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Reflections upon Case History, Diagnosis, and Therapy of a Frustrated Patient: Forensic Science

I have set myself the task of critically reviewing the state of forensic science and pointing out possible remedies for some of the unsatisfactory situations prevailing. I shall refrain from further elaborating on the role played by Swedish forensic workers, merely mentioning such names as Harry Söderman, Arne Svensson, and Otto Wendel and the fact that the development of fingerprints with ninhydrin originated in Sweden.

Historical Development

The three classical fields of human thought and professional endeavor outside of the arts are law, philosophy, and medicine. Out of these roots grew the tree of human knowledge and civilization. Figure 1 shows in a schematic and simplified form how, during the last few centuries and decades, this growth influenced the emergence of what we call today the forensic sciences. Special branches of medicine began to form in the sphere of legal problems. Later, natural science grew branches into the forensic field, out of which toxicology and serology became extensive parts. The organization of what we now call "police" became formalized only during the 19th century, and specialized techniques of criminal investigation eventually became available. Legal and social sciences developed special disciplines concerned with the study of crime and the fight against it. At first glance, the role of philosophy seems to be a peripheral one in our profession, but we are well aware of the significance of logic, ideology, and shades of formulations in the forensic language. Above all, it is applied philosophy that serves as a coordinator and catalyst in establishing and maintaining the contact and mutual understanding between the specialists in the forensic sciences: the scientist, the doctor, the lawyer, and the police officer. Good personal relationships exist between members of these groups, but we are still far from the desired level of mutual trust and understanding between the different professional groups.

Public Recognition of Forensic Sciences

In the eyes of the public which, alas, includes many enlightened policy makers, a forensic scientist has a hazy image and a limited prestige. There are several reasons for this regrettable situation. Firstly, the expression "forensic scientist" is not well defined (it is absent in Webster's dictionary). Secondly, the fields of specialization and training vary

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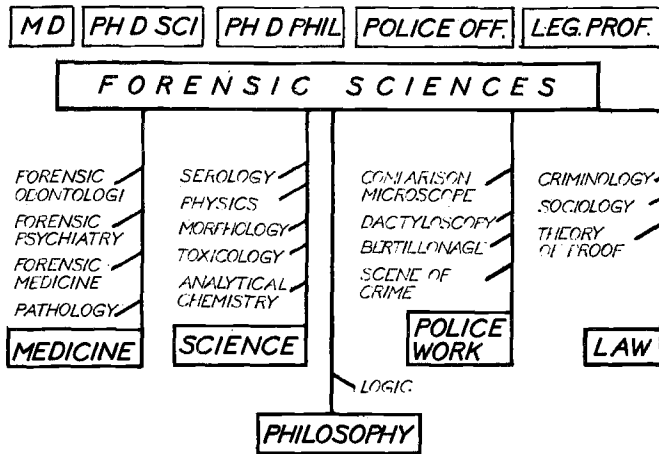


FIG. 1—A schematic and simplified view of the growth of forensic sciences from the roots of human endeavor—medicine, philosophy, and law—as well as the additional fields of science and police work. On the top of the figure some of the professionals working in forensic science are listed: the medical doctor, the natural scientist, the sociologist, the police officer, and the member of the legal profession.

enormously from one individual forensic scientist to the next. Thirdly, there is an outspoken diversity in cultural background (law, language, history, organization) from country to country and even from state to state. And, finally, the quality of the work carried out at various institutes and by different individuals is very uneven. This makes for a negative feedback: a low level of recognition does not attract top-level individuals and vice versa.

The Present State of the Profession

Many forensic scientists have, or should have, three tasks to perform: casework, research, and teaching. What are the prospects for carrying out these tasks satisfactorily?

Casework

Casework has increased at an enormous rate, due to stress symptoms in our industrial society (such as neuroses, drug addiction, alcoholism, suicides, and crime). Faced with the rising flood of incoming cases, some laboratories simply give up the uneven struggle and let the backlog grow. Others pass the buck by asking for larger funds. Some rationalize working procedures. None, let us hope, jeopardize the quality of work.

Lack of contact and of consideration for our work often leads to unnecessary waste of valuable effort. Thus, intensive and detailed work is sometimes carried out in a forensic laboratory for days or even weeks, only to be dismissed as “unnecessary” since the case in question has been dropped or is no longer of any importance.

Research

Research in forensic science is necessarily of the applied type and should, therefore, stand a good chance of obtaining funds. The present trend is away from fundamental and towards applied research, a trend which I personally regret as a scientist but rather welcome as a forensic worker, since we ought to be able to achieve some quick and useful results in our field, and it should also be possible to obtain financial backing.

Methodology

Methodology is in rapid development, but its application to forensic work is mainly limited by the lack of funds. Often the money is available but its distribution is not adequately carried out and does not reach the forensic science laboratories. Among desirable techniques I could mention are the use of computers, mass spectrometry, laser methods, Fourier transform spectrometry, scanning electron microscopy, etc.

We must not be persuaded by the instrument makers or, worse, by vanity, to buy sophisticated machinery before the time is ripe for it. In forensic science, a methodological dilemma always exists; on the one hand, modern scientific methods should be used as soon as possible for ensuring results of high quality and, on the other hand, no methods may be introduced in court before their dependability has been thoroughly tested and established (see Fig. 2).

Education

The trend in education has in some ways been less favorable to us. Quality is sacrificed to quantity, and a solid general background to increased specialization. Specialists are needed, of course; otherwise tasks such as document examination, drug analysis, serology, etc. could not be carried out satisfactorily. But in our broad field of endeavor a solid general education is of great importance, especially for coordinators and leaders of working groups and institutes.

Organization

The organization of service laboratories, of planned research, and of education and training is in many places haphazard, inefficient, and inadequate. Competent individuals are bogged down by high case loads and administrative obstacles. Policy is often made by organizations and individuals who may have very good intentions but have no knowledge of the operation of a forensic science laboratory.

Information

Information about activities and goals for the forensic sciences is insufficient and, above all, does not reach the decision makers. This is partly our fault.

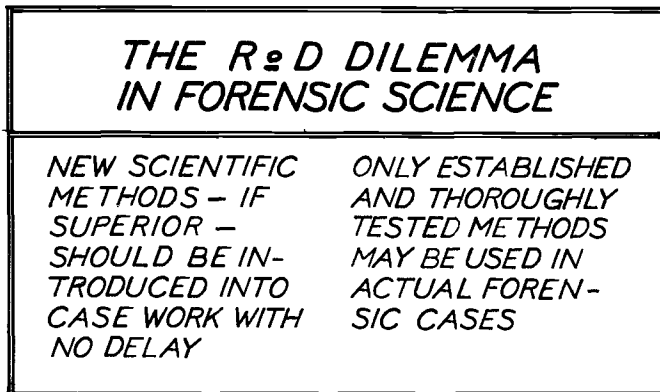


FIG. 2—It is of considerable legal and ethical importance to assist the legal process with the best possible scientific methods. At the same time, no unproven procedures may be employed, so as not to jeopardize the establishment of the truth.

Outlook for the Immediate Future

Pressure from the public, the political leaders, and the administration has initiated a flood of crash programs for law enforcement and against organized crime, not only in the United States but also in other countries. In many cases, planning is overorganized, duplicated, and carried out by too large an army of administrators. This administrative centipede often does not know how its various legs are moving.

I should like to mention some of the measures on the regional, national, or international level that in my opinion could give some beneficial results. Many of these measures are not original and have been suggested by others but it might be useful to review them.

Organization

1. It seems advisable to completely separate forensic science centers from prosecuting authorities. In the interest of a free society, the emphasis of our endeavor should be placed on finding, reporting, and evaluating facts rather than on "law enforcement." Some aspects of possible administrative structures for forensic laboratories have been discussed in a recent report from the Stanford Research Institute [1].

2. In order to permit the hiring of competent staff members and the exchange of research fellows, it is necessary to work for a far-reaching liberalization of working conditions so that out-of-state or foreign scientific workers are accepted in the laboratories. An administrative divorce of the laboratories from police organizations would facilitate such a development.

3. The services of the forensic science laboratories should be available to the courts, the prosecutors, the police, and defense counsels free of charge. The capacity of the laboratories should further be sufficient for giving evidence in civil suits for a fee.

4. The qualifications for the various "layers" of staff members should become subject to national and, eventually, international agreements. In some countries, such as France, there exist official lists of qualified forensic experts. The Forensic Science Foundation suggested the creation of some kind of diploma for similar purposes.

Casework

1. It seems to me that it is time for many of us to take an active share in the responsibility for the case input and the classification of cases, so that the urgent takes precedence over the less urgent, the important over the nonessential.

2. It would be advisable, especially in the field of forensic chemistry, to publish manuals of checked laboratory procedures. A method developed in one laboratory would thus be checked by at least one other institute (preferably in another country) before final publication. Examples for such a procedure are publications such as *Organic Syntheses* or *Biochemical Preparations*.

3. Comparative analyses of test samples could be carried out by many laboratories, such as Lowell Bradford and coworkers have been doing for blood alcohol samples. Such test analyses could also be used as part of the requirements for a diploma. Examples are toxicological tests, drug analyses, document examinations, ballistics, and biological samples.

4. Regional, national, and worldwide lists of specialists in all possible fields connected with forensic science (for example, snake poisons, pollen analysis, blood groups in hair, rocket fuels, brain tumors, etc.) should be compiled and made generally available.

5. Organization of regional workshops (for example, in fluorescence spectrometry, liquid chromatography, fiber analysis, document work, etc) would greatly intensify interlaboratory cooperation. Such workshops are being organized by the Forensic Science Society and the German Forensic State Laboratories.

6. A provision enabling a number of "local" laboratories to specialize in handling cases requiring very special and/or expensive techniques would save money and time, and should ensure higher quality of work. These cases would be assembled from a wider region.

Research

1. Thoroughness in scientific work, accompanied by resolute mutual and self-criticism, must be our foremost goal.

2. The standard of many journals in forensic sciences can be raised by tougher reviewing and selection. Minor contributions could be added in the form of short notes.

3. An important, but much neglected, measure is the exchange of research fellows on at least the postgraduate level. A prerequisite for this is, however, the liberalization of working conditions mentioned above. For example, a physicist (assistant professor) from Sweden works at present as a research fellow at the Metropolitan Police Forensic Science Laboratory in London.

4. A well-organized system of rapid documentation of analytical data and literature is sorely needed. A shining example of such a system is A. S. Curry's organization in Aldermaston (the British Home Office Central Research Establishment). In the field of toxicological information, the work of Brian Finkle et al is outstanding [2,3]. International cooperation is needed, and W. G. Eckert ("Mr. Inform") has excellent suggestions in this connection.

5. Development of new methods is part of the daily work for a well-organized laboratory. Major research projects, however, must be carried out independently of casework. Research groups should therefore not be concerned with incoming assignments but work exclusively on their projects. On the other hand, it is important that the research group be attached or closely linked to a casework laboratory in order to ensure a close contact between the individuals in both organizations. We are trying to set up such a research group within the National Forensic Science Laboratory in Sweden.²

Education and Training

1. A small number of universities should run high-quality schools of forensic science. A good start has been made at Berkeley and the University of Strathclyde in Glasgow.³ Emphasis should be on postgraduate work and research. The leaders for sections, divisions, or whole laboratories would be recruited from these schools. Fellowships should be available for students from other states or countries. The National Institute of Law Enforcement and Criminal Justice, as part of the LEAA, instigated such fellowships in 1970. In that year only one fellowship became available for work in criminalistics, and none in pathology or toxicology.

2. For assistants, a specialized training in either physics, chemistry, or biology is needed. Leaves of absence should be granted to capable assistants for graduate studies at a forensic science school.

² See *Research in Forensic Science and Technology*, Swedish Natural Science Research Council, Stockholm, 1972, 66 pages.

³ Degrees of Master of Science in Forensic Science are also available at John Jay College of Criminal Justice, New York. Courses in criminalistics are further available at, for example, the Institute of Forensic Science and Criminology of the University of Lausanne, Switzerland, and the California State Colleges at Los Angeles and Long Beach. The author is aware of the fact that this list may not be exhaustive.

3. University graduates should have the opportunity of working on their thesis at a laboratory of forensic science. This should give them an opportunity of combining their work in a specialty with a thorough familiarization in other fields of forensic science. Such a system which works very well exists at the Metropolitan Police Forensic Science Laboratory in London.

Information

Much is being done to disseminate information on casework, research, and development within the profession, but I believe that outsiders—and that includes policy makers on all levels, as well as members of state and country parliaments—do not receive the necessary data in order to see a whole picture of what is happening in forensic sciences. Press releases, conference reports, radio and television programs should be activated, as well as lectures given and visits to the laboratories arranged. These are old but proven tactics in grantsmanship.

More than tactics are involved, however, since the standing of our profession is at stake. It is not enough to carry our routine casework at no matter what high level. The directors of the laboratories and their staff must pause frequently, close their eyes, and think: "What am I doing to further the quality and recognition of forensic work, and to project the development of this work into the future, which inevitably holds ever-increasing demands upon the services of the forensic scientist?"

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