Accident Proneness

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Research in the occurrence, causation, and prevention of road accidents

Lynette Shaw
Herbert Sichel

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With a Foreword by
H. J. EYSENCK

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To

T. H. FRITH

Managing Director of Public Utility Transport Corporation,
and the Staff, Past and Present,
of Industrial Psychological Services
and the Operational Research Bureau

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FOREWORD

THIS is an important book, dealing with a topic of obvious social interest; but it is also relevant to many academic and theoretical issues and disputes. The concept of accident proneness has had a chequered career, from the early British work whose high scientific standard has been universally acknowledged, through a period when the concept was extended beyond the sound basis which had been laid, to a period of reaction when doubt was thrown on the very existence of such a notion. This book examines in detail the arguments brought forward by the proponents of both sides, and, more importantly, studies in detail the facts and figures quoted in support; this critical examination has been long overdue, and is carried out with such good sense, such absence of partisan bias, and such modesty that the conclusions are likely to be very widely accepted.

These conclusions, which point unmistakably to the existence of personality-related behaviour patterns which make people differentially prone to traffic accidents, are immeasurably strengthened by the long-continued experimental work in this field carried out by the authors; indeed, it is this experimental work which justifies the inclusion of their book in this series. Most, if not all, of the preceding studies have been statistical in nature, making use of existing data often collected for other purposes; these studies have almost universally suffered from certain weaknesses which even the most expert statistical treatment cannot cure—inaccuracies of recording, marked selectivity of data, wide differences in exposure, accident-generated interference with future driving (through death, disqualification, prison, etc.), and many others enumerated by the authors. Here, almost for the first time, we have an account of experimental procedures in which all these troublesome variables have been properly controlled, and where in addition independent variables have been manipulated to produce changes—predictable and in fact predicted changes—in the dependent variable, in this case the number of accidents observed. It is gratifying to an experimentalist to see how much clearer the picture becomes when such control is introduced—even though there is no change in the general outline of the picture. To be able to exclude drivers on the basis of certain test scores, or to dismiss drivers on the basis of their accident records and then study the effect of this on the number of accidents, is far more informative than a mere statistical study involving much larger numbers of units, but in which there is no control whatever over their behaviour, exposure, or even continued existence!

The book makes it clear that much of the controversy about the existence of accident proneness has been purely semantic. For me to say that cheese is good while you say that it is bad may seem to provide grounds for controversy, but translate these statements into: I like cheese and you don't, and the two statements can be seen both to be true and logically independent. Much the same has happened in this field too. Accident proneness can be defined in many different ways, and to deny its existence at one level does not

necessarily contradict someone else's affirmation at another level. Thus critics have often denied the existence of accident proneness in its widest meaning, i.e. that some individuals are more prone than others to *all* types of accidents, or in its most inclusive form, i.e. all or most accidents are due to a small group of people. Both statements are so obviously wrong that one suspects they are just men of straw, put up to gain a semantic victory by knocking them down. There is no reason to expect that the baby who inadvertently swallows poison is more prone than other babies to become a hit-and-run driver, or that a woman who accidentally gets burned when bending over the oven will run her car into a wall at 100 miles an hour. Nor is it necessary to specify that only accident-prone drivers have accidents, and are thus responsible for all accidents; a much more likely and widely accepted hypothesis would be that those personal qualities related to accident proneness are normally distributed in the population, with most people being neither particularly prone to accidents, nor particularly safe, but with a "tail" of very safe drivers on one side, and of very unsafe drivers on the other. Extreme claims have never been made by reputable investigators, to my knowledge, and their refutation is irrelevant to the main theme of this book.

The hypothesis here examined may be put in a wider and in a more specific manner. In its wide form it asserts that the general set of automobile drivers can be subdivided into sub-sets which, when equated for exposure to different amounts and kinds of traffic, show different patterns of accidents, either by number, or kind, or both. These sub-sets may be formed in many ways; it is widely known that drivers over 30 years are less likely to have accidents than drivers under 30, that men are more likely than women to have accidents, that working-class subjects are more likely than middle-class drivers to suffer in this way, and that highly trained drivers are less likely to do so than poorly trained ones. These findings have been replicated so often, and in so many countries, that few experts would doubt that they represented tangible evidence for the concept of accident proneness in the field of automobile driving.

A more specific hypothesis relates to the existence of another sub-set of drivers characterized by certain personality features which are supposed to make them more likely to drive in a dangerous manner likely to lead to accidents. It is this hypothesis which has been regarded with much suspicion lately, and there is no doubt that in this general form it is difficult to disprove—the possibility of disproof being, according to Popper, the essence of scientific theory. One of the main contributions of this book is that it succeeds in making this hypothesis more concrete, and adduces very strong evidence in favour of this more concrete hypothesis. Future work will be much facilitated by having a clearer statement and a more realistic framework for the testing of this personality theory of accident proneness.

The book suggests that much of the current disbelief in the value of the hypothesis of accident proneness is due to the behaviouristic tenet of the specificity of conduct. Thorndike long ago expressed this belief that "there are no broad, general traits of personality, no general and consistent forms of conduct which, if they existed, would make for consistency of behaviour and stability of personality, but only independent and specific stimulus–response bonds or habits", and many behaviourists (but by no means all) accept some such statement. There are many experimental reasons for regarding this belief

as oversimplified and outdated; within the S–R framework, for instance, stimulus- and response-generalization afford well-recognized and widely studied bases for consistency and broadening of specific S–R bonds. But even on a simple Thorndikean specificity theory the concept of accident proneness cannot be dismissed so simply. Let us assume that there are 1000 simple S–R bonds or habits involved in safe driving, and let us also assume that the probability of each of these habits being in the direction of safety is 0·5. (The actual numerical values are quite arbitrary, of course, and so is the either/or nature of these hypothesized habits; any other assumptions would lead to the same conclusions.) Let us also assume that these habits are distributed randomly over the whole driving population (or else that they are weighted by age, sex, experience, etc.); the result will be some form of binomial distribution (either over the whole driving population, or within each sub-set according to age, sex, etc.) in which most people will have safe and unsafe habits pretty well balanced out, but where some people have a majority of safe habits, others a majority of unsafe habits. Extremes along this curve, therefore, would give us our accident-prone drivers at the one end, and our exceptionally safe drivers at the other. And as habits are presumed to be permanent (unless specially extinguished by appropriate experimental procedures) we would here have a good theoretical substratum for our notion of traffic accident proneness.

I am not suggesting that this is a true or even a reasonable account of the origin of accident proneness; I am merely saying that psychological presuppositions and theoretical beliefs in a "specificity" position do not contraindicate the findings reported in this book; these are just as compatible with a specificity theory as they are with a trait theory of personality. The point is an important one which to my knowledge has not been made before; it suggests that Thorndike was wrong in drawing the conclusions he did from his own postulates. However specific the habits, chance distribution will lead to concatenations of similar and related habits in some people in whom consistency and generality of conduct should then be observable.

The argument just presented suggests that it might be possible to identify some of these specific habits and link them with quite specific types of accident. An illustration of how this can be done is the important work of Paul Babarik on automobile accidents and driver reaction patterns (*J. Appl. Psychol.*, 1968, **52,** 49–54). It is well known that in spite of theoretical expectation, reaction time measurement has never shown much (if any) relation to accident proneness. Babarik argued that some drivers are run into from behind because they react slowly to visual stimuli (initiate responses late), but that once the reaction is begun it is carried out exceptionally fast; he called this the desynchronizing reaction pattern (DRP). He submitted a number of taxicab drivers to a laboratory test in which he measured both the time to react to a stimulus and also the speed of the resulting movement. Comparing the types of accidents of these drivers with their reaction-time patterns, he found very strong relations between a pattern of driving behaviour consisting of many accidents of the "run into from behind" type, and DRP behaviour on the laboratory apparatus. Such specific relations can easily get lost in too general an approach to the problem of accident proneness, and the study suggests the importance of quite specific hypotheses relating to quite specific types of accident. Such studies complement, but they do not replace, the wider implications of personal

determinants of accident proneness; they do suggest, however, that specificity theories may still have something to teach us if they are understood in the proper spirit, and not used on *a priori* grounds to suppress other types of research.

The notion of accident proneness is often played down because it is alleged that it implies a kind of therapeutic nihilism—if people have accidents because of some foreordained fault within themselves, then nothing can be done about it. This book makes it clear that this is quite an erroneous notion; strict disciplinary action is shown to have a most salutary effect on most if not all drivers. If we think of accident proneness in terms of a normal curve of distribution, then we might conceive of the effects of tightening up discipline as shifting the whole curve towards a safer, less dangerous level of driving. Indeed, it is the belief that accidents are indeed completely "accidental", unrelated to human faults and basic personality traits, which encourages therapeutic nihilism, and which would result in a relaxing of the rigid discipline which alone can prevent the rapid increase in automobile accidents otherwise inevitable. British readers will remember the almost miraculous effect the introduction of the breathalyser test had on accident figures. There is little doubt that rigid rules, strictly enforced, have a most powerful effect on all but a handful of drivers—and these would soon be eliminated altogether through withdrawal of licences. The work here described furnishes us with a firm foundation on which to build up a proper system of rules and restraints for the accident-prone driver.

This book, then, is an important contribution to an important field. It is written, however, in a style which should make it understandable (and even enjoyable) to more than the psychological experts to whom it is addressed in the first place. A sprightly style should not disguise the fundamental scholarliness of the approach, but it will no doubt be appreciated by all those who are professionally concerned with traffic safety, or just interested, for one reason or another, in this field. Even statistical arguments can be made understandable (if not enjoyable!) by non-statisticians, particularly when related to logical considerations and flavoured with a commodity sometimes missing in writings on this subject, to wit, common sense. Occasional autobiographical remarks help to show the reader how certain steps in the development of the research programme were initiated, and add to the general interest of the account of what will widely be regarded as an outstanding experiment in accident causation and prevention.

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A BOOK of this nature, which endeavours to cover the history of the thinking on accident proneness in several continents, would never have been possible without the co-operation of research workers in many different countries. This co-operation has been so willingly given that I would like to take this opportunity to thank the many people who went out of their way to provide information—often at the cost of much time and trouble. I am particularly grateful to Aart van der Burgh of Utrecht and Wolfgang Böcher of Cologne, not only for providing statements of their personal views but for scouring Europe in search of material (and am only sorry that translation difficulties have prevented me from making use of all the material they provided); to Ron Coppin and Ray Peck of the California Department of Motor Vehicles for their personal contribution and their many constructive suggestions; to Sauli Hakkinen of Helsinki, Günter Schubert of Cologne, Garth Arbous and John Kerrich of Johannesburg for contributing statements of their personal views.

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In conclusion I would like to thank the many researchers whose work has contributed to this book. I am especially grateful to Dr. H. J. Eysenck for his personal as well as his editorial assistance and encouragement, and for consenting to write the Foreword.

SECTION I

THE VALIDITY AND USEFULNESS OF THE CONCEPT OF ACCIDENT PRONENESS

by

LYNETTE SHAW, B.Sc.

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CHAPTER 1

ACCIDENT PRONENESS—FACT AND FICTION

THE study of accident proneness has been very aptly described as an attempt to give scientific backing to a common-sense notion which most people accept almost without thinking.

The man in the street definitely subscribes to the idea that certain people are far more likely to have accidents than others—and he is quite emphatic on the subject of road accidents. He will laugh at you if you suggest that accidents (except perhaps his own) are a matter of chance, and that there is no great disparity between one driver and the next. He thinks there is all the world of difference, and at the drop of a hat he will tell you just what sort of people are the ones who are the bad accident risks. And although he will probably be far too specific, and far too inclined to air his own pet theories, nevertheless his views, compared with the views of the man in the next street, and the man in the street after that, will have one major factor in common, namely the belief that certain people are indeed more likely to have accidents than others; and that these people will continue to have accidents—unless they get killed or incapacitated in the process, or some change within themselves brings about an equally radical change in their usual driving behaviour.

And who is to say that the man in the street is wrong? Apparently not the officials who handle the traffic offenders among the driving public—or the insurance companies for that matter. They seem to argue on exactly the same lines; and the idea that some people are much more susceptible to accidents, and that this susceptibility can continue for long periods, seems to play a very prominent part in their thinking.

The insurance companies seem to think that a man's past accident record is an indication of the shape of things to come—hence their reluctance to go on insuring certain people. And the traffic officials seem to consider that there are indeed people who drive so badly, or so dangerously, that they are actual or potential accident cases, and therefore a danger to the community—hence points systems designed to pick up the people with repeated traffic violations or accidents and prevent them from driving.

Yet, strangely enough, the concept of an unequal propensity for accidents, or of accident proneness, does not receive anything like the same unanimous backing from the scientists. In fact it is a subject on which, even after fifty years of research, there is still a great deal of argument, controversy and disbelief. Every aspect of the concept is still being debated and argued: so much so that it would probably be difficult to find any other subject on which so many words have been written to so little effect.

What is more, there is no sign of this controversy dying down—on the contrary, there is every sign that opinions are getting more divided and the arguments growing more acrimonious.

However, when my co-author and I were first invited to contribute this present volume on the subject of accident proneness, I, for one, was unaware of just how divided the scientific thinking was really becoming. Having always regarded the concept of certain people being unduly prone to accidents as a most rational one, and having had these views confirmed by every aspect of our own very practical research in South Africa, I found it very difficult to believe that anyone could seriously doubt the accident proneness concept. Argue about the finer points? Yes. But deny that people differ in their susceptibility to accidents, and maintain that accidents are largely random occurrences? No, that I did not really believe. I felt that any doubts there were about the concept were only what one might call technical ones—a sort of scientific pedantry which demanded that all the t's be crossed and all the i's be dotted before the concept could be given official scientific approval. I therefore welcomed the opportunity to join once more in the discussion, and even entertained optimistic hopes that by putting up some new evidence in support of the concept I could speed up its scientific acceptance and approval.

However, in the meantime, several things have happened which have opened my eyes somewhat. During the last year or two there has been a decided swing of the pendulum of scientific opinion on the subject of accident proneness, and the accident literature, particularly in the United States and to a lesser but still noticeable extent in Britain and other countries like Germany, has developed a marked anti-proneness bias. Apart from the appearance of a number of very critical articles and statements in various journals, two full-scale books have been published, both of which have repeatedly and emphatically condemned the validity of the proneness concept. The first one, published in England, Cresswell and Froggatt's *The Causation of Bus Driver Accidents* (1963) was primarily a description of a particular research project carried out in Northern Ireland. Its appearance therefore was not so very significant. But the second volume, published in the United States, was something different altogether. This book, *Accident Research*, by Haddon, Suchman and Klein (1964) was a major publication of some 750 pages dealing with every aspect of the human element in accidents, and intended apparently as a textbook for accident researchers in all fields. The enthusiastic reception which was given to this book, with its strong anti-proneness bias, by bodies such as the American National Safety Council, is a definite indication of the growing tendency to absolve the driver from any great degree of responsibility and to maintain instead that accidents are largely unfortunate occurrences which can happen to anyone at any time.

Difficult as it is to believe that such an attitude can have developed, nevertheless I have found, from personal experience, that this is very much the case. Having spent five months travelling through Europe and the United States talking to accident researchers, I have discovered by first-hand experience just how deeply entrenched, in some quarters, is the opposition to the proneness concept.

I did not find this attitude to be prevalent in Europe—in fact in most of the continental countries the proneness concept is accepted without question. It is accepted, on the basis of logic, backed by observation, that certain people just do have worse accident records than others, and the research tendency is to examine these people, as individuals, in order to establish just why they are having these accidents and to see what can be done about it.

In other words, the research approach is largely a clinical one and therefore is not bedevilled by the problem of statistical reliability or validity.

It is particularly in the United States that opposition to the concept is so deep-rooted. Here the whole research approach has such a strong statistical bias that every contention must be tested by statistical procedures before it can be accepted. This means the group approach as against the individual one, and the acceptance of the concept only if group data can produce evidence to support it. The stated basis of the opposition to the accident-proneness concept is the contention that this evidence has not been forthcoming. In fact the opponents of the concept maintain that not only does the group statistical evidence lend very little support to the concept, but that in many instances the evidence actually refutes it.

However, even in the United States, which is certainly the stronghold of the group statistical approach, opinions are still rather divided. In fact they range all the way from acceptance of the concept, to a very limited and guarded acceptance, to outright denial. At the one end of the scale of opinion are the psychiatrists, and those psychologists whose approach is orientated more toward clinical or "generalist" psychology. These researchers still seem to subscribe to the proneness idea. Certainly they do not think that accidents happen indiscriminately to just anybody—and some of them go so far as to say that there are a great number of people who are such inherently bad risks that they should not be driving.

At the other end of the scale are a number of statisticians, supported by those psychologists whose orientation is toward the earlier forms of behaviourism and the strictly experimental approach—and particularly toward a peculiarly American psychological doctrine (which seems to have no name, unless one could call it "specifism") which denies both the consistency and individuality of behaviour. These researchers are, in turn, strongly opposed to the concept, and speak of "a folklore of accident proneness" and "the universal discredit into which the subject has fallen among scientists".

In between the two groups, though still rather inclined to the "anti" side, are a number of researchers whose attitude seems to be that there is no definite proof one way or the other, but that by and large there seems very little actual evidence (by which they mean statistical evidence) to commend the proneness concept. The following sort of statement is very representative of the thinking of this group:

> "It has not been convincingly demonstrated that an appreciable number of people tend to have more accidents than others under conditions of equal exposure." [McFarland, 1962.]

And in a leading article which appeared in the *New York Times* on 20 December 1964, on the occasion of the publication of Haddon's *Accident Research*, Robert Darnton quotes the opinions of leading accident research workers in the United States as follows:

> "The favorite concept of psychologists in the field during the nineteen-twenties was accident-proneness, an attempt to explain why some individuals have more accidents than others. Psychologists have almost abandoned the concept now, because they have been unable to find enduring psychological traits that differentiate these unfortunate

persons from others. They tend to believe that most 'accident-prone' individuals are victims of the laws of probability."*

The trend is therefore very much toward denying the proneness concept.

However, strangely enough, even the strongest opponents of the "proneness" concept do still sometimes seem to find it necessary to give it limited recognition. Haddon's book is an example of this. The main trend is definitely critical, and he and his co-authors maintain that offering accident proneness as the *explanation* why some individuals have more accidents than others "is a point that has aroused first minor and now major protest". And in discussing the Cresswell and Froggatt book on bus accidents, the authors say:

> "This is but the latest evidence that the burden of proof that there are 'accident-prone' individuals must rest with those who defend the concept, since this most definitive study fails to provide evidence that such individuals exist."

However, elsewhere in the same chapter, they say:

> "For one cannot claim that no cases of accident proneness exist. At the present state of knowledge we must best conclude that accident proneness as an explanation for any major proportion of repeated accidents is unwarranted but that, as a clinical phenomenon limited to some individuals, it may have some validity."

This dual thinking, which is always somewhat reminiscent of the sort of legal plea which states: "The defendant maintains that he did not do it—but if he did, it was unintentional", seems to appear quite often in the American accident research literature. It seems part and parcel of a rather strange anomaly where, although the proneness concept is widely condemned, and there is constant repetition of the belief that accident-prone repeaters (if they exist at all) are responsible for only a fraction of the accidents, nevertheless a considerable (though lessening) amount of research time and research money is still being spent on trying to develop psychological tests which will distinguish between the people who have many accidents and the people who are accident-free—to say nothing of the almost nationwide operation of points systems, the main purpose of which is to pinpoint the bad accident risks.

To an outsider these contradictions between theory and practice, let alone theory and logic, are, to say the least of it, a little odd. In fact one cannot help feeling that the amount of attention which the practical traffic officials in the United States give to accident repeaters and to traffic violators (who are presumably regarded as potential accident offenders, else why prosecute them) should sow a few doubts in *somebody's* mind—for according to widely accepted scientific theory these people are virtually non-existent, and certainly do not represent any appreciable danger to the community.

In fact one cannot help feeling that the wide discrepancy which exists between the basic thinking underlying, on the one hand, some rather untried theories, and, on the other hand, some very well-tried practices, indicates that the fault may possibly lie with the theories—and with the statistical data on which they are based.

Is it not perhaps more than likely that the traffic officials are quite right in their thinking? That accidents are very often anything but random events and that there are indeed

such beings as accident-prone drivers, but that they are not a class all of their own, distinct in their abnormality—in fact that there is a whole spectrum of accident proneness ranging from the accident-free right up to the chronic accident repeater? That it is the *principle* underlying proneness which matters, namely the principle not only of unequal involvement in accidents but of unequal accident *potential*? That it is not just the tip of the iceberg, the multiple serious-accident offenders, whom the traffic officials are worrying about, but a much larger section of the community who, for all sorts of reasons, such as lack of driving skill, or physical defects, or personality defects, or wrong attitudes, have a *dangerous amount of accident potential*; potential which, under conditions of strict supervision is likely to manifest itself only in occasional bad driving or the occasional accident, but which would show itself far more clearly if the supervision were less strict—as is indeed demonstrated in countries other than the United States, where the driving is not nearly so disciplined and the accident rates far higher?

Nor does it seem very likely that the traffic officials are worrying about people whose weaknesses or faults are merely transitory, or about a problem which is of minor significance. They appear to consider the problem to be a serious one, and the reasoning underlying their policy of enforcement is that people do indeed differ fundamentally in their potential for accidents, just as they differ in their potential for crime, and that there are a number of basic similarities between the prevention of one and the prevention of the other.

But if, as the traffic officials seem to think, there are indeed fundamental differences between people's accident potential, how is it that the statistical evidence (derived from figures on reported accident occurrence) on which so much of the theoretical research thinking is based, does not show this up? Is it not possible that the fault may lie with the statistical evidence? That the figures which are always quoted as evidence against the concept are so incomplete, or so selective, that they do not give a true representation of the picture? That the figures on big intrastate studies, for instance, represent only the accidents involving injuries or fatalities or major property damage, and not all of those either—again just the tip of the iceberg? Or that the figures on professional drivers relate only to the more successful drivers, the men with long and continuous service, and exclude all the unsuccessful ones among whom one would expect to find the worst accident records?

And is it not also possible that there are significant shortcomings in much of the evidence (let alone theory) on which the psychological opposition to the proneness concept is based; such as the many failures to find, by means of psychological tests, enduring traits which distinguish the accident repeater from the relatively accident-free? Is it not possible, to quote Eysenck (1965), that "many of the investigations which have failed to produce positive results have been characterized by a poor choice of tests, a poor choice of problems, a poor choice of statistical methods of investigation, and a poor control over relevant variables"?

Moreover it would appear that some of these doubts as to the validity of the evidence against the proneness concept are also present in the minds of even its most severe critics. Otherwise why should they bother to mention that it is easier to find evidence of "proneness" in situations where accidents are more frequent or where accident recording is more complete? Or that there is some justification for believing that there is a relationship

between accidents and social maladjustment? One has the feeling that underneath the condemnation of the proneness concept, on the basis of insufficient scientific "evidence", lies a certain amount of bewilderment as to why, for instance, so many of the studies nivolving the personality of the accident offender come up with such similarr tends. One feels that, to say the least of it, there is still a vague suspicion in the minds of even some of the critics of accident proneness that there are indeed such beings as accident-prone drivers, displaying a whole range of proneness and influencing accident rates to all sorts of degrees, but that they are so well camouflaged by the statistical and psychological "evidence" that they do not show up.

If this is indeed the case it seems to place many accident researchers rather in the position of the leopard in Kipling's *Just So Stories* whose plaint was: "I can *smell* giraffe, I can *hear* giraffe, but I can't *see* giraffe." (Although it also seems more than likely that there are a number of researchers whose credo is: "For purely ideological reasons I would prefer *not* to see giraffe.")

However, be this as it may, it is still very important to establish in some detail how all this contradictory thinking has come about. Just why is it that there is so much controversy? Why is it that the accident-proneness concept is accepted by scientists on one side of the world and rejected by scientists on the other? Why is it that if the concept is eminently acceptable to some scientists, there is still so little statistical evidence to support it?

It seems to me that unless we can examine the point of view of both sides of the argument, sort out the contradictions, and provide some detailed answers to these questions, then further discussion on the subject is futile, and that the contribution which theoretical, psychological and statistical research can make to the pressing problem of road accidents will continue to be depressingly negligible. In fact it is eminently possible that an actual retrogression will take place—if it has not already started. For it seems as though the constant belittlement by so many important and influential writers on accident research of even the basic principle underlying the proneness concept, namely that certain people are inherently worse accident risks than others, is already beginning to play a part in influencing the trend of accident-prevention policy in a country like the United States. Here the emphasis on accident prevention is swinging very noticeably away from the driver and towards the vehicle. Whereas the driver used to be regarded as Scapegoat Number 1, he is gradually being allotted the role of the innocent victim of circumstance, while the vehicle is now being groomed for the role of the villain of the piece.

For the moment this may be all very well, for there is undoubtedly much room for improvement in the safety aspects of vehicle design. But the real danger would come if the pendulum were made to swing too far; if the weight of the counsel of the accident researchers resulted in any discrediting of enforcement or even withdrawal of financial support from measures designed to discipline drivers and clamp down on traffic offenders.

An outcome like this may not be as far-fetched as it sounds. Already there is a good deal of talk in American research writings about the very doubtful value of punitive measures. There is also a good deal of talk about the doubtful relationship between accidents and traffic violations—which have even been described in a recent statistical paper (Haight, 1964) as a "schedule of actions harmless in themselves, which are supposed to 'cause' accidents"! And in the same article in the *New York Times* quoted earlier, one

of the leading members of the Accident Prevention Section of the United States Health Department is quoted as saying that "law enforcement is a doubtful technique for reducing road accidents".

If this development does indeed take place it may well prove to be a most costly and retrogressive step. For in the United States, where big cities and high traffic density should, by rights, have resulted in one of the highest accident rates in the world, it is largely the work, not only of the highway engineers and the traffic controllers, but of the practical officials who discipline and control the drivers, that appears to have brought down the country's accident rate and held it at a figure which is the lowest in the world per mileage driven.

No one disputes the fact that the accident problem is a complex one, but this has not stopped the practical men from making a very good job of tackling it. And in all fairness to them one must admit they have achieved what they have achieved with very little assistance from the theoretical driver researchers. It would be a most unfortunate state of affairs if theoretical thinking, based on evidence much of which is still open to dispute, should be allowed to curtail in any way the activities of the practical officials—activities which appear to have brought about a most far-reaching and beneficial change in the whole attitude of the American driving public. It would be even more unfortunate if this sort of reaction were to spread to other countries where the need for controlling the driver is much greater.

This is why I feel that someone ought to make a determined effort to sort out the confusion in scientific thinking. I have my doubts as to whether yet another book on the subject of accident proneness will have any marked effect on entrenched opinion. Yet I feel all the more that one should be written, particularly one which is specifically aimed at reconciling theory with practice. Hence this dual volume in which I have covered the general and psychological aspects while my co-author has covered the statistical aspect.

As we feel that we would like the book to be of some use to the practical traffic officials, as well as to the research workers, I have given my section a more practical orientation than is usually given in a publication of this kind. I have also tried to write it in less technical language than is usual in a scientific work. The personal studies on which many of my co-author's and my contentions are based have been carried out on a large scale, over a long period of time, and with strict scientific "methodology"; and our findings have scientific authenticity. These findings, and those of many other researchers, are presented with scientific exactitude in certain chapters of the book; but in others which deal with the general aspects of the concept of accident proneness the presentation is less formal. It is my hope that what these chapters may lose in the way of scientific "elegance" will be compensated for by practical usefulness.

I have no intention of making this book yet another review of the accident research literature as there are a number of very comprehensive ones already available. In dealing with the literature my sole aim will be to endeavour to trace the trends of thinking on accident proneness and the developments which have influenced present attitudes, to see whether it is possible to discover the underlying reasons for the disagreements and the contradictions.

But in addition I would also like to do something more constructive, namely to put

forward, with ample supporting evidence, a more moderate and flexible version of the proneness concept than is usually presented—a version which, to my mind, could account for a lot of the anomalies and bridge a number of the gaps.

However, I must reiterate that this concept is intended to refer specifically to the question of road accidents—not industrial accidents, or home accidents, or childhood accidents. In the first place I do not claim to have any specialized knowledge in these fields. And secondly I do not for one moment believe that it is justifiable to generalize from accidents in one sphere to accidents in another, and it has always struck me as most illogical that anyone should have even contemplated doing so. Because, surely, there is no justification for generalizing from one set of data to another when the circumstances are so diverse that there is even a fundamental difference in what constitutes an *accident*? Nor can one compare *situations* which make different demands on people's capabilities, or which call into play such different psychological forces, or serve such different psychological needs.

Unfortunately, however, when it comes to tracing the development of the thinking on accident proneness it is quite impossible to separate the road accident research from the research on other types of accidents. It is all too hopelessly interwoven. Not only has the thinking in one sphere influenced the thinking in the other, but figures relating to one type of accident have constantly been used to support or repudiate arguments about a completely different type of accident. In fact anyone wishing to study the road-accident proneness literature will find references to figures pertaining to everything from industrial accidents among British munition workers, to shunting accidents among South African railwaymen, to poisoning accidents among four-year-old children, to horse kicks among Prussian cavalrymen—which no doubt accounts for at least some of the confusion!