

*O. C. Schroeder, Jr., J.D.*¹

Old Ethics for New Sciences— What Confronts Justice

Daniel Webster, in his funeral oration for Justice Story, 12 Sept. 1845, proclaimed [1]:

Justice, sir, is the great interest of man on earth. It is the ligament which holds civilized beings and civilized nations together!

The primary question confronting humanity in 1976 is: What is justice? What is most important to understand is that justice must contain and control all aspects of human society, including ethics and science. Ethics and science do not contain and control justice, because justice is ultimately the process by which human beings try to adjust, to accommodate, and to harmonize the relationships between and among themselves: relationships including politics, economics, race, sex, religion, and certainly morals, ethics, and science. Justice, in short, dominates any issue which confronts humanity or creates human conflicts.

The "process" aspect of justice is well known to forensic scientists. They bring to the process the fruits of scientific knowledge; they are essential contributors to the continual adjustment, accommodation, and harmonization by providing scientific facts and opinions to aid in the process of justice, a process which is mostly intellectual and rational in operation. Although it functions through organic constitutions, legislative enactments, judicial decisions, administrative rulings, and executive orders, it is more than just an intellectual process; it is also found in the environment of human desires, private feelings, and public attitudes towards the results of the process of justice.

Ultimately, the environment of justice is measured by the beliefs of its citizens who are either blessed to live in a community where justice reigns or cursed to live in a human society where injustice rules. The source of justice is the hearts of men and women [2]:

Who shall put his finger on the work of justice, and say "It is there"? Justice is like the Kingdom of God—it is not without us as a fact, it is within us as a great yearning.

During our bicentennial year the process and environment of justice must be primary concerns because we Americans are obligated by the Preamble of the Constitution "to establish justice" in the Republic for all citizens.

Are the Old Ethics Adequate?

We have described justice and its two characteristics: rationality and feeling. We must now define ethics. Simply, ethics is group morality. Individuals have morals, groups have ethics. The ethics of any group is based on the commonly accepted morals of the group

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¹ Director, Law-Medicine Center, Case Western Reserve University, Cleveland, Ohio.

members. Collections of professional moralities are known as Canons or Codes. Any occupation which directly serves human needs in a professional manner eventually promulgates a code of ethics.

A code encompasses what together we ought to do morally, over and above what we must do legally. Codes of ethics over the years and decades, even centuries if we acknowledge the Hippocratic Oath, have become longer and much more complex. Codes of ethics have emerged as little independent systems of their own, living and breathing in the causes of their individual professions, not necessarily designed for the moral enhancement of society as a whole. Details, rules, technicalities, and narrow decisions are the realities of contemporary ethics. Professional ethics have become ends in themselves rather than means towards the end of more honor and greater integrity in the relationships of the professions to the society which they are committed to serve morally.

Within the past decade, I have begun to detect a significant movement away from the ever-increasing complexity and technicality in professional ethics and the devotion to professional ethics for the profession rather than for the society which it serves. My observations on this trend in professional ethics are founded upon personal experiences: (1) teaching legal ethics to law students, (2) researching the application of the Canons of Legal Ethics to the professional behavior of practitioners of the Ohio Bar, and (3) applying legal ethics to the work and study of law students, who are bound by an honor code based on the Canons of Legal Ethics. These experiences have illustrated some simple facts and one fundamental difference. The ethical debates in the law classrooms and the Bar Association committee meetings concern the complex and unique situations within the practice of law. But the concerns of the court room, the market place, and the public involve the ordinary, common situations of daily life. In these common situations in professional practice, three basic rules apply to most, if not all, of the serious ethical problems in the practice of law: do not lie, do not cheat, do not steal.

Moses, the lawgiver, etched the first and the last on tablets of stone: "Thou shalt not bear false witness against your neighbor" and "Thou shalt not steal." We have added "Thou shalt not cheat" to close somewhat the gap between stealing and lying, because cheating can and does include a little of both. This new commandment brings into the center of the moral spectrum the sins of secrecy, deception, and larceny, the combination of the three being cheating.

My admonition to law students has been and will continue to be very simple; "Do not lie, cheat, or steal and you will have no difficulties in studying law ethically or practicing law morally." Let the U.S. Supreme Court and the American Bar Association argue over the ethical merits of minimum fee schedules and the advertising of legal services. These and other ethical technicalities provide intellectual stimulation for those of us in the practice of law, but Americans are most concerned with an environment wherein lawyers do not lie, do not cheat, and do not steal. Look about you. The citations necessary to prove this point are found in legislative investigative hearings, grand jury indictments, and free press reporting.

This increasing concern for simple ethics was most graphically illustrated by a first-year law student's article which appeared in the Harvard Law School student publication [3]. The article began with the heading: "LM (Legal Methods) Orients 1Ls (1st year law students) to Tactics, not Ethics." This law student of three months indicts both legal education and law practice [3].

But Legal Methods taught us more than merely "what lawyers do": it reinforced the very proclivities of the profession that are primarily responsible of the low esteem in which lawyers are commonly held today. . . . I began to see myself as my client's "bedfellow." I was led to assume that my ethical duty was to serve my client first, and had forgotten that my purpose, as I had once seen it, was to serve justice.

The discovery-related materials were ethically a disaster. We learned how to stop just short

of harassment, to use deception to motivate unwilling witnesses to talk, to influence and color the facts that were divulged, to string witnesses along and help them build their stories until they are lying and repeating merely what you are saying, to push witnesses into bragging and exaggeration by playing with their vanity, and then, finally, how to slip all this unsworn information into the court record. . . . Our B. S. A. (Board of Student Advisers) summarized it this way: "Deny anything that is not on the public record." If it is true, but if you know they can't prove it, DENY!

The idea became readily apparent as we read on that an effective deposition not only wore down the witness to the degree that he "may be more prone to lie," but also ran up sufficient costs as to make the opposing side willing to settle merely because the individual was no longer able to afford the legal fees. The lesson, justice is expensive, and your duty is to make it as expensive as possible. . . .

Our last direction, though by no means the least, was: "After agreement has been reached have your client reject it and raise his demands." Although in all fairness to the article it did note that "this is the most ethically dubious of the tactics listed," it continued by saying "but there will be occasions where a lawyer will have to . . . employ it."

One would think that, in the wake of Watergate when the legal profession was coming under heavy attack for its ethics, THE Law School, THE leading producer of the nation's finest lawyers, THE bastion of legalese would feel more of an obligation—social as well as professional—to try to turn the tide in favor of the independently conscientious lawyer.

A common legal practice which distorts justice is currently also being indicted by legislative enactments. In 1975, the Ohio General Assembly joined several other states in prohibiting certain well-used, commonly accepted trial tactics in rape prosecutions [4].

(D) Evidence of specific instances of the victim's sexual activity, opinion evidence of the victim's sexual activity, and reputation evidence of the victim's sexual activity shall not be admitted under this section unless it involves evidence of the origin of semen, pregnancy, or disease, or the victim's past sexual activity with the offender, and only to the extent that the court finds that the evidence is material to a fact at issue in the case and that its inflammatory or prejudicial nature does not outweigh its probative value.

Evidence of specific instances of the defendant's sexual activity, opinion evidence of the defendant's sexual activity, and reputation evidence of the defendant's sexual activity shall not be admitted under this section unless it involves evidence of the origin of semen, pregnancy, or disease, the defendant's past sexual activity with the victim, or is admissible against the defendant under section 2945.59 of the revised code, and only to the extent that the court finds that the evidence is material to a fact at issue in the case and that its inflammatory or prejudicial nature does not outweigh its probative value.

(E) Prior to taking testimony or receiving evidence of any sexual activity of the victim or the defendant in a proceeding under this section, the court shall resolve the admissibility of the proposed evidence in a hearing in chambers, which shall be held at or before preliminary hearing and not less than three days before trial, or for good cause shown during the trial.

(F) Upon approval by the court, the victim may be represented by counsel in any hearing in chambers or other proceeding to resolve the admissibility of evidence. If the victim is indigent or otherwise unable to obtain the services of counsel, the court may, upon request, appoint counsel to represent the victim without cost to the victim.

Uncontrolled cross-examination of a victim or defendant regarding sexual activities other than those at issue in the case at bar is cross-examination utilized in an attempt to disgrace, confound, or destroy the witness. It is not necessarily used to obtain objective truth. Now such trial examination has been brought under the judge's control by legislative edict. The judicial purpose? To promote justice. The practitioner's tactics have become secondary. I predict more changes of a similar nature will emerge in the justice process. Lawyers must and will be compelled to be more concerned with the delivery of justice than with the practice of law. Society is demanding this. In the past century alone, new judicial rules of civil and of criminal procedures have fantastically limited the ancient common law concept of a strict adversary process. Judges are presiding more and more over a process to deliver justice rather than a procedure for legal jousting.

Today's science is not without a similar challenge as it seeks to fulfill its ethical duties. In a column on "Why Scientists Turn to Fraud" [5], the writer recalls several

recent research studies manipulated and distorted in achieve the scientist's personally desired goal rather than to produce scientific truth for humanity's benefit. The article suggests the reasons for these unethical practices [5]:

We are naïve to believe that dishonesty in research is unique and aberrant. The rewards are just too tempting; prestige, ego enhancement, promotion and, a \$40,000 salary . . .

[The emphasis on scientific success] creates a severe strain on the practicing researcher, who is torn between the norms established for the process of research and the penultimate rewards for success. Under these conditions, deviance is likely to occur in any group, even among scientists.

Scientists are called upon to deliver truth just as lawyers must deliver justice.

The great change in legal ethics is that we are recognizing and beginning to accept the simple rules inscribed by Moses as the cornerstones of our system of justice. An equally momentous change in legal ethics is contemporary, not Mosaic or Biblical in origin, and, unlike the negative commands ("Thou shalt not") of Moses, it is a positive ethic based on our twentieth century understanding that the life of all humanity is affected more by what we do than what we do not do.

So the ancient prohibitions not to lie, not to cheat, and not to steal have as their contemporary corollaries the admonishments to be reasonable, to be fair, and to be humane in living the life of a professional.

Truly the coin of ethics has two sides; one is negative, old, and Biblical, whereas the other is positive, new and scientific. The great gift of the twentieth century sciences to the creation and promulgation of a justice system with legal ethics is the knowledge that a scientist must be reasonable in hypothesis, fair in experiment, and humane in conclusion. Not to lie, not to cheat, and not to steal is insufficient. Reasonableness, fairness, and humaneness are essential for both the scientific and legal professional practices as we enter America's third century.

So here is a profound change in the ethics of law—the blending of Biblical commands and scientific insight. It is no wonder we see the system of justice being reviewed, refashioned, and recast. And our unending effort is to create a justice process which can contain and control new sciences, modern ethics, and Biblical ethics. This unending effort is to create an environment wherein ethics is fused with science under justice as demanded by the constitution which charges us "to establish justice."

What is New in Science?

We can now direct our attention toward the new sciences, after which we will mesh all sciences with the old and new ethics "to establish justice."

There is nothing really new about the new sciences. All new sciences have grown from and are intimately connected with the old sciences. Science, like justice, affects the life of all men by generating knowledge for good or for evil. A system of justice, as previously noted, likewise affects all men by creating an environment of respect or disrespect for justice. But there is a basic difference between science and justice. Science is the product of man's mind while justice is the state of man's heart.

Science Now in Narrow Specializations

What is really new in the sciences is the explosion and fragmentation of the basic sciences into many and varied fields, each of which demands intense specialization to a greater and greater degree while simultaneously demanding less and less breadth. Molecular biology and nuclear physics are but two examples of this.

As a scientist digs deeper into his narrowing intellectual pit called a specialty he loses touch with the big picture of the human endeavor. He generates knowledge of minute

details, minute when compared to the expansive greatness and majesty of human existence. He loses the broad perspective which places his narrow endeavor within the picture of the whole life of humanity. A small part of life has become the scientist's practice, not the whole of life.

Compare this contemporary experience with the example of two great scientists of the period of the American Revolution: Benjamin Franklin, a creator of knowledge, and Thomas Jefferson, an adapter of knowledge. Of Franklin it has been said [6]:

In his first letter to Collison, Franklin revealed his discovery that electricity consists not of two opposing forces but of "a common Element" . . . which he called electrical fire. Franklin showed that the "fluid," in passing out of one body and entering another, is never destroyed but retains its original equality, "the Fire only circulating. Hence have arisen some new Terms among us. We say B (and other Bodies alike circumstanced) are electrised *positively*; or rather B is electrised *plus* and A *minus*. And we daily in our Experiments electrise Bodies *plus* or *minus* as we think proper. *These Terms* we may use till your Philosophers give us better." . . .

Robert A. Millikan, physicist and Nobel Prize winner, has called this experiment "probably the most fundamental thing ever done in the field of electricity." Franklin's single-fluid theory became the basis on which subsequent advances in electricity were to rest; after 1900, it would be known as the electron theory. Electrons move about conductors much as a fluid might move; Franklin's single-fluid idea led directly to this concept.

What Franklin revealed in this first letter to Collison—his one-fluid theory—was not an "invention," but a way of thinking about electricity, a way of looking at the subject that broke through old boundaries and let man proceed to further discovery. This is an achievement possible only to largest minds. It seems to stem from a quality of imagination that inspired I. Bernard Cohen, historian of science to call his book *Franklin and Newton*, a title startling in itself. . . .

Even today, physicists are impressed with Franklin's accomplishment, lacking, as he did, all technical training and having only a slight communication with physicists abroad. Robert Millikan, who had declared the single fluid theory to be the basis on which subsequent advances in electricity were to rest, went so far as to place Franklin among fifteen scientists who, from Copernicus to the twentieth century, have had the most influence. In Millikan's list, Franklin comes fifth, following Copernicus, Galileo, Newton and Huygens.

These words have been written of Jefferson [7]:

Jefferson was 65 when he retired from the presidency in 1809. He felt free at last to cultivate those "tranquil pursuits of science" for which, he said, nature had intended him. "Never did a prisoner released from his chains feel such relief as I shall on shaking off the shackles of power," he wrote.

Leisure gave Jefferson a chance to enjoy his countless and varied interests. He turned to music, architecture, chemical experiments, and the study of religion, philosophy, law, and education. During his long absence, Monticello had run down, and Jefferson worked energetically to repair the damages of long neglect. He also experimented with new crops and new farming techniques, and improved his flower and herb gardens.

Jefferson carried on an immense correspondence with persons in all parts of the world. He improved a copying device called the *polygraph*, which made file copies of the many letters he wrote. He entertained an endless stream of guests who came to pay their respects. In 1811, Jefferson was reconciled with John Adams and the two men renewed their old friendship. Their letters ranged widely over the fields of history, politics, philosophy, religion, and science. The remarkable correspondence continued until they died—both on the same day, July 4, 1826.

Each man made significant and vital contributions to law, politics, and justice in early America, as a creator or as an adapter of science. These two American scientists were not merely justice oriented, they were justice dedicated! Their labors, the Declaration of Independence and the U.S. Constitution, are the living proofs of this statement.

The new sciences have seen the transformation of the old scientific practitioner, the civilized scientific statesman such as Jefferson or Franklin, into a specialized technician concerned with but one segment of human life. This transformation represents a threat to the American justice environment. A scientist who concentrates solely on the problems of his discipline fails to relate ethically to the whole of life. Discovery and the creation of

knowledge have become the ends of science rather than the means by which science could create more fulfilled human beings within a better society. Contemporary scientific practice holds that the pursuit of scientific knowledge is ethically sound no matter how profoundly that truth may affect humanity.

Science Now Relates to Group Rather than Individuals

Another new element in science is the change of science and its direct relationships with human beings. We have had long experience in the interrelationship of an individual human with science. Astronomy provided the individual with an understanding of the tides caused by the moon's gravity. Chemistry provided man with the source of heat and energy in fires. Physics provided man with the use of levers and pulleys to move objects. In the past century we have begun to comprehend that when a human being relates to the historic physical sciences of astronomy, chemistry, and physics in the emerging world of scientific knowledge he inevitably is also relating to many other human beings. In chemistry, for example, we have advanced from ancient fire to modern nuclear energy. In so doing we must include not just the relationship of one human being with the chemistry of fire. We must encompass a relationship with many other human beings because nuclear energy does not serve one person. It directly affects many human beings. It may even affect our continued existence as a human race.

New scientific categories have burst upon the scene to study these more complex relationships of one individual with a group of individuals. These categories are called the social sciences. To the relationship of the individual human being and nuclear power as a source of energy must be added the group concerns as represented by the economics, the politics, the sociology, and the ecology of where nuclear power plants are to be located, what types of nuclear processes are to be used, and how to dispose of nuclear wastes.

What greater proof of this most significant role, now being played by the social sciences in the physical sciences' realm, do we need than the statewide popular referendum in California, in June 1976, setting forth the conditions upon which nuclear power plants can operate in that state. Substantial issues of economics, legal liability, social impact, and ecological effect confront the people of California who will make a political decision on a physical science problem. The "soft" social sciences have truly moved into a commanding position over the "hard" physical and natural sciences.

The medical discipline of psychiatry provides another example. When an individual relates to psychiatry as medicine only one person and one science are connected. But when that person kills another human being, the killer and his mental health problem become the concern of the whole society. Is the killer a criminal for the law to punish, or is he a patient who must be treated medically? Once again we see a social science emerge as a three-component relationship composed of the individual, the group, and the science.

The influence of the sciences has been vastly expanded, and the number of sciences has increased. Table 1 provides a good summary of this increase. To this list must also be added those fusions of the physical and natural sciences, biophysics and biochemistry. Certainly, the welding of pathology and toxicology to law, thereby creating forensic pathology and forensic toxicology, must be acknowledged. Both of these fields have made solid advances in the past generation, thanks in no small measure to the American Academy of Forensic Sciences and such civilized scientific statesmen as Gradwohl in pathology and Gettler in toxicology.

We acknowledge such interrelationships and the cross-fertilization among the five families of science: physical, natural, health, behavioral, and social. As the barriers between the sciences fall, the influences of all the sciences extend.

TABLE 1—*A summary of the increase in the number of sciences with time.*

Early history
Physical sciences: astronomy, chemistry, physics
Sixteenth to eighteen century
Natural sciences: biology, botony, geology, zoology
Nineteenth century
Health sciences: medicine, dentistry, nursing
Early twentieth century
Behavioral sciences: psychiatry, psychology
Mid-twentieth century
Social sciences: anthropology, economics, geography, history, law, political science, sociology, ecology

Science Has Moved from Amoral to Moral

A third new factor in the science of our day is represented by the relationship between science and ethics. Scientists do have morals not only for their human experience but also their scientific practice. The morals of the scientific practitioner have emerged into a code which, even if not expressly written, is accepted. In pursuing the discovery or creation of new scientific truth an honest hypothesis, a fair experiment, and a reasonable conclusion are mandatory. Fellow scientists challenge each other on all three counts whenever a new fact is being tested or a new truth is suggested. This ethic is old but still viable for science.

A splendid example of where the pursuit of knowledge or technological expediency untempered by a broader perspective has led humanity is given in a very disturbing book by Joseph Weizenbaum, Professor of Computer Science at M.I.T. As you read his words remember that for all sciences the computer has become the *sine qua non*; in fact, computer science may well be the god of all sciences. Professor Weizenbaum distressingly and eloquently states that computer science is emerging as humanity's master, generating the most profound ethical dilemmas [8].

That man has aggregated to himself enormous power by means of his science and technology is so grossly banal a platitude that, paradoxically, although it is as widely believed as ever, it is less and less often repeated in serious conversation. The paradox arises because a platitude that ceases to be commonplace ceases to be perceived as platitude.

Some circles may even, after it has not been heard for a while, perceive it as its very opposite, that is, as a deep truth. There is a parable in that, too: the power man has acquired through his science and technology has itself been converted into impotence.

The common people surely feel this. Studs Terkel, in a monumental study of daily work in America, writes:

For the many there is hardly concealed discontent . . . "I'm a machine," says the spot welder. "I'm caged," says the bank teller, and echoes the hotel clerk. "I'm a mule," says the steel worker. "A monkey can do what I do," says the receptionist. "I'm less than a farm implement," says the migrant worker. "I'm an object," says the high fashion model. Blue collar and white call upon the identical phrase: "I'm a robot."

Perhaps the common people believe that although they are powerless, there is power, namely, that exercised by their leaders. But we have seen that the American Secretary of State believes that events simply "befall" us, and that the American Chief of the Joint Chiefs of Staff confesses to having become a slave of computers. Our leaders cannot find the power either.

Even physicians, formerly a culture's very symbol of power, are powerless as they increasingly become mere conduits between their patients and the major drug manufacturers. Patients, in turn, are more and more merely passive objects to whom cures are wrought and to whom things are done. Their own inner healing resources, their capacities for self-reintegration, whether psychic or physical, are more and more regarded as irrelevant in a medicine that can hardly distinguish a human patient from a manufactured object. The now ascendant bio-feedback movement may be the penultimate act in the drama separating man from nature; man no longer even senses himself, his body, directly, but only through pointer readings,

flashing lights, and buzzing sound produced by instruments attached to him as speedometers are attached to automobiles. The ultimate act of the drama is, of course, the final holocaust that wipes life out altogether.

What is new is the impact that the pursuit of scientific truth has on the whole human family. Before our present generation, scientists in their practice considered themselves amoral in relation to the human family. Discovering a scientific truth had no moral implications. With the advent of the atomic bomb, this changed drastically. Now nuclear physicists are deeply concerned over whether or not the creation of the atomic bomb was morally right or wrong. Personal morality has escalated overnight into group ethics.

An example of the emergence of a new ethic for science is the recent demand by the National Science Foundation for genetic scientists not to experiment on engineering, manipulating, or creating human genes until acceptable safeguards are formulated to protect humanity from possible injurious impact. Even stronger ethical concerns for computer science have been expressed by Professor Weizenbaum [8]:

Computers can make judicial decisions, computers can make psychiatric judgments. They can flip coins in much more sophisticated ways than can the most patient human beings. The point is that they ought not be given such tasks. They may even be able to arrive at "correct" decisions in some cases—but always and necessarily on bases no human being should be willing to accept.

There have been many debates on "Computers and Mind." What I conclude here is that the relevant issues are neither technological nor even mathematical; they are ethical. They cannot be settled by asking questions beginning with "can." The limits of the applicability of computers are ultimately statable only in term of "oughts." What emerges as the most elementary insight is that, since we do not now have any ways of making computers wise, we ought not now to give computers tasks that demand wisdom.

Fusing Science, Ethics, and Justice in Practice

With these observation on the new science behind us, we are now able to understand the importance of the application of ethics to science and hopefully see how it relates to the establishment of justice for American Society in the twenty-first century.

Forensic scientists and their colleagues in the justice system—lawyers and judges—have a primary opportunity to lead in this endeavor. Both groups of practitioners are indispensable to the establishment of a respected justice. Regretfully, we often appear to acknowledge that simple maxim only as far as our individual professions are concerned. The practitioners of science know that they are indispensable. The practitioners of law know also that they are indispensable. Somehow the one practitioner cannot see the other practitioner as a positive, indispensable part of the process of justice. We too often see him as a negative, barely tolerated, party in the process. So the first order of business within the profession of forensic science is to accept each other as integral parts of the justice establishment. To my colleagues the lawyers I say, "Justice is too important to be left to the lawyers and judges. Scientists are the sources of accurate facts and truthful opinions upon which justice depends." To the scientist, I say, "As the generators and creators of a human knowledge which augurs a profoundly different human society for the twenty-first century, you cannot go forth unfettered by ethical concerns and uncontrolled by legal rules." Engineering genes, regulating birth, controlling death, experimenting on human subjects, and producing environmental hazards are all within the function of science but they should also be under the control and dominion of the judicial process. To bridge that wide gap is a difficult task, especially when forensic scientists and their law colleagues often cannot solve the dilemma of how to use intelligently the scientific evidence available in a case at trial: evidence produced by the physical sciences, the natural sciences, the health sciences, the behavioral sciences, and especially the social sciences.

We have attempted to define and promulgate justice, ethics, and science as individuals. Now we must combine our concepts of what justice, ethics, and science are to determine what confronts us collectively as we create the process and environment of justice for 1976 and beyond. In the process of justice we must re-emphasize the old truths of ethics—do not lie, do not cheat, do not steal. Forensic science evidence must meet these negative commandments. Above and beyond this, however, the positive ethical concerns for reasonableness, fairness, and humane attitudes in the performances of our professional obligations are essential.

We suggest a simple, practical advance in positive ethics: provide better opportunity for the use of forensic sciences in the criminal justice process. The Forensic Sciences Foundation's 1973-1975 research project for the Law Enforcement Assistant Administration, "An Assessment of the Forensic Sciences in American Criminal Justice," graphically underscored the importance of making available to the accused the same scientific resources for the analyses and evaluations of evidence that are available to the prosecution. Perhaps some procedures akin to the recently enacted Ohio Drug Offense Act are in order. Beginning 1 July 1976, in Ohio, all real evidence of what seems to be contraband drugs seized by the state must be divided in half. One half goes to the police science laboratory, the other half is protected and preserved for the defense's scientific analysis. The impact of this whole new procedure is that it allows the criminal defense equal opportunity to question the accuracy of the prosecution's evidentiary statements.

A new ethics founded on reason, fairness, and humaneness would appear to support this advance not only for drug offenses but also for any criminal offense wherein scientific evidence is relevant and material. An equal opportunity to authenticate, interpret, and evaluate the scientific evidence will create an environment of respect for justice which goes hand-in-hand with the reasonable, fair, and humane process of justice. Belief in and respect for the justice process will increase. In the final analysis this attitude of respect is what the process of justice seeks to promote.

In addition to the forensic sciences are the many other sciences all potentially afflicted with the disease of believing that science is only to be concerned with the pursuit of knowledge. One further example would be the rampant medical experimentation on human subjects. Here lie intricate relationships among science, ethics, and justice [9].

The ethical problems that attend medical research with human subjects are representative of an entire class of problems created by the impact of professionals and professional power on the general public and on public policy. In the area of research with human subjects the medical investigators are not alone; there is a tendency in other fields too for humane concerns to be left at the laboratory door. Psychologists and sociologists have often been accused of circumventing the requirement for consent and of applying unethical manipulative techniques in their investigations of human behavior, and neither profession has welcomed scrutiny from outsiders or restrictive regulation. The issue goes beyond research ethics, however. Many professions now command knowledge that has great potential usefulness for human welfare but bestows power that can be abused. Because professional power is largely based on knowledge that has not yet diffused to the general public it must to a considerable degree be self-regulated, but because professional power is of such major public consequence it must also be subject to significant public control. The medical research profession does not have a proud record of self-regulation or acceptance of public controls.

Concluding Thoughts

Professor Weizenbaum focuses on the fundamental problem pertaining to the sciences as they relate to ethics in the justice process as it creates the justice environment [8, p. 256-257].

But if every time has heard the same Cassandra cry, then every time has also learned how little prophetic it seemed always to prove. Civilizations have been destroyed, many of them.

But never mankind. But this time it is different. We are tired of hearing it, but we cannot deny it: this time man is able to destroy everything. Only his own decisions can save him.

It also used to be said that religion was the opiate of the people. I suppose that saying meant that the people were drugged with visions of the good life that would surely be theirs if they but patiently endured the earthly hell their masters made for them. On the other hand, it may be that religion was not addictive at all. Had it been, perhaps God would have not died and the new rationality would not have won out over grace. But instrumental reason, triumphant technique, and unbridled science are addictive. They create a concrete reality, a self-fulfilling nightmare. The optimistic technologist may yet be right: Perhaps we have reached the point of no return. But why is the crew that has taken us this far cheering? Why do the passengers not look up from their games? Finally, now that we and no longer God are playing dice with the universe, how do we keep from coming up craps?

The response to Professor Weizenbaum's question is for all of us, scientists and lawyers, to reinforce the old ethics—do not lie, cheat, or steal—and undergird the new ethics—be reasonable, fair, and humane. Let us give the dice of life back to God. We have splendid precedent in the words of Johann Kepler. His letter to Galileo Galilei, dated 19 April 1610, is our polestar. Kepler was replying to Galileo's scientific report on the moon based upon man's first telescopic observation [10]:

I yearned to discuss with you, most accomplished Galileo, in a highly agreeable kind of discourse, the many undisclosed treasures of Jehovah the creator, which He reveals to us one after another. For who is permitted to remain silent at the news of such momentous developments? Who is not filled with a surging love of God, pouring itself copiously forth through tongue and pen?

I have also thought it worth while, in passing, to tweak the ear of the higher philosophy. Let it ponder the questions whether the almighty and provident Guardian of the human race permits anything useless and why, like an experienced steward, He opens the inner chambers of his building to us at this particular time. Such was the opinion put forward by my good friend Thomas Seget, a man of wide learning. Or does God the creator, as I replied, lead mankind, like some growing youngster gradually approaching maturity, step by step from one stage of knowledge to another? (For example, there was a period when the distinction between the planets and the fixed stars was unknown; it was quite some time before Pythagoras or Parmenides perceived that the evening star and the morning star are the same body; the planets are not mentioned in Moses, Job, or the Psalms). Let the higher philosophy reflect, I repeat, and glance backward to some extent. How far has the knowledge of nature progressed, how much is left, and what may the men of the future expect?

In the center of the world is the sun, heart of the universe, fountain of light, source of heat, origin of life and cosmic motion. But it seems that man ought quietly to shun that royal throne. Heaven was assigned to the lord of heaven, the sun of righteousness, but earth, to the children of man. God has no body, of course, and requires no dwelling place. Yet more of the force which rules the world is revealed in the sun (in the heaven, as various passages of Scripture put it) than in all the other globes. Because man's house is otherwise, therefore, let him recognize his own wretchedness and the opulence of God. Let him acknowledge that he is not the source and origin of the world's splendor, but that he is dependent on the true source and origin thereof.

Old ethics and new sciences have truly entered into fresh relationships with justice. Is man's mind, which is the source of knowledge, to control man's heart, the citadel of wisdom? How to use scientific knowledge is the issue confronting justice today; how to contain it, how to control it. The new ethics of reason, fairness, and humaneness which strengthen human wisdom demand that the justice process require these qualities in modern scientific and legal practices. Not to lie, not to cheat, and not to steal undergirded the science and justice of yesterday. For today a new justice based on adjusting, accommodating, and harmonizing the new science with the new ethics is demanded. Only through this modern justice process can we create the necessary justice environment so that we will be nurtured as civilized beings into a civilized society and be able to hold ourselves together as we enter the third century of the United States of America.

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Law-Medicine Center
Case Western Reserve University
Cleveland, Ohio 44106