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The Ethical Responsibilities of the Forensic Scientist: Exploring the Limits

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ABSTRACT: This paper explores the ethical conflicts which confront the scientist working in the criminal justice field. Pressures to expand the sphere of conduct considered ethical may come from involvement with law enforcement and with the adversary system. Limits to this sphere, it is argued, are imposed by the ethics of science and individual morality.

KEYWORDS: jurisprudence, forensic science, symposium, ethics, law enforcement

"Forensic Science is the study and practice of the application of science to the purposes of the law" [1]. While a literal interpretation would suggest that any person who applies knowledge from any area of science to any of the infinite purposes of the law is a forensic scientist, the most common range of practice, while still broad, is somewhat narrower. The ten sections of the American Academy of Forensic Sciences give some indication of the specialities regularly engaged in forensic science: criminalistics, engineering, general, jurisprudence, odontology, pathology/biology, physical anthropology, psychiatry and behavioral science, questioned documents, and toxicology. Each of these at some time may assist in the resolution of any type of problem of the law, but the vast majority of activity is in the areas of criminal and coroner/medical examiner law.

One definition of ethics is: "the science of human duty in its widest extent including, besides ethics, the science of law whether civil, political or international" [2]. If "professional" is substituted for "human" in this definition, one has a useful description of ethics for forensic scientists. By associating "ethics" with "duty" in a professional context, conduct that might be perceived as ethical for one profession because of its duty may well be seen to be unethical for a different profession charged with a different duty. Nowhere is this more apparent (and often confusing) than in forensic science, which associates the professions of science, medicine, and the law. Scientists who have chosen (or been conscripted) to work with the law, complain loudly about the "unethical" conduct of lawyers who in fact are doing nothing more than upholding their professional duty to represent their client's interests. Lawyers bemoan the "unethical" conduct of scientists who, through disagreement with other scientists, are doing nothing more than confirming the tenuous nature of so-called scientific laws. "The true business of science is the formulation and testing of hypotheses about the physical world, and while no hypothesis can be finally proved, it is always open to disproof by the discovery of a single fact inconsistent with it. Scientists are therefore keenly aware of the tentative nature of their conclusion" [3].

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Forensic scientists, who are scientists first and forensic scientists second (and must continually remind themselves and others of this), are expected, as are all scientists, to be competent, thorough, objective, and willing to communicate freely the results and the significance of their experiments. Each of these qualities, however, may be compromised by the fact that the fundamental *raison d'être* of a forensic scientist is to assist in the resolution of disputes within an adversarial legal system. The nature of forensic science is such that a majority of practitioners operate within some form of governmental agency, including police forces. The policies and practices of these agencies, although they may be appropriate and proper for the agency, may also be a source of pressure to compromise these qualities. Where they do so, it may be argued that it is the organization which should be held accountable rather than the individual. Many of the issues that will be discussed below are organizational issues as well as (or rather than) individual issues. An interesting philosophical question (which this author will not attempt to answer) is, "Are there such things as organizational ethics or do ethics relate only to an individual?"

The conflicts, frustrations, and impediments faced by forensic scientists in meeting their professional responsibilities arise from four distinct sources: law enforcement (what am I expected to do?), the adversary system (how must I do it?), science (what can I do?), and from within the individual (what should I do?). Each has its own duties and thus its own ethics. Duties arising within the individual, however, might better be described as morals. The scientist who becomes a forensic scientist brings a concept of ethics governed by training in science and personal morality. Contacts with law enforcement and the adversary system will inevitably exert pressure to expand this concept. This pressure can be subtle and may be quite proper in the minds of the police officer and the attorney. Some expansion in fact may be appropriate, but eventually it must reach a limit. Where the ultimate boundary of the ethical sphere of the forensic scientist lies, it is argued, will be determined by the standards of science and by individual morality.

Sources of Pressure

Law Enforcement

The duties of the police are to investigate crimes, arrest alleged perpetrators, and assemble evidence to prosecute these individuals. They must also team with the prosecutor in building a case against the defendant to prove guilt beyond a reasonable doubt. Although the police are expected to follow the law, they are under no obligation to remain impartial or to disclose information which may benefit the defendant.

The police control the input to the forensic science laboratory. They decide which events will be investigated, what physical evidence will be collected, what will be submitted to the laboratory, and what examinations will be requested. An ethical problem is presented to the scientist if not all relevant physical evidence is collected and if relevant examinations are not requested (or, even worse, instructions are issued not to perform certain examinations). Although forensic scientists may not be responsible for police practices that may bias the representative nature or compromise the integrity of the evidence submitted, they must be prepared to provide better training, if required, to insist on appropriate samples, to reject improper requests and, if necessary, to "blow the whistle" on abuse. They surely have not met their ethical responsibilities if they do not. The responsibility for their output cannot begin only at the laboratory door any more than can it end at the courthouse steps. Forensic scientists also, of course, must ensure that they do not systematically exclude evidence that is possibly exculpatory.

Many forensic scientists are employed directly within the structure of police agencies and most who are not work in close association with the police. A survey by Peterson et al. [4]

found that about 80% of North American forensic science labs were within police or prosecution agencies. Fully 30% of the staff of these labs were sworn officers.

For the forensic scientist operating under the direct control of the police and perhaps even more so for the scientist who is also a sworn officer, the sometimes conflicting ethics of science and law enforcement present major dilemmas. The scientist, as a scientist, is expected to be professionally competent and thereby obtain the "right" answer from all tests. Yet for the police officer, either the "boss" or the police officer/scientist, the "right" answer is usually the one that points to the guilt of the defendant. Scientific validity is a problem only if the evidence fails under challenge in the court. As long as the scientist keeps coming up with the "right" answers most of the time, the police officer may challenge the need for more professional training, attendance at conferences, specialist assistants, incredibly expensive equipment, or enhanced laboratory facilities. If the scientist/police officer, as a result of inadequate training, experience or facilities, fails to make examinations which would point to the guilt of a defendant, has he or she fulfilled his or her duty as a police officer? If, for the same reasons, examinations that might point to the innocence of a defendant are not performed, has he (she) fulfilled his (her) duty as a scientist? Is it sufficient to just explain why the tests aren't being done, or must positive steps be taken to arrange for them elsewhere in order to be truly ethical? For example, a scientist qualified and equipped only to perform tests in the ABO system will frequently find blood stains on the clothing of a defendant to be compatible with the blood of the victim. For the police officer this is the "right" answer. However, tests in additional blood group systems might show that it is not compatible with the victim; thus it is the "wrong" answer. Knowing that ABO alone is not "state of the art" in forensic science, is it ethical to continue limiting tests to it? Must not the additional training and facilities be obtained? Must the scientist resign if not provided with adequate support? That might be the ultimate limit of professional ethics for the scientist.

In Peterson's survey [4], 57% of the laboratories reported that they only examined evidence submitted by law enforcement agencies. While it may be understandable that laboratories within police agencies serve only their own agency, such policies effectively deny access to many forensic science services to defendants in criminal cases. The cost of equipping and staffing a full-service forensic science laboratory is such that it is rarely economically viable in the private sector. This presents an ethical issue for scientists who feel it a duty, both moral and professional, to provide services only they can provide (and that should be provided) to those who require them, but are administratively prevented from doing so. The fact that such situations may not be widespread does not defuse the issue. In the report of the Royal Commission of Inquiry into the Chamberlain Convictions, Mr. Justice T. P. Morling of the Federal Court of Australia commented on this issue [5]:

Juries may attach great weight to the opinions of experts on matters outside the competence of the layman to understand. It is essential that everything possible be done to ensure that opinions expressed by experts, especially Crown (prosecution) experts, be soundly based and correct. In many cases, the opinions expressed by the Crown's experts are accepted by the defence. If they are not accepted, the resources of the accused person may well not suffice to enable him to challenge them. The risk of injustice occurring would be diminished if an accused person, in common with the Crown, had access to a National Forensic Science Institute and its staff of experts.

A "civilian" structure might be more receptive to providing service to defendants and defendants might be less inhibited about requesting service from such an agency. Another advantage to such a move was outlined by Mr. Justice Morling [5]:

A forensic scientist may be under considerable pressure from the police to produce quick results. There is no reason to criticize the police for enthusiasm, but it is essential that the forensic scientist be free from pressure to produce results, except after adequate testing procedures have been observed. Dr. Baxter expressed the firm opinion that a forensic science centre should be autonomous and so structured that it is not subject to external pressure. He is obviously correct in his opinion.

When the forensic scientist testifies only on behalf of the prosecution, is not his impartiality and thus his objectivity compromised at least apparently if not actually? "Impartiality is a vague and unreal phantom for those who always give evidence for the prosecution" [6] or the defense. Should the scientist in the "police lab" be denied the opportunity to provide services impartially to either side? Is it ethical to accept cases from only one side in a two-sided system? As long as forensic scientists remain under the administrative control of one of the adversarial parties and are restrained from providing services to both sides, they will be confronted with this ethical dilemma. The police, quite properly, are a partisan unit in the criminal justice system. This being so, should forensic scientists whose credibility depends in large part on their impartiality, be part of that unit? The question seems to answer itself.

The Adversary System

By far the most significant (both in number and extent) pressures presenting ethical dilemmas to forensic scientists are those resulting from involvement (however involuntary) in the adversary process for resolution of disputes. As stated by Cavers, "the process of drawing on scientific knowledge in adjudication reveals that our adversary system of litigation and the scientific method and the temperament of scientists are incompatible [7]. Having stepped into the witness box, scientists must strive to remind themselves that they really have not stepped through the looking glass. They must learn, or at least accept, that the judicial process is not a search for truth in the scientific sense, but rather a search for truth as defined by one or the other of the adversaries. "The scientist who would understand law and legal inquiry must be mindful that law has its own unique purposes and values, even its own logic" [8]. "Search for truth" in the context of the law is simply part of the process by which the goal, "justice," is strived for. In science, on the other hand, truth is the goal. "The principal objective of the litigants is to win the case, often at the expense of the truth" [9]. Shades of gray, so familiar in scientific endeavor, are not permitted; indeed, in the criminal justice system, all shades of gray are simply defined as white.

"The adversary system casts the expert witness in a partisan role. Counsel tries to extract a slanted picture from the witness, and, on cross-examination, opposing counsel seeks to slant the picture the other way. To the man trained in objectivity, this is a perversion of a quest for truth and justice. That some of his colleagues have adapted successfully to its pressure makes the situation all the more obnoxious to him" [7]. This latter statement may reflect a common belief of those unfamiliar with forensic science which angers many forensic scientists. Successful adaptation to the pressure does not require yielding to it. Although it cannot be denied that pressure to yield exists, it is possible for the law to make one a witness and yet for that person to remain a scientist.

While it is conceded that the adversary process is poorly suited to objective presentation and evaluation of scientific information, it must be remembered that this is not the essential purpose of the process. It has evolved as an effective and fair process for resolution of conflict which, although easy to criticize, is difficult to improve upon. The forensic scientist must learn to work within it; however, the profession should not hesitate to recommend, and push for, changes. For example, mandatory pretrial disclosure of scientific evidence would inevitably result in better scientific information being provided to fact finders.

Although there are many ethical conflicts confronting the forensic scientist in the adversary system, most are associated with confidentiality and with the subtle contagion of "winning." In principle at least, disagreements in science are resolved by experimentation, publication of data, and peer review. It is an open process. Although no doubt there are areas of scientific discovery or development which remain confidential, such as for commercial or security reasons, the natural inclination of the scientist is to discuss data openly and in its entirety. Typically in forensic science, on the other hand, reports are issued to police investigators, to prosecutors, or to other attorneys. Control of subsequent handling of the report

passes to these “clients” who do not always share the scientist’s professional view of the value of disclosure. A variety of situations then can develop which present no ethical problem for the police, prosecutor, or attorney, but do for the scientist:

1. The scientist may be asked to rewrite a report to remove what is considered by the client to be irrelevant or unfavorable to the case. Since the report of a scientist should never be prepared without due attention to relevance as well as scientific soundness, it is difficult to conceive how preparation of a different report can be justified.

The wording of a conclusion should also carefully avoid slanting it toward one side. For example, wording such as “This combination of genetic markers is found in approximately 0.01% of the population in this area” is a statement of fact; “This combination of genetic markers is found in only one person in 10 000” is editorial comment.

2. The client may decide not to use the report because it contains material helpful to “the other side.” In most jurisdictions, in North America at least, the defendant in a criminal trial has a right to be informed of the facts including those that are favorable to him. If the prosecutor fails to disclose such facts, forensic scientists surely have a professional (and perhaps legal) duty to do so else they become accessories to the deprivation of the defendant’s rights [6].

Whether such a duty also applies to a scientist retained by a defendant is less clear but no less a dilemma. Does attorney-client privilege pass to the scientist retained by the attorney? While this may be a legal issue, if the legal answer is “yes,” the question of whether it *should* become an ethical issue for the scientist. It can even be taken further; if silence based on privilege is legal and ethical, should it always outweigh moral duty? For example, having examined a firearm provided by the defense, the scientist concludes based upon a firing-pin impression that a cartridge case was fired in that gun. Subsequently, the gun is turned over to the police and their expert concludes that the firing pin did not make the mark. On reexamination, the first expert finds the pin has been changed. Is there not some obligation to come forward with this information?

3. The client may misinterpret the report to “the other side” in order to obtain admissions or stipulations. Although responsibility may be lessened if one cannot reasonably be expected to foresee such abuse occurring, the experience and expertise of most forensic scientists is such that it is unlikely that they should not anticipate such occasional practice.

Although forensic scientists would consider it unethical to prepare a misleading report for the investigator to use in interviewing a suspect, would they feel it equally unethical to provide a blank report form knowing full well it would be used for the same purpose? Surely the scientist must not, even by implication, be a party to tactics that may leave incorrect or improper impressions with a fact finder.

4. Having reported verbally to the client, the scientist may be instructed not to prepare a written report. This raises a question of ethics, but should not a written report always be prepared, if only for the scientist’s protection?

5. Even though the scientist has been called to testify, not all the relevant questions may be asked and thus significant evidence not presented. Having sworn to tell “the whole truth,” can the scientist (or any witness) refrain from honoring that oath?

“Impartiality is an elusive virtue” [7]. The “other-sidedness” thought processes of the adversary system can have significant detrimental effects on the desire for impartiality of the scientist. “Gamesmanship” is a legitimate function of police and attorneys, and the temptation for the scientist to enter the game is subtle but strong. It may even go unnoticed or unappreciated. Legitimate advocacy of a finding or an opinion based upon that finding can with almost imperceptible ease become advocacy for a cause. As stated by Starrs, “The line between legitimate tactics and ethical impropriety is often so dim as to be indistinguishable” [6].

For the scientist who practices with some regularity in the criminal justice system, there is

a tendency to most frequently be called by one side. Whichever side that may be, prosecution or defense, as a result of the frequent and continuing exposure to the mind-set of that side, it would be remarkable if the scientist were not influenced by it. This then can produce another set of pressures and resultant practices, such as

1. The preparation of reports containing minimal information in order not to give the "other side" ammunition for cross-examination. Given the well-known propensity of lawyers to leave no nit unpicked, one can sympathize with, if not approve of, this practice.

2. The reporting of findings without an interpretation on the assumption that if an interpretation is required it can be provided from the witness box. This can lead to allegations that the interpretation was developed to conform with the other facts in evidence. It also overlooks the possibility that the scientist may not be called and that the interpretation of scientific data may then be left to lay people.

3. Omitting some significant point from a report to trap an unsuspecting cross-examiner, thereby "teaching him a lesson."

The profession as a whole could eliminate these three issues by establishing standards for report content and format. For example, a format could require that all reports include some sort of interpretation of the findings, the degree of certainty (if possible), and the limitations (where applicable).

4. During cross-examination, expressing an opinion with greater certainty than the data or experience would justify. This can result from inexperience, from a desire to support the team, or simply from the ego trip that accompanies the exhilaration of being the "star" of the moment.

5. Failure to report or acknowledge any weakness in a finding or opinion. If cross-examination is to be the only way to discover misleading or inadequate testimony by forensic scientists, then too much is being expected from it and not enough from the scientists.

6. Failure to differentiate between opinions that are based on experimental findings and those which are based on study, experience, and judgment. The former should carry more weight than the latter.

7. Appearing in court beside the attorney to assist in preparation of cross-examination of a scientist called by the "other side." Although this may be a necessary practice to expose incompetent, improper, or distorted testimony, some forensic scientists are uncomfortable being so closely identified with one of the adversaries. Although such practice is generally considered to be ethical, the discomfort arises from a vague sense that it is not. If the assistance subtly passes from its proper role to an attempt to thwart justice, then it does become unethical.

The pressures on the forensic scientist to expand the range of what he or she considers ethical are many. However, there must be limits or boundaries to that range. If limits which are fundamental to science are ignored, then one is no longer practicing science.

Boundaries of Ethical Practice

Science

Forensic scientists are professionals within some special area of science and thus have a professional duty to be competent, objective, thorough, and open. The competence of most scientists is determined by other scientists according to some recognized set of standards. On the other hand, the competence of the forensic scientist, at least in theory, is determined by the judge, who decides whether the scientist is to be considered an expert witness, and by the jury, who decide whether to believe the testimony. Since judges and juries rarely are technically competent to assess the quality of the experimental data presented, they must rely on the reputation (if known) of the witness and of the standards of practice of the profession as a

whole. Accreditation of laboratories, such as by the American Society of Crime Laboratory Directors Laboratory Accreditation Board (ASCLD/LAB), may be of assistance, but the individual scientist, not the laboratory, stands in the witness box. For some of the forensic science specialty groups, the judge and jury may also be assisted by voluntary credentialing programs in such areas as pathology, toxicology, psychiatry, odontology, physical anthropology, document examination, and latent fingerprint identification. However, one of the largest forensic science specialty groups, criminalistics, has not formally adopted any recognized set of standards.

In practice, determination of competence, which should be the responsibility of the profession, rests for a large group of forensic scientists with the employing agency and the forensic science laboratory director. Some "crime labs" within police agencies are directed by career police officers with little or no scientific training. Although they may be well-equipped to administer the myriad of nonscientific matters a laboratory director must cope with, for the determination of competence they are largely at the mercy of those they are expected to assess. Thus, in some laboratories, and for many forensic scientists who are in private practice, competence is self-determined. The enormous array of examinations potentially required in forensic science makes it difficult for the individual to assess the breadth and depth of his or her expertise. Particularly in small laboratories or geographically isolated areas, the pressure to extend one's professional capabilities "just to help out" may be irresistible. Those who function in professional isolation have an additional problem: Without resources to attend professional conferences, or even to keep up with the literature, such individuals may extend their range of incompetence simply because they do not know any better.

Laboratories with good scientific leadership and well-documented training, quality assurance, proficiency testing, and file review programs should be able to demonstrate competence of their scientists. Where aids such as certification, accreditation, and outside proficiency testing programs are available, to participate or not is a significant ethical issue for the scientist, particularly if these are unsupported by agency management. The lack of involvement in such programs does not preclude competence, but the absence of documentation certainly lends itself to allegations of incompetence which are difficult to defend against.

The laboratory is perceived by many as one of the last bastions of objectivity. Often this perception is correct. Most forensic scientists would resent any suggestion of lack of objectivity, although "total objectivity" is conceded to be an ideal state to which they can only aspire. However, given the often distasteful and shocking cases scientists must work on, it is difficult for laymen to see how these forensic scientists can possibly retain any objectivity. Knowing that a defendant has confessed to the rape murder of a child, how, laymen wonder, can they be satisfied that the interpretation of the laboratory findings is not in some way colored by that knowledge? Some insist that the scientist should know nothing of the background of an investigation to preclude such possibility. Others maintain that the absence of such information can result in unnecessary examinations being done, necessary examinations being left undone, and inadequate interpretation of the results. Most forensic scientists would argue that, regardless of the investigative information available, the results from the laboratory cannot change and their objectivity therefore cannot be challenged. If all examination results were clear-cut and required no interpretation, this premise might hold. Unfortunately, such utopian analyses often do not exist.³

Forensic scientists do not make physical evidence "objective" simply by subjecting it to analysis in the laboratory. If bias has been employed in selecting evidence from the field or in deciding which evidence should be examined or reported or both, no amount of scientific testing can correct for this prejudice. Since evidence collection at a crime scene is normally a

³It would be an interesting piece of research (for someone else, not this author) to try to determine whether or not the case history does influence the results of laboratory examinations.

police responsibility, if forensic scientists do not control the process they must at least ensure that the personnel involved are thoroughly trained. Although others may have the responsibility to assemble all the evidence in a case, the scientist has a professional duty to have the final say as to which examinations will be made in the laboratory and which will not. Lack of such authority presents a major ethical issue. Scientists must be sensitive to the imperfections and biases of the criminal justice system and strive to change the system if it serves to undermine their professional standards and compromise their personal values [4].

One of the hallmarks of the scientist is thoroughness in the execution of an experiment. Designs incorporate specific sample requirements, appropriate controls, valid standards, proper equipment, and established procedures. The forensic scientist often has little or no control over the quality of the samples; the ones provided are the only ones available. Appropriate controls and valid standards are sometimes not available, the best equipment cannot be afforded, and procedures have to be extemporized. Often the sample will be destroyed in the process of examination. Such limitations do not preclude acceptable results, but the confidence levels of those results must be carefully evaluated and expressed. This adds immensely to the responsibility of the forensic scientist and represents an ethical issue if not acknowledged.

Mr. Justice Morling also outlined his concept of forensic science thoroughness [5]:

In criminal cases where the standard of proof is proof beyond reasonable doubt, it is highly desirable that complex scientific evidence called by the prosecution should be so carefully prepared and expressed that the necessity for the defence to challenge it is reduced as much as possible.

A problem unique to the forensic scientist is the determination of the point at which thoroughness evolves through redundancy to gamesmanship. Frequently, examinations beyond those necessary to establish a finding, can be made. When they add nothing and are performed only to impress laymen with one's thoroughness, is it not unethical to carry them out?

The very essence of science is open communication of experimental details and results. The mind of the scientist is always open to new concepts and alternative hypotheses. Methods, results, and interpretations must not be held secret. Secrecy and science are incompatible. A "scientific" method that can be used by only one person is not a scientific method.

Morling also pointed out the importance of open communication between experts [5]:

Apparently the various experts did not consult together to decide precisely what was established by the results of the tests.

. . . no witness would take responsibility for what was put to the jury. The error appears to have been the result of lack of expertise by some experts, lack of proper equipment and lack of consultation between all the experts involved in this important part of the Crown case.

. . . If there had been consultation between the biologists called at the trial, agreement might have been reached on a description of the test's capabilities so that the risk of the jury being misled would have been eliminated.

In summary, some of the professional duties presenting ethical issues for the forensic scientist as a scientist are

1. The duty to remain competent in a wide range of scientific fields within often limited resources for library and professional meetings. If appropriate resources are not provided, and the forensic scientist cannot meet this responsibility as a scientist, is it ethical to continue to present one's self as such?

2. The duty to be as objective as reasonably possible in the selection of samples and examinations and in the interpretation of results. Is it ethical to ignore relevant samples known to be available simply because they were not submitted? Can one refrain from certain significant tests on request and still be considered ethical?

3. The duty to be thorough and produce results and conclusions within the capabilities and limitations of science, and within the expertise of the individual scientist. Forensic science often involves examinations that are one of a kind. In these cases, is it ethical to not fully reveal the procedures used, the supporting data for them, and the result of blind trials, if any? Is it ethical to use a procedure in the absence of such data? How far is it necessary to go in explaining things that are critical scientifically but may have little or no legal relevance? Should not the reasons for inconclusive results be explained?

4. The duty to be openly communicative. When open communication between scientists is restricted by the demands of others, the scientist is faced with an ethical dilemma. Is it ethical for the scientist not to publish the results of his research for the benefit of all? Should one refuse to talk to other scientists because they may have a different interpretation? Should a technique be used which has not received peer review?

Each of these questions has, implicitly at least, been answered by individual forensic scientists. Professional associations are showing increasing interest in providing guidelines for answers for their membership. The philosophic principles are generally easier to agree to than is actual application in specific instances. When answered, however, they represent boundaries for the sphere of ethical conduct.

The Individual

While the influence of training in science has a profound effect on the scientist's concept of duty, there is also the influence of the development as a human being. Professional ethics at this point dissolve into individual morality and vice versa. Schroeder has presented a scholarly analysis of this interface [10]:

To consider the relationship of ethics and morality to the forensic sciences, professionals must be measured against a standard which begins with the individual as a person not as a forensic scientist. Within each individual's moral fiber rests the professional's ethical performance. Without a consciously developed sense of individual morality, neither personal morals nor professional ethics is attainable. *The cornerstone of all ethical thinking including professional ethics is private morality* (author's emphasis).

As individuals we are taught a set of morals from a very early age. To "lie, cheat, steal or kill" [10] is behavior we instinctively reject and yet many professional codes of ethics do little more than remind us of our parents' admonitions. For example, the Code of Ethics of the American Academy of Forensic Sciences requires its members to refrain from

- . . . any material misrepresentation of education, training, experience or area of expertise
- . . . any material representation of data upon which an expert opinion or conclusion is based
- . . . professional and personal conduct adverse to the best interests of the Academy.

In other words, do not lie, cheat, steal, or kill. Note that, although the professional ethics of the police officer and of the lawyer may be quite different from those of the scientist, the moral responsibilities of the individual do not differ for the different professions.

A few of the ethical issues for forensic scientists relate directly to individual moral values. For example,

1. A psychiatrist who personally finds the death penalty abhorrent may be required to provide a professional opinion which, if accepted, can lead directly to a death sentence. Is it ethical to refuse to testify to a properly held professional opinion solely because that opinion may lead to a result in conflict with one's moral values? Conversely, would it be ethical to provide testimony on such an issue while holding strong personal adverse beliefs. The law may be clear, but the ethics are not necessarily so.

2. An indigent defendant may require professional evidence from a scientist whose sole

income is based on fee for service. Similarly, there are situations in which the only way scientific evidence can be provided is for the scientist to work on a contingency basis. Can service be denied (morally or ethically) in such cases? Many codes of ethics preclude accepting work on a contingency basis. The problem, however, would appear to relate to credibility rather than to ethics.

3. Outside the courtroom, there are situations in which the scientist feels on moral grounds that the whole truth should be withheld because parts of it are irrelevant to the issue and would be devastating to the receiver. Coroners and medical examiners frequently face this issue in reporting to next of kin. Is it unethical in these cases to provide only part of the truth?

4. "Whistle-blowing" on colleagues or other professional associates. Is it not unethical to conceal knowingly unethical actions of others?

Conclusion

There is no doubt that when the scientist doffs the lab coat and dons "sincere attire" to enter the witness box as a forensic scientist, special problem of ethics (and morality) develop. Ethics, based as they are on rational analysis and professional duty are, for the scientist, perhaps not as difficult to cope with as morals which, while they can come from reasoning, more commonly arise from instinct, feeling, environment, and even faith. The generalities are easy: everyone believes in ethical practices; all scientists believe their practices are ethical. The specifics are much more difficult. Where are the boundaries of ethical practice and when are they crossed?

Law enforcement practice and the adversary system quite properly have a significant influence on the conduct of the forensic scientist. Individual scientists must function within substantial legal and organizational constraints, but they also must accept ultimate responsibility for their conduct. A professional code of ethics reflects the profession's historical and contemporary collective experience. The profession must provide guidance and support to the individual. It must also provide guidelines by which outsiders may judge the conduct of the individual. A code of ethics thus serves as an essential element in governing professional as well as personal conduct. The individual's guide, however, must not only be the code of ethics of his or her profession but must also include his or her conscience.

If it is accepted that one professional field cannot totally subjugate its values to those of another, it follows that scientists with a forensic practice should not allow legal or law enforcement professionals to dominate their manner of operation and their conduct. Otherwise, forensic scientists give up any claim to identify themselves as a professional group. Whatever the relationship of forensic science to law enforcement and the legal system, it should be consistent with the fundamental professional duties and thus the ethics of the scientist. In situations in which the law ultimately must prevail, as in a civilized state, the ethics of the scientist should not be questioned.

Throughout this paper, many questions have been raised. For some, there may be more than one answer. One (perhaps an easier one) is based on the realities of current organizational structures and the not always unambiguous interpretations of the laws of evidence. The other is based on ideals—organizational, structural, financial and legal, perhaps unattainable but certainly worth striving for. This reality is reflected in codes of ethics of several organizations; they contain both mandatory provisions ("must not misrepresent qualifications") and aspirational guidelines ("examinations should be made objectively by accepted methods"). The answers may be difficult because the conflicts and pressures arising from involvement with law enforcement and the adversary system are many. It is proposed, however, that if one remembers that one is a scientist first and a forensic scientist second and if one applies the fundamental standards of science (ethics) and personal integrity (morals), all can be answered to the betterment of the profession and of society.

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