important knowledge. Yet the quality of what we are offered is very uneven. Our welfare depends upon our ability to do a good job assessing it. Doctors, lawyers, accountants, economists, media pundits, and many, many others tell us what we should and should not do, what is required for, and what will threaten, our welfare.

In this chapter, we suggest some ways to gain critical leverage on the information and advice given to us by professionals and by the disciplines that underlie professional learning and practice. We shall build on the insights of previous chapters. We shall therefore assume that you are now keenly aware that all humans are fallible, in predictable ways:

- *Subject to a tendency to egocentric thinking*—which leads a person to assume that his concerns are more important than those of others;
- *Subject to a tendency to sociocentric thinking*—which leads a person to assume that the groups to which he belongs are superior to others;
- *Subject to a tendency to self-deception*—which leads a person to twist the facts to achieve immediate self-justification (at the expense of an honest owning of mistakes and mis-deeds);

- *Subject to a lack of intellectual “virtues”*—which leads a person to blind himself to the extent of his ignorance, his inconsistencies, his failure to enter sympathetically into views that disagree with his own, his tendency to avoid complexity, and his fear of disagreeing with members of groups whose approval he seeks;
- *Subject to a tendency to violate basic intellectual standards*—which leads a person to think in ways that are often unclear, inaccurate, imprecise, irrelevant, superficial, narrow-minded, illogical, and unfair;
- *Subject to the influence of vested interest*—which leads a person to focus on power, money, and prestige (usually at the expense of the rights or well being of others).

These facts alone should make us wary of the pronouncements of any human being, “professional” or otherwise. Yet we need to be more than wary. We must know where to look for probable weaknesses and how to recognize likely strengths.

All information is not created equal. All professions are not on the same level of credibility. We should distinguish between professionals of different types and learn when it makes the best sense to question them. We should understand the academic disciplines that underlie the professions and the manner in which they are taught and learned. The first half of the chapter will deal with a sample analysis of some of the professions, most notably those of engineering and medicine. The second half of the chapter will deal with the disciplines that underlie the professions and the manner in which they are represented, taught, and learned. We shall then focus on the gap between the manner in which disciplines represent themselves to the public (in order to gain funding in the academic world) and the actual consequences of the manner in which they are taught and learned.

Let us begin with the contrast between the ideal of professional knowledge and the manner in which professional thinking is applied in the real world.

The Ideal of Professional Knowledge

Professional knowledge is, among other things, a form of power. It gives advantages to those who have it and disadvantages to those who lack it. For example, it can be used to minimize or maximize suffering. It can serve selfish human desires or meet basic human needs. It can be used to create conditions for conflict or those that contribute to peace and understanding. It can be used to destroy or preserve the environment and the lifeforms that inhabit it. It can contribute to a less just or a more just world. It can advance irrational or rational ends.

To the extent that we are committed to fair-mindedness, we are committed to professional knowledge being acquired and used to minimize human suffering, to meet basic human needs, to preserve rather than destroy the environment, to contribute to a more just world, and to serve rational rather than irrational ends. In

providing justification for the public funding of instruction in the various professions, spokespersons argue that their professions serve ends in the public interest.

Ideally, professionals acquire knowledge not to benefit a selected few but, rather, to distribute benefits in the broadest and most just way. Even those who argue that the pursuit of professional knowledge should be free and untrammelled support that argument with the view that the free-wheeling search for professional knowledge will confer, in the long run, the greatest benefit on the largest number. But to what extent are professions serving these higher ends? To what extent are they fulfilling the promises made on their behalf when they seek funding for public instruction and for research? How can we learn to think about professions, and within our own, in the most powerful and rational way? These are the questions that lie behind the critique of professional *thinking*.

Who Should We Believe?

This chapter presents a plausible argument for suspecting a significant gap between the promised benefits of the various professions and the actual effects of them. It makes no further claim. How large that gap is in any professional field is a matter for systematic study. In the next chapter, this general argument is followed up with a more detailed argument for the field of psychology and mental health. In both cases, we would expect numerous qualifications and corrections to emerge from further inquiry.

In any case, as consumers of professional knowledge and advice, we need to think critically in deciding who to believe and what to do with such advice. Consider the following excerpt from an article in the *New York Times* (November 21, 2000):

N.A.S.D Accuses Dean Witter of Fraud in Sale of 3 Funds

Legal troubles continued to mount yesterday for Morgan Stanley Dean Witter & Co. when securities regulators accused the investment bank's brokerage unit of misleading thousands of investors into buying mutual funds that resulted in losses of \$65 million.

In a rare case of litigation between a major Wall Street firm and the National Association of Securities Dealers, the securities industry's self-regulatory organization, Dean Witter Reynolds is being accused of fraud for the way it sold three bond funds in 1992 and 1993. Dean Witter sold more than \$2 Billion of shares in the funds to more than 100,000 investors, many of them beyond retirement age and some of them elderly, the association's regulatory arm said in a complaint filed yesterday.

Dean Witter told its brokers to promote the funds as safe but high-yielding alternatives to certificates of deposit without adequately disclosing how much riskier the funds were, the complaint said.

In this case, some 100,000 investors did not use good thinking in trusting the recommendations of professionals at Dean Witter. As consumers we must develop

our ability to evaluate the thinking of the professionals we hire to support our interests. Otherwise we can too easily become victims of those more concerned with serving their interests than ours. We cannot assume, in other words, that professionals necessarily have our best interests in mind. As critical thinkers, we learn to look beyond the rhetoric of professionals to the actions in which they engage. We then analyze that behavior in terms of the thinking behind it.

This chapter and the next are included in the book because, to become a critical consumer of information, it is essential that one gain some sense of how to avoid or deal with the possible problem of bad advice, or worse, malpractice, on the part of professionals. By malpractice we mean any wrongful use of professional knowledge or information that leads to needless waste, unnecessary suffering, gratuitous harm, or injustice.

Of course, the problem is not always confined to the acts of an isolated group of individuals, as in the case of the Dean Witter scandal. Consider the great U.S. Savings and Loan debacle. In this case, a whole industry (through their lobbyists) persuaded the U.S. Congress to remove regulatory restrictions that prevented them from lending money without a specified level of collateral. The slogan of “de-regulation!” substituted for sound thinking. In essence, lobbyists asked the public to guarantee the solvency of Savings and Loan institutions while allowing them to make questionable loans. The result of the collapses that followed was an additional debt burden of approximately \$9,000 for every man, woman, and child in the United States.

The asbestos and tobacco industries’ have engaged in similar self-serving misrepresentations over many years—with significant harm to the public. In these cases, the public was assured by industry spokespersons that there was no danger to them at the same time that numerous official and “professionals” in the industries knew that their product constituted a mortal threat to the consumer. Government officials trusted the integrity of the industry spokespersons, who, it turns out, were more concerned with profit and public relations than the public good.

Or consider the recent report issued by the National Academy of Sciences on medical errors (*New York Times*, Nov. 30, 1999). The report pointed out not only that medical mistakes cause up to 98,000 unnecessary deaths per year, but also that health care providers could reduce the number of errors by 50 percent in the next five years by simply collecting and analyzing data on unsafe practices, as does the aviation industry. If this article is accurate, then present instruction in the health care professions is resulting in an unacceptable level of errors and malpractice. Ideally, learning to think “medically” should have preempted this large-scale problem from arising in the first instance.

Learning to think about a profession in a rational way requires that we understand both the strengths and weaknesses of the profession. Each profession represents a way of thinking that has power and value. But no professional way of thinking is better than the quality of thinking of the individual professional who applies it. For

remember, all professional thinking necessarily occurs within the context of the full humanity of the thinker and in a world in which a struggle for power is continual. One problem of which we need to be aware is the problem of false loyalty to a profession on the part of many if not most professionals. Another is the problem of non-disclosure, of obtaining information that takes into account the behind the scene activities of powerful interests that may set aside the public good for the short-term gains of the few.

True and False Loyalty to a Profession

True loyalty to a profession is a product of the commitment to ensure that the profession, both in general and in particular cases, serves the public interest. False loyalty to a profession is formed either by an uncritical acceptance of the “ideology” every group engenders, or arises as a product of a fear of being disapproved or punished by other members of the profession—if one deviates from expected behavior. In being socialized into a profession—and socialization is part of being trained in a profession—one learns how to present oneself to outsiders, how to express one’s authority as a professional, and how to protect fellow professionals from criticism—except in group-approved ways.

True loyalty to a profession is born of recognition of the profession’s potential power for good in the world. It is not blind commitment to practices in the profession as they stand. It is not given by the intensity with which one defends the profession. The fact is that ethically sensitive persons who are also astute thinkers find themselves, from time to time, in dilemmas in which they are torn between their consciences, on the one hand, and the in-group pressure not to publicly criticize the profession, on the other.

Consider the legal profession. True loyalty to the profession of the law, for example, derives from a commitment to the creation of a society in which just laws are applied justly to individuals and institutions, irrespective of the power, wealth, and social status of those individuals and institutions. Such loyalty recognizes that all the legal professions are to be judged by the degree to which they enhance personal and social justice. Such loyalty begins with a recognition that the law as applied in society is far from the law as it should be applied, and that justice is not always served by the established legal system.

False loyalty to the legal profession takes the form of a defense of those dimensions of the law that fail to serve the end of justice—sometimes out of fear, sometimes out of ignorance, and sometimes out of vested interest. When persons are socialized into a profession so as to become uncritical defenders of the present practices of the profession; both the profession and the potential good of the profession suffer. To put this another way, a person retards the development of a profession by uncritically defending it. This defensiveness engenders a false sense of loyalty. Conversely, when practitioners recognize weaknesses in a profession, they are well on their way to

contributing to its strengths. It is a strength, an important strength, to recognize one's weakness. Unfortunately, we have not yet reached the phase of development of human professional knowledge wherein each profession, as taught, routinely discloses publicly its most salient weaknesses and failures.

We should all come to recognize the limitations of those professions, with which we must deal, beginning with the problem of false loyalty.

The Gap Between Fact and Ideal

Two objective phenomena—human fallibility and vested interest—account for why few, if any, professions are close to approximating the ideal of professional knowledge and practice. These two phenomena are at the root of much of the misuse of professional knowledge in the world:

1. **Human fallibility:** All professional knowledge is acquired, analyzed, and put to use in the world by individuals subject to the pitfalls of human weakness, self-deception, and a variety of pathological states of mind (e.g., prejudice, egocentrism, or sociocentrism).
2. **Vested interest:** Human professional knowledge exists in a world of power, status, and wealth. The struggle over all three significantly influences what information is acquired within any profession, how it is interpreted, and how it is used.

It follows that we should be skeptical of any description of a human professional knowledge-constructing enterprise that characterizes itself as an approximation of an ideal. Rather, we should approach human professions as in some state of contradiction between an announced ideal and actual reality. In this way, we can realistically take into account the weaknesses as well as the strengths of the profession and thereby contribute to the higher state of development of the profession.

If we begin with the hypothesis that there is some gap between the ideal of any profession and its actual practice, we are much more likely to identify the misuses of information and professional knowledge on the part of human professions. We will come to see that, to some extent and in some discoverable ways, the phenomena of human fallibility and vested interest are operating. No profession has isolated, or could isolate, itself from the irrational dimensions of the human mind in action in human affairs. And, as always, we deal with irrationality best by raising it to the level of conscious recognition, not by sweeping it under the rug or denying it. All illusions about present practice become blinders rendering us incapable of protecting our interest and impeding full development of the profession. Both those who use information disseminated by professionals and those who generate that information should have a realistic conception of the profession.

So we begin with two premises:

1. Every profession has great potential for contributing to human welfare in the world.
2. Nevertheless, the information and professional knowledge that professions generate are subject to mistakes, distortion, and misuse by fallible, self-interested humans at every stage of collection, construction, and use.

We should not assume, then, that professional associations, schools, or universities—even official ethics committees set up by professions—are exempt from irrational influences. We should not assume that professions are now, or at any previous time in history were, motivated to disclose their weaknesses. We should not assume that any profession is willing to put us on guard against self-deception or vested interest in the profession's present practices. For example, only rarely do professions document weaknesses in the professional preparation of those certified in the profession, and when they do, that documentation is frequently marginalized, discredited, or restricted to insiders.

Accordingly, as critical thinkers, it is helpful to recognize the inevitable difference between theory and practice. With the hypothesis that in all likelihood some gap exists, we are much more likely to discover it. With the recognition that any documentation of a gap is likely to be resisted, we are more likely to be politically astute in its disclosure.

Of course, our hypothesis of inconsistency between the ideal and real should not prevent us from noticing very different degrees and forms of inconsistency. Some professions are undoubtedly much closer to the ideal. Some professions are more vigilant about the pitfalls that attend their practice. We, in turn, should guard against our hypothesis becoming a self-fulfilling prophecy in our minds, for then it itself constitutes evidence of self-deception on our part. Though we should be alert to problems in a profession, we should not see problems where none exist. Let us now look at a couple of sample professions and begin to consider further strategies to use in our thinking.

Assessing A Profession or a Professional Conclusion: Matters of Fact, Matters of Opinion, Matters of Judgment

To effectively assess thinking within a discipline, it is important to become proficient in distinguishing three kinds of questions:

1. Those for which it is possible to achieve a definite, verifiable answer;
2. Those for which all answers are matters of personal preference;
3. Those for which reasoned judgment is essential and wherein proposed, conflicting, and reasonable answers must be evaluated to determine which are stronger and which weaker, as responses to the question.

The first and third kinds of questions—matters of fact and matters of judgment—are most important to distinguish in evaluating professions and the questions they take up.

This being so, it is very important, when assessing professionals, to have some sense of the nature of the “discipline” underlying the profession and the manner in which that discipline is typically used as well as the way it is being used in a given case. For example, there are many questions answered by engineers—chemical, electrical, hydraulic, marine, and mechanical—which have definitive answers obtained by inserting objective data into established formulas based on mathematics or physics. For example, if a mechanical engineer needs to figure out the power developed in the cylinder of a reciprocating engine, he simply divides the foot pounds of work performed by the piston in one minute by 33,000. His data include the mean effective pressure (in pounds per square inch), the length of stroke of the piston (in feet), the area of the piston (in square inches), and the number of working strokes per minute. There are literally hundreds of thousands of questions engineers are called upon to answer which have definite answers. These answers can be calculated by established procedures based on physical science and mathematics. The probability of error in such questions is low. There is an established method for verifying the accuracy of the answer.

Of course, we should recognize and remember that not everyone working on an engineering project is an engineer, not every engineer is doing engineering, and not every question raised in engineering is a question with a definite answer. We should be alert to the misuse of the term “engineering” in such expressions as *management* engineering, *sales* engineering, and *business* engineering—where the authoritative sound of the word is used to hide practices lacking the scientific and mathematical basis of ‘engineering’ in its proper use.

Let us take the example of engineering a little further. Even though engineering is based on science and mathematics, it does not follow that all of its questions have definite answers. There are many engineering questions that for best settlement, require wit, ingenuity, judgment, and practical experience. For example, most engineering projects involve a sequence of planning, design, creation, and economical operation of a process that entails building a structure. This process as a whole commonly involves many questions of judgment, in addition to many questions of fact. The answers to questions become most definite the more specialized and limited they are. So when specifications are set for a particular part required, and those specifications are fulfilled by the production of that part, there is typically a high degree of scientific accuracy and precision delivered by the engineer or engineers in question. This does not mean a mistake cannot happen, but it does mean that a mistake is rare and can be verified as such.

However, engineering projects often involve large public expenditures and/or have significant environmental and economic implications. The public interest may be deeply involved. However, with the injection of politics and vested interest,

objectivity often suffers a severe blow. Press releases, public relations campaigns, and other professional “spin doctors” whose skills are those of rhetoric, public relations, and propaganda shape the flow of information to the public. Their services are often for sale to the highest bidder. Such professionals are adept at fostering public impressions and views. They do this not principally by evidence and argumentation, but through understanding the psychology of the public: its impatience with complexity, its susceptibility to fear and suggestiveness, and its general impressibility.

Consider the field of hydraulic engineering. The field itself is based on physical laws governing water and other liquids. But water of sufficient quality and quantity is essential to human well being. There is often, therefore, a great deal of money involved in gaining access to water. The result is that major money interests are often importantly involved. The well being of people is also at stake. How water projects are conceived and carried out becomes a matter that goes far beyond questions of engineering.

Of course, when people with vested interests are involved, they cannot be trusted to represent the facts in a fair and objective manner. Someone must argue for the public interest, and that argument must be given sufficient attention in the media to affect public view. Of course, what the media covers and how they cover it depends on persons whose thinking is often based on “media” considerations in the first place. We cannot assume that media pundits are excellent thinkers or are dispassionate judges of the public interest.

Consider the Panama Canal. As an engineering project, it was a great achievement. However, the political machinations that proceeded and accompanied it, together with the corruption and death that it entailed, were horrendous. In the process, President Teddy Roosevelt, in effect, stole the necessary land from Columbia and conspired in the creation of a new country, Panama. The mass media in the U.S. presented the facts of the case as the government represented those facts. The public was not in a position to know what was going on behind the scenes.

A similar tale of bribery, corruption, and theft of public lands accompanied great engineering projects of the last half of the 19th Century in the U.S.—the building of canals and railroads. For excellent documentation of this history, consult especially Gustavus Myers’ excellent book, *History of the Great American Fortunes* (1908).

Engineering, then, is a science and an art. Many of its questions have definite, demonstrable answers. But both the context for the use of engineering, and the consequences for human good and ill, are not simple matters of science or math. They connect with politics, economics, vested interests, and environmental values and concerns. The broad issues generated are often complex matters of judgment. They require special scrutiny on the part of anyone with the ability to think critically. And the position of engineering, as a field, is parallel to those of other scientifically based disciplines.

Medicine, for example, like engineering, is both a science and an art. Many of its questions have definite, demonstrable answers. But very often, internal politics bulks large, often larger than in engineering. We can see this in examining its history. Consider:

When Edward Jenner hit upon the notion of a smallpox vaccine in 1797, the Royal Society of London scolded him for risking his reputation on something ‘so much at variance with established knowledge, and withal so incredible.’ When the Hungarian physician Ignaz Semmelweis figured out that physicians’ unwashed hands were causing fatal infections among new mothers at the University of Vienna in the 1850s, he lost his own position there. (*Newsweek*, Nov. 27, 2000)

Similarly, in our day, the medical field is highly resistant to the notion that viruses and bacteria play a large part in heart disease, cancer, and other modern plagues—despite growing evidence that they do (Ewald, 2000). According to biologist Ewald, when Barry Marshall first reported his findings on the infectious cause of ulcers in 1983, his peers ignored the discovery until seven years later when it was highlighted in a magazine.

The complexity of modern medicine, including the extent of its ignorance, is just now being recognized by some. Some important medical problems are documented in a book entitled *Clinical Epidemiology: A Basic Science for Clinical Medicine* (Sackett, Haynes, & Tuigwell, 1985), with emphasis on the use of clinical diagnostic strategies, the selection of diagnostic tests, and the interpretation of diagnostic data. Systematic problems are documented. At the University of Arizona College of Medicine, Ann Kerwin, Maryls Witte, and Charles Witte (1995) have founded the Curriculum on Medical Ignorance. This program fosters the idea that it is only through knowledge of our ignorance that we can learn, and that learning itself presupposes ignorance. Through the program students are encouraged to “question, ponder, revise, create, discover, and learn how to learn.”

Ivan Illich (1976), in his classic book, *Medical Nemesis*, assembles a mass of evidence from authoritative medical sources to support the thesis that: “The medical establishment has become a major threat to health. The disabling impact of professional control over medicine has reached the proportions of an epidemic.”

Research in medicine has principally been controlled by those who deeply believe the orthodox theories of health and disease. Research based on new theories has always faced opposition from the status quo. Resistance to new theories is not typically a product of any principle of science itself, but rather of the power of the personal ego of individuals, the pressure to conform to the group, and vested interest. Science is not the only thing that influences the minds of doctors and other medical practitioners. For example, though much of the progress toward the eradication of disease has emerged as a result of preventative public health measures, only a small portion of research and medical expenditure has gone toward prevention of disease. Doctors are trained with the implicit view that medicine plays its role best by

“curing” diseases rather than preventing them. Diagnostics and treatment, not public policy and prevention, are the guiding motifs. What is more, doctors are not usually paid for patients who don’t get sick, but rather for those that do.

What, then, are we implying? Not only the obvious, but also the not so obvious. Obviously, we must be on the outlook for egocentrism, socio-centrism, and self-deception inappropriately influencing professions. The following is less obvious:

- that we should carefully distinguish questions of fact from questions of judgment;
- that we should especially scrutinize the influence of politics, economics, and media spin doctors on the presentation of “facts.”
- that we should always distinguish public interest from special and vested interests.

The Ideal Compared to the Real

Another way to approach professions is through an analysis of the disciplines underlying them and the manner in which those disciplines are represented and taught. We of course recognize that every profession is a powerful mode of thinking that can make a significant contribution to human welfare. However, we must be cautious not to assume that ideal conceptions of the disciplines are equivalent to their actual practices. Rather, reasonability requires that we hypothesize some gap between expressed ideals and actual practice.

Let us therefore experiment with the process of comparing and contrasting the relationship between the ideals that are implied in the way disciplines represent themselves publicly (at the universities and colleges) with the actual consequences of their instruction.

We shall examine some initial elements of this critique. Our examples are not advanced as flawless examples of critical thinking in action but, rather, as illustrations of how we might begin to put the above insights into action in our mode of thinking. We will begin by looking at a variety of academic disciplines from this perspective, followed by some initial reflections in each case.

In this chapter, we will begin with mathematics and then consider the so-called hard sciences of physics, chemistry, and biology. We will then reflect upon the human sciences, the so-called soft sciences, and finally, literature, the arts, and philosophy.

Each case is guided by two important insights:

1. All professional knowledge in use in the world is based in academic disciplines and is subject to the pitfalls of human fallibility on the part of individuals using it.
2. The teaching of all professions occurs within a culture, and is thus influenced by the pursuit of power and vested interest within the culture.

Professions Based on the Ideal of Mathematics and Abstract Quantification

If there are professions free from human fallibility and vested interest, it is those based in mathematics, for presumably the study of abstract quantification favors no group over any other and, therefore, seems least likely to encourage or engender self-deception in its practitioners. But even a cursory examination of the topic suggests a gap between ideal and reality even here.

Let us briefly review the promise of math instruction itself, a promise used to justify the large sums of money necessary to maintain math instruction at all levels of schooling. That promise can be stated in the following terms:

We live today in a world in which mathematics proficiency is increasingly important to success in life. Our world is complex and technological, and mathematics is crucial to both understanding its complexity and operating within its technological dimensions. Our investment in mathematics is sensible because, through it, we are providing society with the mathematicians, engineers, and technical experts necessary to meet worldwide competition. What is more, mathematics proficiency is important to everyone. Many problems and issues of daily personal and public life have an important quantitative dimension. Large-scale math instruction provides the citizenry with the quantitative concepts, principles, and tools by means of which they are able to perform successfully in both their personal and public life. Through it, persons learn to transfer logical thinking to other domains of professional knowledge and thought.

To what extent is the ideal realized? How far are we from it? What are some of the hidden consequences deriving from large-scale math instruction that the promise of the ideal does not take into account? What alternatives do we have to our present practice? To what extent are we getting what we are paying for? To what extent is our social investment in mathematics having the promised effect? To what extent are we realistic in our conception of the value and real consequences of large-scale math instruction at every level of schooling?

In our view, there is a large gap between the promised social gain from math instruction and the actual result. The gap is twofold. The first problem is inherent in the negative consequences for persons unable to perform at some minimal level at school—those who fail at school math. The second problem is the failure of citizens who are certified by schools as competent in math who do not use mathematics successfully in dealing with public and social issues. We are alleging, then, that both the persons who fail officially and those who pass officially constitute evidence of a major problem in math instruction.

The Pain and Suffering of Those Who Fail

Let us begin with the manner in which mathematics is taught and the high stakes associated with success or failure in it. Success in mathematics is given high status in

the schools. Some level of mathematical proficiency is required to be certified as having successfully completed elementary school, then middle school, high school, and college. Persons who find themselves unable to perform at the level taken to be essential experience a great deal of mental distress and anguish. Some proficiency in math is a college-entrance requirement. What is more, persons who fail in math, except in rare circumstances, are not allowed to graduate from high school or college. Some level of proficiency in math is enforced as a precondition for graduation.

Loss of Self-Esteem and Opportunity to Receive Higher Education

We rarely talk about, or attempt to assess, the damage resulting from loss of self-esteem and loss of opportunity to advance in school on the part of the many persons who perform poorly in mathematics. Isn't it possible that many of those who do not perform well in math might yet perform at high levels in other domains of learning? Aren't we wrongfully denying those who fail in math an opportunity to succeed in other areas, especially because many disciplines involve virtually no math?

If we look at the everyday problems of our professional and personal lives, how many require the levels of proficiency in mathematics that testing and certification require? A case can easily be made for simple arithmetic, no doubt, but what about algebra and geometry? How often does the average person face a problem that requires the use of concepts and principles of algebra and geometry—beyond, perhaps, simple percentages? It is not obvious that mathematical proficiencies beyond that of basic arithmetic should be required of all persons. Might we be better off making math optional beyond elementary arithmetic and the simplest algebra? Might we not be better off merely providing incentives to motivated persons to study and excel at math? What is the point of lifelong penalties for those who do poorly in math?

Low Level of Math Competency of Those Who Pass School Examinations

There is a second gap between ideal and real regarding mathematics instruction. Supposedly a society in which all citizens are taught to think mathematically will be able to use math successfully in dealing with public issues involving a quantitative dimension. For example, assessing the national budget involves comprehending large sums and their significance in a variety of budgetary issues. Assessing the significance of damage to the environment from pollution, assessing the loss of natural resources, assessing public health issues, and many other public issues require people to make judgments involving large figures. But it seems reasonable to question how many citizens are actually able to make these judgments reasonably, even when simple math is involved. And consider the many people who cannot seem to manage a personal

budget. Many who have passed the school exams in math are failing the real task of using math successfully in their lives.

Test the Idea Math and You

Think about your education and answer the following questions:

1. To what extent would you say that, while in school or college, you mastered fundamental concepts in math and, as a result, are able to effectively use that professional knowledge in coming to informed conclusions about public issues with a mathematical dimension? To what extent would you say that you memorized definitions and procedures sufficient to pass tests but insufficient to understand the basic concepts underlying the math you were doing? Now, see if you can give examples of when you last used math in your daily life. What level of math was it?
2. To what extent would you say that the math requirements you had to meet were appropriate measures to require of all persons? What reasoning would you use to justify your conclusions?
3. In your view, should persons be prevented from being accepted by a college on the basis of low math scores alone?
4. How often have you faced a problem in your life that required the use of concepts and principles of algebra and geometry?

The Ideal of Science: Physics, Chemistry, Astronomy, Geology, and Biology

Historically, the idea of science was based on the notion that it was important to ask questions about, and consequently think about, the world in a new way—a way that emphasized a carefully controlled empirical study of the world. The idea of science is based on the notion that, instead of thinking about what the world must be like, given our basic assumptions and preconceptions about it, we should discover, through empirical thinking and inquiry, what it is actually like. We must assume that the fundamental ideas through which we think traditionally about the world may be incorrect or misleading. We must be willing to question our seemingly self-evident beliefs about the world and entertain the assumption that they might be false. The idea of empirical thinking and carefully controlled experimentation was taken to be the key to gaining sound professional knowledge of the world.

This ideal of science emerged as a critical response to previous human inquiry in which the reasoning of important thinkers appeared to be inappropriately influenced by beliefs of a highly egocentric and sociocentric nature. Among those great thinkers

were Plato, Aristotle, Augustine, and Aquinas—whose qualities of reflection and reasoning were taken at one time to be self-evident guarantors of professional knowledge. Their views of the physical and natural world were rarely questioned. With the emergence of science, however, such wide-ranging thinkers were increasingly recognized to be biased by questionable assumptions at the root of their thought. Most obviously, it appeared that pre-scientific thinkers often uncritically assumed metaphysical or religious concepts at the foundations of their thought about the world. What is more, the traditional questions asked seemed rarely to focus on testable characteristics in the world.

In the “new” view, which emerged during the Renaissance (1400–1650), one became a scientist when one committed oneself to modes of inquiry based on controlled experimentation. The fields of physical and natural sciences, then, separated themselves from the field of philosophy and became fields of their own. Many of the early scientists set up their own laboratories for this purpose. This commitment, it was assumed, would maximize discovery of the actual laws and principles that operating in the physical and natural worlds and minimize the influence of human preconceptions about the world. There can be no doubt that this notion of science represented a real advance in the pursuit of professional knowledge about the physical and natural worlds.

Physics, chemistry, astronomy, geology, and biology are among the best cases one can choose for professions in which human self-deception and vested interest have been minimized. It does not follow, however, that these factors are not present. So let us now turn briefly to an expression of the promise of instruction in the physical and natural sciences. That ideal is formulated in ways that parallel the justification and argument for social investment in instruction in mathematics:

We live today in a world in which scientific understanding and proficiency are increasingly important to success in life. Our world is complex, and technological and scientific thinking is crucial to understanding both its physical and natural complexity and its technological dimensions. Our investment in science instruction is well spent because, through it, we are providing society with the scientific and technological experts it requires to be competitive. What is more, scientific understanding and proficiency are important to everyone. Many problems and issues, not only in daily personal life but also in public life, have an important scientific dimension. Large-scale science instruction provides the citizenry with the scientific concepts, principles, and tools by means of which they are able to perform successfully in both personal and public ways.

To what extent is this ideal being fulfilled by science instruction as it exists today? It can be argued that the reality is a long distance from the ideal. Consider the following:

- Though virtually all citizens are given many years of instruction in science, is there not abundant evidence to suggest that most people do not think scientifically about everyday scientific problems and issues? For one, can most

high-school graduates distinguish why astronomy is a science and astrology is not? What accounts for many high school graduates believing in astrology?

Isn't there ample evidence to demonstrate that:

- Many, if not most, people cannot explain the difference between theological and scientific questions?
- Many, despite years of science instruction, have not formulated a single scientific hypothesis or designed a single scientific experiment and would not be able to effectively distinguish well-designed from poorly designed scientific experiments?
- Many cannot explain the role of theory in science and cannot, therefore, explain why the theory of evolution in biology cannot be reasonably compared to the interpretation of one reading of the Bible that the world is no more than a few thousand years old?
- Many cannot explain how to distinguish a scientific question from any other kind of questions and, consequently, do not treat scientific questions differently from other kinds of questions?
- Many cannot accurately explain any basic concepts, laws, or principles of science and do not use those concepts, laws, or principles in accounting for the world they experience?
- Most do not read any scientific articles, books, or even magazines (such as *Scientific American* or *Discovery*) and would have trouble understanding them if they did?

These questions, and their most plausible answers, suggest a large gap between the promise of science instruction and the actual effect of that instruction on the lives of most people.

What is more, these questions can be contextualized for each of the various physical and natural sciences. Everywhere the word science appears, one could substitute one of the sciences—physics, chemistry, astronomy, geology, or biology. Consider the following reformulation for the field of biology:

- Though virtually all citizens are given instruction in biology, is there not abundant evidence to suggest that most people do not think biologically about everyday biological problems and issues?
- What accounts for the fact that many, if not most, people cannot explain the difference between a theological and a biological question?
- Isn't it true that most persons who are given instruction in biology have not formulated a single biological hypothesis or designed a single biological experiment and would not be able to effectively distinguish well-designed from poorly designed biological experiments?

- Isn't it true that most people cannot explain the role of theory in biology and cannot, therefore, explain why the theory of evolution in biology cannot be reasonably compared to the interpretation of one reading of the Bible that the world is no more than a few thousand years old?
- Isn't it true that most people cannot explain how to distinguish a biological question from any other kind of question and, consequently, do not treat biological questions differently from other kinds of questions?
- Isn't it true that most people cannot accurately explain any basic concepts, laws, or principles of biology and do not use biological concepts, laws, or principles in accounting for the biological features of the world they experience?

Test the Idea

The Physical and Natural Sciences and You

Answer the following questions regarding your education:

- Why is astronomy a science and astrology not? Do you believe in astrology? If you do, what do you base that belief on? How do you reconcile that belief with the basic principles of science?
- Can you explain the difference between theological and scientific questions?
- Have you ever formulated a scientific hypothesis or designed a scientific experiment? If you answer "yes," explain what your hypothesis was and the design of your experiment.
- Explain the basic role of theory in science. Then explain why the theory of evolution in biology can, or cannot, be evaluated by citing passages in the Bible.
- Select any basic concept, law, or principle of science, state it, then explain it using examples from your experience.

The Ideal of Social Science: History, Sociology, Anthropology, Economics, and Psychology

In light of the success of the physical and natural sciences, it was predictable that those interested in the study of human life and behavior would look to the paradigm of scientific methodology as a means by which questions about the nature of human behavior could be as definitively settled as those about gravity, chemical reactions, plants, and animal life. Many scholars in the professions focused on humans expected a revolution within their professions as a result of a commitment to the application of controlled experiment. By this rigorous process, it was thought,

hypotheses about human life could be confirmed or falsified. Foundational truths about human life and behavior could be discovered and built upon.

There is one major problem with this conception of the study of human behavior. Briefly, it might be expressed as follows: Human behavior is the result of the meaning-creating capacity of the human mind and is much more a product of human thinking than human instinct. Furthermore, a variety of influences have an impact on how humans think (and therefore on how they feel and what they want). Humans are highly complex, multidimensional creatures, which makes the study of human behavior through the scientific method subject to many limiting qualifications at best.

For example, as humans we are born into a culture at some point in time in some place, and reared by parents with particular beliefs. We form a variety of associations with other humans who are equally variously influenced. Our minds are influenced in all of the following dimensions, but not to the same extent or in the same way:

- **sociologically:** our mind is influenced by the social groups to which we belong;
- **philosophically:** our mind is influenced by our personal philosophy;
- **ethically:** our mind is influenced by our character;
- **intellectually:** our mind is influenced by the ideas we hold, by the manner in which we reason and deal with abstractions and abstract systems;
- **anthropologically:** our mind is influenced by cultural practices, mores, and taboos;
- **ideologically and politically:** our mind is influenced by the structure of power and its use by interest groups around us;
- **economically:** our mind is influenced by the economic conditions under which we live;
- **historically:** our mind is influenced by our history and by the way we tell our history;
- **biologically:** our mind is influenced by our biology and neurology;
- **theologically:** our mind is influenced by our religious beliefs and attitudes;
- **psychologically:** our mind is influenced by our personality and personal psychology.

What is more, these influences are not only subject to almost unlimited variation among themselves, but humans are capable of discovering each of these influences, reflecting on them, and then acting to change them in an almost unlimited number of ways. Consider how much more difficult it would be to study the behavior of mice if each mouse were to vary its behavior from every other mouse depending on a unique combination of prior influences within each of the above categories. Moreover, consider what the study of behavior of mice would be like if they could

discover that we were studying them and began to react to our study in the light of that professional knowledge. And how could we even proceed to study them if they were to decide at the same time to study us studying them?

The very idea of studying human behavior scientifically faces enormous difficulties by virtue of the diverse nature of human behavior. It faces enormous difficulties by virtue of the diverse simultaneous influences upon humans as we think, feel, and act in the world, and the capacity of humans to notice and modify virtually any aspect of the thoughts, feelings, and desires that drive our behavior. In light of these considerations, let us examine the sort of promissory claims made on behalf of the social sciences.

The ideal of science is based on the fact that it is possible in principle to ask questions about any aspect of the world. Such questions can be asked in a way that enables us to pursue answers by means of carefully controlled empirical study rather than on the basis of abstract reasoning following from human preconception. There is no reason why, in principle, humans should not be studied empirically. In studying humans as well as in studying other animal species in the world, it is essential that carefully controlled experimentation correlated with falsifiable hypotheses are used as the guiding keys to gaining dependable professional knowledge of the human world. What is more, it is essential that humans be taught professional knowledge of themselves so we can make intelligent decisions about our own conditions of life.

Each profession will make specific claims emerging from its potential (viewed ideally) history, sociology, anthropology, economics, and psychology, approximately as follows.

History as an Ideal

If we as humans do not study the mistakes of the past, we are bound to repeat them. History enables us to grasp the nature of our own past, how we have come to be the way we are, the problems we have had to overcome, the forces that have acted, and are acting, upon us. Such study and such an understanding are essential to our well-being. In this way, we can appreciate our heritage, what we have lived and died for, and the evolution of our culture as a people. Without it, we make our decisions in the dark.

Sociology as an Ideal

We humans are social animals. It is in our nature to live and function within groups. To be free creatures, we need to understand the social conditions under which we live and act. All human groups define themselves in predictable ways. These groups create social requirements and social taboos. They devise ways to identify the “in-group” and the “out-group.” They create a collective ideology that justifies the way power is divided and the manner in which wealth is distributed. If we understand ourselves as social beings, we can maximize the quality of our lives and the conditions under

which we better ourselves. Insight into social reality is an important, if not crucial, need for freedom and social justice to emerge and thrive.

Anthropology as an Ideal

Professional historians trace human history back some 30,000 to 40,000 years. Anthropologists trace human history back one or two million years and link that history seamlessly with the history of other creatures on our planet. Instruction in anthropology provides the perspective and insight into human reality that no other profession can provide. It gives us a much wider breadth of human reality than most other social professions. It helps remind us how variable human culture is and how hard it is to judge one culture from the perspective of another. Many of the world's problems are traceable to an ethnocentrism that the study of anthropology serves to correct.

Economics as an Ideal

Much of human life is concerned with the striving of humans to meet our needs and fulfill our desires. The study of the conditions and systems in which and through which humans seek to satisfy their needs and fulfill their desires is economics. Most social institutions can be understood much more deeply if we understand them in relationship to economic forces. Much of what happens in human life is a product of economic forces. Wars and depressions often result from economic conditions. Starvation and plenty result from economic conditions. Many, if not most, of the large decisions made by human groups are based on their perception of economic realities. Many of the cruelties and atrocities in the world are highly influenced by economic realities. Money, and all of those goods into which money can be transformed, are crucial determinants of human life. If we do not study and understand economic reality, we are likely to suffer as a result.

Psychology as an Ideal

The nature and operations of the human mind are a central determinant in human life. The scientific study of the mind, therefore, can enable us to maximize our control over our own mental health. We can identify the pathologies of the mind in a way parallel to the way we identify the pathologies of the body. We can study causes and consequences of human mental health and disease. We can train practitioners to use the professional knowledge that psychological research collects in counseling and therapy, thereby helping individuals who are in need of mental assistance. With our professional knowledge, we can assist the courts in determining what prisoners are mentally safe to parole, which persons are of sound mind, and which parents are fit or unfit to rear children. We can advise lawmakers on which deviant social practices

are mentally healthy and which are not. In general, psychology contributes to the mental health and optimal mental functioning of humans.

Test the Idea
The Social Sciences and You

Choose one of the social professions you have studied (history, sociology, anthropology, economics, or psychology). Read the above description of the promised aim of the profession. Then assess the extent to which your learning approached that ideal. What is your reasoning is based on?

The Social Sciences as Taught and Practiced

Though the social professions have promised much, clearly the promise falls far short of the ideal. What is more, serious questions can be raised as to whether it is even appropriate to use the word “science” to characterize the status of the social professions. Typically, the social professions are highly “multilogical.” Many divergent points of view and frames of reference compete within the social professions. Often it is possible to get contradictory judgments from different practitioners in the social fields.

On the instructional level, we are clearly far from delivering the benefits that have been promised by those who argue for that instruction. To put it one way, few persons learn, as a result of instruction in history, to think historically, or, as a result of instruction in the other social fields, to think sociologically, anthropologically, economically, or psychologically. Instruction is often designed so that persons are certified as professionally knowledgeable in the content of a course when they have done no more than successfully cram for a true/false or a multiple-choice exam.

It is not clear that the study of history, sociology, anthropology, economics, and psychology has led to a better world (that is, with less war, cruelty, human suffering, and injustice). Actually, our belief that we have been educated as a result of the instruction we have received may render us more self-deceived than we would be without that instruction. This might lead us to believe that we know more than we do within a discipline.

The social studies could, and should, make a significant contribution to a better world. Insights into historical, anthropological, and economic thinking are relevant to critical thinking. These professions, however, are rarely taught in such a way as to contribute to the development of critical thought. For example, though sociology as taught emphasizes that humans tend to behave in keeping with the mores and taboos of social groups, rarely are persons given assignments in which they must make explicit and critically assess the mores and taboos of any of the groups to which they belong. The result is that the persons usually leave sociology classes with little insight

into the nature of their own social indoctrination. They do not seem to gain in autonomy as a result of instruction. The mores and taboos of their social groups and of the broader society rule them as much at the end of their instruction, as far as we can see, as they did at the beginning. Persons begin and end as consummate conformists in language, dress, values, and behavior. They have not, on the whole, begun to think historically, anthropologically, sociologically, or economically.

The Ideal of the Arts and Humanities: Music, Painting, Sculpture, Architecture, Dance, Literature, and Philosophy

The professions that exist within the arts and humanities typically have a twofold dimension:

1. A dimension of appreciation and cultivation;
2. A dimension of performance.

The first dimension is much more questionable as an area of professional knowledge, and its contribution to the quality of life is a likely domain for debate. The second dimension is much more objective and demonstrable.

The Promise of the Fine Arts and Literature

The ideal of instruction in the fine arts and literature could briefly be put as follows: There are two consequences that follow from the study of the fine arts and literature with regard to appreciation and cultivation: esthetic appreciation and (high) culture. The fine arts and literature introduce the person to the study of what is beautiful in painting, sculpture, architecture, dance, music, drama, and literature. This study elevates the person's taste and provides insight into objects and experiences not available to those who have not come to appreciate fine art. Without this study, few will see beauty in fine painting, sculpture, dance, music, drama, and literature. Without it, many will prefer the superficial, the trivial, the vulgar, and the stereotyped to that which is truly unique and beautiful. Those who fail to achieve an appreciation of fine arts and literature are denied an important dimension of human experience and fulfillment.

The Reality of Instruction in the Fine Arts and Literature

The real results of instruction in literature and the fine arts seem distant from the above ideal. Consider the following:

- Though virtually all citizens are given years of instruction in some dimensions of at least some of the fine arts and literature (usually literature), is there not abundant evidence to suggest that most people do not think esthetically or

artistically as a result? Attempts to elevate the taste of most people seem to be a failure. Most people, even after a college education, seem to prefer the products of the popular media to the products of the artistic community. What is more, it is hard to determine what percentage of those whose supposed preference for the products of the artistic community is in truth a pretense born of self-delusion, enabling them to feel superior to the common herd.

- What accounts for the fact that most of us cannot give an intelligible explanation for our judgments about what we consider beautiful in painting, sculpture, architecture, dance, music, drama, or literature?
- Isn't it true that most people have not thought about the role of beauty and art in our lives and are not interested in doing so?
- Isn't it true that most people cannot explain how to distinguish an artistic question or issue from any other kind of questions and issues and tend to respond to such questions in superficial and uninterested ways?
- Isn't it true that most people cannot accurately explain any basic concepts or principles of any of the fine arts or literature and do not use those concepts or principles in accounting for the world they experience?
- Finally, isn't it true that few people change their reading habits as a result of instruction in literature and, consequently, are just as unlikely to read important literature at the end of instruction as they were at the beginning?

It seems likely that some exception must be granted to the judgments implied above in the domain of trained performance in the fine arts and literature. The most successful form of instruction in the fine arts and literature is in the area of skill development: basic painting, sculpting, dancing, singing, acting, and writing skills, as well as performing on a musical instrument. It is questionable, however, to what degree most of the performances made possible by this training rise to the level of esthetic or artistic excellence. In any case, only a small minority of persons develops a level of excellence in the performing arts.

The Promise of Philosophy

The profession of philosophy makes an interesting case. On the one hand, it makes some of the most sweeping claims for itself and on the other hand seems to deliver so little. Let us look at the traditional case made for the value of instruction in philosophy.

We as humans are capable of living two kinds of lives: an unreflective or a reflective life. When we live unreflectively, we live as a conformist, trapped in the world of our own unanalyzed desires and social conditioning. We do not live as free agents. We do not choose our basic and ultimate values. We do not understand the actual options implicit in a human life. We behave in ways that are contradictory to the values we say we believe. We do not understand the forces at work in our lives, nor do we

understand what is valuable and wasteful in them. Often, as unreflective persons, our lives are shot-through with irrationality, prejudice, and self-delusion.

Conversely, when we live reflectively, we become the agents of our own destiny. We begin to act as genuinely independent persons. We see a world beyond the world of our personal egocentrism and social ethnocentrism. We come to terms with our own basic and ultimate values. We make decisions based on the actual options available to us. We begin to understand the forces at work in our lives and act consciously with respect to them. We discover the power of rationality and use that power to minimize our prejudices as well as our involvement in self-delusion. The study of philosophy lays the foundation for living a reflective life.

The Reality of Philosophy

Clearly, the promise of philosophy is rarely fulfilled. The most likely reason for this discrepancy is that living a reflective life is not the usual focus of the coursework offered in philosophy. Instead, the coursework focuses on highly abstract issues (What is being? What is reality? What is time? What is knowledge? What is beauty? What is freedom?) through the reading of arguments and counter-arguments of a highly abstract sort. The arguments themselves are typically the products of professional philosophers who make their way in the profession by addressing themselves successfully to others who are trained in the “moves” considered appropriate by philosophers in their traditions of abstract argumentation. Philosophers write, except for rare occasions, for a specialized audience (of philosophers) already familiar with a specialized terminology, a range of technical distinctions, and a way of talking, thinking, and arguing uncommon in everyday life. If it is reflective, it is reflective in a special, narrow, and technical sense, in the sense of specialists talking to other specialists in an esoteric language.

Philosophical issues are so posed by professional philosophers, typically, that neither an actual case, nor any possible evidence could settle them. The findings of other professions are often ruled out of the discussion by definition:

“You are turning the question into a sociological (psychological, historical, or biological) one. Let us stick to the philosophical one!” The result is that the issues that philosophers argue about are not really subject to being settled by the discovery of any empirical evidence. The various positions are ones that can be argued for and against without end. Positions in the field are not refuted. They are abandoned when they become professionally unfashionable.

As a result, few persons understand the significance to philosophers of any of the positions taken. The predominant response of an outsider is “Who cares?” A small—typically exceedingly small—minority of persons become philosophy majors who, after some years of graduate study, learn how to argue about a range of philosophical questions and philosophical positions (usually the ones treated as significant in their seminar classes) to the satisfaction of some group of professional philosophers.

The result is that few persons develop the skills of argumentation that would qualify them as plausible contributors to the argumentation in which professional philosophers engage. Few persons see any connection between traditional philosophical argumentation and the conditions of their own lives. Few persons are more reflective about their own lives as a result of taking courses in philosophy. Actually, persons often develop a positive dislike of the subject as a result of their classroom experience and carefully avoid taking additional courses in the subject or doing further reading in it.

Finally, the most ironic fact about the field of philosophy is that it is far from clear that professional philosophers are any more reflective about the manner in which they are living their own lives than are members of any other profession. One of the reasons for this is that, rhetoric to the contrary, philosophers themselves have little or no training in, or professional incentive to engage in, self-reflection. Rather, they are limited by their training to the development and submission of abstract argumentation about abstract issues to professional journals (read then by a small number of professional philosophers). Neither students of, nor professors in, philosophy are expected to come to terms with the concepts, values, or principles implicit in their personal life or behavior. Learning how to think reflectively about one's life seems to be an art rarely focused upon and, therefore, rarely mastered.

Test the Idea

The Ideal and the Real

At the beginning of this chapter, we stated that there are two primary reasons why a significant gap exists between the ideal and the real in academic and professional fields. These are human fallibility and vested interest. Choose two of the subjects focused on in this chapter, and for each answer, complete the following:

1. Reread the section in this chapter that focuses on the subject you have chosen. Write your understanding of the ideal as presented by us. State and elaborate the main points. Then write your understanding of the real as presented by us. Again, state and elaborate the main points.
2. Assuming that we are correct in our view that a gap exists between the ideal and the real in this field of study, how do you think human fallibility and vested interest might play a role in creating this gap?
3. How might human fallibility and vested interest be reduced in this profession?
4. If you do not believe there is a gap between the ideal and the real, how would you articulate the field as an ideal?

Conclusion

As critical thinkers, we must be careful not to assume that things are actually the way they are represented in human life. The human mind has a strong predisposition to fallibility and is highly susceptible to vested interest. Human nature and vested interest are to be found at work in all professions and disciplines, and in all domains of human life. To understand a field of knowledge, including professional knowledge, we must understand it realistically. To contribute to it productively, we must view it as an imperfect construction. To use it effectively in our daily life, we must internalize the mode of thinking integral to the profession, and be aware that when we or others think, we do so with fallible human minds operating in a world of power struggles and vested interest.

This is not an argument for cynicism but, rather, for healthy skepticism. This chapter presented one possible set of beginning points from the perspective of which we can begin to appreciate the limitations of human professional knowledge and of the conditions under which human professional knowledge is constructed and applied.

To the extent that we are committed to the development of fair-mindedness, we are committed to professional knowledge being acquired and used to minimize human suffering, to meet basic human needs, to preserve rather than destroy the environment, to contribute to a more just world, and to serve rational rather than irrational ends.

We are historically far from accomplishing the ideal, and far less consideration is being given to narrowing this large gap than is deserved. We need to grant full credit to the powerful modes of thinking implicit in the best practices of professions, but we also must recognize that, for those modes of thinking to flourish, they must develop out of a realistic critique of present practice.