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V. A. Gurgin,[1] *D.Crim.; Brian Parker,*[2] *D.Crim.; and S. J. Betsch,*[1] *M.A.*

Criminalistics: Today and Tomorrow

In the past decade, government decision makers in America increasingly have been required to deal with questions regarding the appropriate allocation of Federal resources in order to obtain cost-effective solutions to those situations we presently take to be human, social problems. It almost goes without saying that crime, in its profusion of variety and volume, is a social problem whose solution necessitates effective government resource allocation for decision making.

Criminalistics, or the derivation by scientific and technological means of physical evidence in the administration of law, has frequently been heralded as one activity which, if its potential were exploited, would greatly enhance the solution of the "crime problem." Thus, governmental decision makers, whose concern is the administration of law, are faced with determining the possible future contours of criminalistic activity so as to be assured that investment in the development of this activity will indeed result in social benefits.

The research reported on here was designed to provide a preliminary set of guidelines for this policy decision question by focusing on the following research question: What can we anticipate the character and nature of the social benefit of increasing criminalistic services to be in the future?

Objectives

The objective of our research was to provide a set of empirical guidelines which would be of assistance to government decision makers when considering the size and form of the investment they should make in the area of criminalistics. Thus, it was our goal to project the future of criminalistics as a social institutional activity and to assess this projection in terms of its socially beneficial potential.

Basic Theoretical Framework

While the research question and objectives posed have all the formal earmarkings of classical cost-benefit assessment problems, this is not the case. One of the principal theoretical characteristics of classical cost-benefit analysis is that it commences from the assumption of a fixed, or objectively given, point of departure; namely, the economic

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[1] Executive director and consulting sociologist, respectively, Institute for the Study of Social Concerns, Berkeley, Calif.

[2] Professor of criminal justice, California State University, Sacramento, Calif.

value of money. Of fundamental importance to the employment of cost-benefit analysis to social institutional questions is the understanding that it is impossible in the realm of the social to posit, *a priori*, any point of reference in terms of which value objectively exists. Social value is created and lodged in institutional forms, which means that the social value of any humanly created and sustained enterprise cannot be assessed independently of the social institutional framework in which it exists and is therefore socially functional.

That is, our assessment of the potential social benefit of increased criminalistic services required that we come to an understanding of the present social institutional processes from which the function of criminalistics derives its current social value or its social benefit. This in turn would provide us with an empirical basis from which to project the future social benefits of increased criminalistic activity.

The methodological implications of these axiomatic sociological statements are the basis of what we feel is a metaresearch insight into the application of cost-benefit analysis to social institutional questions. Stated simply, the major implication of these sociological axioms is that while the arbitrary assignment of monetary values to social actions is methodologically quite possible, it theoretically is of no consequence, for it is not in any way representative of what we know to be the character of social reality. We can ask a man what he thinks it would be worth (in terms of dollar value) to have his hypothetical murderer caught and successfully prosecuted, but his answer is of no utility to us because, from a social institutional perspective, the man on the street has little voice in determining the social value of crime solution; the decision of its worth in society is made only within political institutions that are concerned with the administration of law.

Thus, the relatively ritualized techniques whereby classical cost-benefit analyses are implemented in answering questions concerning dollar cost as against dollar gained were *ipso facto* inappropriate to the character of the research question to which we sought an answer. Instead, it was imperative that we utilize a methodological strategy which would accurately reflect the social institutional processes from which criminalistics derives its social value, or is viewed as socially beneficial.

This essentially is the reasoning for conducting a social institutional analysis of criminalistics: criminalistics, like other professions, is organized around endogenous talents in terms of which it establishes a singularity of purpose. That purpose will specify what its participants take to be the basis for their activities. Criminalistics has become an office in a bureaucratic arrangement in which the materialization of professional purpose must be viewed against the background of sociopolitical institutional objectives that often subvert, compromise, or reconstitute the various purposes that institutionally controlled professionals hold. What we can anticipate is that there is a kind of implicit tension between institutional and professional goals. If the character of this tension can be specified, we can understand the ways in which any professional activity is tailored by the context in which it functions.

Not only does this tension reveal the difficulties that professionals have in creating a factual synthesis between job and calling, but more importantly, it locates the points at which a professional's hypostatized purpose is circumscribed to benefit us in some ways and not in others. We are considering here that the ways in which the sociopolitical institutional framework affects a professional's functioning constitute in and of themselves a cost, a liability to the potential implied in purely "professional" intent. Therefore, the benefit of a profession like criminalistics is represented in the empirical consequences of the structural relationship of the ideology of the profession to the sociopolitical institutional control under which it materializes.

As a profession, criminalistics believes itself to be a "scientific discipline directed to the recognition, identification, individualization, and evaluation of physical evidence by the application of natural sciences to law-science matters." The hidden implication of this definition is that who and what constitute law-science matters are not the concern of criminalistics. Yet the profession is deeply affected by the determination of what is a law-science matter; the way in which such matters are determined will and do impinge upon the application of criminalistics. Once this is recognized as a guiding principle, our attention is directed to the outcome of crime laboratory analyses as the basis for exploring those conditions by which physical evidence becomes a matter of law and science simultaneously. For benefit from criminalistics is limited by the matters with which it may legitimately deal.

Research Procedures

It should be clear that our formal research efforts began by concentrating upon establishing the outcomes of crime laboratory analyses. In keeping with our theoretical understanding of the importance of the social institutional context within which criminalistics exists, we chose to conduct our research along the lines of a case study. We selected the reputably known Santa Clara County, Calif. crime laboratory as the site for intensive investigation. Additionally, we chose a panel of experts in the administration of law and the utilization of criminalistics. We collected data by a variety of techniques, including the utilization of official data concerning the incidence and type of crime for Santa Clara County, the State of California, and the nation. We analyzed the records, over a 25-year span, of utilization of the Santa Clara County crime laboratory. We intensively interviewed law enforcement officials utilizing these criminalistic services, criminalists working within the laboratory, and county administrators.

To provide the basis for establishing the ability to generalize the findings of our case study, we cross-checked our observations and conclusions based upon an analysis of the Santa Clara County crime laboratory with other findings in the field of criminalistics and with our panel of expert consultants. It was generally agreed that our findings and conclusions were indeed representative of the current "state of criminalistics."

Findings

In order to establish crime laboratory outcomes, we initially examined the cases of crime processed by the Santa Clara laboratory. We did this in an effort to determine the relationship between reported crime and crime laboratory utilization (see Figs. 1–6, from the Stanford Research Institute). The singularly most impressive finding of this analysis was that criminalistics is disproportionally utilized in cases of suspected possession and/or use of drug compounds. We asked: Why should this be the situation? Why should it be that only certain and restricted kinds of physical evidence are destined to be a matter of law and science simultaneously?

We looked for our answer directly to the context within which criminalistics exists and functions. We characterized that context just as it is by those who man it, namely as an arm of government which aids in the administration of law. One of the functions of the administration of law is the securement of convictions of those who are guilty of criminal offenses. Logically, then, it would make a difference to the volume and type of crime laboratory processings if physical evidence were a requirement for conviction. Drug offenses (the possession of illegal drug compounds and overindulgence in alcoholic beverages before driving) are categories of criminal offenses in which the scientific findings

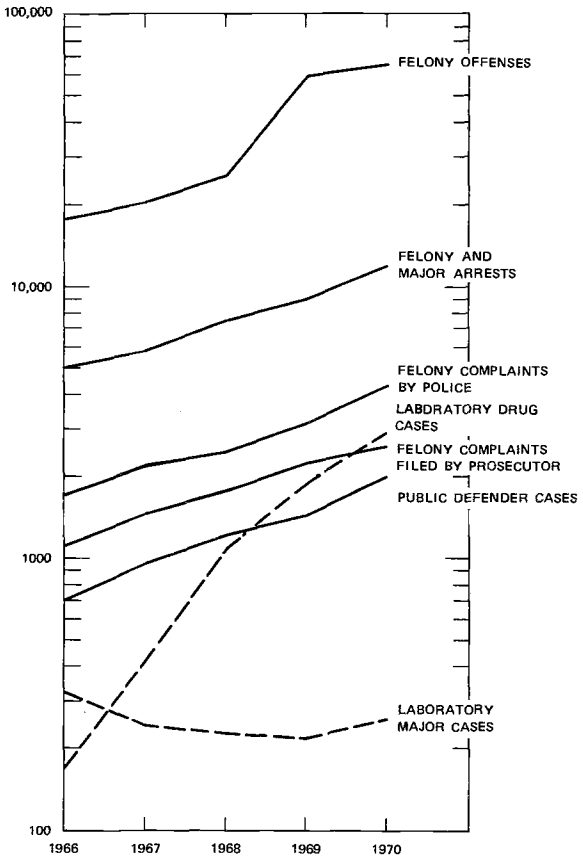

FIG. 1—*Crime index profile for Santa Clara County.*

constitute the *corpora delicti* of the cases. Therefore, crime laboratories benefit us most on those matters of law-science where a scientific evaluation of physical evidence is a working requirement of the law.

We further explored the social institutional or contextual implications of this finding by asking a series of questions. These questions were:

What proportion of crime laboratories are located within agencies concerned with the administration of law?

Under whose fiscal control are the activities of the crime laboratory?

What are the means by which physical evidence is routed through various agencies of the administration of the law to the crime laboratory?

In what kind of criminal cases is the examination of physical evidence by the crime laboratory most likely?

Who decides what constitutes physical evidence requiring crime laboratory analysis?

What role does the criminalist play in determining courtroom utilization of physical evidence that has been examined?

What access to the examination of physical evidence by the publically administered crime laboratory do defense attorneys typically have?

To what end is physical evidence examined by the crime laboratory?

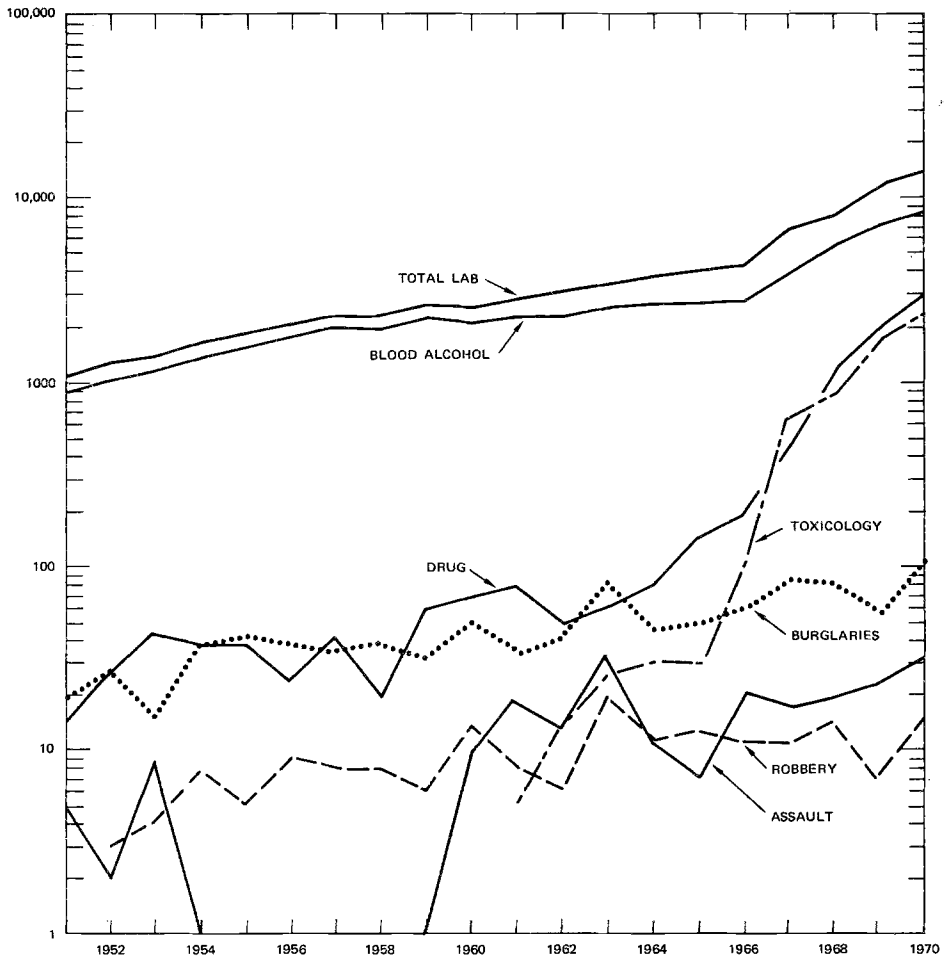

FIG. 2—*Cases submitted to the Laboratory of Criminalistics, Santa Clara County.* [*Note: For 1951 (robbery) and 1956 and 1958 (assault) there were no cases handled by the laboratory.*]

The answers to these questions provide a vivid but dismaying picture of the relationship between the professional aims and goals of criminalists, and the constraints that are socially imposed by the institutional structure wherein criminalistics operates. Crime laboratories are almost exclusively located either within (as a part of) an agency of law enforcement or the office of the district attorney. Funds for the crime laboratory operation, similarly, come from the budgets of one of these two agencies. Of special interest is the observation that the criminalist rarely, if ever, controls the material which is submitted to him for examination. Typically, it is the decision of a law enforcement officer (who most typically has little understanding of the crime laboratory operation or potential) as to whether physical evidence should be preserved for possible scientific evaluation. Physical evidence is most likely to be examined in two sets of circumstances: (1) for public relations purposes for law administering agencies and (2) if the examination of physical evidence is a legal requirement for the successful conviction of the suspected

offender. Persons other than criminalists most frequently decide what physical evidence is, and the criminalist has virtually no control in determining the courtroom utilization of his evidence. That is, the criminalist cannot decide which analyses should be presented in court. Attorneys representing the defendant in any particular criminal case only rarely have access to the utilization of the services of the criminalist. Finally, physical evidence is most likely to be examined in those criminal cases where its analysis is required by law for successful prosecution.

As we have previously said, the social benefit of a profession like criminalistics is represented in the empirical consequences of the structural relationship of the ideology of the profession to the sociopolitical control under which it materializes. The empirical consequences of the existing structural relationship between the defining ideology of criminalistics and the social institutional framework of the administration of law, which controls and directs the efforts of practicing criminalists, are clear indeed. Criminalistics is confined to the examination of physical evidence only in those cases which are politically important, and those cases in which the presentation of an examination of physical evidence is legally required. Thus, while it is the case that relatively large sums of money

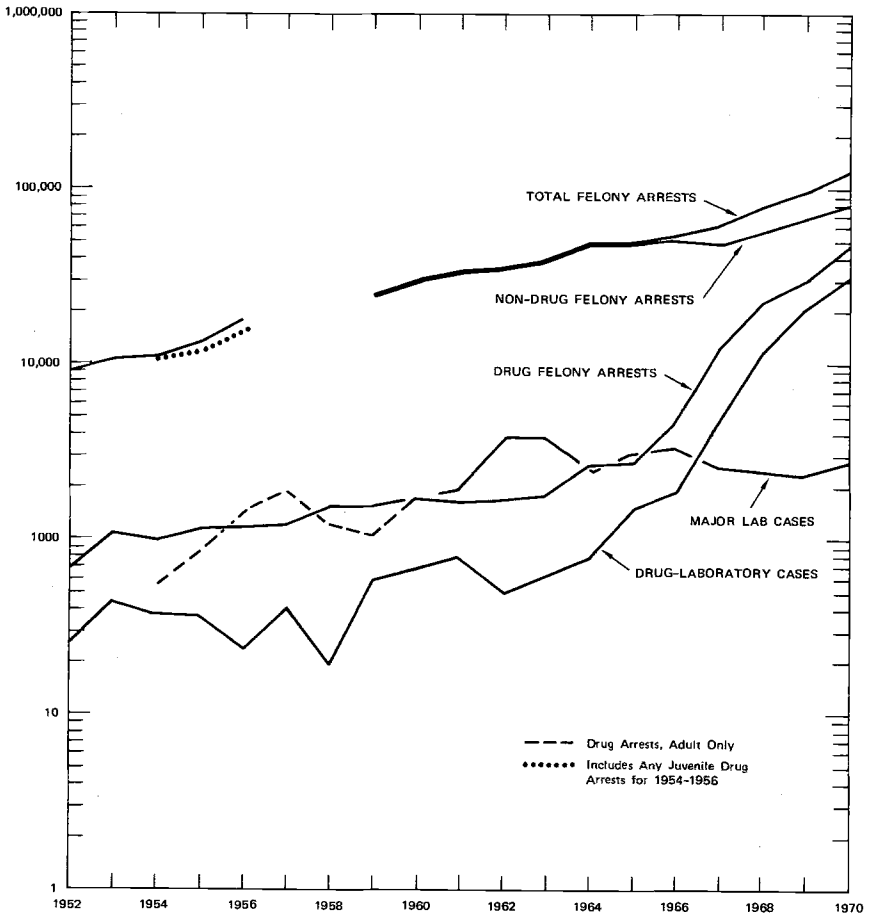

FIG. 3—*Felony arrests and laboratory cases in Santa Clara County.*

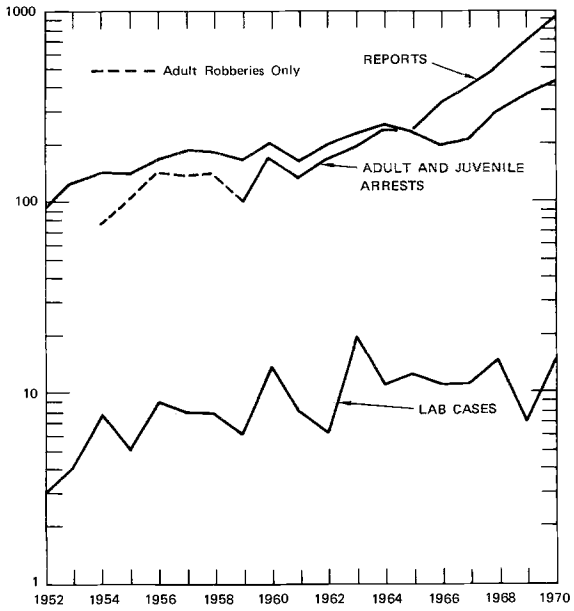

FIG. 4—*Robberies related to laboratory cases in Santa Clara County.*

have been funneled into the development of criminalistics, we find that the social institutional constraints placed upon the operation of criminalistics are such that, while the level of efficiency and accuracy of laboratory analysis may benefit, the kinds and variety of cases which are typically processed by the crime laboratory remain unchanged.

For all practical purposes, it is reasonable to view criminalistics in its current status as an atrophied appendage of the administration of the law. As such, it is institutionally controlled by purposes which do not represent the potential professional capabilities of the activity of criminalistics. So long as this is the case, additional monies directed to research and development within the field of criminalistics are not likely to increase the level of social benefit that a professional operation of criminalistics can provide us. Additional monies will result in more efficiently doing the kinds of analyses of physical evidence that are currently being done, but will not result in expanding the framework for the analysis of physical evidence.

It is highly questionable whether the current social basis, in terms of which the examination of physical evidence has been found to be valuable, is worthy of additional investment. For the root implication of our findings is that the professional growth and expansion of criminalistic activity has been, and will continue to be, effectively checked by the sociopolitical institutional control in terms of which criminalistics functionally exists. That the function of criminalistics is viewed as valuable within the narrow set of institutionally prescribed limits is not in question. However, there is no merit in further investment in the area of criminalistics, so long as criminalists are confined to dealing with a few spectacular cases (cases that yield law enforcement agencies a public relations advantage) and a myriad of routine, but legally required, drug compound and blood-alcohol analyses.

This conclusion will be completely misread and misconstrued if it is viewed as merely a jaundiced view of criminalistic activities. Instead, it is of fundamental significance that the findings represent an initial effort to understand professional possibilities, as they are subsumed under the control and sponsorship of interests and personnel that do not belong to the profession of criminalistics. We think it has been highly profitable as a research effort to discover the particular ways in which inputs into crime laboratories directly affect the output of those laboratories. These inputs, as we find, are basically determined by conditions other than the professional aim of scientifically evaluating physical evidence. As such, criminalistics stands not as a natural science application to all crime but to crimes for which the evaluation of physical evidence is a requirement by law for determining guilt or innocence, and to crimes for which public pressure upon law enforcement agencies is sufficiently great. For the most part, physical evidence is collected as a routine requirement of policing agencies, but that evidence does not in most cases reach the crime laboratory unless sociopolitical functionaries outside the crime laboratory deem it worthwhile or necessary. This establishes the limited extent to which crime laboratories now benefit us in the solution of crime.

Policy Implications

So far as we can determine, there is no inherent limit to the potentialities of the field of criminalistics. It is neither an insufficiency of personnel in criminalistics, nor problems of the application of a natural science technology to physical evidence, that are formative

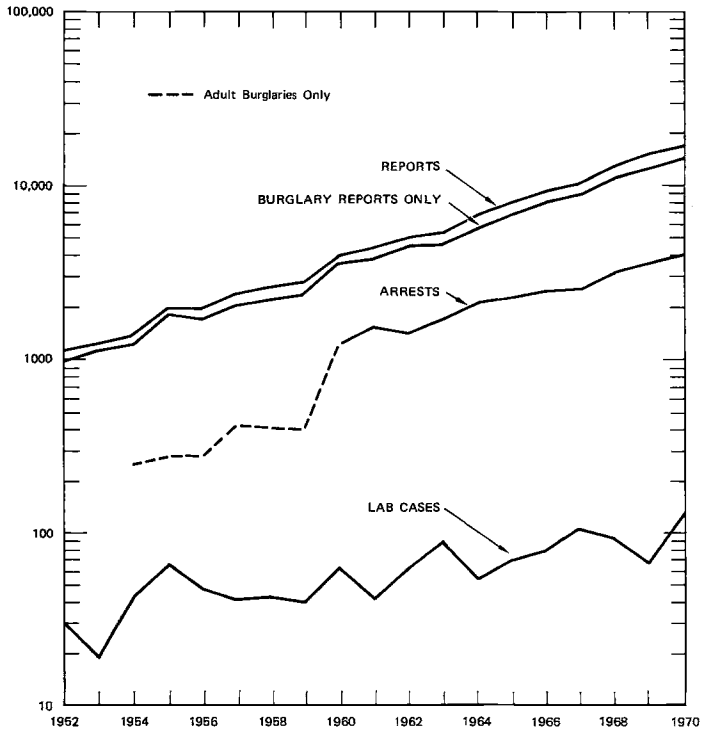

FIG. 5—*Burglaries and thefts related to laboratory cases in Santa Clara County.*

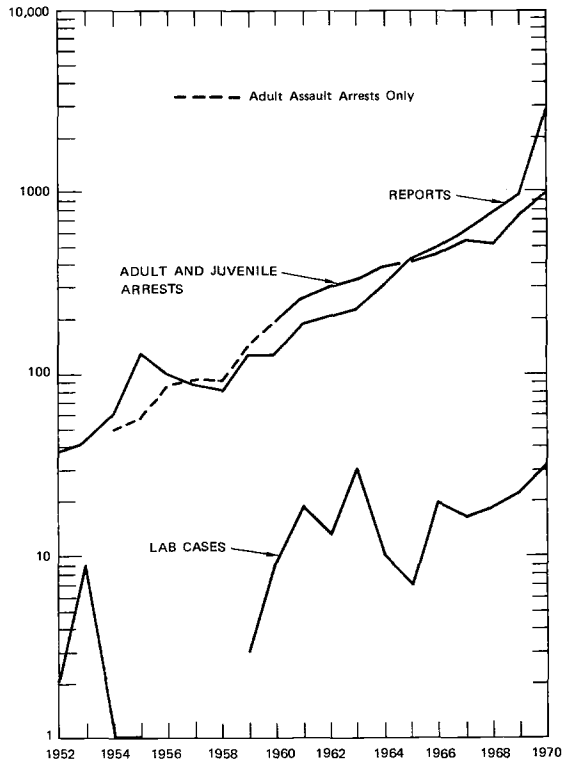

FIG. 6—*Assaults related to laboratory cases in Santa Clara County.*

to the output of crime laboratories. Inasmuch as it is the institutional dependency of criminalistics that determines its output, certain structural changes of inter- and intra-institutional relationships could yield quite a different future to criminalistic services. For example, because criminalistics does not determine (1) what constitutes physical evidence and (2) what cases in which physical evidence is present or relevant, it cannot aid in the conviction or exoneration of all suspects. This dependence on authority at higher levels in the administration of criminal law also inhibits any recognition by courts of examined physical evidence that the criminalist himself may deem essential and pertinent to the determination of guilt or innocence. Presently, a criminalist may examine and evaluate physical evidence, and yet it may never be entered into courtroom procedures because he has no authority to determine which of his outputs will be so utilized.

There is no way to exploit the scientific potential of criminalistics so long as it is solely a servant to the administrative dimensions of law. Because the administration of law treats all cases as discrete and mutually exclusive, there can be no aggregation of the results of the analysis of physical evidence. Those professionally trained in the application of the natural sciences to criminal, physical evidence have all the technical wherewithal to search out the varied types of physical evidence existing for differing crime cases, and the crimes for which physical evidence is ordinarily present or absent. What exists in criminalistic laboratories is a wealth of data on the particularities of physical evidence and the range of crimes as they relate to these particularities.

In their current disaggregated form, there are certain questions we cannot ask or answer. For instance, despite the fact that there exists a substantial fund of criminalistic results on physical evidence pertaining to drugs, it remains disaggregated. But if these data were compiled and analyzed, we could begin to ask the questions which are so relevant to a science of criminal, physical evidence. For example, is there any geographic comparability in the chemical composition of drugs held in illegal possession or illegally used? Is there physical evidence that the patterns of illegal drug use and possession are stable or changing? Is there physical evidence that there is repetition or differentiation in the chemical drug compounds that are used by any particular suspect or group of suspects?

If we cannot raise these questions, it is doubtful that we can continue with the illusion that we have a physical science of crime. An unrestrained physical science of crime would be able to tell us whether or not physical evidence, and of what particular character, is present for some homicide cases and not others, and what evidence distinguishes a homicide case in the first place. The examination of aggregated physical evidence from crime scenes would give us, for example, a more generous view of what kinds of physical evidence distinguish burglary from fraud. It almost seems incredible that we should have the scientific and technical possibility of building a fund of knowledge about crime as it is revealed in physical evidence, and that it remains essentially untapped. We are suggesting that if criminalistics did not exist within institutions that are bound to the administration of the law, it could in fact direct its efforts to all law-science matters and in a way that would yield outputs that are as scientific as they are technical.

In sum, we draw from our findings the implication that further investment into criminalistics as it presently functions, and in terms of the limited benefits it can authoritatively produce, would not be prudent. If an investment were to be made, it would most profitably be done by fostering intensive research efforts on altering the presently institutionally constrained situation of criminalistic services. This situation is most directly connected to the social, political, and institutional conditions of criminalistic operations that prevent them from developing into an unrestrained "evidentiary science." All of this is said understanding that we have not addressed, as other studies might, the issues related to the functional or dysfunctional role of criminalistics in administering justice.

Policy Recommendations

Operational laboratories of criminalistics should be expanded or established only with a provision for scientific assessment of technical services. This provision must allow the discretion for initiating technical services to reside in the scientific personnel. The evaluative component of the provision must determine dynamically the impact of criminalistic service on agencies of criminal justice and other social administration. Private and independent community sectors must take part in the evaluation and the policy formulation. The emphasis in evaluation must be on limited quality data, rather than extensive case data, as a basis for policy. The laboratory as a monitor of criminal and administrative activities must have the capabilities and authority to observe the use of physical evidence within and at the interfaces between social administration agencies.

Research centers in evidentiary science should be established. Two major areas must be exploited to compensate for present inadequate knowledge: reconstruction and utilization.

1. Reconstruction by means of physical tracings requires correlating present physical conditions with past events, especially with reference to the presence or absence of human actors. More attention needs to be given to scientific synthesis (interpretation) in recon-

struction; the nature of physical evidence in explaining a past event from present remains demands systematic study of the relationships involved. Perception of physical evidence must be studied in human beings: witnesses, victims, investigators, examiners, administrators, lawyers, judges, correction officials, and the public. These studies must define not only the limitations but also the optimum states of recognition by individuals and the variance involved. This knowledge will provide improved selection, education, and training of individuals in interpreting prior events. Work must be done on retrieving, preserving, and ducumenting physical evidence as samples adequate for reconstruction. The variety of physical evidence in a simple action is great, yet easily confused with the greater variety of physical evidence from the surroundings. Adequate sampling procedures must be verified to allow clear distinctions between actions of interest and actions of coincidence. These procedures will furnish an enhanced basis for logistical decisions in actual operations. The interpretation of prior events from present remains must be placed on an empirical and theoretical foundation. An evidentiary science will require a development of methodologies to explore the nature of phyical evidence. Important lessons can be taken from archaeology and psychophysiology that bracket the time period to be interpreted. This foundation will delimit the accuracy of reconstruction.

2. Utilization implies a purpose or purposes in reconstructing past events. An evidentiary science needs to study the roles and the data involved in the utilization of physical evidence by various social institutions. Criminal justice administration is one of these social institutions; this study has explored the functions of physical evidence and delineated the present constraints and the potential capabilities. With an evolving study in reconstruction, a research center in evidentiary science would offer a creative resource in knowledge, education, and research for social innovation and discovery in a cooperative endeavor with agencies of criminal justice administration. An operating laboratory of criminalistics would draw on the research center for help and support in assessment and evaluation. In turn, the research center would have the opportunity to gage and estimate the impact of physical evidence in the social context. As comparative studies of utilization of physical evidence in other social institutions are undertaken, another dimension in cross-fertilization of knowledge, education, and research will emerge.

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Institute for the Study of Social Concerns
1099 Sterling Ave.
Berkeley, Calif. 94708