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MEDICOLEGAL CATEGORIES OF DEATH: TAXONOMIC PROBLEMS

by

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A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

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PREFACE

To appreciate the sociological significance of the proposed course of research, one must assess the content of this dissertation in view of recent ethnomethodological critiques (e.g. J. Douglas, 1967, A. Cicourel, 1968) of positivist studies of deviance. At issue is the use of official crime and mortality statistics in sociological explanations of recurring deviant processes such as delinquency or suicide. Cicourel (1968:28) proposes that:

> The statistical models and materials utilized by students of delinquency and crime amount to a premature specification of dependent and independent variables. The ready-made variables provided by official bureaucratic organizations charged with certain bookkeeping operations, have no obvious correspondence with the daily events and practical reasoning that led to the production of rates.

Thus, for example, Cicourel alleges that official statistics on delinquency are products arising from a continuous improvisation of practical procedures used in fitting a collection of findings into abstract legal statutes. When deciding the existence of delinquency officials invoke common sense theories regarding the phenomena to be recorded. Writing obscene messages on school buildings is viewed as youthful exuberance in the context of a middle-class suburb, whereas in a poor neighbourhood an equivalent act is recorded as vandalism by an official who expects to find specific types of delinquency in certain areas of a city. Presumably, different expectations about the geographical distribution

of delinquent acts results in identical cases being treated differently for purposes of official categorization. Moreover, quite different phenomena such as prostitution and indecent exposure may convey the same meaning for an official who subsequently records both events under the heading of ungovernable behaviour. Hence, appreciating the fact that official statistics are aggregated from the personal reports of law enforcement agents, one should not presume cases assigned to a particular category represent the incidence of the same phenomena. Nevertheless, according to Cicourel, statistically oriented researchers continue to rely on officially generated data as a baseline of inquiry into the causes of deviance.

Ethnomethodologists share the opinion that using official statistics to validate hypotheses about deviance has dubious merit when there is an absence of reference indicating explicitly what official categorizations measure. Indeed, Sudnow (1968:174) questions the utility of official categories of crime as indicators of theoretical concepts in sociological research when he asserts that:

> From an inspection of penal code descriptions of crime, it is argued that the way persons seem to be assembled under the auspices of criminal law procedures is such as to produce classes of criminals who are, at least on theoretical grounds, as dissimilar in their social backgrounds and styles of activity as they are similar.

Methodologically, the problem is that officially generated equivalence classes may be too heterogeneous to permit mean-

ingful comparisons of the persons who do or do not fall within a given category. For instance, persons may plead guilty to charges of breaking and entering in order to avoid prosecution for any number of more serious offences. Therefore, statistical inferences about properties which differentiate the population of persons who commit breaking and entering from other types of offenders are misleading when based on samples derived from a list of official categorizations.

Jack Douglas (1967) expresses the view that the problems facing researchers who rely on data derived from official sources cannot be characterized merely as technical issues of validity and reliability. By technical issues is meant errors of enumeration, such as misunderstanding instructions on forms or accidentally omitting items which have the effect of reducing the efficiency of officials whose decisions ultimately determine whether a case is eligible for a particular kind of categorization. To reduce discussion about the imperfections of official statistics to purely technical matters (i.e. errors of enumeration) presumes, according to Jack Douglas, that official categorizations constitute objective sources of data. Thus, if a researcher selects a grouping of suicides from official mortality statistics, he may not be able to specify the relationship between the sample and the universe sampled, but the reality of suicide independent of the subjective experiences of enumerators is never questioned. Jack Douglas, on the other hand, is not prepared to grant the possibility of assessing how far

officials succeed in identifying actions eligible for the categorization of suicide. To appraise the wisdom of this contrary position requires further commentary on the problems of using officially generated data in explanations of deviant phenomena.

Cicourel (1968:104) in his critique of sociological conceptions of delinquency based on official statistics notes:

> To begin with, each offense category in each table represents a necessary reification of what the police or clerks recorded as instances of "what happened". Virtually every instance of categorization requires decisions that transform a truncated behavioural description of "what happened" into some precoded, but almost never unidimensional,category that enables the police to invoke legal language.

In other words, whether or not some form of activity is classified delinquent depends upon numerous judgments about the degree of fit between the particulars of a case and a set of legal categories. These judgements involve ad hoc procedures for resolving routine problems of interpreting evidence implicating diverse forms of social action, as well as arbitrary decisions to cease investigating claims that purportedly describe "what happened". Cicourel argues there are no well-defined rules for relating meanings to social action, and subsequently we cannot expect uniformity among officials in their interpretations of materials bearing upon the ultimate disposition of a case. Therefore, the correspondence between official tabulations of delinquency and the events being represented remains ambiguous. Specifically, what is being counted when a case is assigned to a category

cannot be defined purely in terms of observable features insofar as "Decisions the police make when they must submit official statistics to the state or federal government are confusing abstractions and forced classifications of unclarified materials." (Cicourel, 1968:104)

Likewise, Jack Douglas proposes that official tabulations of suicide are not reducible to observable phenomena, but rather reflect a host of judgments about what thoughts occupied the consciousness of decedents prior to their demise. Moreover, the congruence between such judgments and what messages were intended by the deceased is not open to unambiguous interpretation. Thus, for instance, there are no unassailable procedures for deciding the cut-off point between intentional and unintentional self-destructive behaviour in ventures that include an excessive degree of lethal risk. What Jack Douglas suggests is official categorizations of suicide do not stand in any discernible relation of isomorphism with sense-data, and consequently such findings are unavoidably subject to the systematic biases of enumerators.

We are left with serious doubts about the utility of official statistics for scientific purposes if the data are to be seen as mediated through arbitrary individual judgements of enumerators. This question of utility weighs heavily upon researchers who use officially generated data to evaluate the expediency of social policy. Witness how the abolition of the death sentence in Canada was in part defended through reference to the analysis of data bearing on relations between

murder rates and capital punishment. The value accorded such analysis generally bears testimony to attitude that either there is or is not a clearly defined thing called murder which in principle can be reliably identified and counted. For example, a researcher who believes officially generated statistics can be relied upon as objective data assumes that any difference between the official and true rate of murder is subject to some form of estimate by controlling for possible errors of observation. On the other hand, a reseacher who believes the phenomenon of murder does not exist independent of the reality of the enumerator assumes that official rates, at best can be used as indicators of organizational practices. Subsequently, problems of using official statistics in research are seen as questions of whose picture of society is reflected in officially generated data.

In short, researchers share the opinion that the coding procedures of enumerators whose decisions generate official statistics, may be viewed as problematic regardless of their attitude that such tallies constitute either objective or subjective sources of data. The implication is that sociological interest in data should focus on how activities of enumerators influence the numerical picture of society portrayed through official statistics.

THESIS

We argue that the structure of a system of categories used in compiling official statistics generates a theoretical

rationale that conditions choices governing the assignment of cases into classes. Furthermore, the theoretical rationale embodied in an official system of classification is fashioned by practical concerns which reflect reality as operated upon by persons in their social practice. Additionally, the ease of application of the theoretical rationale governing allocations of cases into classes may influence whether official categories are more or less accurately and reliably fulfilling the functions ascribed to them.

An illustration is needed to specify in greater detail what is meant by saying the structure of a system of categories embodies some kind of theoretical rationale which bears significantly on the relationship between activities of official enumerators and subsequent numerical pictures of society. First, we should imagine the situation of an official who is required to assign persons into the categories of single, married, separated, and divorced for the legal purpose of establishing marital eligibility. Now, the category of being married depends upon concepts such as husband, wife, and sexual consummation which must be understood both culturally and historically. An official would be at a loss to elucidate the category of divorced without resorting to descriptions of properties associated with the vows of husband and wife that are traditional to the society. In turn, the concept of "unconsummated marital vows" endows the category of "single" with meaning which provides contrast with the category of separated. Moreover, the meaning of being "separated" assumes

legal significance through reference to the discontinuance of sexual obligations associated with the category of "married".

In other words, the categories of marital eligibility acquire meaning only insofar as they involve each other. The specific nature of the involvement is determined by relations among concepts which limit alternatives regarding the allocation of cases into categories. Taken together, such relations comprise the structure of a system of categories which generates a rationale for classifying a case one way rather than another. This rationale encompasses theoretical arguments clarifying what is to be gained from imposing a specific kind of order on reality given that the world of persons, groups, and social events could conceivably be ordered according to any of innumerable attributes.

INTENT

We seek to demonstrate in this dissertation how the illumination of relations among concepts embodied in official categories of death helps us to decipher the activities of medicolegal investigators whose decisions determine the content of mortality statistics. Generally speaking, sociologists have overlooked the possibility that there are theoretical arguments embedded in the distinctions of official categories which may be important in the evaluation of official statistics as sources of data. In part, the oversight may be understood by referring to Gray's (1978:129) comment that:

> So ingrained is the human capacity and propensity for classifying, so central

> is it to all argument and exposition, that scholars in various disciplines find it easier to dismiss the activity as scholasticism than to analyze its pervasive occurrence in their own and others' work.

An easily ignored point in keeping with the prior comment is that any system of categories invariably distorts the uniqueness of some phenomenon in question given that the function of classification is to constrain all possible members of a class such as death into a finite number of subgroups (e.g. natural death, suicide, accident and homicide). The degree of distortion is not determined by the individual meanings various officials ascribe to death, nor does it encapsulate their subjective experience of the event, but rather is a function of the objectives that are realized through the recognition of distinctions governing allocations of cases into alternative categories. Hence, for example, the usefulness of the distinctions marking a death as suicide stands only in relation to concepts that elucidate the impertinence of such distinctions for alternative allocations. Therefore, any difficulties associated with the recognition of a death as suicide should reflect upon the inadequacy of concepts that specify what is pertinent to the allocation of death into some other official category. In other words, if any official category of death other than suicide invites ambiguous interpretation, then suicides are susceptible to misidentification. The susceptibility is an effect that arises from the system of categories, rather than the consciousness of the medicolegal investigator.

We are suggesting that a decision to officially classify a death as suicide can with comparable merit be assessed as a judgment not to recognize the event as an accident or homicide. In fact, to divorce the problems of classifying suicide from those of other categories belonging to an official classificatory system bespeaks of shortsightedness akin to explaining left-handed dominance without alluding to the right hand.

To explore how official categories of death function in relation to each other we must dissect the mechanisms which preserve the identity of each category as a member of a system. Such mechanisms are implicit in categorical distinctions which accord different kinds of significance to the particulars of death through reference to conditions of being present, absent, overlapped, equal, and properly included. These conditions are easily exemplified through set-theoretic operations such as union, intersection and complementation. The implication is that the mechanisms orchestrating official categories of death can be made explicit through the instrumentality afforded by set theory. Therefore, in keeping with this implication, the activities of medicolegal investigators are framed as problems of identifying set membership in a finite set. Each official category of death is regarded as a subset of the set containing the system of categories. This approach helps us to explore the ordering of elements within categories through reference to properties guiding relations among sets. Ultimately, such properties should reveal the nature of the official

system of categories of death as a determinative process governing the classificatory activities of medicolegal investigators. Knowledge of the system implicit in the operation of categories of death may help sociologists to assess how they can utilize officially generated data on mortality for purposes of research, and our exercise has relevance, of course, for any other topics of interest to sociologists.

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TABLE OF CONTENT

CHAPTER ONE

CLASSIFYING DEATH

A. Introduction

Considerable attention has focused on official death classificatory schema. Ostensibly, an orderliness is imposed on phenomena of death that is strictly arbitrary. In particular, the objectivity of operational procedures used to assign death to a category has been questioned (J. Douglas, 1967). Moral judgements presumably shape category assignment (Atkinson, 1971). Official death categories, it is said, afford conceptually inadequate distinctions between deaths (Shneidman, 1974). Consequently, problematic category assignments result from incomplete specification of necessary and sufficient properties which identify types of death. The intrusion of moral considerations in discretionary judgements of medicolegal investigators and the conceptual impoverishment of the official categories are responsible, according to critics, for mortality statistics that bear little correspondence to what actually happens in the circumstances of death.

These criticisms may have substance in view of estimations that: "Thousands of deaths every year are classified and enter statistics as due to natural causes or

heart disease which are actually due to preventable accidents." (Curran, 1971:776) Another assessment of mortality statistics concludes that "a major share of death certificates are not worth the paper they are written on." (Prutting, 1971:270) A more serious criticism in view of the administration of justice is found in a statement sponsored by the British Medical Association (1964:paragraph 9) that indicates "the issue of a death certificate from natural causes is a fairly common finding in cases which are afterwards found to have been cases of homicide, e.g. on exhumation."

Medicolegal investigative systems have not been examined with a view to locating sources of classificatory imprecision in conceptual problems intrinsic to the taxonomic ordering of relations which establish distinctions between categories of death. These are primarily problems of identification such as:

a) What criteria differentiate significant discriminatory features of death from those which are discarded as incidental in the conferral of category membership?

b) What classificatory items give specification to similarities and differences within and between categories?

c) How do the relations which establish distinctions between deaths constrain judgements regarding assignment to a category?

The general issue addressed in the forumulation of these questions is the theoretical basis of the correspondence from which categorical similarity derives when events are rendered equivalent for classificatory purposes. Sudnow (1973:178) illuminated this problem with his observation that "the penal code does not provide the reference for deciding the correspondence between the instant event and the general case...".

B. Research Objective

The purpose of this dissertation is to contribute original research into the taxonomic problems of official death classificatory schema through an examination of operational procedures used to assign death to a category. This will encompass an evaluation of the conceptual adequacy of categories in terms of their consistency and exactness as codes for organizing information about death phenomena. Deutsch (1966:5) refers to the possibilities of evaluating taxonomies as codes for organizing information:

> The task of replacing a theory by a better theory, a taxonomy by a better taxonomy, or a model by a better model are all formally analogous when treated from this viewpoint. It is then possible to describe the operation common to all of these tasks as the search for the coding of a large amount of diversified information into a more concise and manageable form.

One of my objectives will be to assess the operational efficiency of a death taxonomy through reference to rules governing the inclusion and exclusion of deaths in specific categories. These operational rules will be examined for their clarity and consistency in establishing correspondences between deaths and categories. Particular emphasis will be paid cases where coroners have difficulty recognizing a correspondence between a category and death. These cases will be used to assess the utility of official categories for organizing information about phenomena of death.

Before proceeding with the proposed study, it will be necessary to introduce in terms of study objectives certain issues that weigh significantly on the credibility of the research design as detailed in the next chapter.

C. Controversial Research Issues

Many contentious issues are apparent in research dealing with the classification of death. A major source of disagreement involves the kinds of operational procedures used to assign death to a category. Specifically, the point of contention divides into two schools of thought known as phenomenalism and positivism. Each school has different theoretical implications. One school operates on the assumption that operational procedures are biased by the social, cultural, and occupational idiosyncrasies

of persons involved in the investigation of death. Atkinson (1973:439) provides substance for this issue by noting: "... one only needs a minimal knowledge of the way sudden deaths are registered to know that the coroner is only one of many who are involved in the process. He has to decide on the basis of evidence which has been collected, edited, and written up by a variety of other people including coroners' officers, other people including coroners' officers, other policemen, chemists, pathologists, ballistics experts and the like, all of whom must necessarily operate with taken-for-granted assumptions about the way in which social structures operate to produce particular corpses...". Here the contention is that the bureaucratic processing of information about sudden death significantly reduces the accuracy reliability of procedures used to assign death to a category. Ostensibly, the potential for errors in category assignment is a function of the degree of difference in the personal assumptions of the various officials investigating a death. However, this presumes that personal assumptions inform judgement as to what evidence confers memebership in a death category. The theoretical implication is that the assignment of death to a category is best studied through a determination of the factors which influence the decision-making of officials responsible for classification.

Two widely divergent models of official decision-making are evident in research concerned with problems of

classifying death. The first model was developed originally in the work of Garfinkel (1967:11-18). His strategy operates as follows: one demonstrates that a death is assigned to a category by fitting the circumstances of the death into some preconceived pattern and then ways are sought for making the evidence consistent with the preconception. In other words, category assignments precede the search for supportive evidence which depends on the production of an investigatory report. The report is consistent with prior ideas about how evidence should be assembled for particular categories of death. For example, a coroner confers the category of suicide in the case of a person who has a history of depression and is found hanging. The decision to classify death as suicide is based on the psychiatric premise that people who are depressed kill themselves.

Atkinson (1975) demonstrates further development of this strategy by proposing that the selection of evidence in death investigations approximates a process of hypothesis testing. The initial investigation of the circumstances precipitates a judgement in favour of a particular category. This judgement constitutes an hypothesis which influences the kind of evidence that will be selected. That is to say, evidence will be sought in a way that supports the hypothesis. Thus; for example, if the initial judgement was accident then detailed questions regarding

the deceased's emotional state or past record of mental illness are likely to be excluded from the investigation.

The methodological implication of Garfinkel's strategy for death classification research is expressed in reservations pertaining to observer-invented indices for counting deaths. Atkinson (1973:4[illegible]) expresses such reservations in his comment that "the accuracy and reliability of suicide statistics are problems only for those who believe that there is some unidimensional decontextualized thing called suicide which can be measured by using suicide rates as the rod." Obviously, an endorsement of this position ultimately defines as untenable any statistical estimations of the actual incidence for any given category of death.

The proponents of strategies which question the accuracy and reliability of mortality statistics pursue two alternative courses of research. One incorporates a phenomenological orientation whereby knowledge of subjective understanding of death is sought to account for the lack of correspondence between official categories and what really happens. The problems of this orientation will be explored in a discussion of the epistemological framework of death classificatory research. A major difficulty in this orientation is the shift in focus from what are the referents of categories to what understanding is necessary to do the classifying. The latter question does not ad-

dress what is being counted but rather why something is being counted.

An alternative course of research is to disregard issues of accuracy and reliability in classifying deaths and to regard mortality statistics as indicators of socially organized activities used to produce rates. That is to say, mortality statistics are seen as reflecting the organizational basis of a rate-producing process (Kitsuse and Cicourel, 1963). Again there is a shift in the focus of research from what are the referents of the categories used in classifying deaths to the organizational features that facilitate and dictate what is to be classified. The insight afforded by such a shift is cogently illustrated in the work of Feinstein (1969:34-40). He has demonstrated that the changing incidence of respiratory deaths reveal more about modifications in diagnostic codification than it does about any variation in the pattern of respiratory disease. Thus, for example, in reference to the increased incidence of lung cancer, Feinstein (1969:40) notes that, "what has mainly increased is the diagnosis, rather than the disease, of lung cancer."

The principal advantage of these alternative strategies for examining how deaths are classified is that they provide a perspective for the recognition of practical limitations in objective classification. These limitations can be addressed as the Achilles' heels of taxonomy.

Namely, there are no universally acceptable measures for assigning similarity when grouping variants and subsequently there are no universally acceptable methods of grouping (Sneath and Sokal, 1973). Indeed, a classification is not a derivative of simple observation but rather as Gould (1974:740) succinctly points out: "A classification is a human decision constrained by a bevy of facts about how best to order nature." To be specific, there are no formal standards for judging the wisdom of a classification. There are very few constraints on the kind of ordering that a classification can reveal. A classification is judged empirically in terms of its propositional richness (Gilmour, 1937:1040-42). The richness is the number of propositions that can be derived from the constituent subgrouping of categories. However, to determine this richness "it is necessary to establish the comprehensiveness intended in using a taxonomic name ..." (Small, 1975:10). Certainly, such comprehensiveness would encompass the subjective dimension of classification that dominates phenomenological approaches.

A positivist school of thought provides a different orientation based on the premise that is is possible to measure with accuracy and reliability the influence of the subjective dimension upon the procedures which match a corpse with a category. For instance, a good illustration of this testing is found in the work of Barraclough, Holding, and Fayers (1976:474) who found

"that coroner's officers seek similar information on which to form an opinion with regard to the cause of death as also do pathologists, and their personal prejudices are unimportant in determining suicide. They all stick to the facts which provide evidence of intent." The positivist strategy is to show that personal or subjective factors do not assume a major role in determining the choice of evidence for classifying a death. Repeatedly, the findings of such tests have shown consistency among medicolegal officials as far as the creteria they employ to discriminate between categories of death (Holding and Barraclough, 1977:244-52: McCarthy and Walsh, 1975:301-8; Ross and Kreitman, 1975:575-82); Barraclough, 1970:361-65). Baldamus (1976:94) provides support for the positivist perspective through reference to suicide statistics:

> First, we observe an obviously significant distribution to the effect that the daily frequency of suicides declines from Monday to Sunday. By no stretch of the sociological imagination could we postulate that the coroner's systematic biases in certifying acts of suicide are in any way connected with day-to-day cycle of the week.

The positivist strategy has been valuable in terms of revealing the medicolegal officials employ approximately similar kinds of evidence in assigning death to a category. However there are indications that per-

sonal factors make some contribution in the extent to which officials will accept variations in the quality of evidence. In other words, similarities in the kind of evidence but differences in the acceptance of qualitative variations are discernible in the operational procedures used to assign death to a category. For instance, officials investigating a death operate with different levels of suspicion depending on their medicolegal training and prior experiences (Patel, 1973:467-470). Hence, they may agree generally on the kinds of properties which differentiate deaths but demonstrate different preferences for eliciting conclusive evidence. These preferences are identified through examining the extent to which efforts are made to question the precision of the evidence.

An important inference follows from the acceptance of the positivist perspective: namely, category assignments operate on the principle that specific kinds of properties are distributed in death categories. Therefore a theoretical base orders the distribution of these properties. This is in keeping with the fact that a theory-neutral classification is possible only if the constituent properties are assigned equivalent classificatory import in the delineation of categorical distinctions (Cormack, 1971:321-367). However, the positivist findings do not reveal evidence of equal weighting in the procedures used to assign death to a category (Jacobsen, Bagley and Rehin,

1976:417-21). Hence, there must be justification for differential weighing of evidence in discriminating procedures.

The argument advanced in this dissertation is that justification for differential weighing of evidence in assigning death to a category encompasses presuppositions about properties which are useful for identifying phenomena of death. The purpose underlying the specification of these presuppositions is to explicate what Hindness (1973) has described as the conceptual instruments inherent in any classificatory schema. These instruments are conceived as theoretical premises that acknowledge how rather than why categories accommodate particulars operating on a multitude of dimensions. We submit that the explication of such premises is productive of propositions concerned with improving codification procedures. The reason for this submission is that such conceptual considerations identify inherent taxonomic problems in death classificatory schema. This could reveal sources of ambiguity in classificatory distinctions that ultimately expose deficiencies in existing mortality statistics.

D. Epistemological Issues

Further justification for this research arises from the complex epistemological issues that emerge when a discussion of death is placed in the framework of taxonomic problems. A statement by Mary Douglas (1973:113) serves

as an introduction to these issues:

> It is no new thing for the law to be drawing the line between biological and social events, choosing the moment when a foetus is enough of a person to require legal protection, deciding when a marriage has been physically consummated, deciding on the definitions of death, rape, cruelty, indecency, a standard of living above starvation. At less public and weighty levels the same assessment and drawing of boundaries proceeds through the whole social process. Physical nature is masticated and driven through the cognitive meshes to satisfy social demands for clarity which compete with logical demands for consistency.

Mary Douglas provides an acknowledgement of the phonomenological perspective that order is imposed on physical events through social conventions that arbitrarily assign properties to categories. Moreover, these conventions are susceptible to reification when given formal embodiment in law. The methodological implication of the phenomenological stance for taxonomic problems is that judgement must be suspended on whether a death is really a suicide, homicide, accident, or some other category. The categories do not possess a set nature insofar as it is not possible to discriminate a type of death in accordance with natural properties of the category. The properties that differentiate categories of death reflect in the classic Weberian sense interpretive understandings of

the classifying agent. That is, something called an accidental or homicidal death is not discovered like a metastatic malignant melanoma is discovered by a pathologist. There may be diagnostic disagreements in the case of the latter, but the melanoma does not depend for its existence on the recognition of the pathologist. It has identifiable constituent properties with causal connections and empirically observeable consequences.

Unlike the melanoma, suicidal or accidental deaths, are defined into existence through the imputation of meanings to actions and appearances. This phenomenological stance shifts the focus to what relevant actors think "is" as opposed to "what is" in the discussion of death as a taxonomic problem. Parenthetically, theoretical stress is placed on the idea that there is nothing intrinsic to a death that makes it suicidal, accidental, homicidal or natural. The categories represent social and cultural judgements of classifiers. Thus taxonomic problems are elaborated in terms which consider how a plurality of meaning can be imputed to information about a death. The methodological import of this elaboration finds direct expression in the phenomenological bias for constructing classificatory schema which include categories of behaviour in the form of linguistic conventions employed by the actors involved. Harre (1976:15) elucidates such constructions when he notes: "The problem of translating a culture

can be solved only by learning the words of action and the words of commentary and explanation for ourselves."

The phenomenological approach to taxonomic problems can easily obscure the distinction between questions of fact and questions of language. To evaluate the significance of this distinction it will be necessary to introduce Jack Douglas's (1967) phenomenological study of suicide. This study attempted to provide support for the contention that death cannot be understood in terms other than those of the actor involved in the death. However, Jack Douglas's study does not demonstrate that personal understanding of death lends itself to more precise, systematic classification than is evident in existing death taxonomies.

To assign primacy to the categorical expressions of the actor in constructing classificatory schema is to suggest that the correspondence between categories and events should be based on the meanings of what happened for the participants. For instance:

> when some ronin of Japan or some Asian Buddhists perform actions which lead to what American or European doctors classify as death, we must recognise that this is a classification by Western doctors, not by the actors involved. Their linguistic expressions for such actions may be totally different from the ones Western observers use and certainly might mean totally different things to the actors and the significant observers of these actions within their own cultures.
>
> (Jack Douglas, 1967:182)

Jack Douglas adopts an untenable position with respect to the problems of taxonomy. We are left to conclude that the only significant difference between the behaviour described in categories such as suicide or accident is the meaning that an actor has assigned to his behaviour in producing what a medicolegal official has classified as either accident or suicide. To accept this conclusion is to accord an extremely tenuous status to the possibility of obtaining objective knowledge about death. Furthermore, the categorical expression employed by an actor to describe a death is presumptive of a specific experience which may have no basis in fact. To be more precise, a categorical expression cannot provide support for the inference that there exists a death to which it ostensibly corresponds. In other words, "belief is not a guarantee of reality, and it does not depend on the reality of what is believed." (Needham, 1972:66) Hampshire (1959:13) cogently articulates this point in the statement: "There are no criteria that anything must satisfy in order to be called a thing in the wide sense of the word."

Jack Douglas defends his position that subjective factors strongly influence decisions to assign death to an official category by contending there is no unequivocal meaning for events classified as suicide or accident. The procedures used to assign death to a category reflect practical concerns and common sense assumptions about intentions and responsibilities. Thus, for example, a

coroner may avoid calssifying a death as suicide when he is concerned that such a category may embarrass the decedent's family. Jack Douglas (1967:213) notes accordingly:

> the more integrated the deceased individual is into his local community and with its officials, the more the doctors, coroners, or other officials responsible for deciding what the cause of death is will be favourably influenced, consciously or sub-consciously, by the preference of the deceased and his significant other.

In essence, he is claiming that the correspondence between referents of a category and the event specified by the category does not derive from perceptible features of death such as the location and condition of a corpse. The correspondence is arbitrarily imposed such that the assumption of equivalence among deaths assigned to the same category is not warranted. The support for this claim is based on the contention that perceptible features at the scene of a death are not sufficient in themselves for informing inferences about what really happened. In other wordes, identifiable properties cannot be viewed independently from the interpretive understanding employed by the medicolegal investigator to match a death with a category. Evidently, the investigator's perception of a death is constrained in some inexplicable way by his conception of death. Hence, matching a death with a category is accorded the status of an elaborate social construc-

of reality.

Methodological inexactness characterizes these claims insofar as Jack Douglas has not clearly differentiated between issues of conceptual adequacy and taxonomic problems of codification that reflect organizational features of medicolegal investigative systems. Category conceptual adequacy in this case is defined as the descriptive economy of creiteria used in drawing distinctions between deaths. This definition has significance when consideration is given to what is being classified when a death is assigned to a category. For example, Nettler (1970:120) points out that: "With too broad a classification system everything counts and nothing specific can be confirmed." This is especially evident with respect to categories descriptive of psychiatric disorder (Coulter, 1973). Hillier (1975:325) notes, for instance, in reference to schizophrenia that the classificatory criteria "are so diverse and manifold that the category itself becomes a kind of portmanteau for all manner of odd behaviour." However, a recent study by Golden and Meehl (1979:217-33) shows that schizophrenia can be discriminated from other categories of psychiatric disorder.

Conceptual adequacy also pertains to how easily categories are identified. This includes the convenience and precision of reference afforded by categorical dis-

tinctions. Shneidman (1973) contends that official categories of death lack precision in the specification of descriptive content. They are ambiguous in terms of their referents:

> If an individual (who wishes to continue living) has his skull invaded by a lethal object, his death is called accidental; if another individual (who also wishes to continue living) is invaded by a lethal virus, his death is called natural. An individual who torments an animal into killing him is said to have died an accidental death, whereas an individual who torments a drunken companion into killing him is called a homicidal victim. (Shneidman, (1966:171)

However, it remains to be demonstrated that such ambiguity poses a problem for officials who classify deaths. Otherwise confusion arises with respect to the distinction between properties which are potentially useful for differentiating phenomena of death and those properties that are used to identify official categories of death. The question is do the latter properties restrict descriptive content that may have greater utility for medicolegal officials in their recognition of equivalence among deaths? To answer this question, it is necessary to discover what kinds of concepts inform the ordering of properties which identify a death as belonging to one category and not another. This helps us to comprehend how taxonomic distinctions acquire theoretical significance as statements

about the purposes of medicolegal classifications of death.

E. Medicolegal Categories of Death

Medicolegal investigative systems generally group deaths in accordance with the International Classification of Diseases and Causes of death established in Geneva by the World Health Organization (1967). Causes of death are defined as "all those diseases, morbid conditions, or injuries which either resulted in or contributed to death, and the circumstances of the accident or violence which produced any such injuries." (World Health Organization, 1967:469) The axis of this classification is based on pathologic causal agency and mode of death. That is, deaths are classified in terms of pathologic alterations and information about the social circumstances surrounding deaths.

There are more than 100 causal agents but only four modes of death are recognized: namely, natural death, accident, suicide, and homicide. These categories of death are matched with corpses on the basis of some combination of medical and non-medical evidence usually derived from physical and social circumstances at the scene of the death. There are no universal criteria for assessing the precise significance of social and physical evidence nor can findings of pathologic alterations always be used to infer the mode of death. Hence, for example, to attribute death to pulmonary embolism (a frequently listed cause in cases of natural death) does not preclude the possibility

of accident, suicide, or homicide. Presswalla (1977:2) refers to the problems of determining what category a death belongs to when the cause is attributed to an overdose of opiate and the decedent is an addict:

> Are they "natural", since addiction is a disease? Or are they "accidental", in that death is an unexpected event when it occurs? Or are they "suicidal", in that this is self-destructive behaviour known to be dangerous and potentially lethal? But then, so is smoking and drinking. Can one really be sure that the addict did not deliberately "shoot up" an extra dose at this particular time to kill himself?

Presswalla's questions reflect Shneidman's (1968,1973) concern that official categories of death are conceptually flaccid. They do not allow for distinctions that accurately reflect circumstances of death. In particular, the categories do not encompass phenomena indicative of self-destructive life-style or intention. He contends that: "The objective evidences of the presence of these roles lie in such behavioural manifestations as, for example, poor judgement, imprudence, excessive risk-taking, abuse of alcohol, misuse of drugs, neglect of self, self-destructive style of life, disregard of prescribed life-saving medical regimen and so on, where the individual fosters, facilitates, exacerbates, or hastens the process of his dying." (1968:39)

Two questions are raised: do official categories of death provide clear distinctions and can consistent distinctions be drawn without incorporating phenomena indicative of self-destructive life style? To address these questions, it is necessary to examine the concepts which order properties used in identifying a death as belonging to a category. These concepts elucidate the general purpose of death classification. That is to say, they clarify what is intended by assigning a death to a category. The intention presumably reflects the state of knowledge expressed through the taxonomic ordering of phenomena associated with death.

F. Natural and Unnatural Death

Medicolegal investigative systems partition phenomena of death into natural and unnatural groupings. The exact origins of the conceptual distinction between natural and unnatural death remain historically obscure. Engelhardt, Jr. (1975:115) in reference to the distinction notes: "The issue is a somewhat vague one - a set of loosely bound presuppositions of modern Western culture which lead to an implicit cultural judgement that death is unnatural." Illich (1976) found no reference to the distinction in dictionaries until late in the nineteenth century. However, numerous references found in twelfth century coroners' rolls indicate that the distinction was fundamental to investigations of death in medieval England (Hunnisett, 1961).

Coroners' rolls bear a crude resemblance to modern medico-legal reports of death. They typically include some reference to the identity of the deceased, the location of the corpse, the cause of death, the approximate time of death, and the social circumstances of the death. Coroners recorded such information when someone died suddenly, violently, or in suspicious circumstances. The following case taken from the thirteenth century Bedfordshire Coroners' Rolls illustrates a coroner's description of what happened to bring about a death:

> It happened in a field in a certain place called Nomansland on Monday next before the feast of St. Peter's Chair that Alfred of Ravensden went after dinner to sow his land, and when he came to the said place, he had the falling sickness which caused him to fall to the ground, and he suddenly died by misadventure.
>
> (Gross, 1896:3)

There are frequent references in Coroners' Rolls to disease and sickness causing death which subsequently was classified as "accident" or "death by misadventure". These two categories appear to be equivalent in terms of their application. The medieval category of natural, according to Havard (1960), was applied when no external indicators of strangulation, wounds, or bruises were evident upon viewing of the corpse. Why some deaths attributed to sickness and disease were not classified as "natural" in

Coroners' Rolls from 1265 to 1413 is not immediately apparent. There are cases where deaths are classified as "natural" when the causes were attributed to starvation, poison pestilence, thirst, torture, and exposure to the cold while serving prison sentences. Indeed, there are instances of prisoners dying a natural death from judicially administered flogging reported in the Year Books of Edward II (Maitland, Harcourt, and Bolland, 1910). A prisoner who died from heat privation in twelfth and thirteenth century England died a "natural death", but in settings other than the prison such deaths were classified as "unnatural".

One key to these classificatory distinctions is found in the medieval legal document Fleta (Richardson and Sayles, 1955). Here it is implied that to die by misfortune, accident, or misadventure refers to causal agency when a death is sudden, but, when violence is included with suddenness, these categories indicate the mode of death. Thus, for example, death by misadventure referred to cause, not mode, when a person died suddenly from a sickness.

The Coroners' Rolls show that to die by felony was in all instances to die violently but not all violent deaths were felonious. Furthermore, in light of the cases reported in Coroners' Rolls it is apparent that to die by felony only referred to cause as opposed to mode of death. Fleta recounts how feloniously caused deaths are inferred

from wounds inflicted without legitimate authority (Richardson and Sayles, 1955:65). In other words, to classify state inflicted death by torture as "natural" may represent a preliminary stage in the legal development of the conception of justifiable homicide. For instance, if a prisoner was tortured to death, an inquest had to decide whether the torture exceeded the prescribed sentence. If the decision was that the torture did not exceed the sentence, then the death was classified as natural. Otherwise, torturers were held responsible for causing a felonious death.

According to The Mirror of Justices, a prominent source of medieval legal reasoning, natural death was presumed when it could not be shown that the decedent died from felony or misadventure (Whittaker, 1895). Hence it is conceivable that the category of natural death originated as a residual assignation in the sense that membership depended on the absence of specific forms of evidence. For example, the parish records of medieval Oxford (Salter, 1912:28) describe a case where the decedent had died after being hit in the chest with a fist. This death was classified as natural when the external features of the corpse provided no evidence of injury. Another case involved a woman who was "rolled over and over before the eyes of the coroner" (Salter, 1912:24) because parishioners suggested she had been beaten unduly by her husband. The corpse appeared uninjured and the death was classified as natural.

In view of the various medieval legal documents it is probable that the term "natural" as a category of death signified the development of knowledge about forensic medicine. The following case illustrates how medical opinions were employed in the recognition of death:

> A woman was seen to strike her four-year-old nurse child (foster child) on the head with her fist and then to hold the child's hair with one hand and beat him on various parts of the body with her hand. She then sat the little boy on a table. He cried, fell back, stretched, and did not move again. A surgeon found a bruise on the left ear but judged it did not indicate a serious injury. He said the child would not have cried if it had received a fatal blow on the head. The verdict was natural death.
>
> (Forbes, 1978:35)

Medieval Coroners' Rolls contain no references to surgical dissections for the purpose of discovering causes of death. Nevertheless, thirteenth century manuscripts conclusively establish that autopsies were performed during this period (King and Meehan, 1973:519). According to Havard (1960), decisions regarding the assignment of death to specific categories did not routinely encompass medical expertise until almost five hundred years after the twelfth century establishment of the coroners' office. Furthermore, the idea of natural death was not conceptually elucidated in medical discourse until the eighteenth century (Illich,

1976). In fact, prior to this period diseases were regarded as accidents by the medical profession (Foucault, 1973). To be specific, diseases were diagnosed as accidental developments of tissue disorder as opposed to complex pathological tissue reactions concomitant with organic process. This would shift the locus of disease causality from internal processes to external occurrences. It is not until the advent of pathological anatomy that "disease loses its old status as an accident, and takes on the internal, constant, mobile dimension of the relation between life and death. It is not because he falls ill that man dies; fundamentally, it is because he may die that man may fall ill." (Foucault, 1973:155) Hence, in view of these observations, it would be reasonable to surmise that the concept of natural death did not encompass medical knowledge regarding assignment of the causes of disease. Otherwise, how would accidental deaths be distinguished from those attributed to some form of illness? The question cannot be easily answered. There are indications that a source of difficulty derives from conceptual distinctions between assigning a "cause of death" and identifying a "mode of dying".

G. Cause and Mode

The basis of the distinction between mode and cause of death can be recognized in the application of the idea of responsibility as a discriminatory criterion for

conferring membership in a category of death. This recognition follows from knowledge that the legal sense of being responsible gives signification to some kind of involvement in a course of action for which there are judicially defined consequences (Hart, 1968). This knowledge can be traced to the medieval jurisprudential notion that the source of any action that takes a person "further from life and closer to death" can be regarded as th responsible agency for contributing toward the hastening of death (Whittaker, 1895:41). The critical point is that actions construed as being responsible for a death must by necessity be located in a temporal frame through considerations of cause and effect. To assign legal responsibility for a death is to signify some form of causal involvement in the occurrences preceding a death. Therefore, analytically speaking, to confer responsibility is to entertain a description of involvement. The description retrospectively orders occurrences associated with an event in such a way that certain occurrences are conceived as having causal significance. This introduces the conceptual problem of multiple causation as illustrated in the following thirteenth century case of unnatural death:

> A woman had brought her year-old son to the father, who refused to accept and care for him; she thereupon dumped the infant in the village street and during the following night died from exposure. The jurors did

> not suspect either parent of causing the death, presumably intentionally, but the justices held both of them and the whole village responsible for it by their negligence; the matter was not treated as a homicide, but all were amerced (fined) for their offence.
>
> (Kellum, 1974:378)

The assignation of causal priority to exposure in this case provided the basis for a description of the death which excluded the category of homicide. Clearly, it is questionable why exposure was assigned greater causal significance than either the act of abandonment or the lack of intervention on the part of the father and villagers. Presumably, the death would not have occurred if the father or someone in the village had given the child shelter. Obviously, reasoning in the same vein, the event would not have happened if the mother had refused to abandon her child. However, it could be argued equally well that the particular circumstances of the death would never have transpired if the child had not been conceived. In other words, the chain of causal connections could be expanded ad infinitum. Hence, to attribute a cause of death is to limit the description of the event to particular dimensions. A graphic illustration of this point is provided by Gluckman (1972:41) in a description of occurrences that were causally associated with the death of a child who had contracted typhus. The father believed that his son

was a victim of witchcraft. An anthropologist informed the father that the death was caused by the bite of a louse infected with typhus. The father did not dispute the louse bite as a causal agency of the typhus but queried how this causally explained why his son and not some other child was the victim of the louse. The cause of death from a medical viewpoint does not incorporate the particulars of what happened prior to the louse bite. The medical cause of death locates the origin of the event in the occurrence of the bite. On the other hand, the witchcraft explanation supported by the father expands causal considerations to explain why the particular child was a victim. Witchcraft incorporates particulars associated with occurrences prior to the bite.

Rothman (1976) elaborates a distinction that is useful for understanding how causal priorities are assigned. He refers to "sufficient" and "component" causes:

> A cause which inevitably produces the effect is sufficient.... Common usage makes no distinction between that constellation of phenomena which constitutes a sufficient cause and the components of the constellation which are likewise referred to as "causes". Another qualification for sufficient causes is restriction to the minimum number of required component causes; this implies that the lack of any component cause renders the remaining component causes insufficient.
> (Rothman, 1976:588)

Hence, for example, a physician would identify a louse infected with typhus and the bite of the louse as "causal components" sufficient to cause death. Witchcraft, from a medical point of view, is excluded from the constellation of "causal components". However, to exclude witchcraft, from a cultural point of view, is to render the infected louse and the bite insufficient as "causal components" of death. Both points of view identify the same sufficient cause of death. Their differences derive from conceptual dimensions used to assign significance to constellations of "causal components". Medical concepts are not compatible with explanations that specify witchcraft as a "causal component" of death associated with typhus. Cultural concepts are compatible with such causal explanations.

Rothman's distinction between component causes and sufficient cause helps us to distinguish mode from cause. That is to say, to assign a cause of death, is to identify a sufficient cause such as "typhus" without reference to "causal components" of typhus. To assign a mode of death, is to identify a constellation of "causal components" that conceptually elucidate occurrences included in the sufficient cause. In other words, the recognition of a mode requires concepts which give distinction to specific arrangements of causes that are conceived as the components of a sufficient cause of death. Rothman (1976:588) notes that the term cause, "does not specify whether the refer-

ence is to a sufficient cause or to a component of a sufficient cause." My proposal is that "mode" is a term which distinguishes constellations of "causal components" in a sufficient cause of death.

Take, as an illustration, the taxonomic problem of deciding whether a death associated with the refusal of life-saving medical treatment is equivalent for classificatory purposes to victim-precipitated homicide or a self-destructive automobile fatality. This problem is resolved by comparing the deaths in terms of consistency among concepts which assign significance to components of their sufficient causes. If comparisons reveal that such concepts are not consistent with each other, then it is questionable whether for classificatory purposes, the deaths should be regarded as equivalent. The logic in this line of questioning requires clarification.

Gray (1978:144) informs us that "every successful taxonomy represents a theoretical argument for a phenomenon being one sort of thing rather than another." Moreover, the argument is expressed through classificatory rules for allocating phenomenon to a category. Therefore, let A, B, and C respectively represent deaths associated with the refusal of medical treatment, self-destruction, and victim-precipitated homicide. Let X, Y, and Z respectively represent concepts which identify components of sufficient causes of A, B, and C. Finally, let the symbol

represent a category in a taxonomy of death.

My proposal is that classificatory rules for including A, B, and C in — · are derived from the recognition of conceptual interrelationships among X, Y, and Z. These interrelationships define equivalence by giving specification to some form of continuity of variation among A, B, and C. This continuity provides a basis of support for the theoretical argument that A belongs with B and C. Hence, the theoretical argument underlying the inclusion of A, B, and C in — is contested by demonstrating sources of ambiguity in concepts which identify continuity of variation among A, B, and C. One demonstration involves showing that properties related to X are not consistent with those related to Y and Z. This is the case, for example, if the significance of the relationship between Y and Z is made obscure by the operation of properties in X. Also, this is the case, if the relationship between Y and Z makes obscure how X operates with either Y or Z to identify continuity of variation within the referents of △ .. Both cases challenge the argument that A belongs with B and C. The challenge is that conceptual interrelationships afforded by (X,Y), (X,Z), and (Y,Z) obscure how referents of — are recognized as equivalent phenomena of death.

H. Review of Proposals

My proposal is that the specification of interrelationships among concepts which identify components of a

sufficient cause of death makes explicit the theoretical basis of rules governing the inclusion and exclusion of deaths in medicolegal categories. Moreover, the specification of a theoretical basis for assigning deaths to medicolegal categories provides evidence of their conceptual adequacy as codes for organizing information about phenomena of death. We submit that such an assessment is productive of propositions concerned with improving procedures for codifying deaths in medicolegal investigative systems.

These proposals can be addressed in light of recent debates about diagnostic criteria of death. The debates take the form of a taxonomic problem: namely, how should medicolegal systems classify deaths when they are causally associated with the removal of resuscitative devices? Mass media descriptions have dramatically forced recognition of this problem in the case of Karen Quinlan. Here, the essential issue was how the action of turning off devices maintaining Quinlan in her persistently comatose state would incur responsibility if she subsequently died. Turning off these devices, according to the Superior Court of New Jersey, was tantamount to a specific kind of homicide (Gold, 1977:89). Suffice it to say, the New Jersey ruling reflects legal ramifications of what Nettler (1976:244-47) aptly describes as movable lexical boundaries. These boundaries in Quinlan's case mark the distinction between deliberately killing and allowing to die.

The case of Potter (Hogan, 1972:80-84) further elaborates how conceptual distinctions figure in assigning causal priorities to establish a correspondence between death and the category of homicide. This case involved a man who received severe irreversible brain damage following an assault. The victim was maintained on a respirator which was turned off after a kidney was removed for transplantation. He subsequently died. Here, as in the Quinlan case, the taxonomic problem resided in the determination of a "causal component" that would render remaining causes insufficient. The coroner did not classify Potter's death as homicide in view of his opinion that the victim was not dying until artificial ventilation ceased. That is to say, the action of turning devices maintaining Potter was conceived as the origin of the event to be classified. This temporal framework excluded occurrences prior to placement on a respirator in the coroner's determination of "causal components" of a sufficient cause of death. Hence, the connection between the assault and subsequent death was not recognized by the coroner. The assailant was held responsible for injuries but not the action of turning off the respirator. In other words, responsibility figured as a key concept in the identification of "causal components" of a sufficient cause of death.

The case of Garrioch illustrates how responsibility functions as a concept in the identification of "causal

components" (Manitoba Law Reform Commission, 1974). Garrioch was struck on the back of the head during an altercation. He returned to his apartment unassisted and was taken to the hospital the following day. Five days after being admitted to the hospital he was pronounced dead, and both kidneys were removed for transplantation. Meningitis was the cause of death. A man involved in the altercation with Garrioch was charged with non-capital murder. Counsel for the accused suggested that the diagnosis of death was not correct in that Garrioch's respiratory and cardiovascular system were functioning with mechanical aid prior to the removal of his kidneys. Moreover, the cause of death was the omission of medical treatment following the transplantation. In other words, the wounds caused by the surgical removal of Garrioch's kidneys were not treated and he was not reconnected to resuscitative devices.

The judge in the Garrioch case raised the question of the relationship of removal of kidneys to cause of death in his address to the jury:

> It is for you to say if you are satisfied beyond a reasonable doubt that it was not the removal of the kidneys which caused Garrioch's death. If you are satisfied beyond a reasonable doubt that the cause of death was meningitis and that the meningitis was caused by the injury of August 9, either directly, or indirectly, or that the injury accelerated or contributed to the death of Garrioch, there is a killing which constitutes culpable homicide, murder,

or manslaughter.

(Manitoba Law Reform Commission, 1974:18)

Jury members during the course of further instructions were asked to consider whether the accused was responsible for initiating occurrences which culminated in the meningitis. If the accused was responsible, then the altercation constituted a "causal component" of the meningitis. Furthermore, if the meningitis was the cause of death, then the event would not have happened without the altercation. These considerations were introduced as directing principles for identifying the causal relationship of the removal of kidneys to cause of death.

A critical conceptual distinction used to identify "causal components" in the cases of Potter and Garrioch was "death of the brain" and "death of the person". A "dead brain" was recognized as being equivalent to a "dead person" in the case of Garrioch. Physicians determined that Garrioch's brain was dead prior to the removal of his kidneys. In other words, there was life in Garrioch's body, but he ceased to be a person when his brain died. Bodily functions were maintained by mechanical aids which were removed after Garrioch was pronounced dead. Consequently, bodily death occurred after the death of the person. To be specific, what happened to Garrioch as a person was distinguished from what happened to his body.

A dead person was not equated with the death of

the person in the case of Potter. A pronouncement of death was not permissible while Potter's circulatory and respiratory functions remained viable through mechanical aids. Potter died after the mechanical aids were removed. Consequently, the removal of the aids was conceived as a cause of death.

A question is raised when a distinction is drawn between occurrences of death associated with person and body. Does the distinction clarify interrelationships among concepts which identify components of a sufficient cause of death? It is evident in view of recent controversy regarding diagnostic criteria of death that the distinction between a dead person and a dead body is not readily compatible with the idea that the transition from being alive to being dead can be identified with precision. Does the absence of such precision have significance for the attribution of salience to components of a sufficient cause of death?

Cassell (1973:171) informs us that prognosis of disease figures prominently in the medical conception of death with the consequence that "bodies can be conceived of as dying, but persons cannot." Ostensibly, if assigning a corpse to a category is restricted to causes of death of a body, then the origin of the event must be located in biological process. That is to say, components of a sufficient cause of death are restricted to anatomical, physio-

logical, and pathological occurrences. On the other hand, concepts which identify causes of death of a person appear to operate through reference to social and psychological occurrences. Are such occurrences and biological process considered mutually exclusive in classificatory rules which allocate deaths to official categories? Does the condition of being mutually exclusive have relevance for specifying how salience is attributed to "causal components" of a sufficient cause of death? These questions can be addressed in light of findings that associate emotional stress with causes of death.

Engel (1971) has proposed that persons are more susceptible to lethal diseases when they experience emotional distresses such as "hopelessness" and "helplessness". Greene and Miller (1958) allege there is a causal relationship between "feelings of loss" and the development of cancer. Eyer (1977:132) explains the pathology of chronic stress:

> In chronic physiological arousal, the immune system is suppressed. This supression is complex and multileveled. The elevation of cortisol in stress, for instance, causes shrinkage of the thymus and decrease in production of new potentially reactive T-cells (small lymphocyte precursors) inhibits the inflammatory process, and prevents the "walling off" of large bacteria or cancer cells by fibroblasts as well as other healing repair processes.

Unemployment, bereavement, retirement, and migration represent sources of stress which make persons susceptible to chronic physiological arousal. Dimsdale (1977) speculates that potentially lethal variations from the normal rhythm of the heart beat occur as responses to overstimulation of the nervous system. This speculation is used to interpret Weisman and Hackett's (1961) observations of a predilection to death among surgical patients who have expressed the desire to die during an operation or briefly afterwards. Milton (1973:1436) describes such cases as self-willed deaths and draws similarities "between the westernized man dying through fear of a disease from which there is no escape and the aborigine who dies from an all-power spell...". Seligman (1975) emphasizes the causal contribution of the decedent in such deaths by referring to "a loss of will to live" as a cause of death. This phenomenon, allegedly occurs when a person perceives a substantial loss of control over his life.

Davis (1978) examined homicide cases where there was an absence of physical contact between the victim and assailant. He suggests that a category of emotion-precipitated homicide may be warranted in view of knowledge of arousal physiology and cardiac responses to emotional stress. However, medically, it is difficult to refute that emotional stress and death are merely coincidental occurrences. Therefore, what conceptual operations are required

in order to conceive a causal relationship between emotional stress and death? This question applies to the following newspaper report:

> "I hope you have a heart attack and die," John Mihalsky shouted at Louis Pastor, 68, during an argument. Pastor promptly had a heart attack and died. The Lorain County coroner ruled the death on Wednesday a homicide caused by a heart attack, and Mihalsky, 66, was arrested Friday and charged with involuntary manslaughter.
>
> (Vancouver Sun, Oct. 2, 1976:3)

Presumably, Mihalsky's malevolent statement was identified as a discrete event which initiated Pastor's heart attack. That is to say, in order to classify Pastor's death as a homicide, the heart attack could not be viewed as an effect arising from a coronary disease. The implication is that official categories such as homicide incorporate concepts which define how phenomena of death are identified as discrete events associated with specific causes. To derive such concepts is the enterprise of this dissertation. The derivation of such concepts stands as logical prerequisite to the resolution of quantitative problems relating to the validity and reliability of official procedures used in assigning deaths to categories. In other words, questions of precision and accuracy often turn on what is being counted in contrast to why something is

counted. Zadeh (1973:28) draws our attention to the fundamental import of this distinction in his expression "the principle of incompatibility":

> Stated informally, the essence of this principle is that as the complexity of a system increases, our ability to make precise and yet significant statements about its behaviour diminishes until a threshold is reached beyond which precision and significance (or relevance) become almost mutually exclusive characteristics.

To reiterate, the focus of the research is exploratory. It endeavours to derive concepts that elaborate how phenomena of death are organized in an official classificatory schema. Certain questions that assumed prominence in the prior epistemological discussion provide an axis of orientation:

1) What concepts inform the ordering of causal priorities?
2) How concise and manageable are concepts which identify "causal components" of a sufficient cause of death?
3) What concepts identify variations in the salience of phenomena of death?
4) How compatible are concepts which identify phenomena of death through different levels of abstraction?

These questions address the logic, clarity, and consistency of taxonomic relations used in establishing a correspondence between an official category and death. The next chapter introduces a number of strategies for deriving such relations.

CHAPTER TWO

METHODOLOGICAL PROCEDURES

A. Research Guidelines

Our major concern in this study is to derive conceptual interrelationships which specify how phenomena of death are recognized as equivalent events for purposes of medicolegal classification. This concern will be ordered in a framework of thought which endeavours to generate an analytic scheme of interpretation in accordance with the guiding principles of the constant comparative method proposed by Glaser and Strauss (1967). This method has been applied with success in related sociological interpretations of dying awareness (Glaser and Strauss, 1965) and also in the analysis of social meanings associated with homicide (Wilt, 1974).

Basically, the method calls for the explicit codification of the evidential basis for appraising the credibility of research inferences. The method is attentive to what Cicourel (1968:4) has deemed the crucial issue of demonstrating "how the observer objectifies the raw material he observes so that others can arrive at similar inferences." A distinctive feature of the method is the constant comparison of occurrences which indicate continuity of variation in phenomena emphasized as being minimally necessary for as-

signing death to a category. The object of comparison is to derive interrelationships among concepts that give specification to variations within phenomena rendered equivalent for classificatory purposes. The procedures showing how the interrelationships emerge from the data are codified in a discussion of data acquisition techniques.

Glaser and Strauss (1967) do not advocate specific analytic procedures for exploring how theoretical propositions emerge from the particular strategy employed in data codification. They write: "In discovering theory one generates conceptual categories or their properties from evidence; then the evidence from which the category emerged is used to illustrate the concept." (1967:23) The theoretically derived relations emerge as analytic products of strategies articulating distinctions between categorical evidence or indicators and the categories themselves which organize the respective evidence. These distinctions provide for the "... readily apparent connections between data and lower and higher level conceptual abstractions of categories and properties." (Glaser and Strauss, 1967:37)

Lower level concepts generally are abstracted from the terms of reference used by persons being observed in field situations. For example, persons who assume official responsibility for investigating deaths refer to the decedent with terms that denote various kinds of prior involvement with a physician. These terms reflect classifi-

cation procedures which are explicated through higher level concepts. The higher level abstractions emerge from the comparison of occurrences containing equivalent lower level concepts. In other words, the research procedure is directed toward the elaboration of uniformities in the medicolegal investigator's terms of reference for conferring membership in a category of death. These uniformities delineate categorical distinctions among phenomena of death.

B. Data Acquisition Techniques

Multi-faceted interrelated strategies of data collection were employed in keeping with the fundamentally pragmatic orientation of the constant comparative method. Schatzman and Strauss (1973:7) address the nature of this pragmatism by noting that: "Method is seen by the field researcher as emerging from operations - from strategic decisions, instrumental actions, and analytic processes - which go on throughout the entire research enterprise." Parenthetically, granting the highly exploratory nature of this research, flexible strategies were necessary to accommodate the diverse forms of data encountered during the course of field observations. In retrospect, it would not have been possible to incorporate such diversity if the selection of data had been restricted by a research design operating through predefined methods of instrumentation.

C. Fieldwork Strategies

The initial strategy involved eliciting the terms

of reference used by medicolegal officials in drawing distinctions and differentiations within and between categories of death. These terms of reference provided a data base for developing subsequent procedures. The purpose was to explore how classificatory items were identified and assigned significance as sets of attributes delimiting phenomena of death. The ob[redacted] to derive relations of inclusion and contrast amo[redacted]icatory items by comparing sources of variati[redacted]epts that established a correspondence between death [redacted] an offi[redacted]cial category. In particular, to facilitate comparisons between deaths, it was considered necessary to ascertain how continuity of variation among classificatory items derived from interrelationships between concepts used to allocate a death to a category. Triesman (1974:304) lends support to this strategy by noting:

> The definitional rules which constitute the guides to recording particular headings only stand in relation to alternative allocations, although those relationships are seldom stated. They generally assume hierarchy of some types of events over related others, the exclusivity of one event from related others, and most important, they assume that the interest in framing such an analytic procedure is common to all classes and groups.

Another related strategy proceeded from the a

priori assumption that certain criteria of discontinuity of variation were evident in the delimitation of phenomena distributed in death classificatory schema. The logic of this assumption was in accordance with the observation by Zadeh (1965:338) that "more often than not, the classes of objects encountered in the real physical world do not have precisely defined criteria of membership." Criteria of discontinuity address requirements of discreteness of variation in classificatory items delimiting distinctions between deaths. The point was to discover how phenomena of death assumed significance as discrete sets of classificatory items. In other words, it was necessary to discover the basis of the distinctions making phenomena of death sufficiently different for separate category assignment by examining how classificatory items were enumerated as members of mutually exclusive sets.

Another strategy involved examining how causes of death were traced through a method that Michael Scriven (1976:105) describes as "modus operandi inference". The term "modis operandi" (MO) is applied in crime investigations to the recognition of effects as being characteristic of a finite set of probable causes such that:

(i) A and A^1 can sometimes cause X.
(ii) Nothing else is known to cause X.
(iii) A but not A^1 was present.
(iv) The MO of A, which is highly distinctive, was present

A probably caused X.

(Scriven, 1976:107

A and A^1 in medicolegal investigations of death, refers to constellations of "causal components" of a sufficient cause of death, and X stands for a category which corresponds with A and A^1. Hence, A is a set, containing the subset a, with elements x_1, x_2, x_3, ... x_n, and A^1 is a set, containing the subset a^1, with elements y_1, y_2, y_3,..., y_n. The elements x_1, x_2, x_3, ..., x_n, and y_1, y_2, y_3,..., y_n, delineate the minimum requirements for recognizing A, and A^1. These minimum requirements govern the allocation of deaths to categories. Therefore, it was necessary to consider the discriminatory value afforded by such requirements. For example, the value would decrease if a or a^1 contained elements that mapped into categories other than X. This occurs when elements not included in X intersect with a or a^1 such that the resulting set is not empty.

To initiate and pursue these strategies, procedures encompassing archival record analysis, open-ended questioning, and participant observation were deployed over a period of four months. The Office of the Provincial Chief Coroner in Alberta provided a base for such operations.

Traditionally, field research in formal organizations involves procedures of observing an organizational member through some course of activity over a defined period of time. In this study medicolegal officials were observed through the various functions that transpired from

the time a death was initially reported until the coroner closed the investigation of the case by matching the corpse with a category. These functions included "those practices which give death-related categories their concrete organizational foundation." (Sudnow, 1967:8) The practices typically involved facets of management in the disposition of corpses by hospital personnel, the police, funeral directors, a coroner, and the decedent's family. Each facet of corpse disposition contributed toward the accumulation of classificatory items which officially documented phenomena of death identified through medicolegal investigation. These procedures of documentation were for purposes of comparison designated as death tracer enumerations.

D. Death Tracers

The idea of a death tracer provided a conceptual foundation for reducing the classificatory items contained in coroner's casefiles to manageable units of analysis. In order to explicate how this reduction was accomplished it will be necessary to elaborate how the death tracer concept was developed for purposes of comparison. Parker (1974) provides the basis for such elaboration with the observation that:

> The unique progression of each individual's physical changes produces a trail of events over time and is the signature of the human agent. Amid the confusion of other acts, human and non-human, in the same space and time,

> the trail and the signature exist as an intertwined thread of relationship. (p.505)

The essential point in Parker's observation is that physical changes supposedly make it possible to identify past occurrences as discrete events through reference to spatial and temporal boundaries. In other words, physical changes provide evidence that an event has taken place. However, it is not prima facie obvious what perceptually identifiable features of physical change define something that has happened as an "event". More to the point, it is not readily apparent what physical changes confer the quality of an event on some assortment of perceived occurrences. The taxonomic problems that subsequently arise in the context of this study have to do with the force and precision of death classificatory schema to organize some assemblage of occurrences in the form of discrete events called natural death, accident, suicide, and homicide. Agar's (1973) ethnography of urban heroin addicts demonstrated the difficulties of defining the constituent structure of what are characteristically addressed as events. The difficulties can be illustrated in laws providing protection against double jeopardy. These are laws that prevent a person from being put upon trial twice for the same offense. Fry (1978) addresses "what is" and "what is not" the same offense as taxonomic problem that arises when violations occur in the same frame of space and time. She

notes, for example, that: "Problems emerge more prominently when there is a distinct separation in time and/or place between or among the separate violations, no matter how minuscule the time/place cleavage might be." (1978:70) The question is when do changes in space and time cease to be continuous? That is to say, what concepts are necessary to recognize a boundary between continuous and discontinuous phenomena? Our assumption is that occurrences are recognized as "discrete events" only if there is some preconceived basis of discontinuity between them.

Initial field observations of medicolegal investigative procedures revealed that classificatory items officially documented in coroner's casefiles identified particulars of death as phenomena of transformation. These phenomena ordered the perception of continuity in a series of transitions by facilitating a conceptual linkage between an antecedent condition and subsequent conditions of alteration or transition. Indeed, the whole process of medicolegal investigation was oriented toward the recognition of continuity and discontinuity in transitions identified through different levels of abstraction.

Medicolegal investigations were designed to elicit evidence of various kinds of transformation that trace a sequence of occurrences leading to death. This evidence of transformation afforded a basis for mapping occurrences into categories that identify phenomena of death as discrete

events. In other words, phenomena of transformation provided an investigative focus for deliberating on the issue of primary concern: namely, how occurrences associated with death are fit into official classificatory schema. The fit is determined through the recognition of a pattern in transitions that identify specific kinds of occurrences as continuous and discontinuous phenomen-

Classificatory items which identified transitions operating through different levels of abstraction were labelled as death tracers. That is, tracers mediated access to phenomena that specified a correspondence between a category and death. Tracers constituted the elements for delineating distinctions between deaths. They were evident in judgements which identified various kinds of physiological, social, psychological, and physical transitions through the ordering of investigative procedures that framed death as an event incorporating specific kinds of transformation. In other words, investigative procedures were designed to elicit evidence of physiological, social, psychological and physical transitions. These alterations codified occurrences such that specific configurations of transitions were discernible for each category of death.

Extensive comparisons of coroner's casefiles revealed that tracers could be exhaustively reduced in terms of the following specifications.

1) temporal tracers specifying when transitions

occurred;

2) spatial tracers specifying where transitions have occurred;

3) causal tracers specifying why transitions have occurred;

4) clinical tracers specifying the occurrence of anatomical, physiological, and pathological transitions;

5) interpersonal tracers specifying the occurrence of transitions in social relationships;

6) psychodynamic tracers specifying the occurrence of transitions in mental state;

7) physical tracers specifying the occurrence of transitions in a physical setting.

Intra-categorical comparisons of these tracers revealed that more refined tracer codification was possible through reference to the following qualifiers:

a) conclusive tracer indicating precision in the identification of transitions;

b) inconclusive tracer indicating imprecision in the identification of transitions;

c) inconsequent tracer indicating that an identified transition is irrelevant;

d) single tracer indicating an emphasis on only one transition;

e) multiple tracer indicating an emphasis on

more than one transition.

Theoretically, tracers and their qualifiers elaborated the investigative procedures delimiting phenomena used by the coroner to reconstitute various occurrences as events corresponding with a specific category of death. Thus, they provided a foundation for the conceptual integration of classificatory items contained in coroner's casefiles.

E. Theoretical Sampling

Coroner's casefiles were compared in terms of their configurations of death tracers in order to discover sources of variation within and between categories of death. The intent was to discover as much variation as possible in phenomena rendered equivalent for classificatory purposes. To be precise, the selection of casefiles was determined by the constant comparative method of theoretical saturation. This involved comparing and contrasting casefiles until no further tracer configurations were discernible within and between categories of death. That is to say, the decision to cease sampling within and between categories was based on the discovery of duplication in tracer configurations. In total, 52 open casefiles (i.e., deaths undergoing investigation) and 78 closed casefiles (i.e., completed death investigations) from 1970 to 1975 were sampled over the course of four months.

Questions probing for the reasons underlying

categorical variations were addressed to persons responsible for eliciting tracer configurations in their routine activities of corpse handling. In addition, these routine activities were observed in order to discover sources of variation in the procedures used to elicit tracer configurations. This information was not readily apparent in the casefiles.

Constant comparisons of coroner's casefiles yielded the data that was necessary for the derivation of concepts that identified continuity and discontinuity of variation among phenomena of death. The data emerged from a procedure of finding similarities and differences between configurations of death tracers. These similarities and differences were related to higher level abstractions which identified contrasts among configurations within a category of death. In essence, these contrasts revealed how classificatory items were accommodated by the categories. Hence, the contrasts provided conceptual referents which mapped the constituent structure of death classificatory schema.

Contrasting procedures continued until the comparisons revealed different orders of significance in continuous and discontinuous phenomena used in establishing distinctions between and within categories of death. These orders of significance constituted the conceptual interrelationships which identified the maximum range of

intra-categorical variation in configurations of tracers. This maximum range located the boundaries differentiating categories. That is to say, conceptual interrelationships defining intra-categorical variations in tracer configurations, delineated sets of classificatory items contained in categories of death. These sets were a function of differential assignments of classificatory import to continuous and discontinuous phenomena accommodated by categories of death.

Theoretical sampling was necessary to collect data that would facilitate the identification of criteria delineating sets of classificatory items for purposes of inter-categorical comparisons. These theoretically established criteria provided the substance for evaluating the adequacy of the sample from which emerged rules for allocating deaths to categories. This was in conformity with the constant comparative method of Glaser and Strauss (1967:63) who note that: "The inadequate theoretical sample is easily spotted, since the theory associated with it is usually thin and not well integrated, and has too many obvious unexplained exceptions."

F. Research Setting

The primary setting for collecting data was the Office of the Chief Provincial Coroner in Alberta. The choice of setting was guided by two considerations. First, this setting was the documentation center where every cor-

oner's casefile in the province of Alberta was collated and stored. Secondly, all major and minor policy decisions regarding procedures of medicolegal investigation and codification originated from this setting. In other words, the Office of the Provincial Chief Coroner served as a locus of orientation for all medicolegal organizational practices. Hence the setting was ideal for initiating the proposed course of research. Indeed a substantial proportion of the data was collected in this setting. The remaining data was obtained from field observations in secondary settings such as police stations, hospital morgues, funeral homes, and physician's offices in 12 towns and cities of Alberta.

The discussion of how field observations were made possible must be attended with a methodological caution: namely, often the "pursuit of the description of increasingly complex and extensive classificatory domains can be criticized for its single-mindedness and for its failure to include a sufficiently critical assessment of the context and variation of the data elicited." (Ellen, 1975:202) This criticism draws reference to problems of validity and reliability in exploratory field research. These problems can be clarified through reference to the basic analytic distinction in fieldwork between an insider's and outsider perspective.

Specifically, an insider's perspective gives recognition to the knowledge acquired through participation in

a setting as a bona fide member of the setting. For example, to be a hospital pathologist is to possess an insider's knowledge of hospital deaths. This knowledge provides a perspective not shared by persons outside of the hospital context. These persons can gain access to the pathologist's knowledge of hospital death only through an outsider's perspective.

An outsider's perspective gives distinction to the knowledge arising from what Douglas (1976) has defined as depth probes. These probes "involve de-focusing, deliberately allowing oneself to simply experience the setting as much as possible like any other new member, but retaining the background commitment to being a social researcher and later returning to a more systematic observation, description, and analysis of the setting." (Douglas, 1976:131)

An outsider's perspective serves as a focus for the theoretical elaboration of the insider's knowledge of his setting. The insider's knowledge reflects upon what is being done as well as how something is done in the observational setting. The insider exercises control over his knowledge by monitoring what is perceptually accessible to the outsider in the observational setting. Hence, the outsider's perspective on what is being done (i.e., medicolegal investigation and codification) can be distorted by the monitoring devices employed by insiders as a measure

of control over the information to which they are privileged as bona fide members of the setting. In other words, the insider by virtue of his privileged status in a setting is in the position to manipulate the outsider's perspective through measures which could involve deception, concealment, and exaggeration. The likelihood of these contrivances increases ostensibly when the outsider is seen as being threatening or intrusive. In essence, the outsider can easily be cast in the role of a voyeur by insiders who fail to appreciate the legitimacy of the interests which warrant an outsider's presence. This poses a problem in self-management for the outsider.

Generally speaking, most fieldwork manuals only provide common sense advice in dealing with self-management problems. For example, Clark (1975:105) in reference to these problems notes: "The general rule is to behave like a gentleman, keep off the women, take quinine daily, and play it by ear." This general rule was considerably modified to suit the particular features of the proposed research settings. To be specific, a form of self-management that can be addressed as research etiquette was employed during the course of field observations. This involved exercising a specific kind of vigilance over how one was viewed as an outsider. The vigilance focused attention on any data that informed inferences pertaining to insider's expectations regarding the appropriate manner and style of outsider self-

management. The objective of research etiquette is to create favourable impressions in the presentation of the self in order to establish relationships based on trust and honesty. It has been repeatedly demonstrated in the fieldwork of Whyte (1955), Polsky (1969), Letkemann (1973), and Johnson (1975) that the accuracy and consistency of field observations depends largely on the development of trust and honesty in relationships with insiders.

G. Research Etiquette

Three closely related factors informed inferences about insider's expectations in relation to the presence of an outsider. The first influence involved readily apparent insider's concerns regarding the confidentiality of the information they handled in their routine practices of corpse disposition. Indeed many facets of the medicolegal disposal of the dead were purposely concealed from public viewing. This was clearly evident in statements made by insiders. For example, on one occasion a hospital pathologist in reference to my presence at an autopsy remarked: "A layman should not be viewing what we are doing here." A coroner in another instance replied: "There is no need for the public to know what actually happens when we take charge of the body." The reply was in response to a concern that a funeral director was being unnecessarily graphic when he informed the decedent's family about the clinical details of an autopsy. To wit, a bereaved husband upon learning

such details wrote to the coroner: "I find out 4 weeks after my wife's death that she was only a shell being buried, maybe the doctors and the coroner's office care less, but how about the family."

The police expressed strong reservations about an outsider's examination of their reports concerning the investigation of a death. A detective of homicide stated: "We routinely look into circumstances surrounding a death that even a coroner has no business knowing." Funeral directors were adamant in their opposition to outsider's requests to view embalming preparations. An embalmer noted: "We do not like the family to know about the suction trocar." This is a device used to remove fluids from the body cavity. Selzer (1974) refers to the removal as the "ultimate suck."

Physicians were obligated by a code of medical ethics not to disclose to outsiders the clinical history of their deceased patients. Indeed these records were made available to the coroner only through a court order. The confidentiality of medical records was defended by coroners and physicians. This rule of confidentiality was extended to coroner's casefiles. In fact, the decedent's family were granted no opportunity to examine the contents of the casefiles. In other words, the proposed settings for collecting data were inaccessible to the majority of outsiders. Hence, the presence of an outsider was likely to

be viewed as intrusive. Therefore, as an outsider, it was particularly important to take note of any discordant insider responses to my presence in the settings. Subsequently, to gain entry to such settings it was necessary to occupy an outsider role that would militate against the likelihood of being perceived as invasive by insiders. Blumberg (1966:21-22) has eloquently discussed this problem of invasive outsider presence in his analysis of the highly insulated environment of the court house:

> Rather than any view of the matter in terms of some variation of a conspiracy hypothesis, this simple explanation is one of an on going system handling delicate tensions, managing the trauma produced by law enforcement and administration and requiring almost pathological distrust of "outsiders" bordering on group paranoia.

The point is that an outsider's presence potentially serves as a source of tension. In a system already burdened with the handling of tension there may be resentment toward any additional sources. The resentment finds expression in the unwillingness of insiders to accept the presence of an outsider. To avoid this resentment it is expedient to entertain a role that affords an opportunity to directly manage the insider's tension arising from an outsider's presence. This is essential to the accomplishment of research etiquette.

The opportunity to entertain a role that would facilitate some control over insider's tension arose through a series of negotiations with the Provincial Chief Coroner. A mutually advantageous agreement was reached whereby complete access was granted to coroner's casefiles in return for my conducting an opinion survey. The survey was concerned with insider's attitudes toward pending changes in the medicolegal investigation of death. Moreover, the survey proved valuable as a rationale for entering insider settings that did not fall under the administrative authority of the Chief Coroner.

Letters of introduction were provided by the Chief Coroner encouraging co-operation and support for the survey. These letters placed particular stress on the role neutrality of the researcher by disclaiming any affiliation or vested interest with any of the departments of the Attorney General. The reference to neutrality provides a prelude to the second factor which informed inferences regarding insider's expectations: namely, interorganizational conflict and confusion arising from recent administrative changes in the Office of the Chief Provincial Coroner. The Chief Coroner's endorsement of my presence in insider's settings subsequently precipitated the problem of being perceived as an outsider who was seeking support for administrative changes.

To be viewed as an agent of the Chief Coroner was

to risk incurring resentment. Hence, those insiders who adopted this perception were enlightened by the fact that the endorsement contained in the letters of introduction entailed no obligation to support or seek approval for the administrative changes of the Chief Coroner. Alternatively, insiders were encouraged to perceive my role as that of a neutral agent through which criticism of the administration could be voiced. To promote this end, a sympathetic stance was taken with respect to any complaints recounted by insiders. Generally this pose involved reassuring insiders that others shared their critical insights. The communication of this recognition of shared concerns in a sympathetic guise fostered a situation of reciprocity such that confidences were bestowed by insiders in exchange for my assuaging their curiosity about some of the administrative changes. In other words, information exchanges during some occasions necessitated the adoption of an informant role. This was in keeping with the insights of Jarvie (1969:505) who astutely observed that: "The success of the method of participant observation derives from exploiting the situations created by the role clashes: insider/outsider, stranger/friend, pupil/teacher."

The third factor which heavily influences strategies of research etiquette was related to the unpleasant nature of the enterprise of handling corpses in various stages of decomposition and dealing with the decedent's

family in cases where death was sudden and unexpected. This enterprise involved insiders in what Hughes (1958) has aptly described as the dirty side of professional practice. The substance of the dirty side found expression symbolically in the emotional strain and tension of continually encountering the grief induced by death and in the actual physical work. Many insiders indicated that prolonged involvement in this kind of dirty work inspired an earnest compassion for those who suffered as a consequence of a family member's untimely death. Indeed the image of a tough or hardened countenance was rarely evident among those engaged in dirty work.

In particular, insiders expressed the concern that they were perceived as ghoulish by outsiders. To wit, during an autopsy a pathologist deemed it necessary to say: "We are not butchers who enjoy cutting people up." This was interpreted as a disavowal of any deviance associated with the work. The interpretation was shaped by Becker's (1963:9) assumption that "... deviance is not a quality of the act the person commits, but rather a consequence of the application by others or rules and sanctions to an offender. The deviant is the one to whom that label has been successfully applied; deviant behaviour is behaviour that people so label." In other words, the pathologist's deviance disavowal was construed as evidence of the awareness that doing medicolegal dirty work in the presence of an outsider was

potentially discreditable. Thus a major consideration in terms of research etiquette was the avoidance of any behaviour that would give form to the discrediting potential of an outsider. For example, to express shock or strong aversion was to risk being cast in the role of a voyeur of ghouls.

The avoidance of the voyeurism role was accomplished in part through direct participation in some of the dirty work connected with medicolegal cases. Primarily, this involved conversations with the decedent's family that addressed problems they encountered in dealing with the police, hospitals, coroners, and funeral directors. For example, the decedent's family were not always informed when an autopsy was ordered by a coroner. Sudden infant deaths, in particular, posed many problems for the family. A mother conveyed her sentiments on such deaths: "I was feeling at the time it was my fault, so the presence of the police kind of confirmed this." Another mother of a deceased infant queried how it was possible to do an autopsy on an infant. Evidently, neither the coroner nor her family physician had taken the time to explain the purpose of an autopsy.

Frequently, family members would become extremely distraught and were unsuccessful in controlling their tears. Hence, I was unavoidably cast in the role of grief counsellor. This in retrospect, proved to be the most exhausting

facet of the field research. Far less demanding emotionally were those occasions when assistance was offered in minor physical tasks such as lifting a corpse, labelling specimen bottles, or holding vials in readiness for blood, urine, and liver samples. The desired effect of this participation was to disclaim the entertainment value of medicolegal dirty work. That is to say, the impression that enjoyment in a voyeuristic sense derived from observing medicolegal dirty work was negated by demonstrating familiarity with the strain and tension of insider's work. The acknowledgement of this familiarity provided an opportunity to convey empathy for insiders.

Problems of managing the decedent's family in cases of sudden and unexpected death provided abundant material that could be shared during the course of casual conversations. Rapport with insiders was considerably enhanced by such conversations. Many insiders saw in my presence the opportunity to instruct a novitiate in the protocol of handling the dead. For example, an insider who managed a body removal service elaborated on how to deal with the sensitive situation of removing a corpse from the scene of death when the decedent's family was present. He would attempt to persuade them to leave. His persuasion usually was effective and in cases involving massive anatomical destruction such as brain matter sprayed over the ceiling from a shotgun blast, the family rarely expressed any

interest in observing the removal. If they left the scene of death, then the corpse was unceremoniously placed in a plastic bag and removed with haste. On the other hand, if the family refused to leave, then the corpse was draped in a blanket and removed with accompanying gestures that conveyed respect for the physical remains.

The novitiate role proved extremely valuable in the preparation of research etiquettes. Usually, instructive comments by insiders included information about what to expect from other insiders. Hence self impressions were organized in accordance with such expectations. In particular, this was the case in dealing with the situation of viewing medicolegal autopsies on mangled and decomposed corpses. Insiders graphically recounted instances where persons had fainted during the performance of an autopsy. A morgue attendant reassuringly noted: "There is no disgrace in being sick as long as you do it in the sink."

Insiders stressed the importance of joking as a mechanism for releasing tension that arises from continually being exposed to the reality of death. The joking was oriented toward the dirty side of medicolegal work. Generally, the joking theme and tempo were controlled by the person who was most frequently in physical contact with the corpse. For example, a pathologist asked two policemen attending an autopsy if they cared to make a ham sandwich from the large chunk of fat he had removed from the throat of a

male corpse. One declined the offer by noting he only ate kosher. The other policeman expressed an interest in liver and onions in preference to the ham. Participation in the joking appeared to serve the purpose of allowing insiders to express stressful experiences without introducing further strain.

Certain conventions were evident in the use of joking as a mechanism for dealing with stress. Somber silence was very much apparent in the handling of a child or infant's corpse. Emotional detachment was difficult to maintain in such cases. Insiders occasionally were observed directly confronting their feelings through overt admissions that the appearance of the dead infant or child was very upsetting. A pathologist indicated that you rarely become nonchalant even after years of continual exposure to such deaths.

H. Data Recording Procedures

Problems associated with the execution of research etiquette decisively influenced procedures for collecting data. For instance, the temptation to tape-record interviews and informal conversations was tempered in deference to the insider's concern about the confidentiality of the information. The police, in particular, were concerned about the legal ramifications that could arise from the disclosure of such tapes. They indicated that any reference to tape-recording would guarantee the concealment of infor-

mation. It was reasonable to presume that anything encouraging concealment would also serve to hinder the development of rapport with insiders. In essence, a tape-recorder would have subverted any strategy dealing with the problem of invasive outside presence. Therefore, it was necessary to adopt a recording routine which would accommodate insider's concerns about confidentiality.

The routine eventually adopted was shaped by the roles acquired through participation with insiders. These roles introduced in the discussion of research etiquette encompassed the two extremes between passive observer and active participant. The participatory role afforded by the task of conducting an opinion survey provided an opportunity to jot down information in cryptic fashion during the course of conversations and interviews. To facilitate expansion and refinement of these notes, narrative accounts of observations were placed on tape after each session with insiders. The information on the tapes was then transcribed along with the written notes into a journal which provided a continuous record of progress in the field.

Slight modifications of the prior routine were necessary when entertaining the roles of novitiate, confidant, informant, and grief counsellor. Note-taking of any form was found to be antithetical to the effective execution of these participatory roles. Therefore within as brief a duration as possible after entertaining these roles,

observations were entered in the journal. This procedure was always concealed from insiders.

The role of passive observer afforded many opportunities to engage in eavesdropping. Schatzman and Strauss (1973:70) note that eavesdropping in field situations provides "a major source of actor-constructed information." Unsolicited information often provides insight into items that are overlooked due to unfamiliarity with a setting. However, the issue of research ethics arises when the unsolicited information is of highly confidential nature. Therefore, permission was invariably sought before engaging in this form of listening. Actual note-taking was conducted unobtrusively. Here the reasoning was that overt note-taking most likely would have accentuated the insider's awareness of being observed. To induce such awareness was to invite speculation that my interests were other than academic. The problem was comparable to the situation often encountered in anthropological studies of native people where as Freilich (1970) notes: "It is highly probably that many natives will be convinced that the anthropologist is a spy." (p.500) My problem was complicated by the fact that some insiders were openly contemptuous of the Chief Coroner. They viewed his administrative changes as those of empire building. The changes were regarded with suspicion by hospital officials. Some pathologists indicated that the increased demand on their services as a consequence of the

changes was tantamount to professional exploitation. Therefore, it was considered important to avoid being identified with the interests of the Chief Coroner.

The examination of casefiles presented no problems. Closed casefiles were reviewed in the evening when the office was shut. The classificatory import of casefile items was probed through open-ended questioning on the following day. These probes were usually directed toward persons working in the Office of the Chief Coroner. Open casefiles were examined during the day. This afforded the opportunity to immediately question insiders about the reasons for including specific kinds of classificatory items. On some occasions invitations were extended to listen in on telephone conversations dealing with death investigatory practices. This was done in order to resolve queries regarding classificatory item inclusion and exclusion.

I. Validity and Reliability

Self-reported retrospective field data can be compared with courtroom eyewitness testimony as far as the sources of unreliability are concerned. The comparison derives from the major methodological difficulty that both are dependent upon perceptual judgements of situations where the possibility of assessing the effects of extraneous variables is highly limited. Therefore, in discussing how validity and reliability are assured, it is important to stress how perceptual judgements were controlled in the con-

text of the research.

The adoption of different roles (i.e. novitiate, informant, grief counsellor, passive observer, opinion surveyor) in the same setting provided some measure of control over the bias of selective perception. That is to say, the observation of features and the significance attributed to the recognition was influenced noticeably by the nature of participation in the setting. In other words, what assumed perceptual significance in a setting often was determined by the role adopted for the occasion. There is confirmation for this insight in experimental studies of eyewitness testimony. Buckhout (1974:5) observed that: "Insignificant events do not motivate a person to bring fully into play the selective process of attention." Thus, for instance, a person who has witnessed a crime may be asked to recall particular circumstances which had little or no significance when they were observed. This will limit the reliability and validity of the testimony.

A strategy for dealing with problems of selective perception was sought through continually checking field records for evidence of setting features that had attained role-specific perceptual significance. These features were then observed from the perspective of a different role. For example, in the novitiate role attention was drawn to specific differences in evisceration methods utilized by pathologists. Those differences were not noted in prior

observations made while entertaining the role of passive observer at an autopsy.

The principle of observing features from the perspective of different roles is analogous to Sack's (1972: 285) description of how a mature patrolman trains a novice policeman to observe street activities such that: "The lovely young lady alighting from a cab is now observable as a call-girl arriving for a session. The novice is shown how to see the street, as, so to speak, scenes from pornographic films." Features of a setting assume a different perceptual significance. A garbage can is seen as a convenient receptacle for concealing a dead infant or a park is viewed as a potential site for child molestation.

Two checks on the potential biasing impact of selective perception were introduced through viewing setting features from the perspective of different roles. First, features initially overlooked or deemed insignificant from the perspective of one role attained salience and were reassessed in light of the perspective provided by a different role. This served to expand the perceptual field of respective roles. The expansion militated against the problem of perceptual attenuation whereby certain features attain such prominence that others fade from attention. Secondly, varying the salience of setting features through multiple role posturing guarded against disinterest incurred by familiarity. That is, the adoption of different

roles renewed interest by focusing perception on setting features that were becoming less salient as the result of constant exposure.

Another form of potential bias that was checked through multiple role posturing was different access. This bias occurs when an outsider is granted access to some settings and not others. To deny access is to close off information which may influence how accessible settings are perceived. The potential for this bias was great as there was considerable intra-organizational feuding between factions and interest groups. Identification with a faction or interest group would have encouraged distrust from other groups. Distrust would lead to denial of access to settings deemed import to the research. The adoption of different roles expanded the opportunities to disclaim affiliations which would have impeded accessibility to settings. It also expanded opportunities to observe insiders in a variety of circumstances. James (1977:191) noted that: "In general, the more time spent with informants under varying circumstances, the more reliable are the data generated."

A form of bias rarely discussed in field research is the influence of stress on perceptual recognition. Coombs and Goldman (1976) have discussed in detail the problems of emotional stress in their field study of hospital intensive care units. However, their discussion focused on coping mechanisms without considering the potential

biasing effect on observations. For instance, the question arises as to whether details of a distressing situation are suppressed during the recording of data. Indeed a further source of concern relates to how the mechanisms for dealing with stress effects what the researcher observes in the setting. To return to the experimental studies on eyewitness testimony, Buckhout (1974:5) points out that "a person under extreme stress is also a less than normally realiable witness." In effect, under such conditions the person becomes more aware of factors inducing stress than any other features in his perceptual field. This reduces the accuracy of recall and in particular leads to exaggerated estimations of what was obse[redacted]ed.

Debriefing with a sympathetic colleague was introduced as a check on the potentially biasing effect of stress. These debriefing sessions were taped and they occurred whenever e[redacted]tional stress was experienced in dealing with in[redacted]. The actual procedure involved giving descriptions of the situations responsible for the stress. The colleague provided feedback which usually entailed asking for greater detail about the situation while at the same time entertaining queries about the accuracy of the description.

Feedback facilitated the recall of details which may otherwise have been forgotten or suppressed. In addition any queries that were not resolved to the satisfaction of the colleague resulted in checks for sources of possible in-

accuracy through further field observations. Another method of checking for inaccuracy was to listen to the tapes when great emotional detachment could be maintained. Occasionally this resulted in the identification of exaggerations in the taped descriptions. If this strategy did not prove successful in locating possible errors in the descriptions, then an attempt was made to observe similar situations that would serve as a basis for comparison.

Insider co-operation was extremely important in obtaining valid and reliable field observations. Therefore it was considered necessary to introduce checks for assessing the trustworthiness of insiders. For example, Maruyama (1974) has stressed the importance of exercising suspicion with respect to the seeming co-operation of insiders in his prison field research. He discovered that: "In order to keep the intrusion of the exploiters to a minimum, inmates used sophisticated phony answers which make interviewers happy." (Maruyama, 1974:319) The point is that outsiders are especially vulnerable to insider manipulations when a setting is highly insulated.

Specific safeguards were employed to check out the information provided by insiders. These involved cross-checking solicited information against data obtained through passive observation and examinations of the documents, contained in coroner's casefiles. In other words, unsolicited data served as a check on solicited information. Another

form of cross-checking consisted of comparing information for insider response consistency. In addition, insider information was checked by having other insiders comment on the accuracy. References to discrepancy in the information solicited from insiders were checked against the role used in obtaining the information. Further investigation of the discrepancy then was undertaken through the adoption of a different role. For instance, if contradictory statements were made in reference to information obtained while entertaining the role of passive observer, then clarification of the contradiction was sought through the novitiate role. This served as a check on the possibility of being manipulated by insiders while entertaining a specific outsider role.

The final form of check on the trustworthiness of insiders was to consider the risk they incurred by disclosing information. Freilich (1970-549) has pointed out that in field research: "Each type of encounter can be associated with a level of risk-taking for the informant." Specifically, the level of risk-taking is proportionate to the confidentiality of the disclosed information. That is to say, by disclosing to outsiders information regarded as confidential or private as opposed to public, an insider incurs the risk that the outsider will abuse the bestowed trust. Hence any disclosure of confidential information by insiders can be taken as an indication of trust in the

outsider. The upshot is that a situation arises whereby trust can be reciprocated.

J. Summary

To reiterate, the dominant mode of inquiry was controlled comparisons of coroner's casefiles by one observer. Constant comparison of casefiles revealed sources of variation in terms of reference used to allocate deaths to categories. Observations of investigative procedures provided concepts for explicating variations in classificatory items found in casefiles. Further comparison revealed interrelationships among such concepts within categories of death. These interrelationships define classificatory rules of inclusion and exclusion. Hence, through their derivation specificity is given to the logic, consistency, precision, and arbitrariness of taxonomic distinctions afforded by medicolegal categories of death.

The next chapter will seek to make explicit conceptual interrelationships which identify continuity of variation among phenomena allocated to the category of natural death. Attention will be given to the clarification and refinement of natural death as a discrete event in relation to the following taxonomic concerns:

1) What are sources of variation in discriminatory criteria which identify particulars of natural death?
2) What levels of contrast are apparent in discriminatory criteria which identify particulars

of natural death?

3) What constituent subgroupings are apparent in discriminatory criteria which identify particulars of natural death?

4) What influences the differential assignment of salience to discriminatory criteria which identify particulars of natural death?

These concerns facilitate intra-categorical comparisons of natural death in terms of relations among sets of classificatory items. The intent is to reveal membership functions that enumerate intra-categorical variability and establish equivalence relations between phenomena of death. These membership functions will provide a basis for inter-categorical comparisons of phenomena distributed in death classificatory schema. Their derivation provides a means for assessing criticism that ambiguity attends the transition from membership to non-membership in official categories of death.

CHAPTER THREE

NATURAL DEATH

A. Medicolegal Investigations

Our analysis of procedures for assigning death to a category will begin with a case that illustrates how medicolegal officials in Alberta employ the Medical Certificate of Death to relate occurrences, objects, and persons to phenomena of transformation. A surgically dissected, partially decomposed body, was found in a shallow exposed grave. According to a pathologist, the body belonged to a female, approximately between 25 and 40 years of age. Her jaws were wired shut and the body cavities contained sawdust. Her chest was sutured and contained a plastic bag filled with organs. These findings were sufficient for medicolegal investigators to derive inferences about the circumstances of the death.

First, the suturing and wiring indicated that the body was prepared for burial by a funeral parlour. The organs in the plastic bag indicated a specific method of evisceration practised by pathologists. This precluded the possibility of dissection by a non-medical person and suggested that a hospital autopsy had been performed. Both the coroner and police suspected that the body was exhumed from a graveyard and re-interred where found.

In other words, three occurrences were associated with the death: namely, an autopsy, preparation for burial, and grave robbery. These occurrences belonged to the set defining what had happened to the "corpse".. This set defined a prior set of occurrences enumerating what had happened to the "person".

In set theoretic terms, a partial ordering of occurrences was observed. For example, let A stand for elements belonging to the set describing what happened to the person, and let B stand for elements belonging to the set describing what happened to the corpse. Moreover, the set A contains the fixed element x which denotes a Medical Certificate of Death. The event being investigated is the union of A and B denoted $A \cup B$. The inclusion relation $\subseteq$ on the union of A and B denotes a partial order in set theory (Halmos, 1960). Accordingly, a partial order is perceived such that $A \subseteq B$ is equivalent to $A \cap B = A$. This order gives rise to the inverse function denoted $f^{-1}(B) = \{x \; f(x) \; A\}$. That is to say, the elements in set B identify the inverse image of B ($f^{-1}(B)$) represented by x in set A. The information expressed in x is sufficient and necessary to allocate death to a category. In essence, the occurrences in set B presupposed that the death had been classified. Therefore, investigators searched for a Medical Certificate of Death that corresponded with properties of the corpse.

Shneidman (1976:241) notes in reference to the Medical Certificate of Death that: "It is better understood as that special form which gives operational meaning to death and which, in fact, defines its current dimensions. It reflects the ways in which man-administrative and forensic man, at any rate - thinks about death and the ways in which he believes it occurs." Certainly, in Alberta the Medical Certificate of Death mediates the administrative goals of the medicolegal system. In particular, item 6 Part I (a,b,c) and Part II provided a working conception of death as an effect of a linear sequence of causal developments:

PART

I (a) Direct cause,
(due to, or as a consequence of)

(b) Intervening antecedent cause,
(due to, or as a consequence of)

(c) Underlying antecedent cause;

II

Other significant conditions contributing to the death but not causally related to the immediate cause (a) above.

Part I and II in combination designate a chain of occurrences that culminate in death. The origin of this chain is located in Part I (b) or (c). In effect, (b) or (c) locate the origin of occurrences associated with dying. The transitions from (c) to (b) to (a) map points of continuity in the transformation from a person to a corpse. Part II in item 6 gives expression to oc-

currences that entered into some phase of the transitions in Part I. The immediate cause of death (a) signals a point of discontinuity in occurrences that originated at (b) or (c). The discontinuity maps the transition from dying to death.

The medicolegal investigation of death operationally assumes the form of an exercise in tracing the transformation from person to corpse through a biographical elaboration of transitions associated with dying. Medicolegal officials accomplish such elaboration by eliciting evidence of transitions which map points of discontinuity from living to dying and from dying to death. These points identify boundaries of the event corresponding with a category of death. Problems connected with the identification of such boundaries influence the course of death investigations and subsequently determine what phenomena are noticed and recorded as elements in the transformation from person to corpse.

Phenomena of death are projected as sets of inverse images that map a course of continuous and discontinuous occurrences from living to dying and dying to death. For example, consider image sets A, B, and C containing respectively properties, x, y, and z. Let image set C specify the boundary between dying and death. Let image set A specify the boundary between living and dying. Let image set B specify the intersect of sets A and C.

There exists a function from set C to set B denoted $f^{-1}(Z)$ whereby, the property z corresponds with the property y in set B. There exists a function from set B to set A denoted $f^{-1}(y)$, whereby the property y corresponds with the property x. Moreover, when $f^{-1}(z)=y$, and $f^{-1}(y)=x$, then it follows that $f^{-1}(z)=x$. The functions expressing the inverse image z from set C to A are derived from concepts that identify effects with possible causes. The investigative procedure approximates Scriven's (1971:65) description of maze-solving or path-finding:

> We have to find a permissible route from some cause to the given effect. (The historian and detective best exemplify this enterprise.) The whole task is a pattern-recognition task or a complex of them, not unlike a chess-problem: we are trying to find a configuration of events which meets certain constraints represented by the circumstances and modus operandi and possible cause/possible effect data.

Path-finding in medicolegal investigations involves projecting inverse images of effects from the set C containing the boundary between dying and death to the set A containing the boundary between living and dying. The intersect of sets A and C (denoted $A \cap C$) contains occurrences that are identified with a category of death. We will define the space $(A \cap C)$ as a zone of mortality for locating the referents of the continuity mapping the transformation from person to corpse. Classificatory

items which give specification to such zones are conceptually elaborated as death tracers. These are identified in codification procedures which indicate:

1) when transitions occurred (i.e. temporal tracers);
2) where transitions occurred (i.e. spatial tracers);
3) why transitions occurred (i.e. causal tracers);
4) the occurrence of physiological pathological, and anatomical transitions (i.e. clinical tracers);
5) the occurrence of transitions in social relationships (i.e. interpersonal tracers);
6) the occurrence of transitions in mental state (i.e. psychodynamic tracers);
7) the occurrence of transitions in a physical setting (i.e. physical tracers).

Death tracers provide medicolegal investigators with images of the circumstances that lead to death. The following case will serve as an introduction to medicolegal procedures for eliciting death tracers.

The police notified the coroner that a 52 year old male had been conveyed to hospital emergency services where he was declared dead. This information initiated an inquiry by the coroner as to how the man arrived at the scene of death. A nurse who had attended the man prior to

death recounted a series of transitions through reference to a detailed record of therapeutic intervention:

> 11:56 P.M. arrived by ambulance not breathing and no pulse, airway inserted by ambulance cardio respiratory resuscitation in ambulance.

Here the nurse introduced conclusive information that identified where and when a physiological transition was occurring.

> 11:57 P.M. intubated with H8 endotrachial tube by Dr.———, defibrillated twice by I.C. nurse, monitor inserted by Dr.——— pattern asystole, cardiac massage by Dr.———, bagged by student intern———.

The therapeutic response to the physiological transitions entered into the biographical elaboration of the dying. Further elaboration was provided by the nurse through reference to a series of transitions which mapped the continuity of the dying.

> 12:00 MIDNIGHT I.V. started in right hand by Dr.———, connected two ringers-lactate sodium carb, 1.2 thousand M.L. I.V. push.
>
> 12:04 A.M. 50 M.L. 7.5 soda B/carb, blood gases drawn for lab.

Note the precision in detailing the record of temporal developments with the therapeutic intervention.

12:06 A.M. external pace maker inserted by Dr.———.

12:08 A.M. 50 M.L. 7.5 S/B carb, massage and bagged.

12:10 A.M. femoral pulse while massage, 500 D.S.W. piggy back with Isuprel, 2 MGS per 50 cc.

12:13 A.M. S/B Carb 50 M.L.

12:14 A.M. 1 cc. of Calcium Chloride by Dr.———.

12:15 A.M. 1 cc. of C.C. and massage by R.N. I.V. of H8 cat on left hand and connected Isuprel by Dr.———, adrenaline.

12:16 A.M. 10 cc. given ringerslactate by Dr.———.

12:18 A.M. S/B Carb. 50 M.L. by Dr.———.

12:21 A.M. defibrillated by I.C.U. nurses twice.

12:24 A.M. 50 M.L. S/B Carb.

12:25 A.M. Dead.

The detailed sequential ordering of transitions provided by the nurse was not sufficient for purposes of matching the corpse with a category. There was evidence that gave specification to a conjunction of clinical,

spatial, and temporal tracers, but there was no reference to causal tracers in the record of therapeutic intervention. Causal tracers were necessary to explain the discontinuity in transitions that originated at 11:56 P.M. They were regarded by the coroner as essential to the biographical elaboration of the dying. That is to say, causal tracers were essential to the delimitation of phenomena which established the correspondence between a death and a category. In essence, the explanation for the conjunction of clinical, spatial, and temporal tracers sought resolution through the elicitation of causal tracers.

The physician who became part of the man's dying biography at 11:57 P.M. informed the coroner that he wanted an autopsy ordered as there was no evidence of a coronary. The request was denied because the coroner had conferred with the decedent's personal physician who suspected his patient may have sustained a massive coronary. Three months prior to the occurrences in the emergency services this physician had established a diagnosis of chronic pulmonary fibrosis. The personal physician also indicated that three weeks prior to death his patient had complained of severe chest pain.

The medical diagnosis made three months prior to death was identified by the coroner as belonging to the boundary between living and dying. This boundary specified the origin of the event to be classified. That is to say, from a medicolegal viewpoint, the man was dying three

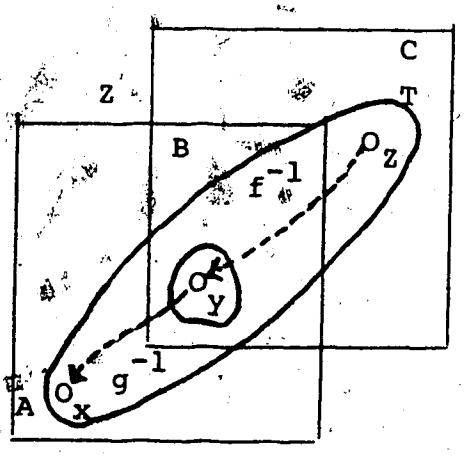
months prior to his hospital admission at 11:56 P.M. The final life-sustaining measure at 12:24 A.M. identified the boundary between dying and death. In other words, the zone of mortality was located between the diagnosis of a disease and hospital emergency services. The coroner noted that the reference to severe chest pains three weeks prior to death provided a point of continuity between the diagnosis of chronic pulmonary fibrosis and the occurrences in the hospital.

Diagrammatically, continuous occurrences as sociated with dying, generate a topological space, on the set containing boundaries delineating discontinuous occurrences from living to dying and dying to death. This space is contained in a zone of mortality identified with a modus operandi of death.

Diagram 1

Medicolegal Death Mapping

On a Topological Space



The elements x, y, and z respectively stand for a diagnosis of disease, chest pains, and occurrences from 11:56 P.M. to 12:25 A.M. Let Z represent the set containing boundaries from living to dying (set A) and dying to death (set B). A basis for a topology on Z denoted T, is the collection of subsets A and C such that $A \cap C = B$ and $y \in B \subset T$. Continuity from z to y in the topological space T is derived from the recognition of a specific configuration of tracers denoted f^{-1}. Moreover, continuity from y to x in T derives from a different configuration of tracers denoted as g^{-1}. If $f^{-1}: z \rightarrow y$ and $g^{-1}: y \rightarrow x$ are continuous in T, then this induces the map $f^{-1} \circ g^{-1}$, such that $z \rightarrow x$ is continuous. That is, the composite of the configurations of tracers in T preserves the image of x in C through the recognition of x, y, and z as a continuous occurrence in Z. Once continuity is identified in Z, then a causal explanation for $f^{-1} \circ g^{-1}: z \rightarrow x$, in T, is provided through modus operandi inference. Scriven (1976:105) notes that: "The M.O. of a particular cause is an associated configuration of events, processes, or properties, usually in time sequence, which can often be described as the characteristic causal chain (or certain distinctive features of this chain) connecting the cause with the effect." In this case, the characteristic causal chain is the topological space T contained in Z. Furthermore, the continuity from z to x is a distinctive feature of T corresponding with the modus operandi of expected clinical death. Deaths

associated with this modus operandi are classified as natural.

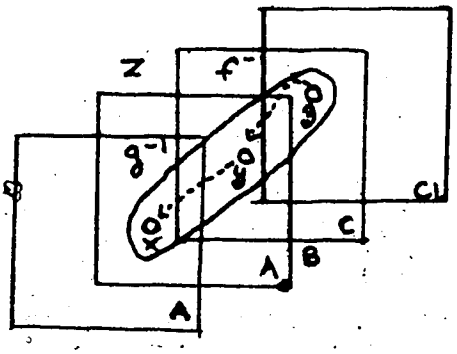
B. Expected Clinical Death

The modus operandi of expected clinical death involves recognition of an altered physiological state as an expected development in light of the kind of clinical management exercised after the diagnosis of a disease. Expected clinical death was evident in 58% of the 60 cases of natural death observed over a period of four months. A mapping of this modus operandi is provided in the following diagram.

Diagram II

Medicolegal Mapping of

Expected Clinical Death



The sets A and C respectively contain elements delineating discontinuous occurrences from living to dying and dying to death. B is the intersect of A and C which

contains elements associated with the continuous occurrence of dying. Z is the union of A, B, and C which contains continuous and discontinuous occurrences identified with phenomena of death. A_1 defined as the living set and C_2 defined as the death set respectively contain elements delineating occurrences prior to and following those in Z such that $A_1 \cap A = \emptyset$, and $C_1 \cap C = \emptyset$. Symptoms observed sometime prior to death, treatment as a patient, and the diagnosis of a potentially lethal disease are respectively denoted z, y, and x. T is a topological space on Z that maps z to x through functions denoted f^{-1} and g^{-1}. These functions are derived from assigning salience to configurations of tracers.

Three situations provide a context for the recognition of expected clinical death.

SITUATION ONE: A corpse is discovered by a relative, acquaintance, or stranger in a public or private setting.

SITUATION TWO: Death occurs enroute to the hospital where no resuscitation measures are attempted prior to the pronouncement of death by an attending physician.

SITUATION THREE: Death occurs within 24 hours of a person being admitted to a hospital.

All medicolegal investigations are concerned about eliminating "foul play" as a component of a sufficient cause of death. Foul play refers to any violation of

the Criminal Code that contributed to the circumstances of the death. Once foul play is eliminated, then evidence of pain, discomfort, or disability experienced prior to death, is sought in conjunction with information about the decedent's career as a patient. This evidence serves to identify a clinical tracer as a continuous occurrence associated with the cause of death.

A case in point involved a woman who informed the police over the phone that she had just killed her husband. The police responded to the scene where they found a naked male corpse with no apparent signs of injury on the body. There were no indications in the room that implicated violence in the circumstances of the dying. During the course of the investigation the woman admitted that she had encouraged her husband to have sexual intercourse. Death occurred immediately after the act was performed, and the woman assumed that she had initiated the event. The decedent's physician informed the investigators that his patient had a history of myocardial infarction. His medical record also registered complaints of occasional chest pain while having intercourse. The woman informed the physician that her husband had complained of chest pain prior to death. Hence, the conjunction of a clinical and temporal tracer denoted as f^{-1} (i.e. pain experienced after intercourse) associated a symptom denoted as z, with a prior condition necessitating medical treatment, denoted as y. Moreover, the conjunction of clinical, spatial, and tem-

poral tracers denoted as g^{-1} (i.e. times and places of treatment as a patient) associated y with a condition discovered through diagnostic investigations, denoted as x. This condition is certified as the cause of death on the basis that the composites of the functions f^{-1} and g^{-1} are continuous.

Minimally, in 68% of 35 cases of expected clinical death, physicians reported a disease observed over an unspecified interval, along with an opinion on causation reflecting clinical management for some unspecified period, and a consent to certify the death in light of the two previous items. Physicians examined the body of a patient at the scene of the death in 34% of 35 cases of expected clinical death. There was no discernible uniformity in either how much or what details a physician reported, nor was there a protocol for the acknowledgement of the references. To be specific, there were no established criteria for discriminating the quality of medical opinion.

There is an explanation for the medicolegal investigator's willingness to accept the causal judgments of physicians without questioning their validity. Physicians are not required by law to certify the fact of death. Their involvement in a case ends merely through the acknowledgment that they are uncertain about the cause of death. Once a physician is not involved in a case, then the task of certifying a death becomes the exclusive concern of the medicolegal system. Hence, investigators seek

the co-operation of physicians in order to avoid increasing their workloads. Subsequently, a physician's discretion in reporting details of a patient's career is subject to minimal control as a means of encouraging co-operation which decreases the workload of the medicolegal system. Accordingly, investigators presume an exact cause of death is provided when physicians suggest that a pathological alteration is continuous on the basis of an observed consistency between a specific disease and a course of suffering. This presumption is readily challenged.

The challenge is directed toward the recognition of x (a disease) as continuous at z (complaints prior to death) in terms of a one-to-one correspondence. Meehl (1977:35) draws reference to the fact that in medicine "there are very few truly pathognomic signs, either in the sense of an inclusion test (one-way pathognomicity, where the presence of the sign guasi-proves the presence of the disease) or stronger, two-way pathognomicity, where the absence of the sign excludes the disease." Thus, for example, Marshall (1970:31) examined as a medicolegal investigator, 641 cases of natural death and concluded, "that whatever region the cause of death occurred in, the principal symptoms or signs could be related to any of the other regions." To wit, complaints of chest pain prior to death in conjunction with a history of heart disease does not exclude suicidal barbiturate poisoning as a cause of death. However, such poisoning would not be detected once

a physician agrees to certify the death as natural.

C. Equivocal Clinical Death

Physicians were not prepared to certify a cause in 27% of the 60 observed cases of natural death. On three occasions, patients were taken by ambulance to hospitals, where their physicians did not have treatment privileges. All three died while undergoing treatment in the emergency services. Their respective physicians declined to certify the deaths on the basis that they had no access to the medical record of treatment in the emergency services. In addition to such refusals, there were five occasions when a coroner was unable to contact the last attending physician of the decedent after a police investigation disclosed that medical attention of some kind had taken place prior to death. Thus, for example, the police responded to a 911 distress call from a woman who reported that she awoke to discover that her husband appeared rigid and felt cold. She informed the investigators that her husband was taking sleeping pills for pain associated with a recent leg amputation and in addition he had a history of blood clots forming in the lungs and heart. However, this information could not be corroborated by the decedent's physician because he was on vacation. Finally, in eight cases, physicians indicated they were uncertain about the cause of death. For example, a physician informed investigators that he had treated his patient for nausea three days prior to the death. The patient had been under his care for

10 years and was diagnosed as having chronic bronchitis with emphysema. In essence, the physician was perplexed by the suddenness of the death, and he was not willing to certify the death in deference to his uncertainty about cause.

Investigators order autopsies when complaints prior to death do not serve to identify a clinical tracer as a continuous occurrence mapping the transformation from person to corpse. Autopsies, in set theoretic terms, are used to enumerate elements that belong to the intersection of sets delineating discontinuous occurrences from living to dying and dying to death. A case in point involved a medical student who telephoned his girl friend to inform her that he had taken an overdose of prescription drugs, and he was calling to say goodbye. The girl notified the police who did not find the student at his residence, but they did discovef several empty pill bottles. Evidently, he had walked to a nearby hospital and collapsed in the entrance. The hospital staff exchanged information with the police and notified the coroner the decedent had died two hours after he was admitted as the result of a probable drug overdose. This death appeared to be an act of self-destruction. However, no note of suicical intention was found. Further investigations disclosed that the decedent had a history of high blood pressure and mental instability associated with continual concern about his medical problem. An autopsy was ordered and the following report was provided by the pathologist:

> It is my opinion that death was due to the failure of normal heart action due to extreme narrowing of the coronary arteries by atherosclerosis. The usual happening is the development of abnormal heart rhythms leading to cardiac arrest. Low levels of a number of drugs were found in the blood, but these levels were not sufficient to have produced depression of normal functions or death.

The pathologist's finding of a 95% narrowing in the left coronary artery and a 70% narrowing of the right coronary artery identified atherosclerosis as an element belonging to the intersection of the sets delineating discontinuous occurrences from living to dying (set A) and dying to death (set C). Postmortem evidence provided conclusive clinical and causal tracers, denoted as function f, for mapping a one-to-one correspondence from y, to occurrences in the hospital, denoted as z. Postmortem evidence also provided multiple clinical tracers, denoted as function g^{-1}, for mapping y to the decedent's career as a patient denoted as x. The mapping $y \xrightarrow{f} z$, which is regarded as equivalent to $z \xrightarrow{f-1} y$, and $y \xrightarrow{g-1} x$, identify a pattern of effects corresponding with the modus operandi of equivocal clinical death. Equivocal refers to the fact that complaints prior to death do not identify a disease as a continuous occurrence in A C. Moreover, complaints prior to death give substance to a form of medicolegal masquerade: namely, "Many violent deaths mimic deaths from disease and, conversely, many deaths from disease simulate violent

deaths." (Adelson, 1971:751)

D. Internal and External Agents

Postmortem evidence reveals occurrences masquerading as violent effects by projecting a topological space on $A \cap C$, that contains elements of pathological changes sufficient to cause death. These changes identify a "pathogen", or internal agent, as the origin of the death. That is to say, the event is conceived as originating within the body. External agents are conceived as causes of occurrences originating outside the body. External agents are excluded as underlying causes of death when an internal agent maps $z \longrightarrow x$, (see Diagram II) as a continuous occurrence in the topological space T, on $A \cap C$.

The distinction between internal and external agent assumes prominence in cases where death is associated with anesthetic, surgical, diagnostic, and therapeutic procedures. These deaths were observed in 8% of the 60 cases of natural death observed over a period of four months. A case in point involved a 27 year old male who complained to his physician that he was experiencing pain in the region of his throat and chest. A physical examination revealed some swelling in the neck and redness in the throat as well as other symptoms that were diagnosed as a form of infection. An antibiotic was prescribed and the patient was instructed to return for further examination if the suffering persisted. More intense pain was experienced and the patient sought additional medical attention which consisted of a

larger dose of antibiotic given by injection. Death occurred suddenly two days later.

The physician was accused of negligence by the decedent's wife who alleged that the death was caused by erroneous treatment. Specifically, the wife attributed the cause of death to judgmental errors in the selection and omission of an appropriate therapeutic intervention. After being apprised of the situation the coroner immediately assumed authority over the case and ordered an autopsy which established the cause of death as a dissecting thoraic aneurysm (i.e. sac formed by localized delation of an artery or vein, one in which rupture of the inner coat has permitted blood to escape between layers of the vessel wall.) Once a disease process sufficient to cause death - such as an aneurysm - is discovered any diagnostic errors are precluded as causal components directly leading to or contributing to the event of death.

Erroneous treatment based upon an erroneous diagnosis does not qualify the attending physician as an external agent in cases of subsequent death. Surgical errors, an incorrect diagnosis proving fatal to a patient, and fatal drug effects represent variations in deaths associated with the modus operandi of suspect clinical death. This pattern is evident when physicians answer to the medicolegal system for changes prior to death in a patient's well-being that are related to consequences of therapeutic intervention. A case in point involved a 30 year old woman who died after

being administered a drug which caused cerebral and pulmonary edema. Her medical records indicated that she had gone to a hospital where a physician prescribed an analgesic and anti-inflammatory drug for chest pains. Furthermore, her records revealed a history of allergic reaction to codeine and aspirin with adverse effects such as nausea, dizziness, burning sensations in the mouth, and convulsions. These symtpoms appeared after the woman took the drug prescribed by the hospital physician. Her husband notified the physician about the adverse effects and was consequently told to give his wife another pill. This precipitated further vomiting, convulsions, and death after an unsuccessful attempt by the husband to maintain her life through mouth-to-mouth resuscitation.

To vindicate himself of potential recriminations of negligence in the management of the patient, the physician entertained what is referred to in the medical profession as a clinicopathological rationalization. Cynically, one medicolegal investigator noted these were reasons which afforded physicians an opportunity to interpret their mistakes as bad luck for the patient.

Clinicopathological rationalizations generally take the form of peer assessments of therapeutic performances in light of deaths associated with errors in medical judgment. The physician in this case noted there was nothing in the woman's medical history that indicated the likelihood of a noxious reaction to the prescribed drug.

Secondly, the drug was the fourth most commonly prescribed in his practice of medicine. Hence, only under exceptional situations would the drug be administered under hospital observation. Finally, he had not seen or heard of any reports of similar reactions prior to death after the administration of the drug. These responses demonstrated that the physician was not remiss in instituting the drug treatment in view of his experience with past consequences of similar medical interventions. Somatic complaints were counted as evidence of continuity in a physiological transition which should have benefited from the prescribed course of treatment.

The key in the recognition of suspect clinical death as a natural event is that occurrences viewed as consequences of a physician's therapeutic intervention are not identified as elements of the set delineating discontinuous occurrences between living and dying (i.e. Set A in Diagram II). To wit, a medicolegal investigation was instituted in the case of a woman whose death was attributed to heroin withdrawal while in police custody. Her police record revealed she was taken to the hospital on three occasions prior to death. The examining physicians were of the opinion she was "well oriented" and "in no acute distress". Hence, in their opinion hospital admission was not warranted. Observed changes in her emotional well-being were viewed as being symptomatic of drug withdrawal. Marked depression experienced during withdrawal cramps was

identified as an expected course of development requiring therapeutic intervention. Intravenous valium was prescribed as the standard method for controlling physiological and emotional changes associated with withdrawal cramps. Nevertheless, the coroner expressed his disapproval of the prescribed therapeutic regimen through reference to possible errors in medical judgment. He noted:

> I did not press the medical attendants about what I felt was a complete lack of knowledge in the use and effects of valium and in the cursory medical examinations done. I was totally unimpressed with the system of handling emergency cases at the hospital in general and this one in particular. She should have been admitted during the first time she was brought in and most certainly during the second and third times. I cannot discount completely that Valium in the amounts given (20 Mgm intravenously at 2:50 A.M. and 20 Mgm intravenously at about 1:00 P.M. at the same day of her death) in a person who was obviously dehydrated by vomiting and diarrhea was a major contributing factor.

Officially, the death was classified as a natural event arising from complications associated with the combined effects of heroin addiction and withdrawal. A pathologist suggested that Valium has a tendency to function as an anti-convulsant which may have masked the development of intra-cerebral pathology. However, this masking effect would not have occurred except for the existing prior disease of addiction. Sagall (1969:59) notes that: "Medical

assessments of causality are influenced considerably by practical awareness that, in most instances of alleged aggravation of underlying disease, no injury, disability or medical damages would have occurred except for an existing prior disorder." Alleged adverse drug effects in the heroin case were identified as conditions surrounding death rather than causal components of the event. That is to say, occurrences associated with the medical management of the case were not enumerated as members of the topological space mapping continuity from living to dying and dying to death.

E. Surrounding Conditions

Conceptually, the distinction between causes and conditions of death draws attention to the limitations of medical knowledge as a resource for selecting causal candidates from a list describing occurrences prior to death. Limitations include the fallibility of physicians in executing diagnostic and therapeutic skills as a consequence of imperfections in the science of medicine. Cyril Wecht (1972:74) addresses such imperfections by noting:

> If you were to go to a meeting of any pathology society, national, state or local, for instance, where slides are reviewed, you would be appalled, amazed and very frightened to see many Board-certified pahtologists come up with 10 different diagnoses, ranging from something that is benign and which requires nothing

> further to be done, to something that is malignant and requires amputation of a limb or extensive extirpation of tissue.

There are no standardized ways for establishing the exact contributory role of a delayed diagnosis in a death involving complex pathological conditions such as cancer. Achong (1978:1315) indicates, in a related vein, that in the present state of medical knowledge, there is considerable disagreement concerning how to identify a clinical occurrence as an adverse drug reaction that causes death. Indeed, Elliot (1975:26) has reported that: "To distinguish between natural death due to the disease per se and unnatural death due to drug effect may be difficult if not impossible both clinically and at necropsy."

The point is that occurrences prior to death are excluded as causal candidates when they do not provide inverse images for projecting a bijective correspondence in the topological space on the intersection of sets delineating discontinuities from living to dying and dying to death. Causal candidacy derives from the recognition that a condition in set C (See Diagramm II) preserves the image of a condition in set A as a continuous occurrence mapping the transformation from person to corpse. Delayed diagnoses and adverse drug reactions associated with deaths are represented as members of the set derived from Z-T, in $A \cap C$. Occurrences belonging to Z-T, are identified as conditions surrounding death. These conditions provide cues for the

recognition of a modus operandi associated with a category of death. The cues in cases of suspect clinical death are represented as pathophysiological transitions that cannot be traced out in the form of order preserving functions.

F. Negligible Clinical Death

Surrounding conditions assume considerable prominence in the classification of sudden infant deaths as natural occurrences. A case in point involved an eight week old infant who was found dead, face down in her crib. Mucoid bloody fluid was exuding from her nostrils. Three weeks prior to death, the infant had received a bruise to the forehead in a car accident. Her parents observed slight changes in personality after the accident as well as noting that regurgitation occurred more frequently than normal. The father provided the following description of what transpired on the day of the death.

> I was at home with my wife and three children when my wife fed the baby at 7:00 A.M. to 7:30 A.M. The wife played with her during that time. Then she started to fall asleep so we put her into her swinging crib. Then we fed our boys and put them outside to play. At about 8:30 A.M. my wife found her. She never touched her, she just screamed. I went into the bedroom. I told her to go and phone an ambulance. I took the baby and tried to give her mouth to mouth. I didn't know how long she had been dead.

An autopsy disclosed nothing to suggest possible trauma suffered during the accident as a direct or contri-

butory cause of death. A toxicological analysis of post mortem blood and gastric contents found no evidence of poisons or carbon monoxide to explain the death. Hence, external agents were eliminated as causes of death. There were some gross anatomical lesions including an enlarged thymus, pulmonary edema, and scattered petechial hemorrhages. However, such alterations were not sufficient to cause death. Neither an internal nor external agent could be identified as the source of the death. This signified the modus operandi of neglibible clinical death which was evident in 7% of the 60 cases of natural death observed over a period of 4 months.

In cases of negligible clinical death, the topological space on A C contained a null set. That is to say, there are no occurrences in set C which preserve an image of the cause initiating the discontinuity from living to dying in set A. Moreover, when T contains no inverse images, it is not possible to delineate occurrences prior to and following those in Z, in order to establish that $A_1 \cap A=\phi$ and $C_1 \cap C=\phi$. Hence, discontinuities differentiating living from dying and dying from death remain opaque. However, this presents no problem for investigators once external agents are eliminated from the topological space on $A \cap C$.

G. Potential Sources of Classification Error

The only apparent source of continuity of variation among deaths classified as natural occurrences is that

external agents are excluded from the causal sequence leading to death. Exclusion is accomplished through enumerating membership in a zone of mortality which maps the transformation from person to corpse. Mapping is guided by modus operandi inference. There are numerous problems with this strategy of medicolegal investigation. We will discuss the implications of such problems as markers of potential error in the classification of death.

An essential feature in the recognition of a mode of death is a point of discontinuity that differentiates between occurrences identified with living and dying. References to the diagnosis of a disease provided the basis for such differentiation in 92% of the 60 cases of natural death. Records of therapeutic intervention are used to identify a disease as a continuous occurrence. Symptoms observed prior to death serve as referents of a set containing a point of discontinuity distinguishing the process of dying from the state of death. This set denoted C, is particularly salient in that it serves the function of preserving an image of the cause initiating a sequence of occurrences defining death as a discrete event. To be specific, classificatory features of death assume salience through the differential significance assigned to tracers as indicators of order-preserving functions. These functions generate a topological space containing a partially ordered set that limits the choice of causal candidates explaining the ways in which death occurs. Judgments regard-

ing an occurrence's inadmissability for causal candidacy stand as theoretical arguments underlying the conferral of membership in a category of death.

In the sample of natural death, neither human action nor human design were included as causal components once investigators identified a clinical tracer in set C as an occurrence preserving the image of an internal agent in set A differentiating living from dying. To establish inverse relations, investigators restrict the explanation of death to physiological occurrences traceable on a single causal pathway. Hence, notions of several independent causes jointly contributing to death are not entertained. Criteria for selecting causally related clinical tracers conform with guidelines set forth by the World Health Organization in the International Classification of Diseases. These guidelines limit the choice of internal agent to pathophysiological mechanisms that can be clearly traced out to establish causal relationships between clinical tracers and subsequent death.

Physicians who attended the decedent prior to death select an internal agent related to a disease under treatment in the pattern of expected clinical death. There is no attempt to confirm the selection through post-mortem examination. Consequently, deducing the category of death, from a record of medical attendance, fashions specific kinds of conditions that accentuate the likelihood of classificatory error in medicolegal investigations.

First, external agents occasionally produce signs and symptoms that mimic a lethal disease state. However, there is a low level of suspicion regarding the possibility of such mimicry, when the signs and symptoms observed prior to death, conform with a physician's expectations about the predictable course of a disease.

Secondly, the contributory role of an external agent may remain concealed by perceptions of signs and symptoms associated with an expected series of physiological transitions eventuating in death. Cases where relatives have purposely withheld medications temporarily prolonging life are not likely to be detected. Other cases not likely to be discovered involve patients who deliberately court self-destruction by not following a therapeutic regime prescribed to retard the progress of some lethal disorder. On the other hand, investigators easily may overlook lethal adverse effects of a therapeutic regime involving the multi-prescription of drugs. That is, lethal effects of elevated levels of prescribed drugs, are disguised in the signs and symptoms associated with the natural course of a disease under treatment. Elliot (1975:28) notes: "One wonders how many geriatric patients have died from digitalis toxicity rather than from the cardiac disease under treatment, remembering that old age itself is not a cause of death."

Reliance on the pattern of expected clinical death, to identify the natural mode of dying, leads to underreporting of deaths that pose considerable diagnostic

problems. These problems typically occur with elderly patients, where according to Freeman (1975:2) "there is a correlation between rising age and the rising incidence of pathologic lesions, at a time when there can be a paucity of signals by the aging body that decreases the unwary or uninformed clinician's effectiveness." Cirrhosis of the liver, for example, provides few symptoms in the presence of multiple pathology and this also is the case for gastrointestinal hemmorrhage arising from clinically untreated peptic ulcers (Prutting, 1967). A study by Hartveit (1977) reveals that cerebrovascular disease in the presence of other disorders, is significantly underdiagnosed as a cause of death. Rossman (1974:1678) examined 6,385 death certificates filed for a single month in the city of New York and found "five of six cases of reported fatalities actually caused by pulmonary embolization will be coded in other categories of cause of death." Underdiagnosis is attributed to the failure to provide postmortem confirmation for causes of death ascribed to myocardial infarction or bronchopneumonia.

Hanson and Gross (1974) indicate that underreporting of causes of death is merely an academic concern in cases where a correct diagnosis would not have appreciably altered the course of a disease. Cases, where correct clinical diagnoses would have resulted in therapy considerably prolonging survival, are classified as matters of life and death. This distinction implicates the physi-

cian as a causal component, when deaths involve inappropriate clinical management of treatable disorders, as a consequence of missed diagnoses. However, there is no opportunity to identify such errors once the pattern of expected clinical death is recognized. In essence, the recognition of expected clinical death serves to conceal the causal contributions of the physician in the occurrences of natural death. Also overlooked are the causal contributions of decedents who inadvertently pursued activities which were deleterious to an undiagnosed disease that eventually caused death.

Different sources of potential classificatory error arise in the recognition of equivocal clinical death. Initially, there is doubt, uncertainty, or confusion on the part of investigators with respect to the causal components of a death. Hence, there are suspicions that a death was unnatural. Pathologists are called upon to select causal components without knowledge of the history of the decedent as a recipient of medical care. Selection depends largely on the quality of circumstantial evidence provided by medicolegal officials. Evidential quality is appraised positively when it provides a basis for supporting inferences that a death was neither directly caused nor accelerated by human design. That is to say, pathologists will not make judgments about the causal contributions of social or psychological occurrences prior to death solely on the basis of clinical tracers retrospectively determined through

postmortem examination. Hence, a negative appraisal of circumstantial evidence is tantamount to an admission by a pathologist that he cannot be expected to trace psychodynamic or interpersonal transitions that exacerbated a natural disease causing death. This admission, in part, reflects the restrictions of nosology in the sense that there is "... no way of classifying behaviour that occurs concurrently with organic illness. (McWhinney, 1972:384).

Nosology also restricts how phenomena of transformation assume candidacy as causal components in the recognition of suspect clinical death. The International Classification of Diseases provides a rule that the underlying and antecedent causes of death must be traceable on a single pathway, such as a terminal circulatory disease due to a malignant neoplasm. Tracing involves locating clinical tracers in set C (i.e. source of discontinuity between dying and death) which preserve conditions in set A (i.e. source of discontinuity between living and dying) through projecting inverse images that map a continuous sequence of pathophysiological change in A | C. Take, for example, the case of an aneurysmal rupture that occurred immediately after the decedent was struck on the head in an altercation. Villiers (1975:11) reports that "Whether aneurysmal rupture can be caused by trauma cannot really be satisfactorily resolved." Clinical tracers characteristic of a ruptured aneurysm do not preserve the images of the effects of head trauma. Hence, given that the trauma is not

clinically traceable to the aneurysm, there is no basis for claiming that the death was caused or accelerated by human intervention.

Analogously, diagnostic errors and therapeutic mistakes are not unequivocally preserved in the effects of a natural disease causing death. To be specific, such occurrences do not yield inverse functions on a single causal pathway. This serves to eliminate the physician's candidacy as a causal component in deaths associated with treatment. Elimination preserves the integrity of the event as a natural occurrence given that physicians are precariously interposed in the occurrences leading to death. Jonsen and Jameton (1977:390) address the precariousness when they remark: "Diagnosis employs relatively simple logic against extremely complex pathological conditions; therapy employs either specific or general procedures against diffuse or highly refined targets. They often miss the mark, not only out of error, but also because of their intrinsic limitations."

H. Categorical Consistency and Arbitrariness

To conclude this chapter, we propose that in order to maintain consistency among referents, the category of natural death, restricts the selection of causal components to occurrences which project inverse images solely on a physiological level of abstraction. Hence, for example, the idea that a decedent may have purposefully contracted a fatal disease is never entertained in medicolegal investi-

gations. Similarly, precluded from causal considerations is the notion of unintentional exposure to a lethal disease as a consequence of self-negligence. In other words, the issue of how a "pathogen" or internal agent was introduced does not enter into the identification of causal components. This issue would force consideration of causes of death that operate beyond the level of changes in cells and tissues. Thus, for example, investigators would be forced to consider why the decedent who died from Rocky Mountain Spotted Fever was exposed to a certain genus of tic that acts as a carrier of the disease. The idea of exposure extends the choice of causal components to external factors such as accidental poisoning.

Infectious diseases causing death are not conceived as cases of deliberate or unintentional poisoning when the choice of causal agents is limited to toxins that arise through metabolic changes occurring after the infection is introduced. One consequence of this limitation, is that an infectious disease causing death does not allow for instances of decedents as homicidal victims. Consider a case where a heroin addict succumbed to serum hepatitus after he was deliberately given an infectious needle. The cause of death precludes investigators from recognizing the decedent in a way that defines the event as an instance of homicide, suicide, or accident.

In effect, restricting the selection of causal components contributes to categorical consistency at the

expense of arbitrariness, as far as locating the origin of the event. Thus, for instance, in the case of Rocky Mountain Spotted Fever, an infected tic is necessary to induce the metabolic changes eventually resulting in death. However, the arbitrary exclusion of the tic as a causal component avoids problems of causal regression. These problems are evident in cases of natural death attributed to cancer of the vagina where the mothers of the decedents were treated with a synthetic hormone known as stilbestrol. Medical researchers have clearly established a causal relationship between women treated with stilbestrol during pregnancy and the subsequent development of cancer of the vagina in their daughters (Henderson, et al., 1973;354). To include stilbestrol as a causal component would necessitate regressing clinical tracers identified at death to events that occurred prior to the birth of the decedents. However, tracing causal components presumes that elements delineating the living set denoted A_1, (See Diagram II) are distinguishable from those contained in the dying set denoted A, such that $A_1 \cap A = \emptyset$. The null set indicates that transitions between living and dying define a discontinuous occurrence in set A which serves as the origin of the event. Hence, without this specification it would not be possible to project a topological space T, on A ; C that differentiates causes from conditions that surround death.

We shall now extend our analysis to considerations of medicolegal distinctions that determine how causal com-

ponents of death are perceived as products of external agents. In particular, the ideas of set-theory will be stressed as an analytical tool to assess the utility of causal reasoning through modus operandi inference in the classification of death.

CHAPTER FOUR

ACCIDENTAL DEATH

A. Causal Components of External Agents

The previous chapter established that referents of medicolegal categories of death are ordered through concepts which identify phenomena of transformation as relations on a living set denoted A_1, a set delineating discontinuous occurrences between living and dying denoted A, a dying set denoted B, a set delineating discontinuous occurrences between dying and death denoted C, and a death set denoted C_1. Moreover, the selection of causal components is limited to continuous occurrences in a zone of mortality 2, arising from $A \bigcap C$. Selection procedures induce a topological space T, on $A \bigcap C$, which projects inverse images preserving conditions that represent effects of either internal or external agents. These agents respectively determine whether a death will be investigated as a natural or unnatural event.

Our concern is to reveal how set-theoretic assumptions are disclosed through classificatory procedures which determine the candidacy of causal components of external agents when a death is accidental. Set-theoretic assumptions are derived from the observation that medicolegal investigators are engaged in the discovery of elements be-

longing to sets A_1, A, B, C, and C_1 for the purpose of identifying boundaries of an event containing occurrences leading to death. The discovery of such elements is predicated on conceptual keys which identify a chain of causation corresponding with a category of death in terms of the bijective mapping of elements from set C to set A. Hence, an examination of the kinds of logic operating in such conceptual keys, is pivotal to the understanding of medicolegal categories as codes that organize information about phenomena of death.

B. Conceptual Keys to Accidental Death

The concept of unavoidable injury served as a causal component in all 38 cases of accidental death observed during a 4 month period. To identify unavoidable injury investigators rely on evidence of opportunities to defensively react to hazardous effects of external agents. They draw a distinction between person-independent and person-dependent opportunities in order to differentiate elements belonging to the living set A_1 from elements delineating the dying set B. Person-independent opportunities refer to physical circumstances that limit abilities to defensively react to the hazardous effects of an external agent. In other words, a person is prevented from exercising abilities to avoid injury due to physical circumstances that curtail advantages gained through possessing such abilities.

Person-dependent opportunities, on the other hand, refer to characteristics of the person which limit the potential for avoiding injury that leads to death. These characteristics include items such as age, sex, physical health, intelligence, living alone, physiological and mental state. For example, a pregnant woman who lived alone, fell down a flight of stairs in her home. She sustained an injury to her back that was not sufficient to cause death. However, she started to haemorrhage as a consequence of her pregnancy. Immobilized by a spinal injury, she was unable to reach a phone, and subsequently died from a loss of blood. In another case, age was included as a factor in the death of a 14 month old child who was immersed in a tub full of scalding water by his 7 year old sister. He crawled out of the tub, but his age precluded him from communicating dire distress. Consequently, his sister unknowingly returned him to the water until she noticed that his legs and bottom were turning bright red. He succumbed to electrolyte and fluid loss caused by second degree burns in the trunk and lower extremity.

Equal to unavoidable injury, is the emphasis investigators place on the concept of unexpected injury, as a causal component of accidental death. To identify unexpected injury, investigators rely on evidence that a sequence of occurrences leading to death was not the product of some design. This evidence is derived from subjective

assessments of the likelihood of the fatal occurrences being anticipated by those involved in the circumstances of a death. For example, investigators referred to the case of a 4 year old male who died in a cemetery when a tombstone he was playing on collapsed and ruptured his liver, as a "freakish occurrence defying objective understanding." Similar references were made in the case of a 6 year old male whose head was run over by a manure spreader when he tripped on a rock that was thrown in his pathway by a tractor pulling the spreader. In both cases, investigators' perceptions of the events as improbable, served to eliminate the possibility of deliberate planning being involved in the production of the lethal occurrences. That is to say, no person could anticipate and subsequently prepare for the impending danger once design is excluded from the event. Investigators reason further that the exclusion of deliberate planning prevents others from warning persons about potential exposure to lethal consequences.

Comparable to unavoidable and unexpected injury as a causal component of accidental death is the concept of unintentional injury. This concept incorporates references to both motives and intentions associated with a course of action that incurred fatal consequences for one or more of the participants. Investigators draw a distinction between motivations that exist prior to exposure to the lethal effects of an external agent, and intentions governing action which causes hazardous exposure to an external agent. These

distinctions are derived from inferences about the state of awareness of risks exhibited by persons involved in the occurrences of a death. Specifically, investigators seek evidence to establish whether such persons were aware that pursuing a specific course of action deliberately invited fatal consequences.

Depression, marital discord, anger, bereavement financial problems, physical illness, employment termination, loneliness, extreme disappointment, ruptured love affairs, shame, and vengeance constitute a list of motives that investigators attempt to relate to lethal occurrences. These motives do not serve as the origin of a death. Rather, they are viewed as preparatory states which lead to the formulation of destructive intentions. Action arising from such formulations is identified as a point of discontinuity signalling the transformation from living to dying. In other words, motives are enumerated as elements belonging to the living set A_1, whereas intentions define membership in the dying set, B.

To identify unintentional injury, investigators establish there is not sufficient evidence to infer motives that would be conducive to destructive intentions. Thus, for example, in a case involving self-inflicted wounds, caused by placing a Smith & Wesson 22 calibre revolver to the head, investigators were satisfied the injuries were unintentional once they established that the decedent had been joking about playing "Russian roulette."

(for some p) with all its faces,
and this collection of simplices
is called a simplicial complex K.

Sets X and Y, in our analysis are named A and C, and the simplices arise from the subset $f^{-1} \subset C \times A$ where $\{x_1, x_2, \ldots, x_{p+1}\}$ are represented as tracers. Each causal component of accidental death is composed of a simplex based on the observation that occurrences in set C preserve the effects of an external agent in set A. Hence, simplicial complex K represents the collection of causal components used to identify an accidental death. We will demonstrate how the relation $K_A(C, f^{-1})$ enters into medicolegal investigations as a format that organizes inferences associating different modus operandi with accidental death.

D. Violent Traumatic Death

To introduce how simplicial complexes arise in the classification of accidental death, attention is drawn to a case of a 17 year old male whose death was attributed to asphyxia from aspiration of chewing gum. Prior to death, the decedent along with two companions, jumped onto a car that was moving through a school parking lot. Witnesses to the event reported that the young female driver abruptly applied the brakes. Both companions landed safely on the pavement. However, the bumper of the car struck the decedent's knees after he landed, and the collision caused him to fall backward onto the pavement. Consequently, he suffered contusion of brain, dislocation of 3rd cervical vertebra, fracture of occipital bone, and loss of conscious-

ness. These injuries were antecedent to asphyxia that resulted when a large piece of chewing gum lodged at the bifurcation of the trachea. Unlike his companions, the decedent was in an awkward position on the hood of the car and was sliding off before the brakes were applied. Braking suddenly was a response to the predicament of the decedent who had jumped onto the car to scare the driver.

Investigators established unavoidable injury denoted simplex C, as a causal component of the event by relating the asphyxia as evidence of a conclusive clinical tracer denoted X, to the contusion, dislocation, fracture, and loss of consciousness representing multiple clinical tracers denoted X_2. Moreover, X_2 was perceived as a continuous occurrence arising from a conclusive physical tracer denoted X_3 that provided evidence of a collision. Finally, X_3 was related to the origin of the event through references to the decedent's awkward position which served as evidence for both a conclusive temporal tracer denoted X_4 and a conclusive spatial tracer denoted X_5. In effect, X, in set C, preserved the effects of X_4, and X_5, in set A, through $C_1 = \langle X_1, X_2, X_3, X_4, X_5 \rangle$.

To establish unexpected injury, denoted simplex C_2, as a causal component of the event, investigators related skid marks as evidence of a conclusive physical tracer X_6, to the driver's perception of the decedent's predicament. This perception provided a conclusive causal tracer X_7 for the response to the decedent sliding off the

hood of the car. Hence, X_7 in set C preserved the effects of X_7 in set A through $C_2 = \langle X_6, X_7 \rangle$.

To establish unintentional injury denoted simplex C_3, as a causal component of the event, investigators related swallowing the gum as evidence of a conclusive clinical tracer X_8 to the occurrence of falling backward. Furthermore, falling backwards constituted a conclusive causal tracer X_9 arising from a physical tracer X_{10} that indicated the decedent was sliding off the car prior to the sudden braking. Therefore, X_8 in set C, preserved the effects of X_{10} in set A through $C_3 = \langle X_8, X_9, X_{10} \rangle$.

Investigators derive subsets from $f^{-1}\subset CxA$ by relating elements which provide faces for connecting C_1, C_2, and C_3. Tracer X_{10}, sliding off the car, was identified as an effect of tracers X_4 and X_5 indicating the origin of the event. Tracer X_9, falling backwards was perceived as an effect of tracer X_3, the collision between the car and decedent. Tracer X_8, swallowing the gum was also recognized as an effect arising from tracer X_3. Hence, C_1 and C_3 share elements constituting the subset $\langle X_3, X_4, X_5, X_8, X_9, X_{10} \rangle$: Tracer X_7, the perception of the decedent by the driver, and tracer X_6, suddenly braking, were identified as effects of tracers X_4 and X_5. Subsequently, C_1 and C_2 share elements delineating the subset $\langle X_6, X_7, X_4, X_5 \rangle$.

We can now apply Atkin's (1974:178) definition of q-connection in K to establish a pattern of occurrences that investigators identify with accidental death.

> Given two simplices σ_p, σ_r in a complex K, we shall say that they are joined by a chain of connection if there exists a finite sequence of simplices.
> $\sigma_{\alpha_1}, \sigma_{\alpha_2}, \ldots \sigma_{\alpha_h}$
> such that
> (1) σ_{α_1} is a face of σ_p
> (2) σ_{α_h} is a face of σ_r
> (3) σ_{α_1} and σ_{α_h} have a commonface, say σ_{pi} for i = 1...(h-1)

Since C_1 and C_2 share $\langle X_6, X_7, X_4, X_5 \rangle$ they are 3-connected in K and, since C_1 and C_3 share $\langle X_3, X_4, X_5, X_8, X_9, X_{10} \rangle$, they are 5-connected in K. Moreover, since C_2 and C_3 do not have a commonface, they are disconnected (q=-1) in K. This reveals a pattern where unavoidable injury is strongly connected to unintentional injury. A weaker connection exists between unavoidable and unexpected injury, whereas no connection is recognized between unexpected and unintentional injury. These connections give form to the modus operandi of violent traumatic death. That is to say, investigators classify a death as accidental, once they recognize a strong connection between the causal components of unavoidable and unintentional injury and a weaker connection between unavoidable and unexpected injury.

Violent traumatic death was observed in 12 of the 38 cases of accidental death sampled over a 4 month period. Variations in the kinds of tracers delineating C_1, C_2, and C_3 did not influence the pattern of q-connection in K. This pattern masks the recognition of deaths that incorporate deliberate planning of lethal occurrences when it ap-

pears the persons involved had no opportunity to avoid injury. Take, for example, a case involving a head-on vehicle collision in which both drivers are fatally injured. The deaths would be classified as accidental even though one driver deliberately drove into oncoming traffic knowing that the death of another driver was highly probable.

E. Non-Violent Traumatic Death

A different modus operandi for accidental death develops from ambiguous evidence associated with opportunities to avoid fatal injury. This was observed in 10 of the 38 cases of accidental death where investigators suspected opportunities for limiting the degree of hazardous exposure that may have been available to the decedent. When such suspicions exist, the burden of investigation shifts to establishing unexpected and unintentional injury as causal components of the event. We demonstrate the influence of this shift on the pattern of simplices in the case of a 29 year old male whose death was attributed to carbon monoxide asphyxiation.

Relatives of the decedent found him in his car sitting behind the steering wheel with head tilted backward. To make the discovery relatives had to break into a garage that was locked from the inside. A tape deck was playing and the car motor was running when the discovery was made. Family members alleged that the decedent could not have committed suicide as he was healthy, financially secure, and had no marital problems. Generally, investi-

gators do not attempt to confirm or dispute such allegations, when there is nothing to indicate self-destructive intentions. Nevertheless, investigators sought to explain why the motor was not shut off before the doors to the garage were locked.

To establish unavoidable injury, C_1, as a causal component of the event, investigators related evidence of clinical tracer X_1, represented by carbon monoxide poisoning, to physical tracer X_2 identified as a build up of exhaust fumes. Finally, physical tracer X_2 was recognized as an effect arising from causal tracer X_3 represented by the occurrence of locking the doors of the garage. Accordingly, X_1 in set C preserved the effects of X_2 and X_3 in set A through $C_1 = \langle X_1, X_2, X_3 \rangle$.

To establish unexpected injury C_2, as a causal component of the event investigators inferred from the position of the body that the decedent had returned to the car in order to shut off the motor. That is to say, spatial tracer X_4, representing the position of the body was related to physical tracer X_5, identified as the running motor. Investigators presumed the decedent had not recognized that the small interior of the garage would cause a quick build up of exhaust fumes. Moreover, an examination of the garage revealed there was an absence of ventilation when the doors were closed. Hence, causal tracer X_6, identified as the small interior of the garage, mediated the relation between physical tracers X_5, and X_7 re-

presenting an absence of ventilation. Investigators inferred from the clinical tracer X_8, vomit, that the decedent unexpectedly became unconscious as a consequence of causal tracer X_6. Therefore, X_4 in set C preserved the effects of $\langle X_5, X_6, X_7, X_8 \rangle$ in set A through $C_2 = \langle X_4, X_5, X_6, X_7, X_8 \rangle$.

The decedent rarely parked in his garage according to his relatives. This information provided investigators with clues that were instrumental in establishing unintentional injury C_3, as a causal component of the event. Investigators presumed the decedent had not followed his usual practice of parking on the street due to adverse weather conditions. In point of fact, the temperature was extremely cold, and high velocity winds were causing snow to accumulate in drifts where the decedent usually parked. Hence, spatial tracer X_9, identified as parking in the garage, was related to causal tracer X_{10}, representing adverse weather conditions. Accordingly, spatial tracer X_4 in set C preserved the effect of causal tracer X_{10} in set A through $C_3 \langle X_9, X_{10} \rangle$.

To locate boundaries of the event, investigators must recognize continuity in occurrences delineating sets A and C. To achieve this recognition, they derive subsets from $f^{-1}(C \times A)$. These subsets connect tracer evidence defining complexes C_1, C_2, and C_3. In other words, the simplexes share inverse images for mapping occurrences from set C to set A. This yields a simplicial complex that investigators equate with a modus operandi for a category of death.

In order to locate the origin of the carbon monoxide poisoning, investigators perceived tracer X_3 as an effect arising from tracer X_{10}. Subsequently, C_1 and C_3 share elements constituting the subset $\{X_3, X_{10}\}$. Furthermore, tracer X_{10} was viewed as a cause of tracer X_5. Thus, C_2 and C_3 share elements constituting the subset X_5, X_{10}. Finally, the co-occurrence of tracers X_5, X_6, and X_7 was seen as an effect producing tracers X_2 and X_1. Therefore, C_1 and C_2 share elements constituting the subset $\{X_1, X_2, X_5, X_6, X_7\}$.

Since C_1 and C_3 share 2 elements, they are 1-connected in K, as are C_2 and C_3. Whereas, C_1 and C_2 share 5 elements, and consequently are 4-connected in K. A pattern is revealed where unavoidable and unexpected injury are strongly connected as causal components of the event. On the other hand, unavoidable and unintentional injury, along with unexpected and unintentional injury exhibit relatively weak connections as causal components of the event. These connections give form to the modus operandi of non-violent traumatic death.

Two conspicuous features appear when such cases are contrasted with those of violent traumatic death. First, investigators perceive that the duration between lethal exposure and fatal consequence afforded the decedent time to react to an external agent before sustaining injuries sufficient to cause death. Hence, they reach for evidence which serves to eliminate suspicion that the dece-

dent deliberately failed to avoid fatal injury. Evidence used to eliminate such suspicion is the absence of pre-existing motivations for self-destruction. However, such evidence does not take into account the possibility of emotional states conducive to self-destruction arising after exposure to a hazardous situation. Engel (1971:776) reports instances where the perception of danger and the threat of injury have initiated feelings of despair which could function as precursors to a "giving up response."

A second distinguishing feature of non-violent traumatic death is that the cause of death is not self-evident from an external examination of the body. Moreover, in such cases, the exact cause of death can remain obscure even after the completion of an autopsy. Consequently, the problem of locating a point of discontinuity between dying and death becomes a matter of conjecture for those investigating the case. In effect, fuzziness attends the recognition of occurrences delineating set Q. A case in point involved a 59 year old male who jumped into a river after he was warned by friends that the current was dangerously swift. He was found dead on a sand bank several miles from where he entered the river. A pathologist submitted the following report:

> After the autopsy was performed it was said that people on the beach saw this man disappearing in rather rapidly flowing water and that he was yelling. This rather rules out the possibility of the man

> having had cardiac arrest at the time of immersion in the water. It is known too that often there is considerable edema of the lungs where there is an epileptic seizure or alcohol intoxication in death by submersion. In this case, no edema was demonstrable, even though it is known that there was a very high alcohol level. Other finds, usually associated with drowning, such as water in the lungs and stomach, and an empty bladder, were absent and there were no petechial or hemorrhages in the middle ears. Despite the absence of all these findings, it is known that this man died after he entered the water, and that he entered rather swiftly flowing water. There is also an absence of any other cause of death or any apparent pro-existing disease or injury. One can only assume, therefore, that this man drowned, although this is a conclusion reached after elimination of all other causes of death.

Investigators inferred from the autopsy report that the decedent succumbed to the fatigue of swimming against a swift current. However, there was no way of confirming that fatigue had occurred from the circumstances under which the body was found. Indeed, there was virtually no evidence indicating what had happened between the decedent's disappearance and his discovery on the sand bank. Nevertheless, this situation worked against a verdict of suicide. That is to say, the evidence was not sufficient for investigators to project an image of the decedent deliberately giving up.

F. Equivocal Traumatic Death

A different modus operandi for accidental death appears when evidence of unintentional injury is equivocal. In such cases investigators conduct an extensive search into the personal history and social background of the decedent. Their purpose in this undertaking is to discover evidence which suggests a verdict of suicide is speculative, and therefore capable of being discredited. We illustrate how such evidence is organized in the death of a 63 year old female who was found lying on her back, fully clothed on the top of a bed. Two empty prescription bottles were found beside the bed. A fire had started in garbage under the kitchen sink, and also in a box containing clothes and papers in the bathroom. Friends of the decedent related that she had been very depressed during the weekend she stayed with them. She had insisted on going to the veterinarian in order to have her dog destroyed. She was very attached to the dog and would not tell her friends why she wanted to have it destroyed.

Investigators suspected, in light of the decedent's action of having her dog destroyed, that she had intended to set her house on fire after taking an overdose of pills. To eliminate such suspicions, investigators seek information showing that a decedent was disposed toward irresponsible, reckless, or negligent conduct. In addition, investigations must disclose evidence which preserves an image of such conduct in a series of occurrences leading to death. These

disclosures provide a foundation for investigators to infer that exposure to a lethal agent was an effect arising from bad judgment or errors on the part of the decedent.

In the case of suspected suicide by fire, investigators enquired about the smoking habits of the decedent, and received the following information:

> She was a very heavy smoker. When she was at our place, she would start one up, set it in the ash tray, leave it and start up another one. She was very forgetful and I feel this was even how a fire could have started in her own home.

A search of the decedent's home revealed numerous cigarette burns in both her furniture and clothing. Autopsy findings indicated that death was due to asphyxia produced by carbon monoxide poisoning. The pathologist noted that high levels of drug in the blood probably contributed to death by rendering the victim unconscious prior to the fire.

To establish unavoidable injury C_1, as a causal component of the event, investigators related conclusive clinical tracer X_1 represented by the high level of drugs in the blood, to clinical tracer X_2, identified as a loss of consciousness. Tracer X_2 preserved the image of causal tracer X_3 which was identified as a susceptibility to carbon monoxide poisoning. Accordingly, X_1 in set C preserved the effects of X_2 and X_3 in set A through $C_1 = \langle X_1, X_2, X_3 \rangle$.

To establish unexpected injury as a causal component, investigators inferred from numerous cigarette burns that the decedent was negligent. That is to say, multiple physical tracers X_4 represented by the burns, were related to causal tracer X_5, identified as negligence. Tracer X_5 was related to multiple spatial tracers X_6, identified as the fires in the bathroom and kitchen. Hence, X_4 in set C preserved the effects of X_5, and X_6 in set A through $C_2 = \langle X_4, X_5, X_6 \rangle$.

Finally, to establish unintentional injury C_3, as a causal component of the event, investigators perceived the empty pill bottles as evidence of an incautious overdose of barbiturate following the death of the decedent's dog. In other words, multiple physical tracers X_7 identified as the empty pill bottles, were related to causal tracer X_8 representing emotional upset following the disposal of the dog. Accordingly, X_7 in set C preserved the effect of X_8 in set A through $C_3 = \langle X_7, X_8 \rangle$.

To locate the origin of the carbon monoxide poisoning, investigators perceived tracer X_3 as an effect arising from tracer X_6. Thus, C_1 and C_2 are 1-connected since they share elements constituting the subset $\{X_3, X_6\}$. Tracer X_8 preserved the effects of tracers X_5 and X_6. Therefore, C_2 and C_3 are 2-connected since they share elements constituting the subset $\{X_5, X_6, X_8\}$. Tracer X_7 preserved the effect of tracer X_1. Hence C_1 and C_3 are 1-connected since they share elements constituting the subset

$\{X_1, X_7\}$.

A pattern is revealed where all causal components exhibit relatively weak connections. The pattern gives form to the modus operandi of equivocal traumatic death. This modus operandi appeared in 10 of the 38 cases of accidental death. In each case, an image of an act of self-destruction was created by the circumstances of the death. However, in each case this image became blurred when investigators discovered that decedents frequently were exposed to risks which made them vulnerable to the kinds of hazards ultimately responsible for their demise. For example, a 48 year old male placed a 30-30 calibre rifle to his forehead and shot himself while in an intoxicated state. This occurrence was witnessed by friends who claimed: "Frank often said that he was going to kill himself when he got drunk. Everytime he drank, he used to talk about taking his life by shooting himself. The threats of suicide were never really serious." Investigators classified the event as an accidental death caused by excessive alcohol which contributed to carelessness in the handling of a firearm.

Drowning, poisoning, hanging, and wounding constitute types of fatal injury found in cases of equivocal traumatic death. These types of injury are seen as consequences of the failure to perceive that a high degree of risk ensues from certain kinds of action. An image of this failure is preserved through reference to alcohol or drug concentrations in the blood. The assumption is that inten-

tional injury requires an awareness of how to avoid inflicting serious harm on oneself or others. A person under the influence of alcohol or drugs is not capable of such awareness.

An obvious flaw in this medicolegal reasoning is that alcohol or drugs diminish a person's capacity to exercise control over a lethal agent. However, this does not exclude the possibility of a person being aware of fatal consequences that are likely to occur as a result of self-induced chemical impairment. In fact, in each case of equivocal traumatic death, the decedents had acted deliberately in ways which induced situations where they were exposed to the lethal effects of an external agent. However, the most salient factor used to identify the deaths as accidental, was evidence indicating decedents had no opportunity to exercise control over the effects of an agent. By comparison, such evidence is accorded less salience in cases of non-violent traumatic death where investigators accord greater significance to evidence showing exposure to a lethal agent was unavoidable. This shift in investigative emphasis reflects different kinds of uncertainty about the decedent's role in the occurrences leading to death.

G. Suspicions of Foul Play

A further shift in investigative emphasis occurs when there is uncertainty about the involvement of persons, other than the decedent, in the circumstances of a death. Suspicions of foul play arise as a product of such uncer-

tainty. These suspicions are highly predictable when three conditions are evident. First, there are indications that others may have been directly responsible for occurrences whereby the decedent's exposure to a lethal agent was unavoidable. Secondly, there are indications that others may have been directly responsible for occurrences which limited the decedent's opportunity to control the effects of exposure. In addition, investigations must disclose evidence showing that such occurrences were the effects of malevolent intentions.

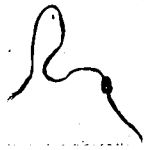
Foul play was suspected in 6 of the 38 cases of accidental death. To demonstrate how foul play is discounted, we refer to the death of a 23 year old female who was last seen alive in the company of a dangerous sexual offender. She was found floating in a lake. However, a pathologist was not able to establish with certainty whether the decedent died and was placed in the lake or if she had entered the water and died as a consequence of drowning. There was evidence that she had received a subcutaneous injection of barbituates just prior to death. The quantity of drugs was not considered lethal, but sufficient to induce coma. There was seminal fluid within the vagina and bruises on the head, but it was not possible to determine how they occurred or whether such injuries produced unconsciousness.

Burdened with suspicions of foul play and lacking sufficient information to project an image of the external agent of death, investigators resort to a form of "fault tree" analysis. Fischhoff (1977:181) informs us that "fault trees start with a particular undesired final event (a failure of the system) and work backward to identify the component failures needed for it to have happened." In medicolegal investigations the undesired final event is death caused by an external agent. Component failures are traced to actions that could have been initiated either by the decedent or the suspect. This procedure provides investigators with alternative descriptions of the event. Each description becomes more or less plausible as investigators discover evidence that preserves images congruent with a particular sequence of component failures. The most plausible description is then compared with modus operandi for categories of unnatural death.

The "fault tree" in the case of the woman found floating in a lake contained five branches describing different sequences of component failures. Each branch started from the undisputed occurrence of death and became increasingly speculative as it was traced through autopsy findings to action initiated either by the woman or the suspect.

FAULT TREE

Note: the symbol ~ stands for is traced to



Branch One:

Death ~ Head Trauma → Attacking Behavior → Action Initiated by Suspect

Branch Two:

Death ~ Overdose of Drugs → Forced Injection → Action Initiated by Suspect

Branch Three:

Death ~ Drowning → Victim Submerged in Water → Action Initiated by Suspect

Initially, these three branches were considered equally plausible when investigators discovered that the suspect was a heavy drug user who engaged in dangerous sexual perversions. An acquaintance of the suspect reported:

> Jim (i.e. the suspect) often took girls to the farm house and told them he was a doctor. He would then inject drugs of some sort into them and perform perverted sex acts. I was often awakened by the screaming of girls who were high on drugs or screaming because of the bizare sex acts being committed upon them.

Further investigation failed to reveal evidence of continuity among component failures traced to actions of the suspect. Hence, for example, biographical information about the suspect served to preserve an image of the decedent as a victim of an assault. But, autopsy findings did not establish the assault as the origin of continuous occurrences

leading to death. Hence, the assault in branch one was viewed as a discrete occurrence or a condition surrounding death. Similarly, investigators recognized that as far as branches two and three were concerned, there was sufficient evidence to project an image of the decedent as someone who was either submerged in a lake or forcefully injected with drugs. Therefore, the three branches of the fault tree associated with actions of the suspect became less plausible as descriptions of what happened to the decedent. Subsequently, suspicions of foul play were accorded less significance as the investigation proceeded.

Branch Four:

Death ← Head Trauma ← Negligence ← Action Initiated by Decedent

Branch Five:

Death ← Drowning ← Drug Overdose ← Action Initiated by Decedent

Branch four was discounted for the same reason as branch one. That is, there was not sufficient evidence to directly connect the head trauma with continuous occurrences leading to death. On the other hand, investigators were satisfied that the evidence they discovered presented an image congruent with component failures in branch five. To achieve such congruence, investigators referred to biographical information about the decedents habits regarding drug use, sexual involvements, and swimming. Accordingly, the investigation closed with the following description of the event:

> The decendent departed from a dance hall with an unknown male companion who appealed to her at the dance. She accompanied this person to a desolate parking place adjacent to the Lake. One thing leading to another, they willingly used drugs and indulged in sexual relations. She entered the Lake for a swim. Due to her state of [illegible] from the drug she encoun[illegible]ficulty and drowned. [illegible]ion searched the area, [illegible]nd departed because [illegible]g involvement.

There was no tangible evidence of the woman's willingness to participate in sex and the use of drugs. Rather, the assumptions that the woman willingly engaged in sex and injected drugs reflected a belief in the constancies of behaviours which make persons susceptible to lethal hazards. This belief is predicated on the idea that certain habits or styles of life expose persons to risks of fatal injury by reducing their resistance to potentially lethal effects of external agents.

In each case where foul play was initially suspected, biographical information about the decendent's style of life served to identify component failures as predictable occurrences. In other words, investigators infer a potential for premature death by attending the hazardous behaviour in the decendent's biography which in retrospect makes a particular ordering of occurrences appear plausible. There is a sense of inevitability with respect to the circumstances of the death. Florovsky, (1969:364) describes this sense

in the context of historical explanation, when he writes: "In retrospect we seem to perceive the logic of the events, which unfold themselves in a regular order, according to a recognizable pattern, with an alleged inner necessity, so that we get the impression that it really could not have happened otherwise."

H. Summary

We have found that the classificatory distinction between natural and unnatural is easily recognized by relating the causes of death to disease or injury. However, critical to the distinction between disease and injury as causes of death, is the perception of the time of onset. For example, is a death natural when a disease initiates an injury which subsequently causes death? Conversely, is a death unnatural when an injury initiates a fatal disease? Both questions relate to the efficiency of medicolegal categories as codes for organizing information about causes of death. Efficiency pertains to the ease of discriminating procedures needed to make the codes operative. With respect to such procedures, Perper and Wecht (1975:243) note: "Real difficulties in the determination of causality of death arise mainly in the presence of concomitant moderate or severe, traumatic and natural conditions."

In particular, there is the difficulty of differentiating between causes underlying the development of a disease and causes which accelarate the progress of a disease. Murphy (1978:283) informs us that many common dis-

eases leading to death are poorly understood as to the time of onset, and the sequence in which lesions develop.

Further difficulties are encountered when the symptoms of an injury are delayed. Pitkin (1973:29) draws our attention to such difficulties in a case where a 58 year old man slipped while dancing, and consequently fractured five ribs. He also sustained considerable soft-tissue damage which caused him to be immobilized in the hospital for one month. Two weeks after being discharged the man died from a massive pulmonary embolus. An autopsy did not reveal the site of the embolus, but the pathologist suspected it was caused by prolonged immobilization following the initial injury.

If the autopsy had revealed that the embolus originated at the site of the injured bone, then the causes of death could be traced to physical trauma, and classified as accidental. However, the embolus was attributed to disease, and consequently the death was classified as natural. On the other hand, the disease would not have occurred had it not been for the condition of prolonged immobilization precipitated by the injury. Therefore, the death could be classified either as natural or unnatural in accordance with how the onset of the event is perceived.

What is the significance of the arbitrariness underlying perceptions used to identify causal agents of death? We have observed that medicolegal distinctions are based on the premise that images of causal agents are pre-

served in continuous sequences of tracers. Moreover, the continuity is recognized through procedures which order evidence of a death in five sets of occurrences (i.e. a living set A_1, a set differentiating living from dying A, a dying set B, a set differentiating dying from death C, a death set C_1).

We have noted different kinds of uncertainty arising with respect to the ordering of occurrences which identify boundaries of the event delineating the transformation from person to corpse. Assuming the arbitrariness of perceptions used to identify causal agents of death, what does this signify about the management of such uncertainty? Is management constrained by coding rules which specify agents if death must be traced on a single causal pathway? Are such constraints instrumental in determining how and what sources of evidence are utilized to classify a death? How do different sources of evidence contribute to potential classificatory errors?

In essence, the first phase of the research has shown that medicolegal investigators allocate death to an official category through decisions which stipulate what is or is not causally important in the development of the event. Official categories of death embody distinctions which define how social, psychological, physical, and physiological occurrances become eligible for the title of cause. A set-theoretic approach provided insight into the procedures investi-

gators adopt in order to limit the range of causal antecedents mapping the transition from person to corpse. Such procedures used to identify occurrences as possible causes of death are conceptualized as an analytical problem of locating a topological space on the intersection of sets delimiting points of discontinuity from living to dying and dying to death. Moreover, in keeping with this conception, the most plausible causes of death are those occurrences which provide inverse mappings of continuous process on a topological space. To be specific, official categories of death fix perceptions of cause by specifying distinctions which legislate how some assemblage of evidence preserves the image of a causal agent in phenomena of transformation.

The second phase of the research will seek to elaborate possible sources of misclassification associated with the types of inferences that are required in deducing the capacity of evidence to preserve an image of a causal agent consistent with imagery alloted by an official category of death. In the next two chapters we will discuss cases where medicolegal investigators have deduced from the circumstances of a death that the preponderance of evidence favours a verdict of either suicide or homicide. Here the emphasis of the research will shift from a set-theoretic approach to an evaluation of the kinds of evidence utilized during the course of medicolegal investigations. This shift does not imply that formulations based on set-theory are inappropriate for describing distinctions embodied in the

categories of suicide and homicide. Rather, the shift represents a diverssification of issues bearing upon the processing of information related to medicolegal perceptions of causes of death. The issues in question provide a nucleus of concerns best characterized as difficulties medicolegal investigators may encounter when they seek to retrieve and assimilate information explaining why the demise of a specific person occurred at a particular time. We will evaluate the relative strength and weakness of causal inferences in light of conceivable indeterminacy which may attend the cognitive postures needed to envisage correspondences among images of cause and categories of death.

CHAPTER FIVE

SUICIDE

A. Inferences Regarding Intent

To classify a death as suicide, investigators must discover evidence confirming that the decedent intended the fatal consequences of action involving some form of exposure to a lethal hazard. Suicide is conceived as a type of self-assault in which a person knowingly exercises control over a causal agent to produce the effect of death. We have observed in cases of accidental death that the concept of control works through perceptions of opportunities for avoiding injury which were available to a decedent. Opportunities are seen as being more or less available in the circumstances of a death. In other words, control is perceived on a continuum, rather than in terms of either being present or absent. Similarly, in cases of accidental death, we have observed that the concept of intent arises when there is uncertainty about the extent of a decedent's appreciation of risk incurred by action involving fatal self-injury. If there is evidence indicating that the decedent was more or less appreciative of the risk, then intent becomes salient as a possible causal component of the event. Specifically, inferences regarding intent are based on perceptions of the degree of awareness of incurring fatal self injury.

Both intent and control, when used as medicolegal terms of reference, constitute examples of loosely bounded concepts. Black (1963:4) notes: "In general, to say that some concept, C, is sharply bounded, will mean that some state of affairs is an instance of C, while another state of affairs, differing as little as we please from the first, is an instance of not-C." By contrast, a loosely bounded concept does not have a sharp boundary, but rather allows for borderline cases which are not indisputably clear in the specification of referents. Black (1963:5) illustrates how the concept of being short is intended to be loose when he writes:

> Any sensible person who was asked to specify the precise height at which a man ceased to be short would quite properly regard the task as impossible.... The 'line' would be 'drawn' in different places by different persons, all equally competent to judge, and even the same man would draw the same line in different places on different occasions.... Anybody who thought it possible to find out the point of transition between short and non-short would be making a mistake about the present uses of the word 'short'. The question, 'How short is short?' has no answer.

Somewhere between short and not short, there is a region of borderline cases where an ad hoc demarcation is drawn for practical or theoretical reasons. Analogously, with respect to the concepts of having or not having control over a causal agent as well as intending or not intending self-injury,

there is a region of borderline cases where an arbitrary distinction is drawn between suicide and accidental death. This region is readily discernible, when investigators experience uncertainty in their identification of occurrences belonging to sets A and C, delineating points of discontinuity between living and dying, as well as dying and death. The issue to be explored is how does the management of such uncertainty influence the arbitrariness of boundaries demarcating an event as a suicide?

We have observed that to classify a death investigators rely on evidence derived from autopsies, the scene of death, biographical information, and eyewitness descriptions. Moreover, each source varies in significance according to the role it assumes in preserving an image of a causal agent. Consider a case where a fully clothed corpse is discovered floating in a river. An autopsy establishes that the cause of death was drowning. However, such evidence does not reveal whether the decedent deliberately jumped, fell or was pushed into the river. Further evidence is needed to trace the source of the event. If there is no basis to suspect foul play, then consideration is given to evidence of intent. We compared 28 cases of suicide to determine how different sources of evidence are utilized to identify intent as a causal component of death.

B. Scene of Death

Generally, investigators strongly suspect a death is suicide when they discover evidence showing a setting was

modified by the decedent in a way that contributed directly to the production of lethal effects. For example, a corpse was found in the front seat of a car. An investigator provided the following description of the scene of death:

> An examination of the vehicle revealed a beige coloured flexible hose inserted in the right exhaust pipe of the vehicle. This flexible hose was looped over the bumper and ran into the trunk which was open. The flexible hose was then connected to a stiff fibrous hose which was inserted through the space separating the cusion and seatback of the seat. This permitted the carbon monoxide gas from the exhaust to freely enter the vehicle. The trunk had been left partially open and the base plate of the car jack had been placed on the edge of the trunk to prevent the lid from opening completely and thereby possibly admitting fresh air.

Such modifications firmly establish the concept of control as a causal component of the event. That is to say, investigators deduce from the evidence of modifications that opportunities for avoiding injury were available to a decedent. Moreover, investigators reason that if a person knows how to modify a setting to produce lethal effects, then he or she is aware of the risk of fatal self-injury incurred by such modifications. Hence, intent is inferred from evidence used to identify control as a causal component of a death.

When the scene of death does not reveal modifications of a lethal nature, investigators attend to evidence suggesting the decedent made preparations which were instrumental in facilitating exposure to a hazardous agent. However, the recognition of such preparation is largely a matter of subjective interpretation. Consider the statement made by an investigator in a case involving a gunshot wound to the head that "it would be difficult to imagine a person unintentionally putting a gun in his mouth and pulling the trigger." Would it be equally difficult for this or any other investigator to imagine a person working in an arsenic-emitting smelter with the intention of contracting terminal lung cancer from constant exposure to noxious fumes? Would it be difficult to imagine a person climbing a hazardous rock cliff with the intention of sustaining a fatal injury through falling? Would it be difficult to imagine a person driving recklessly with the intention of being in a fatal motor vehicle accident? In other words, imaginative powers operate as constraints in the perception of occurrences as preparations for death.

C. Biographical Information

The scene of death does not provide sufficient information to trace a causal pathway incorporating the components of control and intent. To discover how a scene originated investigators make social inquiries probing for evidence of emotional or social problems in the background of the decedent. These inquiries yield psychodynamic and

interpersonal tracers which investigators interrelate with physical and clinical tracers to identify occurrences mapping the transformation from person to corpse. Investigators summarize their findings in the form of a psychological autopsy which designates probable emotional or social occurrences precipitating a suicide. For example, an investigator provided the following summary in a case of carbon monoxide poisoning:

> Inquiring into her background showed that she had been an alcoholic for some time and had been under the care of Dr._____ for this and nervous problems. Her husband had been accused of "playing around". On this occasion when he did not return at a reasonable hour, it is possible to imagine how Mrs._____ must have felt, and it is presumed that she then decided to end it all.

Social inquiries are conducted with the understanding that suicide is an event which develops progressively through a continuous sequence of unmanageable problems. Inquiries identify such problems as occurrences belonging to set A differentiating living from dying. Occurrences delineating set A are seen as extending over relatively long periods of time. In the case of the carbon monoxide poisoning, inquiries revealed that the woman communicated her suicidal intentions to her husband four months before she actually accomplished the act. By comparison, occurrences delineating set A, in accidental deaths, are seen as being relatively brief in duration. These relative

perceptions of duration figure prominently in the derivation of evidence used to identify opportunities for avoiding fatal injury. Investigations proceed on the assumption that such opportunities increase in likelihood when occurrences delineating set A extend over a long duration. Accordingly, investigators operate with the understanding that: "It is safe to say that no suicide takes action without telegraphing his punches." (Wilber, 1974:282).

D. Autopsies

Autopsy findings assume a subsidiary role in the classification of suicide when intent is clearly discernible in the biography of the decedent and the scene of death. Such findings are used to eliminate the possibility of internal agents as causes of death. In addition investigators deduce some measure of the magnitude of an intent to die from the clinical descriptions of injuries. These descriptions provide some estimation of the time sequences for occurrences (i.e. set C) delineating the discontinuity between dying and death. Generally, the briefer the duration of occurrences in set C, the more likely investigators will perceive a decedent as someone who was extremely determined to inflict fatal self-injury.

However, reliance on autopsy findings to determine time sequences in set C poses problems in medicolegal investigations. Van Den Over (1976:273) in an extensive review of methods for estimating time of death notes: "the progressed putrefactive and entomologic changes of a corpse

permit only an estimation of the postmortem interval within such very wide ranges that a reasonably accurate timing is considered to be possible only in the early period, up to 50 hours postmortem." Moreover, postmortem putrefaction can make causes of death anatomically unascertainable. Even prior to putrefaction, autopsies do not always reveal the mechanism of death in cases involving exposure, drug reactions, smothering, drowning, inhalation of inert gases, air embolism, electrocution, and insulin overdoses (Jaffe, 1975:188).

Further problems arise when non-lethal concentrations of drugs or alcohol, sufficient to cause perceptual and judgmental impairment, are discovered in the decedent. This discovery poses a challenge to evidence of intent by instilling doubt as to whether the decedent was aware of the risk of fatal self-injury.

E. Eyewitness Descriptions

Investigators rely on eyewitness descriptions to deduce the state of mind of the decedent immediately prior to death as well as to reconstruct the circumstances of the dying. In particular, they search for evidence which could be interpreted as a threat of suicide. However, there are no objective criteria specifying what actions or utterances qualify as threats of suicide. Nevertheless, such threats are regarded as incontestable proof of intent when investigators suspect that a death is a suicide. For example, a man was seen staring over the edge of a cliff. This action

was recognized as a threat when he was later found dead at the bottom of the cliff. In another case, a man stepped in front of an approaching freight train and ignored the signal of the engineer. He eventually jumped from the track when the train started to slow down. His gesture was later interpreted as a threat when he was found decapitated by the side of the track. In both cases, threats were deduced from the proximity of action to the scene of death.

To infer a threat of suicide from the proximity of action to the scene of death reflects the tendency to interpret occurrences as forseeable after the fact. Fischhoff (1975:72) refers to this tendency as the certainty of hindsight in proposing that "when we learn about an outcome, we immediately make sense of it by integrating it into what we already know. Having reinterpreted what we know, we then view the outcome as more or less inevitable." Investigators knew the man found at the bottom of the cliff was having severe financial problems and had admitted he was responsible for embezzling funds to pay numerous debts. In the case of the decapitation, it was known that the employment of the man had been terminated because he would frequently stop working and inexplicably break into laughter. Hence, the backgrounds of both decedents, according to investigators, were consistent with the recognition of threats deduced from eyewitness descriptions of their actions prior to death.

A similar kind of reasoning through the certainty of hindsight is evident when investigators infer threat from utterances such as:

> Is it convenient for you to
> attend my funeral next week?
> Life really isn't worth living
> now that my husband is dead.
> Don't forget me when I'm gone.
> Tell, Mommy she will never be
> telling lies about me again.
> Being dead can't be any worse
> than things are looking.

Each utterance was made by a person within five days of dying from carbon monoxide poisoning. There is no explicit reference to intent, nor is it logically implied in any of the utterances. Therefore, how does the investigator know he is correctly interpreting the message intended by the speaker? He interprets the utterances in the context of other evidence suggesting injuries were self-inflicted. Subsequently, the utterances, by virtue of temporal proximity to death, provide a link for connecting injuries to motives that compel suicide.

In essence, the utterances are recognized as links through pragmatic implication which occurs, according to the research of Harris and Monaco (1978:1) "when utterances of the speaker strongly suggest (rather than directly assert or logically imply) another piece of information and

may lead the hearer to make a pragmatic inference." Thus, for example, the utterance "Being dead can't be any worse than things are looking" made within days of the speaker's death, carries the invited inference that the person intended to die rather than confront problems of living. The investigator is led to this pragmatic inference by his knowledge of the carbon monoxide poisoning and the decedent's history of emotional problems.

Consider the more ambiguous utterance, "Don't forget me when I'm gone". The word gone, in this case is identified as a euphemism for dead, after the fact of death. However, prior to death, the word gone could imply with equal plausibility that the speaker intended to disappear from the life of the person receiving the message. Death could have been coincidental with this intention. Moreover, Harris and Monaco (1978:7) found that there is a tendency for persons not to recall an utterance itself, but rather the pragmatic implication of an utterance. Therefore, when a person knows a death is a possible suicide, it could influence recall, such that an utterance made by the decedent is remembered in a form which invites the inference of intent. Of course, the converse also applies, in which case a person remembers an utterance in a form that discourages inferences of intent. This latter possibility could conceivably occur when a person is of the opinion that suspicions of suicide are unwarranted. Indeed, Wood (1978, 345) informs us that, "When a misfortune occurs for which a

culprit can be identified, there is a strong tendency to second-guess the culprit."

F. Unequivocal Self-Assault

We will now examine how biases arise in the recognition of suicide by attending to specific kinds of investigative heuristics. The case in question involved a 64 year old male who was found with a gunshot would to the chest, and hanging by the neck in the basement of his residence. His legs were straddling a saw horse, and around his neck was a rope attached to a ceiling joist. Approximately ten feet from the suspended body was a sawed off shotgun that had recently been discharged. Investigators deduced from the scene that the decedent had climbed on the saw horse and fired the shotgun at his heart after placing a rope around his neck. They were not willing to grant any credence to the possibility of accidental death. Rather, their confidence that the death was self-inflicted derived from the fact of suspension. In other words, the investigators thought it inconceivable that the decedent unintentionally placed the rope around his neck.

Moreover, evidence used to deduce intent, served the further purpose of eliminating suspicions of foul play. However, the mere fact of suspension does not exclude another person's involvement in the circumstances of the [redacted] instance, the decedent could have been shot while attempting suicide by hanging. Another possibility is that he was shot and then suspended to the ceiling by

someone attempting to disguise the death as suicide. Nevertheless, these possibilities were never seriously entertained once investigators expressed certainty that the scene of death was modified by the decedent to produce lethal effects.

Certain features in the history of the decedent were interpreted as strong motivations for suicide. He was an alcoholic who would assault his wife when intoxicated and then threaten suicide because he had hurt her. His wife filed for a divorce when he threatened to murder her before committing suicide. Two days prior to the discovery of his body he had sent his wife to the hospital after beating her with a hammer. On the day before his death he informed a friend that he had no future and he was going to shoot himself in the mouth. This person also stated that he had not thought to intervene because the decedent had threatened suicide on many occasions. However, on this particular occasion, he did note that the decedent appeared deeply depressed and determined to kill his wife. Therefore, he went to the home of the decedent, and found him hanging by a rope. The perceived informativeness of this person's description left no doubt in the minds of the investigators that the decedent took his own life.

Subsequently, the autopsy assumed a subsidiary role of establishing the medical causes of death which were attributed to the effects of the shotgun blast. In fact,

TO WHOM IT MAY CONCERN:

Page [illegible] misnumbered and is not missing.

the pathologist did not feel the hanging contributed to death insofar as the decedent would have been dead due to shock and blood loss prior to any effect that the hanging might have had.

G. Borderline Cases

Certain kinds of evidential circumstances make it difficult to apply investigative heuristics used in the identification of straightforward cases of suicide. The age of the victim poses a problem for investigators. If the victim is a child, then this largely precludes the possibility of discovering a history of unmanageable problems usually thought to be associated with the event of suicide. Hence, the motivation for suicide is not readily discernible. A case in point involved an 11 year old boy who was found hanging on a door in the basement of his home. Initially, investigators could not determine whether the hanging represented a misfortunate attempt to scare his parents or a full intention to die.

The boy was discovered one hour after he had been in an argument with his father over a card game they were playing. He left the game in anger, and went to the basement where he was found hanging by his sister. An investigator deduced from the history of the boy that he had an abnormal temper, and subsequently the emotional outbreak in the card game may have been too much for his limited maturity to control. However, the investigator admitted his assumptions regarding the boy's maturity, gave support to the

possibility that death was an unintended consequence of action designed to induce guilt in the father. In other words, both suicide and accidental death were viewed as equally plausible in light of biographical information and descriptions of occurrences prior to the discovery of the boy. Therefore, to classify the event, the investigation focused on the scene of the death.

A stool was situated immediately beside the door frame where the boy was found hanging. This stool provided the means for the boy to wrap a rope around the top of the door frame and hang himself. Hence, the scene of death revealed modifications that were instrumental in producing lethal effects. Medicolegal investigators reason that such modifications imply an awareness of the risk of fatal injury. The problem with this reasoning is that it does not follow that having an awareness of risk implies the person intended death as a consequence of modifying a setting to produce lethal effects. Nevertheless, in this case there was further evidence which identified intent and control as causal components of the event.

A search of the boy's bedroom revealed a note written on the back of an envelope. The content of the note was as follows:

There was no date written on the note.

"Mom and Bronco not Lori or
dad. I want my belongings
to go to mom and money. I

> want Bronco to have my gun, records and other toys and stuff. Paul to have my hockey equipment."

Nevertheless, according to the investigators the note implied that the boy had foreseen death as a consequence of his actions. However, in a discussion of what is signified when an action is recognized as intended, Hart (1968:120) has written:

> ...a merely foreseen, though unwanted outcome is not usually considered as intended .... The exceptions to this usage of 'intentionally' are cases where a foreseen outcome is so immediately and invariably connected with the action done that the suggestion that the action might not have that outcome would by ordinary standards be regarded as absurd, or such as only a mentally abnormal person would seriously entertain. The connexion between action and outcome seems therefore to be not merely contingent but rather to be conceptual.

Medicolegal investigators make a conceptual connection between action and outcome when they specify what does or does not constitute the initial action in a sequence of occurrences leading to death. Thus, for example, investigators reason that if death was foreseen as a probable consequence of an action, then there were opportunities to exercise strategies whereby fatal effects could be avoided or controlled. Moreover, if avoidance or control was not attempted, then death was the intended effect of the action.

Subsequently, the source of the intention is identified with action indicating death was foreseen.

However, investigators encounter difficulty establishing death was foreseeable when they have to rely on evidence suggesting the decedent made preparations which were instrumental in facilitating exposure to a hazardous agent. A case in point involved a 25 year old female whose death was attributed to an overdose of drugs. An initial investigation of the death revealed that the woman had been taking drugs during the day to become more intoxicated as her supply of alcohol was almost depleted. While consuming alcohol and ingesting drugs, she became depressed, and went into a bedroom where she attempted to slash her wrists. Although the cuts were only superficial, she consumed more drugs and began to have seizures. Subsequently, she was taken to emergency services in a hospital where a large bore needle was used to inject adrenalin into her heart in order to produce better cardiac rhythm. With respect to this resuscitation procedure, a pathologist who performed an autopsy on the woman indicated that the effect of the needle may have contributed to death. However, this possibility was accorded the status of mere speculation, and accordingly, excluded in the certification of causes of death.

We have observed that as a code, the category of suicide operates largely through the concept of intent. To classify the death as suicide, investigators had to infer

that the woman intended to die when she ingested the drugs. In other words, the woman was capable of visualizing the effects of action before the death occurred. But, how accessible is this awareness after the fact of the event? Indeed Austin (1966:438) notes a person's own awareness of what he was doing is limited:

> Although we have this notion of my idea of what I'm doing - and indeed we have as a general rule such an idea, as it were a miner's lamp on our forehead which illuminates always so far ahead as we go along - it is not to be supposed that there are any precise rules about the extent and degree of illumination it sheds. The only general rule is that the illumination is always limited, and that in several ways.

Nisbett and Wilson (1977) have demonstrated through experimentation that persons may have little or no introspective awareness of complex mental processes involving self-evaluation, problem solving, and the initiation of behaviour. They note: "It is naturally preferable from the standpoint of prediction and subjective feelings of control, to believe that we have such access." (1977:257). Indeed Shneidman (1973) found, after years of study, that the contents of a suicide note almost never provide an insightful recitation of what was taking place in the mind of a person ostensibly bent upon self-destruction. Rather, content analysis of suicide notes reveals, "Individuals seem to be severely limited in their introspective capability at

the time of the deed and thereby are prevented from sharing, in a note, their emotional and ideational states." (Henken, 1976:36). Shneidman (1973) refers to this limitation as "tunnel vision" suggesting relative close-mindedness, ambivalence, and a narrowing of the field of consciousness.

The point is that to establish death was foreseen as a probable consequence of action, may require investigators to presume greater clarity of thought than is possible. Moreover, this requirement follows from taxonomic principles which maintain distinctions between intentional and unintentional injury are clearly discernible through estimations of the probability of awareness of courting lethal risks. These estimations assume that a person has the necessary knowledge to predict the likelihood of fatal consequences. However, it does not follow that by possessing such knowledge, a person can exercise control over the outcome. Conversely, a person may know how to avoid a lethal risk without assessing the likelihood of its occurrence. Indeed, as Kates (1978:37) notes, "Most people, everywhere, practice aversions making both absolute and relative rankings of risks to be avoided. Yet such a calculus may be only remotely related to the frequency of events or the magnitude of consequences."

Is it conceivable that the woman who succumbed to a drug overdose had knowledge of the lethal effects of the drugs she ingested? One investigator admitted her death would appear to have been an "accidental suicide" insofar

as the effects of the drug are not widely known. In fact, with respect to the weights of drugs discovered in body tissues, the pathologist remarked: "The lethal doses of this material appear much higher than this, at least in rats and mice." Therefore, why was the death classified as suicide? Two reasons were provided by the investigators in this case. First, her family indicated she was depressed and on a prior occasion had threatened to commit suicide. The more salient factor in the decision to classify the death as suicide was the fact that she had slashed both wrists.

Medicolegal investigators regard wrist-slashing, wounding by gunshot, and hanging as equally strong indicators of a person's determination to inflict fatal self-injury. The fact that the wrist-slashing was ineffectual, in this case was attributed to the woman's state of intoxication. In other words, the wrist-slashing furnished a key for the subsequent interpretation of intent. That is, non-lethal action was used to identify intent as a causal component of lethal action.

Numerous attribution studies have shown that whatever or whomever provides a framework for perceptual focusing is likely to be identified as a causal agent (Arkin and Duval, 1975; Storms, 1973; Taylor and Fiske, 1975). Moreover, such perceptual focusing serves to divert attention from other possible causes (i.e. out of sight, out of mind). Thus, for example, the action of wrist-

slashing focuses attention on intent, and consequently the possibility of an unintentional overdose was dismissed as being improbable. However, such estimations of likelihood would require knowledge of how many persons have and have not committed suicide after attempting to slash their wrists. Without this base-rate information probabilistic judgments are susceptible to what Tversky and Kahneman (1971,1973,1974) describe as the systematic biases of the intuitive statistician.

We have observed that suicide is accorded greater plausibility than accidental death when certain motivational states are associated with the decedent. For instance, consider the case of a woman who was involved in an unwitnessed single car accident on a bridge. A passer-by left her standing beside the extensively damaged car in order to call the police. When the police arrived her body was discovered underneath the bridge on a frozen river. Her husband contended, after a suicide verdict was reached, that a more consistent interpretation of the event would be death due to shock resulting from the car accident. Moreover, a cut found on her wrist would be as consistent with the occurrences of accidental death as attempted suicide. Nevertheless, the verdict of suicide was not changed insofar as there was a history of severe postpartum depression involving attempted suicide by wrist-slashing one year prior to death.

A verdict of suicide was changed in a case involving a 62 year old male who was found in a river. He had been missing for one month since having been charged with Impaired Driving. Initially the death was classified as suicide because the decedent was an alcoholic and he had been charged with a criminal offence. However this decision was amended to accidental drowning in view of the high blood/alcohol level at the time of the postmortem examination.

The reason why the latter case was amended and the former was not could be related to a form of judgmental bias that Tversky and Kahneman (1974) describe as the "problem of availability." That is, persons have a tendency to overestimate the likelihood of events which are easy to imagine. The woman's history of depression and wrist-slashing made the leap from the bridge easier to imagine a suicide, rather than accidental death due to shock. In fact, once the death was classified as a suicide, the unwitnessed accident on the bridge was reinterpreted as an attempt to inflict fatal self-injury. In retrospect, this reinterpretation enhanced the predictability of the suicide. On the other hand, in the case of the drowning, the high blood/alcohol findings made it easier to imagine accidental death, rather than suicide. In other words, autopsy evidence was accorded greater salience than the history involving a criminal charge and alcoholism.

Further comparisons revealed that the presence of a high level of alcohol in the blood does not eliminate the possibility of suicide. Indeed, in one case the level of ethyl alcohol in the blood was 990 milligrams per 100 millileters of blood. No suicide note was located and no history was available. The decedent was found lying across the front seat of a car in his garage. Death was attributed to carbon monoxide poisoning. The death was classified as a suicide because a brick had been forced up against the car accelerator suggesting the decedent had modified the scene to produce lethal effects. It was considered inconceivable, in view of the modification, that the decedent had not intended to inflict fatal self-injury. That is to say, the presence of alcohol eliminates intent as a causal component, only if the preponderance of other evidence equally favours images of suicide and accidental death.

H. Summary

We have observed that potential classificatory errors are determined by the operating rules investigators employ to identify clear distinctions between categories of death. These operating rules differentiate phenomena of death by focusing attention on evidence which affords distinct images of causal components of death. The images are furnished by procedures whereby components are selected and eliminated as possible causal candidates through modus operandi reasoning. We have found that such reasoning is susceptible to biases described as certainty of hindsight,

pragmatic inference, and the exclusion of base-rate information in probabilistic judgments. The next chapter will elaborate how such biases could influence the direction of potential classificatory errors. In addition, the implications of recent advancements in the understanding of causes of death will be considered.

CHAPTER SIX

HOMICIDE

A. Detecting Homicide

Every death initially falling under the purview of medicolegal inquiry in Alberta, is viewed as a possible homicide. However, less than one per cent are classified as homicide when an investigation is concluded. Hence, the possibility of homicide ceases to be plausible during the course of most investigations. To ascertain when and why this occurs, we will first draw attention to numerous conceptual distinctions guiding the identification of causal components of homicide.

A general statement pertaining to the concept of causation, as it applies to cases of homicide, is contained in section 209 of the Criminal Code of Canada:

> Where a person causes bodily injury to a human being that results in death, he causes the death of the human being notwithstanding that the effect of the bodily injury is only to accelerate his death from a disease or disorder arising from some other cause.

Accordingly, in cases of homicide, the source of causality is always a person's action. In other words, if the source of a death cannot be traced to the actions of a person, then the possibility of homicide ceases to be plausible.

Furthermore, the Criminal Code of Canada invests persons with the authority to view specific instances of

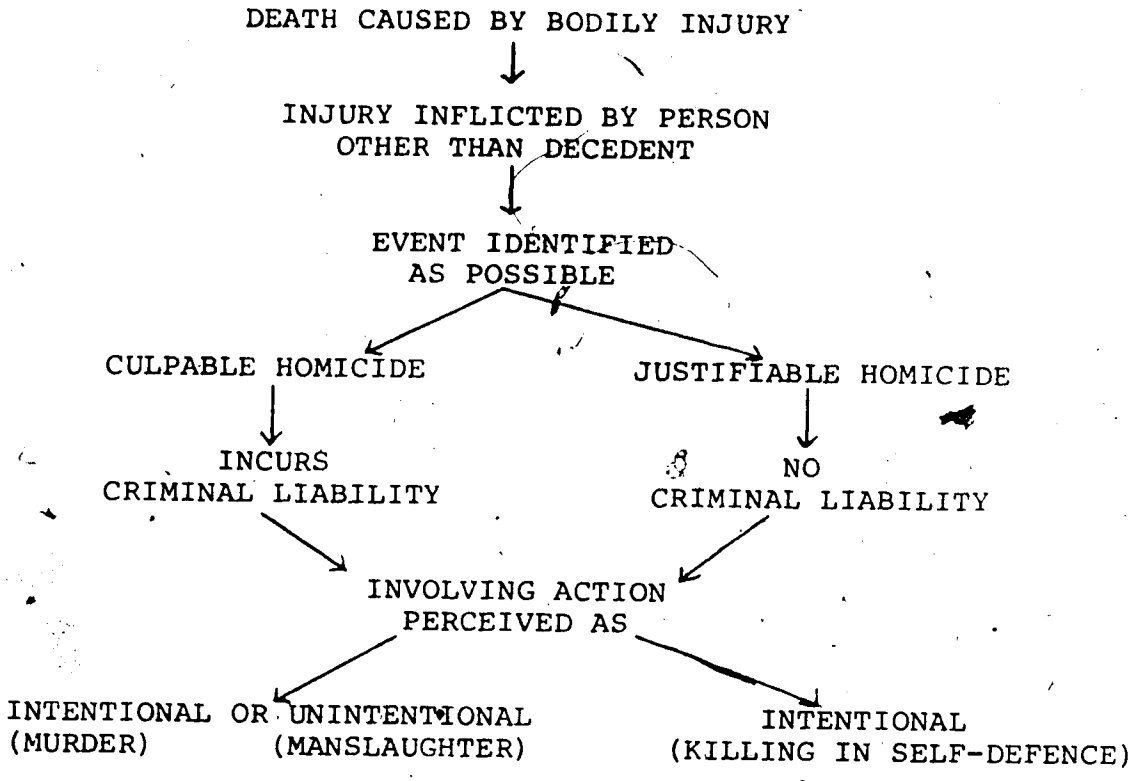
homicide as justifiable, which subsequently eliminates considerations of criminal liability. Justifiable homicide is recognized as an event where someone kills a person who poses a dangerous threat to public safety. This form of killing is regarded as an expedient measure in accordance with section 25 of the Criminal Code whereby:

> a person is not justified in using force that is intended or is likely to cause death or grievous bodily harm unless he belives on reasonable and probable grounds that it is necessary for the purpose of preserving himself or any other under his protection from death or grievous bodily harm.

If there is no justification for killing a person, then the event is classified as a culpable homicide, and the issue of criminal liability is considered. Such consideration bears on a further distinction of culpable homicide as an event which is either intentional or unintentional. If a culpable homicide is intentional, then the event is classified as murder. Whereas, if a culpable homicide is unintentional, then the event is classified as manslaughter. These distinctions afford alternative perceptions of homicide represented in the following schema:

(See overleaf)

PERCEPTIONS OF HOMICIDE



To identify a homicide investigators must suspect that death was caused by bodily injury. Suspicion derives from the perception of death as a natural or unnatural event. Fundamental to this distinction is the idea that deaths are initiated by either internal or external agents. However, the logic of the distinction between internal and external agent is questionable. An infectious bacterial organism that causes death is an internal agent, whereas a poisonous snake that causes death is an external agent. Both agents produced and transmitted lethal substances to a victim. The only difference appears to be that the substance produced by the bacterial organism is associated with a current conception

of disease. Kendell (1975:307) notes with respect to the definition of disease that "it is free to expand or contract with changes in social attitudes and therapeutic optimism and is at the mercy of idiosyncratic decisions by doctors or patients". Spiro (1975:576) concurs that the concept of disease varies with time, fashion and geography, such that, "One suspects that a disease is simply what we physicians have agreed to call a collection of findings". Nevertheless, when a disease is identified as a causal agent of death, there is no further possibility of classifying the event as a homicide. Hence, for example, deliberately exposing a person to radioactive materials would not be detected as a homicide, if as a consequence of the exposure a person contracted cancer and died. To appreciate why this would be the case, we draw attention to a series of deaths involving cardiopulmonary arrests in an American hospital for veterans (Kroll et al. 1977; Stross et al. 1976).

The deaths in question did not initially arouse suspicions of homicide insofar as the arrests were recognized as occurrences compatible with the natural progression of a disease. Moreover, diseases are conceived exclusively on a physiological level of abstraction in order to maintain the distinction between internal and external agents of death. That is to say, external agents of death are identified through reference to concepts of intent and perceptual awareness. Such concepts are excluded as referents of internal agents of death. Otherwise, the distinction between natural and unnatural death is obscured. In other words,

perceptions of intentional action are not compatible with the concept of disease as an internal agent of death.

In the previously mentioned cases involving cardiopulmonary arrests, the medical staff became suspicious about the causes of death when there occurred a number of arrests that were unexpected and not consistent with the history of a patient's disease. Subsequently, an investigation revealed that some of the patients had been poisoned with a muscle-paralyzing agent administered by two nurses. There was no basis for suspecting homicide until a number of unexpected cardiopulmonary arrests occurred with alarming frequency. Stross et al. (1976:1107) note the problems that occurred during the course of the investigation:

> ...there was no definition of which cardiopulmonary arrests were "natural" and which were "induced". It was not clear whether all induced arrests were caused by a single agent and what means were used to administer the agent (or agents). No possible motives (political, personal or euthanasia) were apparent. Finally, the potential suspects were legion and included hospital employees, medical students, other patients and visitors. Without clarification of the nature of the crime, it was difficult to establish the modus operandi or possible motives of the perpetrator (or perpetrators) or to identify possible suspects.

Similarly, in the case of deliberately exposing someone to lethal effects of radioactive material, there would be no way to differentiate between induced and naturally occurring cancer by attending to clinical symptoms of the disease. Indeed the problem of detection is confounded by the fact that causes of cancer are poorly understood. We

have noted in the chapter on natural death how external agents mimic symptoms of common diseases that cause death. The contributory role of an external agent is overlooked when signs and symptoms are consistent with expected developments in the progress of a disease known to cause death. In particular, lethal effects of elevated levels of prescribed drugs, are disguised in the signs and symptoms associated with the natural course of a disease under treatment.

Homicide is not likely to be detected for the same reasons in cases where relatives have purposely withheld medications temporarily prolonging life. The presence of a disease precludes investigators from recognizing occurrences that define the death as a homicide. That is to say, physicians possess background knowledge which leads them to perceive the inevitability of death by natural causes when treating specific kinds of disease. It is this sense of historical inevitability that allows physicians to confidently express opinions about the cause of death without the benefit of autopsy findings. Hence, for example, one can only speculate about the number of victims with a history of heart disease, who have fallen prey to homicidal smothering by persons who reported to physicians that their patients complained of severe chest pain prior to death. Nevertheless, administrators of the medicolegal system in Alberta cannot discourage physicians from expressing opinions about the cause of death without risking a dramatic increase in their

workload.

However, administrators should draw the attention of physicians to populations that are possibly more vulnerable to homicide masquerading as natural death. One such population would be residents of nursing homes for critically ill patients. Perceptions of death as an event that was bound to happen would be particularly strong in such settings. Hence, any death that occurred in the presence of persons other than medical staff should be subject to medicolegal investigation.

B. Homicide Concealed As Accidental Death

If homicide is to remain plausible after the discovery of a fatal injury, then the source of the injury must be traced to a person other than the decedent. However, the following case illustrates how value judgments are incorporated into criteria specifying when the infliction of fatal injury constitutes a homicide. The case in question involved a 6 year old male who succumbed to brain injury when a physician negligently administered nitrous oxide instead of oxygen during an operation for tonsillectomy. Subsequently, the hospital privileges of the physician were revoked when a panel of peers declared he had used poor surgical judgment. Nevertheless, such medical negligence does not incur criminal liability, and therefore, death cannot be classified as culpable homicide. Rather, such deaths are classified as therapeutic misadventures. Medical

negligence would not qualify as justifiable homicide, insofar as the action causing death is perceived as unintentional. Justifiable homicide is identified through reference to the causal components of intentional injury.

Death by therapeutic misadventure is recognized as an event that occurs in medical settings where persons have knowlingly exposed themselves to hazards of surgical intervention. Therefore, we must ask, what distinguishes these deaths from those where women have been killed as the result of exposing themselves to the hazards of hitch-hiking? Why should such women not be recognized as victims of social misadventure? These questions imply that subjective appraisals of the significance of a setting enter into the recognition of causal components of death.

Knowingly exposing oneself to surgical hazards is acceptable from medicolegal perspective, whereas hitch-hiking is viewed as action that incurs an unacceptable risk of fatal injury. Moreover, when action incurring lethal risks is appraised as acceptable (ie. an operation for tonsillectomy), investigators perceive subsequent fatal outcomes as uncontrollable consequences of action that generated the hazardous situation. On the other hand, when action incurring lethal risks is appraised as unacceptable (ie. a woman hitch-hiking by herself), investigators perceive a subsequent fatal outcome as a controllable consequence of action that generated the hazardous situation. We consider, in the following two cases, the logic underlying perceptions of

risk taking incorporating acceptable or unacceptable behaviour, and the subsequent appraisal of death as a controllable or uncontrollable consequence.

In the first case, a man was shot and killed in a rifle duel with his brother. A description of the event is provided by the brother charged with murder:

> I think my brother went a little beserk. He took one gun and loaded it up. He says you put a shell in one, and I'll put a shell in one, and we'll duel. I counted one, two, three and I shot. I killed him, I sorry, officer, honest! I'm a man not a mouse, so I shot first. He said "count to three", so I counted and shot him. I didn't want to, but I had no choice.

In the second case, a man also was shot and killed by his brother. Again, the brother responsible for the death, provided a description of the event:

> My brother and I were hunting, and he just shot a moose. He was sorting tags in the rear of his pick-up. I leaned forward for a closer look and must have applied pressure to the trigger of my rifle. The shot got him in the chest.

The first case was a culpable homicide, whereas the second case was classified as an accidental death. Investigators noted, that the duel was unacceptable behaviour, insofar as any reasonable person could have foreseen the likelihood of death. In other words, the person responsible for the death could have taken action to prevent its occurrence. On the other hand, to be in possession of a loaded rifle is acceptable in the context of hunting game. Killing someone while hunting is not considered likely unless the persons involved

are careless. That is to say, hunting with a rifle is acceptable because death is not easily foreseen as a consequence of such action. If a death was not easily foreseen, then the person responsible could not have taken action to prevent its occurrence.

Hence, homicide ceases to be plausible when investigators regard the possibility difficult to imagine. It is difficult to imagine when the action that generated hazards leading to death is perceived in the context of acceptable behaviour. This behaviour fosters subjective impressions of death as an uncontrollable consequence of action that generated the risks. These impressions derive from the inference that if death was not easily predictable, then the person responsible could not have exercised control over the causal agent. However, such probabilistic judgments are influenced by the initial perception of when the event of death originated. In the case of the hunting accident, investigators retrospectively identified the action of leaning forward to inspect the tagging of the moose as a point signalling the discontinuity between living and dying. Therefore, granting the brevity of the action, it is difficult to imagine either brother having sufficient time to avoid the fatal outcome. But, the initial selection of occurrences marking the origin of the event is susceptible to the bias of reasoning by hindsight.

Investigators select an origin of death which is consistent with an image of the event as an improbable

occurrence when they know that the action generating the lethal risks involved acceptable behaviour. This bias, for instance, works against the detection of homicide in high velocity vehicle collisions which are deliberately executed with the intent of murder and suicide. Indeed, Nelson et al. (1978:78) note, "Since the investigator is reconstructing an event and dealing with residual information, he cannot find what he does not suspect or what he does not bother to look for". Investigators are not suspecting homicide in a vehicle collision due to their perceptions of the action that generates such fatal outcomes. That is, killing someone while driving is not considered likely unless carelessness or mechanical failure is involved. Hence, investigators do not seek evidence of intent in their determination of when and where the event originated. In other words, the list of possible causal candidates, informing modus operandi inferences, is curtailed by perceptions of risks incorporating acceptable behaviour, and the subsequent appraisal of fatal outcomes as uncontrollable consequences.

C. Homicide Concealed As Suicide

There are no medicolegal criteria specifying how to recognize when possibilities have been prematurely excluded from the list of possible causes of death. Investigators must rely on intuition to prevent such premature exclusions. However, intuitive judgments are susceptible to forms of deliberate manipulation that could induce misplaced confi-

dence in the exhaustiveness of a causal list. To describe how such manipulation may occur in medicolegal investigations, we must attend to the circumstances of death that encourage suspicions of homicide.

The possibility of homicide remains extremely plausible when an initial investigation reveals that a corpse may have been concealed. Evidence of concealment is recognized when the location of the corpse does not appear to correspond with the site where injuries were sustained. A case in point involved a 4 year old girl who was found wrapped in a garbage bag inside a refuse container. Blood and human semen were found in the vicinity of the container suggesting the girl had been sexually molested. An autopsy disclosed the girl had been raped in the anus and stabbed numerous times in the throat with a pocket knife. The attempted concealment of the girl identified intent as a causal component of the killing. That is, investigators deduce intent in cases of homicide when there is evidence that a setting has been modified to conceal the occurrence of death.

By comparison, we found in cases of suicide, that intent is inferred from evidence suggesting a scene was modified to produce the effect of death. However, modifications designed to produce death could also serve to conceal the event and vice versa. For example, a corpse with weights attached to the legs was found on the bottom of a river. Therefore, in this case, how would investigators differen-

tiate between homicidal and suicidal intent? According to our field observations, investigators initially rely on autopsy findings to establish the nature of the intent. Certain kinds of clinical tracers discoverable at an autopsy invariably indicate that a person other than the decedent exercised control over the causal agent of death. If such tracers are not evident, then to deduce intent investigators rely on evidence found at the scene of the death, eyewitness reports, and biographical information about the decedent. This evidence derived from sources which vary in credibility, is orchestrated largely through intuition as exemplified in the following case.

A man visiting his mother discovered her dead clothed only in a bra and lying in bed. Numerous empty pill containers were observed and the sheets of the bed were smeared with blood. A lamp was lying on its side on top of a bedside table. There was broken glass on the carpet of the bedroom. A stream of dry blood protruded from the nose of the woman, and a bloody scrape was visible on her chin.

Investigators perceived the condition of the glass, lamps, and sheets as possible evidence of foul play. Hence, there were strong suspicions that the woman was a victim of a homicidal assault. On the other hand, accidental death remained plausible insofar as an external examination of the corpse did not furnish evidence indicating the source of the fatal injury. Moreover, investigators granted that suicide was a possibility in light of the empty pill containers observed at the scene of the death.

An autopsy revealed that the cause of death was brain injury most likely sustained by a striking of the head against a stationary object. However, it was not possible to determine whether a person other than the decedent was responsible for the injury that resulted in death. Adding to the uncertainty of the investigators, was the fact that the level of alcohol in the blood would have rendered the woman intoxicated. Hence, the possibility of death due to an accidental fall while intoxicated appeared more plausible than homicide after investigators received the findings of the autopsy. Suicide was excluded from the list of possible causes. Persons do not kill themselves intentionally by bashing their heads against stationary object, according to medicolegal investigators.

Nevertheless, homicide remained suspect, because a search of the premises where the corpse was found did not reveal any empty or partially consumed bottles of liquor. Investigators traced the woman's whereabouts prior to death by exhibiting her photograph in public places where alcohol is consumed. Eventually, a bartender reported that he saw the woman leave in the company of a man dressed in the uniform of a night watchman. Subsequently, the man was located and he confessed to throwing the woman against a wall when she reneged on a promise of sexual participation.

In retrospect, the homicide was detected largely through intuitive perceptions of the scene of death as a place where violence occurred. That is to say, evidence

used in the inference of violence also preserved an image of accidental occurrences (ie. knocking a lamp over, and breaking a glass), induced by a state of drunkenness. The key feature distinguishing images of accidental and homicidal death was the absence of evidence at the scene of death showing where and how the woman became intoxicated. Investigators were not able to verbalize how the absence of liquor bottles provided a clue to the causal components of death. They rely on hunches to sustain suspicions of homicide when an investigation discloses evidence making other categories of death appear more plausible. Essentially, homicide remains on the list of possible causes until contrary evidence makes its occurrence difficult for investigators to imagine.

Evidence contrary to homicide could be fabricated in cases where autopsy findings do not unequivocally exclude the possibility of self-inflicted injury. According to our field observation, likely candidates for such fabrication are unwitnessed deaths involving poisoning, drowning, falls, and drug overdose. Suicide is particularly suspect in such instances when there is evidence of long standing social or interpersonal problems in the history of the decedent. For example, investigators suspected insulin overdose as the cause of death in the case of a man who was found dead on the floor of his bedroom. Their suspicions were intensified by the wife of the decedent who reported that her husband had adjusted poorly to diabetic regimen, and his subsequent

depression was causing extreme marital discord. A search at the scene of death disclosed the decedent's will and outstanding bills piled neatly on the top of a bedside table. A physician confirmed that the man was having difficulty adjusting to his diabetes, and an autopsy established insulin overdose as the cause of death. Hence, the investigators perceived all of the elements needed to infer intent as a causal component of the event.

There was a motive for suicide based on the evidence of marital discord provided by the wife. The bills and will piled on top of the table indicated the man had made preparations for death. Moreover, the investigators reasoned that a diabetic bent upon self-destruction would most likely resort to administering a fatal dose of insulin. The question is did the wife deliberately lead investigators away from suspicions of homicide by drawing their attention to the likelihood of suicide? Did the wife refer to depression and marital discord knowing this information would invite inferences that her husband killed himself? Did she arrange the scene of death to create the impression that her husband had prepared for his demise? Did she reckon on the ease of imagining suicide by insulin overdose when the preponderance of evidence favoured this possibility? These questions implying suspicions of homicide are deflected by manipulating perceptions of the probability of suicide such that investigators reason correctly from false premises. Indeed, investigators would do well to heed Cohen's

(1977:39) observations that, "...in everyday life we very often have to form beliefs about individual matters of fact in a context of incomplete information. We need something better then than a concept of probability which is conclusively applicable to our inferences only on the assumption that we already have all the relevant premisses".

A number of questions are raised which suggest possible difficulties medicolegal investigators may encounter in deducing causes of death. It is possible to know how much and what kind of awareness a person must possess in order to intend a death? What kind of knowledge is needed to deduce a probability that a person did or did not have opportunities to exercise control over a causal agent of death? It is possible to know when control over a causal agent ceases to be relevant to the causes of death? Is it possible to know when a list of possible causes of death is complete? What kind of knowledge is needed to judge whether death is an avoidable or unavoidable consequence of action that incurred lethal risks? Investigators must deal with such questions in order to recognize distinctions among causal components of death. If investigators seek resolutions by referring to recent explorations in the study of causes of death, they will be confronted with problems that could pose a significant challenge to the adequacy of medicolegal categories as codes for organizing information about phenomena of death. The problems in question relate to delayed effects of causal agents of death. We will examine how medicolegal concepts of causation ignore, overlook, or divert attention from the possibility of such effects.

D. Delayed Effects of Causal Agents

Perper and Wecht (1975:22) draw attention to the difficulty of locating causes when traumatic injuries produce effects that precipitate or aggravate a disease leading to death. The difficulty is illustrated in the case of a man who has a disease that renders him particularly susceptible to sudden cardiac death while undergoing surgery. As the result of a motor vehicle accident, the man with the heart condition sustains injuries necessitating surgical repair. Subsequently, he succumbs to sudden cardiac death two days after surgery is completed. A pathologist reports that any form of stress could have triggered cardiac failure. Therefore, were the occurrences of the accident merely coincidental with an inevitable death caused by disease? If the man had died during the operation, there would have been no difficulty tracing the origin of the event to the effects of trauma sustained in the accident. That is to say, a "causal relationship in delayed traffic death can be successfully proved, both medically and legally by a continuous chain of symptomatology from accident to death (so-called bridging symptoms), and morphologic proof that the changes of natural disease complicating the trauma can be traced to the time of the accident". (Perper and Wecht, 1975:22). However, tracing a death to trauma through reference to "bridging symptoms" becomes increasingly difficult as the post-accident survival period lengthens. We can explain some of the difficulty by attending to our previous observations re-

garding how medicolegal concepts of causation operate in the classification of natural death.

Consider the case of a woman who arrives home to find that someone had broken into her house. She becomes extremely apprehensive about entering and leaving her house on subsequent occasions, and as a consequence develops high blood pressure leading to heart disease. She receives medical treatment for a few years until the disease eventually causes her death. Does the possibility arise of perceiving the woman as a homicide victim of emotional trauma induced by the person who broke into her home? No, this possibility would never be considered, rather the physician who attended the woman throughout the course of the disease, would classify the event as death by natural causes. That is, the issue of how the disease is related to external agents does not enter into the identification of causal components of death, once an internal agent is perceived as the source of the event. Hence, the physician does not consider causes of death that operate beyond the level of changes in cells and tissues. Otherwise, the distinction between natural and unnatural death is obscured. However, this distinction is based on a concept of disease as a cause of death that can be explained exclusively in terms of physiological occurrences. In other words, the legitimacy of natural death as medicolegal category derives from the restriction that causal components of fatal disease must be traceable on a single pathway originating within the body.

There is reason to question the merit of such restriction, from both a pragmatic and scientific perspective.

With respect to ongoing clinical research into causes of sudden cardiac death Engel (1976:665) informs us that, "Although much more work will be required to delineate the critical physiologic mechanisms culminating in lethal arrhythmias, there can no longer be any grounds to disregard the life circumstances and psychologic responses that may initiate the fateful chain of events". Cobb (1976:300-314) provides evidence showing persons are more susceptible to contracting lethal disorders during periods of emotional or social crises. In a related vein, Wenblatt et al (1978:60-65) discovered through elabroate statistical analysis, it is possible to trace sudden coronary death through myocardial damage and lethal arrhythmias to emotional stresses associated with the handicap of being insufficiently educated to manage everyday problems of living. This research complements a more general study of health in Canada that concludes many lethal diseases such as cancer, cirrhosis, and atherosclerosis are related to self-destructive habits of a style of life (Lalonde, 1974). Therefore, to exclude social and psychological occurrences, in tracing the pathogenesis of a fatal disease, is to divert the causal explanation of what Scriven (1975:11) describes as "...the maximum benefits in comprehension that it can impart..."

Furthermore, the distinction between internal and external agent ceases to be compelling as a point of causal reference, if one grants that social and psychological occurrences are characteristically responses to environmental conditions. Indeed, the logic of the distinction between internal and external agent is shrouded in ambiguity. For example, a death is classified as accidental when a miner dies from pneumoconiosis as a result of inhaling coal dust for many years. That is, the event incorporates the causal components of unintentional, unexpected, and unavoidable injury. These components are identified with external agents of death. On the other hand, a death is classified as natural when a person succumbs to legionnaires' disease as a result of inhaling bacterium from a hotel air-conditioning system. Both deaths are products of environmental conditions. Therefore, why in the latter case, is the death not traced to occurrences leading to the fatal exposure?

The idea of fatal exposure as causal component of death, according to our observations, is based on perceptions of action that incurs lethal risks. Accordingly, certain kinds of occupational settings are viewed as places where workers incur the lethal risk of contracting a potentially fatal disease. Hence, the coal miner is perceived as someone who is exposed to the risk of black lung disease, and the hazard of contracting cancer is recognized in jobs that expose workers to asbestos contaminants. However, why is

the dentist who must cope daily with the emotional stress of subjecting his patients to pain, not perceived as someone who is exposed to the risk of high blood pressure and subsequent fatal heart disease? Why is cirrhosis of the liver not considered an occupational hazard of advertising executives who are expected to frequently consume alcohol with prospective clients? Why are persons not considered to be incurring lethal risks when they work in hotels where guests have contracted legionnaires' disease? The point is that to exclude the question of why a person was exposed to fatal disease, as a possible factor contributing to death, is an issue of value, not cause. In other words, value judgments determine when contracting a fatal disease will be perceived as an unavoidable consequence of action that incurs lethal risks.

It is conceivable that such value judgments are fashioned by the constraints of coding phenomena of death in terms of single factor uni-directional causal explanations. For example, consider the case of a Caucasian male who contracts lung cancer and dies as a result of the disease, two years after retiring from a job that required him to have regular chest X-rays. Exposure to radiation can render cells tumorous (Tamplin and Gofman, 1970). Therefore, occupational factors may be implicated in the cause of death. Moreover, the man was a heavy cigarette smoker which is known to be a significant factor in the develop-

ment of lung cancer. Hence, there is a case to be made that the decedent intentionally exposed himself to fatal disease through exercising control over the causal agent? On the other hand, the man lived in a city where there are high levels of air pollutants. The man may have been susceptible to lung cancer as a consequence of smoking cigarettes in highly polluted air. If this is the case, then the agencies which regulate air pollution are causally implicated in the death? Diamond et al. (1973:238-313) have discovered that white-skinned persons more so than dark are susceptible to carcinogenic effects of X-ray exposures. Therefore, the racial ancestry of the man may be a factor contributing to his death.

There is also a case to be made that a causal link exists between the retirement of the man and his subsequent development of lung cancer. Marcus (1976) has suggested that significant changes in life circumstances induce hormonal changes which could suppress immunity to cancer producing agents. The man frequently travelled by airplane after his retirement. Hence, his death could be related to the avoidable hazard of exposure to concentrated cosmic radiation through airplane travel. Alternatively, the frequent travelling would disrupt circadian body rhythms. Disruptions of this kind have been identified as factors which lower resistance to disease (Luce, 1973).

Another dimension can be added to the complex matrix of possible causal factors. Perhaps delay in the dia-

gnosis of the cancer contributed to the man's death? If this is the case, then the attending physicians are causally implicated in the death. Physicians recognize that in cases of cancer sometimes the treatment can be more dangerous than the disease as a life-threatening agent (Pierce et al., 1978:176). Hence, perhaps the cause of death is related to toxic effects induced by the chemotherapeutic management of the cancer. Milton (1973:1435) has noted when some patients are informed about their cancer, they will enter into a state of emotional shock which could hasten death such that, "if a necropsy is carried out, although the patient may have an extensive tumor, there will often appear to be no adequate explanation for the cause of death". Therefore, did the physician who treated the man possibly contribute to the fatal outcome by informing him about the lung cancer? Indeed, what justifications are there for excluding possible chains of causality other than those which can be explicated entirely on a physiological level of abstraction?

To justify such exclusions on the basis of simplicity is to beg the question. A justification through reference to utility reflects interests of value, such as the amount of time a medicolegal system is willing to invest in tracing possible causes of death. A justification that greater objectivity attends reasoning exclusively through physiology is misleading. For example, there is a presump-

tion that the pathologist actually observes rather than deduces physiological processes identified as diseases leading to death. However, Margolis (1976:244) points out there is a question that remains, namely, "What makes what the pathologist observes classifiable as disease?" We have noted that the concept of disease varies with fashion and geography. Indeed Campbell et al. (1979:760) report physicians adopt a nominalist position when they refer to disease such that the question "is this a disease?" becomes "Is it useful in medical discourse to recognize and name as a disease the group of phenomena so defined?"

E. Summary

We will conclude this chapter with a brief discussion of medicolegal concepts that orchestrate membership in categories of unnatural death. Distinctions among unnatural death are firmly anchored in ideas of intent which operate through concepts of being aware of lethal risks, having opportunities to avoid fatal injury, and exercising control over causal agents of death. These concepts provide an axis of orientation whereby the indentification of causal components of external agents becomes an inferential task requiring intuitive estimations of probability. In other words, to infer intent as a causal component of death, is to estimate a probability that evidence does, or does not belong to a subset of occurrences defining an awareness of lethal risks. However, such estimations are sensitive to numerous qualitative judgments concerning the rational-

ity of action. For example, we have noted that investigators rely upon the ease of imagining death as a foreseeable consequence of action to deduce a person was aware of lethal risks. But, when does evidence of death as a foreseeable event signify a fatal outcome was intended? Are persons intending death when they scuba dive without a companion or refuse to wear a seat-belt while driving a car?

Once a fatal consequence is foreseen, it does not necessarily follow that a person will seek to avoid action incurring the lethal risk. Avoidance could deny the expression of their intentions such as the exercise of free choice. That is to say, a person intends to exercise freedom of choice by not wearing a seat-belt or scuba diving without a companion. Is the intention of exercising freedom of choice through deliberate exposure to potentially lethal hazards in a game of Russian roulette not equivalent to an intention of seeking to die? Specifically, when is the intention of exercising freedom of choice accorded less weight than the intention of seeking death? How is the weighting of intent influenced by perceptions of opportunities to avoid fatal injury?

We have found that perceptions of death as an avoidable event depend upon temporal specifications which identify the discontinuity from living to dying as a discrete occurrence in the transformation from person to corpse. Moreover, such specifications enter into subjective estimates

that govern perceptions regarding the likelihood of exercising control over a causal agent of death. Thus, for example, consider a case where a man is informed that car brake failure is imminent if repairs are not made. The warning is not heeded, and some weeks later the man dies from injuries that occur when his car brakes fail to work. In this case, should the causal components of the event include the initial warning as well as the situation where the brakes failed? If the initial warning is included, then was the man exercising control over the occurrences leading to death by driving his car? How does this death differ from a case where the person succumbs to the toxic effects of a drug after being warned about the lethal hazards of overdose? Must the certainty of death approach a specific magnitude before the intention of seeking to die is recognized? How is this magnitude deduced, without knowing the set of all possible outcomes which could embody a wide range of intentions? Is such knowledge not a question of personal judgment? What kinds of value inform such judgment?

We have found that value distinctions assume a significant role in the perception of death as an instance of homicide. However, the logic of such distinctions is vague. For example, if the man with faulty car brakes had killed a pedestrian, rather than himself, would the death be classified as a homicide? Is homicide excluded from the

list of possible causes because the action generating the hazardous situation embodied an element of acceptable behaviour? When does the presence of absence of acceptable behaviour cease to be relevant in the identification of causal components of a death? Whose viewpoints are being represented when unacceptable behaviour is identified with action that incurs a lethal risk leading to fatal injury? This question has immediate implications for cases of "mercy killing". Are such deaths preceived as instances of justifiable or culpable homicide?

A reasonable surmise given the number of taxonomic queries raised in this chapter, is that, numerous impediments to classificatory precision arise from the cognitive postures required to envisage correspondences among images of cause and categories of death? Therefore we must conclude this research by addressing whether the reliability with which causes of death are presently assigned is sufficient for the official purpose of classifying death. The next chapter will assess the utility of medicolegal classifications of death.

CHAPTER SEVEN

CONCLUSION

A. The Utility of Medicolegal Classifications of Death

Diverse collectivities have self-serving reasons for wanting to know why the demise of a specific person occurred at a particular time. When death occurs, causal inquiry affords opportunities for disputing issues of civil and criminal liability, financial compensation, insurance benefits, professional conduct, and personal reputation. In addition to furnishing substance for social disputation, causal inquiry functions as a vehicle for the official registration of death. Mortality statistics are officially coded and tabulated through reference to causation. Moreover, the official assignment of a cause of death is deemed a prerequisite to the social practices of burying or cremating the remains. Also, causes of death are sought by various agencies which assume responsibility for drawing public attention to circumstances that induce potentially lethal hazards.

One can easily appreciate, granting the diffuse objectives of those who seek to know why a person died, that unanimity of agreement regarding causes is unlikely without explicit rules prescribing when a causal explanation is satisfied. The purpose of classifying deaths, officially, is to adjudicate competitive claims about causation through a system of categories which define how occurrences become eligible for the title of cause. Once such eligibility is

determined, the most suitable candidate is selected from a list of possible causes of death. Hence, to suggest, as some critics have, that the enterprise has doubtful validity, is to comment unfavourably on the utility of official classifiers of death as adjudicators for the causally inquisitive. We will grant that such utility is satisfied if for any given death the list of possible causes is exhausted (i.e. criterion of exhaustibility), and all but the most plausible candidates are eliminated (i.e. criterion of elimination). These two criteria were derived from responses to the following questions:

(1) What concepts inform the ordering of causal priority?

(2) How concise and manageable are concepts which identify "causal components" of a sufficient cause of death?

(3) What concepts identify variations in the salience of phenomena of death?

(4) How compatible are concepts which identify phenomena of death through different levels of abstraction?

The above questions were used to explore how official categories of death operate through criteria which afford medicolegal classifiers some means of redressing grievances that their causal explanations of particular deaths are not satisfactory. In other words, the assumption we test is that the criteria used to allocate deaths to official categories embody principles which stand in defence of decisions to

withhold or confer titles of eligible and plausible causes of death. The defence would rest on the demonstration of impartiality in the principles used to specify where the search for causes of death should be initiated and terminated. Moreover, we examine how such medicolegal principles order taxonomic relations which define deaths as discrete events with specific constellations of causal components.

We have found a means of deciphering the logic, clarity and consistency of medicolegal principles through reference to set-theoretical formulations. This instrumentality translates the task of adjudicating the eligibility of occurrences as possible causes of death into an analytical problem of locating a topological space on the intersection of sets delimiting points of discontinuity from living to dying and dying to death. Moreover, in keeping with this set-theoretic approach, the most plausible causes of death are those occurrences which provide inverse mappings of continuous process on a topological space.

A living set, denoted Al, serves to explicate how far medicolegal investigators are prepared to historically regress in their search for the cause of a particular death. To be precise, we have found that causal regression is limited by classificatory distinctions that identify when the cause of a death is preserved in some assemblage of evidence reflecting phenomena of transformation. Any forms of change that happened prior to those which figure in the preservation of the cause of death are conceived as belonging to a living

set. Members of set A1, are deemed inadmissible as causal components of a death. Hence, through the delineation of set A1, investigators restrict the range of causal antecedents used to explain the demise of a person.

A death set, denoted C1, further restricts how medicolegal investigators perceive a particular demise as a discrete event with discernible causes. Set C1 contains references to any forms of change that befall a corpse. Members of the death set furnish medicolegal investigators with tracers pointing to an underlying system of cause and effect explaining why the demise of a specific person occurred at a particular time.

Two fundamental systems of cause and effect are embodied in the distinction that medicolegal investigators draw when they refer to death as either a natural or unnatural event. Both systems of cause and effect (i.e. natural and unnatural) operate within a zone of mortality denoted Z. Sets A and C, respectively, delineate in Z discontinuous occurrences from living to dying and dying to death. A list of possible causes of a death is exhausted by assigning membership in set B, derived from the intersection of A and C.

To choose among candidates from the list of possible causes, medicolegal investigators select members belonging to set C, that map into set A, by way of a bijective correspondence. The bijective mapping induces a topological space denoted T, on the intersection of sets A and C, such

that the most plausible cause of death is preserved as an inverse image projecting a constellation of causal components. We have found that such constellations identify either an internal or external agent as the origin of the death. That is to say, the event is conceived as originating either within (i.e. internal agent) or outside (i.e. external agent) the body of the deceased. This conceptual distinction affords official classifiers of death an axis for adjudicating the claims of those who have a vested interest in knowing why a person died. To assess the validity of the axis we now introduce three types of problems that may raise concerns pertaining to whether a causal explanation of a death is satisfied in view of the previously stated criteria of exhaustibility and elimination. Each type of problem shares the distinction of exposing conceivable errors in the enumeration of members belonging to the intersection of sets A and C.

The first problem is that medicolegal investigators are distracted while enumerating possible causes of death, and subsequently membership in sets A and C is not collectively exhausted. We refer to this distraction where the range of discriminatory possibilities mapping set C to A is incomplete as a problem of decoy.

The second problem is that medicolegal investigators are deceived into naming possible causes of death which in reality do not exist. We refer to this deception, where non-existent members of sets C and A are named, as the pro-

blem of mirage.

The third problem is that possible causes of death are concealed by virtue of possessing an approximate resemblance to occurrences which are not causes but rather conditions surrounding a death (i.e. members of set Z-T). This problem is succinctly conveyed through reference to the perceptual distinction between figure and ground. In this case, the figure is represented as a causal component of death, and the ground is the surrounding condition in which a component is embedded. Both figure and ground are indistinguishable as a consequence of carrying approximately the same information. Hence, the ground serves to conceal unique properties of the figure. When causal components are not perceived as being distinct from conditions surrounding death we refer to this type of concealment as the problem of mimic.

In set-theoretic terms, the problems of decoy, mirage and mimic qualify as errors of composition such that the product set of C and A is either too broad or narrow to delimit a range of discriminations for mapping an inverse image of the causal agent of death. If the product set, C x A, is too broad, then an ineligibile member has been included in the range of possibilities delineating causal components of death. On the other hand, if the product set, C x A, is too narrow, then eligible members are excluded from the list of possibilities delineating causal components of death. These errors are conceivable given our finding that

medicolegal investigators operate with concepts which do not afford precision of manipulation in allocating deaths to official categories. We have found that this problem can be understood through reference to three conditions which function as impediments to the attainment of precision in the processes of allocation.

First, precision of allocation requires information that is inaccessible due to technical deficiencies in the modalities of investigating death. Secondly, the concepts used to derive a correspondence between a death and an official category are not susceptible to exact description. Thirdly, there is no technical means of calibrating precisely when incomplete information leads to faulty observations and subsequently erroneous naming of causal components of a death. These conditions do not necessarily preclude investigators from satisfying criteria of exhaustibility and elimination in their task of allocating deaths to official categories. Nevertheless, such conditions could make the discriminatory task receptive to problems of decoy, mirage and mimic. Therefore, in view of possible errors of composition arising from impediments to classificatory precision, we must assess the merit of criticism that official classifiers of death do not serve well those who have vested interests associated with causes of death. Generally such criticism is found on the assumption of partiality in judgments to confer the causes of death. However, this assumption lacks substance if medicolegal judgments are orchestrated in

accordance with principles which enforce a posture of impartiality.

B. Deaths in the Context of Medical Practices

Numerous situations arise in the context of medical practices where a physician must content with the possibility of denying claims that his action contributed to the death of a patient. We have noted that such situations typically embody the following kinds of circumstances:

Circumstance One

A patient reacts fatally to drugs prescribed during the course of some form of therapeutic intervention.

Circumstance Two

A patient succumbs to postoperative complications precipitated by some form of surgical procedure.

Circumstance Three

A patient dies when an operative condition is either incorrectly diagnosed or not identified sufficiently early for surgical repair.

Circumstance Four

A patient dies following a physician's decision to forgo employing either resuscitative or intensive-care measures needed to sustain vital bodily functions.

Each circumstance offers four perspectives which reflect variations in the causal significance of actions either committed or omitted by a physician during the medical management of a patient. First, the action of the physician is conceived as the immediate cause of death.

Secondly, the action of a physician in conjunction with some morbid condition of the patient is conceived as an antecedent cause of death. Thirdly, the action of a physician is conceived as the underlying cause of death. Finally, the action of a physician is perceived as a condition surrounding but not causing death.

We can assess the validity of each perspective by applying medicolegal principles derived from observation of procedures used to allocate deaths to official categories. Moreover, if a perspective has validity, then we will specify how problems of decoy, mirage and mimic may prevent investigators from fulfilling criteria of exhaustibility and elimination. Finally, we must assess whether feasible means exist for correcting such problems, and if we conclude otherwise, then one alternative is to argue that a guarantee of impartiality in the orchestration of causal evidence is the best one can expect from any taxonomy which furnishes categories for the adjudication of claims about the causes of death.

The initial procedure is to specify principles that refute the validity of causal claims associating a death with the actions of a physician. Each principle furnishes a basis for classifying deaths as natural events in the context of medicolegal practices. With respect to a drug-related death, a physician would not be cast as a causal agent, if the medicament in question was used to treat a disease which left unattended would have inevitably caused the death of a patient. Nor is a physician perceived as a causal agent when the demise

of a patient is attributed to postoperative complications induced by surgery used in the treatment of a potentially fatal disease. In both circumstances the impression one receives is that a physician has accelerated the causal sequences leading to death. However, the stance adopted by the medicolegal investigators is that both circumstances originated with the biological onset of a disease which resulted in death, inspite of, rather than because of the intervention of a physician. This stance derives from a medicolegal concept of disease as characteristic sequences of pathological change which identify underlying causes of death. Specifically, the principle is that once an internal agent is identified as the underlying cause of death, then all subsequent occurrences associated with the event are coded exclusively in terms of tissue and cellular alterations on a single causal pathway. Any form of treatment administered by a physician is comprehended only through reference to higher levels of abstraction, such as motives and purposes for intervention. Accordingly, the physician is excluded as a causal agent, and a specific type of surgical or therapeutic intervention is perceived as a condition surrounding death. In this context, death is conceived as a consequence of a lack of response to treatment for any form of disease deemed potentially fatal.

Next, consider a circumstance where persons claim a physician is the underlying cause of death as the result of failing to diagnose a disease which is usually responsive to

treatment if detected early in the process of development. Medicolegal investigators reject such claims by drawing attention to the absence of prima facie evidence showing that the prolongation of life invariably follows from early detection and treatment of particular diseases associated with causes of death. For example, with respect to the concept of "early cancer", Barron (1978:17) notes: "In terms of time, an early tumour may already have metastasized while a late tumour may be surgically resectable and curable." One patient may succumb to a few small placques in the coronary artery, whereas another patient continues to function normally with an extensive amount of coronary sclerosis. Moreover, patients with equivalent types of pathological lesion do not necessarily benefit equally from equivalent therapeutic regimens. Nor, are there formulae to unequivocally estimate the causal relationship between a delay in diagnosis and the hastening of death.

In essence, there are no fixed guidelines whereby medicolegal investigators can proceed on the assumption that if a disease in a particular case had been treated before reaching a specific stage, then the patient's death would have been postponed. Concomitantly, with respect to postponing a death through drugs or surgery, there is no consensus regarding the actual duration that would qualify a treatment as being advantageous to a patient. Indeed, whether the prolongation of life is a benefit to a patient stands more as a question of value, rather than fact, in

circumstances where the treatment needed to maintain survival causes unremitting pain and discomfort. However, only questions of fact are addressed in medicolegal judgments of causation. Therefore, in cases of mistaken or delayed diagnosis, the medicolegal principle is to exclude a physician's eligibility as a causal component of death when there is no conclusive evidence showing the fatal consequences of a disease could have been prevented through treatment.

Medicolegal investigators invoke other medicolegal principles when adjudicating claims that a physician caused the death of a patient by either withdrawing or withholding measures needed to prolong life. In such cases, foremost consideration is given to the pathophysiological status of the patient prior to the termination of life - prolonging measures. If the patient suffers from a fatal disease which has progressed to an irreversible and irreparable stage, then the physician's decision to disengage intensive measures of therapeutic intervention ceases to be salient in the causal ordering of the event. Specifically, once a prognosis of imminent death is reached, the physician assumes responsibility for easing the burden of dying through the disengagement of measures which delay the unfolding of fatal pathophysiological occurrences. From a medicolegal viewpoint, such action is perceived as a form of treatment which assists rather than causes a patient to undertake the final course of transformation from person to corpse. This viewpoint derives from the

principle that a physician is never conceived as the cause of a patient's demise if treatment executed prior to death is consistent with accepted medical practice.

Let us now consider conditions that impede medicolegal investigators in their attainment of precision as far as applying principles which eliminate physicians from the list of possible causes of death. First, with respect to adverse drug reactions, there are no objective techniques for ascertaining the causal role of a drug used in treatment and a subsequent fatal occurrence. Indeed, considerable ambiguity attends the definition of an adverse drug reaction. Achong (1978:1315) informs us that: "Even when suspected drug reactions are assessed by clinical pharmacologists there is often disagreement as to the certainty about whether the event was drug-induced." Furthermore, when an underlying pathology is complicated or the patient's condition militates against a precise diagnosis, physicians lack the technical means to distinguish fatal effects induced by drugs from those associated with concurrent illnesses. In such cases, there is no conclusive evidence that if a drug implicated in the demise of a patient had not been administered, then the disease underlying treatment would have caused death. Subsequently, medicolegal investigators are extremely limited in their ability to distinguish between genuine and spurious causal reactions when adjudicating claims that a physician caused a death through the administration of drugs. Unless there is unassailable evidence of adverse reactions to a

specific drug as the singular cause of death, medicolegal investigators are obliged to accept claims by physicians that the presence of a disease explains why a patient died.

A reasonable contention is that deaths involving adverse reactions to drugs are susceptible to misclassification in the context of medical practices. However, such errors appear to result from principles which seek to insure impartiality in the adjudication of causes of death. Consider cases where physicians make diagnostic errors and treat their patients with drugs for conditions which are not present. Pharmacological substances used in treatment induce pathophysiological changes that are exhibited in the form of signs and symptoms characteristic of the natural evolution of erroneously diagnozed diseases. There are in such cases no unique clinical features which identify the causal role of drugs in the deaths of the patients. Indeed, as Elliot (1975:22) points out: "To distinguish between natural death due to the disease per se and unnatural death due to drug effect may be difficult if not impossible both clinically and at necropsy." Moreover, we have noted that the medicolegal system in Alberta encourages physicians to classify death as natural if in their opinion disease per se explains occurrences observed immediately prior to death. Hence, due to technical deficiencies in the modalities of investigating drug-induced deaths, problems of mimic arise such that eligible members are excluded from the list of possibilities delineating causal components of death. For

the same reasons, cases where patients have deliberately incurred fatal injury through noncompliance with pharmacological regimens, are not likely to be detected as long as the lethal effects of the drugs cannot be extricated from clinical features of existing diseases.

One might expect difficulties in applying medicolegal principles to adjudicate whether or not occurrences are eligible for the title of cause when the focus of dispute is the claim that surgical intervention initiated a sequence of events leading to death. Consider cases where patients have succumbed to diseases arising from postoperative complications. If such cases are classified as natural deaths, then surgical occurrences do not qualify as part of the causal ancestry of the events. This conditional requirement follows from the principle that death must originate within the body of the deceased in order to be conceived as natural. However, when postoperative complications induce fatal diseases, the causes of death do not exist prior to surgery. Hence, the temporal ordering of the surgical occurrences precludes medicolegal investigators from perceiving death as a consequence of the patient's failure to respond to treatment for a pre-existing disease. This perception is necessary to apply the principle that death induced by surgery is natural insofar as the event occurred inspite of, rather than because of the intervention of a physician. The disease treated by surgical means is different from the disease caused by surgery. But, on the other

hand, embodied in the category of natural death is the principle that a physician does not cause a patient's demise if the treatment in question is consistent with accepted medical practices.

We have observed that physicians work in a climate of uncertainty, given the constant state of flux in therapeutic knowledge. Spiro (1977:558) provides reasons for such uncertainty when he acknowledges, "For all the veneer of mathematical accuracy recently applied, medical practice remains imprecise because disorders are so imprecise and because symptoms and signs and laboratory evidence are often so vague". Consequently, in light of the imperfections of medical knowledge, physicians accrue expertise in finding ways to explain a patient's death without implicating their actions as contributory factors.

To provide causal explanations physicians claim that lethal risks attend any type of surgical or therapeutic intervention. Unless there is evidence to the contrary, deaths arising from postoperative complications are conceived as consequences which relate to lethal risks associated with the treatment of disease. However, medicolegal investigators do not have access to hospital records which could reveal sources of contrary evidence. Therefore, to adjudicate causal disputes they must rely on the integrity of the medical profession to furnish an explanation for deaths in the hospital. Generally the medical profession endorses the perspective that death is a contingency associated with the

treatment of any disease. Therefore, in retrospect, any form of disease has potentially fatal consequences in the context of medical practices. Medicolegal investigators must adopt this perspective in order to remain impartial while assessing the contributory role of a physician in the death of a patient.

C. Death in the Context Of Environmental Hazards

A review of principles embodied in the categories accidental and suicidal death is necessary to assess the merit of criticism that medicolegal classifiers do not serve well those who have vested interests in causally relating fatal events with external agents. First, consider the case of a man who succumbs to an acute myocardial infarction induced by stressful physical effort of shovelling snow. If such circumstances are to be classified as an instance of accidental death, then there must be evidence which preserves the image of an external agent in the effects of bodily injury. A principle employed by medicolegal investigators is that injuries sustained in an accidental death reflect the absence of opportunities to defensively react to hazardous effects of external agents. However, in the case under consideration, there are no lacerations, fractures, or contusions that can be related causally to externally derived forces. Moreover, the pattern of injury is not distinguishable from pathological features associated with fatal occurrences of an underlying disease. In other words, there are no technical means to exclude the possibility that the occurrences of

the infarction and shovelling were merely coincidental. Hence, investigators are obliged to classify the event as a natural death as long as some kind of disease provides an explanation for the findings.

Other circumstances exist where medicolegal thresholds of perception are not sufficiently developed to discriminate differences between internal and external agents of deaths. These include cases where accidentally incurred shocks induce parocysmal cardiac rhythms and sudden death in patients undergoing treatment for heart disorders (Starmer, McIntosh and Whalen, 1971:181-86). Here the presence of a disease in one sense serves to allay suspicion of external agents by distracting attention from electrical hazards as possible causes of death. That is to say, sudden death is an expected occurrence associated with heart disorders, and unless the event was witnessed, there would be no evidence to warrant suspicion of a connection between the death and electrical hazards. Furthermore, even granting witnesses to the electrocution, postmortem evidence would not preserve an image that allows medicolegal investigators to distinguish between internally and externally induced deaths. Gregory Bateson (1979:29) provides some insight into the nature of this discriminatory problem when he states: "All receipt of information is necessarily the receipt of news of difference, and all perception of difference is limited by threshold. Differences that are too slight or too slowly presented are not perceivable."

In set-theoretic terms, not only must differences between internal and external agents be perceived, but the respective images must yield inverse mappings of continuous process on a topological space. To achieve these mappings, it is necessary to temporally locate points of discontinuity from living to dying as well as from dying to death. These points of transition define intersections delineating subsets that partition elements denoting a zone of mortality. This partitioning determined the base of a topology which encapsulates death as a discrete event with order-preserving functions. Moreover, such functions derive from principles embodied in official categories of death. The principles operate on the premise that internal and external agents of death do not preserve equivalent inverse images of temporally symmetric causal relations.

Consider cases where persons claim that excessive exposure to diagnostic x-rays have caused death by inducing cancer. If these cases are to be classified as accidental death, then they must conform to the principle that evidence of injury preserves an image of cause reflecting action without design. However, considerations of design bear upon evidence showing an external agent was instrumental in contributing to the death. Such evidence is deduced from knowledge that on a particular occasion being exposed to a specific external agent would lead to fatal consequences. With respect to cancer, there is no way to determine that carcinogenic effects resulted from exposure to x-rays, as opposed

to occurrences originating within the body. In other words, the presence of the disease does not direct attention to a particular occasion where it would be appropriate to consider design as a possible causal component of death.

We have found that unnatural death is conceived as an event originating through action which occurs in a specific setting, whereas the concept of natural death does not order cause through reference to locale, but rather the timing of pathophysiological occurrences. Specifically, unnatural death is perceived as an event that emanates from a specific setting, whereas such perceptions are not necessary to identify a natural demise. This distinction is important insofar as the eligibility of an external agent as a possible cause of death is predicated on the presence of evidence showing the event originated within a discernible location. Thus, for example, consider the claim that if excessive consumption of food, tobacco, or alcohol is causally implicated in a death, then the event should be classified as suicide.

We have noted that a primary consideration in classifying death as suicide is that decedents have deliberately exposed themselves to a dangerous situation with the intent of incurring a fatal consequence. Investigators infer such intentions by relying on evidence which indicates a decedent made preparations that contributed to the certainty of death. Moreover, evidence of intent must complement a further finding that opportunities were available whereby

a decedent could have exercised control over the lethal effects of an external agent. Both concepts of intent and control operate through criteria which identify the transition from living to dying with action originating within a specific setting. In other words, a spatial as opposed to temporal orientation assumes priority in medicolegal investigative procedures used to map causal components of unnatural death. References to space fix perceptions of unnatural death as a discrete event by restricting the causal nexus of a fatality to a particular location. By comparison, references to time fix perceptions of natural death as a discrete event by restricting the causal nexus of a demise to pathophysiological occurrences with irreversible sequences of limited duration.

With respect to claims that a person incurred death through disease by abusing his health, there are no means of determining where such abuse transpired. Presumably, the abuse occurred over a protracted period of time involving a wide variety of situations. Subsequently, there is no way of determining what situation exhibits evidence preserving images of intent and control as causal components of the event. Thus, for instance, the concept of a person slowly killing himself through excessive cigarette smoking or alcohol consumption is not compatible with principles that inform medicolegal perceptions of suicide.

Let us now consider conditions that militate against precision in applying principles embodied in the categories

of accidental and suicidal death. The principles in question require investigators to make judgments about a person's awareness of the likelihood of incurring lethal risks prior to death. These probalistic judgments are susceptible to numerous errors. First, both the decedent's appreciation of hazards and his opportunities for avoiding fatal injury are perceived on a continuum, rather than in terms of either being present or absent. To locate the decedent on the continuum investigators make appraisals of the degree to which a self-imposed risk contributed to the certainty of a fatal occurrence. These appraisals are guided by inferences that a decedent had some awareness of activities portending hazardous consequences, in addition to possessing knowledge of the immediacy of the lethal effects. In order to deduce such cognitive capacities on the part of the decedent, investigators must assimilate widely disparate information. However, there are no objective criteria to direct the assimilation process.

To appreciate the difficulties of assimilating information about causes of death, contemplate a case where a man deliberately kills himself by stepping in front of an oncoming vehicle. There is no letter of intent in this case to draw attention to the suicidal nature of the man's behaviour. Initially, only injuries sustained by the man furnish evidence of causation. Hence, in view of initial impressions gleaned from the scene of death, equiprobable explanations of the event are that the man was preoccupied and

did not see the vehicle, he miscalculated the chances of avoiding a collision, or his ability to react to the perceived risk was impaired. A subsequent investigation of the death reveals a history of minor injuries sustained through reckless behaviour. Acquaintances of the deceased report he was extremely depressed about his recent retirement from work. Witnesses to the event disagree as to whether the decedent saw the vehicle prior to the fatal collision. An autopsy discloses an advanced malignant tumour and a quantity of alcohol in the blood sufficient to cause some perceptual impairment. A physician who had previously diagnosed the cancer six months prior to death reports the decedent had talked about the possibility of suicide upon learning of his disease. A pathologist, after reviewing the findings of the autopsy, expresses the opinion that the injuries sustained in the collision probably would not have been fatal, except for complications related to prior injuries. How should a medicolegal investigator evaluate each item of information in this case to determine the cause of death?

Rasmussen and Jensen (1974:293) in a study of repair strategies used by electronic maintenance technicians note: "The task of a man operating any technical system is to select from the information presented to him by the system the data relevant to his current goal, and to transform this information into a set of manipulations appropriate to his goal." In the vernacular of medicolegal investigation, the

technical system is represented by the principles embodied in official categories of death. We have emphasized how such principles determine eligibility on the list of possible causal components of death. The goal of the investigator is to assimilate causally relevant information in a manner that demonstrates the preponderance of evidence favours a particular category of death. Manipulations in aid of this goal involve assigning each member from the list of eligible causes, a capacity to yield inverse mappings of continuous process on an unidirectional single causal pathway. Items accorded the strongest capacity are deemed the most plausible explanations for the occurrences of death.

There are no uniform policies to assist investigators in estimating the capacity of evidence to preserve an image of cause consistent with perceptual distinctions afforded by official categories of death. Rather, they rely on practical experience to guide them in making probalistic judgments about the relative weight of evidence. We have observed that this reliance exposes medicolegal investigators to the systematic biases of the intuitive statistician. These biases can be illustrated in the prior case of the man who deliberately stepped in the path of an oncoming vehicle.

Reference to extreme depression following retirement furnishes evidence of motive for suicide. Moreover, the decedent's talk of suicide following the disclosure of his cancer enhances the plausibility of intent as a causal component of the event.

Medicolegal investigators perceive suicide as an event which develops progressively through a continuous sequence of unmanageable problems. However, there are no objective criteria specifying what type, duration or intensity of problem is likely to precipitate fatal self-injury. Nor, do investigators have access to records consisting of information about the distribution of outcomes in cases of the same general class. Thus, for example, they do not know how frequently persons resort to suicide as a response to depression initiated by retirement. Similarly, they do not know the prevalence of suicidal ideation among patients with cancer who never commit acts of self-destruction. Ingoring prior probabilities reduces the accuracy of judgments used in weighing the causal significance of evidence specific to the case at hand. (Tversky and Kahneman, 1974)

There are no objective criteria for deducing the state of mind of the decedent immediately prior to death. To preserve an image of intent investigators seek evidence which provides an estimate of the decedent's awareness of the risk of fatal self-injury. In the case under review there is no evidence indicating the scene of death was modified by the decedent to produce lethal effects. Thus, investigators would attend to evidence suggesting the decedent made preparations which were instrumental in facilitating exposure to a hazardous agent. In other words, they would seek some indication that the collision with the vehicle was deliberately executed by the decedent. However, eyewitness

descriptions of the event do not furnish unequivocal evidence of design.

A number of complex factors influencing the probative value of witness testimony could predispose investigators to revise their opinions about the likelihood of intent in the wrong direction. Disagreement among witnesses with respect to whether the decedent had opportunities to avoid fatal injury encourages suspicions that a verdict of suicide is unwarranted. Differences of opinion could reflect variations among witnesses in the propensity to accurately recall events. Some witnesses may have been better located than others to observe the responses of the decedent. Disagreement could reflect the fact that witnesses became cognizant of the man's action at different points in time. Differences of opinion could imply variations amont witnesses in their characterization of risk. Loftus (1975: 561) reports, "that questions asked about an event shortly after it occurs may distort the witness' memory for that event". Perhaps, differences of opinion bear testimony of such distortion in the different recollections of the event.

Once investigators encounter difficulty sustaining images of intent and control, they accord greater weight to evidence consistent with the occurrences of accidental death. Hence, a high blood/alcohol level or a history of reckless behaviour is perceived as evidence that exposure to a lethal agent was an effect arising from bad judgment or errors on the part of the decedent. This perception is open to

challenge insofar as a drug or alcohol related diminishment in the ability to exercise control over a lethal agent does not preclude the possibility of a person being aware of fatal consequences that are likely to occur as a result of self-induced chemical impairment. Conversely, a person may accurately estimate the likelihood of fatal consequences, but it does not follow that such knowledge guarantees opportunities to exercise control over the outcome. In addition, a person may know how to avoid a lethal risk without possessing knowledge about the likelihood of its occurrence. Nevertheless, to infer a potential for premature death, by attending to evidence of hazardous behaviour in the history of the decedent, makes accidental death easier to imagine than suicide. Consequently, medicolegal investigators are susceptible to the judgmental bias of overestimating the likelihood of events which are easy to imagine.

Persons who have vested interests in concealing their suicidal deaths could readily exploit the bias of anchoring probabilistic judgments to the ease of recalling prior instances. Findings of suicide are unlikely in occupational settings where workers have deliberately exposed themselves to lethal effects associated with hazardous jobs. In such cases the setting serves as a decoy by focusing perceptions on hazardous jobs as probable sources of accidental death. Similar decoys are created by obscuring evidence which connects any type of deliberate action with occurrences delineating the discontinuity from living to dying. The chances

of success are good, with respect to the execution of such subterfuge, given the fact that there are no technical means for controlling the quality of evidence bearing upon the awareness of lethal hazards.

D. Death in the Context Of Occupational Settings

To assess the merit of criticism that medicolegal classifiers do not serve well those who have vested interests in relating causes of death to conditions of employment, we must consider the adequacy of measures used to insure accurate causal adjudications. This consideration reflects directly upon criteria of exhaustibility and elimination. To be accurate, in allocating death to a medicolegal category, investigators must exhaust all possible candidates, and then select the most plausible cause from the list of possibilities. However, we have illustrated how factors related to biased perceptions of a death on the part of witnesses to the event, can distract investigators, whereby suspicions of underlying causes are wrongly discouraged (i.e. problem of decoy). Prior expectations about the likely course of an illness may lead investigators to falsely attribute the cause of death to disease when external agents are causally implicated in the event (i.e. problem of mirage). Finally, phenomena of transformation are perceptible. There is a possibility that causal components embedded in the surrounding circumstances of a death will be overlooked due to limited thresholds of perception (i.e. problem of mimic). If the various impediments to classifi-

catory precision favour the interests of specific collectivities, then one could argue with authority that medicolegal methods of adjudicating competitive claims about causation have questionable utility. However, we have not found any indication of a collectivity receiving preferential treatment in medicolegal decisions to withhold or confer titles of eligible and plausible causes of death. Indeed, we have found that principles embodied in official categories of death furnish medicolegal decision makers with defences against allegations of partiality.

Take, as a case in point, the claim that a death attributed to the effects of cancer was accidentally incurred through some form of work (e.g. medical technician) which placed the decedent in the vicinity of a device emitting radiation. Long-term employment in noxious environments such as coal or asbestos mines serves as prima facie evidence of fatal disease derived from external sources. Hence, the pneumoconioses of the coal and asbestos miners are perceived as injuries arising from exposure to lethal contaminants. Therefore, is bias not exhibited in medicolegal judgments to exclude the case of a medical technician who contracted a fatal neoplastic disease, as an instance of a worker succumbing to the perils of a job, when exposure to a known cancerous agent enters into the circumstances of death?

To appreciate the distinction between cases of pneumoconioses and neoplastic disease as respective products

of external and internal agents, one must recall the medicolegal principle that unnatural death is coded exclusively through reference to perceptions of lethal hazards. We noted that these perceptions must be sufficiently refined to identify causes of death unequivocally with action emanating from a particular location. Refinement derives from the precise formulation of the extent of risk incurred through exposure to the deleterious effects of external agents. To achieve such precision, the causal understanding of risky ventures must be above the level of provisional conjecture. Thus, for example, investigators are well acquainted with the degree of risk posed by the inhalation of certain dusts during the course of work. Disease is classified as an occupational injury when clinical tracers such as fibrotic lesions afford a clearly perceptible image of cause in a form that can be traced to long-term conditions of employment. Fatal tumors found in workers exposed to radiation do not qualify as occupational injuries, because the knowledge that many internal and external agents cause cancer confounds assessment of risk incurred through work. Once such confounding occurs, any causal association between the tumor and occupational hazards is regarded merely as a matter of conjecture, and subsequently, the case for unnatural death is lost.

E. Death in the Context of Criminal Events

One must be prepared to concede at this point that the encapsulation of distinctions among death through medicolegal principles serves to fashion intransigent images of the causes of death. Moreover, such images may neither represent nor satisfy the diverse interests of those who seek explanations for the demise of a particular person. But, on the other hand, the purpose of causal adjudication is served well in the sense that the interests of one person or collectivity are not placed above another. For instance, Lewis Thomas (1978:462) an inveterate observer of medical affairs, informs us that the idea of disease arising from a single dominant cause is not in keeping with the perspective of modern medicine. Rather, physicians prefer to explain the sources of fatal illnesses through reference to multifactorial mechanisms encompassing the combined effects of internal and external agents. This preference runs counter to the medicolegal principle of explaining a death in terms of either internal or external agents. Also the preference for mutiple causes is not compatible with principles that inform medicolegal perceptions of natural and unnatural death. Occurrences originating outside the body of the deceased are not eligible for the title of cause once a disease is identified as the source of the event. Physicians would be left in an untenable position without this principle for eliminating possible causes of death, given that they are precariously interposed in occurrences leading to the demise

of patients by virtue of their therapeutic roles.

There is a danger that the images of cause fashioned by medicolegal principles may make some instances of homicide extremely difficult to detect. First, let us review how homicide could be misclassified as suicide. We have found that medicolegal perceptions of suicide are bound to images which are comparable in dimensions to theatrical performances involving a solo actor who willingly ends his life during the course of the drama. A continuous sequence of unmanageable problems provides the inspiration for such drama. Investigators, in other words, do not equate suicide with precipitate action, but rather they hold to the perspective that the event encompasses a period of methodical deliberation (i.e. there is method in what may appear to be madness). To lend credence to this perspective, investigators seek evidence that suicidal intentions were communicated well in advance of the act. The expression of such intent preserves an image of suicide as an event that is rehearsed. This image assumes greater clarity with the discovery of evidence suggesting the decedent made preparations which were instrumental in facilitating exposure to a hazardous agent.

The cues investigators adopt to sustain an image of suicide become a resource for the concealment of unlawful killing. For example, a man causes the death of his wife by hanging her, and then discourages suspicions of foul play by fabricating a history of prior suicidal attempts. In

essence, he designs a stage for the recognition of suicide by furnishing information which permits investigators to easily trace a causal pathway incorporating the components of control and intent. We have found that once investigators begin to favour a particular image of cause, they are likely to overestimate the salience of findings which lend support to a favoured impression of the possible cause and effect relationships reflected in the circumstances of a death. In addition, their reliance on modus operandi inference to derive a list of possible causes of death, serves to evoke stereotypes about the informativeness of cues introduced during the course of medicolegal investigations. Thus, the man who kills his wife, introduces biographical information consistent with the stereotype of the person who commits suicide, and thereby directs causal inquiry away from the malicious deed.

To further elaborate on opportunities that exist for persons to misdirect investigators in their pursuit of possible routes from cause to effects, let us review how homicide could be misclassified as accidental death. We have found that the principles used to identify accidental death preserve an image of the event as an uncontrollable consequence of the random aggregation of several dangerous occurrences which coalesce to produce a fatal outcome. In order to classify a death as accidental, investigators seek evidence indicating that the decedent had no opportunity to exercise control over the hazard which ultimately caused his

demise. However, the discovery of such evidence is determined by initial perceptions of when and where the event originated. These perceptions are influenced by appraisals which consider the circumstances of a death in terms of action that incurs an acceptable risk of fatal injury. Thus, for example, potentially lethal risks prevail whenever persons are engaged in acceptable pursuits such as mountain climbing, sailing, hunting, driving a car or swimming. When the behaviour generating a lethal risk is deemed acceptable, investigators seek to explain fatal outcomes through reference to injuries known to be associated with the random production of hazardous occurrences. Foul play would not be suspected in a fatal vehicle collision due to the perception that such events are caused by random factors involving errors in judgment, mechanical faults, and adverse driving conditions. Each factor relates the fatal outcome to an uncontrollable consequence of action that figured initially in the generation of the risk. Hence once an impression takes form that the circumstances of a death were beyond human control, there would be no incentive to search for evidence of intent in causal sequences marking the discontinuity from living to dying. In other words, deliberate killing would be difficult to detect as long as the immediate circumstances of a death conform with perceptions of random process fashioned by the causal components of accidental death. To insure such conformity the perpetrator of a deliberate killing would inflict injuries congruent with

images of death imparted through the perception of action incurring acceptable elements of lethal risk. For instance, persons fall prey to homicidal shooting while hunting or they are deliberately drowned while swimming.

The intransigence of the causal imagery afforded by medicolegal principles is particularly evident in the identification of natural death. Indeed, neither human activity nor design is eligible for causal candidacy when a sequence of pathophysiological changes preserves the image of an internal agent as the underlying cause of death. Hence claims that a death was caused or accelerated by human intervention are not accredited once an internal agent furnishes an explanation for the demise of a person. To maintain the distinction between natural and unnatural death for purposes of adjudication, medicolegal investigators operate with the principle that if an internal agent is traceable on a single causal pathway, then the transformation from person to corpse is explained solely on a physiological level of abstraction. However, one consequence of this principle is that it precludes investigators from recognizing instances where persons have been deliberately exposed to the lethal effects of an internal agent. The idea of exposure obliges investigators to consider phenomena of transformation which cannot be explained through reference to changes in cells and tissues.

A statement by Thomas Hobbes (1839:101) seems appropriate in light of the perceptual constraints that work

against the detection of homicide: "For the errors of definitions multiply themselves according as the reckoning proceeds, and lead men into absurdities, which at last they see, but cannot avoid, without reckoning anew from the beginning, in which lies the foundation of their errors." The errors of medicolegal principles do not stem from the uncompromising orchestration of evidence bearing on the causal ancestory of a death. There would be interminable vexatious litigation among those seeking to profit from their causal claims about death without fixed rules specifying where the search for cause should be initiated and terminated. Rather, medicolegal principles fall prey to errors by virtue of fixing rules that prescribe how some assemblage of evidence preserves the image of an agent of death without making further provision for the exclusion of all possible conditions which may bear false testimony to the presence of that causal agent. However, these errors appear to be unavoidable given that any set of provisions delineating possibilities of simulation will be limited by the cognitive postures needed to envisage correspondences among images of cause and categories of death. Such postures are born from the obligation assumed by official classifiers of death to remain impartial while adjudicating competitive claims suggesting why the demise of a specific person occurred at a particular time. Therefore, to meet this obligation official classifiers of death may not execute their task of adjudication as efficiently as some collectivities would desire. Nevertheless, we would endorse the

existing system of allocating deaths to official categories unless those who are critical of the enterprise succeed in demonstrating the liabilities of misclassification exceed the benefits of impartial adjudication.

F. Methodological Implications To Be Drawn From the Preceding Analysis

From this study of death categorization we can derive insights which may serve as advice for sociologists or any other statistically oriented researchers who rely on officially generated data as a baseline of inquiry into causes of mortality.

First, one should not assume that official categories embody theoretical neutrality. Rather, any system of categories that have evolved for practical purposes of administering to social concerns will exhibit theoretical postures which may or may not be consonant with sociological understanding of the phenomena in question. The theoretical postures derive from numerous considerations that must be acknowledged by persons who attempt to serve diffuse collective ends by means of individual decisions. For example, officials compiling mortality data share a working conception of death as an event with a single underlying cause (i.e., a disease or injury that initiated a sequence of occurrences culminating in death). Official categorizers utilize a conceptual framework based upon singular causal explanation to make the circumstances of death intelligible for reasons which do not involve scientific concerns about what is to count as the most accurate measure of cause.

To put the matter more succinctly, the purposes of classifying death in terms of a single cause determine the meaning of validity for that taxonomy.

Secondly, one cannot comprehend the operation of a system of categories from the exclusive vantage point of any one conceived rational categorizer (i.e., police, coroners, physicians). Comprehension from a single perspective (i.e., one type of death processor) is not feasible because a system of categories incorporates theoretical postures (e.g.,intransigent causal imagery) which are made operational through integrating concepts of diverse practitioners who must work together in order to achieve a satisfactory outcome. The upshot is that ethico-legal taxa and attributions fulfilling multiple social purposes may not stand up well to evaluative criteria which are applied against taxonomies constructed for scientific purposes.

The final point is that categorizers are satisfied when they can discern a correspondence between an event and a category without protracted definitional disputes. We have seen that categorizers of death work with loosely bounded concepts such as awareness of risks, occupational hazards, intentional behaviour, and unavoidable occurrences. Thus, for example, there are no universally-agreed tests for precise characterizations of evidence signifying the probability of awareness of courting lethal risks or the opportunities of avoiding fatal injury. Moreover, concepts such as "cause", "disease",and "a dead person" cannot be completely immunized to

doubt about definitive criteria of proper application, although they are clearly understood by categorizers of death.

These points can be elaborated by noting that sociologists, most of the time, work with "secondary data". That is, we are not on-the-scene observers and classifiers of the events of interest. Fo[illegible]who do venture on-the-scene to collect first hand d[illegible]re is no exemption from any of the challenges wh[illegible] the eyewitness in courtroom testimony. In most of our research, we are bound or condemned to use information that has been socially processed, be this information about birth and death, crime, or domestic relations.

Now, critics of processed data can always ask whether the data are "good enough" and whether they can be improved. But being "good enough" and "improved" requires a standard against which to judge competing taxonomic systems and their measuring devices. In the physical sciences, and sometimes in the social sciences, this standard is the combined one of reliability of measurement (inter-judge agreement), economy of measurement, construct validity of the measuring tool, and forecast utility. What is asked of "improved data" in the sciences is that procedures for acquiring them be economic and reliable, but also that employers of the data be able to do more, or better, with such information, where the "more and better" is judged by contribution to predictive power.

However, data gathered for social purposes do not lend themselves neatly to scientific purposes. Such data (i.e., the secondary data sociologists most frequently use) have been collected in pursuit of other objectives than those a scientist has in mind. These "public" objectives are sometimes in conflict among themselves. They include such functions as doing justice, resolving conflict, conscripting private desires in the service of public interests, and describing accurately "what happened". All of these functions are carried out within the context of a web of understandings about what constitutes an event, about what is fair, and about how causation is conceived. The evident inexactness of concepts such as event, disease, intent, risk, and cause does not impede categorizers in their reaching a consensus with regard to the objectives sought via the application of these concepts. In other words, categorizers agree on how to do what they are doing even though they may not be achieving any particular thing as efficiently as utilizers of socially processed data would desire.

Now, researchers who depend upon socially processed information may suggest modifications in ethico-legal taxa so they are better suited to scientific purposes. However, such changes could be ill-advised insofar as attempts to improve the predictive validity of ethico-legal taxa may work against the fulfillment of social functions such as resolving conflict or doing justice. For instance, researchers may suggest that official categorizers abandon the concept of

death as an effect arising from either a single disease or injury. Their suggestion is prompted by the concern that biological processes leading to death operate within dense causal systems, and therefore, it is not possible accurately to identify a single sequence of occurrences as the cause of death. In essence, researchers -- being mindful of the need for scientific accuracy -- are saying that the complexity of the causal nexus within which the circumstances of death allegedly unfold does not permit categorizers to discriminate causes and weigh their relative importance with the clarity of inference attainable in the laboratory. Therefore, categorizers, whenever necessary, should be permitted to make either/or judgments in their official representation of causes of death, rather than being compelled to select a single factor, even though the evidence does not permit them to select as accurately as a science might desire. Also, they should be permitted to list for their publics all of the factors which in their opinion realistically contribute to the demise of a person.

To appreciate how such suggestions would be implemented, let us consider a hypothetical case where a man succumbs to surgery for a gastrointestinal disorder which is related to excessive alcohol consumption. An investigation reveals that various stresses of working overtime in compliance with employer demands precipitated the decedent's drinking problem. Moreover, the decedent suffered from malnutrition which was attributed to his wife's refusal to assist him in making meals when he was intoxicated. The malnutrition aggravated the gastrointestinal disorder to the extent where surgery was

deemed necessary. Hence, in the opinion of the official categorizer the causes of death were either surgically-induced trauma or noninfective enteritis in conjunction with occupational stress, alcoholism, and malnutrition. Certainly such an opinion furnishes more comprehensive causal imagery than the existing system of classification would permit. The existing system would merely disclose that the death was due to a particular disease and was, therefore, a "natural event". However, the comprehensiveness of the causal imagery also could foster vexatious litigation among parties causally implicated in the circumstances of death.

To understand why vexatious litigation could arise one must appreciate that causal assignations in cases of death bear significantly upon legal interpretations of who or what is responsible for the event. Persons attribute legal responsibility for a death in order to fix blame. Fixing blame is a primary means of seeking redress through monetary compensation. Hence, in light of the causal assignations associated with the hypothetical case, one could readily imagine a situation where the decedent's children blame their mother for causing the malnutrition, and subsequently the decedent's wife disclaims responsibility by pointing an accusatory finger at the employer for causing the occupational stress and alcoholism. In turn, the employer attaches blame to the physician by noting the categorizer has included surgically-induced trauma as a factor contributing to the event. The physician defends his position by noting the categorizer

has also included disease as the cause of death. Now to resolve the dispute, the categorizer must select a single cause which will legally clarify who or what is responsible for the death, even though listing multiple causes may be in greater accordance with standards of scientific accuracy. Nevertheless, the selection of a single cause serves a social function rather than a scientific purpose.

Researchers, again mindful of the need for scientific accuracy, may suggest that procedures for selecting a dominant cause should include quantitative assessments of probability. Certainly, such assessments may lend an air of exactitude to medicolegal decision making -- which is otherwise not apparent. On the other hand, Tversky and Kahneman (1974, 1124-1131) demonstrate that both experts and laymen alike produce assessments of probability which are often inaccurate, uncalibrated, and incoherent. The point is that requiring categorizers of death to assign numerical probabilities to possible causes of death may engender an air of specious exactitude.

Assessment of the probabilities of possible causes of death is beset with numerous problems. We have seen that the categorizer of death must make decisions regarding causes of death in the face of information which is incomplete, ambiguous, and even conflicting. There are no unassailable procedures informing categorizers how to incorporate the various kinds of quality of information into probability judgments or when it is useful to do this quantitatively. How should

a categorizer proceed when there are so many unusual features to a case that no standard values for probabilities are available? What kind of safeguards are necessary to insure that categorizers remain consistent in their judgments and coherent in their stated probabilities?

There is another form of criticism which could reflect upon the advisability of asking categorizers to provide estimates specifying the probability of possible causes of death. Let us presume, for the sake of argument, that categorizers have the means of providing their publics with knowledge certifying in probabilistic terms the extent of a decedent's intentional contribution to his own demise. For example, a categorizer reports the following probabilities, denoted by p, with respect to possible causes of death. Let A denote cardiac dysrhythmias, B denotes intentional self-destruction, C denotes accidental electrocution, and D denotes homicide such that $p(A)=0.37$, $p(B)=0.27$, $p(C)=0.25$, $p(D)=0.11$.

The police may believe that the probability of D is sufficiently high to warrant further investigation of the case. On the other hand, the probability of A leads the categorizer to attribute the death to natural processes of disease. However, the reluctance of the police to dismiss the possibility of foul play exposes the decedent's family to the additional trauma of renewed interrogation about the circumstances of the death. In addition, the family could be burdened with guilt in light of their belief that the probability of B suggests the decedent may have contributed to his own

death. Alternatively, they may believe that the probability of C is sufficiently high to justify claiming insurance benefits for accidental death. Other interested parties may call for further estimates to be done by different categorizers in view of pending civil or criminal litigation. Other categorizers may be obliged to set quantitative limits on the estimates. This introduces further questions about the standards used to define such limits.

The point is that demands for rigorous appraisals of probabilities could encumber categorizers to the point where they were not able to accomplish social functions as efficiently as they do through the application of scientifically inexact measures. In other words, a system of reliable ⟨agreed upon⟩ signs of causation have evolved among those officially responsible for assigning causes of death. The system is designed to serve social functions, such as doing justice or resolving conflict, that can be achieved without instituting requirements of accuracy expected of a scientist. Such requirements could make the job of doing justice or resolving conflict unduly complicated by staggering the process of decision making under a mass of details which may confuse rather than clarify the issue of what constitutes a fair judgment. For instance, we found that official categorizers of death share ideas of intentional self-destruction which operate through concepts of being aware of lethal risks, having opportunities to avoid fatal injury, and exercising control over causal agents. Imagine the potential for confusion that would be created if categorizers were required to deduce exactly how much and what kind of awareness

a person must possess in order to intend his own death. Where would they seek knowledge needed to estimate probabilities that a person did or did not have opportunities to exercise control over a causal agent? Imagine the potential for disagreement among categorizers if they attempted to fix a specific magnitude that the certainty of death must approach before the intention of seeking to die is officially recognized.

Irrefutably, scientists interested in explaining suicidal ideation would benefit from the information official categorizers of death collect to derive a probability of intent based upon statistical assessments of the worth of all the evidence. However, categorizers need only refer to a presumption of intent, based upon modus operandi inferences, in order to execute their task of adjudicating competitive claims about possible causes of death. The upshot is that the data arising from such principles of reasoning are susceptible to numerous forms of bias which could make them unsuitable for scientific purposes.

Confronted with such "dirty data" students of social relations have employed two general procedures for improving the information with which they work. One procedure attempts to collect "primary data". It "goes to the source" as in participant observation. Another procedure invents multiple measures of the events of interest and tests these many measures, each one of which is imperfect, for congruence between them and for their contribution to forecast accuracy, singly or in some combination. The latter device has been used, for

example, in assessing personality and in locating criminal activity socially. Both procedures have limitations.

Gathering primary data is cumbersome, costly, and always subject to the charge of observer-bias. Studies of the psychology of eyewitness testimony, for example, have long demonstrated degrees of unreliability among observers of "the same happening". The situation is like that depicted in the Japanese drama, Rashomon [Western version = The Outrage]. In this tale, all participants in a drama tell plausible stories about "what happened". All stories are shown to be false because they are self-serving, but the finding of falsity requires an external, veridical observer - the true witness.

In sociology we are hoist because we can never assure ourselves of the acuity of the "veridical observer". The search for pure primary data in the study of social relations is futile. It is futile not only because of observer contamination, but also because description and, a fortiori, explanation of what happened must be given with a ready-made, evolved set of concepts. The users of these concepts resist attempts to fix definitive criteria of proper application because of conflicting moral and political commitments. Therefore, employing multiple measures of presumably similar events seems the best hope of ascertaining "what has happened" -- as those measures give convergent readings and those measures contribute to greater foresight.

In summary, data gathering for social purposes may not be "good enough" for sociological purposes. They may, nevertheless, do a satisfactory social job. Social functions need not be reduced to -- or elevated to -- scientific functions. As an illustration, consider a legal process called "divorce". The legal ritual has evolved in resolution of kinds of conflict and in satisfaction of kinds of justice. Neither of these "pieces of work" need gather the kind of information that would be useful in explaining divorce scientifically. Neither function requires accurate knowledge of "what happened". In fact, sophisticated lawyers know that no one can ever ascertain "all that happened" behind others' domestic doors.

The work of ending a conflict while doing some justice requires only an approximation to "what happened", where the approximation fits a changing sense of fairness and "gets the job done". Doing the job justly involves causal concepts -- concepts of causal criteria, content, and style -- but the causal concepts used in law may not be those conducive to knowledge-building and increased predictive power. The concepts employed in the legal suit need have no relevance to marital happiness or marriage counselling.

Now, there are broader implications in the message we convey to sociologists who work with information that has been socially processed. To state what those broader implications are, it is necessary to explain why this study of death categorization was done.

stands (e.g., the probability of suicide) is not sufficiently free from ambiguity and vagueness to be accurate enough for purposes of science.

Faced with an apparent hiatus between the clarity of concepts needed to do social practices, as opposed to scientific work, sociologists may attempt to make practitioners' concepts more scientifically efficacious. However, there must be some justification behind attempts to divest indeterminacy from concepts which have pragmatic utility for practitioners. The justification must rest upon more than appeals to advance scientific goals of testing and prediction. In essence, the sociologist must be able to specify how practitioners' objectives might better be served through the adoption of concepts that meet requirements of scientific accuracy. If such requirements are irrelevant to the achievements of the practioner's objectives, then there may be no way for sociologists to earnestly justify the desideratum of making the concepts more useful for their purposes. If such requirements appear to be counter-productive as far as helping practitioners to achieve their objectives more efficiently, then sociologists must concede some respect for vague and ambiguous concepts which get the job done.

G. Social Implications To Be Drawn From The Preceding Analysis

Specific implications of social relevance emerge from the appraisal of the theoretical principles embedded in the categorical distinctions which attend the official classification of death. Generally speaking, any criticism of the decisions that determine the content of mortality statistics must be measured against the function official categories of death fulfill as symbols which convey images of cause for collectivities who want to know why a person died at a particular time. We have seen that the theoretical principles implicit in the application of official categories of death generate guidelines for attaining causal judgments which are impartial. However, there may be a remarkable divergence between any individual's intuitive standards of equity and the principles of weighting interests which govern the allocation of death into official categories. Ironically, the source of the divergence appears to derive from the general purpose for which a knowledge of the causes of death is officially required. Fundamentally, this purpose is to provide public assurance that the interests of one collectivity are not given preference over another in ascertaining causes of death. Such assurance is unlikely to dissuade critical societal responses. For example, let us examine a case where various individuals expressed dissent over the location selected by medicolegal investigators as a starting point in the search for causes of death.

The case in question involved a young boy who died while undergoing surgery for injuries that occurred when a car ran over him after the driver lost control due to his epileptic seizure. Witnesses to the collision reported that the boy was chased by a snarling dog from a sidewalk to the side of a road where a car veered into him.

A loss of vehicular control attributed to epileptic seizure was selected by medicolegal investigators as the outstanding incident among the antecedents to death. This first link (i.e., epileptic seizure) in the chain of occurrences leading to death was determined by assessments of the boy's injuries as being inconsistent with images of cause other than those conveyed through components of accidental death.

The circumstances of the death did not convey an image of unavoidable injury for the parents of the decedent. They claimed charges of criminal negligence should be brought against the physician of the driver who was prone to epileptic seizures. Their sense of injustice was born of the belief that the physician acted irresponsibly by not taking measures to withdraw the operator's licence of a man known to be suffering from epilepsy.

From the physician's point of view, to grant credence to this belief would necessitate finding the owner of the snarling dog equally to blame in facilitating the boy's exposure to lethal injury. The point of the physician is well taken insofar as there is no way of disputing that countless antecedents led to the circumstances of the death.

If the causes of death are members of an indeterminate set of antecedents, then every concerned party is in a position to advance a strong case for the particular cause that it espouses. Therefore, an official designation of the cause of death is likely to be considered inequitable by any party whose interests are not directly served through the causal judgment. For example, let us suppose that the boy in the previous case survived the accident only to die from medical complications arising from a tonsillectomy, and the event was officially classified as a natural death. In the eyes of the deceased child's parents, to dissociate the cause of death from some physical trauma suffered through contact with external agents (i.e., surgical instruments) is to grant the surgeon preferential treatment in the ordering of causal antecedents. Essentially, the parents regard themselves as being in competition with a surgeon over matters of causation which are impossible to resolve without incurring conflicts of interest. The competition approximates the dynamics of a zero sum game wherein classifying death as natural is scored as a win for the surgeon and a loss for the parents who subsequently presume their winning is contingent upon the surgeon losing when the death is classified as an unnatural event.

Recipients of classificatory judgments made by medicolegal investigators may think that the process of ordering antecedents leading to death is sensitive to information about individual interests which stand to benefit from the association of death with particular kinds of causes. Indeed, Jack

Douglas (1867:213) would have us believe that:

> The more integrated the deceased individual is into his local community and with its officials, the more the doctors, coroners, or other officials responsible for deciding what the cause of death is will be favourably influenced, consciously or sub-consciously, by the preferences of the deceased and his significant other.

One is left with the misleading impression that official decisions to allocate death into categories such as accident or suicide are constrained by practical concerns regarding the consequences of categorization for individuals who have vested interests related to the causes of death.

Jack Douglas has ignored the fact that the certificate of death is a legal document. To deliberately falsify the cause of death through omission or commission may be construed as the promotion of fraud. Therefore, those officially responsible for assigning causes of death are mindful they must exercise reasonable judgment.

In the context of this study, we found that reasonable judgments are measured against the kinds of evidence which officials have agreed among themselves to accept as proof of causation. For example, we found three separate incidents where parents unsuccessfully appealed to officials on humanitarian grounds that a categorization of suicide be changed to accidental death when their child -- in each case under the age of nine -- was found hanging by the neck. In each case the child had left a note expressing the intent to inflict a fatal self-injury. Such notes serve as incontrovertible proof of suicide.

Officials involved in those cases admitted during the course of informal interviews they were aware that classifying the deaths as suicide would place a heavy burden of guilt on the parents of the deceased children. However, this awareness was irrelevant to the ascertainment of evidence relating to causes of death. These officials also indicated that if the children had not left notes expressing suicidal intent, then there would have been reasonable grounds for appealing the judgment in view of their young ages.

The point is that those officially responsible for assigning causes of death employ a system of reliable signs of causation. We would not refute that knowledge of the consequences portended by a particular categorization of death may induce persons to conceal, invent, or otherwise distort evidence which officials utilize in their classificatory judgments. In fact, such knowledge of consequences may be influential in determining how persons other than medicolegal officials classify death. For example, the parents of a child whose death is officially attributed to suicide may not agree that the decedent was sufficiently advanced in terms of the mental maturity needed to execute a plan of self-destruction. Their interests are served by the disagreement insofar as it permits them to deny the guilt that accrues from conceiving the death as an expression of parental rejection. In other words, to classify the death of their child, the parents invoke a classificatory rationale which fits with conceptions of what is in or to their interest. Moreover, such

conceptions gain substance from the contrasts that evolve when undesirable consequences of allocating death into one category rather than another are compared against intuitive standards of equity.

Let us illustrate what is meant by saying conceptions of interest invite evaluations of what is equitable in the classification of death. For purposes of discussion, consider the hypothetical case of a postal union that presumes there is a reasonable justification for classifying varicose veins as a fatal disease associated with the occupation of carrying mail. The justification is based on incidents where letter carriers have succumbed to deleterious effects of surgery for the treatment of varicose veins without entitlement of indemnity for their dependants. What the union has taken into consideration is the convention of industrialized states to classify persons who have died from diseases related to occupational endeavours as victims of unnatural death. Usually, the dependants of such victims are entitled to a given monetary compensation from the employer judged responsible for the hazardous conditions of work.

We have seen that the idea of succumbing to the perils of a job is rigidly specified by concepts embedded in the principles which determine how official categories of death function in relation to each other. For instance, the meanings of medicolegal concepts such as unavoidable injury, lethal risks, noxious environment, and fatal disease derive from the saliency of the contrasts they provide within a

system of categories that limits how distinctions among causes of death are identified. To wit, the meaning of an external agent of death stands only in relation to the contrast it provides with properties which affirm the causal candidacy of an internal agent of death. If medicolegal investigators do not use the concept of external agent in this fashion, they cannot differentiate consistently among causes belonging to the categories of natural and unnatural death.

Many of the concepts used by medicolegal investigators to identify a death with a category are common currency in everyday communication about the circumstances of death and dying. Individuals easily relate to ideas such as deliberate exposure to hazardous agents, the absence of opportunities to avoid fatal injury, intentional killing though unacceptable creation of lethal risks, and contracting a fatal disease. Nevertheless, this does not imply that medicolegal terms of reference carry the same denotations and connotations for individuals other than those who are officially involved in the task of classifying death. Indeed, variations in the everyday usage of such terms by collectivities who seek to have particular interests satisfied through the official classification of death may explain why a perceived incongruence arises between principles governing the selection of [redacted] and expectations regarding what is equitable in the ordering of causes. For example, letter carriers may regard their exposure to varicose veins and requisite surgery as a condition which is comparable in lethality to the pro-

longed inhalation of coal dust by a miner. From the perspective of the letter carriers, both conditions contribute to the work of nature by advancing the biological timetable of death. Consequently, expectations of equity are violated when these different working conditions are not officially accorded an equivalent classificatory status.

With respect to conceptions of the causes of death, an insurance agency may hold steadfast to the conviction that reckless driving in a poorly maintained car constitutes a form of suicidal behaviour. Similarly, relatives of a person who succumbs to the complications of a hemorrhoidectomy may argue the event is inextricably related to the insults of surgery, and therefore that the circumstances of the dying contradict their conception of a natural death.

What individuals generally fail to recognize when they append some kind of symbolic significance to an official category of death is the system of orchestration which constrains the proper uses of the categories through relations of mutual dependency. For example, the category of suicide may convey images of causes involving a wide range of potentially self-destructive behaviour. However, from the perspective of the medicolegal investigator, the application of the category of suicide is limited to circumstances of dying which acquire meaning by virtue of being incompatible with the causal imagery conveyed through accidental, homicidal, and natural death. Each official category of death operates in concert with another to furnish an order of comparison

among causes of death. Hence, an official decision to classify the hemorrhoidectomy case as a natural death is based on the perception of moribund circumstances which compare favourably with [illegible]al distinctions that negate the candidacy of an external agent of death.

Individuals may contest the way official categories of death are used when the practices of medicine are implicated in the circumstances surrounding the demise of a patient. Employees working under conditions conducive to emotional stresses may claim that employers benefit unduly from narrowly defined conceptions of occupational disease. A group of citizens may reproach the medicolegal system for failing to identify a moral equivalency between killing and letting die in cases where someone has decided not to prolong a life through therapeutic measures. An insurance company may claim that the demands of proof in the categorization of suicide work in favour of persons who place themselves at a serious risk of injury in order to promote uncertainty about the deliberate nature of their self abuse. Politicians may proclaim that non-disclosure of corporate irresponsibility takes precedence over public safety in the official conception of homicide, insofar as this category excludes instances where fatalities have occurred as the result of manufacturers neglecting to advise purchasers of the hazards associated with their products (eg. the Ford Motor Company's production of Pinto models with allegedly faulty gas tanks).

The point is that official categories of death invite seemingly ineradicable dispute as to the criteria of their correct application. Dissent over usage appears inescapable considering that any given application of an official category of death is likely to meet with an asymmetry between what is judged to be beneficial to the public as a whole and what is viewed as equitable in the promotion of personal welfare. That is to say, embodied in the official usage of death categories are sets of conditions deemed collectively beneficial to all members of society. For example, if the category of homicide was liberally applied to death arising from surgery, then physicians would be excessively chary in dispensation of their services. However, the highly restricted use of the concept of unnatural death in the context of medical practices may serve a collective welfare function only at the expense of disregarding particular interests of individuals (eg. those who suffer the fatal consequences of medical errors). Indeed, the likelihood of individuals possessing interests which are incompatible with the goals of public welfare is generally conceded to be axiomatic by sociologists. Individuals are not likely to perceive how promoting the welfare of the group to which they belong could have utility in promoting their particular interests. Without this perception individuals are committed to evaluating how official categories of death are applied in terms of the fulfillment of personal, rather than public, welfare.

H. Final Comment

In view of this discussion one can surmise when a taxonomy is likely to be replaced by another. We have observed how categories of death embody concepts which are essentially contestable. The intransigence of the theoretical postures which figure prominently in the conceptual indeterminacy of the categories makes the resolution of ambiguous cases immune to rational argument. Potential for abuse of the principle of impartiality increases as rational argument diminishes. Subsequently, perceived inequities flourish and generate divisiveness among categorizers. Protracted definitional disputes pose serious impediments to the efficiency of the taxonomic users. Compromises are then effected through the introduction of a new taxonomy.

In short, there is no definitive way of limiting the range of ontological discretion permitted to builders of taxonomic systems. To postulate otherwise is to engage a metaphysical conceit that there are finite sets of uniquely apt descriptions of social behaviour. Ultimately, the test of any taxonomy is to be found in how well it serves its users and recipients of the services. Moreover, any taxonomic system is open to challenge on the basis of perceived incongruities between theoretical and observational terms. Perhaps, one could conclude that the conceptual indeterminacy inherent in taxonomic systems provides a stimulus for maintaining dialogue over rival characterizations of the world.

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