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Wanted—An American Sign Language!

By EMILY C. DAVIS

Can the United States—land of innumerable dialects and local mannerisms of speech—develop for itself an all-American sign language, so that its road and street signs will talk the same easily read code from coast to coast?

This is the huge problem on which engineers and other traffic experts are working. They never expect to see the day when all traffic signs will be exactly uniform everywhere. That is a trifle too much to hope for in an imperfect world. In the biggest cities congestion may make special regulations unavoidable.

But the U. S. Bureau of Public Roads and state highway officials together have worked out a standard system of signs for rural highways, and a committee on city traffic ordinances has begun to work on a standard system of suitable signals for city streets. And this means that the American sign language is actually beginning to emerge from confusion into an orderly code.

The whole affair is one of importance, not merely to the drivers of 22,000,000 American automobiles, but to every person who walks on the streets and roadways. When the man on foot who doesn't read signs comes walking briskly around a sharp curve just in time to meet a flying motorist who doesn't read signs either, there is trouble. And the man on foot is apt to fare worse than the man in the car. It is perhaps even more vital that pedestrians should understand the signals along city streets. But the percentage of pedestrians who understand what automobile drivers are trying to do at corners and stop signs and left hand turns is still not so very large in spite of campaigns to educate the public along this line.

The majority of drivers understand local traffic signals. Their trouble begins when they venture away from home, for each town and each state highway system has its own ideas as to what certain symbols should mean. A government expert on lighting problems once counted seven different uses of the yellow traffic light in different communities. And in the country there is still more variety than in towns. Out on the road, the motorist happens to pass a striped post which means "Slow down quick, curve ahead." On another road, in another state, he slows down for a striped post with a sign of some sort on it. But this time the stripes are merely painted there to make sure of catching his eye for the direction sign perched atop the pole.

Moreover, advertising experts have mastered the trick of catching the eye of the motorist, a fact which adds to the complexity of the situation. Some of the very effective advertising signs make use of the same devices that are associated with traffic signals. Electric signs that change from red to green and back again, at night, painted boards that say "Stop—get your chicken dinner at Mosquito Net Farm," or "Slow down—gas station ahead" are undoubtedly good advertising. But after a while the motorist tends to become less keen to the significance of the real warning signs. Instead of STOP carrying an instant, unmistakable message, the driver must look again to make sure that the sign is an official order and not a clever advertiser's plea.

Getting the Facts

The chaotic variety of signs and symbols in use began to attract the attention of traffic experts some time

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TRANSCONTINENTAL ROAD SIGNS. Do you know what the shield indicates? Does the figure 6 mean anything to you?

Traffic Signs

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ago. So many conferences, committees and research boards began to work on the problem and to confer together that it is hard to say where the work of one begins and another leaves off. The result of this work is that there is now a good deal of scientific information available, showing how and why certain kinds of lights and paints and lettering carry a message to the eye more quickly and surely than other kinds.

Take the question of colored lights, for example. Obviously some colors are more easily seen than others, but which? Some data on this subject were gathered by Dr. Knight Dunlap, at Johns Hopkins University, under the auspices of the National Research Council. Dr. Dunlap took into consideration the fact that some four per cent. of men and a slightly smaller per cent. of women are color blind, and a great many more are color weak, that is, they have difficulty in distinguishing colors quickly or when their atten-

tion is divided. Translated into figures, this means several million people who might have difficulty in distinguishing traffic signals.

"It is advisable for traffic purposes," said Dr. Dunlap, "to treat all persons as if they were color blind in the usual way. These people see only two colors, blue and yellow, where the normal person sees the

whole spectrum. Red, orange and yellow appear yellow or brown, and blue-green and blue both appear blue. There is no difficulty in distinguishing any color of the one group from any color in the other, except that pale blue and pink look alike."

Invisible Lights

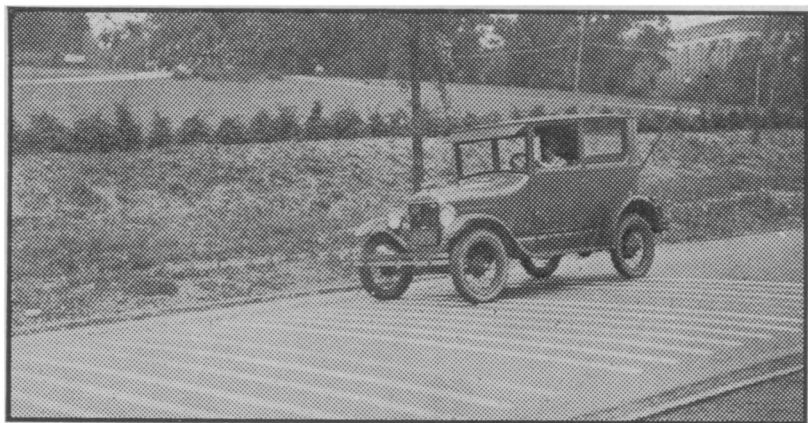
Green lights used in some towns would appear white to the color blind person, he pointed out, and to some color blind drivers certain red lights in use would be almost invisible.

"The automobile driver," he said, "in the very situations where the signals are most important, has to watch other machines and pedestrians at the very moment when the signals are effective, and must frequently see the signals in indirect vision, that is, not looking directly at them but with the eyes directed more or less in another direction. Unfortunately, the 'normal' eye is color-blind at certain angles of indirect vision, and color-weak even at lesser angles. That is, at certain angles of vision, the normal man has just the same difficulties in distinguishing colors as the color-blind or color-weak man."

Orange-red light for stop and blue-green for go (the bluer the better) are the two signals which are most clearly distinguished for traffic purposes, Dr. Dunlap stated. Yellow light, if used at all for caution, should be a flashing signal.

In the code of colors and forms for traffic signals approved by a sectional committee of the American Engineering Standards Committee, the red-orange and blue-green glass, made according to a set formula of color ingredients, are now set down as standard.

The wisdom of using a yellow
(Just turn the page)



TRAFFIC IS HARD ON WHITE PAINT. Here are a dozen paint samples taking a street test in front of the U. S. Bureau of Standards

Traffic Signs

(Continued from page 105)

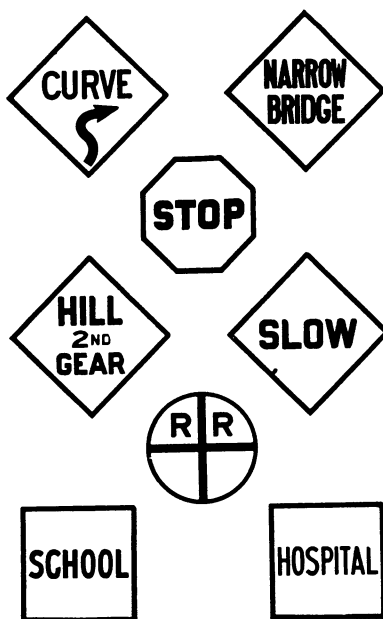
light to clear a crossing when the red and green lights change is now being questioned, even apart from its bearing on the problem of color-weakness. Dr. M. G. Lloyd, electrical engineer at the U. S. Bureau of Standards, states that a third color seems to be unnecessary for this purpose.

"Use of the yellow light has been discarded in New York City, and I am inclined to think it might well be dispensed with in other cities," he said. "The display of red in all directions will stop vehicle traffic in favor of pedestrians, and the same combination exposed for a few seconds would serve to clear the crossing of one stream before the green signal is displayed to start the other.

"Similarly, if it is desired to stop traffic in all directions upon the approach of fire apparatus, red will do this just as effectively as yellow, or more so, and if a special indication of the condition is necessary the red can be changed to a flashing signal or a siren sounded in addition. Use of yellow for this purpose has a disadvantage; that is, its first appearance is usually interpreted as being a transition signal, and drivers actually get started when it is the intention to hold them stopped."

Light Without Electricity

Colored lights have been introduced to some extent in warning signs along highways because the illumination is more striking than flat paint, especially at night. In recent glass lettered signs, however, the effect of light is obtained without use of electricity. The back surface



THE BLACK LETTERED SIGNS on a pale yellow background all shout one message—"Caution"

of this glass is molded at such angles that it reflects the light from head lamps back to the driver even when he looks at it from an angle. These glass lettered signboards are being used as caution signals along highways, and also have begun to be used in cities as stop signs at the entrance to a boulevard. These stop signs are usually a red background with the glass letters in white.

Except for red lights, red, the color of danger, is not playing so large a part in traffic sign language as might be expected. This is chiefly because the red does not stand out prominently as a color at night.

Black lettering on pale yellow has been found to be the most effective contrast and black lettering on white is also easily read. Incidentally, experiments along this same line show that dark letters and figures on a light background make more legible automobile license plates than light colored letters on a dark ground.

The best height for signs from the ground, so that they can be read by the light of head lamps has been tested, and it has been found that many signs are placed too high from the ground. It has also been set down as a serviceable rule that warning markers at crossroads or curves should be 200 to 300 feet in advance.

Result of some of the testing and planning are found in the set of signals developed by state highway officials and federal highway experts

for the U. S. highways, which consist of 96,000 miles of transcontinental highways and roadways connecting with them.

Twenty-four states have marked out the sections of these roads that run through their territory, according to the new system, and the rest expect to follow suit when details of local arrangements are completed.

Numbers Instead of Names

Along these roads, which cross the country in every direction, will be found shield-shaped signs marked U. S. with a number below the letters. The number on the shield is the key to the identity of the road, and conveys a good deal of information to the person who is familiar with the system. All odd numbers, for instance, mean roads running north and south. Even numbers indicate east and west roads. Route one starting in Maine runs through to Florida. Route 101 parallels the length of the west coast. Number 40 is a cross country mid-continental route from Atlantic City to Baltimore and thence across to Denver and San Francisco.

Aside from route 101, all three-digit roads are cross-over roads leading to the main routes. The individual who finds himself on a road marked 140 or 240 will, by traveling in a westerly direction find himself eventually meeting main road number 40.

Naming roadways has proved confusing to travelers, and that is why these routes have been numbered and no attention paid to the names of the highways with which they may coincide. In Mississippi there have been seven Jefferson Davis Highways. In Montana one road has had eight different names, all of them in local use. The U. S. highway system coincides in some sections with the Lincoln Highway and other well known routes, but none of the cross country routes fits exactly with the named highways.

These 96,000 miles of standardized road are being marked with a simple set of caution and direction signs. Black letters on white ground are reserved for information and direction signs, on rectangular boards or on arrows. Black letters on a lemon-colored background means caution regardless of the exact wording of the sign.

Yellow for Danger

On these yellow signs the degree of the hazard is indicated by the shape of the signboard. A round

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Traffic Signs

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yellow marker is reserved for railroad crossings. A diamond-shaped marker means slow down, and this general message of the diamond can be read before the driver comes within reading distance of the words curve or hill. An octagon sign means stop. And a square sign indicates a school, hospital, or other situation which may require a little more than ordinary care on the part of the passing driver.

Some progressive cities have begun to adopt this method of conveying an idea by color and shape as well as by the words on a sign. In Washington, stop signs at the entrance to boulevards are now made octagon shape, in accordance with the system on the U. S. highway routes. But so recent is this idea that the majority of local drivers have not appreciated that the form of the sign has any particular significance.

This use by a city of one of the new highway devices shows how a really uniform sign language will fit into cities as well as country roads. A model city traffic code, which includes provisions for signals and signs, is in process of development to show local traffic officials how nationwide standardization can be effected. It has been stated that the New Jersey legislature will probably take the lead in putting such a model code into practical city use, once an agreement on details is reached by the experts formulating it.

Questioning the Cities

To find out what the cities are doing, and just how much difference there is in local practices, the American Engineering Council has sent out questionnaires to local committees in 125 cities with a population of more than 50,000, and also to 75 additional selected cities where special conditions exist. These questionnaires will show how electric traffic signals are used, what sort of caution and stop signs are used, how tall the letters on them are and what colors and kinds of paint, wood, and metal are considered satisfactory, and so on until a large collection of valuable information regarding traffic materials and devices is set down for study by statisticians and engineers.

The Highway Research Board, which was organized under the National Research Council to coordinate the results of highway research throughout the country, points out

(Just turn the page)

GEOLOGY

Vesuvius Rumbles

Vesuvius, which is reported restless is not yet dangerously active, volcanologists believe, though the time for a serious outbreak may be approaching.

Following the last great outbreak of Vesuvius, in 1906, several hundred feet of the summit were blown off and the crater was widened and deepened. The new crater, with a depth of 1,200 feet and very steep sides, slowly began to fill up again, and a small interior cone began to build.

Dr. Henry S. Washington, of the Geophysical Laboratory of the Carnegie Institution of Washington, who has visited Vesuvius many times and took part in a special study of its last great eruption, states that the lava level has been rising until it is very near the rim.

"Vesuvius, however, seldom sends lava flows over the rim of the crater," he states. "Usually they break out on the sides of the mountain, accompanied by the eruption of vast clouds of smoke and ashes."

Vesuvius spouting lava is a sight of wonder, but to thousands of people who live within its reach, and to the archaeologists who are digging out the old city of Herculaneum it is a menacing spectacle. News from Vesu-

(Just turn the page)

PHYSIOLOGY

Heat from Heart Beat

A quite normally beating heart, like an automatically equipped storage battery, "discharges" and "recharges" within the period of each beat. From his researches on the hearts of turtles and king crabs, at the Johns Hopkins University, Dr. Charles D. Snyder and his associates have found that even a single beat of the heart will produce heat in proportion to the energy expended.

"This explains at last," Dr. Snyder declared, "the wonder of the heart's great regularity, its constant vitality and the age long mystery of its indefatigability."

In their experiments every precaution was taken to exclude heat from outside sources. The hearts of turtles and king crabs were used because they will keep beating a long time after the animal itself has been killed. A small thermos jar was placed inside a larger one and in the cap of the smaller jar were fixed hard rubber posts to which the muscles were attached. Through the cap were perforations for the wires connecting the thermopile with

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BOTANY

Rubber for United States?

Rubber raising in the United States, a project which enjoyed a renewal of public interest following Thomas A. Edison's recent visit to Washington, is at bottom a problem of the relation of plants to climate. If Edison's hopes of establishing rubber plantations in the United States are to be realized, either hardy forms of the present rubber-yielding plants of the tropics will have to be evolved, or certain rubber-yielding plants native to the temperate zones will have to be bred up to a point where their rubber content will pay for its own extraction.

All the present rubber trees and vines are warm-climate plants. The Para rubber tree, *Hevea*, which now produces by far the larger part of the world's crop on the East Indian plantations, is decidedly a tropical form. It will just consent to grow in southern Florida, but will not grow for money unless it is permitted to hug the equator. It is out of the question for the United States proper, though it would thrive in the Canal Zone and the Philippines.

The original "India rubber" of the Orient was the product of a species of fig, the same tree used as an ornamental in thousands of apartments, and in larger size as a display piece in many greenhouses. This tree is slightly harder than the *Hevea*, but is still very sensitive to frost, and could hardly be expected to pay its way even in the South unless new

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PSYCHIATRY

Mental Disease in Children

An appreciable increase in the number of young people who fall prey to mental diseases is found by Dr. Menas S. Gregory, head of the psychiatric department of Bellevue Hospital.

People are more enlightened about the danger of letting mental and nervous ills gain headway, and as a result more youthful cases reach the hospital, he says, but this does not fully explain the increase.

"The higher standards of the present day are largely responsible," he states. "The demand for material luxuries is greater today than it has ever been. The longings of youth are more intricate, more difficult to attain. They are more likely to be thwarted. And an increase in thwarted longings and ambitions makes for an increase in abnormal mental and nervous states."

Rubber in U. S.

(Continued from page 107)

varieties better adapted to our climate can be produced.

Perhaps third in present importance as a rubber producer is the Madagascar rubber vine, related to our milkweeds, which Mr. Edison is now trying out in the South. Even in the tropics, it now produces only a small fraction of the world's rubber, but it might be exploited more advantageously by plantation methods and with more modern means of extraction than those now practised in its native home.

In our own semi-arid Southwest, and more extensively in the adjacent states of Mexico, there is a native bush, the guayule, which contains rubber in paying quantities. It has the distinction also of yielding its rubber as tiny bits of the pure substance, not as a milky juice or latex which has to be given complicated and expensive treatments before it can be used. Guayule is now being cultivated by a corporation which has a large plantation in southern California, but even this native rubber plant requires the desert heat for profitable growth and holds out little hope of becoming adapted to the colder North.

There remain native plants like the milkweeds and dogbanes, which yield a milky juice containing a little rubber or rubber-like material. These are perfectly hardy in the North, and very prolific—frequently too prolific from the point of view of the farmer. But their content of resilient gums is so low that it would be a bold undertaking to try to make them into commercial sources of rubber, even with the best methods now at the disposal of the plant breeder.

Science News-Letter, August 13, 1927

Ants are fond of the nectar in flowers.

The highest pitched musical instrument is the piccolo.

One-tenth of the world's crops are eaten up by insects.

A baby Indian elephant stands about three feet high.

An insect with wings is an adult and will not grow larger.

Numerous deaths of western wild fowl are puzzling biologists.

Vesuvius Rumbles

(Continued from page 107)

vius indicates that Herculaneum is not in danger, Dr. Washington believes, but the important archaeological work that is going on there is attracting attention to the situation, and if a new layer of mud should roll down from the volcano, the long awaited excavation of the city might be still further delayed.

In 79 A. D., when Pompeii was buried n 15 feet of ash, Herculaneum, which is several miles closer to Vesuvius, was smothered in from 30 to 70 feet of mud. Six more eruptions buried deeper, and the mud hardened into stone. This stone is now being systematically attacked with pneumatic drills by Italian archaeologists, and in less than three months of work they have made encouraging progress, unearthing a street 80 feet below the surface, revealing walls and columns of shops and houses.

The hardness of the stone in which the city is buried has hitherto baffled scientists. Small portions of the city, laboriously unearthed from time to time, have showed that Herculaneum contains remarkable works of art and perhaps the most complete remains of a Roman city anywhere preserved, all of it closely encased in the strange packing of stone.

Science News-Letter, August 13, 1927

Heat from Heart

(Continued from page 107)

the galvanometer for recording heat and for a thread connecting the muscle with a lever outside that recorded the tension. The desired temperature in the inner jar, usually 1 to 3 degrees Centigrade, was maintained with ice. The sensitive thermopile, or heat detector, was placed in close contact with the surface of the muscles, and both heat and tension were finally recorded on a moving photographic film.

It was found that the heart of the king crab produced on the average 71 millionths of a calory per centimeter of length for each gram of tension exerted and that the ratio of heat produced to the tension exerted per gram of weight of muscle was fairly constant throughout the series of experiments.

Science News-Letter, August 13, 1927

The average 20-year old Japanese woman today is two inches taller than the average of 20 years ago, while the height of Japanese men has increased one inch.

Traffic Signs

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that highway safety is primarily an engineering problem, but it is considerably influenced by the human factor.

Prof. S. S. Steinberg, of the University of Maryland, who is assistant director of this board, says that "a recent statistical study of the distribution of blame among factors involved in highway accidents, has shown that the 'human factor' is responsible for approximately 90 per cent. of motor vehicle accidents, and that causes attributed directly to defects in the highway or the vehicle are of small relative importance. Loss of some 25,000 lives annually, the injury of several times that number, and the enormous property damage have focused the attention of many agencies upon this grave problem of highway safety."

So far as the signs on street and road are concerned, this human factor is a complex item which is only beginning to be given full consideration. Most of the signs which rise up to confront the passer-by can be read and understood by any one who gets close enough and looks them over. Many of them are good enough for the automobile driver with keen eyesight and an alert mind. But this is not enough, it is now recognized, so long as there are several million color-blind people, several million with eye defects, the illiterates, and nobody knows how many million that react just a little slowly when they are tired or worried or distracted. For such people a few seconds delay in grasping the message of a sign means the difference between safe steering and a wild effort to bring a car under control in time to avoid danger. It is because of the complex human factor that engineers are now saying that the sign language should be as fool-proof as possible, and so simple and uniform that everybody can read it—and read it fast.

Science News-Letter, August 13, 1927

Tobacco demands more work per acre than any other big crop in this country.

Few alligators live a natural lifetime because of the demand for their hides.

An electric machine that counts coins at high speed is used in the Bank of England.



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ENGINEERING-PSYCHOLOGY

Wanted—An American Sign Language!



DREAM OF A ROAMING MOTORIST