

Epidemiological method and studies of human capacity are needed for the complete reappraisal of traffic safety programs. These approaches are discussed in this article and the one which follows.

The Neglected Element in Highway Safety

By PAUL H. BLAISDELL, M.A.

FOR MORE THAN a half century the safe and smooth flow of traffic on our highways has been a race among technological advancement, economic necessity, and humanitarian application, with the human aspect running a poor third.

There is no better example of the fallacy of worship at the shrine of technology than that contained in the appalling highway accident record. Our mechanical aptitude really asserted itself in the late 1800's when the automobile reached the American scene. Before we learned to adjust ourselves to our new mobility, our inventive genius had made the automobile faster, more efficient, cheaper, and apparently well within the capability of the average individual to know how to start, steer, and stop. The motive power, which was to knit us together as a Nation more certainly, even, than rapid communication, was also to exact a terrible price in the destruction of life, limb, and property. In other words, our social maturity failed to keep pace with our technological attainments, and until we can bring both sides of this equation into balance there is no prospect

for sustained sanity on the streets and highways.

Mechanical Marvel

As new vehicles created the need for new roads, new roads set the stage for newer vehicles. The rough dirt roads and trails capable of accommodating the wagon gave way to graded gravel surfaces and finally to those first 16-foot widths of macadam. The hand crank disappeared with the self-starter; the hard rubber tire gave way to the pneumatic variety; the one-man top to the greater comfort of the sedan; and two-wheel brakes to the greater safety of a braking surface on all four wheels. Somewhere along the line dawned the realization that accidents were displacing war and disease as the foremost agent of sudden death and that traffic led the parade in the accident toll. If, at that time, we had appreciated the simple truth that while improvement in roads and vehicles had been solid and steady there had not been 1 milligram of change in the basic traits, capabilities, and aptitudes of the human mechanism controlling the vehicle and using the roads, we might have averted the traffic tragedy which followed.

Perhaps no one knows how much money has been poured into highway construction, repair, and maintenance during the past 35 years in all States, counties, and local political subdivisions, but the most elementary mathematics tells us that it exceeds 60 billion dollars. During the same span some 2 trillion, 450 billion dollars has gone into the purchase of new passen-

Mr. Blaisdell, director of the traffic safety division, accident prevention department of the Association of Casualty and Surety Companies, has had 20 years of close association with the various enforcement and safety phases of traffic and transportation. His address before the American Association for the Advancement of Science in Boston, December 1953, is presented in condensed form.

ger cars, trucks, buses, parts, accessories, and gasoline.

To regulate the mushrooming volume of traffic, we have enacted laws by a hit or miss pattern, stubbornly refusing to bring about uniformity, persisting in the contention that each State and each municipality has some unique set of conditions which makes its problem a little different from that of even its nearest neighbor. Into this philosophy we have injected engineering, enforcement, and education as the means of assuring a safe, smooth flow of traffic. At the same time we have expected the same identical methods to create and sustain a social consciousness for the individual responsibilities of driver, passenger, and pedestrian. We should not be surprised at the dismal result.

The highway engineer can and does build roads which are capable of sustaining heavy volumes of traffic and still remain suitable for years of usage. The traffic engineer, a professional newcomer born of the highway scramble, channels the varying types of traffic, removes pedestrians from the vehicular lanes, devises superhighways and, insofar as current knowledge will permit, constructs safety into the very road itself. The automotive engineer designs and builds a great safety potential into the modern car. Mix all of these together with mere man as the catalyst and we have an engineering marvel which is a potentially greater menace than almost any of the instruments of destruction we have been able to devise.

Human Engineering Lags

As though the lag in human engineering were not enough of a problem, we have so misled the thinking of today's driver that his inflated ego distorts his judgment and has given him a superman complex which believes it can operate a car of today at sustained high speeds and still escape the possibility of disaster. The number of vehicles continues to grow and so therefore does the traffic congestion, the highway deaths, personal injuries, and property damage. To unravel the snarl, we hear the cry for more, better-designed roads, which, in turn, will bring more powerful vehicles and will further aggravate the results of human fallacy in using the new creations. Not more than once in a thou-

sand times, when someone offers a solution to the traffic problem, do we hear it suggested that we spend some of our time, money, and research capabilities on taking apart the human dynamo at the wheel to determine why he reacts as he does to the situations of modern highway transportation.

Community, State, and Federal governments extract taxes for roads, vehicles, fuels, and licenses. During 1952 approximately 6 billion, 735 million dollars was taken in, and of these revenues 5 billion, 453 million dollars went back into road construction. Some of the balance was used for highway administration. Nearly 250 million dollars was diverted to other than highway purposes. During this period about 12 million dollars was devoted to driver education in the public high schools of the Nation. With this sum we reached only 54 percent of the eligible students and 43 percent of the high schools. Should we expect miracles if we are willing to devote only a small fraction of our highway income to the creation of a proper driver attitude? During the year 1952 the sale of new cars topped 26 billion dollars and we spent another 12 billion dollars to keep our automotive empire moving. During the same period less than 1/100th of 1 percent of this total went into all forms of highway safety and a minuscule portion of that amount into the search for an answer to the riddle of the human being at the wheel.

To the allegation that we can achieve highway safety by slide rule, transit rod, drafting table, spot maps, new roads, and more powerful vehicles, we can only submit the record for consideration.

The mayor of Pittsburgh, when addressing the 1953 annual meeting of the Citizens Traffic Safety Board in New York, reported: "During the past several years 9 out of every 10 accidents in Pittsburgh have been the result of a violation of traffic regulations." The answer needed is why those drivers committed a traffic violation.

Traffic Accident Causes

In a rundown of traffic accident causation in the 1953 volume of the National Safety Council's Accident Facts, these significant figures on fatal traffic accidents appear:

28 percent were caused by excessive speed.
22 percent involved a drinking driver or pedestrian.
16 percent were under adverse weather conditions.
12 percent resulted from an obstruction to vision.
7 percent came about through a defective vehicle.
5.5 percent were caused by a physical defect of the driver or pedestrian.

We cannot regard any of these traffic accident causes as truly basic. We must ask:

1. Why did the drivers exceed the speed limit?
2. What is the quirk of human behavior that insists upon drinking and driving?
3. When weather conditions were obviously bad, why did the individual operate a vehicle in such a manner that it could not be controlled?
4. When fog or rain, snow or sleet, cut off vision through the windshield, or when a building or a bush made it impossible to see the other approaching vehicle or the approaching train, why did the driver "bull" ahead as though visibility were perfect?
5. Why will drivers knowingly operate a car which has but one headlight in operation or brakes for which no amount of pumping will produce an effective application?
6. Why will a driver willfully expose himself, his family, and others to the dangers of his performance at the wheel when he knows that his eyesight or his heart or some other physical condition makes him unfit to be on the road?

When we can answer these questions we will begin to know something about traffic accidents. We will be in a position to determine who may drive. We will be able to counteract false security with solid safety facts and to devise a program of highway safety based on human ability to perform rather than on the technological advancement of vehicles and roads. And we will start penetrating the human behavior pattern with some lasting effect.

Speed Control Project

In the summer months of 1953, 11 northeastern States concentrated on control of highway speeds as a means of reducing traffic accidents. The States were Pennsylvania, New York, New Jersey, Connecticut, New Hampshire, Rhode Island, Massachusetts, Maine, Vermont, Dela-

ware, and Maryland. This project established a trend showing that increases in convictions for speeding were accompanied by a drop in the number of traffic deaths, injuries, or property damage accidents, or some combination of 2 of these 3 objectives. The program added valuable information to the fund of traffic facts. It told us nothing about why speeds were so excessive that more convictions were possible.

As a part of the northeastern project, the Center for Safety Education of New York University operated its radar research car on a 15,000-mile tour of 11 States. Some of the findings of radar research on the speeding problem are most enlightening, for example:

1. From 25 to 90 percent of the drivers exceed the 25 mile an hour speed limit in residential areas.
2. Motorists pay little or no attention to traffic signs, especially speed zoning, caution and curve warnings, and school-slow indications.
3. The incidence of excessive speed rises sharply at night, with the greatest amount of fast driving after midnight.
4. The motorist is getting progressively more irritable. Delays due to congestion and poorly timed lights, the inadequacy of highways to accommodate the traffic load, and overheated motors from crawling traffic all tax the emotional capacity of drivers. There are more evidences of discourtesy, horn blowing, chance-taking, driving too fast after passing a congested area, and trying to make up for lost time.
5. The tendency to exceed speed limits is not confined to any type or class of drivers or to any group of old or new vehicles in the hands of those drivers.

Despite this evidence, and a hoard of similar facts, colleges and universities are pouring money and skills into research on methods of speed control, while we are not even close to the maximum use of our present knowledge of how to control highway speeds. We are almost totally ignorant of what speed is suitable for the mental and emotional stability of today's driver and his need for care and caution. The stepping up of research suggested in 1948 by the President's Highway Safety Conference has brought about 10 or 20 independent projects, but too many of them are aimed at vehicle

design deficiency or other mechanical elements in the traffic problem. We might legislate a requirement for passenger safety belts in all highway vehicles. However, we could not legislate a perpetual conscience to remind drivers and passengers of the necessity for fastening that belt into position. We could make the ridiculous mistake of requiring a governor on every motor vehicle to limit its maximum speed, but we could not take away from the individual his skill as a hairpin mechanic to make the governor inoperable.

The transit and trucking industries are probing into driver selection through tests which place more emphasis upon attitudes, social behavior, reactions, and health than on fragmentary knowledge of traffic laws, the ability to distinguish red from green, and competence at angle parking. This is one of the few signs of scientific advancement in the human factor of highway safety. And at least one State, Colorado, now requires psychiatric examination for persistent violators of the traffic laws.

There are certain things, requiring great faith and even greater moral courage, we must do before the conservation of human resources on our highways is a reality rather than a remote goal. We may come to such a program only as a last resort, or we may have a new birth of social understanding which will insist upon drastic steps for drastic conditions.

Proposed Program

First, we need a complete reappraisal of the highway and traffic program in terms of human capacity rather than the efficiency of roads and machines.

Second, as a preliminary to highway safety based on man's behavior, we need research and more research and all the money it requires to conduct that research to find out why the highway user reacts as he does to traffic problems, to the rules of orderly traffic, and to the enforcement designed to protect others and to save him from his own foolhardiness.

Third, public and private schools should inaugurate, without delay, a program of driver education which recognizes the predominance of the human element in highway usage and teaches the generations of new drivers ways and

means of coping with technological giants while preserving an attitude of reasonableness, caution, and common courtesy. If we are to be a Nation of superhighway users we must learn to manage ourselves without exceeding our own capabilities and ending in disaster.

Fourth, once we have rewritten our laws and rules to fit human capacity, we must gear the machinery of enforcement to carry out compliance with the established limits by providing enough well-trained enforcement personnel and by eliminating inadequate judicial procedure in traffic cases. The slap-on-the-wrist tactics of the present day must give way to the strong whiplash of severe penalty. Those who cannot meet the requirements must be denied the driving privilege and no act of histrionics or economic pressure can be allowed to change the decision.

The basic problem is one of man's intelligent control over all the forms of power that he has learned to produce. Power machines have no sense of moral value and no minds of their own. They produce results that are good or bad, destructive or creative, depending upon the skill, understanding, and judgment of those who control them. The driver makes the difference. His, and his alone, is the decision from the moment he touches the starter until he applies the parking brake at the end of a given journey. His trip may end in satisfaction or it may end in tragedy, depending upon the driver's ability and willingness to use the vehicle with the level of intelligence and aptitude which made its creation possible.

It is unthinkable that scientific advancement in highways and vehicles should grind to a halt. We cannot hold progress in a state of suspended animation while human capacity catches up. But, we can stop the headlong rush up the wrong avenues to satisfactory adjustment by eliminating the erroneous impression that vehicles and highways can be so safe, in themselves, that human frailties are no longer important. The mere application of the prefix "super" does not automatically make a roadway safe. The quiet smoothness of the modern vehicle at 70 miles per hour does not mean that the need for undivided attention has been discarded. These corrections of attitude must be the assignment of the new driver education.