THE UNIVERSITY OF MANITOBA

~~AN ANALYSIS OF THE ACCIDENT RECORDS AND DRIVING CHARACTERISTICS OF YOUTHFUL MANITOBA MOTOR VEHICLE OPERATORS WITH THE VIEW TO INVESTIGATING THE NEED FOR AND~~ PROBLEMS OF DRIVER EDUCATION IN THE MANITOBA HIGH SCHOOL CURRICULUM

BEING A THESIS SUBMITTED TO THE COMMITTEE ON POST-GRADUATE STUDIES IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF EDUCATION

BY

RUDOLPH MARTIN ARNOLD

WINNIPEG, MANITOBA

APRIL, 1952

ACKNOWLEDGEMENTS

I wish to express my gratitude to Dr. Joseph Katz for the assistance and advice so generously given in the planning and writing of this thesis. I wish also to thank Mr. S. Myres and Mr. J. Vine, both for having first suggested the problem to me and for giving so generously of their facilities during the early stages of the study.

Grateful acknowledgement is made to Mr. G. J. Reeves for permitting much of the testing to be done in St. John's Technical High School; to the Winnipeg Junior Chamber of Commerce for their co-operation in the general high school testing program; to Lieutenant P. H. Potts and his men of the No. 10 Company, Royal Canadian Army Service Corps for helping in the psychophysical testing portion of the study; and to my fellow-workers at the Manitoba Safety Division whose contributions to this study are too many to relate.

I gladly acknowledge indebtedness to my wife, who rendered constant and painstaking service from the beginning in making the completion of this thesis possible.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

Foreword

Whenever a significant social problem arises whose ultimate solution may lie in educable factors, it can be expected that sooner or later those concerned with the problem will seek assistance from the schools of the nation. Such a problem has been posed by the ever-increasing magnitude of losses --deaths, injuries and economic waste--annually dissipated through automobile accidents.

In the face of this positive challenge to public action, one might expect to find a growing appreciation of the need for solving the accident problem. But, on the contrary, there appears a tendency, particularly among Canadian school administrators, to relegate highway accident prevention to the limbo of non-essential activities.

During the last three decades repeated attempts have been made by safety-conscious organizations in the United States to arouse public awareness to the seriousness of the situation, to formulate positive and constructive plans for achieving accident-free highways, and to conduct research projects designed to furnish proof of the overwhelming advantages of reasonable control measures. In the United States these efforts have been responsible for the establishment of a permanent national highway accident prevention research and

planning agency--President Truman's Action Program for highway safety. Where the policies and recommendations of the Action Program have been applied to the fullest extent, gratifying reductions in human suffering and economic losses have been achieved:

> If nothing had been done to improve safety conditions on the highways, and the death rate had remained the same as it was in 1946, we would have had nearly 25 percent more deaths and accidents in 1948 than actually occurred.
>
> We have saved, through our safety programs, almost 11,000 lives and prevented injury to nearly 400,000 persons.[1]

But progress throughout the United States has not been uniform; and even in the more progressive areas the daily toll of traffic mishaps are forceful reminders that the problem is far from solution:

> The 1949 Inventory of Traffic Safety Activities has assembled and analyzed a vast bulk of facts, but none more striking and significant than this: that the chances of being killed in a motor vehicle accident are from three to five times greater in some States and communities than in others.
>
> State fatality rates the past year ranged from more than 12 deaths per 100 million vehicle miles to less than 3. In towns and cities, the rates varied from almost 20 deaths per 10,000 vehicles registered to less than 4.
>
> In these sharp contrasts are epitomized the strength and weakness of the organized safety effort... . The States and communities that have done the best job of protecting life and limb on their streets and highways are almost invariably those which have applied the Action Program to the fullest extent.[2]

The safety movement in Canada may charitably be referred to as being in its infancy, and correspondingly, the automobile casualty mischief is becoming increasingly serious.

---

[1] 1949-50 Inventory and Guide for Action, p. iv. The President's Highway Safety Conference. Excerpts from President Truman's speech. Washington, D.C.: Government Printing Office, 1950.

[2] Ibid., p. 1.

The mounting toll of deaths, injuries and property damages graphically portrays the ineffectiveness of intermittant and abortive campaigns that some local and provincial governments have offered as panaceas for the traffic-accident problem. It may be a statement of the obvious to say that the public approves the idea that highway transportation be made safe, but public approval does not necessarily engender public understanding and support. In the public mind there still appears to exist a general misconception as to the magnitude of the problem, of the factors that deter the enactment and administration of good traffic safety legislation, and of the forces needed to remedy the evil. In short, the written record on highway safety activities in Canada seems to be permeated with an inhibiting attitude of defeatism, evasion, procrastination and humbug.

The writer was particularly impressed with the apparent tardiness and lack of enthusiasm on the part of the Canadian high schools in providing a program of safety education. The efforts of the secondary school in this direction have lagged noticeably behind those of the elementary school and a number of non-school agencies. Yet, there is much sentiment to the effect that a definite contribution could be made to the success of a safety movement if the secondary school would but undertake to provide an effective program in traffic safety education. Such an appeal was addressed to the Nation's schools by the Dominion Bureau of Statistics:

> The number of drivers under 18 years of age involved in accidents increased percentage wise in 1949 over 1948 considerably more than that for any other age group, suggesting that safe driving might well be taught

more widely in our high schools.[1]

Purpose of the Study

The situation suggested by the foregoing preliminary observations prompted the writer to undertake a study, concerning, in general, the role the secondary school might take in a highway safety program. A preliminary survey of the literature related to highway safety, however, revealed a number of remarkable anomalies which have influenced the selection and treatment of the present study's major purpose:

(1) "Engineering research on the automobile has shown consistent progress for thirty-five years or more"[2]. . . . but the human factor of safety on the open road is complicated and none too well understood. "In the field of research in psychology and safety--there exists today only a limited amount of proved facts and reliable data".[3]

(2) With the exception of several investigations on the effects of alcohol to automobile-accident susceptibility, the Canadian literature appears completely barren of any scientific research contributions related to highway accident prevention activities.

(3) In the National Safety Council's bibliography--Research

---

[1] The Motor Vehicle 1949, p. 26. Compiled by the Public Finance and Transportation Division, Dominion Bureau of Statistics. Ottawa: King's Printer, 1950.

[2] H. R. DeSilva, Why We Have Automobile Accidents, p. 344. New York: John Wiley and Sons, 1942.

[3] The Motor-Vehicle Driver: His Nature and Improvement, p. 5. Edited by the Staff of the Eno Foundation for Highway Traffic Control. Saugatuck, Connecticut: the Eno Foundation, 1949.

in Safety Education[1]--appeared a listing of one hundred and sixty-three Masters' theses, and fifty-seven Doctor's dissertations. Of the fifteen studies related to secondary safety education and reviewed by the writer, only five were devoted exclusively to inquiries in the field of high-school driver education. In all instances, the normative-survey method was the sole supplement to the historical data compiled in these studies.[2, 3, 4, 5, 6]

Problems to be investigated.--The present study was undertaken with a view to discovering whether a need exists for the extension of traffic safety education to the Manitoba secondary school level; and, assuming that this need is shown to exist, to investigate the basic factors influencing the establishment and organization of a driver education course in Winnipeg High Schools. These statements imply that answers must be sought

---

[1] Research in Safety Education. Compiled by the School and College Division, National Safety Council. Chicago: the Council, 1950.

[2] S. F. Brougher, "A Survey of Driver Education in Texas Schools." Unpublished Master's thesis. Austin: University of Texas, 1950.

[3] W. M. Christman, "A Study of Certain Administrative Features of Driver Education and Training Courses in the High Schools of the United States in 1940." Unpublished Master's thesis. Pennsylvania State College, 1940.

[4] S. J. Rudd, "Highway Auto Traffic Accidents and Their Causes with Special Reference to a High School Automotive Safety Program." Unpublished Master's thesis. Pittsburg, Kansas: Kansas State Teachers College, 1947.

[5] Norman Key, "Education for Traffic Safety." Published Master's Abstract. Washington, D.C.: George Washington University, 1947.

[6] E. C. Jeppsen, "A Procedure for Determining the Content of a Course of Study for Automobile Drivers." Unpublished Master's thesis. Fort Collins: Colorado A&M College, 1938.

to the following questions:

(1) Within the frame of reference of the historical evolution of motor transportation, what factors have contributed to the magnitude of the present highway-accident problem?

(2) Have significant trends emerged from the safety education movement in terms of basic concepts?

(3) What is the current status of the accident problem in the United States? In Canada? In Manitoba? Have these accident statistics relevance to the need for driver education in the high schools? What factors determine and limit the competency of these basic sources?

(4) To what extent are the secondary schools of Canada and the United States providing students experiences through driver education courses? Are the efforts justified in terms of the results achieved? Who have been the principal supporters of this movement?

(5) Within the purposes and functions of the secondary school, and with an appreciation of its strategic position, can Manitoba high schools meet the need for safety education through courses in driver education?

(6) What are some of the fundamental problems encountered in the organization and administration of an adequate driver education program?

(7) To what extent has the writer's experimental evidence, gathered through quantitative measurement procedures, provided additional data for the solution of the problem? How adequate are driver-testing procedures for the detection of accident-prone drivers? As evaluation and motivational techniques?

(8) And finally, what does this study mean? Is the problem under investigation fragmentary, or does it suggest significant implications for other phases of the secondary school curriculum? What worthwhile contribution does this study make to scientific educational research? Are the generalizations which have been drawn from the hypotheses definitive? If not, what further avenues of educational research are suggested?

Sources of data.--The writer has drawn heavily upon source materials published by national safety organizations in the United States. These include: National Commission on Safety Education of the National Education Association, National Safety Council, Association of Casualty and Surety Companies (and the Association's endowed Center for Safety Education, New York University), American Automobile Association, American Association of Motor Vehicle Administrators, Northwestern University Traffic Institute, Technical and Inventory Liaison Committees of the President's Highway Safety Conferences, and the Eno Foundation for Highway Traffic Control.

Bibliographical lists appearing in some of the above-mentioned literature and in the Education Index directed the writer to scientific articles on traffic safety in psychological and educational journals. The fifteen safety education theses, previously referred to, were obtained through the university inter-library loan system.

Much of the statistical data has been compiled by the writer himself while working in the capacity of Assistant Director of Highway Safety for the Province of Manitoba.

The Plan of the Study

Techniques employed.--No single method of investigation has been used exclusively in the present study. Rather, a four-fold and closely integrated attack has been made on the problem: (1) an examination of evidence and experience of the past to aid in analyzing and interpreting the present status of safety education; (2) a questionnaire-survey of present safety education practice in Canada to fill in gaps in the historical research; (3) a further extension of the normative-survey method through the testing of licensed high school students to detect differences in knowledge of road rules, attitude to driving, psychophysical capacities, and ability to drive safely an automobile in traffic; and (4) the determining of relationships among testees and between test group and "standard" group through statistical manipulation of data.

Principal assumptions.--The problem under investigation--Does a need exist for the inclusion of driver education in the Winnipeg secondary school curriculum? and, What fundamental factors influence the establishment of high-school driver education?--is meaningless without the recognition of certain basic assumptions.

Firstly, such hypotheses as are formulated in this study are applicable only within the concept of a "progressive" secondary school system. While the essence of the many various interpretations of progressive education seems to say "Whatever ye do, do for him"; which says that the school exists for the child and that education is growth and life, the point of view which limits this study is that interpretation of the general

objectives of the Winnipeg schools set out in the Reavis Report:

> The central purpose of the schools is to secure effective participation in the highest form of the democratic way of life, through service directed toward the preservation and extension, and through the fullest possible realization of the potentialities of each individual.
>
> . . .
>
> (1) The pupil should learn how to maintain his health at the highest possible level, should develop physical and mental habits which promote health of body and mind, and should receive sufficient exercise and recreation to meet his current needs. This objective involves:
>
> (a) personal health for satisfactory living.
> (b) personal physical and mental fitness for employment.
> (c) appreciation of the importance of public health both for individual and community benefit.
> (d) realization of, and acceptance of, his individual share of the responsibility for public health.
> (e) ability to meet intelligently the hazards of ordinary life and concern himself with the safety of others.
>
> . . .
>
> (4) The pupil should gain a knowledge of those fundamental facts which are essential to an understanding of the physical world in which he lives. He must also learn about the influence of science on human life and gain practice in using "scientific method". . . .
>
> (a) knowledge of the natural resources of his area, his country, and the world in general.
> (b) recognition of the need for the intelligent conservation of these resources and for their utilization for legitimate social and economic purposes.
>
> . . .
>
> (f) some understanding of the methods that have been developed in the fields of natural science for collection, verification, organization, interpretation, and application of facts.
>
> (5) The pupil should develop the ability to think. . . .
>
> (a) recognition of the widespread importance of "problem-solving" in human affairs--personal and social.
> (b) knowledge of the difficulties confronting the problem-solver. (emotional influences, fallacies in reasoning, difficulty in determining facts, etc.)

(c) ability to make conscious use of an effective problem-solving technique.
(d) ability to apply (in some degree) to a wider field problem-solving techniques learned in school situations.

. . .

(8) The pupil should develop an understanding of the purposes of life and should learn what values are supreme.

(a) interest in evaluation of human activities and achievements.
(b) development of some sense of values and some criteria for establishment of values.

. . .

(d) recognition of excellence in human actions, achievements, and relations.[1]

The second major assumption which has governed the writer's approach to the problem under investigation concerns the emphasis placed upon the role the driver plays in traffic accidents. While it is axiomatic that no single, sovereign remedy exists--solution of the accident problem must be sought in basic factors that necessarily involve complex inter-relationships--it is upon the driver that paramount attention must be focused. In effect, the writer has adopted the point of view that considers accidents as being manifestations of underlying maladjustments in the driver himself or in his lack of orientation to the varying traffic situations that he must face on the streets and highways. This means that traffic engineering, accident analysis, driver education, traffic law enforcement, driver licensing and other such important tools in accident prevention must be evaluated in terms of their positive or negative influence on the behavior of the driver.

---

[1] Report of the Directed Self Survey Winnipeg Public Schools, pp. 128-131. Compiled by Committee on Field Services, Department of Education, University of Chicago. Chicago: the University, 1948.

Dr. DeSilva, one of America's foremost accident-prevention research authorities, has aptly expressed this viewpoint:

> Although our present roads have not been designed primarily from the safety point of view, they can be driven on with impunity. The automobile, also, in most respects a safe piece of machinery, can be used with a minimum of danger. It is the driver to whom we must impute responsibility for the hazards presented by these instruments. Left gloriously free, free to follow his own inclinations, be they good or bad, he has been driving much as he pleased. And year by year he has managed to kill and injure his fellow men by the hundreds of thousands. Why? Because of wilful human faults--selfishness, lack of appreciation of his responsibilities to others, carelessness, wastefulness; because of lack of driving skill, because of unwillingness to conform to reasonable driving regulations. The driver is in need of a thorough overhauling. In place of his present casual education and lax control we need efficient public driver training and examining and effective and coordinated enforcement of suitable driver laws and regulations by all state motor vehicle departments.[1]

Definitions.--In 1941, the Commission on Safety Education of the National Education Association defined the terms "driver education" and "driver training" in the sense that had gained them widespread, general acceptance. "Driver education" was considered that phase of classroom work which preceded or accompanied actual road instruction or "driver training".[2]

Probably because this duality of terms could not be defended within the broad concept of modern secondary education, the Commission, in 1950, re-defined "driver education"--an interpretation which the writer has used throughout this study:

---

[1]DeSilva, op. cit., p. xiv.

[2]Safety Education, Eighteenth Yearbook of the American Association of School Administrators, p. 135. Compiled by the Commission on Safety Education. Washington, D. C.: National Education Association, 1940.

Driver education, . . . refers to all those learning experiences provided by the school for the purpose of helping students to learn to use motor vehicles safely and efficiently.

Classroom instruction in driver education programs refers to those learning experiences which are provided elsewhere than in an automobile.

Practice driving refers to learning experiences in driver education provided for the student as an observer and student-driver in an automobile.[1]

Whenever the writer has used the terms "highway accident", "traffic accident", or "motor-vehicle accident" he has made reference to the following uniform definitions:

Motor vehicle.--A motor vehicle is any mechanically or electrically powered device (except one moved by human power), not operated on rails, upon which or by which any person or property may be transported or drawn upon a land highway. The load of a motor vehicle is considered a part of the vehicle.

Motor-vehicle (traffic) accident.--A motor-vehicle accident is any accident involving a motor vehicle in motion (on a trafficway) that results in death, injury, or property damage.

Trafficway (Highway or Street).--A trafficway is the entire width between property lines (or other boundary lines) of every way or place of which any part is open to the use of the public for purposes of vehicular traffic as a matter of right or custom. . . .

Motor-vehicle accident injury.--A motor-vehcle accident injury is any injury received in a motor-vehicle accident that requires treatment by a practitioner of medicine at some time within 6 months of accident. An injury is classified as a motor-vehicle accident injury regardless of whether treatment was actually received.

Motor-vehicle accident death (fatality).--A motor-vehicle accident death is any fatality resulting from a motor-vehicle accident.

Property damage.--Property damage is defined as damage to or destruction of any property as the immediate and direct result of a motor-vehicle accident. It does not include

---

[1] High-School Driver Education: Policies and Recommendations, p. 10. Developed by the National Conference on High-School Driver Education administered by the National Commission on Safety Education. Washington, D.C.: National Education Association, 1950.

loss of human life or personal injury.[1]

Novelty and value of present study.--The bulk of the five hundred publications reviewed are, for the most part, easily accessible. Neither the techniques employed in the actual testing program nor the basic generalizations derived through historical research are remarkable for their novelty or originality, except insofar as their application and orientation to the Canadian highway accident problem.

Something may be said for the few infusions of "cauterizing criticism" which the writer has directed toward certain areas of the literature. Also, the Manitoba accident-statistics analyses are novel in the sense that they suggest a viewpoint opposed to the usually garbled, and often inimical, opinions of the local Press. It is hoped, however, that this marshalling of data relating to the need for safety education will serve as an adequate springboard to stimulate interest and action in a cause commensurate with the school's fullest capacities--the conservation of human life.

---

[1]Uniform Definitions of Motor-Vehicle Accidents, pp. 1-17. Prepared by the Federal Security Agency, National Office of Vital Statistics. Washington, D.C.: Government Printing Office, 1947.

CHAPTER II

THE NEED FOR SAFETY EDUCATION

Introduction

Motor vehicles were first produced in quantity in the United States at the beginning of this century. Shortly thereafter automobiles appeared in Canada. In fifty years their use has multiplied until there are now in Canada approximately two and one quarter million, and in the United States nearly 50,000,000 vehicles. In these countries today, sixty million persons are driving cars on thousands of miles of paved highways--highways the like of which did not exist four decades ago. To sustain the rapidly expanding motor transportation system, men, materials, and new industries were required. These activities tapped new resources, brought gainful employment to millions, and provided cheaply and easily the conveniences of a new mode of travel. But motor transportation brought also many problems. Some yielded readily to the skill and ingenuity of the engineer; others necessitated painful readjustments in the relationship of management to labor; yet, of all the problems arising out of the common use of the motor car the one occasioning the gravest public concern has been the automobile accident.

Admittedly, the traffic accident problem is complex. No single or sovereign remedy appears to exist. Yet there is evidence that this will yield to the same scientific methods

which have brought advancement in other fields--organized fact collecting, analysis, planning, and practical application of findings. It is the method of this section: (a) to trace the growth of the accident problem by examining the evolution of motor transportation; (b) to provide statistical evidence suggesting the magnitude of the impact accidents have had on society; and (c) to examine organized efforts to solve the accident problem for basic principles, procedures, and results. It is hoped that this approach will uncover data appropriate to the solution of the problem under investigation--what responsibility and difficulties the secondary school has to provide driver education.

Points of View

The rapid expansion of motor transportation has occasioned many critical comments. Two such are quoted below:

> One of the most significant developments in the twentieth century has been the growth of automotive transport. It has become an integral part of our transportation system, indispensable to our way of life. It vitally affects every segment of our economy, for through automotive transportation the interchange of ideas and goods have been accelerated, with inestimable benefits to society. . . . The social and economic effects upon the economy of the nation have been greater than those occasioned by any other single technological development. . . . At the end of 1949, it is estimated that there were 44 million vehicles registered. These vehicles used more than 32 billion gallons of gasoline in 1949 in travelling some 425 billion miles.[1]

> . . . in fifty years the American automobile has advanced from the Merry Oldsmobile, with curved dash, one cylinder, and total weight of seven hundred pounds, to the Cadillac V-8, with a Fisher body, weighing two tons. And . . . America acquired four-lane highways, motor parkways, motels, . . . no parking, safety zones, right turn, left

---

[1] C. A. Taff, Commercial Motor Transportation, p. 3. Chicago: Richard D. Irwin, Incorporated, 1950.

> turn, U-turn, diagonal parking, collective bargaining, C. I. O., Taft-Hartley, used-car lots, monthly payments and the jitters.[1]
>
> . . . Today, automobile accidents cause a yearly property damage of $1,100,000,000. The annual cost in wage losses, medical expenses and insurance is $1,700,000,000.
>
> The total value of all passenger cars, trucks, and buses produced last year was $6,711,000,000, so possibly statisticians can prove that we achieve a net gain, provided we charge off lost lives and crippled bodies at some nominal fee.[2]

These opinions aptly illustrate the polar limits of the many divergent viewpoints that have been expressed in the literature regarding the influences that motor transportation has exerted upon Western culture. The first critic--a competent scientist at the University of Maryland--through a vast assembly of pertinent factual data, analyzes the magnitude, scope and potential of America's huge motor transportation and highway system in terms of its many technical vector forces and organizational minutae. Through such analytic observations Dr. Taff suggests an accelerated expansion of automotive transport in the future, and the attendance of many material advantages.

The second critic examines the evolution of the automobile in terms of personalities, human values and social implications. While recognizing the many worthwhile contributions which the automobile has made to society, Musselman acidly decries the attendant lowering of moral standards; the intrusions upon the privacy and solidarity of the home; the constant, blatant and unethical barrage of publicity and

---

[1] M. M. Musselman, Get A Horse! The Story of the Automobile in America, p.23. New York: J. B. Lippincott Company, 1950.

[2] Ibid., p. 287.

advertisements; and the many social problems, not the least of which is "the size of the monthly instalments which he cannot afford but does".[1]

Whatever merits there may be in the points of view of this apparent dichotomy, it does appear that the differences are symptomatic of more basic disturbances in the social order. For a number of years many social institutions have come in for review and criticism. Our high schools, for example, have been criticized because of the lag they have sometimes permitted between the programs they offer and the social needs requiring action on the part of the schools. Our school administrators and teachers, in turn, have long complained that the curriculum is already over-crowded; that in the face of the infinite demands made upon the schools, it is impossible in the limited time at their disposal to fulfill adequately the manifold responsibilities they have already undertaken. Tradition is cherished and our secondary schools have been loath to abandon their traditional offerings. Nor have they been encouraged to do so by those persons who still value nostalgically their own educational experiences, however distasteful they may have seemed once, and who therefore view with skepticism the "fads and frills" to be found in the curriculum of more progressive schools. That this attitude has been directed toward traffic safety education on the secondary school level is evidenced by the alarm expressed in some quarters over the adoption of driver education (and in a very restricted sense) by a handful of Canadian high schools:

---

[1] Ibid., p. 22.

> We ourselves, as one more unfortunate, weary of breath, drive some nine miles each way through rush hour traffic to our office. We have no confidence that school driving courses could contribute much to the easement of this lunatic experience. . . .
>
> For the schools to consider the provision of special courses as a solution to the arrested mental development of egotistical and asinine motorists is similar to burning the pig sty to obtain roast pork, and as wasteful. Motor traffic is a task for the police; . . .
>
> There are enough will-o'-wisps now in the school and the school yard; let us not take to the highways in search of more.[1]

Fortunately, although somewhat belatedly, the Canadian secondary school has come to recognize the need for changes in the school program in response to the persistent pressure of the newer social needs of an ever-changing environment. It would be unjust, however, to castigate the school for any apparent delinquency in providing youth's safety education needs. Dr. Leonard has expressed the view that the high school curriculum has definite social determinants, "The first, and one of great importance, is that secondary education has reflected the motives and ideals of the dominant social class in our society".[2] And it would be difficult, in Canada, to find another field of such practical importance to millions as the improvement and control of the habits of those using the streets and highways, in which so little systematic research has been attempted, so few facts gathered, and so little accomplished.

The multitude of groundless opinions about the causes of traffic accidents have propagated the fallacy that highway

---

[1] "Driver Training Courses," The Canadian Education Association News Letter, Number 67 (May--June, 1951). Toronto: the Association, 1951.

[2] J. P. Leonard, Developing the Secondary School Curriculum, p. 55. New York: Rinehart and Company, Inc., 1946.

accidents are the inevitable price of greater mobility. To offset this attitude of uninformed pessimism, there is a need, by means of appropriate research and fact-gathering, to demonstrate to the public how accidents can be decreased, and, by means of lasting reductions under a wide variety of conditions, to convince the public that intelligent planning pays for itself in accident prevention just as it does in other spheres of endeavor.

If the Canadian high school elects, then, to share in the elements of a balanced highway safety program, the school can ill-afford to ignore these basic points of view. Participation should embrace only those positive and practical measures that scientific evaluation has shown to be feasible within the purposes and capabilities of the school. But successful participation will also depend upon the fullest appreciation of the social and economic factors which precipitated the highway accident problem. A critical examination of the evolution of motor transportation should provide a partial answer to whether the secondary school is justified in providing a program of driver education.

Evolution of Motor Transportation

A synoptic history of the automobile.--It is axiomatic that no survey related to motor transportation can afford to ignore the phenomenal growth of the automobile industry in America and Canada. The reason is simple. The progress of this young, dynamic industry has either directly or indirectly influenced every major socio-economic change in America during the last thirty-five years. Table I is a "flow-chart" designed to substantiate these statements.

TABLE I[a,b,c,d]

FLOW CHART OF MAJOR EVENTS IN THE HISTORY OF MOTOR TRANSPORTATION

Year	Significant Milestones
1769.	Cugnot built steam tractor for French artillery use, the first self-propelled vehicle constructed for definite use as constrasted with experimentation.
1865.	Great Britain, after a long series of restrictive laws, passed statute requiring a self-propelled vehicle to be preceded by a man carrying a red flag.
1867.	Otto (German) patented a four-cycle engine operating with illuminating gas.
1879.	George Seldon (American), lawyer, applied for patent for his blue-printed "gasoline road Locomotive". Model never built. Is claimed to have blocked final issuance of patent until 1895. Later (1903) formed the A.L.A.M.--Association of Licensed Manufacturers. From 1895--1911 collected royalties from all American automobile manufacturers (except Ford), varying from five to .8 per cent. Eight-six "contributors" IN 1910. After eight years litigation, Ford broke monopoly in 1911.
1885.	Daimler (German) invented his famous petrol-vapor engine on the Otto cycle, the first motor to be manufactured in quantity. Daimler's first car brought out in 1887, the beginning of engineering supremacy of European automobiles--Daimler-Benz, Panhard, De Dion-Bouton, Renault, Fiat, Rolls-Royce.
1893.	Charles E. and Frank Duryea built and ran successfully the first gasoline car made in America, a (pfd.)

[a]Musselman, op. cit.

[b]Sportsmanlike Driving, pp.1-17. American Automobile Association. Washington, D.C.: the Association, 1948.

[c]Man and the Motor Car, pp.1-19. Association of Casualty and Surety Companies. Edited by A. W. Whitney. New York: the Association, 1947.

[d]A. Pound, Transportation Progress, A Story of Self-Propelled Vehicles from Earliest Times Down to the Automobile. Reprinted from The Story of General Motors Through Twenty-Five Years, 1908--1933. New York: Doubleday, Doran And Company, 1934.

TABLE 1--Continued

Year	Significant Milestones
	"horseless buggy". A tablet in the Smithsonian Institute states: . . . It has a one-cylinder, four stroke, four-horsepower, water cooled, gasoline engine with make-and-break, electric ignition. Up-and-down movement of the steering tiller shifts the gears to give two forward speeds and reverse. Weight about 750 pounds.
1894.	Panhard and Levassor, Paris, with French rights on the Daimler motor, led the industry in design, placing the motor under the hood and otherwise creating a car along modern lines. . First road-race, Paris to Rouen, 78 miles. All starters finished. Won by De Dion with an average speed of 12 m.p.h.
1895.	.First American road race won by Frank Duryea. .American Motor League organized. .Three hundred cars in production. One produced. One registered. .Haynes-Apperson Company formed.
1896.	.First car built by Henry Ford.
1899.	.Production 2,500. Registration 3,200. .Olds Motor Works, Detroit, the first (?) factory for automobile production exclusively.
1901.	.Connecticut enacted first automobile traffic law. .Roy D. Chapin drove the "merry" Oldsmobile curved-dash runabout from Detroit to New York City. .Second New York automobile show in Madison Square Gardens.
1905.	.First registration of motor vehicles in Canada--565 passenger cars. .Mass productions of Oldsmobiles--6,500 in one year. .First Glidden endurance tour. .Prest-O-Lite, headlights using carbide gas. .Charles Knight invents sleeve-valve engine.
1908.	.First Model T Ford. 11,000 sales that year. .General Motors Company of New Jersey organized by William Durant. Buick and Oldsmobile join. .McLaughlin Motor Car Co. at Oshawa, Ontario. .American automobile production valued at $137,800,000. .Eight hundred traffic deaths.

(pfd.)

TABLE 1--Continued

Year	Significant Milestones
1910.	.Barney Oldfield sets speed record of 132.72 m.p.h. .General Motors show net profit of over ten million dollars. Durant ousted from presidency.
1913.	.Campaign begins for better roads with the formation of the Lincoln Highway Association.
1914.	.Ford reduces working hours from nine to eight, raises minimum wage from two dollars and thirty-four cents to five dollars per day. Company announced this policy "to nullify the efforts of the I.W.W. to unionize our plant".
1921.	.There were eighty-eight firms in the United States manufacturing their own automobiles. By 1938, fifty-two automobile factories had succumbed to the competition of the Big Three--Ford, General Motors, Chrysler. .Durant again ousted as president of General Motors after having regained position in 1915 by financial coup d'etat. .Federal Highway Act providing $75 million to assist the development of interstate and intercounty highways.
1926.	.Ford discontinues building Model T, having manufactured fifteen million. .Weighted average features of lowest priced Sedan: Price $1,007 (120%); Wheelbase 106.5" (9%); Curb Weight 2,356 lbs. (45%); Maximum Speed 47.8 m.p.h. (71%); Horsepower 32 (180%). The figures in the parentheses represent the percentage change for a similar class of car sold in Winnipeg in 1951.
1930.	.Production value of motor vehicles manufactured $2,034,835,213, the depression causing a drop of 43 per cent as compared with the output value in 1929. .General Motors had outstanding 43,500,000 shares of common stock in hands of 263,000 stockholders. .Cadillac introduced America's first sixteen-cylinder engine. Four cylinders are enough for Indianapolis racing cars that, in 1951, can do better than 185 miles an hour.
1941.	.Traffic fatalities reach all-time high of 39,969 in the United States.

(pfd.)

TABLE 1--Continued

Year	Significant Milestones
1942.	.Automotive industry ceases passenger car production and manufactures war materials.
1944.	.General Motors delivers 3.8 billion dollars of war supplies. Employment averages 465,617.
1945.	.Reconversion to civilian production. .Organized labor strongly asserts itself. .Ten automobile companies and fourteen truck manufacturers make all American motor vehicles.
1947.	.Britisher John Cobb travels 394.196 miles per hour.
1948-50.	.In 1948, estimated revenue paid by highway users to United States Government (not including State licence fees) is over one billion dollars. .Total motor vehicle registration fees and gasoline tax gross Canadian provincial governments $195,739,405 in 1949; approximately 20 per cent of total provincial revenues.

From the foregoing information it should be possible to extract a number of pertinent points, the most important of which is the almost universal use of cars that the following factors have stimulated: (a) mass production of "cheap" cars; (b) demand for labor increasing earning power to a point where millions of people,who previously could not afford a vehicle, now are in a position to purchase one; and (c) the development of more and better roads permitting the swift and easy movement of automobile traffic.

In the meantime, accidents kept pace with the accelerating increases in motor vehicle production, registration and mileage travelled. While a more detailed study of this increased accident-involvement will be given in a later section,

it is of interest to note that traffic injuries and deaths were one hundred times higher in 1947 than in 1906. Because it is the major assumption of this thesis that the human element is the paramount issue in traffic accidents, it is important to the study to trace in greater detail the influence of motor transportation on society.

A recent report in Highway Research Abstracts details the increases in motor vehicle registrations in the United States during 1950--49,143,175 units as compared with 8,000 in 1900, an increase of over 600,000 per cent in fifty years.[1] It is also estimated that American vehicles travelled 450 billion vehicle-miles--an estimate derived by multiplying the number of gallons of gasoline consumed by the factor 13.12 miles

Figure 1 relates the mileage and vehicle-registration trends in the United States to the population increases. Using 1940 Statistics as the basis of comparison, population increases in the last twenty-five years have amounted to less than 25 per cent while motor-vehicle registrations and motor-vehicle mileage have jumped 92 per cent and 108 per cent respectively!

The situation in Canada.--While less spectacular, the growth of motor transportation in Canada has closely paralleled the United States' trends. Data for the year 1949 reveal a new maximum in the steady advance of the motor vehicle's popularity in Canada. Figure 2 traces the five-year increases in

---

[1]"U.S. Truck Fleet Increased 7.2 Per Cent in 1950," Highway Research Abstracts, XXI (June, 1951), 3.

POPULATION, MOTOR VEHICLE REGISTRATION AND MILEAGE TRENDS IN THE UNITED STATES

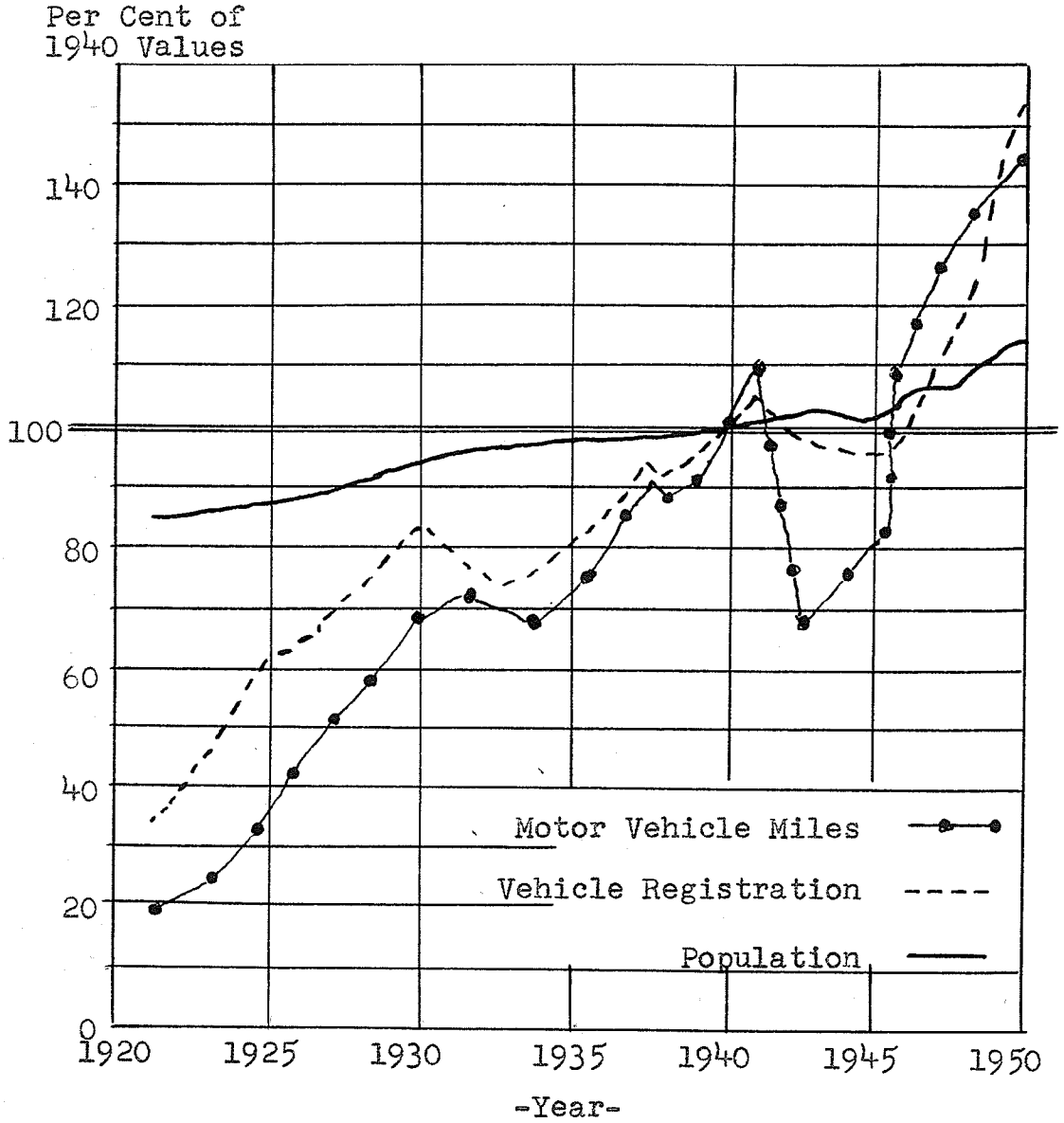


Figure 1.--Trends in growth of population, motor vehicle registration, and vehicle-miles of travel calculated on the basis of 1940 values as 100 per cent.

Source: Highway Needs of the National Defence, p. 77. Public Works Document No. 249. Washington: Government Printing Office, 1949.

CANADIAN INCREASES IN NATIONAL
MOTOR-VEHICLE REGISTRATIONS

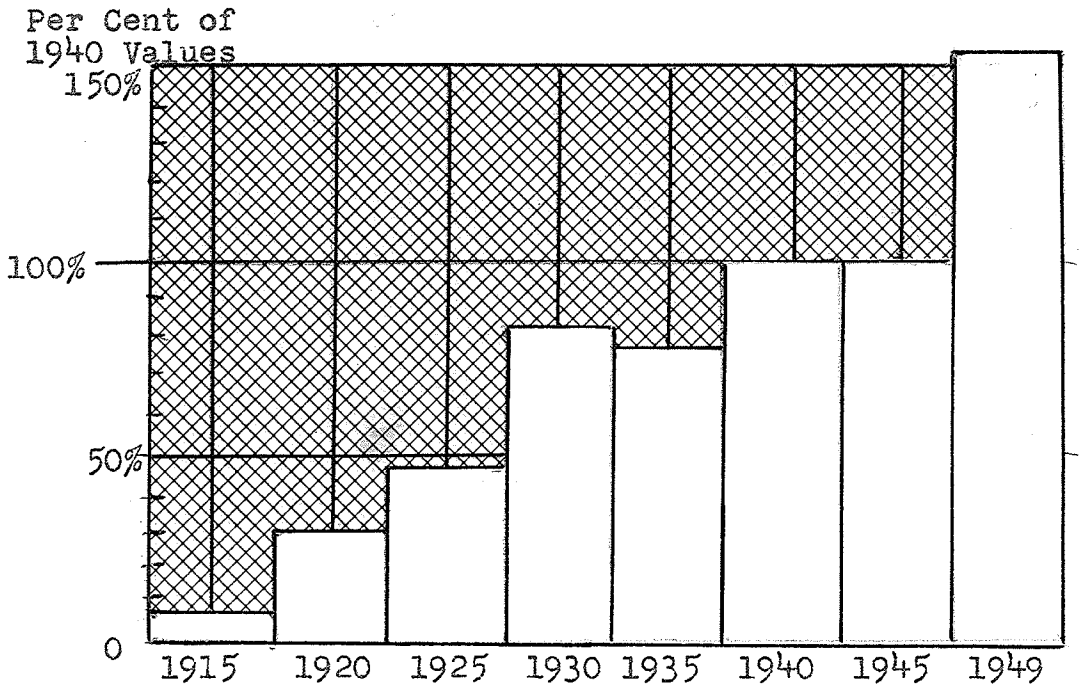


Figure 2--Trend in motor-vehicle registrations in Canada when compared in per cent with 1,500,829 motor vehicles registered in 1940.

Source: Derived from registration figures appearing in The Motor Vehicle 1949, p. 5. Op. cit.

registrations from 565 vehicles in 1905 to 2,293,226 in 1949. (The 1949 figures are made up of 1,672,352 passenger cars, 580,880 commercial vehicles, and 39,994 motorcycles.) Newfoundland added 13,981 vehicles to the national total. Furthermore, all provinces shared in the gain. Manitoba registered 138,576 motor vehicles--an 8.3 per cent increase over 1948.

Table 2 outlines the progress that the Canadian automotive industry has made since 1925. The number of vehicles produced in 1949 is nearly twice the number in 1925, and the monetary value of the 1949 production is more than four times the 1925 value.

TABLE 2[a]

TWENTY-FIVE YEARS OF MOTOR-VEHICLE PRODUCTION IN CANADA

	Passenger Cars		Trucks and Buses	
	Number[b]	Value[c]	Number[b]	Value[c]
1925..	135,573	$ 86,158,773	26,397	$ 12,234,486
1926..	166,887	106,000,203	37,840	16,629,334
1927..	146,421	100,962,211	32,633	14,942,017
1928..	197.848	127,263,877	44,206	21,913,122
1929..	203,307	134,023,280	59,318	29,474,395
1930..	121,337	75,253,581	32,035	16,513,225
1931..	65,072	42,634,173	17,487	10,330,763
1932..	50,694	32,490,129	10,095	6,070,667
1933..	53,849	32,568268	12,003	6,062,195
1934..	92,647	57,260,156	24,205	12,770,318
1935..	135,562	79,209,276	37,315	19,803,771
1936..	128,369	76,814,258	33,790	19,140,946
1937..	153,046	93,368,282	54,417	30,389,011
1938..	123,761	81,661,687	42,352	26,497,038
1939..	108,369	71,101,204	47,057	28,072,712
1940..	109,911	83,544,445	113,102	91,191,516
1941..	96,603	81,167,694	173,588	163,414,253
1942..	12,236	10,305,013	216,057	229,103,128
1943..	...	...	178,064	222,393,092
1944..	...	...	158,038	213,259,582
1945..	1,868	1,638,118	130,777	167,103,012
1946..	91,871	82,847,330	79,657	81,204,338
1947..	167,257	182,161,183	90,758	116,357,486
1948..	166,819	210,799,512	96,941	137,228,722
1949..	193,556	277,660,998	99,028	146,697,354

[a]Source: Facts and Figures of the Automobile Industry. Toronto: Canadian Automobile Chamber of Commerce, 1950.

[b]Production figures include all wheeled vehicles for military use; universal carriers and scout cars are not included.

[c]Selling value represents the wholesale value or the amount of money received by the manufacturers from their dealers or distributors; taxes, dealers' commissions, etc., are not included.

A partial summary of this Canadian industry's 1949 achievements is given in Table 3 below.

TABLE 3*

PRODUCTION ACHIEVEMENTS OF THE CANADIAN MOTOR-VEHICLE INDUSTRY FOR 1949

Production.		292,584
Passenger Cars.	193,556	
Motor Trucks.	98,303	
Coaches and Buses	725	
Production for Export		29,809
Passenger Cars.	16,496	
Motor Trucks.	13,313	
Motor-Vehicle Manufacturing:		
Number of Plants.		15
Total Salaried Employees and Wage Earners Employed . .		27,022
Wages and Salaries.		$ 76,684,328
Net Cost of Materials Used.		$300,705,398

*Source: Facts and Figures of the Automobile Industry, p. 4. Op. cit.

Some indications of the import that the motor vehicle has upon the lives of Canadians is contained in the following report by the Canadian Government's Bureau of Statistics:

> Canada may well be considered a nation on wheels with a motor vehicle for every 5.9 persons, sufficient to transport the entire population at one time. . . . autos have gradually been replacing electric trains in urban and inter-urban areas and the motor truck has become an essential factor in moving produce to consumers and servicing the national economy. During 1949 over 675 million passengers were transported by auto buses on urban, inter-urban and rural routes. A large percentage of the gainfully employed in Canada depends on the manufacture, operation and servicing of the motor vehicle for their livelihood.
>
> The increase in trucks servicing agriculture has been remarkable the past score years while the motor vehicle has made possible spectacular industrial growth without

> creating congested living areas . . . Our important tourist industry which brought Canada some $270 million of needed United States currency in 1949 is predicated on the motor car. Highway transportation has been one of the key factors in expanding educational opportunity through the use of school buses. . . . The motor vehicle has brought both the city and the country closer in a way and freedom of life vastly improved over that of yesterday. The modern army could not function without motor vehicles and highway transportation is thus indispensable to national defence.[1]

In Canada, then, the growth of motor-vehicle transportation has developed along the same lines as in the United States. Within fifty years the motor vehicle has risen from obscurity to a prominence unrivalled by other twentieth century technological phenomena. It would seem valid, therefore, that any implications to the problem of the study which the writer may infer from this general overview of the evolution of motor transportation should apply with equal force to component areas. In short, all inferences should be applicable to the metropolitan area of Winnipeg.

Motor vehicle transportation and the accident problem.--Insofar as motor-vehicle accidents are concerned, the historical evidence presented in the foregoing section seems to have influenced their growth and prevalence in the following ways:

(1) The increasing number of cars, their availability through relatively low prices or easy payment plans, the added power and speed of all motor vehicles, their widespread use in commerce and industry, and the elaborate system of improved highways all have contributed to allowing the use of motor-vehicle transport to a vast, heterogeneous army of drivers, who must include appreciable numbers of persons mentally and

---

[1] The Motor Vehicle 1949, p. 3. Op. cit.

and physically unfit, socially or financially irresponsible, and possessing insufficient knowledge or skill to drive safely their vehicles.

(2) Another significant observation that may be derived from the historical evidence is the continuing, even accelerating, increase in driver registrations. This means that the school would be justified in assigning time, talent and funds to planning long-range programs to solve such aspects of the attendant accident problem as may presently beg the school's assistance.

(3) The rate of increase in use of motor vehicles has trebled population increases, until, in 1951, two of every five eligible adults are driving cars in Manitoba. This fact in itself has meaning for the secondary school, for in the metropolitan area of Winnipeg 23,600 or 9.8 per cent of the entire adult population are in the fifteen to nineteen year age group.[1] But Dr. Leonard's analysis of high school elimination studies indicates that "drop-outs" are increasing: ". . . only from a third to a half of our youth in the United States remain for the duration of the secondary school, . . ."[2] Quite aside from any implication of the inadequacy of the secondary school's program, the juxtaposition of the increased elimination from the high school and the increased number of youthful drivers points to the urgency for inaugurating such highway accident prevention programs as the secondary school may

---

[1]"Metropolitan Area of Winnipeg," p. 17. Report on Census of the Prairie Provinces, 1946. Dominion Bureau of Statistics. Ottawa: King's Printer, 1947.

[2]Leonard, op. cit., p. 215.

choose to adopt.

The writer has previously set forth the assumption that the progressive high school aims toward "the preparation of the individual as a prospective citizen and cooperating member of society."[1] This means that the secondary school may teach the tools of social and personal living so that youth will be competent to discover new truths and to solve their problems. But this point of view also requires a unique school program--a program originating in the basic needs of the individual. In the planning of a curriculum in harmony with this concept, a number of practices are evident in the educational literature. The procedure which is favored by the writer organizes the materials drawn from personal and social life around certain major problems vital to youth and in themselves a mixture of heritage and present living. Problems, as Dewey[2] defines them, are made up of issues which offer problematical situations to youth. Youth must make decisions of immediate and future significance to them. The school thus deals with problems which have immediate and long-term personal significance, and with those which are important socially. In building such a curriculum the major responsibility for proper selection of appropriate subject matter must rest with the teacher. He should guide the direction of the experiences of his students; but he can only do this if he understands

---

[1]H. R. Douglass, "Nature and Function of the Curriculum," The High School Curriculum, p. 30. New York: Ronald Press, 1947.

[2]J. Dewey, Experience and Education, p. 45. New York: The Macmillan Company, 1938.

fully their major personal and social needs. To state the argument in specific terms of this study, before education for traffic safety can be discussed at all, it must be established that highway accidents present a personal and social problem of major proportions. The following section proposes to examine critically the past and present status of traffic accidents.

The Accident Problem

Accidents are as old as mankind but the traffic accident problem as it exists today and the safety education movement undertaken for its partial solution are comparatively novel. It is true, of course, that the automobile has been a boon in many ways: it has provided means for effortless mobility which has revolutionized modern modes of living. It has not, however, been an unmixed blessing. The greater number of cars on the roads, the unselected number of persons driving them, their increased mileages and speeds, their greater use under unsafe driving conditions, have all led to more and more traffic accidents, both those involving cars alone and those implicating bicyclists and pedestrians.

For generations human beings have been accustomed to relatively slow rates of travel. Now, although still endowed with nerves and muscles adjusted to slower tempos, they find themselves at the wheels of powerful, highspeed vehicles whose potentialities often prove too much for them.

Nature and extent of the traffic-accident problem.--The scope, magnitude and importance of the problem can perhaps be best illustrated through a review of some outstanding highway-

accident statistics and traffic research studies. In this respect, some Canadian and British data have been included, but the major contributions are drawn from research conducted by American institutions.

Interpretation of accident statistics.--To measure or compare anything some convenient unit of measurement is needed. The four indices generally employed for rating cruciality of motor-vehicle accidents are: (1) total motor-vehicle deaths; (2) traffic fatalities per 100,000 population; (3) traffic fatalities per 10,000 registered motor vehicles; and (4) fatalities per 100 million vehicle-miles traveled. These indices are predicated upon the following basic assumptions:

(a) Traffic accident exposure varies directly with the population.
(b) Traffic accident exposure varies directly as to the number of vehicles.
(c) Traffic accident exposure varies directly with vehicle-miles traveled.[1]

It is recognized, of course, that these assumptions cannot be entirely accurate as they do not take into account travel concentrations, two-car collisions (which theoretically vary as the square of the traffic volume), or pedestrian concentrations and activities. Nevertheless, if total accidents were employed as the major variable in these equations the results would be essentially correct. Unfortunately, a number of practical deterrents restrict the usefulness of total-accidents statistics:

(1) "The reporting of property damage accidents is done very poorly in most parts of the United States. The primary

---

[1] Uses of Traffic Accident Records, p. 34. National Conference on Uniform Traffic Accident Statistics. Saugatuck, Connecticut: Eno Foundation for Highway Traffic Control, Incorporated, 1947.

reason is that there is a universal tendency among operators to avoid reporting non-injury accidents."[1]

(2) In states and provinces which, unlike Manitoba, do not possess a well-administered safety or financial responsibility law, there is little incentive and inadequate machinery for good accident reporting. These divergent reporting standards are in evidence in a recent report on accident records to the President's Highway Safety Conference. In tabling the ratios of reported non-fatal accidents, the report shows the following extremes among the forty-eight states: Oregon, District of Columbia, and Connecticut record 150 or more injury-accidents per fatality, while Arkansas, Mississippi and West Virginia less than ten.[2] The tendency of highly-urbanized areas toward a greater proportion of non-fatal accidents does not account for the discrepancies. Connecticut, for example, has long been regarded ". . . one of the states outstanding in highway safety promotion".[3]

(3) In Canada, the only provinces which centralize the collection, processing and distribution of traffic-accident statistics are Manitoba, Ontario, Saskatchewan and British Columbia. And even here, non-standard procedures, and differences in funds available, number and quality of personnel, and provincial statutes, influence the accuracy

---

[1]DeSilva, op. cit., p. 121.

[2]Priorities in the Action Program, p. 17. 1950-51 Inventory and Guide for Action. Prepared for the President's 1950 Highway Safety Conference. Washington, D.C.: Government Printing Office, 1951.

[3]DeSilva, op. cit., p. 336.

and reliability of published accident reports.

The foregoing conditions have been instrumental in creating a fantastic situation. The highway safety status of countries and component areas are being gauged, almost exclusively by one criterion--road fatalities. This, because traffic fatalities constitute the one reliable source of accident information, and despite the known fact that they represent "less than five per cent of all accident occurrences".[1] (In 1950, traffic fatalities represented less than 0.6 per cent of Manitoba's 10,534 highway accidents.)

To overcome these difficulties there has been a move, in the United States, to conduct intensive research studies which critically seek relationships between personal characteristics of a selected group of drivers with known records and their accident- and conviction-involvements. Some of these traffic studies were conducted with a full understanding of Mill's[2] canon or principle of research; that is, to note the effect of a single variable applied to one situation or group, but not applied to a comparable situation or equivalent group. Such valuable studies on the differing effects of alcohol upon the reactions of drivers resulted in official recommendation that 0.15 per cent alcohol content in the blood be established as the concentration point at which an "average

---

[1] The Motor-Vehicle Driver: His Nature and Improvement, p. 7. Op. cit.

[2] C. V. Good, A. S. Barr and D. E. Scates, The Methodology of Educational Research, p. 485. New York: Appleton-Century-Crofts, Incorporated, 1941.

man's" driving ability can be considered seriously impaired.[1,2]

Another, and far more numerous, group of investigators have sought means of predicting "accident-proneness" among automobile drivers:

> . . . a class of drivers whose mean accident-rate per unit time or unit distance is significantly greater than that of the remainder of the driver population.[3]

For a long time attempts have been made to segregate this elusive factor: firstly, by means of simple tests of some specific psychophysical characteristics--visual acuity, depth perception, etc.--and the relation of these to actual driving performance;[4] secondly, (during the nineteen-thirties) DeSilva,[5] at Harvard and later at Yale, and Lauer,[6] at Iowa State College, utilized, on the theory of pattern or Gestalt psychology, elaborate batteries of psychological and psychophysical tests to measure at one time: (a) a person's eye-hand co-ordination while using a steering wheel, (b) his braking- and mental-reaction time, and (c) his ability to do several things at once or in quick succession; and thirdly, and most recently, by comparing equated groups of drivers--"accident-free" with "accident-repeaters"--

---

[1]"Committee on Street and Highway Accidents," Journal of the American Medical Association, CXVII (1942).

[2]Report of Committee on Tests for Intoxication. National Safety Council. Chicago: the Council, 1939.

[3]H. M. Johnson, "The Detection and Treatment of Accident Prone Drivers," Psychological Bulletin, XLIII (November, 1946), 489.

[4]H. Munsterberg, Accidents and Their Prevention. New York: Houghton-Mifflin Company, 1913. Pp. viii+321.

[5]DeSilva, op. cit., pp. 62-67.

[6]A. R. Lauer, "Methods of Measuring the Ability to Drive an Automobile," Iowa State Extension Service Engineering Bulletin, CXV (1936), 39.

as to differences in personal backgrounds, accident records, and performances in medical-physical tests.[1]

Excellent reviews and evaluations of test-studies conducted before 1939 are given by Johnson[2] and Lawshe.[3] While more specific references are made later, some findings are quoted below which illustrate the futility of attempting to account for accidents entirely or largely in terms of a single factor:

> The outstanding fact yielded by this investigation is the high percentage (77 per cent) of the accident-repeaters with relatively low systolic blood pressure, as compared with a rather normal distribution . . . among the accident-free drivers . . .[4]

> No significant differences were found in the following: (a) systolic and diastolic blood pressure, . . .[5]

And earlier, Johnson refuted the "findings" of scores of driver-testing studies by correlating the test performances of a random sample of drivers, selected and tested under the supervision of the Highway Research Board, with the known accident records of these drivers. He found:

> 1. Sensitivity to glare, whether determined by the Harvard method or the Iowa State method, is not significantly associated with preponderance of night accidents over

---

[1] Personal Characteristics of Traffic-Accident Repeaters, pp. 64. Center for Safety Education, New York University. Saugatuck, Conn.: The Eno Foundation for Highway Traffic Control, 1948.

[2] Johnson, op. cit. pp. 489-524.

[3] C. H. Lawshe, "A Review of the Literature Related to Various Psychological Aspects of Highway Safety," Purdue University Engineering Bulletin, XXIII (April, 1939), 7-59.

[4] L. Brody, Personal Factors in Safe Operation of Motor Vehicles, p. 87. New York: Center for Safety Education, New York University, 1941.

[5] Personal Characteristics of Traffic-Accident Repeaters, p. 51. Op. cit.

other accidents.
2. Defects of color vision are not significantly associated with a preponderance of accidents at signal-protected crossings over other accidents.
3. The Iowa Test of distance judgment is not significantly associated with a preponderance of head-against-rear accidents over other accidents. Neither is the Harvard test.
4. Inequality of acuity in the two eyes is not significantly associated with a preponderance of head-against-rear collisions over other accidents.
5. The time required for a simple reaction to auditory stimuli is not significantly associated with a propensity to head-against-rear or passing collisions over other accidents.
6. The variability of these reaction times is associated with a propensity to head-against-rear or passing collisions over other types of accidents.
7. The subjects' scores on the Harvard vigilance-test ("sensory braking"), in which the subject was to depress brake-pedal as quickly as possible in response to a visual stimulus, are not significantly associated with a propensity to head-against-rear or passing collisions over other types of accidents.
8. The scores on the Harvard vigilance-test ("combined-braking") are not significantly associated with a propensity to head-against-rear or passing collisions over other types of accidents. . . .[1]

Value of testing movement.--It would appear that no one has yet succeeded in devising a brief, easily-administered test or prediction-criteria that will serve to differentiate between individual accident-free and accident-prone drivers. There is reason to doubt seriously if the approach that some of these studies have taken is not theoretically impossible. In reviewing these studies, the writer has been impressed with the constant recurrence of the methodological crime of basing personal diagnosis on the results of techniques that are useful only for group predictions--a pursuit analogous in many ways to the mental testing movement's ceaseless search for the elusive "intelligence" factor. Nevertheless, research studies related to highway safety have made many notable contributions.

---

[1]Johnson, op. cit., pp. 516-517.

The following are some which appear most pertinent to the present study:

(1) By emphasizing his personal characteristics, these studies re-affirm the paramount role of the driver.

(2) These separate scientific efforts have greatly stimulated the present trend toward national highway research organizations:

> An advisory group on highway safety research has been appointed by Maj. Gen. Philip B. Fleming, as General Chairman of the President's Highway Safety Conference, to formulate a program of desirable research projects to be conducted during the next 5 years, and to suggest an individual or organization to conduct each project, and practicable means of financing.[1]

A year later this advisory group recommended, on the bases of "urgency of need, practicality, usefulness of results to the maximum number of people, . . . cost,"[2] eight research projects: (1) studies of driver and pedestrian characteristics and behavior; (2) critical analysis of existing data; (3) intensive investigations of motor-vehicle accidents; (4) statistical studies of motor-vehicle-accident rates and distribution; (5) relation of vision to driving; (6) alcohol influence as related to traffic accidents; (7) economic cost of motor-vehicle accidents; and (8) governmental responsibilities in the administration of highway safety functions.

(3) These studies have pointed out gross weaknesses in some

---

[1] Inventory and Guide for Action, p. 59. President's Highway Safety Conference. Washington, D.C.: Government Printing Office, 1948.

[2] 1949-50 Inventory and Guide for Action, pp. 54-57. President's Highway Safety Conference. Washington, D.C.: Government Printing Office, 1949.

primary source materials--particularly in accident-record data.

(4) Probably the most beneficial result of these studies is the use to which the best techniques were put once it became firmly established that psychophysical and other measuring devices "must be used as instruments to supplement the judgment, rather than as primary indicators."[1] Kramer has enumerated some uses in terms of generalities:

> It is desirable to use certain psychophysical testing devices and the data obtained from their use in a program of driver selection and driver education.
>
> Data obtained from tests can be used to make drivers aware of their personal weaknesses so that remedial training, compensation, and correction can be initiated and practised.
>
> In the selection of drivers, data secured from the use of psychological tests should be evaluated with regard to other significant factors which also serve to provide a picture of driver characteristics. Such factors . . . include ratings of the driver's general health, physical condition, attitudes, driving skills in traffic driving experience, literacy, accident record, and knowledge of traffic rules and driving procedures.[2]

These recommendations are echoed in a prominent British report on road safety:

> The most comprehensive and reliable method would, perhaps, be the setting up and maintenance of a central index of all drivers licensed, in which would be recorded the age, occupation, annual mileage done and type of vehicle normally driven in relation to each driver as well as the accidents in which he was involved.[3]

---

[1] The Motor-Vehicle Driver: His Nature and Improvement, p. 28. Op. cit.

[2] Safety Supervision in Motor Vehicle Fleets, p. 136. Edited by M. D. Kramer for the Association of Casualty and Surety Companies. New York: the Association, 1947.

[3] Final Report of the Committee on Road Safety, p. 28. Ministry of Transport. London, England: His Majesty's Stationery Office, 1947.

Implications of the Highway Accident Problem

Magnitude and Scope.--In 1949 there were 115,225 motor-vehicle accidents reported in Canada, bringing death to 2,230 and injury to 43,814 persons. This represented a 15 per cent increase over traffic fatalities occurring the previous year. Property-damage accidents were up 30 per cent in 1949 and totaled, as economic loss, over nineteen million dollars. In raw figures the Canadian toll seems insignificant when compared to similar totals suffered in the United States. Table 4, however, analyzes the situation more accurately. It is readily seen that from 1933 to 1946 the trends were following like patterns--an increase in fatalities up to 1941, then a decrease brought about by restricted war-time travel. From 1946 onward, there appears a sharp divergence--a steady decrease in the American indices, while the Canadian rates continue to mount. In these sharp contrasts are epitomized the virtues and rewards of a concerted, organized safety movement, for the reversal in American automobile accidents coincided with the inauguration of President Truman's National Action Program for Highway Safety.

As one of its principal recommendations, the 2,000 delegates to the first Conference in 1946 endorsed the resolution urging the adoption of traffic safety education in the schools:

> In the more than 30 million young people enrolled in the schools of the Nation lies our greatest hope for a solution of the mounting accident problem. Their minds are receptive to new ideas. They are at an age when habits and skills can successfully be established. Attitudes developed during these early years will influence their behavior through life.
>
> These young people represent one large united body. They are "reachable". They should be given guidance

TABLE 4[a]

COMPARISONS OF AMERICAN AND CANADIAN TRAFFIC-ACCIDENT FATALITIES

Year	Total Deaths		Total Death Rates					
			Per 100,000 Population		Per 10,000 Motor Vehicles		Per 100,000,000 Vehicle Miles [b]	
	U.S.	Can.	U.S.	Can.	U.S.	Can.	U.S.	Can.
1933	31,363	955	25.0	9.1	13.2	8.8	15.6	...
1934	36,101	1,115	28.6	10.4	14.4	9.8	16.7	...
1935	36,369	1,224	28.6	11.3	13.9	10.4	15.9	...
1936	38,089	1,316	29.7	12.0	13.5	10.6	15.1	15.4
1937	39,643	1,633	30.8	14.8	13.3	12.4	14.7	17.0
1938	32,582	1,545	25.1	13.9	11.1	11.1	12.0	15.4
1939	32,386	1,584	24.7	14.1	10.6	11.0	11.3	15.2
1940	34,501	1,723	26.1	15.2	10.8	11.5	11.4	15.6
1941	39,969	1,852	30.0	16.1	11.6	11.8	12.0	15.7
1942	28,309	1,409	21.1	12.1	8.7	9.2	10.6	14.6
1943	23,823	1,437	17.8	12.2	7.8	9.5	11.5	17.2
1944	24,282	1,372	18.3	11.5	8.1	9.1	11.5	15.1
1945	28,076	1,556	21.3	12.9	9.2	10.4	11.3	14.9
1946	33,411	1,781	23.9	14.5	9.8	11.0	9.8	11.3
1947	32,697	1,869	22.8	14.9	8.7	10.2	8.8	10.6
1948	32,259	2,070	22.1	16.1	7.9	10.2	8.1	10.7
1949	31,500	2,230	21.2	16.5	7.1	9.8	7.4	10.4

[a]Sources: Compiled from population statistics given in The Canada Yearbook 1950; and traffic accident statistics in National Safety Council, 1950 Accident Facts, p. 60. Chicago: The Council, 1950; and gasoline sales and accident figures in the Government of Canada, The Motor Vehicle 1949, op. cit., pp. 23, 27.

[b]This index is derived from the following formula:

$$\frac{\text{Total Net Gasoline Consumed (Average Mileage per Gallon)}}{\text{1,000,000 (Total Traffic Deaths)}}$$

For the American index the estimated mileage per gallon is 13.12.
For the Canadian index the estimated mileage per gallon is 15.8.

> in accident prevention. As educators, it is our job to assist in equipping them fully. For upon their ability to shoulder their responsibilities involving traffic will depend the success or failure of traffic-accident prevention for years to come.[1]

In 1944, the British Government commissioned Professor J. H. Jones, head of the Economics and Commerce faculty, University of Leeds, to investigate the cost to the community of road accidents and traffic congestion. With customary British thoroughness, Jones prepared a model report based on the random sampling of accidents occurring in the period 1935-38. His following summary indicates the enormity of the economic loss suffered by Britons during a period when their motor-vehicle registrations averaged less than 2,900,000 or about 6 per cent of the current United States motor fleet:

> 1. I estimate that the average annual total cost to the community of road accidents during the period 1935-38 was approximately £60,000,000 at the price and income levels then prevailing.
> 2. This sum represents approximately 1.33 per cent of the total National income.
> 3. If the same total number of similar accidents were to occur under present conditions, I estimate the total cost would be of the order of £100,000,000 per annum.[2]

A report appearing recently in Highway Research Abstracts indicates that road accidents in Great Britain are on the increase:

> During 1950, 201,325 persons were injured or killed in 166,592 road accidents in Great Britain. This was the highest total of road deaths and injuries for any year since the war, and was 24,546, or 14 per cent, more than for 1949.

---

[1] Report of the Committee on Education, p. 1. The President's Highway Safety Conference. Washington, D.C.: Government Printing Office, 1946.

[2] Road Accidents Report, p. 7. Prepared by J. H. Jones for the Ministry of Transport. London: His Majesty's Stationery Office, 1946.

> The deaths numbered 5,012, an increase of 239 compared with the previous year, and rose over the 5,000 mark for the first time since 1946. . . . The best feature of the 1950 records is a reduction in the number of child deaths, the total of 868 being the lowest for more than 27 years. (writer's italics) [1]

Appalling as these figures are, they represent a substantial decrease from the peak accident period of 1938 when 6,648 persons were killed in 195,664 fatal or non-fatal accidents. In the absence of factual data, the writer can only conjecture as to the forces that brought about this decline. But the similarity in the accident trends of Great Britain and of the United States after national safety programs had been initiated is too remarkable to be attributed to chance. For in 1943 the urgency of the road safety problem moved both Houses of Parliament to request the appointment of a Royal Commission under the following terms of reference:

> To consider and frame such plans as are possible for reducing accidents on the roads and for securing improvements in the conduct of road users in the interests of safety; . . .[2]

This Committee on Road Safety made its interim report in December, 1944, and its final report in May of 1947. It is indeed significant that these studies, which thoroughly and scientifically investigated every phase of the complex traffic-accident problem, should stress, as did President Truman's Highway Safety Conferences, the importance of including highway-accident prevention in the school curriculum:

> We endorse the view expressed by the Alness

---

[1] "Increase in Road Accidents in 1950 in Great Britain", Highway Research Abstracts, XXI (April, 1951), 13.

[2] Interim Report of the Committee on Road Safety, p. 4. Ministry of War Transport. London: His Majesty's Stationery Office, 1945.

> Committee . . . that the most important of remedial measures lies in the education of school children. That this is also the view of the Department is evidenced by the attention given to child safety in the wartime propaganda campaigns. The Royal Society for the Prevention of Accidents have also concentrated on the education and training of children and we have been impressed by the fund of information on the subject. . .
>
> . . . Safety training in schools is of paramount importance and the necessity for including adequate education in road safety in the curriculum is, we are glad to know, fully accepted by the Ministry of Education and the Scottish Department of Education.[1]

General situation in Manitoba.--Before 1951, the traffic-accident situation in Manitoba was by no means further advanced than that obtaining for the entire Canadian scene. From 1937 (a peak year for the United States and Great Britain) to 1950, total reported accidents increased nearly fourfold--from 2,205 to 10,534. Figure 3 traces the upward trend in the three phases of highway accidents--deaths, injuries, total accidents --from 1944. Table 5 details the number of accidents, types of accidents, and percentage changes for Manitoba's two worst years--1949 and 1950.

Superficially, these increases in the Manitoba traffic toll can be partially attributed: (1) to better reporting of accidents since December, 1945, when Manitoba's Safety Responsibility Act was promulgated; (2) to increases in registrations from 90,000 to 140,000 motor vehicles; (3) to numerical increases in licensed drivers, from 109,000 to 180,000; and (4) to the shift in meaning of the definition "damage to vehicles involved exceeds twenty-five dollars", which accounts for the reporting of a greater number of property-damage collisions in these inflationary times.

---

[1] Ibid., pp. 22-23.

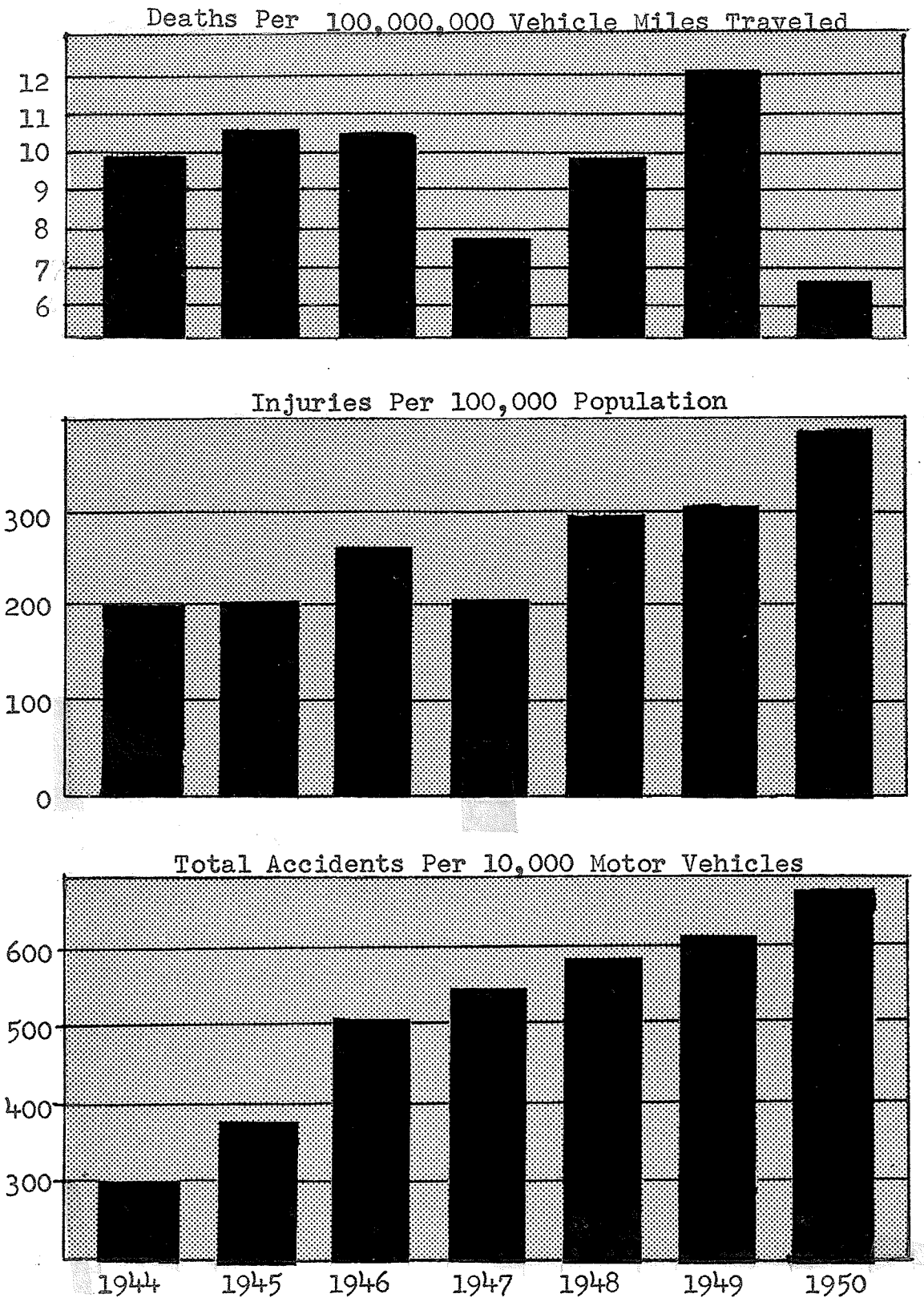


Figure 3.--Motor-Vehicle Accident Trends in Manitoba for the Years 1944 to 1950.

TABLE 5*

COMPARISON OF HIGHWAY ACCIDENTS IN MANITOBA FOR THE YEARS 1949 AND 1950

Type of Accident	All Accidents			Fatal			Non-Fatal			Property Damage		
	1949	1950	% Change	1949	1950	% Change	1949	1950	% Change	1949	1950	% Change
-Motor Vehicle with-												
Pedestrian	526	575	9.3%	28	26	- 7.1%	498	549	10.2%	...	...	...
Motor Vehicle	6418	7952	23.9%	19	13	-31.6%	985	815	-17.3%	5414	7124	31.5%
Railroad Train	44	66	50.0%	8	2	-75.0%	7	23	229.0%	29	41	41.4%
Street Car	212	216	1.9%	1	0	-100 %	42	31	-26.2%	169	185	9.5%
Bicycle	280	291	3.9%	1	3	200 %	165	226	37.0%	114	62	-45.6%
Animal	182	217	19.2%	0	0	zero	23	25	8.7%	159	192	20.7%
Fixed Object	409	370	- 9.5%	1	3	200 %	84	84	zero	324	283	-12.7%
Other Object	7	9	28.6%	7	0	-100 %	0	3	infin.	0	6	infin.
Non-Collision	664	838	26.2%	24	11	-54.2%	129	265	10.5%	511	562	10.2%
Totals	8742	10534	20.5%	89	58	-34.8%	1933	2021	4.6%	6720	8455	25.9%

*Source: Statistics for 1949 and for January to July, 1950, were compiled by the Manitoba Department of Labor, (W. T. Davies). August to December, 1950, statistics were compiled by the Manitoba Safety Division, (R. M. Arnold).

In this undigested form, these accident statistics seem to conclude the inevitability of mounting highway mishaps with increases in the exposure of the driving population. That this is a fallacious assumption seems apparent by applying the findings of just one of the many comprehensive analyses made by the first Committee on Accident Records to Manitoba accident statistics. In its 1946 report, this committee stated:

> . . . Due to increased rural traffic and effective urban accident-control measures, rural deaths have increased sharply since 1931, while urban deaths have changed but little.[1]

But in 1951, after five years of concerted highway-accident prevention, the American Nation could glean some satisfaction from the National Safety Council's assessment of its achievements:

> The trend of the death rate per 100,000,000 vehicle miles has been consistently downward in both urban and rural areas. . . . Despite a slight increase from 1949 to 1950, the decrease in the rural rate from 1937 to 1950 amounted to 40 per cent. The urban rate dropped 61 per cent.[2]

Table 6 shows the situation in Manitoba during the last five months of 1950. The comparison favors the country driver, for 69 per cent of total accidents occurred in urban areas. Although the City of Winnipeg registers approximately one-quarter of the Province's 140,000 motor vehicles, 552 injury-accidents, or 57 per cent of the entire provincial toll for that period, occurred on its traffic-ways.

---

[1] Report of Committee on Accident Records, p. 2. The President's Highway Safety Conference. Washington, D.C.: Government Printing Office, 1946.

[2] Accident Facts, p. 55. The National Safety Council. Chicago: the Council, 1951.

TABLE 6*

MANITOBA MOTOR VEHICLE TRAFFIC ACCIDENTS
BY URBAN-RURAL LOCATION
(AUGUST--DECEMBER, 1950)

Location	Number of Accidents				Number of Persons			
	All Accidents	Fatal	Non-Fatal	Prop. Damage	Killed	Injured		
						Total	Severe	Slight
Incorporated City, Town. .	356	2	55	299	2	149	120	29
Brandon . . .	254	2	18	234	2	43	9	34
Greater Winnipeg. . .	2936	7	552	2377	7	524	211	313
Total Urban	3546	11	625	2910	11	716	340	376
Provincial Highways. . .	614	10	192	412	11	332	172	160
Local Roads	961	7	158	796	7	251	104	147
Total Rural	1575	17	350	1208	18	583	276	307
Total All Accidents . .	5121	28	975	4118	29	1299	616	683

*Source: Accident Statistics Section, Manitoba Safety Division. Compiled by R. M. Arnold.

That this adverse trend is amenable to improvement may be assumed from the accident experience of Manitoba for the first six months of 1951. Table 7 provides a statistical analysis of this improvement. The 9 per cent reduction in non-fatal (injury) accidents for the entire province--the first downward trend since 1947--is remarkable because the

TABLE 7

MOTOR-VEHICLE TRAFFIC ACCIDENTS IN MANITOBA DURING FIRST SIX MONTHS OF 1950 AND 1951

Type of Accident[a]	Number of Accidents[b]						Per Cent Change in Non-Fatal Record
	Jan.-June, 1950			Jan.-June, 1951			
	All Accidents	Fatal	Non-Fatal	All Accidents	Fatal	Non-Fatal	
PROVINCE WIDE -Motor Vehicle with-							
Pedestrian	287	12	275	239	14	225	- 18%
Motor Vehicle	3472	3	361	3455	5	270	- 25%
Railroad Train	23	0	6	27	2	10	66%
Street Car	131	0	20	104	0	27	35%
Bicycle	108	0	68	88	0	75	10%
Animal	72	0	12	46	1	6	- 50%
Fixed Object	162	0	31	163	0	32	3%
Other Object	1	1	7	4	0	0	-100%
Non-Collision	187	3	51	412	6	109	114%
Totals	4443	19	831	4538	28	754	- 9%
WINNIPEG -Motor Vehicle with-							
Pedestrian	207	8	199	168	5	163	- 18%
Motor Vehicle	1957	1	227	2070	1	153	- 33%
Street Car[c]	118	0	23	101	0	11	- 50%
Bicycle	72	0	49	71	0	62	26%
Animal	22	0	2	11	0	2	zero
Fixed Object	82	0	23	102	0	26	12%
Non-Collision	20	0	12	10	0	3	- 75%
Totals	2478	9	535	2533	6	420	- 22%

[a]All accidents in this summary involve at least one registered motor vehicle.

[b]These statistics show the number of accidents; not the total of deaths, injuries, and damage. More than one injury or death may occur and more than one car may be involved in any one accident.

[c]Includes collisions with Railroad Train.

entire improvement has occurred in Winnipeg! And this, despite a 15 per cent increase, over 1950, in the number of registered motor vehicles.

Information is lacking in regard to the many variable factors which contribute to accidents. In the absence of adequate research facilities it is impossible to evaluate properly the effect of the following influences on Winnipeg's 1951 traffic accidents: (1) exposure, (2) speeding, (3) skill of drivers, and (4) any new shifts in the distribution of personal, and socio-economic characteristics of the driving population. Nevertheless, there is one force present in 1951 which did not exist in 1950. This is the Manitoba Government's vigorous highway accident-prevention program.

Since March of 1951, the Manitoba Safety Division has introduced the Greater Winnipeg area to two measures designed to improve the skill and safety-mindedness of motor-vehicle operators: (1) stringent driver examinations, and (2) a Driver Improvement Clinic which records and assigns driver responsibility for accidents and traffic convictions, and which influences the driver through safety propaganda, advisory letters, interviews, review examinations, visual-education media, and temporary or absolute suspension of driving privileges. This approach is predicated on a narrower concept of safety education which has proved most effective in States such as Connecticut, Massachusetts, Delaware and New Jersey; States which have consistently led the American nation in thwarting the highway accident menace. The American Association of Motor Vehicle Administrators have stated the basic aims of driver improvement through licensing procedures as follows:

1. That every driver, somehow, gets at least the minimum training needed;
2. That the few who might try to drive without enough physical or mental ability for driving are prevented from doing so; and
3. That the public is protected from those who repeatedly misbehave in spite of enforcement by the police and courts.[1]

Although motor vehicle administrators could boast with considerable justification that "for the money spent, and in the long run, no other activity will control the traffic accidents so well as a good driver-licence law well administered,"[2] they had long realized that only mediocre success could result from such limited educational objectives. As early as 1925 these motor vehicle administrators were advocating the principle that safety could be achieved only through education, and they pledged themselves "to further every type of broad educational work that their official duties would permit them to enter."[3]

This viewpoint is apparently shared by Manitoba's Premier. Among the several topics discussed at the first meeting of the new Manitoba Highway Safety Council, convened by the Honorable D. L. Campbell on May 30, 1951, safety education in the schools was the one traffic-accident prevention activity most prominently discussed and advocated by Premier Campbell and other speakers. Mr. T. McMaster pledged the

---

[1] Driver Improvement Through Licensing Procedures, p. 11. Prepared by the Bureau of Public Roads and the Traffic Institute, Northwestern University. Washington, D.C.: American Association of Motor Vehicle Administrators, 1950.

[2] Ibid., p. 11.

[3] Report of Committee on Motor Vehicle Administration, p. 11. The President's Highway Safety Conference. Washington, D.C.: Government Printing Office, 1949.

Manitoba Teachers Society's support to a brief advocating high school driver education[1] which was jointly presented by the Winnipeg School Board and the Winnipeg Junior Chamber of Commerce.

Some generalizations and hypotheses.--The writer suggests that the foregoing evidence on highway accidents warrants the derivation of the following generalizations:

(1) That the magnitude and scope of traffic accidents is such as to affect, directly or indirectly, every member of the community.

(2) That the accident toll can be checked in direct proportion to the quality and comprehensiveness of a purposeful, all-inclusive program of accident prevention. This program must include elements of better motor-vehicle administration, engineering, enforcement, education, improved highway safety legislation, research, and organized public support.

(3) That authoritative opinions hold education, as differentiated from engineering and enforcement practices, to be the most effective method of preventing traffic accidents. By "education" these authorities mean all positive measures undertaken by organizations interested in traffic-accident prevention to improve the road user: by improving his knowledge of road rules and safe driving and walking practices; by discovering his psychophysical deficiencies

---

[1]"A Charter for Driver Education in Manitoba High Schools," pp. 9. Brief prepared by R. M. Arnold, and presented to the Minister of Education on May 23, 1951, by the Winnipeg School Board and the Winnipeg Junior Chamber of Commerce. Winnipeg: Winnipeg School Board (mimeo), 1951.

and by helping him to compensate for them; and by acquainting him of his social responsibilities through a variety of media.

In reviewing the highway accident problem, no attempt was made to analyze available accident statistics except as they depict the general seriousness of the problem and reveal a continuous upward trend. It is entirely possible to utilize these facts to point out groups by age, location, and frequency of accident involvement. Correlations may then be made with other data to show dangerous practices; and to suggest remedial measures.

A detailed analysis of this type is directed toward drivers in the sixteen to twenty-four year age groups in a later section of this study. Firstly, however, the writer reviews organized efforts to control accidents; particularly those efforts which employed the educational concept of preparing the individual to adjust his behavior to the hazards of industry and traffic conditions.

Organized Efforts to Control Accidents

National programs in the United States.--While it is not practical, in the present study, to examine in detail the many ramifications of the American nation's growth toward traffic-safety consciousness, the important implications that this movement connotes for the school's participation are too essential to be entirely disregarded.

Table 8 gives a chronological list of outstanding events in the evolution of traffic safety organization. It is of interest to note, for example, that the National Education Association's Yearbook on Safety Education coincided with the first National Conference on Street and Highway Safety, called

TABLE 8*

HISTORY OF TRAFFIC SAFETY

	Year	M.V. Traffic Deaths	Mileage Death Rate
300 autos in U. S.	1895		
80,000 autos in U. S.. . .	1906	400	
National Safety Council organized.	1913	4,200	
NSC. School, Public Safety Divisions.	1923-24		
First National Conference.	1925	21,000	19.0
Uniform Vehicle Code . . .			
Model Traffic Ordinance. .			
NEA Yearbook on Safety Education.	1926-28		
Bureau for Street Traffic Research, Harvard. . . .			
American Engineering Council Traffic Comm.. . . .			
Automotive Safety Foundation			
Northwestern University Traffic Institute. . . .	1936		
American Bar Association Insurance Section Symposium			
Highest Traffic Death Toll	1941	39,969	12.0
Warren Report.			
ABA Program.	1942		
Traffic Court Conferences (NSC-ABA).			
President's Highway Safety Conferences.	1946	33,411	9.8
NUTI-ABA Court Conferences	1947	32,697	8.8
	1948	32,259	8.0
	1949	31,500	7.4
	1950	35,000	7.5

*Sidney J. Williams, "The Traffic Problem and Principles of Control through Engineering, Education, and Enforcement," p. 4. Judge and Prosecutor in Traffic Court. Chicago: American Bar Association and The Traffic Institute Northwestern University, 1951.

by Herbert Hoover at the behest of a number of highway interested organizations. Also, it is noteworthy to trace the gradual augmentation of many diverse forces, beginning with the National Council for Industrial Safety in 1912 (changed to the National Safety Council in 1913), and culminating in the President's Highway Safety Conferences--gatherings which represent nearly every industrial, educational and official segment of the American nation.

One of the most fascinating developments in the safety movement has been the extension and application of its principal maxim--education--to every major traffic accident-prevention activity. Industry seems to have been the first area interested in conserving the life, health and material resources of its members; to appreciate the huge economic wastage of time lost because of injuries. MacMillan has pointed this out:

> . . . The first indications of safety efforts in industry became apparent in the period between 1905 and 1910, when a few of the employers began to study the accidents which were occurring in their plants. . . . This led to the discovery of danger points and the guarding of them. Every step in the different processes of manufacturing was studied from the standpoint of safety of the workman. . . . These methods brought about a decided decrease in industrial accidents, but accidents still occurred. A further study showed that a vast majority of accidents were now due to carelessness on the part of the workman. The logical means to overcome this situation was a campaign of safety education. Here we find the first organized attempt to inculcate safety and prevent accidents through training.[1]

Stack cites some very remarkable reductions in fatalities and injury-accidents where an intensive industrial

---

[1] R. MacMillan, "Safety Education in the Public Schools of the United States," p. 11. Published Doctor's Thesis. Philadelphia: Teachers' College, Temple University, 1936.

safety program was inaugurated.[1] Table 9 gives a statistical version of this progress for the entire American industrial safety effort; a success which Vernon attributes to industry's realization of the importance of "the non-mechanical conditions in which human factors play an all-important part."[2]

Non-school agencies promote traffic-safety education.--The faith in educational activity as the paramount approach to the solution of the accident mischief, and to the meeting of the increasingly apparent social and economic needs identified with this problem, was manifested by non-school agencies for some time before the schools themselves became seriously interested. In point of fact, it is largely due to the efforts of these non-school agencies that American schools were originally induced to participate in the organized safety movement. To them, also, is due much of the credit for whatever success the schools have experienced in the safety programs they have undertaken.

The purposes of the present study permit only the briefest resumé of the educational interests of some outstanding non-school agencies.

The pioneer, and one of the most influential forces in current safety promotion, is the National Safety Council. Formed in 1913 primarily to assist in the solution of the industrial safety problem and to furnish services to industrial

---

[1]H. J. Stack, "Safety Education in the Secondary Schools," p. 75. Published Doctor's Thesis. New York: Center for Safety Education, New York University, 1929.

[2]H. M. Vernon, "The Neglect of the Human Factor in the Prevention of Industrial Accidents," International Labor Review, XXXIV (December, 1936), 393-6.

TABLE 9[a]

TRENDS IN INDUSTRIAL ACCIDENT FREQUENCY AND SEVERITY RATES

Year	Number of Units Reporting	Frequency Rate[b]	Severity Rate[c]
1926	1,725	31.87	2.50
1927	2,089	25.95	1.88
1928	2,552	24.52	2.03
1929	3,605	25.39	2.25
1930	4,198	18.47	1.97
1931	4,383	15.12	1.72
1932	3,937	13.20	1.59
1933	3,776	14.56	1.59
1934	3,866	15.29	1.70
1935	3,796	14.02	1.58
1936	4,093	13.57	1.64
1937	4,032	14.05	1.58
1938	4,497	12.18	1.53
1939	4,734	11.83	1.42
1940	5,163	12.52	1.44
1941	5,325	15.39	1.53
1942	5,537	14.68	1.49
1943	6,060	14.52	1.20
1944	5,857	14.46	1.21
1945	6,262	13.63	1.16
1946	6,212	14.16	1.28
1947	6,634	13.26	1.23
1948	6,707	11.49	1.12
1949	7,185	10.14	1.02
Decline since 1926.		-65%	-60%

[a] National Safety Council, Accident Facts, p.28. Chicago: the Council, 1950.

[b] Frequency Rate is the number of disabling occupational injuries per million man-hours exposure.

[c] Severity Rate is the total time charged for occupational injuries per thousand man-hours of exposure. The time charges for each injury include actual calendar days disability for temporary total disability, and arbitrary charges for deaths and permanent disabilities on a time charge of 6,000 days for a death.

organizations, its scope has broadened and its activities have extended to cover the whole field of safety in all its phases. The Council describes itself as a "non-profit, cooperative association of members, organized and operated to carry out a national program for reducing the number and seriousness of all kinds of accidents."[1]

In addition to presenting its information through periodic bulletins, technical memos and pamphlets, graphic posters, or elaborate plans for the prevention of traffic accidents throughout an entire state or city (Operation Safety), the Council publishes an annual statistical report, Accident Facts, giving authentic, analytical data on all types of accidents, and three monthly journals: National Safety News, Public Safety, and Safety Education. Besides giving valuable assistance in the formation of national safety codes, the Council is responsible to the President of the United States for annual normative-surveys and assessments of his Action Program. This Annual Inventory of Traffic Safety Activities was intrusted to the Council by the National Committee for Traffic Safety. Each year the States report all aspects of their activities in highway accident prevention; and these are evaluated according to a scale of merits which has been the result of the best research in achieving proper perspective for the various phases of traffic safety activities.

The Association of Casualty and Surety Companies--the most influential of the many insurance associations participating in traffic safety activities--has greatly stimulated the

---

[1]Accident Facts, p. 96, op. cit.

growth of driver educationin the United States by providing the following services: (1) conducting the annual High School Driver Education Award Program; (2) the preparation and distribution of high-school standardized drivers' knowledge tests and of an excellent text book for high-school driver education courses[1]; and (3) the establishment of the Center for Safety Education, New York University, ". . . the first university department in safety education on the graduate level in this country, . . ."[2] which is devoted primarily to the training of leaders for all parts of the safety education field.

Two other groups that have a strong interest in promoting highway safety (and not entirely for altruistic motives) are the automobile industry and the automobile clubs. The automobile industry is represented by the Automotive Safety Foundation, founded in 1936, and whose chief functions are organizing public support and endowing traffic safety research. The automobile clubs are largely represented by the American Automobile Association. This organization has probably provided more practical help and incentive to high school driver education than any other non-school agency: providing regular courses for teachers of driver education at Pennsylvania State College; developing and distributing tests, textbooks, audio-visual aids and psychophysical testing equipment; making available the free use of dual-control automobiles; and undertaking research studies on the national status of safety education,

---

[1] Man and the Motor Car, pp. xi/287. The Association of Casualty and Surety Companies. Edited by A. W. Whitney. New York: the Association, 1947.

[2] "The Center for Safety Education," p. 3. A syllabus of the Center for Safety Education, New York University. New York: the Center, 1950.

the accident-liability of youthful drivers, and the "effect of driver training on the accident and conviction records of high school students, . . ."[1]

This recital of non-school organizations seriously concerned over the accident problem and actively participating in the safety education movement seems to imply that such agencies maintain a virtual monopoly of safety activity. Orginally, this was probably true, but through no fault of the agencies themselves. In fact, it was largely due to the persistent pressure exerted by these outside groups that the elementary schools of America responded so splendidly to the demand that the school accept responsibility for providing a safety program which would include traffic education. MacMillan explains this trend as follows:

> By 1913 the pendulum had swung far over to the preventive side in accordance with the trend that had taken place in industry. The National Safety Council, organized in that year, began publication of supplementary reading material for school children. Directions for safety gradually appeared in Courses of Study and in textbooks. In 1918, an experiment was carried out in the public schools of St. Louis in the field of safety teaching by Dr. E. George Payne of Harris Teachers College, St. Louis. That was the first of many such studies leading to the formulation of definite safety teaching and definite courses of study in safety.[2]

While the major principles of safety education have been evolved by non-school agencies, it must be noted that they themselves realize and openly admit that only through the schools can the most effective safety education be accomplished and, furthermore, that only in providing assistance to the

---

[1] Driver Training Reduces Traffic Accidents One Half. Traffic Engineering and Safety Department, American Automobile Association. Washington, D.C.: the Association, 1945.

[2] MacMillan, op. cit., p. 10.

schools can their own efforts prove most fruitful. What, then, have the non-school agencies achieved? Frank W. Hubbard says:

> The special interest groups have done two things well: (1) they have made the public aware of the need for safety; (2) they have compiled information which may be used in instruction. The situation now needs to be shot through with the interest, enthusiasm, and technic of the professional educator. Superintendents, principals, and teachers must publicly recognize the need for safety instruction and deliberately guide the movement in channels acceptable to modern educational theory and practice.[1]

Traffic safety in the elementary school.--It is not the purpose of this study to inquire critically, and in detail, into the many aspects of traffic-accident prevention activities in the elementary school. Certain features of this movement, however, suggest valuable approaches for introducing driver education into the high-school curriculum. These implications for the high school may be defined in terms of the following hypotheses:

(1) That driver education in the high schools may be justified on the same basic grounds as those generally recognized for the elementary school.

(2) That the problems of introducing driver education into the high school are fundamentally similar to those which were successfully met by the elementary school.

(3) As in the elementary school, a safety program in the high school will appeal to pupils, teachers, and the community at large; its growth, therefore, will not be static.

(4) That driver education will effectively reduce traffic accidents involving high-school drivers as pedestrian and bicycle-safety education have reduced child traffic-accident involvements among age groups attending the elementary

---

[1]F. W. Hubbard, "Editorial Comment: Research in Safety Education," The Phi Delta Kappan, XXI (January, 1939), 161.

school.

The falling birth-rate, lowered school enrolments, and a spiralling death and injury rate, caused American legislators to view with alarm the traffic-accident involvements of school children. In 1932, the White House Conference on Child Health and Protection published a report which clearly enunciated the objectives of safety education in the elementary schools as the development of: (1) habits of personal safety; (2) a consciousness of responsibility for the safety of others; (3) a spirit of cooperation in solving problems of social significance, especially community problems; (4) respect for community regulations; (5) an understanding of the common causes of accidents and knowledge of how to meet them.[1] In one of the earliest significant and oft-cited research studies of safety education at the elementary level, Ruth Streitz reached the following conclusion:

> The objectives of safety education are attained to the degree in which individuals apply them in their lives, feel responsibility for their associates, and realize the civic responsibilities for community safety. The very nature of the problem implies the re-currence of habit-forming experiences on successive grade levels, and this incorporation of safety thinking and safety acting in other subjects and in typical life situations and activities.[2]

Examination of current practice reveals that safety education is being presented in the elementary school curriculum: (1) through integration with many other subjects and activities such as reading, social studies, science, and

---

[1]White House Conference on Child Health and Protection, Safety Education in the Schools, p. 23. Report of the Subcommittee of Safety Education. New York: The Century Co., 1932.

[2]Ruth Streitz, Safety Education in the Elementary School, p. 35. Doctor's Thesis. New York: Columbia University, 1926.

physical education; (2) as a separate subject; and (3) as a combination of both. Since habit formation is a slow process and requires continued emphasis in many grades, there is much repetition of content on the various grade levels but with varied method of presentation and adaptation to the needs and interests of the pupils at each age level. Supplementing the types of organization mentioned above are usually found such pupil organizations as school safety clubs, councils, and patrols, as well as assembly presentations, special demonstrations, and campaigns of various types. Usually a definite topic is assigned to each month and emphasis is placed on the seasonal approach, that is, emphasizing hazards at the season of the year when each type is most prevalent.

The elementary school finds no difficulty in applying the "learning by doing" principle to the safety education program. Many activities in and about the school building afford the children excellent opportunities to develop proper attitudes, practise correct habits, and acquire the understanding that safety is a cooperative enterprise. The organized group activity of safety clubs has a direct and potent appeal to children. The two most important elementary school safety organizations today are the Junior Safety Council and the Schoolboy Patrol. The school Safety Council is composed of pupils representing the various homerooms, holds regularly scheduled meetings, and, under faculty guidance, assumes a multiplicity of responsibilities and duties with respect to safe conduct in the school building, on the schoolgrounds, and in the neighborhood. By having the council representatives carry reports to their homerooms following each council meeting,

the entire student body is kept in close contact with the Safety Council and united in the cause of safety. The following safety pledge has been adopted by these organizations throughout the country:

> 1. I will work for the safety of others, as I would want them to work for my safety.
> 2. I will try to be careful all the time everywhere.
> 3. I will not take unnecessary chances of getting hurt and will warn others against doing so.
> 4. I will do my part to help reduce the number of accidents this year.
> 5. All this I will do for the sake of humanity and the honor of my school.[1]

The active interest of pupils, teachers, school administrators and outside organizations is reflected in the rapid growth of elementary school traffic-safety activities. As early as 1941, the National Education Association's Commission on Safety Education reported that there were already 300,000 school safety patrol members in the United States:

> How extensive this participation may be is shown by a survey in one city high school where of a total of 1936 reporting, 59 per cent of the boys and 57 per cent of the girls reported previous experience as members of elementary-school traffic patrols.[2]

The extent to which school administrators had accepted safety education as a part of the school's program is indicated by this Commission's study:

> . . . Of the 2,673 superintendents who responded . . . to the Commission's inquiry as to how the yearbook could be helpful less than 1 per cent asked for discussion of the school's responsibility. Apparently they accepted it without question. Eighty per cent asked for practical materials and plans. They want their yearbook not so much to convince them of the value of safety education as to show them how they can incorporate it into an already overcrowded curriculum and how it can be most effectively

---

[1] MacMillan, op. cit., p. 49.

[2] Safety Education, op. cit., p. 46.

> taught . . . a commendable interest in brass tacks in preference to generalities and pink lamp shades.[1]

The continuing enthusiasm of the American elementary school is shown in Tables 10 and 11, which are reports of the National Pedestrian Protection Contest and the Annual Inventory of Traffic Safety Activities.

The American elementary school and non-school agencies interested in school safety promotion point with pride to the results of their progress as told by statistics. In 1922, the year in which organized safety education was first offered in the elementary schools, the "all-types-of-accidents" death rate for this age category was 40.8 deaths per 100,000 population. By 1950, the rate for this 5-14 age group was 22.4.[2] Figure 4 and Figure 5 evaluate the effectiveness of elementary school safety programs in terms of nearly 30,000 child-lives saved in the period 1930-1945. Dr. Stack, dean of the movement for promoting safety education in American schools, has commented on the question, "What do the changes in the accident record show?" as follows:

> Child traffic deaths in the last two decades have shown a steady decline, while adult traffic deaths have increased, following the population increase and a greater usage of vehicles. This downward trend has resulted in a saving of more than 24,000 child lives.[3]

Figure 4 is based on United States population figures compiled by the 1940 Census, and the number of pedestrian and non-pedestrian deaths recorded by the National Safety Council

---

[1] Ibid., p. 44.

[2] Accident Facts, op. cit., p. 11.

[3] H. J. Stack, "Progress in Safety Education," Safety Education DIgest, (Fall, 1949), 4.

TABLE 10*

PEDESTRIAN AND BICYCLE SAFETY INSTRUCTION IN ELEMENTARY SCHOOLS, BY CITIES, 1948-49 AND 1949-50

Population	Number of Cities Reporting		Percentage of cities reporting school instruction in--			
			Pedestrian Safety		Bicycle Safety	
	48-49	49-50	48-49	49-50	48-49	49-50
10,000- 25,000	288	296	86	88	86	90
25,000- 50,000	123	134	94	93	92	93
50,000-100,000	74	82	97	95	99	96
100,000-250,000	41	42	100	100	92	98
250,000-500,000	29	32	100	97	97	97
Over 500,000	15	15	93	100	93	93

Source: National Safety Council.

TABLE 11*

PERCENTAGE OF CITIES REPORTING ACTIVE SAFETY PATROLS IN SOME OR ALL SCHOOLS, 1948-49 AND 1949-50

Population	Number of Cities Reporting		Percentage of Cities Reporting Patrols in Schools	
	48-49	49-50	48-49	49-50
Under 10,000	361	402	57.3	64.2
10,000- 25,000	300	303	68.1	70.0
	Both Years			
25,000- 50,000	90		75.5	84.2
50,000-100,000	44		76.0	82.1
100,000-200,000	29		75.0	82.8
200,000-500,000	13		83.7	84.5
Over 500,000	10		97.0	95.0

Source: American Automobile Association.

*Priorities in the Action Program, op. cit., p.29.

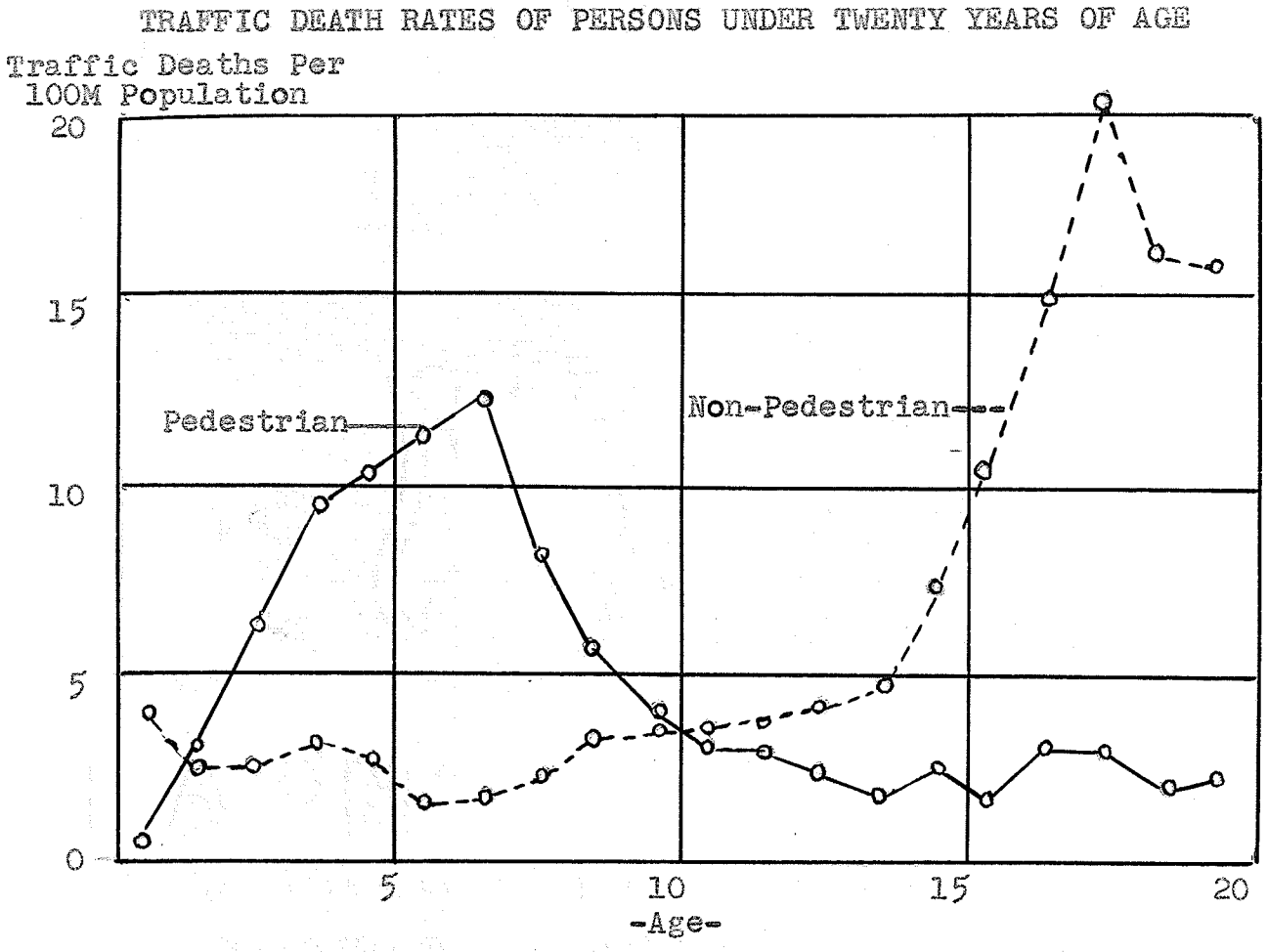


Figure 4.--Number of persons under the age of 20 killed in motor-vehicle accidents in 1944. Rates calculated from United States Bureau of Census population and deaths figures.

in 1944. The pedestrian-death index rises sharply as soon as children are able to walk. This index reaches a maximum of 12.6 deaths per 100,000 population at six years of age, then declines rapidly to 3.2. The broken line in Figure 4 depicts the death rate of non-pedestrians. It is interesting to note the sharp rise which occurs between ages sixteen to nineteen--the ages when youth first qualify as motor vehicle operators. One may surmise on the basis of these accident trends that if the safety programs of the American elementary school are

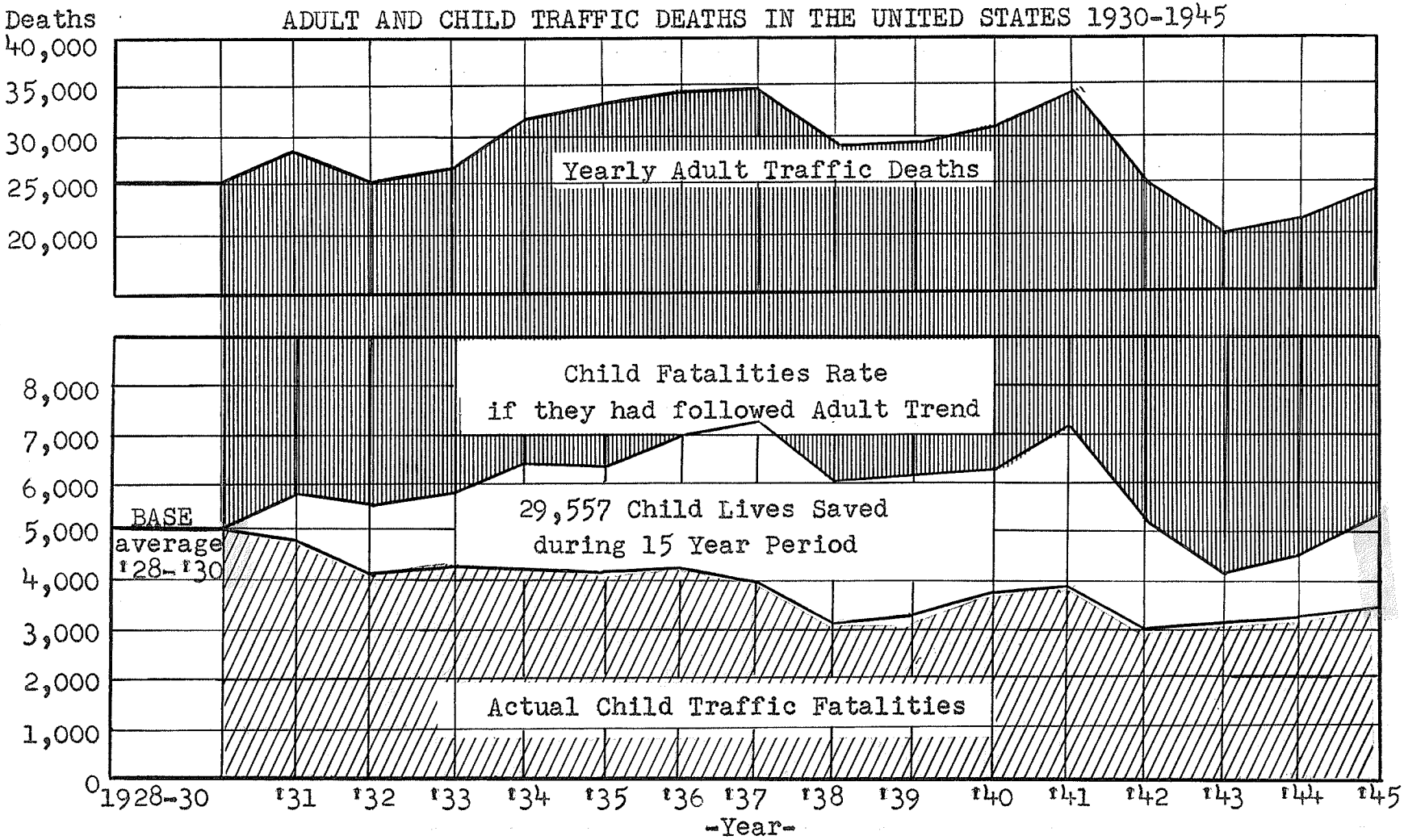


Figure 5.--Savings credited to traffic accident prevention activities among school children during 1928-1945

Source: Uses of Traffic Accident Records, p. 122. The Eno Foundation for Highway Traffic Control. Saugatuck, Connecticut: The Foundation, 1947.

largely responsible for reducing traffic accident involvements among juvenile pedestrians, then the effectiveness of similar programs in the secondary school, directed toward safe driving practices, is certainly of a much lower calibre. However, this problem will be more thoroughly investigated in the next chapter of this study.

While the purposes of this investigation do not include an inquiry into the status of elementary school safety activities in Winnipeg schools, there is evidence, although unfortunately of a negative nature, to support the major thesis of this study: that the needs of modern youth include guidance from the schools to assist them to solve at least personal problems arising from the hazards of widespread motor vehicle usage. The evidence is derived from two sources. Firstly, the writer in his capacity as Assistant Director of Highway Safety for Manitoba determined the "traffic-accident-involvement index" of various age groups during the first six months of 1951. This index is compiled by dividing an age group's percentage of the total accident involvement according to ages, by the percentage that this age group comprises of the entire population. Thus, the "expected" accident-involvement index is 1.0, but it must be understood that this does not take into account the important variable, exposure. Table 12 summarizes the findings. In column nine it will be noted that among pedestrians and bicyclists being injured and killed in traffic mishaps, only the school and pre-school age groups exceed the "expected" involvement. As a general trend, the Manitoba involvements are essentially similar to the American experience depicted in Figure 4. But in the case of

TABLE 12[a]

TRAFFIC ACCIDENT INVOLVEMENT RATES OF PERSONS INJURED AND KILLED IN MANITOBA FROM JANUARY TO JUNE, 1951

Age Groups	Sample Population	Per Cent Distribution	All Persons			Pedestrians and Bicyclists		
			Killed and Injured	Per Cent	Involvement Index[b]	Killed and Injured	Per Cent	Involvement Index[b]
0- 4	24,805	8.1	60	6.7	0.8	40	14.3	1.8
5- 9	18,953	6.1	87	9.7	1.6	64	22.9	4.7
10-14	19,009	6.2	54	6.0	0.9	27	9.6	1.6
15-19	23,600	7.8	122	13.5	1.7	25	8.9	1.1
20-24	30,400	9.9	163	18.1	1.8	11	3.9	0.4
25-34	56,388	18.0	163	18.1	1.0	28	10.0	0.5
35-44	42,850	13.9	97	10.7	0.8	19	6.8	0.5
45-54	36,164	11.8	70	7.8	0.7	15	5.4	0.4
55-64	32,525	10.7	44	4.8	0.4	24	8.5	0.8
Over 64	22,800	7.5	42	4.6	0.6	27	9.6	1.3
Total	307,494	100.0	902	100.0	---	280	100.0	---

[a] Compiled from Accident Statistics, Manitoba Safety Division, and from population figures for Greater Winnipeg, Dominion Bureau of Statistics, 1946.

[b] Involvement Index = $\frac{\text{Accident Involvement of "Y" Age Group in Per Cent}}{\text{Per Cent of Population for "Y" Age Group}}$

children below the age of ten, there is one very significant difference! Despite the added exposure to traffic hazards and the lessening influence of parental guidance, Figure 4 shows that the pedestrian death rate decreases sharply when American children first enter school. As previously pointed out, because this reduction in child deaths and the rate of decline both coincide with the introduction and expansion of traffic safety programs in the elementary schools, accident analysts have attributed the savings in child lives to the effectiveness of these school programs. If this is a valid deduction, then its corollary is applicable to the Manitoba elementary schools. In a six-months period incidence of pedestrian deaths and injuries among Manitoba elementary school children has exceeded the "expected" involvement fivefold.

A second source of evidence which suggests that the Manitoba elementary school is ineffectually meeting the traffic safety needs of its membership is found in the report of the directed self survey of the Winnipeg Public Schools:

> The average time per week spent in these (health, safety) activities is: training safety patrols (per patrol) 45 minutes; . . .
>
> In safety instruction incidental lessons are more frequent than formal instruction. The chief topics discussed are street and traffic safety, playgrounds, rivers, and fires. Fifty-five per cent of the teachers provide opportunities for pupils to read current publications in health and safety.[1]

Yet, upon appraising this section of elementary education, the Core Committee with the advice of a member of the survey staff --Bertrand L. Smith--strongly recommended: "That regular formal lessons in safety be an important part of the weeks's

---

[1] Report of the Directed Self Survey Winnipeg Public Schools, p. 161. Op. cit.

program."[1]

Before summarizing the findings of this chapter, the writer suggests that, on the one hand, the apparent success of industry, and of the cooperative action of non-school agencies and the United States elementary school in providing for the safety needs of their members, and on the other, the evidence of the appalling traffic accident record of Manitoba elementary-school age children, are vital aspects, sufficient in scope and direction, to provide ample material for an independent study.

Summary

Mechanization, in all its varied forms, has steadily increased the hazards of human life. In this chapter, the writer has attempted to substantiate his earlier claim that, of the many modern technological discoveries possessing highly hazardous potentials, transportation, in all its aspects, most widely affects society. Data have been presented which show a steady yearly advance of the motor vehicle's popularity until, at present, the Canadian nation possesses one vehicle for every 5.9 persons, sufficient to transport the entire population at one time.

Evidence has also been given indicating the magnitude and scope of society's chief concern arising out of widespread motor vehicle usage--the traffic accident problem. Injury caused by highway accidents is responsible yearly for the loss of life or limb on the part of thousands of our citizens. Where death is not the result, numerous people are left to

---

[1] Ibid., p. 163.

face life with maimed and broken bodies. In Canada, an average of 44 persons were killed each week of 1949 and 843 others injured in motor vehicles accidents. Traffic accidents became a problem as soon as motor vehicles appeared. In the United States, 400 persons were killed by them in 1906, although there were but 80,000 vehicles in operation at that time. Traffic accidents did not create widespread concern, however, until the 1920's when, along with registration and travel, they began to rise sharply. In 1925 there were more than 20,000 persons killed, and in that year the first preventive efforts on a national scale were made. Great Britain hit its peak death-toll in 1938, with 6,553 killed on the roads; the United States in 1941 when nearly 40,000 persons met death. In the period immediately following World War II, both these nations carried out serious and concerted actions on a national scale to do something about traffic accidents. Despite record increases in motor vehicle travel, both Great Britain and the United States have had eminent success. Total deaths have been reduced; but more significant has been the decrease in the fatality rate per 100 million vehicle miles--in the United States, from a high of 19 in 1925 to 7.4 in 1949. Traffic authorities have thanked hard, co-ordinated work for the improvement, and have pointed with pride to the fact that states and cities with the best traffic safety programs have death rates less than half the national average (Connecticut: 3.4 in 1949). Typical of the serious attitude adopted toward traffic accidents in America and Great Britain is the following invocation for less complacency among public officials:

> A public issue of the magnitude of the current traffic accident problem demands the wholehearted

> cooperation of all segments of the people, but above all, of the public officials charged by law with the responsibility for public security.
>
> Last year there were more than 15 million traffic accidents, involving some 8 million drivers. . . .
>
> This is a challenge we cannot escape in the days ahead. Moreover, . . . should the threatening international situation develop the need for all-out mobilization, there would be an even greater urgency to increase safety and efficiency of highway transportation. . . .
>
> In the last analysis, it will be leadership which will decide whether we will halt the fearful wave of traffic accidents. Most of all, we need the dynamic leadership of Governors and legislatures, mayors and city councils, . . . What has been accomplished in the past is inspiring proof of what a redoubled effort could accomplish in the future.[1]

It is indeed a sad commentary on the quality of national leadership that the Canadian Hansard records no similar recognition of the urgency of the Nation's road safety problem. Equally disturbing is the unhappy fact that highway accidents have mounted steadily in post-war years, until today, unchecked by any nation-wide plan of action, the death and injury toll on Canadian highways surpasses all previous maxima.

Direction toward the next area surveyed by the writer was stimulated by the frequent references made in the reports of national safety research committees to the efficacy of the "educational approach" in effective traffic accident-prevention programs. While not explicitly defining "education" the connotation generally employed in these reports inferred the preference of positive, corrective or preparatory measures as opposed to negative, punitive or restrictive controls. The accident-control experiences of two segments of society, diametrically opposite in principles, but both professing remarkable success in curtailing accident occurrence among their membership through "educational" methods, were briefly

---

[1] Priorities in the Action Program, p. 8. Op. cit.

reviewed. Motivated by the certain knowledge that accidents meant added production costs, the first segment--industry--moved quickly to effect remedies for this situation. As early as 1910, industry had rejected total reliance on mechanical safeguards and had directed its accident-prevention efforts to instil safety-consciousness among its employees. The three stages of this personalized approach have been colloquially referred to as: (1) the "Horror" stage, characterized by the emphasis on the gruesome, repulsive aspects of accidents; (2) the "Safety Talk" or "Ballyhoo" stage, distinguished by the fact that the substance of the safety propaganda was not identified with the unfulfilled personal and social needs or basic disturbances of the individual; and (3) the "Individual" stage, which functionally related accident-prevention activities to the behavior of the individual in social situations, and therefore took cognizance of an individual's four basic areas of needs--immediate social relationships, wider social relationships, economic relationships, and personal living.[1]

The second segment of society--the American elementary schools--has ably demonstrated its willingness to deem the teaching of safe walking and bicycling as a legitimate function of the school, and the child-traffic-accident trends reviewed provide ample proof of the school's effectiveness in this field. The school safety patrol and the Junior Safety Council were cited as major organizational techniques to achieve maximum traffic-safety consciousness among elementary school

---

[1]V. T. Thayer, C. B. Zachry, R. Kotinsky, Reorganizing Secondary Education. New York: D. Appleton-Century Company, 1939.

children. A cursory analysis was made of traffic-accident involvements of Manitoba children. This revealed a disturbingly high involvement index for injuries and deaths among 5-9 year old pedestrians--nearly five times greater than the "expected" involvement. This trend, however, was not incompatible with further evidence suggesting the ineffectual organization and presentation of child-safety activities in the Winnipeg public school curriculum, and, in point of fact, closely resembled the ratio of child traffic deaths to adult traffic deaths in the United States during the period prior to 1925 when the American elementary school had not yet assumed full participation in teaching traffic safety experiences.

It is pertinent, at this point, to raise the question whether there is sufficient justification for extending to the secondary school level a safety education program comparable to that now extensively accepted as an important part of the American elementary school curriculum. It is reasonable to inquire whether there is anything of a substantial nature left for the secondary school to do, considering what is being accomplished by the elementary school on the one hand, and, on the other, what might be expected in the way of accomplishment from the home and the heterogeneous host of other non-school agencies--governmental, business, civic, and welfare-committed to participation in safety activities through educational media. In other words, is there a need for driver education in the high schools?

CHAPTER III

THE NEED FOR DRIVER EDUCATION IN THE SECONDARY SCHOOLS

Introduction

The problem.--The problem is to determine whether youthful operators of motor vehicles are involved in a disproportionately high number of highway accidents; and, assuming that such is found to be the case, whether an evaluation of the causes and reasons for this high accident-rate can suggest approaches which the secondary school may follow toward guiding its youth to solve his personal and social traffic problems.

The methods of the investigation.--The study of the problem falls into six major divisions:

1. A review of the literature for objective materials related to the accident hazards of drivers under the age of twenty-five.
2. An original statistical analysis of the accidents involving youthful drivers in Manitoba during the period January to December, 1951.
3. A survey-testing program of 2,372 Winnipeg high-school students by means of a 45-item standardized Knowledge Test for Automobile Drivers developed by New York University.
4. An intensive driver-testing program of 61 licensed drivers attending St. John's Technical High School, Winnipeg. The measuring devices included: written knowledge test and attitude scale; tests for visual acuity, depth perception,

foot-reaction time, and color discrimination; and a driving performance test in dual-control automobiles over a 15.4 mile standard route.

5. An analysis of the driver-testing results of tests conducted at the Manitoba Safety Division under the writer's supervision.
6. A cursory analysis of the personal -histories file of 28 of Manitoba's worst accident-repeaters under the age of twenty-five.

While this six-step investigation could not, because of practical difficulties, be carried out in the same sequence as is delineated above, the writer suggests that this order of presenting the evidence is most logical. Figure 4, in the preceding chapter, gave some indication that 'teen-age youth are involved in traffic accidents more frequently than should be the case if the probability of death or injury in this manner were equal for all age groups. The next step, then, should be an inquiry into the accident status of youthful drivers; firstly, as the problem manifests itself generally, and next, as it obtains within the limits of the present study. If cruciality is inferred from the results of this preliminary survey, it seems logical to examine the problem for significant factors. The testing programs provided normative materials which indicated the prevailing levels of driving proficiency throughout the group. Because standardized tests were employed for which norms had been developed purporting to distinguish between trained and non-trained testees, the test results were also used to appraise the quality of the driver training. Lastly, the biographies of 28 young Manitoba drivers were examined. These

youthful accident-repeaters had been called into the Safety Division Driver Improvement Clinic for review examinations and counselling. Thus, any significant trends that became apparent after this minimum training could be inferred to reflect on the effectiveness of a more comprehensive driver education program on the part of the school.

Basic Limitations.--In the previous chapter of the present study a detailed account was given of the shortcomings in traffic-accident statistical analyses. The writer was conscious of these failings while setting up the present police accident-reporting form[1] for the Manitoba Government, and the Safety Division's code for mechanically tabulating accident records.[2] With a high level of reporting stimulated by the Safety Responsibility Law, and the utilization of the most widely advocated statistical procedures, there are still two major factors determining the competency of the basic sources used in this study of which the writer has only meagre knowledge and even less control. In the Eno Foundation's principal study of 1949, there appears a concise summary of these two prerequisites for effective accident records on driver performance:

> The second major factor ... is to be found in the character of the check-up of driver reports in terms of their accuracy and completeness. ... Few drivers have the skill, training, authority and time to report correctly on accident causes. Moreover, a driver tends to soft-pedal his own omissions and commissions and to lay blame elsewhere. ...
>
> Sound accident-investigation by police is the third

---

[1] Appendix A.

[2] Manual on State Traffic Accident Records, Part XI, National Safety Council. Chicago: the Council, 1950.

> factor that determines the reliability of data on driver-action. ... Limited police manpower, inadequacy of training and equipment and other factors make the investigation of most accidents difficult and often impossible. ... We do not know exactly what percentage of all accidents is followed by competent police investigation, but traffic authorities agree that the percentage is low.[1]

While the above-mentioned difficulties do affect critically the validity of many conclusions derived from accident reports, it appears that these fact-finding deficiencies are characteristic of all governmental accident statistics. As the major purpose for examining the following facts about youthful drivers is to detect general current trends rather than individual traits, the errors in reporting may be considered constant; hence, negligible for the present study.

A. THE ACCIDENT RECORD OF AMERICA'S YOUTHFUL DRIVERS

The one aspect of the traffic-accident problem which appears to predominate whenever statistics are analyzed is the abnormally high child- and youth-involvements. Since 1932, a number of studies have been made to determine the influence of age upon driving records. Ned Dearborn, president of the National Safety Council, has summarized the findings as follows:

> Accident figures continue to prove the disheartening fact that drivers under the age of 25 are involved in a disproportionate number of fatal and non-fatal accidents.
>
> Last year, 37,000 drivers of all ages were involved in fatal accidents, with 11,400 or 31 per cent, in the under 25 age group. More than 4,100,000, or 27 per cent of the 15,500,000 drivers involved in all accidents last year were in this age group despite the fact that it contains less than 20 per cent of all drivers. ...
>
> In addition to the death and injury they are

---

[1] The Motor-Vehicle Driver: His Nature and Improvement, p. 5. Edited by the Staff of the Eno Foundation for Highway Traffic Control. Saugatuck, Connecticut: the Eno Foundation, 1949.

> spreading among other motorists and pedestrians, their behavior indicates that too many of them are inviting self-destruction. Of the over-all total of 32,000 killed in automobile accidents last year, 7,100, or 22 per cent, were in the 15 to 24 year age group. More than 320,000 were injured. ...[1]

Over ten years ago the Connecticut Motor Vehicle Department undertook a study correlating fatal-accident involvement with the age of the driver. Under the direction of Dr. H. M. Johnson, Tulane University, the study was based on the accident reports of 2,467 Connecticut drivers for the period 1932 to 1936. The American Automobile Association coupled these figures of the "drivers in fatal accidents per 100,000 registered drivers" with the estimated exposure of 5,451 drivers who submitted annual mileage estimates to the Association. The results of this study are detailed in Table 13.

This analysis indicates that drivers aged 16 to 19 inclusive have five times the probability of being involved in a fatal accident than do drivers in the safest group--the 45-49 age category.

Impressive as the Association's conclusions appear upon perfunctory examination, the method of the study, nevertheless, possesses serious statistical shortcomings. Firstly, the Association admits the fallibility of the mileage estimates submitted. Secondly, the sample is too small when considered in the light of the more than fifteen million drivers annually involved in American traffic accidents. Lastly, the total reliance on fatality involvements is certainly an injudicious practice; in 1950, the probability of any one of Manitoba's 200,000

---

[1] N. Dearborn, "Accident Facts", Teen-Age Drivers, p. 6. Chicago: Lumberman's Mutual Casualty Company, 1950.

TABLE 13[a]

FATALITY HAZARD GREATER FOR YOUNG DRIVERS

Age	Drivers in Fatal Accidents per 100M Registered Drivers	Miles Driven per Year per Driver	Millions of Miles Driven per Fatal Accident
16	200	4,700	2.3
17	186	6,600	3.5
18	147	7,400	5.0
19	218	10,200	4.7
20	218	11,400	5.2
21	218	14,000	6.4
22	198	15,100	7.6
23	160	15,500	9.7
24	140	17,800	12.7
25-29	133	16,200	12.2
30-34	105	16,500	15.7
35-39	100	16,800	16.8
40-44	88	16,400	18.6
45-49	69	15,100	21.9
50-59	71	14,000	19.7
60-69	86	10,400	12.1

[a]Source: Fatality Hazard Greater for Young Drivers, Traffic Engineering and Safety Department, American Automobile Association. Washington, D.C.: the Association, 1938.

drivers becoming involved in a fatal highway accident was less than one in 2,000.

Possibly to search for a more valid appraisal of the effect of age on accident involvement, the Center for Safety Education, New York University, engaged in a two-year study of the state accident records of 3,750,000 drivers. The results for Connecticut, Wisconsin and Massachusetts are shown in Table 14. In Figure 6 a detailed graph is drawn of the accident experience of Connecticut drivers. Commenting on this study, the Traffic Engineering Handbook stated:

> The involvement index was obtained by dividing the percentage of accident involvements attributable to a given age

TABLE 14[a]

ACCIDENT-INVOLVEMENT INDICES BY AGE GROUP OF 3,750,000 LICENSED DRIVERS IN THREE STATES--1947-1948

State	Number of Drivers	Age 16-19	Age 20-24	Age 25-29	Age 40-44
Connecticut	750,000	1.2	1.6	1.2	0.8
Massachusetts	1,500,000	1.6	1.6	1.5	0.8
Wisconsin	1,500,000	1.5	1.6	1.2	0.9

[a]Source: Accident-Involvement Indices by Age Group of 3,750,000 Licensed Drivers in Three States. Compiled by the Center for Safety Education, New York University. New York: the Center, 1949.

> group by the percentage of the driving population in that group. This study did not take into account the exposure, or miles driven by each age group, hence it is not a measure of safe driving ability, but purely a measure of ... risk on an individual basis.[1]

On the basis of these studies and the post-war loss experience of the American casualty insurance companies, William H. Brewster, Manager of the Automobile Division of the National Bureau of Casualty Underwriters made the following observations:

> In the final analysis, automobile bodily injury liability and property damage liability insurance rates are determined by the man behind the wheel, no matter what his age may be. There will be improvement in the present bad accident record of youthful operators only when these operators fully recognize their obligations to others on our highways, and, as the result of the combined efforts of parents, teachers, state authorities and safety organizations, our youthful operators exercise care, common sense and reasonable consideration for others. If and when their accident rates improve the automobile liability rates for

[1]Traffic Engineering Handbook, p. 135. Compiled by The Institute of Traffic Engineers. Edited by H. K. Evans. New York: Peter F. Mallon, Incorporated, 1950.

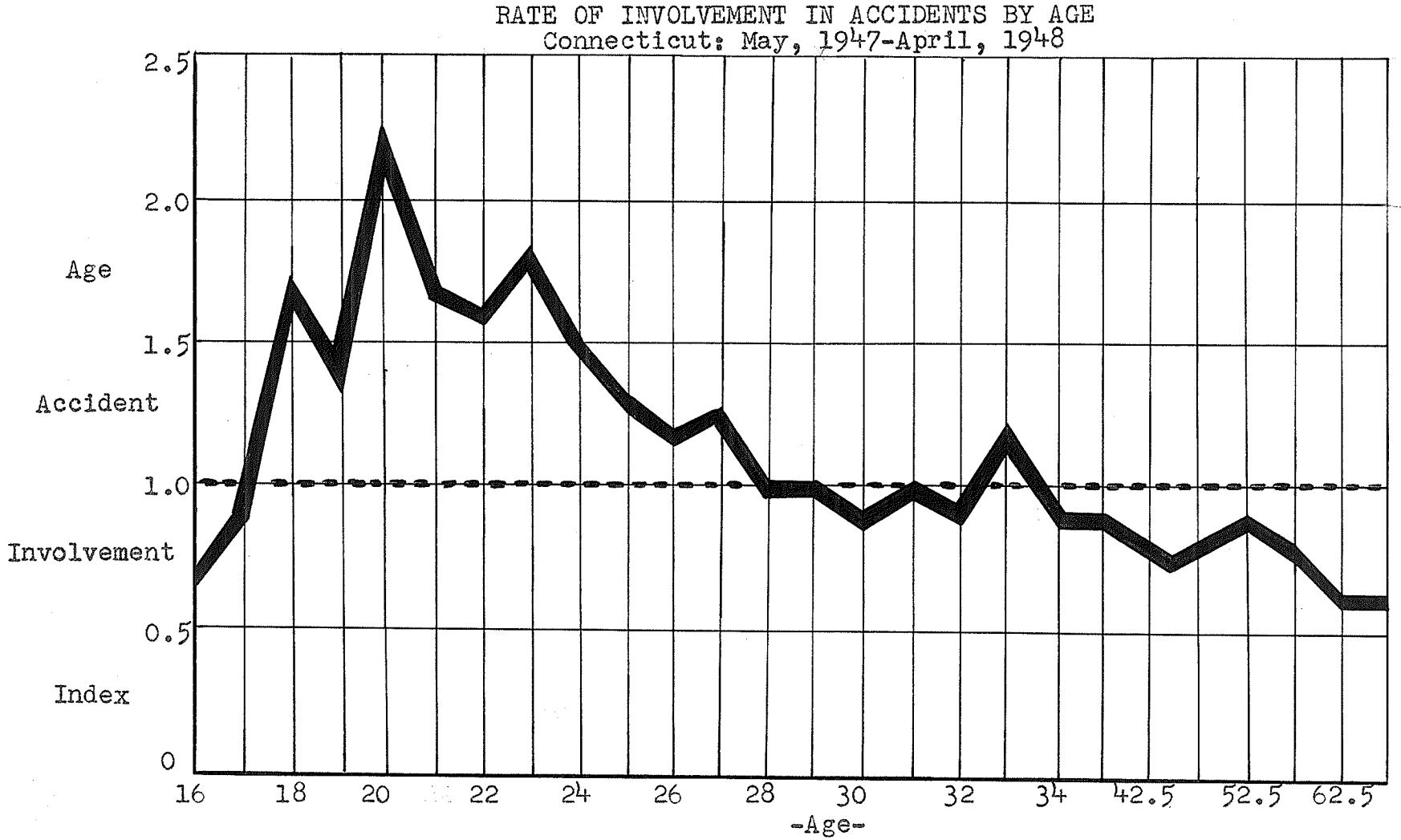


Figure 6.--Results of study by Center for Safety Education, New York University, showing accident-involvement indices of 750,000 Connecticut drivers.

> this class of operators will be reduced. In addition to the monetary reward thus to be realized these operators will find great satisfaction in having a real part in reducing the appalling number of needless and costly deaths and injuries now occurring on our streets and highways.[1]

Summary.--The data presented on traffic-accident involvement of youthful drivers in the United States reveal a susceptibility two to five times greater than for older operators. While these facts do not indict all 'teen-age drivers as reckless and irresponsible, any more than all drivers in safer categories can be exonerated, the foregoing records do suggest that young drivers are cutting a swath of death and injury out of proportion to their numbers and to their physical and mental capabilities. Furthermore, the striking fact that a person's best record as a driver is achieved only after years of experience suggests an urgency to shorten this period of learning to drive safely, hence, offerring a real challenge to those in charge of secondary education. A thorough driver education program may well provide the opportunity for youthful drivers to acquire quickly the proper attitudes, habits and skills which otherwise would be gained only after long years of trial and error.

Although there can be little dispute with statistics which reveal the under-25 age group in the United States to be the drivers most frequently involved in accidents, it does not necessarily follow that all youthful drivers in other areas will display the same tendencies toward a high differential in hazard between themselves as a group and older, more experienced operators. In the succeeding sections the writer investigates

---

[1]W. H. Brewster, "Teen-age Drivers: Their Influence on Automobile Liability Insurance Rates", Inspection News. New York: Association of Casualty and Surety Companies, 1950.

various aspects of the current traffic accident status of Manitoba drivers under the age of twenty-five.

B. THE ACCIDENT RECORDS OF MANITOBA'S YOUTHFUL DRIVERS

Sources for information on Manitoba drivers.--Since June, 1950, the Manitoba Safety Division has developed four areas of information relating to personal characteristics of all motor-vehicle operators in the Province. These are as follows:

1. Motor-vehicle accident reporting and recording system.
2. Permanent files on individual drivers involved in highway accidents and/or convicted of traffic violations.
3. Tabulating-card file on every Manitoban licensed to operate a motor vehicle.
4. Tabulating-card file on applicants for driver's license satisfactorily completing the examination requirements at the Safety Division's Driver Improvement Clinic.

In his capacity as Manitoba's Assistant Director of Highway Safety, the writer was assigned the task of establishing the technical phases of an accident-recording system and driver-record files. With the exception of the third system mentioned above, all procedures are adaptations of recommended practices appearing in the literature.

Statistical summaries on motor-vehicle accidents are basically derived from information contained in police reports. This information is pre-coded within a framework of 1,395 standard accident-classifications and definitions which have been developed since 1937 by the Committee on Uniform Traffic Accident Statistics. This code is then transcribed on

80-column Hollerith tabulating cards[1] by the International Business Machine Company's key-punch units. Tabulations are made through the medium of an I.B.M. card-counting sorter machine which can sort and count at the rate of 478 cards per minute.

The permanent driver-files containing a "safety-point" score, and the tabulating-card files on individuals passing the Clinic's driver-examinations are fully described in a later section of this study.

The information contained on the general tabulating-card file of each Manitoba driver includes type of licence, 1951 Operator's or Chauffeur number, name, address, date of birth, driving restrictions (if any), and occupation.[2] The primary purpose of this system is the creation of a permanent number for each Manitoba driver. Through this unique means of identification, many errors previously made when assigning individual responsibility for accidents are eliminated. Also, through use of Hollerith cards with I.B.M. sorting and collating machines, this system permits rapid mechanical tabulations of recorded data pertinent to the driver, card-filing by name or licence number, correlations between test performances and subsequent accident involvement, and screening out of driver licences cancelled or suspended for statutory infractions. An added feature of this system, of particular importance to efficient licensing administration, is its use to print driver-licence renewals.[2]

---

[1]Appendix B.

[2]Appendix C.

Accident-involvement by age groups.--By employing data derived from 211,188 driver tabulating-card files and 9,743 punched accident-record cards containing information on 16,510 drivers involved in traffic mishaps during 1951 the writer duplicated the New York University study depicted in Table 14 and Figure 6.

Table 15 summarizes the accident-involvement distribution of various age-groups of Manitoba drivers during the period January, 1951, to December, 1951. Among the three types of accidents--fatal, non-fatal (injury), and property-damage--the largest number of drivers involved belong to the 25-34 age-group. This group, however, also comprises the largest single category of the driver population--27.2 per cent.

In Table 16 the analysis is taken a step further. Columns 4, 5, 6 and 7 show the involvement indices of the various age-groups. It will be noted that the trend is essentially similar to those previously quoted for Connecticut, Massachusetts and Wisconsin in Table 14, and for Connecticut alone in Figure 6. In all cases drivers under the age of twenty-five are involved in a disproportionately high number of traffic accidents; the indices for all types of accidents exceed the "expected" 1.00. Also, the results of both the University of New York study and the writer's investigations reveal the sixty-five and over age-group to be the "safest".

Interpretations of the accident-involvement data.--The foregoing statistical evidence appears to provide convincing proof that young Manitoba motor-vehicle operators from 16 to 24 years of age possess a mean accident-rate per registered driver which is significantly greater than that of the remainder of the

TABLE 15

HIGHWAY-ACCIDENT INVOLVEMENTS OF MANITOBA DRIVERS BY AGE-GROUPS
JANUARY, 1951 TO DECEMBER, 1951

Age Group	Per Cent Licensed Drivers	All Accidents		Fatal		Non-Fatal		Property Damage	
		Total	%	Total	%	Total	%	Total	%
16-19	6.5	1,118	6.8	12	11.9	198	8.7	908	6.5
20-24	12.8	2,704	16.4	23	22.7	411	17.9	2,270	16.1
25-34	27.2	5,130	31.1	22	21.8	668	28.1	4,440	31.5
35-44	24.0	3,623	21.9	25	24.7	479	20.9	3,119	22.0
45-54	15.1	2,146	13.0	8	7.9	283	12.3	1,856	13.2
55-64	9.8	1,312	7.9	6	6.0	181	7.9	1,125	7.9
65-74	4.1	420	2.5	5	5.0	61	2.6	354	2.5
over 74	0.5	56	0.4	0	0.0	14	0.6	42	0.3
Totals	100.0	16,510	100.0	101	100.0	2,295	100.0	14,114	100.0

TABLE 16

ACCIDENT-INVOLVEMENT INDICES BY AGE GROUP OF LICENSED DRIVERS IN MANITOBA --JANUARY, 1951, TO DECEMBER, 1951

Age Group	Total Driver Population	Per Cent Licensed Drivers	Accident-Involvement Indices[a]			
			All Accidents	Fatal	Non-Fatal	Property-Damage
16--19	13,861	6.5	1.05	1.83	1.34	1.00
20--24	27,095	12.8	1.28	1.77	1.40	1.26
25--34	57,403	27.2	1.14	0.83	1.03	1.15
35--44	50,619	24.0	0.91	1.03	0.87	0.91
45--54	31,798	15.1	0.86	0.52	0.82	0.87
55--64	20,739	9.8	0.81	0.61	0.81	0.81
65--74	8,578	4.1	0.61	1.22	0.63	0.61
over 74	1,095	0.5	0.80	0.00	1.20	0.50
not stated	6,835	---	----	----	----	----
Total	218,023	100.0				
Sub-Total	211,188[b]					

[a]Ratio of accident-involved drivers to licensed drivers by given ages. Normal or "expected" index is 1.00.

[b]Sub-total excludes the 6,835 tabulating-card files not containing age-of-driver data.

driving population. What are the implications of this apparent fact?

To answer this question in simple terms, it means that the chances are approximately three to one for youth to be involved in death- or serious injury-accidents when compared to drivers of the safest age-groups. Furthermore, to attain even this modicum of safety youth must survive the perils of thirty to fifty years of motor-vehicle operation. Surely this is a prohibitive waste to the community when measured in unfulfilled service and human suffering.

Nor can this loss to society be totally accounted for in terms of social distress. The dissipation of economic resources through this one destructive channel--highway accidents --has reached proportions which constitute a major problem to the country and which clearly confront the community with a challenge to explore every avenue yielding a reduction in all types of road mishaps. Furthermore, there is evidence in the literature which stresses the relationship of school finances to curriculum content. Dr. Reavis has aptly summed up this viewpoint as follows:

> Finance is the beginning and end of all problems in education. When a new service or improvement is proposed in a school system the first question to be asked is, What will it cost? Eventually, the service or improvement will be evaluated and the question will then inevitably arise, Was the service worth the price?[1]

While the cost of driver education and its probable benefits are discussed in detail in a later section of this

---

[1] Report of the Directed Self Survey Winnipeg Public Schools, p. 81. Compiled by Committee on Field Services, Department of Education, University of Chicago. Chicago: the University, 1948.

study, it may be pertinent to examine critically the following corollary to Dr. Reavis's questions: What may it cost not to provide highway accident prevention services through the school program?

If the phrase "monetary loss to the community" is given the narrow interpretation and precise meaning of compensation likely to be allowed by the Courts, then a partial answer is given by the Dominion Bureau of Statistics:

> Property damage resulting from motor vehicle accidents increased considerably in 1950 over the total for the preceding 12 months. ... It is interesting to note that the average amount of property damage reported per accident in 1947 was approximately $188 while in 1948 the property damage assessed per accident had risen to$205, to $232 in 1949 and $276 for 1950.[1]

On the basis of this information the writer estimates the average cost per property-damage accident for 1951 to be approximately $312 or an average increase of 13 per cent over the previous year. Thus, in 1951, the 2,881 property-damage accidents involving drivers under the age of twenty-five (Table 17) represent a total loss of $900,000.

It is relatively a simple matter, of course, to compute estimates of the monetary cost of property-damage accidents. The actuarial records of insurance companies provide the chief source of these data. It is not so easy a task when the monetary loss includes road accidents where persons have been injured and killed. To the writer's knowledge, there exists in the literature but one study which investigates the cost to the community of all types of road accidents. This

---

[1] The Motor Vehicle 1950, p. 32. Compiled by the Public Finance and Transportation Division, Dominion Bureau of Statistics Ottawa: King's Printer, 1951.

study, commissioned by His Majesty's Parliament in May, 1944, is contained in a report submitted to the Minister of Transport by J. Harry Jones, Professor of Economics and Head of the Economics and Commerce Department, University of Leeds.

Professor Jones confined his study to "an estimate of cost based upon compensation likely to be allowed by the Courts, and that such compensation, like the National income, normally excludes unpaid services."[1] Using two independent methods of inquiry--the first, and most important being the method of random sampling, and the second being the insurance method--Jones investigated three sources of information: (1) road-accident files of the War Department Claims Commission; (2) the Police reports on road accidents from thirteen selected areas; and (3) the Special Report on Road Accidents, 1936-1937, published by the Ministry of Transport. Jones states his reasons for selecting these sources:

> None of these, taken alone, would have made it possible to complete the task. ... Stated briefly, the files of the War Department Claims Commission made it possible to establish the distribution and costs of types of accidents (including accidents not involving injury to persons) for the years 1942-43; the Police reports made it possible to establish the distribution of accidents reported for the four years (1935-38) covered by the investigation; the Ministry of Transport Report made it possible to apply some minor indirect checks. The consistency of the material exceeded expectation, particularly in view of the fact that in estimating the seriousness of certain types of injury the subjective influence may be very important.[2]

A partial summary of Professor Jones's conclusions follows:

---

[1] Road Accidents Report, p. 7. Prepared by J. H. Jones for the Ministry of Transport. London: His Majesty's Stationery Office, 1946.

[2] Ibid., p. 12.

> 4. Of the total cost to the community (annually £60,000,000 at the 1935-38 price levels), nine-tenths represented human injury; only one-tenth represented damage to vehicles and property.
>
> 5. Of the total cost to the community ninety-four per cent. was due to accidents involving injury to human beings; only six per cent. was due to the very much larger number of accidents not involving injury to human beings.
> ...
>
> 8. Pedestrians, bicyclists and motor cyclists were the road users most likely to suffer death or very serious injury in road accidents.
>
> 9. Accidents involving serious injury often cost the community more than accidents involving death and occurred about five times as frequently as the latter.

It may be useful, at this stage, to refer to the general procedure from which Jones derived these conclusions. First, the Ministry of Transport published annually the total number of injuries and accidents involving injury; these were taken as the starting point. Secondly, the Army files were employed to find the ratio of injury accidents to non-injury accidents. By means of this ratio the total number of accidents was computed. Thirdly, the Police files showed the distribution of injuries by types and this distribution was applied to break down the total for each year under consideration. Fourthly, the cost of each type of accident, the rate of compensation for injury being fixed after consultation with experts and the cost of damage per vehicle from information contained in the Army files. This method--the random sample investigation selected from data supplied by two departments of State--was supported by an independent investigation in which insurance premiums and the number of vehicles registered at selected

---

[1] Ibid., p. 7.

dates were used as material. Before Professor Jones's report was accepted by the British Parliament a draft was presented to the Government Actuary, who, in turn submitted an alternative estimate of cost based upon an entirely different method of procedure. Jones comments upon the Government Actuary's estimate:

> It will be observed that the Government Actuary's final estimate is approximately £50,000,000. The fact that the two estimates, based upon two totally different sets of assumptions and following two entirely different lines of approach, are of the same order of magnitude seems to me far more striking and important than the difference in the actual figures... .[1]

It would appear to the writer that the by-products of Professor Jones's sample investigation are of paramount importance to the present study. These are embodied in his fifth and eighth conclusions which were previously cited. They stress the relative importance of human injury as a cost to the community and are adequately summarized in Table 17.

TABLE 17[a]

PERCENTAGE OF TOTAL COST REPRESENTED BY VARIOUS FACTORS IN BRITISH TRAFFIC ACCIDENTS

Year	Human Compensation	Repair of Vehicles	Damage to Property	Loss of Animals
1935	90%	8.0%	1.8%	0.2%
1936	89%	9.1%	1.7%	0.2%
1937	90%	8.2%	1.6%	0.2%
1938	90%	8.2%	1.6%	0.2%

[a]Source: Road Accidents Report, p. 27. Op. cit..

[1]Ibid., p. 22.

The significance of Jones's cost ratio to the loss sustained through highway accidents involving Manitoba drivers under 25 years of age is at once apparent. If the Dominion Bureau of Statistics' estimate of property-damage-accident (non-injury accident) cost is accepted--approximately $312--bringing the damage cost of these accidents to $900,000, then the total cost to the community during 1951 of all types of highway accidents involving Manitoba's youthful drivers would approximate, by Jones's ratio, ten times this amount, and be of the order of $9,000,000.

Mindful of the suspicion sometimes accorded casual statistical manipulations (Mark Twain's "lies, damned lies and statistics"), the writer attempted to approach a closer analysis of the community's accident cost in two ways. First, the elements of Professor Jones's distribution sample were compared with similar elements derived from the 1951 Motor-Vehicle Accidents for Manitoba[1] and, through separate manipulations, from the Manitoba Safety Division's primary Hollerith-card accident records. Secondly, the factor of "blame" for the accident was examined in order to assess equitably the cost to the community of those accidents for which drivers under the age of twenty-five were responsible.

Table 18 shows the distribution of types of motor-vehicle accidents amongst a "true" sample of 3,491 accidents involving 3,822 Manitoba drivers under the age of twenty-five. In Table 19, Professor Jones presents a similar distribution

---

[1] 1951 Summary: Motor-Vehicle Accident Facts. Compiled by R. M. Arnold. Winnipeg: King's Printer, 1951.

TABLE 18

MOTOR-VEHICLE ACCIDENT INVOLVEMENT OF MANITOBA DRIVERS UNDER THE AGE OF TWENTY-FIVE BY TYPES OF ACCIDENTS (JANUARY--DECEMBER, 1951)

Accident of Motor Vehicle with--	Total		Fatal		Non-Fatal		Property Damage	
	No.	%	No.	%	No.	%	No.	%
Pedestrian	141	4.0	14	40.0	127	22.1	---	0.0
Motor Vehicle	2720	78.0	6	17.1	285	49.5	2429	84.3
Railway Train	13	0.4	0	0.0	2	0.3	11	0.4
Street Car	26	0.7	0	0.0	1	0.2	25	0.8
Animal-Drawn Vehicle	10	0.3	1	2.8	3	0.5	6	0.2
Bicycle	32	0.9	1	2.8	29	5.0	2	0.1
Animal	30	0.8	1	2.8	1	0.2	28	1.0
Fixed Object	96	2.7	2	5.8	16	2.8	78	2.7
Other Object	1	0.0	0	0.0	1	0.2	0	0.0
Over-turned on road	5	0.1	0	0.0	1	0.2	4	0.2
Ran Off Roadway	414	12.0	10	28.7	107	18.7	297	10.2
Other Non-Collision	3	0.1	0	0.0	2	0.3	1	0.1
Totals	3491	100.0	35	100.0	575	100.0	2881	100.0

TABLE 19[a]

PERCENTAGE OF ALL FACTORS CONCERNED IN BRITISH INJURY ACCIDENTS ACCOUNTED FOR BY EACH INDIVIDUAL FACTOR 1935--1938

Type of Factor	1935 %	1936 %	1937 %	1938 %
Pedestrian	21	19	21	19
Bicycle	21	20	21	17
Motor Cycle	8	11	9	11
Car	22	21	26	24
Load Carrier	10	11	7	10
Bus	4	6	4	4
Tram	3	2	1	2
Horse Transport	2	2	1	2
Property and Animals	8	7	10	10

[a]Source: Road Accidents Report, p.45. Op. Cit..

scale based upon a random sample of 1,207 injury accident Police reports.

For purposes of comparing Jones's distribution trend of injury accidents occurring in Great Britain during 1935-38 with the distribution trend of injury accidents involving youthful drivers in Manitoba during 1951, the writer made certain adjustments in the percentage distributions in order to equate the types of collisions. These are:

1. Combining Manitoba's "Fatal" and "Non-Fatal" accident categories to represent the total injury toll.
2. Combining the British "Motor-Cycle", "Car", "Load Carrier", and "Bus" distributions as being equivalent to the Manitoba definition of "Accident of Motor Vehicle with Motor Vehicle".
3. Combining the Manitoba accident factors of collisions with "Fixed Object", "Other Object", "Animal", "Over-Turned on Road", "Ran off Roadway", and "Other Non-Collision" as representing the same occurrences as the British connotation of "Property and Animals" collisions.
4. Combining the Manitoba factors of "Railway Train" and "Street Car" as being equivalent to the British "Tram" Factor.

The comparison of the percentage distribution of types of road collisions is shown in Figure 7.

It is apparent, from Figure 7, that the basic variations between the two injury-accident samples are negligible except in two instances: (1) bicycle accidents; and (2) accidents with property and animals. Upon a closer examination of Professor Jones's data, a possible explanation of this

INJURY-ACCIDENT RATIOS FOR GREAT BRITAIN AND MANITOBA

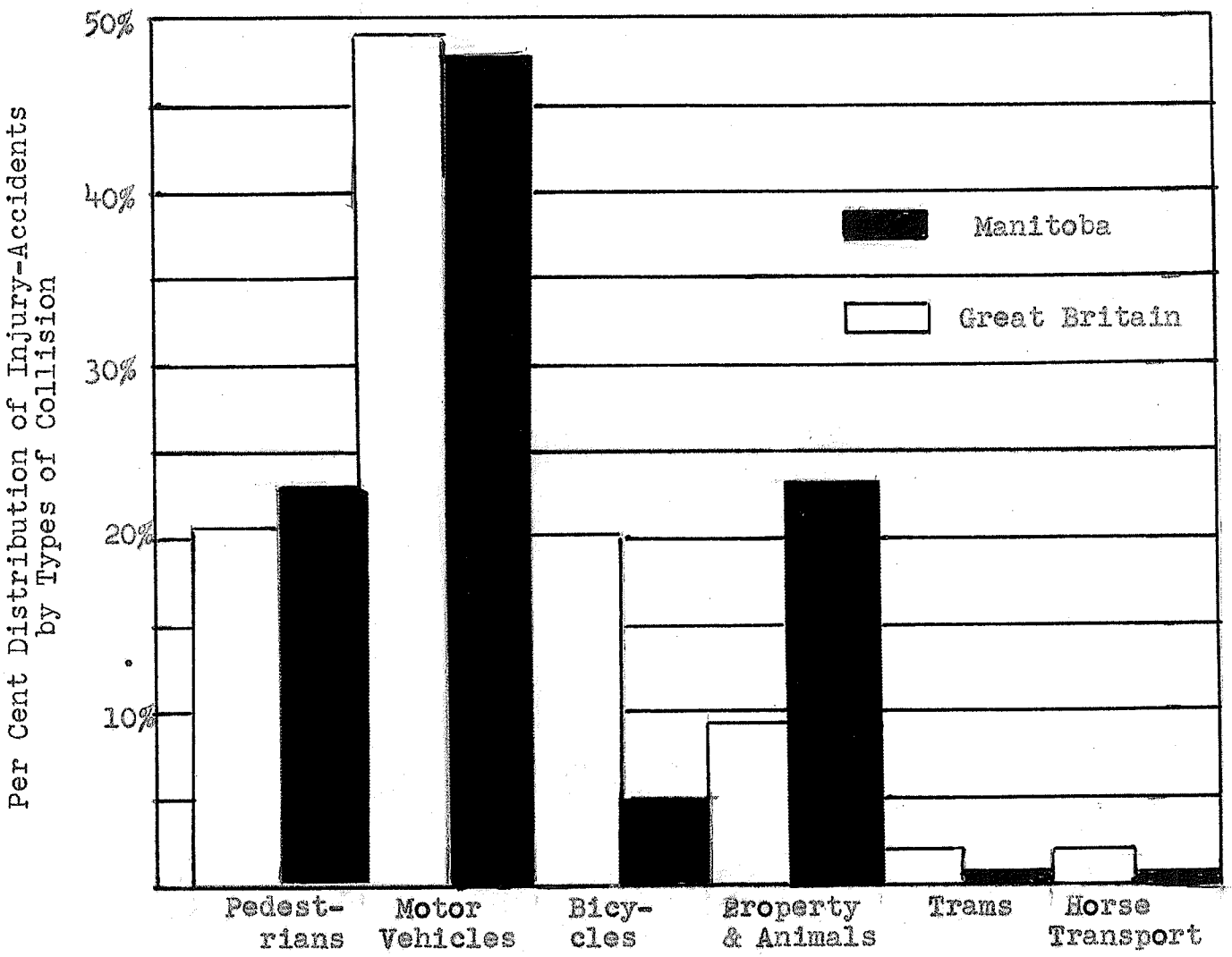


Figure 7.--Comparative Distribution of Types of Injury Accidents which occurred in Manitoba during 1951, and in Great Britain during 1935-38.

divergence results from his use of non-motor vehicle traffic accidents. This is of particular importance in assigning the proper proportion of bicycle collisions. For example, 166 of his injury-accident sample of 373 involving bicycle mishaps are classified by such types as "collisions between bicycle and horse transport, bicycle and bicycle, bicycle and pedestrian, and bicycle and animal/property."[1] The writer has no access to such data for injury accidents occurring in Manitoba.

While the foregoing interpretation may partially reconcile the variations between the "Bicycle" samples, it cannot serve to discount the importance of this non-motor vehicle item in estimating the total cost of road accidents to the community. Jones points out that the combination of vulnerability and disproportionately low speeds results in more severe and hence costlier injuries to pedestrians and bicyclists involved in accidents--"the percentage of total cost of all accidents arising from collisions involving pedestrians and bicyclists being 62 per cent."[2] Furthermore, the cost, to Great Britain, of non-motor vehicle--bicycle collisions is 10.7 per cent of the "total costs of reported injury accidents in 1936."[3] In the estimate of the total cost to the community of motor-vehicle accidents involving Manitoba drivers, sixteen to twenty-four years of age, this factor of non-motor-vehicle accident influence is taken into account. Table 20 outlines the steps for estimating the total cost to be $5,450,000 for

---

[1] Ibid., p. 44.

[2] Ibid., p. 29.

[3] Ibid., p. 52.

TABLE 20

FACTORS IN ESTIMATING THE TOTAL COST OF ALL MOTOR-VEHICLE ACCIDENTS INVOLVING MANITOBA DRIVERS UNDER THE AGE OF TWENTY-FIVE

Injury Accidents (Manitoba, 1951)	615
Property Damage Accidents (Manitoba, 1951). . . .	2881
Ratio of Damage to Injury Accidents	4.7:1
Professor Jones's Estimated Number of Non-Injury Accidents occurring for 42 Separate Types of Injury Collisions Reported to the Police. . .	219.07
Estimated Ratio of Damage to Injury Accidents (Great Britain, 1935-38).	5.2:1
Percentage of Total Cost Represented by Injury Accidents in all Types of Road Collisions . . (Great Britain, 1935-38)	93.5%
Percentage of Total Cost Represented by Injury Accidents in Road Collisions Involving at least One Motor Vehicle	83.5%
Dominion Bureau of Statistics' Estimate of Property-Damage Accidents in 1950	$276
Estimated Cost per 1951 Property-Damage Accident on basis of 13 per cent average increase. . .	$312
Total Estimate of Motor-Vehicle Accident Costs in 1951, involving Manitoba Drivers under the Age of 25	$5,450,000

the twelve-month period of 1951.

Driver violations of rules and regulations.--The next step in the writer's investigation was to examine the accident records for evidence which would permit an estimate of the proportion of youthful drivers who were blameworthy and therefore liable for the cost of their accidents. This approach was directed by the belief, emphatically expressed by leading highway safety research organizations, that "violations of law are without question the outstanding cause of traffic accidents. Reports from 23 states disclose that a driver violation occurs in 86 per cent of all accidents. Thus, about nine out of ten

accidents involve a violation."[1] Table 21 details the driver violations recorded, under the writer's supervision, by staff members of the Manitoba Safety Division from primary Police accident reports submitted during 1951. For comparative purposes the violations recorded by two age groups is given: (1) the sixteen to twenty-four age-group which recorded the highest injury-accident involvement index--1.40; and (2) the sixty-five to seventy-four age-group which achieved the "safest" injury-involvement index of 0.63.

From the material presented in Table 21 it may be conservatively estimated that youthful drivers were blameworthy to the extent of being liable for 70 per cent of the loss sustained from accidents in which they were involved. The monetary cost to the community in 1951 would approach $3,800,000, an amount comparable in magnitude to the Government of Manitoba's 1951 school grant of $4,343,755.[2]

By-products of the violations-investigation.--The accidents referred to in Table 21 comprise a selected sample. Only those Police accident reports were tabulated which contained non-ambiguous evidence of the driver's actions prior to the accident.

While the violation-sample investigation was designed to assess responsibility for accidents, it also throws light upon other problems falling within the same universe:

1. It will be observed that the majority of all recorded

---

[1] The Motor-Vehicle Driver: His Natureand Improvement, p. 16. Op. cit..

[2] Winnipeg Free Press, February 16, 1952.

TABLE 21

VIOLATIONS PER 100 DRIVERS, AGE GROUPS 16--24 AND 65--74, IN MANITOBA MOTOR-VEHICLE TRAFFIC ACCIDENTS, 1951

Violations	Injury Accidents		All Accidents	
	Age Group 16--24	Age Group 65--74	Age Group 16--24	Age Group 65--74
Ability impaired by Alcohol	6	2	3	1
Exceeding Safe Speed	28	7	19	7
Exceeding Speed Limit	0.5	0	0.1	0
Did Not Have Right-of-Way	7	7	7	10
Following Too Closely	5	3	9	5
Improper Passing	3	2	4	4
Failed to Signal Properly	1	2	2	3
On Wrong Side of Road	2	0	0.5	0
Disregarded Traffic Controls	5	2	3	2
Improper Turning	2	5	4	8
Improper Parking, Starting	3	0	5	8
Failed to Dim Lights	0	2	0	1
Did Not Anticipate Hazardous Conditions	13	5	12	7
Other Improper Driving	1	0	0.4	0
Violations per 100 Drivers	76.5	37	69	56
Total Violations Recorded	362	21	2101	195
Driver Sample Investigated	476	58	3136	384

driver violations fall within two classifications: "Exceeding safe speed" and "Did not anticipate hazardous conditions." The prevalency of these violations indicates that most accidents result from a combination of factors. Furthermore, the frequency of these violations points up the inability of many drivers to cope with complex situations for which they are usually held responsible:

> 42. (1) Every person who drives a motor vehicle or a trolley bus on a highway without due care and attention or without reasonable consideration for other persons using the highway is guilty of an offence.[1]

2. Two significant trends emerge when Table 21 is combined with Table 16. First, a youthful driver's chances of becoming involved in an injury-accident occurrence are double those of a driver in the 65--74 age category. Secondly, at least partial responsibility for an injury-accident can be assumed in 75 per cent of mishaps to rest with the youthful drivers involved. When older drivers are involved, they record only half as many violations. These trends suggest that causative factors contribute to the high incidence of serious traffic accidents among youthful drivers.

Reflective analysis.--The materials presented in the preceding sections have emphasized the economic implications of highway accidents involving youthful drivers. The writer ventures to submit that these statistics strongly suggest that certain changes might be expected to reduce the number

---

[1]The Highway Traffic Act, p. 39. Office Consolidation of Chapter 93 of the Revised Statutes of Manitoba, 1940. Winnipeg: King's Printer, 1951.

of serious accidents; not the least important being the education of all road users in the nature of their social responsibilities. Of course, the ultimate justification for public expenditure designed to reduce the number of traffic accidents is to be found not in the economic gain to the community but in the saving of life and limb. The writer,states, without laboring, the obvious.

While the accident records clearly show the disproportionately high accident-rate of younger drivers, they do not probe deeply into the causative factors. Expert opinion holds that it is for one or all of the following reasons that youth at the wheel is so susceptible to accidents: (1) the driver does not possess the skills and abilities required for safe and efficient driving; (2) he does not have the required or sufficient understanding of the highway code; (3) he does not recognize or fully appreciate the inherent hazards of driving and their relationship to the lives of other road-users.

These matters relating to the mental, physical and emotional competency of younger drivers are studied in the following section.

C. PERSONAL CHARACTERISTICS OF DRIVERS IN WINNIPEG HIGH SCHOOLS

The driver licence act rests on the premise that driving on the public highway is a privilege and not a right. In the United States[1] numerous court decisions have always

---

[1] Driver Improvement Through Licensing Procedures, p.15. American Association of Motor-Vehicle Administrators. Washington, D.C.: the Association, 1950.

upheld this principle. In Manitoba, the legal basis for arguing this viewpoint is the absolute discretion accorded the Minister in the granting of a chauffeur's or driver's licence (Section 16A. (3) of the Manitoba Highway Traffic Act).

In conferring the privilege to drive, society is interested in making certain that: (1) the driver has the mental and physical equipment to drive properly; (2) knows how to drive properly; and (3) has an attitude about driving which will assure that he will drive properly. Whether society's interest is reflected in a high standard of skill, knowledge and safety-mindedness being achieved by its prospective and licensed drivers is a question that has often been challenged by eminent authorities on safety:

> An important reason why driver training has lagged in many states is that prospective drivers have been able to procure licences with little or no instruction. The only way of inducing beginners to undertake a course of training is to make the examination for a driver's licence so difficult that they will have to go to school in order to pass it. ...
>
> A little known fact about our present group of drivers is that approximately 60 per cent of them have never had their ability to drive investigated. ...
>
> ... It is high time we put into operation systematic training and strict examining of all drivers to curb the excessive national waste in avoidable highway accidents.[1]

The basic assumption underlying this section of the experimental evidence of the writer's research, is that sufficient material has been presented to segregate the 16 to 24 driver age-group as a class of operators of motor vehicles whose accident rate is significantly higher than that of the

---

[1]H. R. DeSilva, Why We Have Automobile Accidents, pp. 292-301. New York: John Wiley and Sons, 1942.

remainder of the driving population. It follows that this investigation is concerned with one question only: What can be disclosed concerning various samples of high school drivers that will enable the schools to improve their contribution to highway safety?

General method.--The factors or characteristics that the writer investigated were selected from the recommendations of previous research studies. Some of the principal primary sources reviewed by the writer included studies conducted by Lauer[1], Brody[2], Siebrecht[3], Johnson[4], and New York University's group project[5]. Excellent abstractions of major research on characteristics of "accident-repeaters" were found in reviews by DeSilva[6] and Lawshe[7]. More recent investigation in this

---

[1]Lauer, "Methods of Measuring the Ability to Drive an Automobile", Extension Service Bulletin, CXV, Ames: Iowa State College, 1936.

[2]L. Brody, Personal Factors in the Safe Operation of Motor Vehicles. New York: Center for Safety Education, New York University, 1941. Pp. viii--96.

[3]E.B. Siebrecht, The Construction and Validation of a Scale for the Measurement of Attitudes Toward Safety in Automobile Driving. New York: New York University, 1941. Pp. 142.

[4]H.M. Johnson, "The Detection and Treatment of Accident-Prone Drivers," Psychological Bulletin, XLIII, 6 (November, 1946), pp. 489--532.

[5]Personal Characteristics of Traffic-Accident Repeaters. Saugatuck, Connecticut: The Eno Foundation for Highway Traffic Control, 1948. Pp. 64.

[6]DeSilva, Why We Have Automobile Accidents. Op. cit..

[7]C.H. Lawshe, A Review of the Literature Related to the Various Psychological Aspects of Highway Safety. Lafayette: Purdue University, 1939. Pp. 59.

field were found in studies by Allgaier[1], Kramer[2], and the Eno Foundation[3].

Two general procedures were adopted: (1) the examination method; and (2) the biographical method. The first method purported to detect differences among the high-school samples in knowledge of road-rules and practices, in certain psycho-physical performances, and in actual behind-the-wheel driving. Standardized knowledge tests, attitude scales, performance-test scales, and driver-rating scales were employed to test the students and to evaluate the scores. The second method consisted of accumulating and interpreting as many data as possible concerning the personal histories of youthful drivers who had been called in by the Manitoba Safety Division's Driver Improvement Clinic for review of their abnormally high conviction- and accident-records.

The Status of High School Drivers with Respect to Knowledge of Road Rules

This portion of the study falls into two parts. First, under the sponsorship of the Winnipeg Junior Chamber of Commerce, a sample population of 2,372 students from the six Winnipeg High Schools[4] were examined by means of an abridged

---

[1]E. Allgaier, "Some Road-User Characteristics in the Traffic Problem." Washington, D.C.: American Automobile Association, 1950. Pp. 59--77.

[2]M.D. Kramer, Safety Supervision in Motor Vehicle Fleets. New York: Association of Casualty and Surety Companies, 1947. Pp. 214.

[3]The Motor-Vehicle Driver: His Nature and Improvement. Op. cit..

[4]Daniel McIntyre Collegiate, Gordon Bell High School, Isaac Newton High School, Kelvin Technical High School, Lord Selkirk High School and St. John's Technical High School.

standardized test--Knowledge Test for Automobile Drivers.[1] These tests were administered by teachers of the various schools; tests were scored by members of the Junior Chamber of Commerce; the writer is responsible for the accuracy of the tabulated results and for any interpretations of the data. Secondly, the writer conducted a battery of tests to a selected sample of 61 licensed drivers who were students of St. John's Technical High School in 1950.

The history of the testn--While a number of pencil tests on driving knowledge (all purported to have been standardized) were reviewed,[2,3,4] the writer selected the New York University's 50--item Knowledge Test for Automobile Drivers for the following reasons.

Firstly, the purpose of the test is clearly stated:

> ... it is designed to examine knowledge and reasoning in matters which are significant for safe driving, ... The fifty questions deal with matters pertaining to hand signals, stopping distances, traffic rules and regulations, warning signs, vehicle control and common emergencies.[5]

Secondly, the test is easily administered and scored.

---

[1]Appendix D.

[2]Sportsmanlike Driving Test. Developed by the Traffic Engineering and Safety Department, American Automobile Association. Washington, D.C.: the Association, 1949.

[3]Standard Test in Driver Education. Prepared by the Accident Prevention Department, Association of Casualty and Surety Companies. New York: the Association, 1949.

[4]Ruch-Wilson Safe Driver Selection System. Prepared by the Psychological Research Center for Business and Industry. Los Angeles: the Center, 1948.

[5]H.J. Stack, "Announcement of Two New Tests in the Center for Safety Education Series." New York: the Center for Safety Education, New York University, 1949.

Thirdly, the authors of the test claim, "It was standardized by administering several thousand in the high schools of ten states."[1] In a communication from S. Kirklen Collins, Assistant Educational Director, Association of Casualty and Surety Companies, the grade norms were given only in raw scores, omitting the standard deviations and sample totals, and thus making it impossible for the writer to properly evaluate his sample distributions. The grade norms given are as follows:[2]

Grade Level	Raw Score
Twelfth	46.5
Eleventh	44.1
Tenth	43.0
Ninth	42.1
Eighth	40.6

Fourthly, and because "the true validity of an educational or psychological test must always remain a hypothetical concept,"[3] the Knowledge Test for Automobile Drivers was chosen for its clearly defined methods of determining the validation criteria. These methods were:

1. An analysis of unsafe acts resulting in accidents.
2. An analysis of violations reported in each state, indicating either a lack of information or faulty attitudes.
3. A study of emergency driving situations to determine how a lack of information regarding correct procedures might lead to accidents.
4. An analysis of other tests to include items previously validated.[4]

Fifthly, the reliability coefficient, determined by

---

[1] Ibid..

[2] Letter from S.K. Collins, Assistant Educational Director, Casualty and Surety Companies, New York. August 8, 1951.

[3] E.F. Lindquist, A First Course in Statistics, p. 214. Boston: Houghton Mifflin Company, 1942.

[4] Personal Characteristics of Traffic-Accident Repeaters, p. 22. Op. cit..

the test--re-test method, is given as $r = 0.65$.[1]

Lastly, the use of this test in the New York University group study on matched groups of 193 "accident-repeaters" and 193 "accident-free" drivers from Michigan and Connecticut provided much data which proved valuable for comparative purposes.[2]

Statistical concepts employed.--In the analysis of test results, use was made of a number of statistical procedures. These are the mean, standard deviation, standard error of the mean, standard error of the difference, critical ratio, and level of confidence. Also, the Spearman-Brown formula (involving the computations of several product-moment correlation coefficients) was employed to test the reliability of the Knowledge Test for Automobile Drivers. A synoptic review of the manner in which the procedures were used follows:

Mean.--A measure of central tendency found by dividing thesum of all measures by the group number.

Standard deviation.--The degree of variability of "spread" of individual scores which shows one measure of the relative homogeneity of a group--in simple terms, the smaller the S.D. the smaller the scatter of the test-group's range of abilities. The fundamental formula for the S.D. is:

$$S.D. = \sqrt{\frac{\Sigma x^2}{N}}$$

where Σx^2 equals the sum of the square of each difference between the average score and each actual score made; and N

---

[1] Ibid., p.22.

[2] Ibid., pp. 22--27.

the total number of scores.

Standard error of the mean (σM).--This is a measure of the "trueness" of the average group score; the relative degree to which the obtained mean is free from errors of sampling and measurement. The reliability of the obtained mean increases as its standard error decreases.

$$\sigma M = \frac{\sigma}{\sqrt{N - 1}}$$

where σ= the standard deviation of the mean.

Standard error of the difference (σD).--The standard error of the difference between two groups identifies the degree of fluctuation that can be expected in the difference from sampling errors.

$$\sigma D = \sqrt{(\sigma M_1)^2 + (\sigma M_2)^2}$$

Critical ratio.--This ratio (C.R. or t) between the mean scores of two different groups is a measure of the statistical significance that can be justifiably attached to this difference. The implications of this procedure are well expressed by Lindquist:

> ... we are often uniquely interested in testing the hypothesis that the two populations sampled are alike in the trait measured, or that the true difference is zero ("null" hypothesis).
>
> When the null hypothesis may be rejected at a high level of confidence, we say that the difference is "statistically significant". Frequently, we qualify such statements, saying, for example, that a difference is "significant" at the 5 per cent level (meaning that the null hypothesis may be rejected at the 5 per cent level). ... When we say that a difference is significant, we mean that it is too large to be reasonably attributed to chance (sampling error) alone, and that we are highly confident

that the two populations differ in the trait measured.[1] The formula for deriving the critical ratio is:

$$C.R. = \frac{D}{\sigma D}$$

where D equals the difference in average scores, and σD the standard error of this difference.

Results of the Junior Chamber of Commerce survey.--It should be recalled that the Junior Chamber's testing program had, as its primary purpose, the stimulation of school interest in traffic safety. Financial restrictions made it necessary to shorten the standard Knowledge Test for Automobile Drivers to 45 questions, thus obviating any comparisons with standard norms or mean scores obtained on other sample populations.

The results are summarized in Tables 22, 23, and 24. The interpretation of the obtained critical ratios is based upon the following authority:

> ... The "critical value" which the significance ratio must exceed ... depends upon the level of confidence which we chose to employ, ... Educational and psychological research workers have in the past frequently followed the practice of requiring that the signigicance ratio exceed 3 before declaring a difference significant, that is, they have insisted on a very high degree of confidence (0.26 per cent level) that the null hypothesis is false. More recent practice is to utilize the 1 per cent and two per cent levels, with 2.58 and 2.33 as the corresponding "critical" values of the significant ratio.[2]

Observations.--Results outlined in Tables 22 and 23 show that the licensed drivers made significantly better scores than did

---

[1]Lindquist, p. 130. Op. cit..

[2]Ibid., p. 132.

TABLE 22

DISTRIBUTION OF SCORES ON THE KNOWLEDGE TEST FOR AUTOMOBILE DRIVERS AMONG WINNIPEG SENIOR HIGH SCHOOL STUDENTS MAY, 1950

Score	Male Licensed	Female Licensed	Male Non-Licensed	Female Non-Licensed
43	4	0	0	1
42	2	0	2	1
41	12	0	0	0
40	19	0	5	0
39	21	1	15	0
38	19	0	34	5
37	31	4	36	5
36	16	0	50	17
35	28	2	62	18
34	27	2	72	32
33	29	2	85	48
32	21	3	88	88
31	16	2	94	77
30	6	1	96	107
29	11	4	76	111
28	7	3	47	127
27	5	2	49	100
26	3	1	47	106
25	1	1	38	75
24	1	1	16	56
23	1	0	12	34
22	0	0	11	31
21	0	0	5	25
20	0	0	3	17
19	1	0	2	12
18	0	0	0	9
17	0	0	1	3
16	0	0	1	3
15	0	0	1	3
14	0	0	2	0
13	0	0	0	1
N	281	29	950	1112
Mean	34.82(M_1)	31.33(M_2)	31.10(M_3)	27.99(M_4)
S.D.	4.06	3.83	4.13	4.01
σM	0.24	0.72	0.13	0.12

TABLE 23

STATISTICAL SIGNIFICANCE OF DIFFERENCES BETWEEN MEAN KNOWLEDGE TEST SCORES OF LICENSED AND UNLICENSED HIGH SCHOOL STUDENTS, MARCH, 1950

Comparative Sample Populations	Standard Error of the Difference	Critical Ratio	Confidence Level
Licensed Male (M_1) and Licensed Female (M_2)	0.757	4.6	0.006%
Unlicensed Male (M_3) and Unlicensed Female (M_4)	0.178	17.5	0.00006%
Licensed Male (M_1) and Unlicensed Male (M_3)	0.254	14.5	0.00006%
Licensed Female (M_2) and Unlicensed Female (M_4)	0.731	4.5	0.006%

their fellow-students who were not licensed to operate motor vehicles.

Despite the fact that the licensed students included samples from every socio-economic area of Winnipeg, the knowledge-test results as shown in Table 24 attribute no outstanding superiority to any of the six licensed student groups.

The results of Table 23 show that, in comparing samples of similar driving status, male students achieve significantly higher scores than the female students.

In Table 24 the "unlicensed students" of two high schools--Kelvin and Gordon Bell--show a significant

TABLE 24

COMPARISONS OF KNOWLEDGE TEST SCORES AMONG SIX SENIOR WINNIPEG HIGH SCHOOL STUDENT SAMPLES

	St. John's	Kelvin	Daniel McIntyre	Gordon Bell	Isaac Newton	Lord Selkirk
Licensed Student Sample						
Total	77	71	43	59	33	27
Mean	34.39	35.56	33.23	34.75	33.46	33.48
Standard Deviation	3.20	4.13	4.08	3.80	4.25	5.26
C.R. St. John's with	.....	1.87	1.57	0.57	1.11	0.83
C.R. Kelvin with	.....	.....	2.88	1.15	2.34	1.82
C.R. Daniel McIntyre	.....	.....	.....	1.90	0.23	0.21
C.R. Gordon Bell with	.....	.....	.....	.....	1.43	1.10
C.R. Isaac Newton with	.....	.....	.....	.....	.....	0.01
Unlicensed Students						
Total	621	186	266	428	375	188
Mean	28.67	31.24	29.09	30.45	28.89	29.53
Standard Deviation	4.70	4.24	4.37	3.85	5.36	3.72
C.R. St. John's with	.....	7.05	1.26	6.70	0.65	2.58
C.R. Kelvin with	.....	.....	5.20	2.17	5.63	7.08
C.R. Daniel McIntyre	.....	.....	.....	4.12	0.51	1.14
C.R. Gordon Bell with	.....	.....	.....	.....	4.66	2.79
C.R. Isaac Newton with	.....	.....	.....	.....	.....	1.64
Ratio of Female Students to Male in Test Sample	1.10	1.27	0.65	1.56	1.33	1.27

superiority over similar student samples in the average scores achieved. While it is important to note that the significance of an obtained difference does not account for the cause of the difference, the writer suggests, on the basis of purely subjective observation, that the higher economic status of the areas supplying these schools permits ahigher ratio of automobile ownership and hence a greater opportunity to acquire traffic knowledge through observation.

Limitations.--The major shortcomings of the Chamber test-survey are twofold. First, the failure of the abridged test form to provide time limits and instructions with example affects the validity and reliability of the test. Secondly, the elimination of five questions from the standardized form prevents comparisons with norms achieved by other groups.

In order to approach a more valid assessment of the adequacy of student-drivers' traffic knowledge and information, the writer had, previous to the Chamber survey, tested a driver population of 61 students of St. John's Technical High School with the standard form of the New York University's Knowledge Test for Automobile Drivers.

St. John's Technical High School Study.--The testing program consisted of administering standard knowledge test, attitude scales, psychophysical tests, and road tests to 61 St. John's Technical High School students enrolled in this Winnipeg school during March, 1950. The sample was selected by one criterion--each member of the group must possess a current Manitoba driver's licence.

In administering the tests, care was taken to establish

rapport with the students by: (1) carefully explaining the purpose of the program; and (2) providing for complete anonymity of the subjects through the use of code signatures.

The scores of the St. John's student sample were compared to those achieved by two other groups. First, the writer obtained norms which had been computed on the basis of a large testing program conducted by the Center for Safety Education, New York University, among various levels of American high school students who were receiving class-room instruction in driver education. The level used for comparison was Grade Eleven. Unfortunately, the sample number and the standard deviation of the Grade Eleven mean score could not be obtained.

The second basis of comparison were the knowledge-test results of a study of drivers in Connecticut and Michigan made in 1948 by the Center for Safety Education, New York University, for the Eno Foundation. This investigation involved a group of 193 "repeaters" who in a 10-year period had been involved in 835 accidents, with 1,107 violations charged against them, and a group matched with the "repeaters" on the basis of age, sex, annual mileage, type of vehicle and occupation, who had not been involved in any accidents or charged with any violations in the same period of time.

In observing the results obtained by non-repeaters and repeaters on the knowledge tests, the investigators found:

> ... the free drivers tested made significantly better scores than the repeaters on the Center for Safety Knowledge-Test for Automobile Drivers.[1]

---

[1] Personal Characteristics of Traffic-Accident Repeaters, p. 23. Op. cit..

Afurther refinement in the sampling was made by the New York University investigators when they matched the scores of "serious repeaters" with "free" drivers. These serious offenders were persons, twenty-one from the Michigan repeater sample, whose accident frequencies fell within the range of 25 to 100 accidents per 100,000 miles. The following comment was made upon comparing the results:

> The serious repeaters compare even more unfavorably with the entire free group with respect to driving knowledge and information than do the entire repeater group. The entire repeater group scored 2.1 points poorer than the free, while the serious repeaters scored 3.4 points poorer. The statistics show that both of these figures denote a "true difference" between the groups (99 out of 100 trials) and cannot be attributed to chance alone.[1]

Results of St. John's Technical High School study.--The results of the testing survey of 61 licensed students of this Winnipeg high school are condensed in Table 25. One general observation seems to be warranted by the significant difference obtained between the St. John scores and those of the Connecticut and Michigan "accident-free" groups: If it is true that "inadequate knowledge and information of the safe driving practices and traffic regulations is directly related to motor vehicle accidents,"[2] if the test used is a valid and reliable instrument to measure this trait, and if the St. John's sample is as truly representative of the Winnipeg high school student drivers as Table 24 previously indicated, then the Winnipeg student drivers possess a higher accident-risk potential than any but the worst accident-repeater groups.

---

[1] Ibid., p. 25.

[2] Ibid., p. 26.

TABLE 25

RESULTS AND COMPARISONS OF KNOWLEDGE TEST FOR AUTOMOBILE DRIVERS SCORES MADE BY 61 STUDENTS OF ST. JOHN'S TECHNICAL HIGH SCHOOL LICENSED TO OPERATE MOTOR VEHICLES IN MANITOBA--MARCH, 1950

	St. John's High (Wpg.)	Driver Education Sample (American)	Accident "Free" Drivers (Conn.)	Accident "Free" Drivers (Mich.)	Accident Repeaters (Conn.)	Accident Repeaters (Mich.)	Serious "Repeaters" (Mich.)
Number. . . .	61	(61)[a]	93	100	93	100	21
PARTS I & II							
Mean. . . .	36.05	44.1[b]	...	...	...	...	...
S.D.. . . .	3.89	(4.0)[a]	...	...	...	...	...
σM	0.5	0.52	...	...	...	...	...
C.R.. . . .		9.8	...	...	...	...	...
Level of Confidence.		0.00%	...	...	...	...	...
PART II							
Mean. . . .	15.96		18.62	18.80	17.44	17.23	15.4
S.D.. . . .	2.82		3.08	3.72	3.02	3.54	4.05
σM	0.367		0.325	0.372	0.319	0.354	0.885
σD (on Part II only) of St. John's High with.			0.490	0.522	0.485	0.510	0.970
Critical Ratio between Mean Scores of St. John's with			5.42	5.42	3.05	2.24	0.55
Level of Confidence			0.00006%	0.00006%	0.25%	2.5%	58%

[a]Conservative Approximations. Data on standardization norms stated only that "several thousand driver education pupils from ten States were examined."

[b]Norm provided for Grade Eleven driver education students.

However, there is little evidence that "repeaters" and "free" can be differentiated on the basis of deficiencies in driving knowledge alone. An effective use of knowledge tests for drivers is to disclose individual deficiencies as an aid to the determination of the areas where driver education is needed. Table 26 ascertains, through an item analysis, the percentage of drivers failing each question. That proper instruction can be given toward increasing the general knowledge of traffic safety is indicated in the higher norms achieved on the same test by American students receiving driver education.[1]

The following items were incorrectly answered by more than half of the sample population:

Part I--(9) You may legally exceed the speed limit when you are driving an injured person to the hospital. (11) More accidents take place on clear, dry days than on stormy days.

Part II--(7) If the application of brakes at 20 miles per hour requires 25 feet to bring a car to a dead stop, the required distance at 40 miles per hour would be: (1) 40 feet (2) 50 feet (3) 75 feet (4) 100 feet.

(19) In preparation for a right turn the most important thing for you to do is to: (1) drive in the extreme right lane (2) check your mirror for conditions in the rear (3) blow your horn lightly (4) give a hand signal.

Which of the questions are more important? The writer does not hazard the answer. In general, tests are devices for obtaining samples of behavior under controlled situations. To the extent that such samples of behavior are related to subsequent behavior while driving, predictions of probable success or failure can be made. All data presented in this study

---

[1]See Page 111.

TABLE 26

RANK ORDER OF ITEMS INCORRECTLY ANSWERED ON KNOWLEDGE TEST FOR AUTOMOBILE DRIVERS BY 61 LICENSED STUDENTS OF ST. JOHN'S TECHNICAL HIGH SCHOOL
MARCH, 1950

Part I of Test				Part II of Test			
Rank Order	Question Number	Number Incorrect Items	Per Cent Incorrect Answers	Rank Order	Question Number	Number Incorrect Items	Per Cent Incorrect Answers
1	9	31	50.9%	1	19	50	82.0%
	11	31	50.9%	2	7	49	80.4%
3	3	23	37.7%	3	10	35	57.4%
4	5	21	34.4%	4	6	30	49.1%
5	24	20	32.8%		15	30	49.1%
6	14	18	29.5%	6	17	28	45.9%
	25	18	29.5%		23	28	45.9%
8	8	16	26.2%		25	28	45.9%
9	2	15	24.6%	9	20	25	41.0%
10	4	13	21.3%	10	18	24	39.4%
	7	13	21.3%	11	9	23	37.7%
	22	13	21.3%	12	22	22	36.0%
13	13	12	19.7%	13	5	21	34.4%
14	15	8	13.1%	14	2	19	31.2%
	20	8	13.1%		12	19	31.2%
	21	8	13.1%		24	19	31.2%
17	10	7	11.5%	17	3	15	24.6%
	17	7	11.5%	18	21	12	19.7%
19	1	6	9.8%	19	14	10	16.4%
20	16	3	4.9%		16	10	16.4%
21	19	2	3.3%	21	13	9	14.7%
22	6	1	1.6%		4	9	14.7%
	12	1	1.6%	23	1	8	13.1%
	23	1	1.6%	24	11	5	8.2%
25	18	0	0.0	25	8	0	0.0

emphasize the complexity of the components which contribute to accident causation. Lauer has pointed this out:

> We do not know specifically today why certain drivers have accidents. We do not know that a given driver is going to react the same way every time a certain situation arises. We do not know precisely why certain drivers, with every apparent reason for getting into accidents, singularly are able to stay out of them.[1]

From the comparisons of test-score means presented in this section, the writer must conclude that youthful drivers are not well-informed regarding the provisions of the highway code or the best driving practices. It should be worthwhile to extend this investigation toward an appraisal of the physical attributes of young operators of motor vehicles.

Some Psychophysical Aptitudes of High School Drivers

In Chapter II of this study, an historical outline was presented tracing the various stages in the development of selective techniques to detect and treat the accident-repeater. It will be recalled that testing programs have had three major purposes: (1) to serve as psychological hurdles; (2) to predict and segregate accident-prone drivers; and (3) to diagnose weaknesses in the individual driver so that useful remedial measures can be instituted.

The first viewpoint has been adopted as the principal justification for the Manitoba Safety Division's testing program. As psychological hurdles, tests can provide a stimulus for self-improvement among prospective drivers. DeSilva has forcefully advocated this approach:

---

[1] The Motor-Vehicle Driver: His Nature and Improvement, p. 35. Op. cit..

> The examination standards for granting a licence areof fundamental importance to determining the amount of training that prospective drivers have to undergo to obtain it. Where the licence standards are high, prospective drivers have to practise and study hard to master the road test and motor vehicle regulations, whereas in those states in which licence standards are low, prospective applicants naturally put forth only the minimum amount of exertion necessary to obtain that licence.[1]

The second viewpoint has been a contentious issue since it was first employed by Muensterburg[2] and Lahy[3] to predict accident-proneness among selected samples of street-car operators. As previously stated, the concensus of expert opinion seems to regard as futile the use of tests to prognosticate individual accident involvements. Even the most severe critic--Dr. H.M. Johnson--however, has conceded the usefulness of test results for group predictions:

> The results verify the hypothesis that the tests (DeSilva's and Lauer's) enable one to select classes of operators, such that every class will include enough operators to make the classification useful, while the accident-rates will differ widely and reliably from one class to another.[4]

The third viewpoint--the diagnostic use of tests for educational purposes--is the approach followed in the present study. The purpose of the psychophysical testing was to discover if youthful drivers as a group possessed sufficient deficiencies in physical factors thought necessary to safe driving to warrant the inclusion of psychophysical testing in

---

[1]DeSilva, op. cit., p. 292.

[2]H. Muensterburg, "Experiments in the Interest of Electric Railway Service." Psychology and Industrial Efficiency. New York: Houghton Mifflin Company, 1913.

[3]J.M. Lahy, La selection psychophysiologique des travailleurs; conducteurs de tramways et d'autobus. Paris: Dunod, 1927. (English abstract)

[4]Johnson, op. cit., p. 515.

the driver education program.

Principal assumptions.--Some evidence has already been advanced regarding the dichotomy of viewpoints on the validity of driving tests. Even among the exponents of psychophysical testing there exists considerable differences of opinion as to which traits should be examined. This divergence is apparent among the following research abstracts:

1. Visual Acuity.

> ... When 70 drivers who were arrested for "cutting in" on California highways were given vision tests it was found that more than half of these had one eye with subnormal acuity.[1]

> ... In most tasks of seeing, and particularly on streets and highways, contrast is a far more important factor than visual acuity. ... Visual acuity is no measure of the visibility of most hazards of drivers.[2]

2. Distance Judgment (Depth Perception).

> ... Depth perception, ... is closely related to the ability of the individual to judge highway distances accurately. Tests of visual depth are important because the quality is a highly developed skill and is the first one to be sacrificed when difficulty develops in the ocular behavior.[3]

> ... The Iowa test of distance judgment is not significantly associated with a preponderance of head-against-rear collisions over other accidents. Neither is the Harvard test.[4]

3. Side Vision (Field of Vision).

> ... the field of vision must be normal. Restricted field

---

[1]DeSilva, p. 72. Op. cit..

[2]Brody, p. 83. Op. cit..

[3]D.E. Renner, "Drivers' Vision Tests," Optometric Weekly, (September 14, 1950).

[4]Johnson, p. 516. Op. cit..

was found to be highly associated with accident-proneness.[1]

No significantly strong differences appear between (accident) repeaters and (accident) free with regard to visual fields.[2]

4. Night Vision.

It was found that seven times more individuals in the poor-driver group failed the glare test, than in the good-driver group. That defective glare vision among the poor-driver group played an important part in their accidents is indicated by the fact that this group had 128 of their 174 accidents at night.[3]

Sensitivity to glare whether determined by the Harvard Method or the Iowa method is not significantly associated with preponderance of night accidents over other accidents.[4]

Because there is no test which is both accurate and easy to administer, very little information has been accumulated on either individual variations, ability to see at night, or the relation of night vision to night traffic accidents.[5]

5. Color Vision.

Color blindness is of importance in driving, chiefly insofar as it affects the ability to recognize traffic lights.[6]

The problem of red-green color blindness seems of minor importance alongside the problem confronting all drivers as the result of the widespread use of red and green neon advertising signs.[7]

And yet, despite the mass of conflicting results that

---

[1]A.R. Lauer, "What Types of Persons Have Accidents?" National Safety News, XXVI (1932), 16.

[2]Personal Characteristics of Traffic-Accident Repeaters, p. 51. Op. cit..

[3]DeSilva, p. 77. Op. cit..

[4]Johnson, p.516. Op. cit..

[5]Allgaier, "Some Road-User Characteristics in the Traffic Problem," p. 67. Op. cit..

[6]DeSilva, p. 77. Op. cit..

[7]Brody, p. 87. Op. cit..

testing studies have reported, the writer has found complete unanimity among the views of the various investigators regarding the value of driver testing in diagnosing drivers' problems and in rehabilitating drivers with questionable personal characteristics or marked deficiencies. Even Johnson concedes the possibility of benefit ("small, but not to be disparaged"[1]) from the re-education of trouble-making operators. He cautions, however:

> From what we have just said it follows that if we are to gain very much from improving "bad" drivers, we must not content ourselves with making them into"average" drivers; we must make them into superior drivers.[2]

Since no assumptions regarding the "best" tests could be drawn from the foregoing welter of opinions and findings, the writer resorted to the composite judgment of men who have had the most experience in selecting drivers or in analyzing driver research data. Fortunately, this need was satisfied by a questionnaire study conducted by the American Automobile Association.[3] In this study, 33 outstanding workers in the field of driver selection ranked the various testing techniques in order of importance. Table 27 presents the average rankings of psychophysical traits.

Psychophysical testing of St. John's Technical High School students.--This section of the research was made possible through the co-operation of the Royal Canadian Army Service

---

[1]Johnson, op. cit., p. 501.

[2]Ibid..

[3]Research Report Number 24. A compilation of the "Best" Selective Techniques for Driver Selection. Washington, D.C.: Traffic Engineering and Safety Department, American Automobile Association, (mimeo).

TABLE 27[a]

MEAN RANKINGS OF PSYCHOPHYSICAL TRAITS BY THIRTY-THREE DRIVER TESTING AUTHORITIES

Test	Mean Rankings	S.D. of the Distribution
Visual Acuity	3.3	2.9
Distance Judgment	4.3	2.1
Reaction Time	4.7	2.6
Muscular Coordination	5.0	2.8
Night Vision	5.2	2.7
Field of Vision	5.2	2.4
Glare Vision	7.0	1.9
Steadiness	7.1	2.8
Color Vision	7.1	2.9
Hearing	7.2	2.9
Eye Dominance	9.2	2.7

[a]Source: Research Report Number 24, p. 4. Op. cit..

Corps stationed at Fort Osborne Barracks, Winnipeg. By means of the Army driver-testing equipment, a random sample of 36 St. John's Technical High School students possessing Manitoba operator's licences were examined in the following traits: visual acuity, distance judgment, foot-reaction time, field of vision, and color vision.

As the test sample was quite small, the writer investigated the distribution of psychophysical traits recorded from tests given by the Manitoba Safety Division to a random sample of 210 driver licence applicants in the 16--19 age-group. Stereoscopic instruments were employed to rate the applicants in simultaneous binocular perception, visual acuity, stereopsis, and ocular muscle balance. The tests also included standard measures of field of vision, reaction time and color perception. An added procedure was the measurement of dark adaptation by means of the Feldman Adaptometer. The

distribution of scores was computed from the Manitoba Safety Division's I.B.M. tabulating-card files[1] which provide a permanent record of each driver-applicant's test results.

Results of the psychophysical testing survey.--The distributions of acuity ratings are shown in Tables 28 and 29. In Table 28, the ratings scored by the St. John's students were obtained from Snellen chart readings at 20 feet. The scores in Table 29 were obtained from "far-point" readings on the American Optical Company's Sight Screener.

In the student-test sample, it willbe observed that 99 per cent record normal or superior acuity. However, nearly 15 per cent of this group rated poorer than 20/50 Snellen in either the left or right eye.

In the 16 to 19 age-group sample, when the Snellen equivalent of 20/30 is used as the threshold acuity standard, 23 per cent of the testees are recorded below this standard.

An adaptation of the Howard-Dolman peg test was used

TABLE 28

DISTRIBUTION OF ACUITY RATINGS OF 36 LICENSED STUDENTS OF ST. JOHN'S TECHNICAL HIGH SCHOOL MARCH, 1950

Per Cent Visual Acuity	Right Eye	Per Cent Distrib.	Left Eye	Per Cent Distrib.	Both Eyes	Per Cent Distrib.
150	5	13.8	7	19.4	12	33.2
130-140	20	55.5	18	50.0	19	52.7
110-120	5	13.8	6	16.6	4	11.1
60-100	1	2.8	1	2.8	0	0.0
20- 50	5	13.8	4	11.1	1	2.8

[1]Appendix B

TABLE 29

DISTRIBUTION OF ACUITY RATINGS OF 210 DRIVER-LICENCE APPLICANTS IN THE 16--19 AGE GROUP 1951

	Visual Acuity for Both Eyes		Simultaneous Binocular Perception	
	20/20 + and above	20/30 - and above	Normal	Suppresses, Alternates
Total	162	48	206	4
Per Cent Distribution	77	23	98	2

for testing the distance-judgment trait among the 36 high school students. The results are shown in Table 30. In the test the examinee aligns two movable model cars with a stationary one at a distance of twenty feet. The rating norms were developed by the Motorists' Vision Committee of the

TABLE 30

COMPARATIVE DISTRIBUTIONS OF DISTANCE JUDGMENT AND STEREOPSIS SCORES OBTAINED BY YOUTHFUL DRIVERS OF TWO SEPARATE SAMPLES

Distance-Judgment Test 36 Students of St. John's High			Stereopsis Test 210 Driver-Licence Applicants		
Sum of 10 Readings	Raw Scores	Per Cent Distribution	Shephard-Fry Scale	Raw Scores	Per Cent Distribution
0- 7	2	5.5	105%	146	69.5
8- 14	8	22.2	90%	33	15.7
15- 29	16	44.5	75%	23	11.0
30- 59	10	27.8	60%	3	1.4
60-100	0	0.0	45%	3	1.4

American Optometric Association.[1] The centimeter-error ratings are the sum of ten trials.

Table 30 also shows the distribution among the driver-applicant sample of one factor in distance judgment--stereopsis.

Too much significance should not be attached to the obvious disparity in the two distributions in Table 30. Distance judgment is a complex trait comprising, as one prominent Canadian ophthalmologist explains,"two physiological factors and three psychological factors."[2] Nevertheless, Brody considers the ability to judge distance worthy of consideration in educating the motor-vehicle driver. He states:

> ... mention may be made of the conditions which tend to diminish this ability. These include poor visual acuity; eyestrain; squinting; suppression of one eye; effects of tobacco, liquor, ... ; fatigue; ... inadequate illumination; and fog and mist.[3]

Next in importance appears to be the reaction-time test. While there is absolutely no evidence that tests of simple or complex reaction time are of any value in detecting even groups of accident-repeaters, the principle of braking-reaction time has its place in impressing upon the individual the relation of stopping-distance to speed--a problem which 82 per cent of the student sample failed to answer correctly on the knowledge test.

---

[1] Manual on Drivers' Vision Test, p. 19. Prepared by the Motorists' Vision Committee, American Optometric Association. Pittsburgh: the Association, 1949.

[2] J.V.V. Nicholls, "Relationship of Heterophoria to Depth Perception in Aviation," American Journal of Ophthalmology, XXXIII (October, 1950) 14-97.

[3] Brody, p. 86. Op. cit..

Table 31 shows the distribution of scores for both the high-school sample and the driver-applicant group. The norms used for rating the scores were developed by the American Automobile Association.[1]

TABLE 31

DISTRIBUTION OF REACTION-TIME SCORES BY TWO GROUPS OF YOUTHFUL DRIVERS: ST. JOHN'S TECHNICAL HIGH SCHOOL SAMPLE AND THE DRIVER-APPLICANT SAMPLE

Rating Norms (secs.)	High-School Students		Driver-Licence Applicants	
	Raw Scores	Per Cent Distribution	Raw Scores	Per Cent Distribution
0.0 -0.36	0	0.0	2	1.3
0.37-0.40	0	0.0	1	0.7
0.41-0.44	7	19.4	11	7.3
0.45-0.48	27	75.0	62	41.3
0.49 and over	2	5.6	74	49.4

The field of vision or side-vision test was administered to both test-samples by the same technique--a lateral perimeter. The norms which rate the scores include the sum of four readings--two right eye, temporal side and two left eye, temporal side.

The importance of peripheral vision to safe driving is stressed by committees of the National Research Council and the American Optometric Association on the basis of vision research carried out at Ohio State and Iowa State colleges:

The lateral field of vision is very important in

[1] Instruction Manual for Driver Tests, p. 13. Prepared by the Traffic Engineering and Safety Department, American Automobile Association. Washington, D.C.: the Association, 1949.

> driving, and the recognition of its importance is even more essential to the driver for safe motoring. While it is impossible to increase the field of vision by a simple test, we can call the attention of the applicant to the importance of good field, or side vision. When the fields cannot be expanded, a driver can be taught to turn his head and eyes, especially at intersections, to compensate for his restricted fields. Extreme cases of restricted or narrow field are commonly described as "tunnel vision."[1]

In Table 32, thirty-three per cent of the student group scored "below average" fields. Authorities, however, do not regard as serious fields which exceed 159 degrees of arc in binocular vision.[2] If this standard is valid, two of the 210 licence-applicant group possess potentially dangerous fields.

TABLE 32

DISTRIBUTION OF SIDE VISION SCORES RECORDED BY TWO DRIVER SAMPLES: 36 STUDENT-DRIVERS AND 210 YOUTHFUL APPLICANTS FOR LICENCES

Rating Norms (degrees)	High-School Students		Driver-Licence Applicants	
	Raw Scores	Per Cent Distribution	Raw Scores	Per Cent Distribution
420-440	0	0.0	58	27.6
405-419	5	13.8	143	68.1
390-404	19	52.8	5	2.4
375-389	12	33.4	2	0.9
300-374	0	0.0	2	0.9

The final test administered to the student sample was the color vision test. Using the pseudo-Ishihara color plates, not one case of red-green color "blindness" was detected among

[1] Manual on Drivers' Vision Tests, p. 19. Op. cit..

[2] Ibid., p. 20.

the students. At the Safety Division, a red, green, and amber lantern test is given. Not one of the 210 youthful applicants for drivers' licences displayed difficulty in discriminating between the colored lenses. A factor in the latter case is the addition of yellow to the red lens and blue to the green lens.

Observations.--In earlier sections of this study, convincing evidence was produced to indicate that youth were responsible for a large portion of the serious traffic-accident problem. In accounting for age differences in accident rates it has been noted that the general knowledge of road rules and safe-driving practices among the sample student bodies was inadequate. The same indictment cannot be levelled against the youthful driver by virtue of inherent psychophysical disabilities. If the sample driver populations investigated by the writer are representative, few young drivers suffer from physical deficiencies. Whether these young drivers are conscious of their physical limitations is a problem beyond the scope of the driver tests employed. A pair of perfect eyes is still no guarantee of freedom from accident. For one thing, they must be properly used. Particularly important is the factor of attention in the process of driving a vehicle. Evidence seems to indicate that tests are being incorporated into educational programs of traffic safety to develop this attitude and to emphasize its importance. For example, Dr. Elkow of the Department of Health and Physical Education, Brooklyn College, strongly recommends the following uses of psychophysical tests in driver-education classes:

1. As an illustration of individual differences with regard to psychophysical characteristics.
2. To disclose for the students' self-enlightenment personal deficiencies and weaknesses.
3. To make students aware of the need for correcting or compensating for these weaknesses.
4. To determine needed remedial training and corrective action.
5. To emphasize to the students the need for participating in "defensive driving"--by reason of the shortcomings of others.
6. To develop a good driving attitude.[1]

Driver tests, like intelligence tests, are of use in the hands of persons trained to appreciate fully their functions and limitations. By themselves, driver tests should never be employed to predict individual success or failure in avoiding future accidents. The reason for this isthat a driver's susceptibility to accidents depends not only on his knowledge and skill, but also on the manner in which he reacts to the total situation. This factor of safety-mindedness, or the proper attitude toward driving, is examined in the following section.

Attitudes of Young Drivers

The implications of good driver-attitudes.--It is generally agreed that faulty attitudes and unstable emotions are basic factors underlying many accidents. Dr. Stack, Director of the Center for Safety Education, New York University, states this viewpoint emphatically:

> Recent research studies on the driver have re-emphasized the importance of faulty attitudes as a major underlying cause of traffic accidents. While a knowledge of traffic regulations and sound driving practices are of value, and while driving skills help make for accident-free driving, there is general agreement that good

---

[1]J.D. Elkow, "Recent Developments in Psychophysical Testing," Safety Education Digest, p. 46. New York: Center for Safety Education, New York University, 1949.

> attitudes are even more important for safety. This is especially true of younger drivers who have not learned from experience the value of good attitudes. Our research studies have shown that one of the best ways to identify accident-free drivers and accident-repeaters is to check on their attitudes.[1]

While the psychological literature abounds with erudite definitions of "attitude" (Remmers points out that an attitude is "a more or less emotionalized tendency, organized through experience, to react positively or negatively to a psychological object."[2]), it appears to the writer that these classifications are more academic than functional, and serve best to point out differences in the thinking of persons who use them. Prescott defines, from an educational standpoint, three helpful bands in the aatitude spectrum: (1) those which are primarily bodily, (2) those which are affected primarily by experience, individual and group, and are determined much by the nature of the mores, customs, demands of the social group, and (3) those which grow out of a mental process of rationalization, organization and generalization.[3] It follows that the abilities of individuals to form these attitudes are a matter of individual differences--a difference of the power to utilize experiences and to deal with it.

It is the principal assumption of this section of the study that the school can arrange the scope of its program to allow for the sequential organization of these learning

---

[1]H.J. Stack, Improving the Attitudes of Younger Drivers, p. 3. New York: the Center for Safety Education, New York University, 1948.

[2]H.H. Remmers, N.L. Gage, Educational Measurement and Evaluation, p. 125. New York: Harper Brothers, 1943.

[3]D.A. Prescott, Emotion and the Educative Process, pp. 59-63. Washington, D.C.: American Council on Education, 1938.

experiences. For such an arrangement the problems may include caution, foresight (defensive driving), emotional stability, an understanding of the driver's inherent limitations, and consideration for the lives, property and comfort of the other road-users.

Attitude Tests.--Despite its admitted importance, few attempts have been made to devise tests to measure the safety-mindedness of motorists. Wechsler,[1] Siebrecht[2] and Conover[3] have developed paper-and-pencil scales which purport to give an estimate, in terms of a number of desirable criteria-responses, of a person's attitude to safe driving. Only one, however, has been fully developed in accordance with standard procedures of test-validation and standardization. This is the Siebrecht Attitude Scale,[4] the result of extensive research by Dr.Siebrecht at New York University.

The Siebrecht Attitude Scale.--Siebrecht validated the attitude scale by three criteria: (1) factors thought to be important in the driving of an automobile, and which were subjectively derived from the literature, (2) an evaluation of the relative importance of various factors by a jury of 25 Motor Vehicle Administrators, and (3) by the criterion of "widely

---

[1]D. Wechsler,"Tests for Taxicab Drivers," Personnel Journal, V (May-June, 1926), 24-30.

[2]E.B. Siebrecht, Measuring Driver Attitudes, pp. 1-29. New York: Center for Safety Education, New York University, 1941.

[3]D. Conover, "Development of Certain Techniques for the Measurement of Driver Attitudes." Unpublished Master's Thesis, Iowa State College, 1947.

[4]Appendix E.

spaced groups."

The jury's evaluation of desirable items to be included in the scale ranked the following factors: inspection of motor vehicles, speeding, drivers' examinations, passing on hills and curves, enforcement of traffic rules, effects of drinking alcohol, driving skill, physical condition of the driver, fatigue in driving, running traffic signals, hit-and-run drivers, courtesy to pedestrians, courtesy on the highway, the "road-hog", courtesy to traffic officers, driving as a privilege, sharing the road, fair play on the highway, ticket "fixing", age of driver, emotional stability, dimming lights, and fatalistic attitude.[1]

> Finally, the scale has been validated by the criterion of "widely-spaced groups". The final form of the scale was administered to 2,025 high-school students in representative schools throughout the United States. The school sampling included: Washington, D.C., New York City, New Jersey, Massachusetts, Connecticut, Pennsylvania, Illinois, Ohio, Louisiana, Missouri, Oklahoma, Minnesota, Michigan, North Dakota, California, and Washington State.[2]

In its final form, the scale consists of forty items each presenting a statement concerning some issue in traffic safety, such as, "People are as courteous 'behind-the-wheel' as they are at any other time."[3] The examinee is instructed to indicate his true personal feeling toward each issue by marking one of five degrees of agreement or disagreement. The statements which Siebrecht retained differentiated significantly between the mean scores of high- and low-scoring groups of his 2,025 student-sample:

---

[1]Siebrecht, op. cit., p. 9.

[2]Ibid., p. 15.

[3]Siebrecht Attitude Scale, item 32.

> ... a 20 per cent segment of the extreme was used. For none of the statements is the critical ratio of the difference between the means of the 20 per cent segments less than 3.00. The average ratio is 6.234.[1]

By the split-half method, a reliability coefficient of 0.81 has been secured by Siebrecht on a group of 100 students enrolled in the driver-training courses.

Scaling attitudes of the St. John's Technical High School sample.--The Siebrecht scale was administered to 61 student-drivers of St. John's Technical High School, Winnipeg. The standard procedures for administering the scale were carefully observed. Table 33 outlines the distribution of the scores, the average for the sample, and the variability of the scores. Table 34 shows Siebrecht's tentative norms for six classes of high-school students. Table 35 provides a statistical comparison between the writer's test-sample and the various student-groups sampled by Siebrecht.

Observations.--In general, the data show that the 61 students of St. John's Technical High School, despite the fact that all are licensed to operate motor vehicles, and possess an average driving experience of 3.75 years, score significantly poorer on the Siebrecht Attitude Scale than do the driver-training students or driving-experience students of Siebrecht's standard groups.

If the scale validly differentiates between groups presumed to possess a difference of attitude toward issues in safe driving, then the significantly poorer rating of the St. John's sample merits closer examination. An item-analysis

---

[1]Siebrecht, op. cit., p. 17.

TABLE 33

DISTRIBUTION OF SCORES ON SIEBRECHT ATTITUDE SCALE BY 61 STUDENT-DRIVERS OF ST. JOHN'S HIGH MARCH, 1950

Score	Mid-Point	f	D	fD	fD^2
188-192	190	1	8	8	64
183-187	185	0	7	0	0
178-182	180	0	6	0	0
173-177	175	5	5	25	125
168-172	170	7	4	28	112
163-167	165	6	3	18	54
158-162	160	8	2	16	32
153-157	155	5	1	5	5
148-152	150	13	0	0	0
143-147	145	3	-1	-3	3
138-142	140	8	-2	-16	32
133-137	135	2	-3	-6	18
128-132	130	2	-4	-8	32
123-127	125	1	-5	-5	25

N	61.00
Mean	155.09
Standard Deviation	13.40
Standard Error of the Mean	1.73

TABLE 34[a]

SIEBRECHT'S SAMPLE MEANS FOR STANDARDIZATION OF SCALE

Groups	Cases	Mean	σ (Sigma)	σ_M
Freshmen	192	144.10	17.54	1.27
Sophomores	472	151.05	17.36	.80
Juniors	360	155.81	18.44	...
Seniors	413	158.15	18.76	.92
Driver Training Students	430	164.53	13.77	.66
Driving Experience Students	158	168.20	12.84	1.02

[a]Source: Manual of Directions for Siebrecht Attitude Scale, p. 2. Op. cit..

TABLE 35

STATISTICAL COMPARISON OF MEAN SCORES OBTAINED ON SIEBRECHT ATTITUDE SCALE BETWEEN TEST AND STANDARD GROUPS

Comparative Groups	M_1-M_2	$\sigma(M_1-M_2)$	Critical Ratio
St. John's Students: Freshman.	10.99	2.15	5.11
St. John's Students: Sophomores.	4.04	1.90	2.12
St. John's Students: Seniors	3.06	1.96	1.56
St. John's Students: Driver-Training Students. .	9.44	1.85	5.09
St. John's Students: Driving-Experience Students	13.11	2.01	6.54

was carried out among those statements where at least 20 per cent of the total responses by the St. John's sample varied by three to four degrees from the most "desirable" attitude. These items are listed in Table 36 , on the following page, with the decisions of Siebrecht's panel of 125 traffic-safety authorities.

TABLE 36

ITEM ANALYSIS OF STUDENT RESPONSES ON SIEBRECHT ATTITUDE SCALE DIFFERING FROM MOST "DESIRABLE" ATTITUDE

Item Number	Per Cent of Total Responses	Jury's Standard Responses	Statement
1	39.3	Undecided	Drivers examinations should be more difficult, to eliminate all but the best drivers.
9	25.0	Undecided	Strict enforcement of traffic regulations is the only way to prevent accidents.
10	29.5	Disagree	Pedestrians should at all times be solely responsible for their own safety.
13	36.1	Agree	Most drivers lack the ability to control automobiles at high speeds.
17	37.7	Strongly Disagree	The driver of a car should decide when it is safe to pass on curves.
19	51.0	Disagree	A tired motorist should always drive slowly until the drowsiness leaves him.
20	27.9	Agree	The rudeness of traffic officers discourages courtesy on the part of the motorist.
22	36.1	Undecided	Examinations for drivers' licences should be required of all persons once a year.
30	34.4	Disagree	A driver really is the best judge of the speed he should be permitted to drive.
32	21.3	Disagree	People are as courteous "behind the wheel" as they are at any other time.
34	20.0	Strongly Disagree	No person should be denied the right to drive an automobile.
36	33.0	Disagree	Pedestrians should yield the right of way to motorists.
40	29.5	Disagree	Drivers with many years of experience should not be required to submit to re-examination in later years.

There are, of course, some major limitations which critically influence the value to be assigned any attitude-measurement results. Firstly, it may be assumed that in devising the scale, Siebrecht attempted to achieve "uni-dimensionality,"[1] that is, to select only items which are homogeneous in respect to the quality being measured. But as Conrad has pointed out:

> From the complex origins and complicated nature of many opinions and most attitudes, we should judge that strictly uni-dimensional scales in the realm of opinions and attitudes may be virtually impossible to construct--except possibly for issues which are indeed quite narrow and simple.[2]

Secondly, it is doubtful whether the students fully understood the terms and concepts implicit in the statements. And thirdly, there is no valid check that the students indicated only their true attitudes and not the ones they thought were expected or desired of them.

If these objections are over-looked, there still remains the question whether deficiencies in <u>knowledge</u> of safe driving practices may account for the wide variations from accepted standards of driving conduct. To test this theory, the writer ran a Pearson product-moment correlation for the scores the students obtained on both tests. The resulting coefficient of correlation was 0.173[3]--a strong indication that the two traits were not highly related.

---

[1]H.S. Conrad, "Some Principles of Attitude-Measurement: A Reply to 'Opinion-Attitude Methodology'," <u>Psychological Bulletin</u>, XLVI, 6 (November, 1946), pp. 570-589.

[2]<u>Ibid</u>., p. 571.

[3]Appendix E, Table 49.

Implications of the attitude-measurements.--The formation of value patterns which distinguish people is the result of not only what they know and can do, but also, in large part, the product of those attitudes and beliefs that produce satisfying adjustments. These attitudes, in turn, serve to guide the use to which understandings and skills may be put.

Professor Moran of the University of New York has investigated the basic philosophy of safety education through the principles laid down over two decades ago by its foremost advocate, Dr. Albert W. Whitney. Moran pointed out that Whitney was most anxious to identify the aims of safety education beyond and above the functional purpose of bearing effectively and immediately upon the practical problems and practical needs of safe living:

> ... Safety as he (Whitney) defined it is a condition; it is the condition, or the totality of conditions, that make two great fields of human endeavor possible, conservation and progress.
> ...
> One of the cornerstones of Albert Whitney's basic conservation-progress philosophy of safety education was the concept that the preservation of the social order needs not skill but insight, not technical knowledge but the right attitude toward life, ... it is an attitude of mind to be cultivated ... with implications reaching deep into the fields of personal, social, and ethical responsibilities.[1]

The results of the attitude-measurement of the student sample suggest but a few areas where there is need for more mature, more social outlooks. Improvement in driver attitudes through the offerings of the school curriculum is a difficult and complex undertaking, and appears to require an insight into what constitutes effective maturity.

---

[1]M.K. Moran, "Attitude Improvement Through Safety Instruction," Safety Education Digest, op. cit., p. 42.

Prescott has suggested that the basic problem educators must face before they can hope to achieve a dynamic relationship between the attitudes ("quasi-needs") of the individual and the immediate situations in which he finds himself, is:

> ... to gain insight into what constitutes effective maturity, ... to learn what behavior will satisfy needs in the culture in which the individual lives, while it takes all aspects of reality into consideration. The problem ... is to find what experiences will give developing young people the attitudes and ruling value concepts that can be the basis for valid choices of behavior patterns in the situations which they will meet.[1]

The attitude-measurement investigations constituted the third type of indirect examination used by the writer to study personal characteristics among his experimental student-group. To complete his survey, a selected number of the students were tested in the actual operation of an automobile over a standard fifteen-mile route.

Driving Skills of Youthful Operators

Rating driver performance.--The actual driving test has four purposes: (1) to measure the driver's ability to operate a car in traffic, (2) to determine through subjective evaluation of certain actions the driver's attitude to other road-users, (3) to determine areas of needed remedial instruction, and (4) to detect unsafe driving habits.

The road test requires each of the drivers of any sample to operate a motor vehicle--preferably over a standard course--under the observation of a trained examiner who rates his performance. This is essentially a special instance of the "work sampling" method. A number of prominent research

---

[1]Prescott, op. cit., p. 94.

authorities have questioned the validity of this direct form of the driver examination method. Three such criticisms are quoted below:

> ... It (the road test) suffers from the fact that the sample is not merely small, but is also obtained under conditions that may call into play some unusual attitudes and intentions of the driver. Moreover, it suffers from the fact that it is impractical to create actual emergencies, which would demand that the driver use his utmost skill, or else wreck the test-car and in so doing expose himself and others to special bodily hazard.[1]

> ... They (driver road tests) test driver performance only at the time of the test, not his potential ability. They do not measure the operator in complex traffic conditions or dangerous road situations. They make no allowance for the personal bias of the examiner nor for the emotional state of the examinee, who is "alerted" and perhaps excited and who may not perform in a normal manner.[2]

> ... The easiest and most reliable test of the manifest extent of ability to handle a car is an examination of complex behavioral units such as gear shifting, or stopping on a hill, which the average person cannot carry out properly without adequate preliminary practice. The road test, therefore, emphasizes experience in contra-distinction to overall potential ability. It is primarily an indicator of extent of experience, not of native ability or of accident-proneness.[3]

The writer was conscious of these limitations when establishing his road-test procedure. In order to minimize these defects of adequacy and selectivity, considerable care was exercised in the selection of the test form, the examiners, the test cars, and the route. A discussion of these factors follows.

The test form.--Professor Neyhart's Road Test in Traffic[4] was

---

[1]Johnson, op. cit., p. 489.

[2]Kramer, op. cit., p. 116.

[3]DeSilva, op. cit., p. 58.

[4]Appendix F.

chosen to measure the driving ability of 19 of the writer's student-driver sample. The test involves checking the undesirable practices performed by the driver on a tally sheet which details 115 driving situations. For example:

XII. UNCONTROLLED INTERSECTIONS OR THROUGH STREETS

	Deduct	
A. Fails to come to full stop . .	10..	( ) ( ) ( )
B. Fails to stop in a position to see roadway to right and left	5..	( ) ( ) ( )
C. Hesitates too long for conditions	3..	( ) ( ) ( ) [1]

Neyhart's test has been validated and standardized by five criteria: (1) listing common unsafe driving practices thought undesirable by a panel of driving experts, (2) expanding these general practices into specific factors, (3) weighing these factors on the basis of their contributory influence to various types of accidents, and also on the judgment of "12 motor vehicle fleet supervisors who control from 5 to 4,500 pieces of equipment,"[2] (4) selecting a standard route of 7.6 miles, in which each situation listed on the scale appeared at least five times, (5) testing several thousand drivers over this route from which the following norms were developed: excellent drivers (7 per cent) 0-69, good drivers (24 per cent) 70-149, average drivers (38 per cent) 150-229, poor drivers (24 per cent) 230-349, very poor drivers (7 per cent) 350 or above.[3]

---

[1] Ibid..

[2] Driver Selection and Training, p. 40. A Manual for Truck Operators Prepared by Dr. R.N. Murry and Professor A.E. Neyhart. Cleveland: The White Motor Company, 1946.

[3] Ibid..

Road test procedures.--Johnson's previously mentioned criticism of the small performance sample led to the selection of a standard course 16.6 miles long. The average time required to travel this course was one hour and five minutes. Figure 8 traces the test-route through the streets of the city of Winnipeg.

In order to reduce the influence of personal bias in rating test performance, two estimates were made of the student-examinee's undesirable driving actions: (1) a professional driving school instructor of the Joe Vine Driving School checked the items on the Neyhart scale, (2) the writer kept an independent score. In observing the test-student's actions, the driving school instructor occupied the seat next to the driver; the writer occupied the back seat. At the conclusion of the test the two scores were compared in detail and any inconsistencies were reconciled before tabulations were entered.

To make it feasible to test the student's ability in complex traffic conditions and dangerous road situations, two measures were adopted. First, the test course traversed the most heavily travelled streets of the Winnipeg down-town area during the peak period--4.15 p.m. to 5.20 p.m.. Secondly, the test cars were fully equipped with dual controls, thus making it possible to permit the fullest development of actual emergencies short of contact with other road users.

In order to reduce the influence of any unusual emotional sets, each student was allowed to practise for five blocks. During this practice period the student was aware that no recorded observations were being made. Also, the following instructions were read to the test-driver at the

DRIVING TEST ROUTE

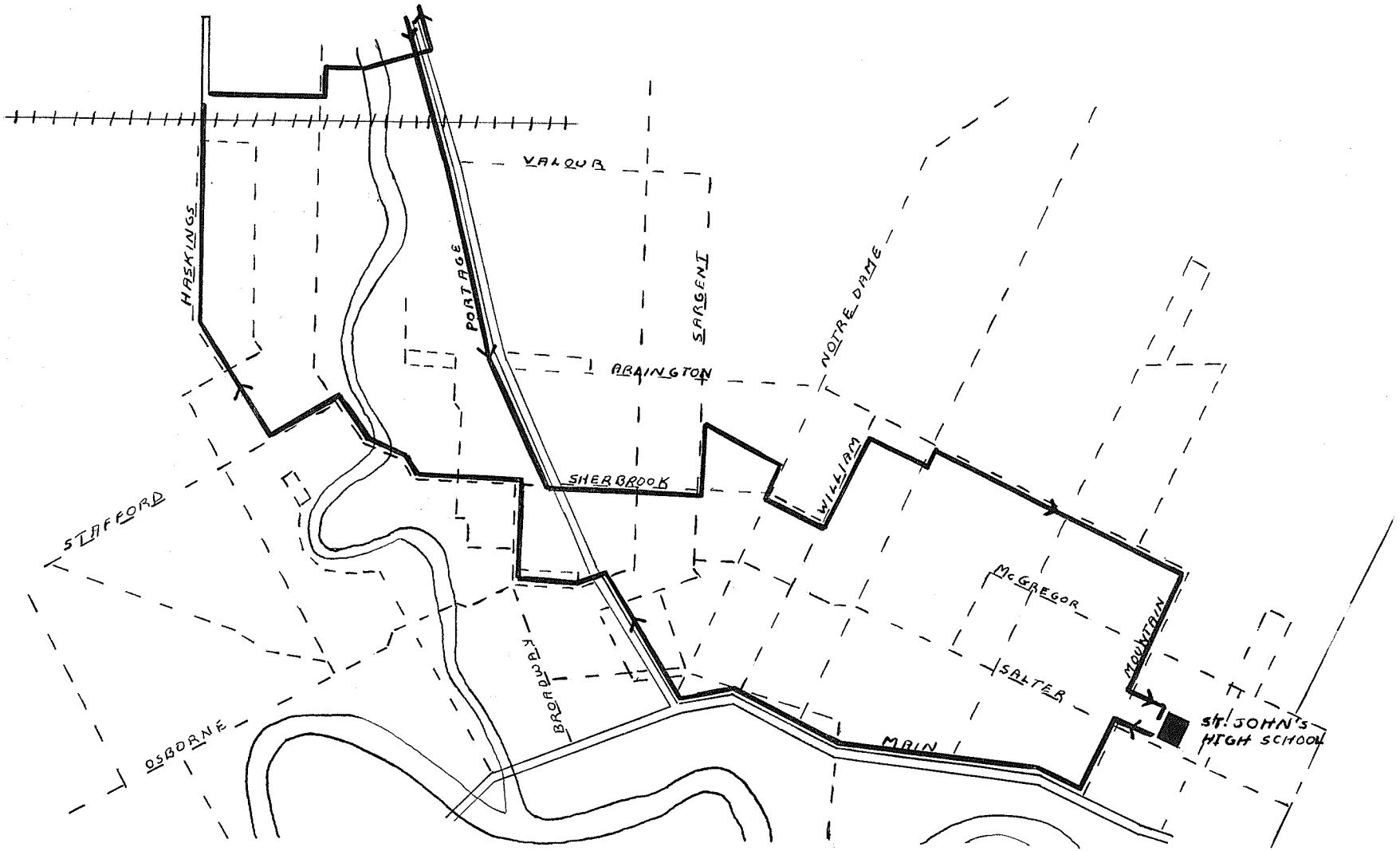


Figure 8.--Map of Winnipeg, Manitoba showing route of 16-mile road test travelled by 18 St. John's students during March, 1950; starting time 4:15 p.m.

start of the examination:

> You are about to be given a road test. Although this test will not last much longer than one hour, you are to assume that you are going on a 300-mile trip, part of which will be made at night. You are to enumerate the items that should be checked before making such a trip.
>
> You will drive over a course several miles long. During this test your driving practices will be checked and scored.
>
> You will be advised well in advance as to any changes in directions. Just drive as you believe a good driver should drive. You will not be asked to do anything in violation of Provincial or city traffic laws. There will be no trick directions. If you do not understand any directions during the test, ask to have them repeated.
>
> Is this clear? If so, you may start when ready.

Road-test results of the St. John's Technical High School sample.--A selected sample of twenty students were chosen for road tests. The basis of selection was the Siebrecht Attitude Scale rankings of the 61 licensed students who had answered the form. Five students were chosen at random from each of the four quartiles. Of the twenty selected, eighteen students took the test.

Table 37 shows the distribution of scores. It may be pointed out that the scores represent demerit marks and, therefore, in presenting the distribution, the normal practice of listing the highest score-intervals first has been reversed.

Table 38 distributes the student scores according to norms provided by Professor Neyhart. Further comparisons were obviated by the writer's inability to obtain the number and the variability of Neyhart's standard sample.

Table 39 ranks the road-tested sample and includes respective ranks obtained on the attitude and knowledge tests.

Table 41 provides an item-analysis of the twenty unsafe driving practices most frequently violated by the test group.

TABLE 37

DISTRIBUTION OF ROAD-TEST SCORES AMONG 18 HIGH-SCHOOL STUDENTS LICENSED TO OPERATE AUTOMOBILES

Interval	Mid-Point	f	D	fD	fD^2
180-151	165	1	-6	-6	36
210-181	195	1	-5	-5	25
240-211	225	1	-4	-4	16
270-241	255	3	-3	-9	27
300-271	285	3	-2	-6	12
330-301	315	1	-1	-1	1
360-331	345	2	0	0	0
390-361	375	1	1	1	1
420-391	405	1	2	2	4
450-421	435	0	3	0	0
480-451	465	0	4	0	0
510-481	495	0	5	0	0
540-511	525	1	6	6	36
570-541	555	0	7	0	0
600-571	585	1	8	8	64
630-601	615	2	9	18	162

Mean = 351.6 Standard Deviation = 138.1
σM = 33.6

TABLE 38

COMPARISON OF STUDENT SCORES WITH STANDARD NORMS DEVELOPED BY NEYHART BY "TESTING OVER 1,000 DRIVERS BOTH GOOD AND BAD"[a]

Neyhart's Standardization Sample		High-School Student Sample	
Per Cent Standard-Sample Distribution	Standard Norms	Frequency Student-Sample Distribution	Per Cent Student-Sample Distribution
7	0-104	0	0
24	105-224	2	11.1
38	225-344	10	55.5
24	345-524	3	16.7
7	525-	3	16.7

Mean = 294 σM = 3.9 Standard Deviation = 125
Critical Ratio of Students : Standard Group = 1.7

[a] Driver Selection and Training, p. 40. Op. cit..

TABLE 39

RANK-ORDER DISTRIBUTION OF 18 STUDENT DRIVERS BY SCORES MADE ON ROAD TEST, ON ATTITUDE TEST AND ON KNOWLEDGE TEST

Student	Road Test		Knowledge Test		Attitude Scale	
	Raw Score	Rank (N=18)	Raw Score	Rank (N=61)	Raw Score	Rank (N=61)
F-5	-163	1	42	3	157	28
D-6	-203	2	38	17	158	26
C-1	-237	3	39	13	136	57
D-2	-247	4	27	59	142	49
B-4	-258	5	38	17	171	10
E-5	-263	6	31	54	150	36
J-3	-271	7	43	2	166	14
A-6	-271	7	38	17	177	2
G-6	-289	9	38	17	151	34
F-7	-320	10	33	47	160	21
F-4	-331	11	35	35	190	1
E-6	-344	12	42	3	132	59
H-2	-383	13	37	23	160	21
B-3	-405	14	36	26	139	55
F-2	-513	15	41	6	147	46
K-2	-582	16	36	26	175	4
C-6	-613	17	39	13	125	61
E-2	-607[a]	18	32	48	172	7

[a]Test discontinued.

TABLE 40

CORRELATIONS: KNOWLEDGE TEST, ATTITUDE SCALE AND ROAD TEST

	N	Knowledge Test			Attitude Scale		
		ρ[a]	r	σr	ρ[a]	r	σr
Road Test..	18	.156	.164[b]	.23	-.108	-.114[b]	.23
Knowledge Test...	61	....	....	...	....	.173[c]	.12

[a]Spearman's rank correlation.

[b]Pearson's formula for translating ρ to r.

[c]Pearson's product-moment correlation--see Appendix E.

Observations.--In order to interpret the data arising out of the road-test tabulations, it should be stated that no Province-supervised scheme of licence examinations existed at the time the student driver-testing program was being administered. In the absence of any selection agency, it is not inconceivable that persons possessing as widely divergent abilities as indicated by the variability of scores in Table 37 should be "qualified" as licensed drivers.

While Neyhart did not publish his standardization data, it was possible to estimate the mean and standard deviation from his normal per cent distribution (43 per cent of the area from the mean ordinate represents 189 score-units or 1.5 σ's). The difference of the means is only significant at the 9 per cent level of confidence. This means that differences in average driving ability as shown in Table 38 between the student- and standard-groups could well be accounted for by errors in random sampling. Subsequent investigations by the writer into larger samples of driver-ability scores obtained by students on comparable road tests at the Manitoba Safety Division (Table 42) gave no indication, however, that the St. John's Technical High School student -group sampling was skewed toward the poorer driver-ability limits.

Table 39 and Table 40 seem to provide convincing evidence that no significant relationship can be deduced between driving ability and attitude; driving ability and knowledge; and knowledge and attitude. If this generalization is valid, the importance of these three factors in highway accident prevention would suggest that the secondary school, in providing driver education, should not neglect to emphasize separate

learning experiences for all three problems.

What are the specific driving needs of the student automobile operators? Table 41 ranks the undesirable driving actions detected on the road test by frequency-weight indices. For example, 8 of the 18 students drove "too fast for conditions"--a factor which is most heavily weighted of the test, 10 demerit marks. Thus, the frequency-weight index is:

$$\text{Index} = \frac{(\text{Frequency})(\text{Weight})}{\text{Population}}$$

The weights, it will be recalled, were assigned to various items in the road test according to their relative influence to accident susceptibility. Multiple violations by a testee of any single action contribute only one to the group frequency.

TABLE 41

ITEM ANALYSIS OF VIOLATIONS COMMITTED ON ROAD TEST BY 18 STUDENT DRIVERS

Frequency-Weight Index	Violations of Safe-Driving Practices Involving over 50% of Student Sample
10.0	Fails to anticipate or respond to hazardous traffic conditions in the making (including pedestrians).
8.3	Fails to use rear-view mirror.
7.7	Inattentive (day-dreams, etc.).
6.1	Fails to make sure road ahead and behind is clear when passing other vehicles going in the same direction.
5.5	Fails to come to full stop at "STOP" streets.
5.0	Overconfident.
4.7	Straddles traffic lanes (marked or unmarked).

(pfd.)

TABLE 41--Continued

Frequency-Weight Index	Violations of Safe-Driving Practices Involving over 50% of Student Sample
4.5	Speed too fast for conditions (exclusive of turns)
4.5	Does not use turn signals when moving from lane to lane.
4.2	Straddles at signal or sign when stopping.
4.2	Fails to yield right of way at uncontrolled intersections or through streets.
3.9	Fails to respond to hazardous traffic conditions at uncontrolled intersections and through streets.
3.6	Fails to drive in proper lane (exclusive of turns)
3.3	Signaling failures--leaving curb, fails to look back.
3.3	Passes other vehicles going in same direction at intersections.
3.1	Fails to check traffic conditions when starting.
3.0	Fails to co-ordinate clutch, gear shift and accelerator.
2.8	In improper lane during left turn.
2.7	In excess of marked speed limits.
2.7	Stalls the engine.
2.7	Steers abruptly, not smoothly.
2.2	Railroad Crossing: Fails to shift to lower gear when necessary and remain in that gear until clear of tracks.
1.9	Drives too close to other vehicles, moving objects, etc.
1.7	Fails to observe indications that parked vehicle may start from curb.

Table 41 takes on particular significance when its distribution of the major driving faults are compared to those violations committed by youthful drivers involved in injury accidents (Table 21). First, "speed too fast for conditions" and "failure to anticipate hazardous conditions" rank high on both the road test and accident record. Secondly, with two exceptions--"ability impaired by alcohol" and "failedto dim lights"--every cause of injury accidents recorded in Table 21 was duplicated among the major errors on the road-test results.

Driving ability among various groups of motor-vehicle operators.--The significantly higher scores made by licensed student drivers on the knowledge tests when compared to non-licensed students (Table 23) raises the question: Could the secondary school, if it chose to provide driver education, omit expensive driver-training experiences in the belief that this ability can quickly be developed through unguided practice?

A partial answer seems to be evident in the results of road-testing activities which were obtained by the Manitoba Safety Division's Driver Improvement Clinic during 1951. That year, 12,986 driver tests were administered to applicants for licences. Of the 51.9 per cent failing to meet the standards on the first test, less than one-third of the rejections were due to knowledge-test failure or vision screening. Furthermore, 473 applicants required three road tests, 66 four road tests, and 12 five road tests, before they were successful candidates for licences.

Table 42 is derived from the files of a random

sampling of 1,376 driver-licence applicants who successfully completed the Safety Division's road test after one or more trials. The test form[1] is essentially similar to Neyhart's, but the course is shortened to a standard 14-block route--including some of the most densely travelled streets in down-town Winnipeg.

The test data are examined from three points of view: (1) age groups, (2) former driving status, and (3) occupation. It can readily be seen that only one of the nineteen categories shows any significant superiority. This category is the "military"; a group who are often subject to special training in the safe operation of motor vehicles. Therefore, on the basis of the information secured from road tests, there is little reason to expect that occupational training in other than driving skills, or years of driving experience will, in themselves develop in the individual the ability to operate an automobile safely and efficiently.

Measurement and evaluation.--To this point in the present section of the study, the writer has presented considerable quantitative data related to the incidence of accidents among youthful drivers, and to personal factors which may contribute to accident susceptibility. It is not easy, however, to evaluate the results of these measurement techniques, for the term "evaluation" implies a process by which the values of some enterprise can be ascertained. While direct and indirect types of driver examinations have generally been proven valueless as primary indicators of accident liability, even their

---

[1]Appendix F.

TABLE 42

FAILURE RATES OF SAMPLE GROUPS OF DRIVER-LICENCE APPLICANTS ON MANITOBA SAFETY DIVISION'S ROAD TESTS DURING 1951

Age Groups	N	Failure on First Road Test	Per Cent Failed
16-19	214	96	45
20-24	244	108	44
25-34	455	172	38
35-44	262	105	40
45-54	127	56	44
55-64	74	47	63
Total	1376	584	

Driver Status	N	Failure on First Road Test	Per Cent Failed
Former Driver	556	207	37
New Driver	455	243	53
Out of Prov.[a]	252	77	31
Re-Certification[b]	113	57	50
Total	1376	584	

Occupation	N	Failure on First Road Test	Per Cent Failed
Professional	50	23	46
Farmer	14	9	64
Clerical	86	39	45
Trav. Salesmen	55	27	49
Commercial	58	20	34
Military	56	7	12
Students	126	55	44
House-Wives	108	50	46
Other Workers	823	354	44
Total	1376	584	

[a]Licensed in other jurisdictions.

[b]Temporarily suspended for violations of Highway Traffic Act.

usefulness as diagnostic and remedial instruments seems to be contingent upon a fuller understanding of the individual's personal history. Johnson cites the following example:

> ... it has been readily and certainly established that the operator's religion, the type and degree of his education, his major interests in school, his previous occupations, his age, the reasons which he mentions for desiring to be trained for the new occupation, and the like, are conjointly associated with the probability of his success in training for the vocation.[1]

Now, it is far beyond the purposes of this study to attempt to devise an adequate method for combining such items of information that would establish prediction-criteria for accident-proneness. However, in view of the many conflicting "values" that driver education texts ascribe to measurement techniques, it is of paramount importance that casual and causal relationships be carefully differentiated:

> ... No more serious blunder in the interpretation of correlation coefficients can be made than that of assuming that the correlation between two traits is a measure of the extent to which an individual's status in one trait is caused by or due to his status in the other.[2]

In the following section a synoptic biography of 28 youthful Manitoba drivers is presented. These drivers were selected at random from the 16-24 age category of the 254 Greater Winnipeg drivers whose accident- and violation-record during March to December, 1951, necessitated the temporary suspension of driving privileges.

Biographies of Youthful Manitoba Accident-Repeaters

Source of the data.--In March of 1951, the Manitoba Safety Division put into operation its Safety-Point Plan--an

---

[1]Johnson, op. cit., p. 499.

[2]Lindquist, op. cit., p. 203.

adaptation of the Connecticut Point System. Saturday Night concisely explained the Manitoba program as follows:

> ... tab is kept on the driving habits of all drivers. When a driver is involved in an accident or is convicted of a traffic offence or driving error, points are scored against him. When he accumulates six points, he is invited to attend the Driver Improvement Clinic. When he has eight points, he must attend the Clinic and take take tests (and be interviewed). If he passes the tests, he is given a probationary licence, unless he demonstrates by his attitude that a period of suspension is necessary. If he still persists in wrong driving practices, his driving privileges are suspended for a period, the length of time depending upon the circumstances.[1]

Of the 17,050 Manitoba drivers who had at least one point scored against their permanent record during March to December of 1951, 241, all from the Greater Winnipeg area, were called in for review because of multiple traffic violations and accidents. Table 43 shows the distribution of the re-certified accident repeaters by age groups.

TABLE 43

RECERTIFIED "REPEATERS" BY AGE GROUPS
MANITOBA, MARCH TO DECEMBER, 1951

Age Groups	% Driver Population	Re-Certified Accident Repeaters N	%	Re-Certified "Repeaters" Re-Suspended N	%
16-19	6.5	7	3.5	2	5.1
20-24	12.8	46	22.8	7	17.9
25-34	27.2	71	35.2	11	28.2
35-44	24.0	42	20.8	9	23.0
45-54	15.1	22	10.9	7	17.9
55-64	9.8	10	4.9	1	2.6
65-74	4.1	4	1.9	2	5.1
75-	0.5	0	0.0	0	0.0
Total		202		39	

[1] L.D. Millar, "Manitoba Cuts Accidents," Saturday Night, LXVII, 23 (March, 1952), p. 25.

Two salient trends are suggested by these data. First, drivers under 25 years of age are most frequently called into the Clinic for review. Secondly, only 16 per cent of the 241 "recertifications" have subsequently become involved in traffic violations. This latter observation, relating to the success of the Clinic, is more clearly shown in Table 44. Among the 28 worst offenders a total of 97 accidents and convictions had been accumulated during the first seven months the Safety-Point Plan was in operation. In that time, each operator averaged one accident or conviction every 1.2 months. The accident-free period after exposure to the Clinic's examinations and counselling averaged 3.9 months.

Of course, the period of observation has been very short, but if these dramatic instances are not artifacts, nor attributable primarily to regression or centripetal drift, the value of clinically-based counselling seems to merit more intensive research. However, it must be recognized that the regrettable feature of this entire approach is its orientation in individual accident-histories <u>where a critically high involvement rate has already been established</u>.

When considered conjointly, three factors in the accident-histories of these young drivers suggest the need for guidance in safe driving. These factors are: (1) that the overwhelming majority were taught to drive by non-educational agencies, (2) that in 61 per cent of the first road tests, failure to pass the Safety Division standards indicated a serious lack in the quality of the training, and (3) despite this apparent deficiency in their ability to operate a motor vehicle safely, 58 per cent of the "repeaters" <u>must</u> drive to

TABLE 44

SUMMARY OF BIOGRAPHICAL DATA RELATING TO 28 OF MANITOBA'S MOST SERIOUS CONVICTION- AND ACCIDENT-REPEATERS

Occupation	
Professional and semi-professional drivers	10
Travelling salesmen	6
Trades, services, utilities	8
Farmers	3
Students	1
Marital Status	
Married	9
Single	17
Separated	2
Average Education	
Highest school grade completed	10.2
Average Age	
(Groups were restricted to "repeaters" 16-24 years of age)	21.8
Learning Method	
By friend, member of the family, or self-taught	27
Military	1
Professional driving school	0
Licence Previously Suspended	0
Driving Experience	
Average number of years	5.2
Miles Driven in Previous 12 Months Period	
In city	3,000
Highest single estimate	10,000
In country	8,000
Highest single estimate	32,000
Psychophysical Characteristics	
Visual Acuity in Both Eyes (AO Sight-Screener)	
20/30 or better	28
Side Vision	
190 degrees or more	28
Stereopsis (Shepard-Fry scale)	
90 per cent plus	11
75 per cent and minus	17

TABLE 44--Continued

Foot-Reaction Time	
0.50 seconds or faster	6
0.51 seconds or slower	22
Dark Adaptation (Feldman Adaptometer)	
50 seconds or faster	18
51 seconds or slower	10
Road Test	
Passed first road test	11
Failed first road test only	12
Failed second road test	3
Failed third road test	2
Accidents and Convictions (recorded between March-Dec., 1951)	
Accidents	41
Convictions (with no accident--violation of H.T.A.)	56
Total	97
Accidents with convictions	29
Accidents	
Fatal	1
Non-Fatal (one or more persons injured)	16
Property Damage	24
Convictions	
Total (including convictions with accidents)	85
Types of Convictions	
Driving to the common danger (42-1 H.T.A.)	57
Following too closely (57 H.T.A.)	11
Failed to regard "Stop" streets (51-4 H.T.A.)	10
Hit-and-run (128 F H.T.A.)	3
Drinking (285-4 and 285-4A Criminal Code)	1
Reckless driving (285-6 C.C.C.)	1
Doing grievous harm (247-48-84 C.C.C.)	1
Other	1
Record at the Manitoba Driver Improvement Clinic	
Average "Safety-Point" score	10.1
Number of accidents or convictions	97
Number of months per violation per operator	1.2
Average number of months free from violations after Clinic interview (March, 1951- March,'52)	3.9

pursue their respective vocations. Group these factors with the fact that the majority of the "repeaters" have completed secondary education, and the formula indicates a more active participation by the high school in providing driver education.

Summary of the Experimental Findings

The central problem under investigation in the foregoing sections was to establish, on the merits of objective, quantitative data, whether youthful operators of motor vehicles are involved in a disproportionately high number of highway accidents. Secondary problems which were suggested by the primary materials included: (1) the factor of "blame" in accidents, (2) the cost of accidents to the community, and (3) differences in personal characteristics among sample groups of student drivers and among a group of 28 youthful Manitoba accident-repeaters.

The findings are briefly summarized as follows:

1. Youthful Manitoba drivers reveal a susceptibility to serious injury accidents 1.7 times the rate for the whole driver population. These drivers who are between 16 and 24 years of age possess a mean fatal accident-involvement rate 3.5 times the age group of 45 to 54 years.
2. During 1951, the cost to the community of road accidents involving Manitoba drivers in the age group of 16 to 24 years was approximately $5,500,000 at the price and income levels then prevailing.
3. While it is recognized that the true "cause" of an accident is often to be found in a combination of circumstances, the writer considered, for practical purposes,

driver violations of the Provincial highway code as the exciting cause. By this definition it was found that approximately three-quarters of the drivers under the age of 25 were partially or totally blameworthy for the injury accidents in which they were involved.

The research resources of the Manitoba Safety Division --driver-examination files and permanent driver-records--were combined with a high-school testing program to investigate differences in four basic factors which were assumed important to safe driving. These factors were: knowledge of road rules and driving practices, psychophysical capacities, attitude to driving, and actual driving manoeuvres. The data examined suggest the following observations:

1. The biographical study indicates a close relationship between accidents and violations. A cumulative record of both, combined with a detailed personal history of each operator provides the best estimate of the driving practices of the licensed operator.
2. High-school students, holding current Manitoba drivers' licences, are not as well informed regarding safe driving practices and regulations as are American student groups who have received driver education. Knowledge scores made by licensed Winnipeg high-school students were significantly poorer than the score-results made by the Michigan high accident-frequency group. The Winnipeg licensed students, however, scored significantly higher on the knowledge test than their non-licensed fellow-students.
3. No significantly strong differences appear among the student test-groups with regard to visual acuity, visual

fields, depth perception, simple reaction time and color vision. Nevertheless, expert opinion seems to regard psychophysical examinations as useful psychological hurdles, and as valid instruments for diagnostic and remedial purposes.

4. The attitudes toward certain aspects of driving are significantly poorer among the Winnipeg licensed high-school students when compared to like measurements obtained on high-school groups receiving driver education.
5. No statistical significance can be attributed to the mean differences of scores made on the standard driving test by the student drivers and Neyhart's standardization group. In general, the results of the Safety Division's testing program reveal no significant differences between driving-test analyses on the basis of age, occupation or driving experience. One factor alone seems to distinguish better driving proficiency--the training received by military personnel.
6. Manitoba accident repeaters in the age group of 16-24 reveal: (1) significant deficiencies in driving ability, (2) no previous training in driver education, and (3) occupations requiring high exposure to driving hazards.

On the basis of experimental findings and statistical analyses it seems apparent that young drivers possess a high accident potential. Not only are they involved in more accidents per licensed operator, but the total picture suggests that when a youthful driver is involved, the accident is more likely to result in death or personal injury. Some young

drivers violate traffic rules and good driving practices because they are ignorant of the law or have had insufficient training to become skilful operators. Other youth, who are neither ignorant of the traffic code nor physically defective repeatedly become involved in highway accidents because they are not sufficiently concerned to avoid them. Their improper attitude is demonstrated by their taking unnecessary chances and wilfully ignoring the rights of other road users.

It seems improbable that educational efforts of non-school agencies can meet the accident-prevention needs of youth to solve the problem thus analyzed in its component parts. Certainly the elementary school is not the appropriate institution to handle the traffic safety problems peculiar to the period of adolescence and particularly the problem of training youth to become safe operators of motor vehicles. These problems, involving the acquisition of knowledge, understandings, habits, skills, ideals, and attitudes too advanced for the elementary school level, seem to beg inclusion in the secondary school curriculum. Before this assumption is examined, however, an investigation should be carried out to ascertain the present status of driver education in the high schools of the United States and Canada.

CHAPTER IV

THE NORMATIVE STATUS OF DRIVER EDUCATION IN THE HIGH SCHOOLS OF UNITED STATES AND CANADA

Introduction.--More recently, less universally, less enthusiastically, and therefore less successfully, the high schools of America have yielded to the demand that they extend the safety teachings of the elementary school to their own curriculum. Until 1946, the year when driver education was given its greatest impetus by the emphasis placed upon it at the President's Highway Safety Conference, the efforts of the secondary school had lagged considerably behind those of the elementary school, both as to the adoption of any safety program at all and as to the effectiveness of the program belatedly presented. School administrators in Canada and the United States have displayed truly remarkable unanimity of thought in claiming an already over-crowded schedule, and in being loath to eliminate any part of the traditional curriculum to make room for the new need.

A discussion on high school driver education held during 1949 at the University of Toronto, brought forth arguments similar to those advanced by American school administrators [1] during the late nineteen-thirties. L. S. Beattie of the Ontario Department of Education expressed the following views:

---

[1] H. R. DeSilva, Why We Have Automobile Accidents, p. 285. New York: John Wiley and Sons, 1942.

> It would be useless at the present to expect to place Driver Education and Training on the curriculum as a regular part of the course of study. The curriculum is at present over-crowded. Many subjects are competing for a place on the curriculum. Certain subjects presently included are not proving their worth, for example, the Citizenship Course. There is at present so much curriculum content to be covered that lengthening the school day is under consideration. A subject which might not necessarily apply to all would have scant likelihood of being considered.
>
> Under present regulations it would not be possible for the principal of a school in a community interested in Driver Education and Training to divert part of the school grant supplied by the Province to this purpose. The present high cost of education forces Boards of Education across the Province to operate at top limit of their educational grants so that it would be practically impossible to obtain funds to use for this purpose. [1]

The writer has already presented factual data relating to the ever-increasing tempo of motor-vehicle usage--from 110,000 drivers and 90,000 vehicles to 180,000 vehicles and 218,000 drivers in the decade 1941-51--and upon these facts the prediction can be made that one out of every two students now enrolled in Manitoba junior high schools will be driving a car by the time he graduates from the senior level. The statistical materials which estimated the exorbitant loss to the community of accidents involving youth, and the experimental evidence which indicated the poor quality of safe-driving knowledge and ability among student drivers, both seem to refute the applicability of Beattie's arguments insofar as the needs of Manitoba youth are concerned. When it is recalled that Ontario experienced, in 1950, a total of 43,681 traffic accidents which killed 791 persons and injured an

---

[1] L. S. Beattie, "A Discussion of High School Driver Education and Training." Toronto: Division of Public Safety, University of Toronto, 1949, (mimeo).

additional 19,940 persons,[1] it seems that a priori reasoning has been the basis for advocating the exclusion of driver education on the grounds of cost expediency and restricted applicability.

Nevertheless, these viewpoints, by their prevalency even among authoritative positions in the school structure, are symptomatic of a general dissatisfaction with the offerings of the high school and cannot be ignored. The responsibility thrown upon anyone who seeks to revise the secondary school curriculum is enormous, for not only must he direct the reconstruction of society's basic instrument for developing youth, but he must contend with the apathy, and antipathy, of groups of teachers and citizens who may not want any changes in their school program.

The introduction of high school driver education without reference to the fundamental philosophical, psychological and social determinants of the modern school curriculum may prove of little value. Even after the objectives have been reconciled with the stated aims of the school and have been identified with the basic needs of youth in the community, there still remains the problem of orienting driver education in some area of the school program. This problem is unique in every secondary school organization:

> Neither the subjects of the curriculum, nor the time spent on each, nor the way they are to be taught is laid down by the Ministry of Education. Education in this country is a partnership between the Ministry, the local education authorities, . . . and the teachers. The headmaster . . . is responsible for framing the curriculum

---

[1] The Motor Vehicle 1950, p. 35. Compiled by the Public Finance and Transportation Division, Dominion Bureau of Statistics. Ottawa: King's Printer, 1951.

> and drawing the syllabus of his school. He may get advice and guidance possibly criticism-- from His Majesty's Inspectors, but never direction.[1]

In following chapters of this study, however, methods for introducing driver education into the curriculum and proposals for dealing with certain administrative problems have been suggested. These have been culled from the published experiences of safety-education specialists and the recommendations of national committees working in the field. Consideration has also been given to the following questions: (1) Is driver education in harmony with the purposes and functions of the secondary school? (2) Does driver education reduce highway-accident involvements of youthful operators?

In order to examine these problems in proper perspective, the writer has traced briefly the development of the driver-education movement and the extent to which this new curriculum offering has been adopted in the United States and Canada.

Driver education in the United States.--Driver education as it exists in American high schools today may be said to have originated in the pioneer efforts of Professor Amos E. Neyhart. In 1931, Neyhart organized experimental courses in high school driver training, and evaluated the results after three years. His findings indicated: (1) that the influence of the teacher is highly noticeable in the learner's experience; (2) the best teachers for driving instruction were those familiar with highway regulations, themselves cautious and careful, and having a no-accident record; (3) students taught using a step by step

---

[1]The New Secondary Education, p. 34. British Ministry of Education. London: His Majesty's Stationery Office, 1947.

method with explanation of mechanisms had fewer accidents; and (4) learners in non-accident groups had taken more lessons than learners in accident groups.[1]

From this modest start the growth of driver education has been remarkable. One outcome of the recommendation of the President's Highway Safety Conference--"Provide driver education as an integral part of the curriculum when students are near driving age"[2]--has been the annual Driver Education Award project. From the data accumulated in these competitions it has been possible to deduce the progress of secondary school driver education in quantitative terms. Tables 45 and 46 indicate the growth for the school years 1948-50. A number of pertinent trends are evident in these materials:

1. Slightly over 33 per cent of the nearly one and three-quarter million eligible students were enrolled in some type of driver-education program.
2. Less than half of the students enrolled received, in 1950, both classroom and driving instruction.
3. The number of high schools providing driver education have more than doubled in the years 1948-50.
4. . . . Another significant disclosure . . . answers a question frequently voiced by opponents of the driver education program--does anyone ever fail to pass the course? Thirty-three states reported the number of failures--a total of 18,812. This figure is a real

---

[1]A. E. Neyhart, "The Relation of the Training and Other Characteristics of Automobile Drivers to Their Proneness to Accident." Unpublished Master's thesis, Department of Science, Pennsylvania State College, 1934.

[2]Report of the Committee on Education, p. 14. The President's Highway Safety Conference. Washington: Government Printing Office, 1949.

TABLE 45[a]

SUMMARY OF RESULTS
HIGH SCHOOL DRIVER EDUCATION AWARD PROGRAM
1948--1949--1950

	1948	1949	1950
1. States			
Number reporting	25	43	48
2. Schools			
Total No. Schools	13,964	21,621	20,744
No. Conducting Courses:			
Classroom only	..	2,411	2,632
Classroom and Driving Instruction	..	3,267	4,363
Total	3,055	5,678	6,995
% Increase over 1949			23
% All Schools Covered			34
3. Student Participation			
Number eligible	1,643,836	1,722,678	1,607,741
Enrolled classroom only	..	235,836	300,785
Enrolled classroom and Driving Instruction	..	204,716	250,495
Total	333,017	440,552	551,280
% Increase over 1949			25
% All Students Enrolled			34
4. Average enrollment per course	..	97	114
Classroom and Driving Instruction	..	62	57
5. Unsuccessfully Completed Course (33 states)	..	..	18,812
6. Substandard Courses (31 states)			
Number	..	387	540
Enrollment	..	18,603	46,367

[a]Source: Compiled from Results of Annual Driver Education Award Project. Association of Casualty and Surety Companies. New York: the Association, 1950.

TABLE 46[a]

SUMMARY OF STATE REPORTS
HIGH SCHOOL DRIVER EDUCATION AWARD PROGRAM

State	No. of Secondary Schools	No. of Eligible Students	No. of Schools Giving Courses 1949-50	1948-49	No. of Students Enrolled 1949-50	1948-49
Alabama	575	31,905	34	28	1,264	1,038
Arizona	67	8,250	58	58	5,170	5,609
Arkansas	524	21,000	21	15	619	494
California	423	98,000	397	324	84,519	53,959
Colorado	287	13,053	23	25	4,433	4,371
Connecticut	100	7,500	65	56	2,929	2,000
Delaware	35	2,731	35	34	1,141	1,142
Florida	306	26,343	42	33	3,479	2,536
Georgia	701	35,000	131	43	4,198	711
Idaho	157	7,776	29	0	439	0
Illinois	692	120,000	597	543	77,333	71,298
Indiana	782	49,000	525	416	27,270	21,840
Iowa	834	100,000	400	134	27,000	7,504
Kansas	630	22,508	88	39	4,377	1,989
Kentucky	566	22,509	41	30	1,198	1,026
Louisiana	529	27,240	44	36	4,403	3,603
Maine	230	10,000	22	17	993	910
Maryland	159	17,236	80	89	3,865	5,542
Mass.	278	75,000	237	232	43,137	40,249
Michigan	568	57,733	306	253	31,714	31,087
Mississippi	526	12,000	53	40	2,280	1,483
Minnesota	478	31,868	189	153	15,079	8,110
Missouri	670	39,397	135	170	6,898	4,811
Montana	178	6,614	30	28	1,279	1,180
Nebraska	440	16,744	96	62	3,825	3,162
Nevada	35	1,500	7	3	282	120
New Hamp.	93	5,100	32	21	1,312	853
New Jersey	199	37,118	133	152	21,889	19,507
New Mexico	140	6,500	28	17	1,783	1,035
New York	826	150,892	325	282	11,700	9,722
N. Carolina	900	40,147	109	44	4,217	1,903
N. Dakota	300	7,573	290	290	7,288	6,426 (pfd.)

[a] Ibid.

TABLE 46--Continued

State	No. of High Schools	No. of Eligible Students	No. of Schools Giving Courses 1949-50	1948-49	No. of Students Enrolled 1949-50	1948-49
Ohio	1,211	75,904	250	197	13,259	10,948
Oklahoma	676	31,285	378	237	18,430	10,105
Oregon	229	17,144	56	47	4,191	3,381
Penn.	900	112,461	221	171	17,092	13,341
Rhode Is.	29	5,050	15	16	795	803
S. Carolina	373	20,060	65	91	3,072	4,560
S. Dakota	384	7,994	13	9	700	292
Tennessee	524	30,065	30	18	961	620
Texas	1,440	71,515	364	365	23,280	20,293
Utah	75	10,402	35	38	4,937	3,500
Vermont	83	3,157	19	15	577	589
Virginia	517	25,443	216	194	12,373	20,656
Washington	267	24,123	116	120	8,651	7,471
W Virginia	272	23,789	245	143	9,418	6,142
Wisconsin	449	37,304	349	335	25,250	21,962
Wyoming	87	3,808	21	15	981	669
Total	20,744	1,607,741	6,995	5,678	551,280	440,552

blow to the calm presumption that all young people are necessarily capable of being good drivers when they reach the age prescribed by law in their State. [1]

5. An indication of the growing popularity of driver education may be drawn from the fact that only six states--Arizona, Maryland, Rhode Island, South Carolina, Vermont and Virginia--had smaller student enrollments in 1950 than in the previous school year.

---

[1] "Driver Education Shows Sharp Upswing in 1950 but Two-Thirds of Nation's High Schools Fail to Offer Course." Newsletter of the National Committee for Traffic Safety. Spotlighting Traffic Safety, VI, 9 (September, 1950).

6. In Chapter II it was pointed out that "deaths per 100 million motor-vehicle miles travelled" was one index (although not the most reliable) that was readily available for measuring the highway safety status of any specified area. It may be significant to note that only one of the ten states which enrolled more than 50 per cent of their respective high-school populations in driver education courses recorded a significantly higher death-index in 1950 than the national rate of 7.5 fatalities for every 100 million motor-vehicle miles travelled. This State was Arizona, with a death rate of 11.2. Massachusetts with an index of 4.3, and New Jersey with an index of 4.2 led the states most vigorously developing safety education programsinsofar as achieving the lowest death-rates.[1]

Driver education in Canada.--In order to ascertain the extent to which driver education had been adopted by the high schools of Canada, the writer, in his capacity of Manitoba's Assistant Director of Highway Safety, sent a questionnaire[2] to the Deputy Minister of Education of each of the ten provinces requesting information on traffic safety activities in the schools. To facilitate comparisons with available American data, the questionnaire was fashioned on the same principles and topics as the one used by the National Committee for Traffic Safety.

All provinces acknowledged the questionnaire, but only

---

[1] Accident Facts, p. 48. Compiled Annually by the National Safety Council. Chicago: the Council, 1951.

[2] Appendix G.

three--British Columbia, Alberta and Newfoundland--completed the form. As the majority of the replies did not readily lend themselves to tabulated analysis, the writer has examined the data from three viewpoints: (1) provinces which have established courses; (2)provinces which are favorably considering the introduction of high-school driver education; and (3) provinces which have not yet planned driver-education courses.

British Columbia.--On the basis of the information that was received, this Province has apparently made the most progress in providing its high-school population opportunities for courses in driver education. This fact is not surprising when examined from the viewpoint of the progressive attitude British Columbia has adopted toward an over-all highway safety program. Vigorously carrying out a province-wide program of driver improvement through licensing procedures, British Columbia, in 1950, achieved the distinction of becoming the first province to substantially reduce total traffic accidents since the end of World War II. [1,2]

Table 47 outlines features of the British Columbia program. While less than 9 per cent of the provincial high schools were offering driver education in 1950, it is encouraging to note a 42.3 per cent increase in student enrollment over the previous year. Other matters of interest appearing in the completed questionnaire from British Columbia were as follows:

> . . . Sixteen regularly employed teachers taught the classroom instruction in the 1949-50 school year, as compared

---

[1] The Motor Vehicle, 1949, p. 29. Op. cit.

[2] The Motor Vehicle, 1950, p. 35. Op. cit.

TABLE 47

DRIVER EDUCATION IN BRITISH COLUMBIA

	1949	1950
1. Schools		
Total No. Schools	139	139
No. Conducting Courses:		
Classroom only	0	0
Classroom and Driving Instruction	11	12
Total	11	12
Per cent increase over 1949		9.0%
2. Student Participation		
Number eligible	..	..
Enrolled in classroom only	0	0
Enrolled in classroom and Driving Instruction	215	306
Per cent increase over 1949		42.3%
3. Average Enrollment per Course		
Classroom and Driving Instruction	20	21
4. Unsuccessfully Completed Course		
Number	6	8
Per cent failure of enrolled students	3%	2.5%

to thirteen teachers in the previous year.
. . . Average cost per pupil was $26, of which the individual pupil paid 16 per cent. (approximately $4)
. . . No academic credits were given for completed course.
. . . One Commercial Driving School was employed.
. . . There are no laws or specific regulations pertaining to Safety Education. Safety is taught in connection with Health and Physical Education which are "compulsory in all grades in all schools." . . . In Grades 7 to 12 Safety Education is incorporated in the new course Effective Living--compulsory in Grades 7, 8, 9, 10, and 11 or 12 . . . [1]

Similar to the situation that existed in the United States during the early period of driver education, the

[1]Communication from J. R. Meredith, Research Assistant, Department of Education, British Columbia, February, 1951.

dominant force advocating safety education in British Columbia high schools has been the non-school agencies. The degree to which one such group--the Vancouver Safety Council--has committed its support is clearly set forth in the following report:

> Thank God our Provincial Government is becoming more and more aware of the necessity for training our motor vehicle drivers and has started this training where it will do the most good, namely with the students of our High Schools. Last year the Provincial Government entrusted our Council with $6,000 to be used in conducting a High School Driver Training Course throughout the Province. Eleven schools participated in this program, three in the City of Vancouver. This year the Government increased the amount to $7,000 and it is expected that 17 or 18 schools will participate. [1]

Ontario.--Driver education in the high schools of this Province was described by the deputy minister of education as follows:

> . . .Driver education is not part of the curriculum of the schools in the Province of Ontario. On an experimental basis classes have been conducted in the city of Hamilton to give some training to pupils in driving a car. [2]

From other sources the writer has received information that the vocational collegiates at Kitchener and at St. Catharines have been providing students with courses in driver education.[3] Ziegler, the principal of the Kitchener-Waterloo Collegiate, has been very helpful to the writer by providing the following information:

> . . . In the early part of the year 1949, asurvey was taken to determine how many of the student body were interested in taking a course in driver education. A modest estimate showed that almost half of the study body was

---

[1] 1949 Annual Report of the Vancouver Traffic and Safety Council. Vancouver: the Council, 1950 (mimeo).

[2] Letter from C. A. Brown, Deputy Minister, Department of Education, Ontario, January 26, 1951.

[3] The Toronto Star Weekly, February 10, 1951, p. 2.

> enthusiastic concerning the idea. We obtained the Sportsmanlike Driving Course text books and teacher's manual from the American Automobile Association . . . The lectures were given as an extra-curricular activity. Forty-five students were chosen from the senior classes and three groups were formed. One group attended lectures with one teacher for a set period during which a definite part of the course was covered. Then the groups changed around . . . Occasionally the whole group met in the assembly hall and saw films pertaining to the course or took part in discussions held by police traffic officers, insurance adjusters or other authorities.
>
> . . . The School Board set up a budget of $2,000 for this school year. This provided for a full time instructor and paid running expenses which are currently $15 per month. From 7:30 o'clock in the morning till 8:50 there is time for two driving classes of four students each in the car. From 12 to 1:20 there are two more and from 4 to 5:30 there are two more. Then during spare periods pupils may go out as scheduled.[1]

Alberta.--The questionnaire replies from this Province concern the one experimental driver-education course being offered, in 1950-51, to 28 students of an Edmonton high school:

1. One teacher is employed part time for classroom lessons.
2. Lectures and behind-the-wheel training are given during school hours.
3. The entire cost is borne by the Edmonton School Board.
4. No academic credits are awarded for successfully completing the course.
5. As in British Columbia, a commercial driving school provides the instructors and dual-controlled cars for road lessons.

The growing interest in traffic safety education has been expressed by the chief superintendent of Alberta schools:

---

[1] Communication from W. T. Ziegler, Principal, Kitchener-Waterloo Collegiate and Vocational School, Kitchener, Ontario, July, 1950.

> . . . In this province we deal with the subject of safety, including watchfulness while on the road as a pedestrian, and while driving a motor vehicle, in our health courses. Very shortly we hope to get out a course on health and personal development, which will deal with safety to a greater extent than previously. [1]

Driver education in the rest of Canada.--Letters received from the Departments of Education in Saskatchewan,[2] Quebec,[3,4] New Brunswick,[5] Nova Scotia,[6] Prince Edward Island,[7] and Newfoundland[8] contained similar information: (1) that driver education was not part of the high-school curriculum; and (2) that high-school driver training courses were not being conducted extra-curricularly.

Up until October, 1951, the foregoing situation obtained for Manitoba secondary schools. At the beginning of the 1951-52 school year, A. E. Kuzyk, an enterprising young teacher of St. James Collegiate, expanded one of the fifty-six sub-units ("Safe walking, cycling, riding and driving"[9])

---

[1]Letter from W. E. Frame, Chief Superintendent of Schools, Department of Education, Alberta, January 30, 1951.

[2]Letter from A. McCallum, Deputy Minister, Department of Education, Saskatchewan, January 15, 1951.

[3]Letter from B. O. Filteau, Secretary, Département de l'Instruction publique, Province de Québec, January 26, 1951.

[4]Letter from W. P. Percival, Director of Protestant Education, Quebec, January 15, 1951.

[5]Letter from F. E. MacDiarmid, Chief Superintendent of Education, New Brunswick, January 16, 1951.

[6]Letter from H. P. Moffatt, Deputy Minister, Department of Education, Nova Scotia, January 13, 1951.

[7]Letter from L. W. Shaw, Deputy Minister, Department of Education, Prince Edward Island, January 15, 1951.

[8]Letter from G. A. Tucker, Deputy Minister, Department of Education, Newfoundland, March 3, 1951.

[9]Programme of Studies for the Schools of Manitoba, Senior High Schools, p. 78. Winnipeg: King's Printer, 1950.

of the high-school Health Course into a full-fledged program of driver education. With the help of the Manitoba Safety Division, the Royal Canadian Mounted Police, an automobile dealer, and an insurance company, classroom instruction was given to 100 students and driver instruction consisting of six hours behind-the-wheel for each student was arranged for 32 pupils in the class.

Findings of the questionnaire study.--

1. In 1950, sixteen high schools offered courses in driver education to students in Canadian secondary schools.
2. Without exception, all courses included driver training experiences in dual-control automobiles.
3. Over 80 per cent of the schools employed the services of commercial driving schools for road-training classes.
4. In the large majority of instances, driver education was integrated into health and physical education courses.
5. With one exception, behind-the-wheel training in all schools utilized outside-school hours.
6. No Canadian high school gave academic credits for completing courses in driver education.
7. No mention was made in the replies to the questionnaire regarding teacher preparation.

One observation that appears obvious in view of the foregoing findings is that more research is needed to discover why driver education has not gained wider support among Canadian school administrators and teachers alike. In terms of student and community needs the writer has advanced many statistical and experimental data to his thesis that high-

way mishaps involving youth constitute an immediate problem of major proportions. If this need has been established, there still remains the question: What effect have driver education courses on the accident and conviction records of high school students?

Results of high school driver education.--During the last ten years, only a few limited studies have been made which compare the future records of drivers who have had high school driver education with the records of non-trained students. In all cases the scientific method used has been: (1) to select two groups of licensed high school students as closely matched as possible ecept that one group has successfully completed a course in driver education; and (2) after some time has elapsed to check and compare the respective group's total accident and conviction record.

The limitations of this type of study are numerous. The fundamental premise that these students are matched in all respects except in their education to operate safely a motor vehicle, is, of course, fallacious. Such factors as, the exposure or the number and relative danger of the hazards which each student encounters in his driving experience, the varying maturity levels of the students in both test and control groups, and the environmental influences are but several of variables that have not adequately been accounted for in the studies appearing in the literature. Nevertheless, the published results have been imposing. In every reported instance, the high-school trained drivers have had significantly fewer highway accidents and traffic convictions than the

untrained ones.

The first of these studies (and still the most carefully planned, investigated, analyzed and reported) was a group project carried out under the direction of Burton W. Marsh, Director, Traffic and Engineering and Safety Department of the American Automobile Association, among students graduating from high schools in Cleveland, Ohio. The following are abstracts of the method used and the principal finding:

> In order to determine the effect of driver training on the accident and conviction records of high school students, an analysis was made of 1,880 high school students who received driver training instruction and 1,372 high school students who received no training. These were students graduating from 11 Cleveland high schools between June, 1939 and June, 1941. All of these students obtained driver licenses. The accident and conviction records were checked from the time of graduation to November, 1941. [1]

	1,273 Trained Men	1,151 Untrained Men
Accidents	48	76
Per Cent Involved	3.77%	6.60%
Difference		2.83% (P = .001)

> Training reduced number of men involved in accidents by 42.8 per cent.[2]

Other studies have been conducted by state licence administrators of Arizona, Delaware, Wisconsin, District of Columbia, and Massachusetts. [3] While statistical details have been impossible to obtain upon request, the published results

---

[1] Driver Training Reduces Traffic Accidents One-Half, p. 5. American Automobile Association. Washington: the Association, 1945.

[2] Ibid., p. 14

[3] Results of Driver Training. American Automobile Association. Washington: the Association, 1948 (mimeo).

have "proved" dramatically, if not significantly, the effectiveness of driver education in reducing accident involvements. Excerpts from two of these studies have been given below. The Delaware claims are probably the more valid; the Massachusetts results certainly the most flamboyant.

> Delaware.--. . . a reduction in motor vehicle accidents, arrests, and warnings involving the teen-age driver in Delaware is evidenced in the results of the comparative survey study. . . The survey involved the driving experience of 1600 drivers--800 non-trained drivers as compared to 800 trained drivers. The drivers were of the same age groups and were picked at random from the files. . . 200 licensed in 1946, 600 in 1945, and 800 in 1944.
>
> The results of the survey are as follows:

	800 Trained	800 Non-Trained
Arrests.	31 or 4%	219 or 27%
Accidents.	24 or 3%	112 or 14%
Warnings	45 or 6%	438 or 55%
Total Violations .	100 or 12.5%	769 or 96% [1]

> Massachusetts.--Driver education pays big dividends in lives saved and accidents prevented!
>
> Proof of this statement is best given in preliminary data measuring the accident record of the trained against untrained motor vehicle operators . . . drivers in the untrained group have nine times as many reported violations as those who have had classroom instruction, and ten times more than those who had the complete program. . .
>
> Fifteen hundred students representing every section of the Commonwealth were selected. They were divided into three groups of 500 each. The first had no Driver Education; the second had classroom instruction only; the third group had both classroom instruction and behind-the-wheel training. [2]

Upon the writer's request for more complete data on this remarkable experiment, the following meagre details were sent:

---

[1] Final Report on Student Driver Training Program, p. 5. Delaware Department of Public Instruction. Dover: the Department, 1947.

[2] R. F. King, "Driver Education Pays Off", Public Safety, December, 1950, p. 10.

Registrar King requested me to answer your . . letter. . .

The following percentages have been compiled for the calendar year January 1--December 31, 1950, from data now on file with the Registry office and will vary somewhat from the final results after all reports have been filed and analyzed.

	Accidents	Violations
Untrained Groups	78%	69%
Trained Groups	22%	31%

[1]

Summary and Implications

Up to the present, in both Canada and the United States, the results of the foregoing survey suggest that the most effective leadership in promoting driver education has been supplied by non-school agencies. Encouraging progress has been made in the United States, both as to growing number of schools instituting driver education in their secondary school curricula, and in the beneficial effects that this program has been purported to have yielded in reducing accident involvements among youthful drivers.

But even in the United States the facts disclose a vast amount of work to be done by educators and public support groups before driver education is available on a nation-wide basis.

Except for the worthwhile efforts of a few individuals, leadership among Canadian school authorities has been lacking. Among the sixteen high schools offering driver education, only the British Columbia group can claim to be providing relatively complete courses. But even here, their limited participation in the highway safety movement has

---

[1] Letter from E. J. Fanning, Supervisor, Driver Education, Registry of Motor Vehicles, The Commonwealth of Massachusetts, January 26, 1951.

been little more than an adjunct to the efforts of provincial engineering, legislative, enforcement, and non-school educational agencies which have been steadfastly striving, though for the most part with a discouraging modicum of success, to effect any substantial reduction in the highway accident toll.

CHAPTER V

THE RESPONSIBILITY OF THE SECONDARY SCHOOL FOR MORE EFFECTUALLY MEETING THE NEED

In seeking an explanation for the present delinquent status of the vast majority of Canadian high schools with respect to the driver education movement, two possibilities are presented. First, there may be some question as to whether the secondary school really has a responsibility or is justified in assuming responsibility for providing an effective program of traffic safety education for high school students. Secondly, if this doubt is removed, certain troublesome problems may appear insurmountable in the organization and administration of such a program. Some of these problems have already been obliquely refered to in the materials that have been previously presented. Their solution may offer difficulty because of failure to recognize basic principles or successful practices which should be applied to them.

In this chapter the question to be examined is: Does driver education contribute to achievement of the recognized objectives and functions of secondary education?

Aims and Functions of Secondary Education

A review of current educational literature reveals that authorities are practically unanimous in their agreement that the ultimate educational aim is so to equip each indi-

vidual that he may adjust and adapt himself to function effectively in his changing environment for the immediate present and for the potential future. The functional concept recognizes the student as raw material possessing latent capacities in creating and shaping his world. It advocates growth and development through adventurous, creative living. It demands that the old formal traditional curriculum be superceded by multiple experiences offering the high school student contacts with the major problems of modern living. By focussing attention on the individual and by aiding him to acquire deeper understandings, more efficient skills, and better attitudes, the problem-type approach helps him to organize himself into a purposefully functioning self-dependent being:

> Education should produce a self-directive, self-reliant individual, free from mental conflict, healthful in a physical sense, poised in his contacts with others, conscious of the problems that concern the social group of which he is a part, sympathetically inclined toward his fellows, appreciative of the finer things of life--in a word, education should produce the integrated personality. [1]

And Harl R. Douglass suggests that the curriculum cannot become static or precious:

> The curriculum is no more than the provision by means of which appropriate educative experiences are assured. It follows naturally that the curriculum then is not merely something to be learned or even merely the acquisition of the heritage of the race as some have seemed to believe. It is not a thing of intrinsic value, to be "passed on" to the young. <u>It is a means not an end</u>. . .[2]

---

[1]Aubrey A. Douglass, <u>Modern Secondary Education</u>, p. 223. Boston: the Houghton-Mifflin Company, 1938.

[2]Harl R. Douglass, "The Nature and Function of the Curriculum," <u>The High School Curriculum</u>, p. 27. Edited by Harl R. Douglass, New York: the Ronald Press, 1947.

Hand in hand with the development of the individual, as a general aim goes social efficiency. This aim implies preparing the individual for good citizenship by guiding him in the acquisition of appropriate social ideals, attitudes and habits. The development of a sense of social responsibility and a proper disposition for co-operative effort in worthwhile activities of the school and community are especially needed at this time. Dr. Leonard has pointed out that the primary function of the secondary school is to maintain and improve the democratic state. The school thus serves as the chief instrument for the development of individuals who have the knowledge, the skills, and the disposition to work for democracy. As such, its function is primarily social and will include:

> . . . a program of knowledge and one of prevention and treatment that will enable them to maintain health and physical fitness throughout life.
>
> If the secondary school is to meet the needs of society today we must immediately study its practices. We should restate its objectives, discover the needs of youth, build sequences of learning in the common areas and problems of life, and provide enriched experiences and opportunities for boys and girls in all other curriculum areas. This will require some bold strokes--breaking away from rigid subject classifications, retraining teachers to be more competent in many areas, relating the school more closely to the activities of the community, and making distinct innovations in administration.[1]

What is safety education?--One of the first authoritative statements enunciating the aims of safety teachings in the school was expressed, in 1932, by the White House Conference on Child Health and Protection:

---

[1] J. P. Leonard, Developing the Secondary School Curriculum, p. 552. New York: Rinehart and Company, 1946.

> Safety education means teaching the child to adjust himself to our modern civilization, preparing him to meet successfully the novelly recurring situations of life. For example, to travel the streets safely he must be alert of mind and body; he must know something of the way in which traffic is controlled and kept moving; he must recognize the rights of others in the streets and be ready for any unexpected developments. . . . It involves the acquisition of a certain fund of information, the ability to apply this information to concrete situations, and the building up of habits which will make the application of knowledge to situations automatic. [1]

In 1950, the National Committee on Safety Education translated these aims of safety education into general objectives for high-school driver education:

> 1. to develop in young people a strong sense of personal and social responsibility for the common welfare, particularly as it is effected by and involved in the operation of motor vehicles.
>
> 2. to develop pride in maintaining high standards of performance, particularly in the operation of motor vehicles
>
> 3. to promote the safe, efficient, and enjoyable use of equipment and environment, particularly of motor vehicles and highways.
>
> 4. to promote effective habits of cooperation in meeting problems of the common welfare, especially those concerned with the use of motor vehicles and highways.
>
> 5. to prepare young people for socially useful vocations suited to their individual abilities, particularly those that involve the use of motor vehicles. [2]

If the opinions of these authorities are valid, no one can deny that an adequate program of driver education will contribute to the two ultimate aims of social efficiency and the development of the individual. It seems fruitless to argue which it promotes to a greater extent. The aims are mutually

---

[1] Safety Education in the Schools, p. 5. Report of the Subcommittee of Safety Education, White House Conference on Child Health and Protection. New York: the Century Co., 1932.

[2] High-School Driver Education: Policies and Recommendations, p. 15. Op. cit.

inter-related and interdependent. Since society is the sum of its individual members, any safety training which benefits the parts should accrue to the benefit of the whole. Accident prevention is more than a selfish personal problem. The materials previously presented indicate that it has become a serious social problem in Manitoba and the Nation as a whole. But society will not solve this problem until each individual, through the effects of well-directed educational activity, develops a feeling of personal responsibility not only for his own safety, but equally as much for the safety of others. Likewise, any training which is directed toward the promotion of the interests of society should at the same time contribute to the interests of its members by making the community a safer place in which to live and earn a living.

It has long been popular in educational circles to refer to the Seven Cardinal Principles of Secondary Education[1] as a commonly accepted statement of the general objectives for use as a criterion in admitting or excluding proposed additions to high school curriculum. It should require no extensive argument to show that driver education is fully in accord with four of these objectives: health, vocation efficiency, citizenship, and worthy use of leisure time. The preservation of health is dependent upon freedom from the consequences of accidents. It has been shown predictable that every Manitoba youth now attending high school is a potential automobile driver; many will seek employment through this medium. Good citizenship is developed when the student learns that he must assume responsibility not only for his own safety

---

[1]Cited in Harl R. Douglass, op. cit., p. 31.

but also for his fellow-citizens in the community. He is impressed with the seriousness of the accident problem in his own environment, is made aware of the need for co-operative effort, and actually participates in activities directed toward the solution of the problem.

It has been shown by quantitative data that the need for driver education is particularly acute at the high school level. Most students here are either already driving, or will do so very shortly after leaving school. All will be pedestrians. Whether as pedestrian or driver, the high school student who has received driver education will be better prepared to cope with the everyday traffic problems that he will encounter. There is a further reason why even those students who may never drive should be given the same instruction. "Public opinion" is an important factor in the success of efforts to reduce materially the traffic accident toll, to improve traffic conditions, to provide more adequate highways, and to produce needed innovations among agencies licensing and controlling the driver. A proper public attitude upon traffic matters can be secured only through sound education. The high school student of today will be the taxpayer and public official of the future. As such, the proper fundamental attitudes instilled in them by means of a sound program of traffic safety may well be the bulwark for the adoption of scientific accident-prevention measures. Furthermore, in the role of automobile passengers, or even as companion pedestrians, students made safety-conscious may be expected to express disapproval of dangerous actions on the

part of others and thus become an educative agency for those who have not had the benefit of such a program themselves.

In the past, young people learning to drive a motor vehicle have been left to prepare themselves for this common but involved activity of modern living through their own resourcefulness and hit-and-miss methods. It has been suggested that the solution of this problem should be the responsibility of the home. In general, this approach has already been found unsatisfactory. Parents are unfitted, technically and pedagogically, to handle the problem. In another sphere, the driver-examination practices of some Canadian provinces--British Columbia since 1945, and currently Manitoba--have introduced a helpful but inconclusive measure of educational influence. The solution to the problem is for the high school to fulfill its proper function of teaching students to do better the worthwhile things they are going to do anyway by providing an adequate program of driver education for all.

Outstanding among the psychological characteristics of the adolescent are his desire for maturity (identification in terms of adult values), his restlessness, love of adventure and dislike of restraint. By stressing the positive rather than the restrictive aspect of traffic safety, driver education will appeal to adolescents. Because it guides the student in his choice of experiences in traffic, and encourages him to be discriminating in his selections of adventures by substituting for a poor one, fraught with serious hazards, a better adventure, driver education can become an important instrument to assist the school in sublimating the excessive

exuberance of youth.

Finally, secondary education is concerned with the development of personality and character. Merely meeting the practical needs of present day life might seem to brand driver education as over-emphasis of utilitarian considerations. The essence of driver instruction is the acquisition by the student, not merely of safety information, but also of better habits, and more important stil, of better attitudes. Albert W. Whitney stated his views concerning the potential of safety instruction as follows:

> My general thesis is that no educational system is satisfactory or complete which does not extract from concrete experiences those cultural qualities that go to make up personality and character, and that safety possesses particularly rich deposits of these hidden values. . . . Safety brings us into contact with the realities and processes that can be most effectively capitalized for the development of those qualities of personality and character that are the highest objective not only of education but of life itself. [1]

The Strategic Position of the Secondary School For Providing Driver Education

While the high school cannot possibly meet completely all the obligations of traffic safety education, it is of all agencies the best equipped for the service. It is the most universal and it operates in the most crucial years of the individual's development. The high school, with its organization, facilities, discipline, and teaching personnel is the best prepared public institution for undertaking the provision of organized instruction in highway safety.

The high school age is the appropriate time in life

---

[1]Whitney, op. cit., p. 74.

for such training. At this time--when the student is near or at the legal driving age of sixteen--the need is apparent and student interest is sufficient motivation. Driver education prepares the student to meet requirements for securing his driver's licence and thus solves what for many erstwhile Manitoba drivers has become a problem of not inconsiderable proportions. Greater skill and sounder attitudes are produced by the high school's systematic training. Driver education offers greater opportunity than many traditional subjects to inculcate habits of courtesy, responsibility, cooperation and obedience to law. By promoting more intelligent, more skilful, safer driving, it should tend to reduce the high rate of injuries and fatalities among youthful drivers.

It must be concluded that the high school is justified in offering experiences in driver education. Furthermore, if the school is to perform its special function to meet the needs and interests of its adolescent enrollment, there seems sufficient evidence to suggest that it will be unsuccessful unless its program includes adequate elements of driver education.

Implications.--The need for driver education has been suggested. The helpful but inadequate efforts of non-school agencies have been described. The success of the elementary and secondary schools in the United States has raised a beacon of hope for Canadian high school students. Yet in their schools there has been a great lag in meeting the new social need. What excuses can be offered for the Manitoba high

school's delinquency? It has been a matter of record that a subcommittee of Winnipeg staff teachers reported, during the school survey of 1947-48, that safety education was within the competence of Winnipeg high schools, and recommended that "study and consideration . . . be continued since they represent vital material thoroughly defensible for attention by the secondary school".[1] It may well be that in the attempt to organize and administer a desirable program, troublesome problems were encountered and anticipated. The unsatisfactory solution of these problems may have been due to failure to recognize certain basic principles which should have been applied, or lack of knowledge of practices found to be successful elsewhere.

Some of these problems will be considered next.

---

[1]Report of the Directed Self Survey Winnipeg Public Schools, p. 228. Op. cit.

CHAPTER VI

PROBLEMS ENCOUNTERED IN THE ORGANIZATION AND ADMINISTRATION OF AN ADEQUATE DRIVER EDUCATION PROGRAM

With a curriculum that is over-crowded and a staff personnel that considers itself overburdened, it is only natural to find the school administrator postponing as long as possible the necessity of facing certain problems which inevitably appear when a new program seeks an active role in the school curriculum. Sooner or later, however, these problems must be faced as the need for the program becomes increasingly apparent with the failure of non-school agencies to effect a solution.

Objectives and subject content.--One of the first problems is the determination of content. This is dependent, however, upon the determination of objectives which, in turn, are based upon educational philosophy and local needs. For a program of driver education in Manitoba, the determination of local needs can be partially derived from analysis of highway accidents, and these data are already available from the Provincial Government's Safety Division. These statistics, and the historical and experimental materials compiled in this study and in the literature will serve only to orient a local program. Because of the twofold purpose of driver education: (1) to help the individual become self-directive with respect to his own safety and that of his fellows; and

(2) to encourage the student to actively co-operate in the solution of the traffic-accident problem as a community endeavor, the specific needs in terms of desired learning experiences should be determined by normative surveys that have been conducted by the teachers concerned.

The following research possibilities seem to merit attention:

1. The maintenance of a Student Traffic Accident Report system and the analysis of report summaries.
2. A survey of the social and economic backgrounds of the students to determine the likelihood of operating motor vehicles in the immediate and post-secondary school future.
3. A preliminary testing program including standardized knowledge tests and attitude scales to be administered to the entire eligible student population, and additional road tests for students already possessing licences. These test-surveys should indicate shortages in aspects generally considered important to safety on the streets and highways. Re-testing will assist in evaluating the outcomes of the program undertaken.

It is not the purpose of this study to attempt an examination of all the administrative problems that have been posed when driver education has been introduced into the high school curriculum. Only the major problem-fields are discussed. These include: curriculum placement, types of programs, cost factors, standards, and teacher preparation. Finally, the feasibility of instituting driver education in Manitoba is briefly examined in reference to the problems to be met.

Placing Driver Education in the Curriculum

Basic considerations.--A major problem in determining the most effective arrangement of driver education in relation to the total curriculum is the question to whom the program will be offered. For the same reasons that driver education is needed at all, it is needed by all. These reasons, it will be recalled, involve the universality of highway accidents, the disproportionately high youth-rate, and the potential effectiveness of secondary school safety programs.

With the curriculum already over-crowded, when and where should the program be offered? The basic educational principles of student needs and interests suggests that the most appropriate time for introducing these experiences in the school would be during the student's sixteenth year. This is the minimum age for eligibility to operate a motor vehicle in accordance with the Highway Traffic Act of Manitoba. Conducting driver education earlier may result in loss of effectiveness and carry-over as well as insufficient interest. This latter surmise is based on the fact that it would be illegal to include behind-the-wheel training before the students had reached their sixteenth year. Presenting the program too late brings up the problem of improper habits and faulty attitudes already formed and the failure to reach students who leave school before the completion of the full high school course.

Where to place driver education.--A survey conducted by the American Association of School Administrators, during 1937-40, reported that driver education was being conducted in a variety of ways. The four major approaches seemed to be:

1. Correlating and integrating safety with many different subjects and activities.
2. Teaching safety as a separate unit included in other subjects.
3. Organizing safety education as a separate subject.
4. Centering a safety education program around pupil organizations and special projects of various types. [1]

When driver education was first introduced into the high schools of the United States, the first impulse was to refrain from adding a new subject because of the crowded condition of the schedule, but rather to combine safety teachings with well-established subject fields. The plan has both advantages and disadvantages. It is true that phases of traffic safety education relate themselves naturally and effectively to many elements in the various traditional secondary school subjects, but the outstanding weakness seems to be that too frequently safety which is correlated with other subjects becomes too incidental or even ignored. The National Commission on Safety Education, in 1950, advised as follows:

> A complete driver education program includes both classroom instruction and practice driving. While the classroom phase by itself is of definite value, it is recognized that if all the objectives of driver education are to be achieved, practice driving must be an integral part of the program.
>
> It is recommended that whenever possible the classroom phase of driver education be presented separately, with integration of learning experiences in other programs--social studies, industrial arts, health education, or general science--serving as a supplementation. [2]

This Committee held no brief for the casual "extra-curricular" type of program that are a feature of Canadian

---

[1] Safety Education, p. 105. Eighteenth Yearbook of the American Association of School Administrators. Op. cit.

[2] High-School Driver Education: Policies and Recommendations, p. 31. Op. cit.

high school driver education courses:

> The plan whereby the opportunity for practice driving is provided by parents in conjunction with the in-school classroom work has met with little success in practice to date. The procedure is recommended only for communities where home-school cooperation is unusually strong and where the school can offer effective supervision of the program. Possibly this plan would produce better results if parents had an opportunity to complete an adult driver education course before their children receive the in-school classroom instruction.[1]

A preferred plan for high school driver education.--The writer examined critically the published administrative guides from the departments of public instruction of 18 American states.[2] In the majority of instances, the content for the classroom instruction was based on the plan of study embodied in two standard reference textbooks: Sportsmanlike Driving[3] and Man and the Motor Car.[4]

Three plans appeared most frequently in these state guides for driver education:

1. A two-part course--classroom and driver training--organized as a separate subject. Credits are given upon successfully completing not less than 32 clock-hours in the car (8 hours behind-the-wheel) and one semester of 5 periods per week in the classroom. This is the preferred plan.

---

[1] Ibid., p. 31.

[2] New York, Minnesota, Virginia, Indiana, Illinois, Texas, Missouri, Delaware, California, Wisconsin, Ohio, Maine, Pennsylvania, Iowa, New Jersey, Wyoming, Kansas, and North Dakota.

[3] Sportsmanlike Driving. Edited by B. W. Marsh. Washington: American Automobile Association, 1948. Pp. 473.

[4] Man and the Motor Car. Edited by M. D. Kramer. New York: Association of Casualty and Surety Companies, 1950. Pp. vii-318.

2. Including driver education as a part of a course in general safety.

3. Integrating driver education as a unit in the following subjects: health and physical education, social studies, vocational education. Supervised driver training by outside agencies is part of this least acceptable plan.

An informative summary of the organization of the preferred plan appears in the Missouri syllabus for driver education:

Preferred Plan

> The most desirable plan is a separate course usually involving five periods per week for a semester in the classroom supplemented with behind-the-wheel training given by a teacher in a school-owned control car.
>
> For road instruction a class should be divided into groups of four students each. By rotating the groups, the training is provided concurrently with classroom phases. During the semester each group of four students should have 32 clock hours in the car which allows 8 hours per person behind-the-wheel.
>
> The instructor must be in the front seat of the car during all practice driving. After demonstrating each driving act the instructor should keep an accurate record of the time that each student spends behind-the-wheel and of the work that is done in each road training period.
>
> By this plan the groups may be scheduled for driving practice at the off periods during the school day or after hours. For after-hour training the teacher could start and end work later in the day.
>
> Generally, one-half unit of high school credit may be permitted under this plan. Where more than one-half unit is allowed it must be justified on the basis of additional work with the approval of the office of the Commissioner of Education. [1]

The Texas sequence of driver education units has been outlined in Table 48. The classroom work, in the credit course consists of 60 periods of 45minutes each.

---

[1] Driver Education and Training, p. 9. Publication No. 8. Missouri State Department of Education. Jefferson City: the Department, 1947.

TABLE 48[a]

TIME DISTRIBUTION FOR DRIVER EDUCATION INSTRUCTION

Units	Driver Education and Behind-the-Wheel Instruction	Driver Education and General Safety	Short Course In Driver Education only
	Class Periods of 45 minutes		
Classroom Instruction			
The Motor Vehicle and Modern Life	3	2	2
Understanding the Automobile	7	6	4
Qualifications of the Driver	13	10	5
Sound Driving Practices	13	10	6
Engineering for Safety	4	2	2
Traffic Regulations, Laws and the Police	7	5	5
The Pedestrian and Bicyclist in the Automobile Age	4	3	2
Accidents and Liabilities	3	2	1
Other Facts	6	5	3
Behind-the-Wheel			
Getting Acquainted with Car	3		
Starting, Stopping, Steering and Signalling	4		
Making Turns	2		
Using Reverse Gear	2	Home and School	Home and School
Parking	3		
Driving in Residential Area	4		
Driving in Traffic	5		
Driving at Night	4		
Testing One's Skill	2		
Student Test Ride	1		
Total Periods	90	45	30

[a]Source: Driver Education. Bulletin No. 493, State Department of Education. Austin, Texas: The Department, 1950.

Cost of Driver Education

The National Commission on Safety Education put forward, in 1950, as one of its strongest recommendations that "money to finance driver education should be part of, and come from the same sources as, funds provided for the school's whole program."[1] This statement was made with special reference to the many non-school agencies--insurance companies, automobile manufacturers, etc.--who had, in the United States, contributed most generously toward the development of school driver education, and, quite naturally, had retained some control on how the funds were spent.

The Canadian secondary schools appear not to have been "cursed" with this problem. It seems only too apparent in Manitoba that with realty taxes comprising the major sources of school revenue, little hope can be held for further demands on this dwindling reservoir. Two possibilities suggest themselves: first, that some less essential part of the present curriculum be abolished to make room for the new need; and secondly, that a new source of revenue be tapped --one that would not involve "special interests" controls.

These suggested approaches are presented here only as possibilities for further research. Both are fundamental problems to the entire modern school structure. With regard to the second possible solution, however, it has been suggested to the writer by interested parents he has interviewed at the Manitoba Safety Division, that a small annual "insurance" levy be placed on every driver's licence issued which would develop into sufficient funds to train every Manitoba youth

---

[1] High-School Driver Education: Policies and Recommendations, p. 30. Op. cit.

in the responsibilities of road safety.

Cost of driver education in Canada.--Unfortunately, the data available are meagre. Only two estimates can be quoted: (1) a cost of $26 per pupil for British Columbia schools; and (2) the sum of $44 per pupil at the Kitchener-Waterloo Collegiate if the total enrollment as reported did not exceed 45 students. The British Columbia quotation takes into account only expenses incurred through hiring a commercial driving school. The Kitchener figure includes the salary of a full-time instructor.

Cost of driver education in the United States.--The cost experience among American schools have been more extensively itemized. One example is the detailed cost figures for driver education (classroom and behind-the-wheel instruction) in the high schools of Pittsburg, Pennsylvania during 1950.

> One full-time teacher gives three courses of twelve weeks each. During each course he gives 60 pupils 6 hours actual driving time, . . . 24 hours in the car per pupil. Each pupil also receives one and one-half hours of classroom instruction per week, or 18 hours per course. The total time for each student in the course, then, is 42 hours. The total of pupil-hours per year (180 students is 7560.
>
> Cost items are:

Full-time teacher salary.	$4200
Insurance	120
Garage.	140
Repair and upkeep	150
Gasoline (tax free)	96
Oil	10
Total. . .	$4716

> On the basis of $4716 total cost per year, the hourly cost per pupil amounts to about 62 cents. The per pupil cost for the course is about $26.04 [1]

[1] Summary of Available Cost Figures for Driver Education Courses, p. 4. National Commission on Safety Education. Washington: the National Educational Association, 1950.

While conditions and practices, as well as budgeting and bookkeeping of finances, vary greatly among school systems with respect to teacher salaries, hours of classroom and road instruction, and other cost factors, the favorable balance that is apparent when a school-operated driving instruction program is compared with the Canadian high school practice of employing commercial concerns, suggests that reasons for the latter choice may be due to other than financial factors. This question is more closely examined in a later section of this chapter in its relation to the feasibility of incorporating driver education in the Manitoba high school curriculum.

Driver Education Standards

Stating the objectives of a course of study helps to delineate the nature and scope of the desired experiences. Constant evaluation of achievement should be maintained if accomplishment is to be related to the objectives. To assure these anticipated outcomes it is essential to formulate proper standards. For driver education in secondary schools in the United States an earlier National Commission on Safety Education developed, in 1946-47, the following minimum standards:

> 1. The school administrator should take the lead in organizing a practical plan to include driver education in the school program. . . , he must delegate both responsibility and authority to a qualified teacher for development and conduct of the course.
>
> 2. To qualify, . . . it seems reasonable that the prospective teacher have several years of experience in driving different kinds of automobiles. . . and is trained in content and method for teaching the course.

3. The organization of the course should provide for classroom work consisting of such activities as guided discussion based on systematically assigned reading, project work, and supervised field trips. Class work should be scheduled over a period of time sufficient for student growth toward the desired goals.

4. The course should be organized so that each student receives instruction at the controls of a training car. . . <u>There is no safe substitute</u>.

5. Periods of practice driving should be scheduled not less than once a week for each student. Most feasible schedule will call for practice driving from two to five times a week. In accordance with the principles of learning, students should not be scheduled for practice driving oftener than once a day, and preferably not more than one class period at a time.

6. The beginning stages of road instruction should be conducted in an enclosed area, on a private course, on barricaded streets, or on little-used streets such as in city parks. The school may have the police barricade the necessary streets during the school day . . .

7. The car, . . . should have dual controls and be adequately insured.

8. The later stages of practices should include driving in moderate traffic or on the highway or both, . . . There is no substitute for supervised practice in actual situations students will later experience when alone.

9. The school should allow for providing students the use of text and reference materials.

10. The size of the classroom should be such as will promote teaching efficiency. In driving classes, class size depends largely upon the number of students the teacher can instruct with the training car, and the number of assistants available.

11. Tests to measure student achievement in both classroom work and road training should be used during and at the end of the driving course. Some standardized tests are available. Other tests may be devised by the teacher (often in cooperation with the Government Driver License Division). Each test should be a learning experience for the student as well as a measuring device of his progress toward specific goals. Testing should not be considered an end or a separate phase in itself, but rather a variation in teaching method with the incidental results of reflecting student achievement and teaching efficiency.

12. The school should allow credit toward graduation for successful completion of the course in driving. In the absence of credit, both teacher and student may consider the driving course less important than it really is. [1]

Teacher Preparation

The administrative problems of introducing driver education into the high school cannot be lightly assumed. The difficulties involved, however, need not prove insoluble. Actually one of the chief deterrents is the shortage of adequately trained teachers. Training in administration phases of the program and in subject matter is, of course, necessary. But in addition, only carefully selected and highly-skilled persons are capable of teaching satisfactorily the actual driving techniques. The greatest pitfall seems to lie in the tendency of almost anyone who drives to believe he is a good operator. There seems to be no way, other than stricter government licencing standards, to convince him otherwise. The 50 per cent failure rate on initial driving tests currently being recorded at the Manitoba Safety Division's Driver Improvement Clinic, seems to suggest that untrained teachers, even though they possess an accident-free record, are likely to pass on basically poor driving skills.

In the United States, considerable attention seems to have been given to the preparation of teachers for this important function. The 1950 report of the Committee on Education of the President's Highway Safety Conference stated:

> According to reports, 170 teachers colleges and schools of education in 43 States offered courses to

---

[1] Let's Teach Driving, pp. 31-34. National Commission on Safety Education. Washington: the National Education Association, 1947.

> prepare teachers in various phases of traffic safety education during 1949-50. Approximately 100 intensive 1- and 2-week courses were given. . . Five 1-week seminars were held to prepare college instructors for giving teacher education courses in traffic safety and driver education. [1]

In Canada, the only institute providing some opportunities for teachers of high school driver education programs has been the Safety Section of the Extension Branch of the University of Toronto. Its director, Colonel Bryce, has conducted several short courses on aspects of traffic safety applicable to teachers and supervisors of motor vehicle fleet training programs.

Professor Hagman of Teachers College, Columbia University, has put forward the opinion that the teacher is the greatest single factor in the success of driver education. The task of ensuring his adequate training seems logically to belong to institutions specializing in teacher preparation. Hagman has suggested a number of basic considerations on setting up a teacher's course in driver education:

1. Initial efforts should be directed in terms of time, content, and selection toward the in-service group.
2. Those selected for preparation as teachers of driver education should meet the professional requirements of other secondary school teachers.
3. The related fields of specialization of individuals selected for training in driver education should equip them to teach adequately the classroom phase of the program.
4. Those selected for preparation in driver training should possess particular physical and emotional qualifications.
5. Adequate opportunities should be provided for mastery of the actual skills of driving.
6. The need to develop major programs of teacher preparation in driver education on both graduate and undergraduate levels should be explored. [2]

---

[1] Priorities in the Action Program, p. 25. Op. cit.

[2] E. P. Hagman, "Preparing Teachers for Driver Education," Teachers College Record, (April, 1948), 478-485.

The Feasibility of Driver Education in Manitoba Secondary Schools

The materials that have been presented in this study would seem to corroborate the statement, made in the report of a subcommittee of the 1947-48 directed self-survey of Winnipeg Public Schools, that "safety education represents a vital material thoroughly defensible for attention by the secondary school".[1] In terms of student and community needs, harmony with the basic aims of the school, and successful application elsewhere, driver education as an integral part of the high school curriculum seems to be justified and should receive greater recognition from Manitoba school administrators and teachers.

The basic problems that the Manitoba schools will encounter once action for a driver education program is initiated are likely to be: (1) content, (2) place in the curriculum, (3) instructors for actual driving instruction, and (4) cost.

It has not been the purpose of this study to derive a tentative program of study in driver education for use in Manitoba high schools. To be valid such a syllabus would infer detailed and reliable knowledge of the needs of a particular segment of the Manitoba high school population. There is, however, sufficient similarity in the course content of the eighteen state programs of driver education reviewed to warrant the suggestion that initially, Manitoba could follow the course outline shown in Table 48. Excellent helps for

---

[1] Report of the Directed Self Survey Winnipeg Public Schools, p. 228. Op. cit.

expanding these topics are to be found in the teacher's manual accompanying two widely adopted textbooks--Sportsmanlike Driving[1] and Man and the Motor Car[2].

While it has been the concensus of expert opinion that best results are achieved when driver education is taught as a separate subject, the writer suggests that the Winnipeg high schools' subcommittee on safety recommendation is well taken. They recommended that "where possible safety education should be integrated with expanded social studies, science, or other courses"[3]. The most feasible procedure would likely be to expand the sub-unit of the 1950-51 Health and Physical Education Course as has been done in the St. James Collegiate experiment previously mentioned. The writer suggests this approach purely as a measure of expediency. While optimum results are unlikely to be achieved, the opportunity to awaken teacher and student interest without disrupting the present timetable should not be ignored. The status of driver education in relation to other curriculum offerings will grow as the need for this experience is demonstrated.

On the question of cost, the writer can add nothing further to his two exploratory suggestions: (1) elimination of some portion of the present curriculum; and (2) levying a driver education tax on all Manitoba drivers' licences.

---

[1] Teacher's Manual for Sportsmanlike Driving. Washington: American Automobile Association, 1948. Pp. iii-173.

[2] Driver Education Teacher's Manual for Classroom Instruction. New York: Association of Casualty and Surety Companies, 1950. Pp. 52.

[3] Report of the Directed Self Survey Winnipeg Public Schools, p. 228. Op. cit.

Probably the greatest problem that will face high school principals will be the selection of competent staff teachers to conduct the road training phase of driver education. Few if any qualified driving instructors will be available until the Manitoba Faculty of Education, University of Manitoba, develops courses to train them, and there is little likelihood that such courses will be arranged until the demand for them is evident. This dilemma was probably anticipated in the suggestion by Winnipeg high school teachers that appeared in the previously mentioned Reavis report:

> . . . It is possible that arrangement could be made involving the police, the motor club, and automobile companies for a program and facilities involving guided training of high-school youth before they receive driver's licences. [1]

The foregoing suggestion for assistance by such a non-school agency seems, in the opinion of the writer, to possess many disadvantages. While school expenses will benefit by reason that such services will be freely donated, it is questionable whether this saving will counterbalance the school's loss in control of the program. If funds can be obtained for the purpose, Manitoba secondary schools might well adopt the practice of British Columbia schools and utilize the services of a competent professional driving school. It would appear that this plan possesses a number of distinct advantages:

1. Competency of instructors is assured through Manitoba Safety Division's licensing controls.
2. School retains complete control over (1) content of course, (2) method of instruction, (3) time-allotments per pupil, and (4) time of instruction.

---

[1] Ibid., p. 228.

3. More students benefit due to the availability of numerous dual-controlled automobiles and to the extreme flexibility of instruction periods.
4. The school avoids certain troublesome responsibilities: (1) liability for any accidents, (2) housing and maintaining vehicles, and (3) supervision by staff members outside school hours.

Summary.--It would be useless to gloss over the many formidable problems that arise upon introducing and administering a program of driver education in Manitoba high schools. The materials that have been presented should emphasize the complexity of this undertaking, hence the need for careful planning.

In tracing the growth of the highway accident problem, its appalling magnitude, and the measures conceived for its solution, frequent reference was made to the major theme in the accident prevention program--the education of all road-users. Because participation in such a program is a novel experience for Manitoba high schools, the writer freely annotated his data with the opinions and findings of experts in the traffic safety field. But in the long view, it will be the teacher, not the specialist, who provides the learning experiences which may enable youth to meet the problems of highway traffic. With supervisory guidance and progressive leadership provided, the teacher may be expected to react more enthusiastically and exert greater effort toward an attainment commensurate with the school's fullest capacity--the conservation of life.

CHAPTER VII

CONCLUSIONS AND IMPLICATIONS OF THE STUDY

In recent years, highly emotionalized reports have frequently accompanied the occurrence of serious motor vehicle accidents involving youthful drivers stressing the tragic proportions of the highway accident problem, indicting youth as reckless and irresponsible drivers, and usually urging a variety of panaceas.

A preliminary study seemed to indicate that the local and national traffic toll constituted a problem of major dimensions, and that there could be little dispute with the statistics which showed drivers in the 16 to 24 age category to be the worst accident offenders. Information was also found, however, which clearly suggested an awareness to the magnitude of the mischief, and the vital interest that had been generated toward finding its ultimate solution.

In areas such as Great Britain and the United States where the most tangible reductions in highway accidents seemed to have been achieved it became at once apparent that a diversified, and highly scientific approach had been formulated and been put into action. It was also apparent that, in directing their attention to the abnormally high child and youth involvements, these plans were unanimous in advocating more effective participation by the schools in highway safety programs.

This preliminary survey suggested an undertaking that would inquire critically whether there existed a need for extending traffic safety education to the Manitoba high school level, and, if such were found to be indicated, to examine some of the major problems the school would encounter. A number of hypotheses were formulated to serve as focal points in this investigation. The principal findings and their implications have been reported below in terms of these hypotheses, which have been framed in the form of questions.

First hypothesis.--How has the growth of motor vehicle usage influenced the highway accident problem?

In Manitoba, a span of forty years has witnessed a phenomenal rise in the number of motor vehicles registered and persons licensed to drive. From 418 passenger cars in 1908 the total has increased to 180,000 motor vehicles in 1951; double the number of vehicles registered ten years ago. Nearly one-quarter million Manitobans travelled over 1000 million miles by motor vehicles in 1951; one of every three persons now residing in this Province have "qualified" for driver licences.

For Manitoba schools, continuation of this trend will mean that half of the student population now attending junior high school will be driving upon graduation from the senior levels.

This trebling of population increases by motor vehicle usage rates over the last ten years implies that Manitoba highways have been filled with a vast, heterogeneous host of drivers, who must include numbers of persons mentally and physically unfit, socially and financially irresponsible, and possessing

insufficient knowledge or skill to operate their vehicles safely.

Second hypothesis.--Has a basic concept been applied in accident prevention programs?

The first serious attempt at conservation through accident prevention measures appears to have been carried out in industry. The success of the programs is to be inferred from the industrial accident statistics which show by reductions in frequency and severity rates that accidents have decreased to a third during the last quarter century.

The second major area to introduce safety education measures appears to been the elementary schools of the United States. Child accident rates when compared to those of the general population have steadily decreased. During a span of fifteen years (1930-45) it has been estimated that a saving of 24,000 child-lives has been accomplished largely due to the influence of safety teaching in the schools.

The safety achievements of industry and the elementary school have meaning for the application of driver education to the Manitoba secondary curriculum by virtue of having demonstrated the validity of the following concepts:

1. By experimenting with, and rejecting total reliance on mechanical safeguards in favor of an approach which functionally relates the safety program to the behavior of the individual, industry helped to establish the fundamental concept of accident prevention--accidents are manifestations of underlying maladjustments in the individual.
2. First, by deeming the teaching of safe-walking and safe-bicycling as legitimate functions of the school, the

the elementary grades have established the precedent for school participation in safety activities. Secondly, by experimenting with various methodologies, the elementary school has shown the feasibility of organizing safety education either as a separate subject or as an integrated part of other fields. By the success it has attained through application of the "learning by doing" principle, the elementary school has demonstrated the inadvisability of ignoring practical learning experiences in safety education.

Third hypothesis.--What do accident statistics reveal about the extent of the accident problem? What implications have they for the secondary school? What deficiencies are apparent in these data?

An analysis of the over-all highway accident trends for Great Britain, the United States, and Canada, indicated that only Canada had maintained its high post-war rate of accident increase. The peak period of road casualties was 1941 for the United States and 1938 for Great Britain. Reductions in accidents in these countries coincided with the introduction of nationally co-ordinated highway safety programs.

A statistical analysis of all types of Manitoba motor vehicle accidents for the years 1944-50 revealed the following trends:

1. Total accidents per 10,000 motor vehicles registered showed an undeviating climb from an index of 300 to 680.
2. Except for a reversal in 1947, traffic injured persons per 100,000 population advanced steadily from 200 to 390.

3. Road fatalities, which have never exceeded two per cent of Manitoba's total accident experience for any single year, reveal no significant trend. The lowest number of deaths per 100 million motor vehicle miles travelled --6,6 --occurred in 1950, the year in which Manitoba recorded its greatest number of highway accidents.

Deficiencies in the published data relating to (a) accident involvement by age, (b) violations, and (c) cost of accidents to the community were overcome through first-hand analysis of primary Manitoba accident files. The principal findings were:

1. Manitoba operators, ages 16 to 24, were involved in nearly two times the number of injury-accidents and over three times the number of fatal accidents as the remainder of the driving population. These statistics were developed on the basis of accidents per total driver age category licensed.
2. Seventy-six out of every 100 youthful Manitoba drivers involved in injury-accidents were found to have committed offences in their accidents punishable under the Highway Traffic Act.
3. It was estimated that accidents involving youthful drivers during 1951 cost the community an amount of the order of $5,000,000.

The implications of these findings were twofold: (1) the accelerating increase of all types of traffic accidents in Manitoba up to 1951 suggested the need for extending the present effective, but limited government highway safety program; (2) the records of youthful drivers indicated an acute

need for concentrating the major efforts of any safety education program in areas accessible to them.

Fourth hypothesis.--What is the normative status of driver education in the United States and Canada? Are the efforts of driver education justified in terms of reduced accidents?

Reports received from the United States indicated that over one-third of that nation's secondary schools were offering driver education on their curricula. In addition, nearly two hundred institutions were providing teacher preparation courses, seminars for college instructors, and graduate and post-graduate degree courses in safety education. Current proceedings of national organizations interested in safety education appeared less concerned with justifying driver education than with the practical problems of making it an effective program in the high schools.

Replies to the writer's questionnaire revealed that less than twenty Canadian high schools were offering driver education. With one exception the road training in all schools was carried during outside school hours. None of the courses were alloted high school credits. The support for driver education appeared to originate largely from non-school quarters. Some adverse criticism was expressed from remote positions in Canadian educational circles and, so it appeared to the writer, were based upon untested presumptions.

A number of published studies were reviewed which purported to prove the improvement in accident involvements of young drivers having completed courses in driver education. While the results varied considerably, it appeared significant that major reductions had presumably been achieved among every

group of driver education students.

The enthusiastic support accorded driver education in the United States, its rapid growth to a prominent position on the curriculum, and the benefit to students in terms of reduced accident involvement implied that the Manitoba high school could contemplate instituting at least some experimental classes on the assurance that driver education had proved popular and effective in other secondary schools.

Fifth hypothesis.--Is driver education in harmony with the purposes and functions of the high school?

In view of the desired goals to be achieved through driver education, no conflict was found with the basic philosophical and psychological tenets of the modern secondary school.

In examining the feasibility of introducing driver education into the Manitoba high school curriculum certain suggestions seemed in order:

1. That driver education could best be integrated with the existing Health and Physical Education course;
2. That initially, driver training could be best provided outside regular school hours.
3. That professional driving schools could be employed until such time as the school is prepared to provide adequate instruction in driver training.

Sixth hypothesis.--What fundamental problems are likely to be encountered in introducing driver education in the high schools?

Some of the basic problems that were considered, mainly in principle, were (1) course content, (2) types of programs,

(3) costs, (4) standards and evaluation, and (5) teacher preparation.

Except for the discussion on course content where a review of eighteen American guides for high school education suggested definite patterns of learning experiences perhaps applicable to initial courses in Manitoba schools, the treatment of the problems was largely philosophical and unsupported by any objective data. On the questions of driver education costs and teacher preparation, however, several exploratory approaches were suggested for further research. These included investigating the advisability of setting up teachers' courses in driver education at the University of Manitoba, and studying the possibility of obtaining funds for training youthful drivers through the medium of a driver licence tax.

Final hypothesis.--Do experimental findings involving the driver testing of student operators suggest the need for systematic instruction and guidance? What personal characteristics among youthful drivers suggest serious deficiencies in their ability to operate a motor vehicle safely?

The major portion of this study was devoted to accumulating and analyzing experimental data on the driver skills, knowledge of safe driving practices, and driver attitudes of various samples of students and youthful drivers who had appeared at the Manitoba Government's Driver Improvement Clinic. The important findings seemed to have been the following:

1. Licensed students in Winnipeg high schools rate significantly higher on knowledge items than do non-licensed

students.

2. No significant differences in knowledge of safe driving were found between samples of licensed students from all six Winnipeg high schools.
3. No significant differences appeared among student samples in the psychophysical capacities tested.
4. The group averages made by the licensed student sample of St. John's High were significantly poorer than the norms of American high school students having completed courses in driver education. Standardized tests for knowledge, attitudes, and driving skills were used to measure the differences.
5. The Manitoba Driver Improvement Clinic's test records indicated that the substandard level of driving proficiency was general across (a) all age categories, (b) all types of former driving experience, and (c) nearly all types of driver occupation.
6. An examination of the test-, personal-, and accident-histories of twenty-eight youthful drivers who were among Manitoba's worst traffic offenders indicated: (a) the majority had high school attendance; (b) the majority were employed as professional drivers; (c) the majority failed their first road test; and (d) the period of time free from accidents and convictions <u>after</u> having passed the battery of tests and received the Clinic's personal counselling was on the average significantly <u>longer</u> than the elapsed time to accumulate the entire previous record.

<u>Conclusion</u>.--The data suggest that Manitoba youth's susceptibility to a disproportionately high rate of accident involve-

ments is the resultant of a number of vector forces over which he can exert little influence. Untutored in the skills and knowledge prerequisite for safe driving, immature because of his years, cast into an environment where potentially dangerous driving practices are not the exception but the rule, Manitoba youth today is a target for disaster on the highway.

One conclusion seems inescapable. So long as Manitoba youth is denied the opportunity to prepare himself for the problems of highway travel before he drives, so long as he must first accumulate a critical number of accidents to qualify for the minimum counselling services available, then just so long will youth and accidents remain synonymous terms.

Whenever a significant problem arises whose ultimate solution lies in educable factors, those concerned with the problem must seek assistance from the schools. The reduction of accidents involving its youth poses a challenge for Manitoba schools.

BIBLIOGRAPHY

Articles

Allgaier, E. "Some Road-User Characteristics in the Traffic Problem." American Automobile Association. Washington, D.C.: the Association, 1950, 59-77.

Brewster, W.H. "Teen-Age Drivers, Their Influence on Automobile Liability Insurance Rates," Inspection News. New York: Association of Casualty and Surety Companies, 1950.

"Committee on Street and Highway Accidents," Journal of the American Medical Association, CXVII (1942).

Conrad, H.S. "Some Principles of Attitude-Measurement: A Reply to 'Opinion-Attitude Methodology'," Psychological Bulletin, XLVI, 6 (November, 1946), 570-589.

"Driver Training Courses," The Canadian Education Association News Letter, Number 67. Toronto: the Association, (May-June, 1951), 4.

Elkow, J.D. "Recent Developments in Psychophysical Testing," Safety Education Digest. New York: Center for Safety Education, New York University, 1949. 44-46.

Hagman, E.P. "Preparing Teachers for Driver Education," Teachers College Record, (April, 1948), 478-485.

Hubbard, F.W. "Editorial Comment: Research in Safety Education," The Phi Delta Kappan, XXI (January, 1939), 161.

"Increase in Road Accidents in 1950 in Great Britain," Highway Research Abstracts, XXI (April, 1951), 13.

Johnson, H.M. "The Detection and Treatment of Accident-Prone Drivers," Psychological Bulletin, XLIII, 6 (November, 1946), 489-532.

King, R.F. "Driver Education Pays Off," Public Safety, (December, 1950), 10-24.

Lauer, A.R. "Methods of Measuring the Ability to Drive an Automobile," Extension Service Bulletin, CXV. Ames: Iowa State College, 1936.

Lauer, A.R. "What Types of Persons Have Accidents?" National Safety News, XXVI (1932), 16.

Muensterburg, H. "Experiments in the Interest of Electric Railway Service," Psychology and Industrial Efficiency. New York: Houghton-Mifflin Company, 1913.

"Driver Education Shows Sharp Upswing in 1950 bu Two-Thirds of Nation's High Schools Fail to Offer Course," Spotlighting Traffic Safety, Newsletter of National Committee for Traffic Safety, VI, 9 (September, 1950), 1-4.

Nicholls, J.V.V. "Relationship of Heterophoria to Depth Perception in Aviation," American Journal of Ophthalmology, XXXIII (October, 1950), 14-97.

Renner, D.E. "Drivers' Vision Tests," The Optometric Weekly (September, 1950).

Stack, H.J. "Progress in Safety Education," Safety Education Digest (Fall, 1949), 4.

"U. S. Truck Fleet Increased 7.2 Per Cent in 1950," Highway Research Abstracts, XXI (June, 1951), 3.

Vernon, H.M. "The Neglect of the Human Factor in the Prevention of Industrial Accidents," International Labour Review, XXXIV (December, 1936), 393-396.

Wechsler, D. "Tests for Taxicab Drivers," Personnel Journal, V (May-June, 1936), 24-30.

Whitney, A.W. "Why Are We in Safety Education?" Safety Education, VIII (November, 1938), 74-75.

Books

Brody, L. Personal Factors in Safe Operation of Motor Vehicles. New York: Center for Safety Education, New York University, 1941. Pp. 96.

DeSilva, H.R. Why We Have Automobile Accidents. New York: John Wiley and Sons, Incorporated, 1942. Pp. 394.

Douglass, A.A. Modern Secondary Education. Boston: The Houghton-Mifflin Company, 1938. Pp. 375.

Douglass, H.R. The High School Curriculum. New York: The Ronald Press, 1947. Pp. 661.

Driver Education Teacher's Manual for Classroom Instruction. New York: Association of Casualty and Surety Companies, 1950. Pp. 52.

Driver Improvement through Licensing Procedures. American Association of Motor Vehicle Administrators. Washington, D.C.: the Association, 1950. Pp. 112.

Driver Selection and Training: A Manual for Truck Operators. Prepared by Dr. R.N. Murry and Professor A.E. Neyhart. Cleveland: The White Motor Company, 1946. Pp. 49.

Driver Training Reduces Traffic Accidents One-Half. American Automobile Association. Washington, D.C.: the Association, 1945. Pp. 18.

Facts and Figures of the Automobile Industry. Canadian Automobile Chamber of Commerce. Toronto: the Chamber, 1950. Pp. 56.

Good, C.V., Barr, A.S. and Scates, D.E. The Methodology of Educational Research. New York: Appleton-Century-Crofts, Incorporated, 1941. Pp. 890.

High-School Driver Education: Policies and Recommendations. National Conference on High-School Driver Education, administered by The National Commission on Safety Education. Washington, D.C.: National Education Association, 1950. Pp. 78.

Instruction Manual for Driver Tests. Prepared by the Traffic Engineering and Safety Department, American Automobile Association. Washington, D.C.: the Association, 1949. Pp. 16.

Judge and Prosecutor in Traffic Court. American Bar Association. Chicago: The Traffic Institute, Northwestern University, 1951. Pp. 345.

Key, N. Education for Traffic Safety. Washington, D.C.: American Automobile Association, 1949. Pp. 47.

Lawshe, C.H., Jr. A Review of the Literature Related to the Various Psychological Aspects of Highway Safety. Lafayette, Indiana: Purdue University, 1939. Pp. 59.

Leonard, J.P. Developing the Secondary School Curriculum. New York: Rinehart and Company, 1946. Pp. 580.

Let's Teach Driving. National Commission on Safety Education. Washington, D.C.: The National Education Association, 1947. Pp. 133.

Lindquist, E.F. A First Course in Statistics. Boston: The Houghton-Mifflin Company, 1942. Pp. 242.

Man and the Motor Car. Edited by M.D. Kramer. New York: Association of Casualty and Surety Companies, 1950. Pp. 318.

Man and the Motor Car. Edited by A.W. Whitney. New York: Association of Casualty and Surety Companies, 1947. Pp. 287.

Manual on Drivers' Vision Test. Prepared by the Motorists' Vision Committee, American Optometric Association. Pittsburgh: the Association, 1949. Pp. 36.

Manual on State Traffic Accident Records, Part XI. National Safety Council. Chicago: the Council, 1950.

MacMillan, R. Safety Education in the Public Schools of the United States. Philadelphia: Temple University, 1936. Pp. 112.

The Motor Vehicle Driver: His Nature and Improvement. Eno Foundation for Highway Traffic Control. Saugatuck, Connecticut: the Foundation, 1949. Pp. 165.

Munsterburg, H. Accidents and Their Prevention. New York: The Houghton-Mifflin Company, 1939. Pp. 321.

Musselman, M.M. Get a Horse! The Story of the Automobile in America. New York: J.B. Lippincott Company, 1950. Pp.304.

Personal Characteristics of Traffic Accident Repeaters. Eno Foundation for Highway Traffic Control. Saugatuck, Connecticut: the Foundation, 1948. Pp. 64;

Pound, A. Transportation Progress: A Story of Self-Propelled Vehicles from Earliest Times down to the Automobile. Reprinted from The Story of General Motors through Twenty-Five Years, 1908-1933. New York: Doubleday, Doran and Company, 1934. Pp. 54.

Research in Safety Education. National Safety Council. Chicago: the Council, 1950. Pp. 23.

Safety Education: Eighteenth Yearbook. American Association of School Administrators. Washington, D.C.: the Associ ation, 1940. Pp. 544.

Safety Supervision in Motor Vehicle Fleets. Edited by M.D. Kramer for the Association of Casualty and Surety Companies. New York: the Association, 1947. Pp. 214.

Siebrecht, E.B. Measuring Driver Attitudes. New York: Center for Safety Education, New York University, 1941. Pp. 35.

Sportsmanlike Driving. Edited by B.W. Marsh. Washington, D.C.: American Automobile Association, 1948. Pp. 473.

Stack, H.J. Improving the Attitudes of Younger Drivers. New York: Center for Safety Education, New York University, 1948. Pp. 18.

Stack, H.J. Safety Education in the Secondary Schools. New York: Teachers College, Columbia University, 1929. Pp.157.

Streitz, R. Safety Education in the Elementary School. New York: Columbia University, 1926. Pp. 142.

Taff, C.A. Commercial Motor Transportation. Chicago: Richard D. Irwin, Incorporated, 1950. Pp. 413.

Teacher's Manual for Sportsmanlike Driving. American Automobile Association. Washington, D.C.: the Association, 1948. Pp. 173.

Teen-Age Drivers. Lumbermans Mutual Casualty Company. Chicago: Lumbermans, 1950. Pp. 17.

Thayer, V.T., Zachry, C.B. and Kotinsky, R. Reorganizing Secondary Education. New York: D. Appleton-Century Company, 1939.

Traffic Engineering Handbook. Edited by H.K. Evans. New Haven, Connecticut. Institute of Traffic Engineers, 1950. Pp.514.

Uses of Traffic Accident Records. Eno Foundation for Highway Traffic Control. Saugatuck, Connecticut: the Foundation, 1947. Pp. 187.

Letters

Brown, C.A., Deputy Minister, Department of Education, Ontario, January, 1951.

Collins, S.K., Assistant Educational Director, American Casualty and Surety Companies, New York, August, 1951.

Fanning, E.J., Supervisor, Driver Education, Registry of Motor Vehicles, The Commonwealth of Massachusetts, January, 1951.

Filteau, B.O., Secretary, Departement de l'Instruction Publique, Province de Quebec, January, 1951.

Frame, W.E., Chief Superintendent of Schools, Department of Education, Alberta, January, 1951.

MacDiarmid, F.E., Chief Superintendent of Education, Province of New Brunswick, January, 1951.

McCallum, A., Deputy Minister, Department of Education,Province of Saskatchewan, January, 1951.

Meredith, J.R., Research Assistant, Department of Education, British Columbia, February, 1951.

Moffatt, H.P., Deputy Minister, Department of Education, Province of Nova Scotia, January, 1951.

Percival, W.P., Director of Protestant Education, Province of Quebec, January, 1951.

Shaw, L.W., Deputy Minister, Department of Education, Province of Prince Edward Island, January, 1951.

Tucker, G.A., Deputy Minister, Department of Education, Newfoundland, March, 1951.

Ziegler, W.T., Principal, Kitchener-Waterloo Collegiate and Vocational School, Kitchener, Ontario, July, 1950.

Public Documents

"The Center for Safety Education," A Syllabus of the Center for Safety Education, New York University. New York: the Center, 1950.

Driver Education, Bulletin Number 493. Austin, Texas: Department of Education, 1950. Pp. 61.

Driver Education and Training: Publication Number 8. Jefferson City, Missouri: Department of Education, 1947. Pp. 32.

The Highway Traffic Act. Office Consolidation of Chapter 93 of the Revised Statutes of Manitoba, 1940. Winnipeg: King's Printer, 1951.

"Metropolitan Area of Winnipeg," Report on Census of Prairie Provinces, 1946. Dominion Bureau of Statistics. Ottawa: King's Printer, 1947.

Programme of Studies for the Schools of Manitoba, Senior High Schools. Winnipeg: King's Printer, 1950.

Uniform Definitions of Motor-Vehicle Accidents. Prepared by the Federal Security Agency, National Office of Vital Statistics. Washington, D.C.: Government Printing Office, 1947.

Reports

1950 Accident Facts. National Safety Council. Chicago: the Council, 1950. Pp. 98.

1951 Accident Facts. National Safety Council. Chicago: the Council, 1951. Pp. 97.

1949 Annual Report of the Vancouver Traffic and Safety Council. Vancouver: the Council, 1950. Pp. 18.

Final Report of the Committee on Road Safety. Ministry of War Transport. London, England: His Majesty's Stationery Office, 1947. Pp. 144.

Final Report on Student Driver Training Program. State Department of Public Instruction. Dover, Delaware: the Department, 1947. Pp. 5.

Interim Report of the Committe on Road Safety. Ministry of War Transport. London, England: His Majesty's Stationery Office, 1945. Pp. 88.

1948-49 Inventory and Guide for Action. The President's Highway Safety Conference. Washington, D.C.: Government Printing Office, 1948. Pp. 75.

1949-50 Inventory and Guide for Action. The President's Highway Safety Conference. Washington, D.C.: Government Printing Office, 1949. Pp. 78.

The Motor Vehicle, 1949. Compiled by the Public Finance and Transportation Division, Dominion Bureau of Statistics. Ottawa: King's Printer, 1950. Pp. 34.

The Motor Vehicle, 1950. Compiled by the Public Finance and Transportation Division, Dominion Bureau of Statistics. Ottawa: King's Printer, 1951. Pp. 39.

Priorities in the Action Program: 1950-51 Inventory and Guide for Action. The President's Highway Safety Conference. Washington, D.C.: Government Printing Office, 1950. Pp.85.

Report of Committee on Accident Records. The President's Highway Safety Conference. Washington, D.C.: Government Printing Office, 1946. Pp. 26.

Report of the Directed Self Survey Winnipeg Public Schools. Compiled by Committee on Field Services, Department of Education, University of Chicago. Chicago: the University, 1948. Pp. 311.

Report of the Committee on Education. The President's Highway Safety Conference. Washington, D.C.: Government Printing Office, 1949. Pp. 50.

Results of Driver Training. American Automobile Association. Washington, D.C.: the Association, 1948. Pp. 4.

Report of Committee on Motor Vehicle Administration. The President's Highway Safety Conference. Washington, D.C.: Government Printing Office, 1949. Pp. 24.

Report of Committee on Tests for Intoxication. National Safety Council. Chicago: the Council, 1939.

Research Report Number 24: A Compilation of the "Best" Selective Techniques for Driver Selection. Traffic Engineering and Safety Department, American Automobile Association. Washington, D.C.: the Association, 1949. Pp. 8.

Road Accidents Report. Prepared by J.H. Jones for the Ministry of Transport. London, England: His Majesty's Stationery Office, 1946. Pp. 80.

Safety Education in the Schools. Report of the Subcommittee Of Safety Education, White House Conference on Child Health and Protection. New York: The Century Company, 1932. Pp. 61.

Summary of Available Cost Figures for Driver Education Courses. National Commission on Safety Education. Washington, D.C.: National Educational Association, 1950. Pp. 5.

Summary of Results, High School Driver Award Program, 1948-1949-1950. Association of Casualty and Surety Companies, New York: the Association, 1950. Pp. 4.

Unpublished Material

Beattie, L.S. "A Discussion of High School Driver Education and Training." Toronto: University of Toronto, 1949 (mimeographed). Pp. 10.

Brougher, S.F. "A Survey of Driver Education in Texas Schools." Master's Thesis. Austin: University of Texas, 1950.

Christman, W.M. Jr. "A Study of Certain Administrative Features of Driver Education and Training Courses in the High Schools of the United States in 1940." Master's Thesis. Pennsylvania State College, 1940.

Conover, D. "Development of Certain Techniques for the Measurement of Driver Attitudes." Master's Thesis. Iowa State College, 1947.

Jeppsen, E.C. "A Procedure for Determining the Content of a Course of Study for Automobile Drivers." Master's Thesis. Colorado A&M College, 1938. Pp. 114.

Neyhart, A.E. "The Relation of the Training and Other Characteristics of Automobile Drivers to Their Proneness to Accidents." Master's Thesis. Pennsylvania State College, 1934. Pp. 89.

Rudd, S.J. "Highway Auto Traffic Accidents and Their Causes with Special Reference to a High School Automotive Safety Program." Kansas State Teachers College, 1947. Pp. 66.

T-ht-28

HIGHWAY TRAFFIC ACT

Report and Statement Concerning an Accident

(S.S. 4 of Sec. 128F of H.T.A.)

Date.....19.....

Accident Location .....

Time of Accident ..... (A.M. or P.M.) (Day of Week) Date of Accident.....19.....

	No. 1	No. 2
Date Reporting ..... Time ..... (A.M. P.M.)		..... Time ..... (A.M. P.M.)
Person Reporting		.....
Address		.....

VEHICLES INVOLVED

Make and Year		.....
Serial Number		.....
Type of Vehicle		.....
License Number		.....
Registered Owner's Name		.....
Registered Owner's Address		.....
Driver		.....
Address		.....
Driver's License No.		.....
Insurance Card ..... (Yes) (No)		..... (Yes) (No)
Fin. Resp. Card (Number)		.....
Insurance Company		.....
Policy Number		.....
Date Policy Expires		.....
Approximate Damage $.....		.....
Possible Infraction (H.T.A.).....		.....

T-ht-28

HIGHWAY TRAFFIC ACT

Report and Statement Concerning an Accident

(S.S. 4 of Sec. 128F of H.T.A.)

Date.....19.....

Accident Location .....

Time of Accident ..... (A.M. or P.M.) (Day of Week) Date of Accident.....19.....

	No. 1	No. 2
Date Reporting ..... Time ..... (A.M. P.M.)		..... Time ..... (A.M. P.M.)
Person Reporting		.....
Address		.....

VEHICLES INVOLVED

Make and Year		.....
Serial Number		.....
Type of Vehicle		.....
License Number		.....
Registered Owner's Name		.....
Registered Owner's Address		.....
Driver		.....
Address		.....
Driver's License No.		.....
Insurance Card ..... (Yes) (No)		..... (Yes) (No)
Fin. Resp. Card (Number)		.....
Insurance Company		.....
Policy Number		.....
Date Policy Expires		.....
Approximate Damage $.....		.....
Possible Infraction (H.T.A.).....		.....
..... (Signature of Person Reporting)		..... (Signature of Person Reporting)
..... (Signature of Officer — Detachment)		..... (Signature of Officer — Detachment)

STATISTICS

Age of Driver and Sex		.....
Speed ..... Direction		Speed ..... Direction .....
No. Miles Travelled Last Yr. ..... Before Accident.....		No. Miles Travelled Last Yr. ..... Before Accident.....
Driver's Experience: (a) Years		(a) Years .....
(b) Taught by Driving School or Not ..... (Yes or No)		(b) Taught by Driving School or Not ..... (Yes or No)
No. of Occupants		.....
No. and Ages of Persons:		
(a) Killed ..... No. Ages No. Hospitalized		(a) Killed ..... No. Ages No. Hospitalized
(b) Injured		(b) Injured .....
Purpose of Trip (business or pleasure)		..... (Business or pleasure)
Hours Driven Without Rest Prior to Accident		.....

Weather Conditions ..... (Clear, cloudy, rain, etc.) Road Location ..... (Curve, hill, etc.) Type ..... (Paved, etc.)

Road Condition .....

REMARKS: (Give complete ACTION AND CONDITION OF MOTORIST AND/OR PEDESTRIAN WHERE POSSIBLE)

.....

.....

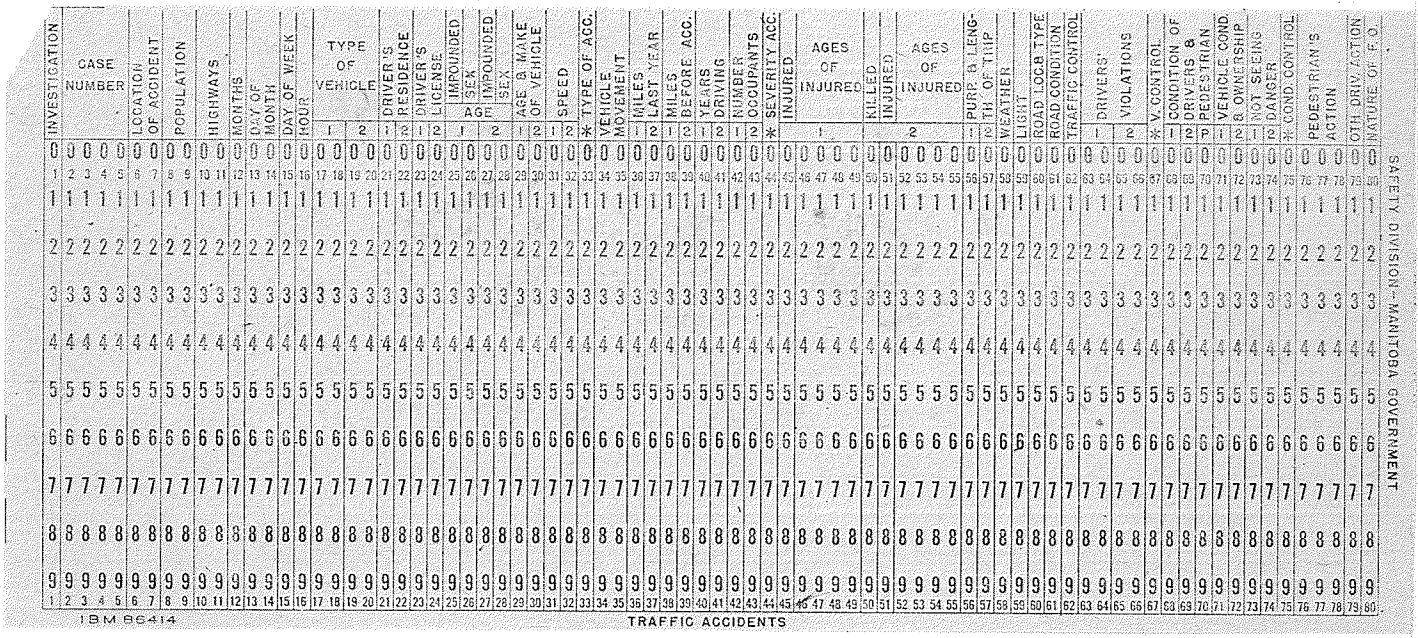
.....

.....

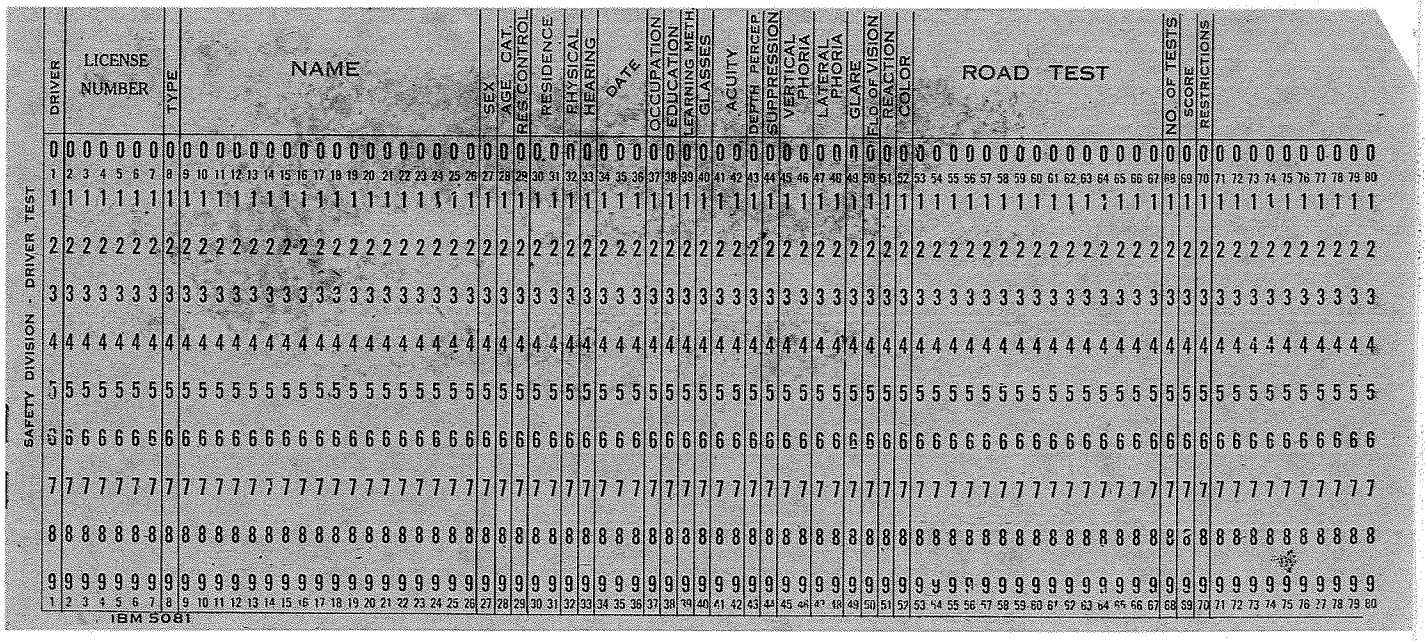
APPENDIX B

HOLLERITH ANALYSIS CARDS

Accident Records



Driver Examination Record

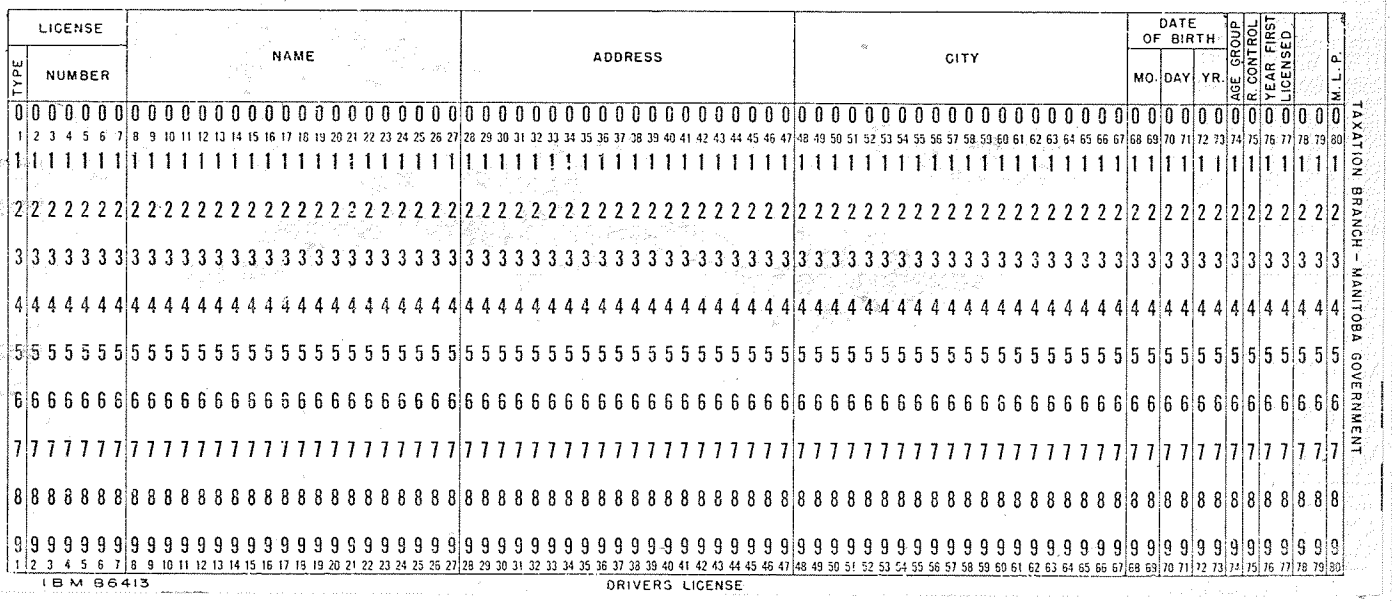


APPENDIX C

DRIVER RECORD SOURCES

1. Master Hollerith Record Card
2. Driver Licence application Form

Master Hollerith Record Card



DRIVER LICENCE-APPLICATION FORM

FORM T-ht-90

PROVINCE OF MANITOBA

DRIVER'S LICENSE

THE UNDERMENTIONED IS LICENSED AS A DRIVER UNDER THE HIGHWAY TRAFFIC ACT TO OPERATE A MOTOR VEHICLE AS A CHAUFFEUR.

NOT VALID UNLESS STAMPED HERE BY ISSUING OFFICE

EXPIRES JUNE 30th, 1953

LICENSE NO.

MO.	DAY	YEAR

DATE OF BIRTH

△IA (SIGNATURE OF DRIVER — IN INK)

Driving & Walking
Be Safety - Wise!

DO NOT DETACH

THIS IS YOUR APPLICATION FOR DRIVER'S LICENSE

I, _____
(PRINT IN INK — LAST NAME FIRST)

OF _____
(RESIDENCE ADDRESS) (POST OFFICE)

OCCUPATION _____

FEE $1.50

LICENSE NO.

DATE OF BIRTH MO.	DAY	YEAR

DO HEREBY APPLY FOR A LICENSE TO OPERATE A MOTOR VEHICLE ☐ MOTOR CYCLE ☐ AND CERTIFY THAT THE ANSWERS GIVEN HERE ARE TRUE

DO YOU WEAR GLASSES WHILE DRIVING?_____ DO YOU SUFFER FROM FITS OR BLACKOUTS?_____

GIVE PARTICULARS OF ANY OTHER PHYSICAL DISABILITY_____

ARE YOUR DRIVING PRIVILEGES SUSPENDED? (YES OR NO)_____

DATE_____ 195____ _____
(SIGNATURE IN INK)

FILL OUT THE ABOVE AND RETURN THE ENTIRE FORM TOGETHER WITH FEE TO SAFETY DIVISION, REVENUE BUILDING, WINNIPEG, MAN.

CAUTION: IT IS A PUNISHABLE OFFENCE KNOWINGLY TO MAKE A FALSE ANSWER TO ANY OF THE ABOVE QUESTIONS.

APPENDIX D

DRIVER KNOWLEDGE TESTING

1. 45-Item Abridged Form
2. 50-Item Standard Form

KNOWLEDGE TEST FOR AUTOMOBILE DRIVERS

Conducted by the Winnipeg Junior Chamber of Commerce

Fill in the following blank spaces, read the following directions for answering the test questions, and then start immediately with the test. WRITE PLAINLY.

Name _____ **No. of Years a Driver** _____

Position or School _____ **Age** _____ **Date** _____

City _____ **Province** _____

PARTS	SCORE
I	
II	
TOTAL	

The test consists of two parts: Part I, of 22 true-false statements; and Part II, of 23 multiple-choice statements.

DIRECTIONS FOR PART I. Some of the following statements are true; some are false. Read each statement through carefully. If you think a statement is TRUE, place an X in the proper square under TRUE. If a statement is FALSE, place an X in the proper square under FALSE.

PART I

	True	False
1. It is not necessary for you to follow the directions of road signs in the vicinity of your home if you are entirely familiar with the conditions where the signs are posted	☐	☐
2. When a left turn is to be made on multiple-lane streets at an intersection, you should always make the turn from the lane nearest the center line	☐	☐
3. The practice of crossing the center line on a curve is all right providing you can see 300 feet ahead	☐	☐
4. It is better to rely on a quick dash of speed to get through an intersection ahead of another vehicle than to reduce your speed in expectation of trouble as you approach the intersection	☐	☐
5. A stated speed limit sign really means that you should keep your speed definitely below the stated limit when the road is wet	☐	☐
6. It requires the same distance to slow down from 60 miles per hour to 50 miles per hour as from 40 miles per hour to 30 miles per hour	☐	☐
7. Defective eyesight will affect a driver more adversely in night driving than in day driving	☐	☐
8. A rear view mirror can be relied upon for a complete view of what is behind your car	☐	☐
9. You may legally exceed the speed limit when you are driving an injured person to the hospital	☐	☐
10. In preparing to make a right-hand turn you should drive your car so near to the right-hand curb (or line of parked cars) that no other driver may pass you on your right	☐	☐
11. More fatal accidents take place on clear, dry days than on stormy days	☐	☐
12. New nonskid tires have done away with the danger of skidding on wet pavements	☐	☐
13. Your vision to the sides decreases as the speed of your car increases	☐	☐
14. A pedestrian who has the right of way on a crosswalk in the daytime must yield it after dark because drivers	☐	☐

KNOWLEDGE TEST FOR AUTOMOBILE DRIVERS

Conducted by the Winnipeg Junior Chamber of Commerce

Fill in the following blank spaces, read the following directions for answering the test questions, and then start immediately with the test. WRITE PLAINLY.

Name _____ **No. of Years a Driver** _____

Position or School _____ **Age** _____ **Date** _____

City _____ **Province** _____

The test consists of two parts: Part I, of 22 true-false statements; and Part II, of 23 multiple-choice statements.

PARTS	SCORE
I	
II	
TOTAL	

DIRECTIONS FOR PART I. Some of the following statements are true; some are false. Read each statement through carefully. If you think a statement is TRUE, place an X in the proper square under TRUE. If a statement is FALSE, place an X in the proper square under FALSE.

PART I

	True	False
1. It is not necessary for you to follow the directions of road signs in the vicinity of your home if you are entirely familiar with the conditions where the signs are posted	☐	☐
2. When a left turn is to be made on multiple-lane streets at an intersection, you should always make the turn from the lane nearest the center line	☐	☐
3. The practice of crossing the center line on a curve is all right providing you can see 300 feet ahead	☐	☐
4. It is better to rely on a quick dash of speed to get through an intersection ahead of another vehicle than to reduce your speed in expectation of trouble as you approach the intersection	☐	☐
5. A stated speed limit sign really means that you should keep your speed definitely below the stated limit when the road is wet	☐	☐
6. It requires the same distance to slow down from 60 miles per hour to 50 miles per hour as from 40 miles per hour to 30 miles per hour	☐	☐
7. Defective eyesight will affect a driver more adversely in night driving than in day driving	☐	☐
8. A rear view mirror can be relied upon for a complete view of what is behind your car	☐	☐
9. You may legally exceed the speed limit when you are driving an injured person to the hospital	☐	☐
10. In preparing to make a right-hand turn you should drive your car so near to the right-hand curb (or line of parked cars) that no other driver may pass you on your right	☐	☐
11. More fatal accidents take place on clear, dry days than on stormy days	☐	☐
12. New nonskid tires have done away with the danger of skidding on wet pavements	☐	☐
13. Your vision to the sides decreases as the speed of your car increases	☐	☐
14. A pedestrian who has the right of way on a crosswalk in the daytime must yield it after dark because drivers cannot see him very well	☐	☐
15. When you intend to turn or stop, the law does not require you to give a hand signal unless there is a vehicle following yours	☐	☐
16. When you back your car, you have the right of way because you cannot see very well while driving backward	☐	☐
17. The amount of alcohol in one cocktail is sufficient to decrease one's keenness of vision	☐	☐
18. It is all right to warm up the car engine by running it in a closed garage provided you open the doors just as soon as you smell the carbon monoxide exhaust fumes	☐	☐
19. If a driver seriously injures a pedestrian, legally at fault, the driver does not have to make out an accident report	☐	☐
20. When you drive out of a filling-station yard, street traffic on your left has the right of way	☐	☐
21. It is not necessary to slow down at an unprotected intersection if you do not see any cross traffic	☐	☐
22. When you drive down a long hill, it is all right to hold the cluth pedal down if you leave the gear shift lever in high position	☐	☐

PART II

DIRECTIONS: Read each of the following statements carefully. Four possibilities for completing each statement are given. Select the one that you think completes the statement most correctly and place an X in the square under the proper number.

	1	2	3	4
1. Most traffic accidents are the result of: (1) Mechanical defects in automobiles (2) Defects in the road (3) Errors in drivers' judgment (4) Adverse weather conditions	☐	☐	☐	☐
2. Visibility is best at night when driving on roads made of: (1) Asphalt (2) Dirt (3) Brick (4) Concrete	☐	☐	☐	☐
3. A good driver, suddenly finding the foot brakes not functioning, will attempt to control the car for stopping by: (1) Turning off ignition (2) Pushing the clutch pedal down and letting it up, repeating this several times (3) Driving onto the shoulder of the road to slow down the car (4) Double clutching the gear into second position and using engine compression	☐	☐	☐	☐

1 2

4. When ascending a hill behind a transport truck, you should:
(1) Stay far enough behind the truck so that it does not block your view of oncoming traffic (2) Stay close to the rear of the truck so that no other car from behind can get in between you and the truck (3) Blow your horn (daytime) or flick your lights (night time) to let the truck driver know you wish to pass (4) Speed up and make a quick pass around the truck ☐ ☐ ☐ ☐

5. When driving around a curve on the highway you should:
(1) Accelerate at the beginning of the curve and apply the brakes just before reaching the straightaway (2) Slow down before reaching the curve, depress the clutch, and coast around the curve (3) Slow the car down with the engine before reaching the curve, start around the curve, and accelerate just before reaching the straightaway (4) Start into the curve at the speed the car is traveling and apply the brakes only if necessary ☐ ☐ ☐ ☐

6. In crossing trolley tracks on a wet street, you should:
(1) Turn gradually across the tracks (2) Cut across the tracks at a wide angle (3) Drive on the tracks before crossing them (4) make it a practice never to cross trolley tracks on wet days ☐ ☐ ☐ ☐

7. If application of the brakes at 20 miles per hour requires 25 feet to bring a car to a dead stop, the required distance at 40 miles per hour would be:
(1) 40 feet (2) 50 feet (3) 75 feet (4) 100 feet ☐ ☐ ☐ ☐

8. You are driving at the speed limit and a driver behind sounds his horn and starts by. You should:
(1) Decrease your speed slightly and give way to him (2) Block him to let him know he is already driving at the speed limit (3) Speed up get out of his way (4) Let him by and then overtake him ☐ ☐ ☐ ☐

9. Night traffic on the roads is much less than day traffic; but night accidents in proportion to the traffic are far more numerous than day accidents. The main reason is:
(1) Visibility is poor (2) Drunken drivers are more numerous. (3) Pedestrians walk on the wrong side of dark roads (4) People drive faster at night than during the day ☐ ☐ ☐ ☐

10. For safety when driving through an intersection, you should:
(1) Glance right and then left in approaching the intersection (2) Look into the mirror to see how close you are being followed (3) Glance left and then right in approaching the intersection (4) Keep your eyes straight ahead to see what dangers you might face ☐ ☐ ☐ ☐

11. If steam forms on the inside of the windshield, you should:
(1) Increase your speed by ten miles per hour (2) Stop every mile and wipe it off (3) Open a window slightly (4) Wipe it off frequently while driving ☐ ☐ ☐ ☐

12. If you are involved in an accident you should first:
(1) Notify the police (2) Assist the injured (3) Drive away quickly (4) Notify your insurance company ☐ ☐ ☐ ☐

13. When the right wheels of your car slip off the edge of the pavement, you should:
(1) Slow down gradually until you can steer back on to the pavement at a convenient place (2) Turn back onto the pavement quickly before your car has lost any of its momentum (3) Apply the brakes quickly in order to keep from rolling over into a ditch (4) Turn off the ignition, coast to a stop, and then back up onto the pavement ☐ ☐ ☐ ☐

14. You are driving on a snow-covered road and have to make a stop quickly. The best way to do this is to:
(1) Slam the brakes on hard (2) Roll down the window and signal (3) Turn off the ignition and apply the hand brake (4) Pump the brake pedal ☐ ☐ ☐ ☐

15. In bringing a car to a complete non-emergency stop from a speed in excess of 30 miles per hour, you should:
(1) Depress the clutch and brake pedals at the same time (2) Depress the clutch pedal first and then depress the brake pedal (3) Depress the clutch and brake pedals together and then place the gear shift lever in neutral (4) Depress the brake pedal first and depress the clutch pedal later ☐ ☐ ☐ ☐

16. Most automobile skids are the result of:
(1) Under-inflated tires (2) Too much snow or ice on the road (3) Over-inflated tires (4) Driving too fast on slippery road surfaces ☐ ☐ ☐ ☐

17. A red signal that flashes on and off, on and off, means:
(1) Stop (2) Slow down (3) Blow the horn (4) Shift to second gear ☐ ☐ ☐ ☐

18. Most city traffic accidents take place:
(1) In the morning rush (2) In the noon rush (3) In the evening rush (4) Late at night ☐ ☐ ☐ ☐

19. In preparation for a right turn the most important thing for you to do is:
(1) Drive in the extreme right lane (2) Check your mirror for conditions in the rear (3) Blow your horn lightly (4) Give a hand signal ☐ ☐ ☐ ☐

20. When driving in a fog at night you will have the best possible visibility by using:
(1) The upper headlight beam (2) The lower, or passing, headlight beam (3) The parking lights (4) No lights at all ☐ ☐ ☐ ☐

21. When driving behind a school bus which makes a sudden stop, you should:
(1) Slow down and pass if no children cross the road (2) Pass the bus, sounding your horn as you go by (3) Bump into the bus lightly (4) Stop behind the bus and wait for it to proceed before you start up again ☐ ☐ ☐ ☐

22. Your car (A) is being overtaken by another car (B) on a two-lane road. Just as the overtaking car draws up alongside yours, its driver, seeing that an oncoming car (C) is near, starts to drop back into line again. You can help reduce the danger toall three cars by:
(1) Accelerating (2) Applying the brakes (3) Keeping your speed constant (4) Blowing your horn as a danger signal ☐ ☐ ☐ ☐

23. In the situation above (No. 22) you are driving car (C). You can help reduce the danger to all three cars by:
(1) Blowing your horn (2) Keeping your speed constant (3) Moving toward the center of the road to scare car (B) back into line (4) Applying the brakes ☐ ☐ ☐ ☐

KNOWLEDGE TEST FOR AUTOMOBILE DRIVERS*

NEW YORK UNIVERSITY
DIVISION OF GENERAL EDUCATION
CENTER FOR SAFETY EDUCATION

rt Form

l in the following blank spaces, read the following directions for answering the test questions, and then start im-diately with the test. WRITE PLAINLY.

me_____ Age_____ Date_____

sition or School_____ No. of Years a Driver_____

y_____ State_____

The test consists of two parts: Part I, of 25 true-false statements; and Part II, of 25 multiple-choice statements.

PARTS	SCORE
I	
II	
TOTAL	

DIRECTIONS FOR PART I. Some of the following statements are true; some are false. Read each statement rough carefully. If you think a statement is TRUE, place an X in the proper square under TRUE. If a statement FALSE, place an X in the proper square under FALSE. The following statement is an example:

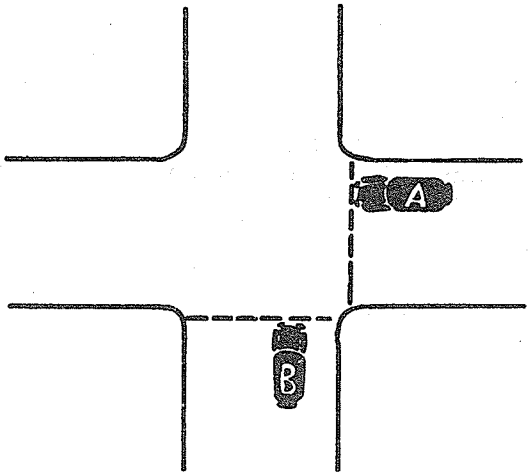
	True	*False*
As a rule motorists under 20 years of age are safer drivers than those over 40 years of age.....	☐	☒

PART I

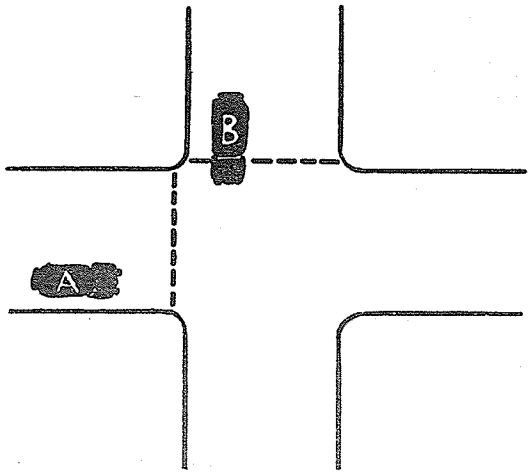
It is not necessary for you to follow the directions of road signs in the vicinity of your home if you are entirely familiar with the conditions where the signs are posted.	☐	☐
When a left turn is to be made on multiple-lane streets at an intersection, you should always make the turn from the lane nearest the center line.	☐	☐
The practice of crossing the center line on a curve is all right providing you can see 300 feet ahead.	☐	☐
It is better to rely on a quick dash of speed to get through an intersection ahead of another vehicle than to reduce your speed in expectation of trouble as you approach the intersection.	☐	☐
A stated speed limit sign really means that you should keep your speed definitely below the stated limit when the road is wet.	☐	☐
It requires the same distance to slow down from 60 miles per hour to 50 miles per hour as from 40 miles per hour to 30 miles per hour.	☐	☐
Defective eyesight will affect a driver more adversely in night driving than in day driving.	☐	☐
A rear view mirror can be relied upon for a complete view of what is behind your car.	☐	☐
You may legally exceed the speed limit when you are driving an injured person to the hospital.	☐	☐
In preparing to make a right-hand turn you should drive your car so near to the right-hand curb (or line of parked cars) that no other driver may pass you on your right.	☐	☐
More fatal accidents take place on clear, dry days than on stormy days.	☐	☐
New nonskid tires have done away with the danger of skidding on wet pavements.	☐	☐
Your vision to the sides decreases as the speed of your car increases.	☐	☐

ems in this test selected from the original Abercrombie Driver Test.

	True	False
14. A pedestrian who has the right of way on a crosswalk in the daytime must yield it after dark because drivers cannot see him very well.	☐	☐
15. When you intend to turn or stop, the law does not require you to give a hand signal unless there is a vehicle following yours.	☐	☐
16. When you back your car, you have the right of way because you cannot see very well while driving backward.	☐	☐
17. The amount of alcohol in one cocktail is sufficient to decrease one's keenness of vision.	☐	☐
18. It is all right to warm up the car engine by running it in a closed garage provided you open the doors just as soon as you smell the carbon monoxide exhaust fumes.	☐	☐
19. If a driver seriously injures a pedestrian, legally at fault, the driver does not have to make out an accident report.	☐	☐
20. When you drive out of a filling-station yard, street traffic on your left has the right of way.	☐	☐
21. It is not necessary to slow down at an unprotected intersection if you do not see any cross traffic.	☐	☐
22. When you drive down a long hill, it is all right to hold the clutch pedal down if you leave the gear shift lever in high position.	☐	☐
23. For a quick emergency tire repair on the highway you should jack up your car on the pavement.	☐	☐
24. In the accompanying picture car B, being on the left, should yield the right of way to car A.	☐	☐



25. In the accompanying picture, car A should yield the right of way to car B because car B entered the intersection first.	☐	☐



PART II

DIRECTIONS: Read each of the following statements carefully. Four possibilities for completing each statement are given. Select the one that you think completes the statement most correctly and place an X in the square under the proper number. Notice how the sample is answered:

SAMPLE: The speed of your car will be increased if you feed more: 1 2 3 4
(1) Oil (2) Gasoline (3) Water (4) Electricity ..... ☐ ☒ ☐ ☐

Most traffic accidents are the result of:
(1) Mechanical defects in automobiles (2) Defects in the road (3) Errors in drivers' judgment (4) Adverse weather conditions. ..... ☐ ☐ ☐ ☐

Visibility is best at night when driving on roads made of:
(1) Asphalt (2) Dirt (3) Brick (4) Concrete ..... ☐ ☐ ☐ ☐

A good driver, suddenly finding the foot brakes not functioning, will attempt to control the car for stopping by:
(1) Turning off ignition (2) Pushing the clutch pedal down and letting it up, repeating this several times (3) Driving onto the shoulder of the road to slow down the car (4) Double-clutching the gear into second position and using engine compression. ..... ☐ ☐ ☐ ☐

When ascending a hill behind a transport truck, you should:
(1) Stay far enough behind the truck so that it does not block your view of oncoming traffic (2) Stay close to the rear of the truck so that no other car from behind can get in between you and the truck (3) Blow your horn (daytime) or flick your lights (night time) to let the truck driver know you wish to pass (4) Speed up and make a quick pass around the truck. ..... ☐ ☐ ☐ ☐

When driving around a curve on the highway you should:
(1) Accelerate at the beginning of the curve and apply the brakes just before reaching the straightaway (2) Slow down before reaching the curve, depress the clutch, and coast around the curve (3) Slow the car down with the engine before reaching the curve, start around the curve, and accelerate just before reaching the straightaway (4) Start into the curve at the speed the car is traveling and apply the brakes only if necessary. ..... ☐ ☐ ☐ ☐

In crossing trolley car tracks on a wet street, you should:
(1) Turn gradually across the tracks (2) Cut across the tracks at a wide angle (3) Drive on the tracks before crossing them (4) Make it a practice never to cross trolley tracks on wet days. ..... ☐ ☐ ☐ ☐

If application of the brakes at 20 miles per hour requires 25 feet to bring a car to a dead stop, the required distance at 40 miles per hour would be:
(1) 40 feet (2) 50 feet (3) 75 feet (4) 100 feet. ..... ☐ ☐ ☐ ☐

You are driving at the speed limit and a driver behind sounds his horn and starts by. You should:
(1) Decrease your speed slightly and give way to him (2) Block him to let him know he is already driving at the speed limit (3) Speed up to get out of his way (4) Let him by and then overtake him. ..... ☐ ☐ ☐ ☐

Night traffic on the roads is much less than day traffic; but night accidents in proportion to the traffic are far more numerous than day accidents. The main reason is:
(1) Visibility is poor (2) Drunken drivers are more numerous (3) Pedestrians walk on the wrong side of dark roads (4) People drive faster at night than during the day. ..... ☐ ☐ ☐ ☐

For safety when driving through an intersection, you should:
(1) Glance right and then left in approaching the intersection (2) Look into the mirror to see how close you are being followed (3) Glance left and then right in approaching the intersection (4) Keep your eyes straight ahead to see what dangers you might face. ..... ☐ ☐ ☐ ☐

If steam forms on the inside of the windshield, you should:
(1) Increase your speed by ten miles per hour (2) Stop every mile and wipe it off (3) Open a window slightly (4) Wipe it off frequently while driving. ..... ☐ ☐ ☐ ☐

If you are involved in an accident you should first:
(1) Notify the police (2) Assist the injured (3) Drive away quickly (4) Notify your insurance company ..... ☐ ☐ ☐ ☐

13. When the right wheels of your car slip off the edge of the pavement, you should:
(1) Slow down gradually until you can steer back onto the pavement at a convenient place (2) Turn back onto the pavement quickly before your car has lost any of its momentum (3) Apply the brakes quickly in order to keep from rolling over into a ditch (4) Turn off the ignition, coast to a stop, and then back up onto the pavement ..... ☐ ☐ ☐

14. You are driving on a snow-covered road and have to make a stop quickly. The best way to do this is to:
(1) Slam the brakes on hard (2) Roll down the window and signal (3) Turn off the ignition and apply the hand brake (4) Pump the brake pedal ..... ☐ ☐ ☐

15. In bringing a car to a complete nonemergency stop from a speed in excess of 30 miles per hour, you should:
(1) Depress the clutch and brake pedals at the same time (2) Depress the clutch pedal first and then depress the brake pedal (3) Depress the clutch and brake pedals together and then place the gear shift lever in neutral (4) Depress the brake pedal first and depress the clutch pedal later .... ☐ ☐ ☐

16. Most automobile skids are the result of:
(1) Under-inflated tires (2) Too much snow or ice on the road (3) Over-inflated tires (4) Driving too fast on slippery road surfaces ..... ☐ ☐ ☐

17. A red signal that flashes on and off, on and off, means:
(1) Stop (2) Slow down (3) Blow the horn (4) Shift to second gear ..... ☐ ☐ ☐

18. Most city traffic accidents take place:
(1) In the morning rush (2) In the noon rush (3) In the evening rush (4) Late at night ..... ☐ ☐ ☐

19. In preparation for a right turn the most important thing for you to do is:
(1) Drive in the extreme right lane (2) Check your mirror for conditions in the rear (3) Blow your horn lightly (4) Give a hand signal ..... ☐ ☐ ☐

20. When driving in a fog at night you will have the best possible visibility by using:
(1) The upper headlight beam (2) The lower, or passing, headlight beam (3) The parking lights (4) No lights at all ..... ☐ ☐ ☐

21. When driving behind a school bus which makes a sudden stop, you should:
(1) Slow down and pass if no children cross the road (2) Pass the bus, sounding your horn as you go by (3) Bump into the bus lightly (4) Stop behind the bus and wait for it to proceed before you start up again ..... ☐ ☐ ☐

22. Your car (A) is being overtaken by another car (B) on a two-lane road. Just as the overtaking car draws up alongside yours, its driver, seeing that an oncoming car (C) is near, starts to drop back into line again. You can help reduce the danger to all three cars by:
(1) Accelerating (2) Applying the brakes (3) Keeping your speed constant (4) Blowing your horn as a danger signal ..... ☐ ☐ ☐

23. In the situation above (#22) you are driving car (C). You can help reduce the danger to all three cars by:
(1) Blowing your horn (2) Keeping your speed constant (3) Moving toward the center of the road to scare car (B) back into line (4) Applying the brakes ..... ☐ ☐ ☐

24. Figure A (below) indicates a standard sign as used on roads in the United States:
(1) Railroad crossing (2) Stop (3) Speed limit (4) Curve ..... ☐ ☐ ☐

25. Figure B (below) indicates a standard sign as used on roads in the United States:
(1) Stop (2) Underpass (3) Railroad crossing (4) Traffic signal ahead ..... ☐ ☐ ☐

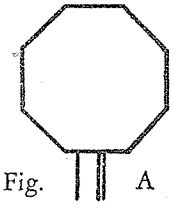


Fig. A

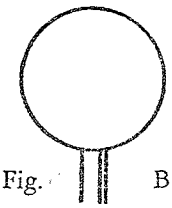


Fig. B

APPENDIX E

ATTITUDE TESTING

1. Siebrecht Attitude Scale
2. Correlation Calculations between Knowledge Scores and Attitude Ratings

SIEBRECHT ATTITUDE SCALE

BY ELMER B. SIEBRECHT, ED.D.

NEW YORK UNIVERSITY

DIVISION FOR GENERAL EDUCATION

CENTER FOR SAFETY EDUCATION

PRELIMINARY EDUCATION

1. Name ..... City..... State.....
   Date.....
2. Age..... Sex..... Extent of education: Freshman.....
   Sophomore..... Junior..... Senior..... Other.....
3. Place of residence: City..... Small town.....
   Country (farm)..... Other.....
4. Driving experience: (a) Number of years you have driven a motor vehicle.....
   (b) Approximate number of miles driven (1) last year.....
   (2) last five years..... (c) Number of accidents you have had
   (1) while driving..... (2) as a pedestrian.....
5. Kind of vehicle you drive most often: (a) Automobile..... (b) Truck.....
   (c) Bus..... (d) Other.....
6. Method by which you learned to drive: (a) From member of the family.....
   (b) From a friend..... (c) By yourself..... (d) Course in high
   school..... (e) Other.....
7. Your occupation..... Also your father's occupation if you
   are a student.....

DIRECTIONS: Below is a series of statements about problems related to the driving of motor vehicles. There are no correct answers for these statements. They have therefore been set up in such a manner as to permit persons to indicate the extent to which they agree or disagree with the ideas expressed. Suppose the statement is Only persons who have reached their nineteenth birthday should be permitted to drive a motor vehicle.

.....Strongly agree[5] .....*x*.....Agree[4] .....Undecided[3] .....Disagree[2] ..... Strongly disagree[1]

As you read the statement you will know whether you agree or disagree with the idea expressed. You must then indicate the extent to which you agree or disagree. If you agree fully, place an *x* before the words "Strongly agree"; if you agree but with reservation, that is you do not fully agree, place the *x* before the word "Agree," as in the sample above. If you disagree with the idea, indicate the extent to which you disagree by checking either "Disagree" or "Strongly disagree." But if you neither agree nor disagree, that is you are not certain, place the *x* before "Undecided." To indicate your attitude, read the statement carefully, then quickly check the position which best indicates your attitude. Do not spend much time with any statement. *But be sure to answer every statement.* You should complete the work in no more than *ten minutes*. Most persons will finish in less time. Work fast but carefully.

STATEMENTS

1. Drivers' examination should be more difficult to eliminate all but the best drivers.
   .....Strongly agree[5] .....Agree[4] .....Undecided[3] .....Disagree[2] .....Strongly disagree[1]
2. The driver of an automobile should be the sole judge of the mechanical fitness of his car.
   .....Strongly disagree[5] .....Disagree[4] .....Undecided[3] .....Agree[2] .....Strongly agree[1]
3. Drivers who pass on hills and curves should be considered incompetent.
   .....Strongly agree[5] .....Agree[4] .....Undecided[3] .....Disagree[2] .....Strongly disagree[1]
4. Hit-and-run drivers should be classified as criminals.
   .....Strongly agree[5] .....Agree[4] .....Undecided[3] .....Disagree[2] .....Strongly disagree[1]
5. Drivers who have the right of way need not be concerned about sharing the road.
   .....Strongly disagree[5] .....Disagree[4] .....Undecided[3] .....Agree[2] .....Strongly agree[1]
6. A person should be permitted to drive a car only as long as he does not abuse his privilege.
   .....Strongly agree[5] .....Agree[4] .....Undecided[3] .....Disagree[2] .....Strongly disagree[1]
7. The drinking of alcohol by drivers should be a matter for the consideration of the drivers alone.
   .....Strongly disagree[5] .....Disagree[4] .....Undecided[3] .....Agree[2] .....Strongly agree[1]
8. Prospective drivers should take a course in the driving of the automobile.
   .....Strongly agree[5] .....Agree[4] .....Undecided[3] .....Disagree[2] .....Strongly disagree[1]
9. Strict enforcement of traffic regulations is the only way to prevent accidents.
   .....Strongly agree[5] .....Agree[4] .....Undecided[3] .....Disagree[2] .....Strongly disagree[1]
10. Pedestrians should at all times be solely responsible for their own safety.
    .....Strongly disagree[5] .....Disagree[4] .....Undecided[3] .....Agree[2] .....Strongly agree[1]
11. Every driver should be required to have his car inspected twice a year.
    .....Strongly agree[5] .....Agree[4] .....Undecided[3] .....Disagree[2] .....Strongly disagree[1]
12. Drivers who disregard traffic regulations should be punished only if they cause damage or injury.
    .....Strongly disagree[5] .....Disagree[4] .....Undecided[3] .....Agree[2] .....Strongly agree[1]
13. Most drivers lack the ability to control automobiles at high speed.
    .....Strongly agree[5] .....Agree[4] .....Undecided[3] .....Disagree[2] .....Strongly disagree[1]
14. Because "things just happen" one should not be concerned with the prevention of accidents.
    .....Strongly disagree[5] .....Disagree[4] .....Undecided[3] .....Agree[2] .....Strongly agree[1]
15. Drivers who handle cars carefully should not be denied the right to drive on public highways.
    .....Strongly agree[5] .....Agree[4] .....Undecided[3] .....Disagree[2] .....Strongly disagree[1]
16. Drivers convicted of hit-and-run accidents should have their licenses revoked.
    .....Strongly agree[5] .....Agree[4] .....Undecided[3] .....Disagree[2] .....Strongly disagree[1]
17. The driver of a car should decide when it is safe to pass on curves.
    .....Strongly disagree[5] .....Disagree[4] .....Undecided[3] .....Agree[2] .....Strongly agree[1]
18. A person should pass a physical examination before being issued a driver's license.
    .....Strongly agree[5] .....Agree[4] .....Undecided[3] .....Disagree[2] .....Strongly disagree[1]
19. A tired motorist should drive slowly until the drowsiness leaves him.
    .....Strongly disagree[5] .....Disagree[4] .....Undecided[3] .....Agree[2] .....Strongly agree[1]

). The rudeness of traffic officers discourages courtesy on the part of the motorist.
.....Strongly agree[5] .....Agree[4] .....Undecided[3] .....Disagree[2] .....Strongly disagree[1]

. The sturdy construction of automobiles assures safety at any speed.
.....Strongly disagree[5] .....Disagree[4] .....Undecided[3] .....Agree[2] .....Strongly agree[1]

:. Examinations for drivers' licenses should be required of all persons once a year.
.....Strongly agree[5] .....Agree[4] .....Undecided[3] .....Disagree[2] .....Strongly disagree[1]

). The present emphasis on the enforcement of traffic rules should be reduced.
.....Strongly disagree[5] .....Disagree[4] .....Undecided[3] .....Agree[2] .....Strongly agree[1]

:. Every motorist should be required to pass a driving-skill test once in five years.
.....Strongly agree[5] .....Agree[4] .....Undecided[3] .....Disagree[2] .....Strongly disagree[1]

). Motorists should be permitted to run signals and lights when there is no cross traffic approaching.
.....Strongly disagree[5] .....Disagree[4] .....Undecided[3] .....Agree[2] .....Strongly agree[1]

). Inexperienced drivers should not be arrested for running through traffic lights.
.....Strongly disagree[5] .....Disagree[4] .....Undecided[3] .....Agree[2] .....Strongly agree[1]

. To accommodate the traffic, the coöperation of all drivers is necessary.
.....Strongly agree[5] .....Agree[4] .....Undecided[3] .....Disagree[2] .....Strongly disagree[1]

. The occurrence of accidents is a matter of chance and should be regarded as unavoidable.
.....Strongly disagree[5] .....Disagree[4] .....Undecided[3] .....Agree[2] .....Strongly agree[1]

. Until a person passes a driving-skill test he should not be granted a license to drive.
.....Strongly agree[5] .....Agree[4] .....Undecided[3] .....Disagree[2] .....Strongly disagree[1]

. A driver really is the best judge of the speed he should be permitted to drive.
.....Strongly disagree[5] .....Disagree[4] .....Undecided[3] .....Agree[2] .....Strongly agree[1]

. Drivers convicted of driving while under the influence of liquor should have their licenses revoked.
.....Strongly agree[5] .....Agree[4] .....Undecided[3] .....Disagree[2] .....Strongly disagree[1]

. People are as courteous "behind the wheel" as they are at any other time.
.....Strongly disagree[5] .....Disagree[4] .....Undecided[3] .....Agree[2] .....Strongly agree[1]

. Every driver should be required to pass an examination on the rules of the road.
.....Strongly agree[5] .....Agree[4] .....Undecided[3] .....Disagree[2] .....Strongly disagree[1]

. No person should be denied the right to drive an automobile.
.....Strongly disagree[5] .....Disagree[4] .....Undecided[3] .....Agree[2] .....Strongly agree[1]

. Examinations for drivers' licenses should be difficult enough to eliminate persons who are physically unfit and emotionally unstable.
.....Strongly agree[5] .....Agree[4] .....Undecided[3] .....Disagree[2] .....Strongly disagree[1]

. Pedestrians should yield the right of way to motorists.
.....Strongly disagree[5] .....Disagree[4] .....Undecided[3] .....Agree[2] .....Strongly agree[1]

. Drivers of automobiles should be more concerned with the welfare of their passengers than of themselves.
.....Strongly agree[5] .....Agree[4] .....Undecided[3] .....Disagree[2] .....Strongly disagree[1]

. Improved construction of automobiles makes driving skill less necessary today than five years ago.
.....Strongly disagree[5] .....Disagree[4] .....Undecided[3] .....Agree[2] .....Strongly agree[1]

39. Driving is a coöperative affair in which the motorists share alike on the highways.

.....Strongly agree[5] .....Agree[4] .....Undecided[3] .....Disagree[2] .....Strongly disagree[1]

40. Drivers with many years of experience should not be required to submit to reëxamination in later years.

.....Strongly disagree[5] .....Disagree[4] .....Undecided[3] .....Agree[2] .....Strongly agree[1]

Answer only one — EITHER (A) OR (B)

(A) *If you now drive,* rate yourself as a driver by placing an *x* at that point along the line below from VERY POOR to EXPERT DRIVER which you believe will indicate the kind of driver you are:

VERY POOR . . . . . EXPERT DRIVER

(B) *If you do not now drive but hope to,* rate yourself as to the kind of driver you hope to become by placing an *x* at that point along the line below from VERY POOR to EXPERT DRIVER which you believe will best indicate the kind of driver you will be:

VERY POOR . . . . . EXPERT DRIVER

TABLE 49

CORRELATION OF SCORES OBTAINED BY ST. JOHN'S STUDENTS ON SIEBRECHT ATTITUDE SCALE AND KNOWLEDGE TEST FOR AUTOMOBILE DRIVERS

	Mid-Points																		
	125	130	135	140	145	150	155	160	165	170	175	180	185	190	Fy	Dy	FyDy	$FyDy^2$	$\Sigma FxyDx$	$Dy\Sigma FxyDx$
44									1						1	17	17	289	8	136
43									1						1	16	16	256	8	128
42		1					1			1					3	15	45	675	16	240
41					1	1		1	1						4	14	56	784	24	336
40								1	1	1					3	13	39	507	24	312
39	1		1			1	1								4	12	48	576	13	156
38					1	1		2		1	1				6	11	66	726	42	462
37					1	2		1							4	10	40	400	21	210
36				1		1	1	1		2	3				9	9	81	729	69	621
35				3		1	2	1	2					1	10	8	80	640	62	496
34				2											2	7	14	98	6	42
33						1		1							2	6	12	72	12	72
32						3				1					4	5	20	100	24	120
31		1				1					1				3	4	12	48	16	64
30				1						1					2	3	6	18	12	36
29															0	2	0	0	0	0
28															0	1	0	0	0	0
27			1	1		1									3	0	0	0	10	0
															61		552	5918	367	3431
Fx	1	2	2	8	3	13	5	8	6	7	5	0	0	1	61					
Dx	0	1	2	3	4	5	6	7	8	9	10	11	12	13						
FxDx	0	2	4	24	12	65	30	56	48	63	50	0	0	13	367					
$FxDx^2$	0	2	8	72	48	325	180	392	384	567	500	0	0	169	2647					
$\Sigma FxyDy$	12	19	12	50	35	99	52	82	76	65	42	0	0	8	552					
$Dx\Sigma FxyDy$	19		24	150	140	495	312	574	608	585	420	0	0	104	3431					

x = Siebrecht
y = Knowledge

r = 0.173

APPENDIX F

ROAD TESTING

1. Neyhart's Standardized Road Test in Traffic
2. Manitoba Safety Division's Driver Improvement Clinic Road Test

Neyhart's Road Test in Traffic

Check List and Score Sheet for

ROAD TEST IN TRAFFIC

FOR

Testing, Rating and Training Passenger Car Drivers

By AMOS E. NEYHART

Consultant on Road Training, American Automobile Association, and Administrative Head, Institute of Public Safety, The Pennsylvania State College

Name..... Age..... Checked by .....

Street and Number.....

City and State..... Date.....

Time of Test—Beginning..... Ending..... Elapsed Time .....

Odometer Reading—Start ..... Finish..... Miles Traveled .....

FINAL SCORE (Sum of Parts I and II)..... Final Letter Grade .....

PART I—SPECIFIC

ITEMS	DEDUCT	CHECK (✓) ITEMS MISSED BY DRIVER	DEDUCTIONS
I. CHECKING THE VEHICLE			
A. Fails to check gasoline	1	☐	
B. Fails to check windshield wipers	1	☐	
C. Fails to check horn	1	☐	
D. Fails to check:			
1. Stop lights	2	☐	
2. Parking lights	2	☐	
3. Headlights:			
a. Low beam	2	☐	
b. High beam	2	☐	
E. Fails to check for underinflated tires	3	☐	
F. Fails to check water in radiator	3	☐	
G. Fails to check water in battery	1	☐	
H. Fails to check oil level	4	☐	
I. Fails to check brake pedal reserve	5	☐	
II. CHECKING THE DRIVER			
A. Fails to enter vehicle from curb side—when practical	2	☐	
B. Fails to check doors to see if closed properly	2	☐	
C. Fails to adjust windows for ventilation	2	☐	
D. Fails to adjust rear-view mirrors	3	☐	
E. Fails to adjust seat properly	1	☐	
F. Fails to assume erect and alert driving position	1	☐	
III. STARTING ENGINE			
A. Fails to depress clutch pedal	1	☐☐☐☐☐☐☐☐	
B. Does not check gearshift lever for neutral position	2	☐☐☐☐☐☐☐☐	
C. Fails to turn on ignition switch before pressing starter button	1	☐☐☐☐☐☐☐☐	

3244

ITEMS

D. Does not
engine st
E. Spends to
to run, fa
F. Does not
G. Races en

IV. START

A. Fails to
B. Selects w
C. Does not
D. Rolls bac
E. Races the
F. Stalls the

V. BACKI

A. Fails to s
B. Fails to l
backing
C. Backs jerl
D. Oversteer

VI. CLUTC

A. Rides the
B. Fails to
shifting n
C. Stays in lo
D. Fails to a
to higher
E. Fails to c
gear shift
F. Stays in h
G. Stalls the
H. Clashes g
clashing o
I. Slips clut
back whil
J. Keeps clut
at traffic s
K. Selects wr
on level
L. Coasts dov
traffic ligh

VII. STEER

A. Places han
B. Steers abr
C. Rests arm
D. Uses one h
E. Turns stee
rest

VIII. RAILR

A. Fails to loc
B. Fails to co
C. Fails to sto
D. Fails to sh
sary and r
of tracks
E. Fails to d
crossing tr

Check List and Score Sheet for

ROAD TEST IN TRAFFIC

FOR

Testing, Rating and Training Passenger Car Drivers

By AMOS E. NEYHART

Consultant on Road Training, American Automobile Association, and Administrative Head, Institute of Public Safety, The Pennsylvania State College

Name..... Age..... Checked by .....

Street and Number.....

City and State..... Date.....

Time of Test—Beginning..... Ending..... Elapsed Time .....

Odometer Reading—Start ..... Finish..... Miles Traveled .....

FINAL SCORE (Sum of Parts I and II)..... Final Letter Grade .....

PART I—SPECIFIC

ITEMS	DEDUCT	CHECK (✓) ITEMS MISSED BY DRIVER	DEDUCTIONS
I. CHECKING THE VEHICLE			
A. Fails to check gasoline	1	☐	
B. Fails to check windshield wipers	1	☐	
C. Fails to check horn	1	☐	
D. Fails to check:			
1. Stop lights	2	☐	
2. Parking lights	2	☐	
3. Headlights:			
a. Low beam	2	☐	
b. High beam	2	☐	
E. Fails to check for underinflated tires	3	☐	
F. Fails to check water in radiator	3	☐	
G. Fails to check water in battery	1	☐	
H. Fails to check oil level	4	☐	
I. Fails to check brake pedal reserve	5	☐	
II. CHECKING THE DRIVER			
A. Fails to enter vehicle from curb side—when practical	2	☐	
B. Fails to check doors to see if closed properly	2	☐	
C. Fails to adjust windows for ventilation	2	☐	
D. Fails to adjust rear-view mirrors	3	☐	
E. Fails to adjust seat properly	1	☐	
F. Fails to assume erect and alert driving position	1	☐	
III. STARTING ENGINE			
A. Fails to depress clutch pedal	1	☐☐☐☐☐☐☐☐	
B. Does not check gearshift lever for neutral position	2	☐☐☐☐☐☐☐☐	
C. Fails to turn on ignition switch before pressing starter button	1	☐☐☐☐☐☐☐☐	
D. Does not release starter button as soon as engine starts to operate on its own power	2	☐☐☐☐☐☐☐☐	
E. Spends too much time trying to get engine to run, fails to use choke properly	1	☐☐☐☐☐☐☐☐	
F. Does not allow engine to warm up	5	☐☐☐☐☐☐☐☐	
G. Races engine during warm-up period	5	☐☐☐☐☐☐☐☐	
IV. STARTING THE VEHICLE IN LOW			
A. Fails to check traffic conditions	5	☐☐☐☐☐☐☐☐	
B. Selects wrong gear (does not start in low)	3	☐☐☐☐☐☐☐☐	
C. Does not release hand brake	1	☐☐☐☐☐☐☐☐	
D. Rolls back when on a grade	5	☐☐☐☐☐☐☐☐	
E. Races the engine	5	☐☐☐☐☐☐☐☐	
F. Stalls the engine	5	☐☐☐☐☐☐☐☐	
V. BACKING			
A. Fails to stop in correct position to back	5	☐☐☐☐☐☐☐☐	
B. Fails to look to the rear of vehicle while backing	5	☐☐☐☐☐☐☐☐	
C. Backs jerkily	2	☐☐☐☐☐☐☐☐	
D. Oversteers and zigzags when backing	2	☐☐☐☐☐☐☐☐	
VI. CLUTCHING, SHIFTING GEARS			
A. Rides the clutch	3	☐☐☐☐☐☐☐☐	
B. Fails to keep eyes on the road during shifting maneuver	3	☐☐☐☐☐☐☐☐	
C. Stays in low gear(s) too long	3	☐☐☐☐☐☐☐☐	
D. Fails to attain proper speed when shifting to higher gears	3	☐☐☐☐☐☐☐☐	
E. Fails to coordinate clutch, accelerator, and gear shift (jerky)	3	☐☐☐☐☐☐☐☐	
F. Stays in high gear(s) too long	3	☐☐☐☐☐☐☐☐	
G. Stalls the engine	5	☐☐☐☐☐☐☐☐	
H. Clashes gears when shifting (any other clashing of gears)	5	☐☐☐☐☐☐☐☐	
I. Slips clutch to hold vehicle from rolling back while waiting at traffic signal	3	☐☐☐☐☐☐☐☐	
J. Keeps clutch pedal depressed while waiting at traffic signal	1	☐☐☐☐☐☐☐☐	
K. Selects wrong gear—upgrade, downgrade or on level	3	☐☐☐☐☐☐☐☐	
L. Coasts down grades, up to stop signs and traffic lights	3	☐☐☐☐☐☐☐☐	
VII. STEERING			
A. Places hands in unstable position on wheel	2	☐☐☐☐☐☐☐☐	
B. Steers abruptly, not smoothly	5	☐☐☐☐☐☐☐☐	
C. Rests arm on window	2	☐☐☐☐☐☐☐☐	
D. Uses one hand habitually	2	☐☐☐☐☐☐☐☐	
E. Turns steering wheel while vehicle is at rest	2	☐☐☐☐☐☐☐☐	
VIII. RAILROAD CROSSING			
A. Fails to look in all directions	10	☐☐☐☐☐☐☐☐	
B. Fails to come to full stop when necessary	10	☐☐☐☐☐☐☐☐	
C. Fails to stop at a safe place, if necessary	5	☐☐☐☐☐☐☐☐	
D. Fails to shift to lower gear when necessary and remain in that gear until clear of tracks	5	☐☐☐☐☐☐☐☐	
E. Fails to drive in correct position when crossing tracks	5	☐☐☐☐☐☐☐☐	

ITEMS | DEDUCT | CHECK (✓) ITEMS MISSED BY DRIVER | DEDUCTIONS

IX. SPEED CONTROL (Exclusive of Turns)

A. Too fast for conditions	10	
B. In excess of marked speed limits	5	
C. Too slow for conditions	2	
D. Brakes on curves	5	

X. STOPPING

A. Before necessary (especially at signals and signs)	1	
B. Not soon enough (over-running crosswalk or avoidance of zone line)	2	
C. Not at a safe place (too close to other vehicles, etc.)	5	

XI. STOP STREETS

A. Fails to come to full stop	10	
B. Fails to stop in a position to see roadway to the right and left	5	
C. Hesitates too long for conditions	3	

XII. UNCONTROLLED INTERSECTIONS OR THROUGH STREETS

A. Fails to slow down with intent to stop if necessary	3	
B. Fails to look in all directions	5	
C. Fails to shift to lower gears when necessary	3	
D. Fails to respond to hazardous traffic conditions in the making	10	
E. Fails to yield right of way	10	

XIII. SIGNALING FAILURES

A. Leaving curb—fails to signal	2	
B. Leaving curb—fails to look back	5	
C. Turning—fails to use turn signals	2	
D. Leaves turn signal on after turning	2	
E. Does not use turn signals moving from lane to lane	2	
F. Uses horn improperly or fails to use horn	2	
G. Fails to observe courtesy of signaling—hand signals when possible	5	

XIV. SIGNAL VIOLATIONS

A. Traffic signal (through on amber)	3	
B. Traffic signal (through on red)	10	
C. Traffic officer	10	

XV. PASSING OTHER VEHICLES GOING IN SAME DIRECTION

A. Fails to make sure road ahead and behind is clear	10	
B. Fails to sound horn when passing	3	
C. Misjudges speed of oncoming traffic	10	
D. Passes on curve	10	
E. Passes at intersection	10	
F. Passes at crest of hill	10	
G. Cuts back into line too soon after passing	5	
H. Passes by weaving through traffic	5	
I. Starts passing when approaching obstructions in center of street	5	
J. Pulls into center traffic lane when approaching center of street obstructions such as pedestrian islands	5	
K. Passes so as to block vehicles at right from steering around parked or slow moving vehicle	5	
L. Fails to observe indications that parked		

ITEMS | DEDUCT | CHECK (✓) ITEMS MISSED BY DRIVER

XVI. POSITION OF VEHICLE ON ROADWAY

TRAFFIC LANES (Exclusive of Turns—Marked o

A. Fails to drive in proper lane	5	
B. Straddles traffic lanes (marked or unmarked)	5	
C. Straddles at signal or sign when stopping	5	
D. Follows too close to other vehicles	5	
E. Drives too close to other vehicles, moving objects, etc.	3	

TURNING (Right)

A. Approaches from improper lane	3	
B. At improper speed (too fast or too slow)	2	
C. In improper lane during turn	3	
D. Into improper lane after turn	3	
E. Strikes curb	3	
F. Makes turn unnecessarily wide	1	
G. Shies away, then turns right	2	
H. Shifts gears while turning	2	
I. Fails to yield right of way	10	

TURNING (Left)

A. Approaches from improper lane	3	
B. At improper speed (too fast or too slow)	2	
C. In improper lane during turn	3	
D. Into improper lane after turn	3	
E. Cuts corner too short	1	
F. Cuts corner too wide	1	
G. Shies away, then turns left	2	
H. Shifts gears while turning	2	
I. Fails to yield right of way	10	

XVII. SMOOTHNESS OF OPERATION

A. Rough starts—By Jerk Recorder or Tumbling Cylinders Tally	(Deduct one point each time cylinder is tipped)	
B. Rough stops—By Jerk Recorder or Tumbling Cylinders Tally	(Maximum total deduction—10 points)	
C. Uses clutch roughly	5	
D. Uses brakes roughly or unevenly	5	
E. Fails to hold accelerator steady	5	

PART I—TOTAL SCORE

TO DEDU

PART II—GENERAL

ITEMS

I. Inattentive (day dreams, etc.)	0 Not at all	5 Occasionally	10 Part of time	15 Often	20 Over entire route
II. Nervous and Hesitant	0 Not at all	5 Occasionally		10 Often	15 All the time
III. Overconfident	0 Not at all		5 Part of time		10 Cocky
IV. Fails to USE rear-view mirrors	0 Not at all		2.5 Part of time		5 Over entire route
V. Fails to anticipate or respond to hazardous traffic conditions in the making (including pedestrians)	0 Not at all		5 Part of time		10 All the time

PART II—TOTAL SCORE

GRAND TOTAL SCORE

Manitoba Safety Division's Road Test

ITEMS	Deduct	Check Items Missed by Driver	Deductions
VII. SPEED			
A. Speed greater than ability warrants	5	☐☐☐☐☐☐☐☐	
B. Too fast for conditions	10	☐☐☐☐☐☐☐☐	
C. Tendency to lag and catch up	3	☐☐☐☐☐☐☐☐	
D. Slows down while passing thru an intersection	2	☐☐☐☐☐☐☐☐	
E. Exceeds stated speed limit	10	☐☐☐☐☐☐☐☐	
VIII. BACKING			
A. Fails to look to rear of vehicle while backing	5	☐☐☐☐☐☐☐☐	
B. Backs jerkily	2	☐☐☐☐☐☐☐☐	
C. Oversteers and zigzags when backing	2	☐☐☐☐☐☐☐☐	
IX. PARALLEL PARKING			
A. Fails to observe traffic conditions ahead and behind	5	☐	
B. Stops vehicle in improper position to back into stall	3	☐	
C. Both wheels not within 1 foot of curb in 3 movements of the vehicle	3	☐	
D. Strikes curb	2	☐	
F. Strikes stanchions	10	☐	
		TOTAL	

PART II—GENERAL

Items	Deduct
I. Inattentive (day-dreams, etc.)	0 — 5 — 10 — 15 — 20
II. Control	0 — 5 — 10 — 15 — 20
III. Fails to use rear-view mirror	0 — 2 (Part of time) — 5 (Over entire route)
IV. Fails to anticipate or respond to hazardous traffic conditions in the making	0 — 10 (Part of time) — 20 (All the time)

PART I—TOTAL SCORE .....

PART II—TOTAL SCORE .....

(Driver restrictions)

GRAND TOTAL .....

(Examiner's signature)

Manitoba Safety Division's Road Test

DRIVER'S PHYSICAL-APTITUDE SCORES

VISUAL ACUITY:

	With Glasses	Without Glasses
Wears Glasses: Yes ☐ No ☐		
	Right.....	Right.....
	Left.....	Left.....
	Both.....	Both.....

SUPPRESSION: Left ☐ Right ☐

DEPTH PERCEPTION:.....% (Shephard-Fry Scale)

VERTICAL PHORIA:.....p. d's (left, right)

LATERAL PHORIA:.....p. d's (eso, exo)

GLARE RECOVERY:.....sec. (1 min. glare exposure)
(Feldman Adaptometer)

FIELD OF VISION: R..... L..... R..... L..... TOTAL.....

REACTION TIME: a.....b.....c.....d.....e..... Average.....

COLOR VISION: Normal ☐ Partial ☐ Red-Green Blind ☐

PROVINCE OF MANITOBA

ROAD TEST IN TRAFFIC

PART I—SPECIFIC

ITEMS	Deduct	Check Items Missed by Driver	Deductions
I. STARTING			
A. Fails to depress clutch	1	☐☐☐	
B. Does not check gear shift for neutral position	2	☐☐☐☐	
C. Fails to check traffic conditions	5	☐☐☐☐	
D. Noisy and uncertain gear shifting	2	☐☐☐☐	
E. Unnecessarily fast and uneven get-away	3	☐☐☐☐	
F. Rolls when on grade	10	☐☐☐☐	
G. Fails to signal	5	☐☐☐☐	
II. STOPPING			
A. Depresses clutch before brake in high gear stopping	2	☐☐☐☐☐	
B. Fails to signal	3	☐☐☐☐☐☐☐	
C. Slows down too suddenly	3	☐☐☐☐☐☐☐	
D. Not soon enough (over-running cross-walk, etc.)	5	☐☐☐☐☐☐☐	
E. Not at safe place (too close to other vehicles, etc.)	5	☐☐☐☐☐☐☐	
F. Stalls Motor	1	☐☐☐☐☐	
III. SIGNAL VIOLATIONS			
A. Uses horn improperly	2	☐☐☐☐☐☐☐	
B. Traffic signal (thru on amber)	3	☐☐☐☐☐☐☐	
C. Starts before light turns to green	5	☐☐☐☐☐☐☐	
D. Traffic signal (thru on red)	10	☐☐☐☐☐☐☐	
E. At "STOP STREETS" fails to come to full stop	10	☐☐☐☐☐	

ITEMS	Deduct	Check Items Missed by Driver	Deductions
IV. VEHICLE MOVING ON ROADWAY			
On Straight-Away—Traffic Lanes, Marked or Unmarked			
A. Fails to drive in proper lane	5	☐☐☐☐☐	
B. Straddles traffic lane	3	☐☐☐☐☐	
C. Follows too closely	5	☐☐☐☐☐	
D. Fails to check traffic when moving from lane to lane	5	☐☐☐☐☐	
E. Hinders traffic by moving slowly in centre of street	5	☐☐☐☐☐	
Turning Right			
A. Fails to use turn signal	2	☐☐☐☐☐	
B. Approaches from improper lane	5	☐☐☐☐☐	
C. At improper speed (too fast or too slow)	2	☐☐☐☐☐	
D. In improper lane during turn	3	☐☐☐☐☐	
E. In improper lane after turn	3	☐☐☐☐☐	
F. Shies away, then turns right	5	☐☐☐☐☐	
G. Strikes curb	3	☐☐☐☐☐	
H. Fails to yield right-of-way (pedestrian or vehicle	10	☐☐☐☐☐	
Turning Left			
A. Fails to use turn signal	5	☐☐☐☐☐☐☐	
B. Approaches from improper lane	5	☐☐☐☐☐☐☐	
C. At improper speed (too fast or too slow)	2	☐☐☐☐☐☐☐	
D. In improper lane during turn (left of centre)	5	☐☐☐☐☐☐☐	
E. In improper lane after turn	3	☐☐☐☐☐☐☐	
F. Shies away, then turns left	5	☐☐☐☐☐☐☐	
G. Fails to yield right-of-way (pedestrian or vehicle)	10	☐☐☐☐☐☐☐	
V. PASSING			
A. Fails to make sure road ahead and behind is clear	10	☐☐☐☐☐☐☐	
B. Passes on right where unlawful	10	☐☐☐☐☐☐☐	
C. Passes at intersection	10	☐☐☐☐☐☐☐	
D. Cuts back into line too soon after passing	5	☐☐☐☐☐☐☐	
E. Passes by weaving thru traffic	5	☐☐☐☐☐☐☐	
F. Fails to anticipate that parked vehicles may pull out from curb	5	☐☐☐☐☐☐☐	
G. Too little speed in overtaking	2	☐☐☐☐☐☐☐	
H. Speeds up when being overtaken	5	☐☐☐☐☐☐☐	
VI. UNCONTROLLED INTERSECTIONS OR THROUGH STREETS			
A. Fails to slow down with intent to stop if necessary	3	☐☐☐☐☐☐☐	
B. Fails to look in all directions	5	☐☐☐☐☐☐☐	
C. Fails to yield right-of-way (pedestrian or vehicle)	10	☐☐☐☐☐☐☐	

ITEMS	Deduct	Check Items Missed by Driver	Deductions
VII. SPEED			
A. Speed greater than ability warrants	5	☐☐☐☐☐☐☐	
B. Too fast for conditions	10	☐☐☐☐☐☐☐	
C. Tendency to lag and catch up	3	☐☐☐☐☐☐☐	
D. Slows down while passing thru an intersection	2	☐☐☐☐☐☐☐	
E. Exceeds stated speed limit	10	☐☐☐☐☐☐☐	
VIII. BACKING			
A. Fails to look to rear of vehicle while backing	5	☐☐☐☐☐☐☐	
B. Backs jerkily	2	☐☐☐☐☐☐☐	
C. Oversteers and zigzags when backing	2	☐☐☐☐☐☐☐	
IX. PARALLEL PARKING			
A. Fails to observe traffic conditions ahead and behind	5	☐	
B. Stops vehicle in improper position to back into stall	3	☐	
C. Both wheels not within 1 foot of curb in 3 movements of the vehicle	3	☐	
D. Strikes curb	2	☐	
F. Strikes stanchions	10	☐	

TOTAL .....

PART II—GENERAL

Items	Deduct
I. Inattentive (day-dreams, etc.)	0 5 10 15 20
II. Control	0 5 10 15 20
III. Fails to use rear-view mirror	0 2 5 Part of time Over entire route
IV. Fails to anticipate or respond to hazardous traffic conditions in the making	0 10 20 Part of time All the time

PART I—TOTAL SCORE .....

PART II—TOTAL SCORE .....

.....
(Driver restrictions)

GRAND TOTAL .....

.....
(Examiner's signature)

FORMER DR. ☐ BEGINNER ☐ OUT-OF-PROV. ☐ RECERT. ☐

PERMANENT DRIVER'S LICENSE NUMBER.....

Last Name	Mr. ☐ Miss ☐ Mrs. ☐	First Name	Date of Birth Mo.	Day	Year	Sex

ADDRESS — OCCUPATION

Number and Street	City and Prov.	

PHYSICAL CONDITION

Stiffness ☐ Shakiness ☐ Missing Limbs ☐ Satisfactory ☐

HEARING: Good ☐ Fair ☐ Poor ☐ Deaf ☐

HIGHEST EDUCATIONAL QUALIFICATIONS (Mark one only)

Grade School ☐ High School ☐ Technical School ☐ Commercial School ☐ University ☐

METHOD OF LEARNING TO DRIVE

Commercial Driving School ☐ Name.....

Service Driving School (Army, etc.) ☐ Name.....

High School Course: Class-room training only ☐ both ☐

Self-Taught ☐ By Friend or Member of Family ☐

PROVINCE OF MANITOBA

Examination (A) for Operator's License

DIRECTIONS: Select the **ONE** answer that **best completes** each of the following statements. Place an X in the square on the right hand side of the page which is under the correct numerical column.

	1	2	3
Example: If you should lose your license you should:			
1. Use someone else's when you are driving	☐	☐	☒
2. Use the one you were issued the year before			
3. Apply for another immediately			
1. In the last few years, automobile accidents have tended to increase. The chief reason for this is:			
1. Faulty mechanism of the car	☐	☐	☐
2. Human faults			
3. Faulty roads			
2. The principal reason that driving at night demands special caution is:			
1. People usually drive faster at night	☐	☐	☐
2. Visibility is poor			
3. More cars are on the highways at night			
3. The shape of a "Regulatory" sign is usually:			
1. 8-sided shape	☐	☐	☐
2. Diamond shape			
3. Square or box shape			
4. When driving behind a school bus which makes a sudden stop, you should:			
1. Slow down and pass if no children cross the road	☐	☐	☐
2. Pass the bus, sounding your horn as you go by			
3. Stop behind the bus and wait for it to proceed before you start up again			
5. In preparation for a "Right Turn" the most important thing you should do is:			
1. Drive in the extreme right lane	☐	☐	☐
2. Check your mirror for conditions behind you			
3. Give a hand signal			
6. In crossing trolley-car tracks on a wet day you should:			
1. Make it a practice never to cross trolley tracks on a wet day	☐	☐	☐
2. Turn gradually across the tracks			
3. Cut across the tracks at a wide angle			
7. If you are involved in an accident you should first:			
1. Notify the police	☐	☐	☐
2. Assist the injured			
3. Notify your insurance company			
8. For 20 m.p.h. the stopping distance is about 40 ft. At 40 m.p.h. the distance required to bring your car to a full stop is:			
1. 80 ft.	☐	☐	☐
2. 95 ft.			
3. 115 ft.			
9. When driving at night, following or meeting another car, you should:			
1. Dim your lights before blinding him	☐	☐	☐
2. Wait until the other fellow dims before dimming your lights			
3. Not dim at all			
10. Pedestrians when walking on a roadway should:			
1. Walk on right side of road with traffic	☐	☐	☐
2. Walk on the left side of the road facing traffic			
3. Walk on either side of the road			
11. As with other skills, the best way to learn driving is by:			
1. Demonstration	☐	☐	☐
2. Guided practice			
3. Trial and error			
12. If you become very fatigued while driving, you should:			
1. Stop and rest	☐	☐	☐
2. Drink coffee			
3. Keep plenty of fresh air in the car			

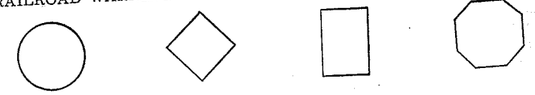
DIRECTIONS: In the following statements select the **ONE** best answer out of the **four** given:

	1	2	3	4
13. Fundamentally, traffic laws exist to:				
1. Assist officers in making arrests	☐	☐	☐	☐
2. Protect drivers				
3. Punish offenders				
4. Secure revenue				
14. Which of the following traffic convictions carries an automatic jail sentence?				
1. Exceeding the speed law	☐	☐	☐	☐
2. Failing to report an accident				
3. Driving while intoxicated				
4. Driving a car without owner's permission				
15. Every car owner should carry Automobile Insurance:				
1. To escape the penalties of Manitoba's Safety Responsibility Law	☐	☐	☐	☐
2. To protect himself and others in case of an accident				
3. To avoid trouble selling his car				
4. To apply for a driver's license				
16. A good driving personality is due chiefly to a driver's				
1. Age	☐	☐	☐	☐
2. Education				
3. Occupation				
4. Attitudes				
17. The driver of an emergency vehicle				
1. Need have no concern for the police	☐	☐	☐	☐
2. Is not legally responsible for traffic accidents caused by him				
3. Must be a traffic officer				
4. Has immediate traffic right-of-way				
18. In driving through intersections, your lowest speed should be at the				
1. Centre of the intersection	☐	☐	☐	☐
2. Nearest crosswalk				
3. Farthest crosswalk				
4. Middle of the block				

Read each of the following statements carefully. If you think a statement is "TRUE", draw a circle around the letter "T" at the right of the statement. If you think the statement is "FALSE", encircle the letter "F".

19. At an intersection where a policeman is directing traffic, and signal lights are also in operation, the motorist should obey only the signal lights	T	F
20. You may **not** legally exceed the speed limit when you drive an injured or sick person to the hospital	T	F
21. As you approach an intersection it is better to slow down expecting trouble, than to rely on a quick dash of speed to get you through the intersection ahead of another vehicle	T	F
22. Passing on a curve is all right providing you can see 300 feet ahead	T	F
23. When you drive out of a filling station, street traffic on the **left** has the right-of-way	T	F

24. The meaning of a road sign is indicated by its shape and color markings. Write the names "STOP", "REDUCE SPEED", "REGULATORY" or "RAILROAD WARNING" under proper signs.



APPENDIX G

A QUESTIONNAIRE ON DRIVER AND TRAFFIC SAFETY EDUCATION ACTIVITIES IN CANADIAN SECONDARY SCHOOLS

Report for the Province of _____

	1948	1949	1950
Schools			
Total No. Schools	____	____	____
Number Conducting Courses			
i. Classroom only	____	____	____
ii. Classroom and behind-the-wheel.	____	____	____
Student Participation			
i. Number eligible. . . . (over 16 years of age)	____	____	____
ii. Enrolled classroom only	____	____	____
iii. Enrolled classroom and behind-the-wheel . . .	____	____	____
Average Enrollment per Course			
i. Classroom only	____	____	____
ii. Classroom and behind-the-wheel.	____	____	____
Unsuccessfully Completed Course			
Administration			
i. No. of full-time teachers employed	____	____	____
ii. No. of part-time teachers employed	____	____	____

General

1. Average cost per pupil ____

2. Percentage of total cost paid by individual pupil ____

3. Credits given for completed course ____

4. Number of Commercial Driving Schools employed ____

5. There (is, is not) a Provincial law requiring the teaching of safety in the high schools of the Province.

6. This law was enacted in the year 19___

7. This law is published in (indicate the reference where it can be located).

8. This law covers ____ general safety, ____ general safety including traffic safety ____ traffic safety only.

9. The Department of Education (has, has not) passed a regulation requiring the teaching of safety in the high schools of the Province.

10. This regulation was made in the year 19___.

11. A copy of this regulation (is, is not) available.

12. This regulation covers, ____general safety, ____general safety including traffic safety, ____ traffic safety only.

13. This regulation (does, does not) provide for safety to be taught as a separate subject.

14. Does your Province have any printed or mimeographed courses of study of safety? Yes ____ No ____ If so, will you please send copies?

15. Does your Province have any committee, group, or individual at work developing a course of study in safety? Yes ____ No ____ If so, for what grades? ____

16. Do you anticipate appointing such a committee, group, or individual during the present school year?
Yes ____ No ____