of light. By analogy a phonon would correspond to some constant times the frequency of the wave of sound under consideration.

Prof. E. Teller of George Washington University, who has been credited by Science Service with the introduction of the terms exciton and phonon, wishes to acknowledge Prof. Frenkel's clear priority for the use of these terms.

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PSYCHOLOGY—ENGINEERING

Driver Tests May Reject Some Who Would Be Good Drivers

Researches Aimed at Promoting Driving Safety Are Described to Highway Research Board Meeting

THE new tests of driving skill which seek to use quickness of the hand and eye, the affliction of night blindness, visual acuity and other physiological factors as a basis for issuance of drivers' licenses by state authorities were judged unsuitable for this purpose in a report presented at the meeting of the Highway Research Board.

Dr. Percy W. Cobb of the Board described exhaustive studies now being made by the Highway Research Board and the U. S. Bureau of Public Roads to determine what correlation, if any, exists between lack of certain skills and a proneness to accidents.

Using over 3,000 drivers in the State of Connecticut as a sample of the population, statisticians have been seeking all possible correlations between scores obtained on various supposed tests of driving skill and the accident records of the subjects of the tests.

The average accident record of the subjects was one accident in ten years. This is about two and a half times the rate of a six-year sample of Connecticut drivers generally, and is explained by the fact that many of the drivers selected for testing were chosen from the group having the worst accident records.

Definite correlations of accident-proneness and grades on the driving tests were detected, which cannot be assigned to chance by odds approaching a billion to one or more in some cases.

Despite this seemingly encouraging factor, it was also found that about 24 per cent. of the group with poor scores —and hence with assumed accident-proneness—had never had an accident. Thus the driver's tests fail for one-fourth of the group sampled.

Dr. Harry M. Johnson, professor of psychology at Tulane University, who began this study while with the U. S. Bureau of Public Roads, emphasized that Dr. Cobb's report pointed to the lack of value of such tests as decisive factors in granting motor vehicle drivers' licenses.

The tests, Dr. Johnson said, would be of definite help to an employer who might wish to select the "safest" group of drivers out of a large list of applicants. Such a company would not have a responsibility about the injustice of excluding some good drivers along with the bad because its sole interest is the hiring of superior drivers.

But a motor vehicle commissioner does face this factor of possible injustice in granting licenses for driving permits. He must exclude the bad drivers from the roads if he can, but he should not, at the same time, exclude good drivers too.

While he must keep the maximum number of accident-prone drivers from the highways he must also see that a maximum number of apt drivers use the highways without interference.

This last factor cannot be obtained, Dr. Johnson said, by any driving skill test which would remove 24 per cent. of the people from the highways who scored low in the tests, but who—according to the Connecticut study—have a negligible accident record. "In a democracy," he concluded, "one need not expect such a test to be applied."

Roller Coasters a Model

OUT of the thrilling curves of giant roller coasters in amusement parks has come the newest idea for increasing highway safety.

Parabolic deflectors down the center line of a roadway have been found to give positive redirection to a speeding motor vehicle which may strike them, it was reported by Dr. Miller McClintock of Yale University's Bureau of Street Traffic Research.

The parabolic barrier wall, Dr. McClintock said, was an outgrowth of observations in amusement parks where the cars of a roller coaster negotiate curves which are so sharp that neither flanges on the wheels nor super-elevation of the curve would normally keep the car on its track.

On roller coasters the trick is to have the side of the car mounted with rollers so that an additional restoring force is obtained.

Adapting this idea for a central barrier wall Yale traffic experts devised a sloping metal surface whose profile is a parabolic curve.

As the front tire of a car starts to ride up this surface it gradually reaches a point where the side walls of the tire press against the barrier wall. This creates a restoring force which redirects the car away from the barrier and back onto the roadway. The action is positive and gentle if the driver only allows the car to guide itself for the instant it is on the barrier. No part of the car, except the sides of the tires, touches the barrier wall.

Extensive tests of the barrier have been made in cooperation with the Michigan State highway department, Dr. McClintock said, with all types of motor vehicles, from light passenger cars to 15-ton trucks, and at speeds from 10 to 60 miles an hour. In no case was any car out of control, damaged in any way or the occupants harmed.

A full size parabolic deflector would be four and a half feet high and four feet wide at its base. It would be adapted for any highways wider than two lane roads.

Study Times for Passing

A THOUSAND feet of distance and ten seconds of time are required by the average motorist for passing at 50 miles an hour, it is shown by new studies reported by Yale University scientists to the meeting of the Highway Research Board.

With candid camera and stop watch

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T. M. Matson and T. W. Forbes of the Yale University Bureau for Street Traffic Research have obtained an analysis of nearly 800 actual "passes" of vehicles in New England, the central west and in the far west. The results are important for highway engineers in their determinations of the proper sight distances needed on roadways to make possible the passing of vehicles without undue hazard.

Using cameras in a traveling car, the passing car was photographed to determine its distance to the rear at which the pass started, and the distance in front at which the pass was completed. At the same time a stop watch measured the length of the time taken for the maneuver.

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OCEANOGRAPHY

Mariners May Have To Depend on Foreign Charts

AMERICAN mariners may have to depend on foreign charts when they are in certain parts of the world, is the warning of the Hydrographic Office of the U. S. Navy in its annual report, just issued.

The Hydrographic Office has plates for something over 900 charts which are photo-reproductions of foreign charts. About one-third of these are good, another third are fair, and the remaining third are either obsolete or so badly worn that they should be replaced.

However, at the present rate of production the replacement of these bad plates can not be accomplished in less than 10 years, and in the meantime other plates now classified as still fair or good will have joined them. An increase in the chart-making personnel is indicated as necessary to remedy the situation.

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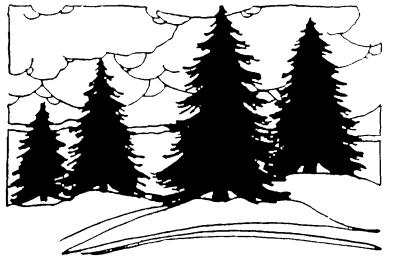
Fifty tons of pottery have been dug up in the excavation of the ancient British city at Colchester.

CLIMATOLOGY

NATURE RAMBLINGS by Frank Thone



Gifts From the North

GIFTS from the East marked the world's first Christmas season. The East has been for ages a legendary land of wealth and splendor, so that it is only natural for folk to continue their visions of the three scholar-princes riding in on their camels from out the sunrise, bringing gifts of gold, and myrrh, and frankincense.

Yet for us who dwell in those lands of extreme temperature changes that are not too accurately called the "temperate" zones, the greatest gifts that nature brings to us come from the North. They follow the sled-tracks of Santa Claus, not the caravan-path of the Magi.

The snow itself is among the greatest of these gifts. A blanket of snow is that much water in natural cold storage, to be released more or less gradually, not running off quickly as rain does. This snow-storage is of especial importance in irrigated regions; there the people must very literally lift up their eyes to the hills from whence shall come their help. But even in humid lands winter snow is important as a source of soil moisture in spring: not so much April showers as January snows bring forth May flowers.

The cold itself, that comes down from the North, is a great bounty. For the expansion and contraction of the rocks with changes in temperature, and even the alternate freezing and thawing of ice in their cracks, breaks down the earth's sterile crust into fertile soil. And the tremendous super-plows of ice, the glacial sheets, that once moved slowly over the continent, helped to make the richest of all our farm land. The corn belt of the Midwest is practically coextensive with the glaciated area.

The ebb and flow of cold from the North and warmth from the South are the basic cause of the alternation of seasons, that give life in these latitudes much of its stimulating interest. If you look for the first robin and the first crocus in spring, if you watch the flight of wild geese in autumn and treasure the last gold and amethyst of the asters, remember always that these, too, are gifts from the North.

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ICHTHYOLOGY

Nesting Fish

● "It seems strange indeed to think of fish building nests and guarding their eggs and watching over their young like birds. But there are many species of fish who do this. Scientists tell us that the birds were developed from the reptiles and that reptiles evolved from fishes, so perhaps the birds acquired their habits of nest building from their fish ancestors."—A. Hyatt Verrill in STRANGE FISH AND THEIR STORIES (*L. C. Page*).

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ENTOMOLOGY

Impressive Aggregations

● "Locusts in migration swarm out of the sky in the Sahara borderlands, in southern Russia, in South Africa and on the Malay Peninsula in terrorizing numbers. They once did so on the Great Plains of the United States, leaving a lively memory of destruction that is still roused by the smaller migrations that may occur there any summer in spite of active control measures. I myself have seen the so-called Mormon cricket advancing from the relatively barren mountain pastures of Utah into the green fields in numbers which were not halted by the hawks, turkeys and snakes attendant on the swarm and feeding greedily; or the active assaults of men and children warned out to protect the cultivated lands. Migrating army worms and chinch bugs present equally impressive aggregations."—W. C. Allee in THE SOCIAL LIFE OF ANIMALS (*Norton*).

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