shape, and sometimes also with tiny men and women. If a figure lands right side up facing you in the game, it's yours.

The interesting thing about that, so far as Eskimo history goes, is that prehistoric Eskimos in northern Canada used to play this dice game, and then some of these Eskimos moved back west to Alaska, carrying this idea of amusement with them. Finding the little ivory ducks in old, buried settlements in Canada, but only in more recent settlements in Alaska, has provided one clew to an old, unrecorded migration.

Eskimo craps is a simple game. But they have a name for it. Tingmiujang. With a language like that, maybe Santa is lucky, too, that he doesn't have to read the letters an Eskimo child would write.

Science News Letter, December 17, 1938

DENTISTRY

Pyorrhea Greatest Problem Facing Dentists Today

PYORRHEA and other diseases of the gums constitute the greatest problem facing dentists, Dr. Olin Kirkland, of Montgomery, Ala., told dentists at the Greater New York Dental Meeting.

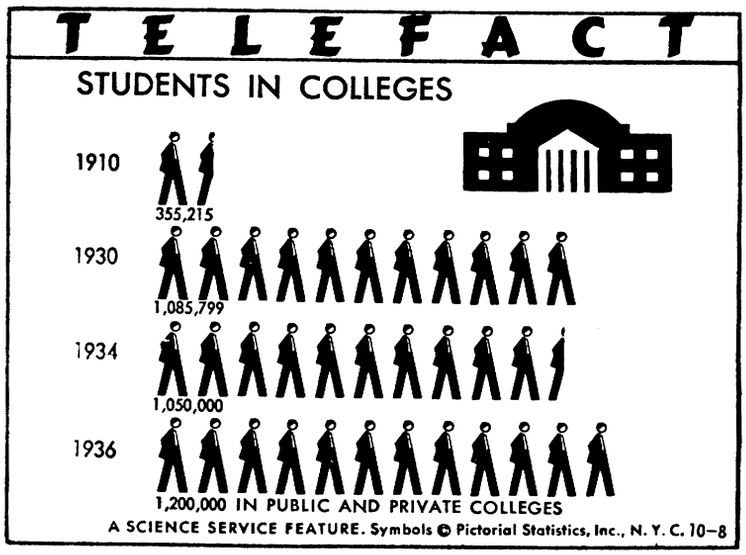
"There is a way to treat pyorrhea successfully," Dr. Kirkland said, "but the operator must make an early diagnosis and proceed to eradicate the infective foci."

Diseases of the gums can be controlled with much less effort than caries or tooth decay and with equal assurance of success, Dr. Kirkland stated, but unfortunately the public does not know this.

More specialists in diseases of the gums are needed, Dr. Kirkland said.

Science News Letter, December 17, 1938

The New York Zoo has a tigon, which is the hybrid offspring of a Siberian tiger and an African lion.



PHYSICS

Introduces New Simplicity Into Atom Mathematics

All the Many Atomic Particles Are Found to Belong To Two Classes According to the Type of Their Spin

THE spin of atomic particles, the same kind of whirling which makes a top stand up on a table-top when properly spun, is now enabling scientists to find a new simplicity in nature.

All the many atomic particles—the electrons, positrons, neutrons, neutrinos, deuterons, mesotrons and all the rest—are now known to fall into one of two simple categories. Either their nuclear spin falls into half integral or into whole integral differences.

In a reply to a query of Science Service, Prof. J. Frenkel, theoretical physicist at the Industrial Institute in Leningrad, points out that all the atomic particles conform to either Fermi-Dirac or Einstein-Bose statistics, special advanced kinds of mathematics developed to interpret their properties.

Electrons, positrons, protons, neutrons and neutrinos conform to Fermi-Dirac statistics, Prof. Frenkel says, and he suggests that they be called "odd" particles.

The second kind of particles have whole integral spins, conform to the Einstein-Bose statistics and include photons, deuterons and mesotrons. These particles would be known as "even" particles, suggests Prof. Frenkel.

In treating the particles by mathematics it turns out that Fermi-Dirac class particles can combine their half integrals of spin and thus turn over into the second kind of Einstein-Bose particles. Thus where two, four, six or any even number of them combine the result is that the Fermi-Dirac particles show properties closely like the Einstein-Bose particles.

Where three, five, seven or any odd number of Fermi-Dirac particles combine they keep their original properties. Einstein-Bose type particles cannot, of course, ever combine into the Fermi-Dirac type because of their whole integral spin values.

Prof. Frenkel is the well-known physicist who also named excitons and phonons as new concepts in mathematical physics. Exciton is a term used to designate a state of excitation moving from one atom to another in a material body, as where light would be absorbed in passing through a material like glass.

The phonon is a fictitious particle bearing the same relation to a sound wave as a photon does to a light wave. The latter is defined as a packet or bundle, of radiant energy whose magnitude is equivalent to Planck's constant "h" times the frequency of the wave

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.

Science News Letter, December 17, 1938

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