



GREATEST OF SHARKS

E. W. Gudger Photo

Whale sharks swim all the warm seas. They are the greatest of all sharks, lengths of twenty to thirty feet being common, and at least one nearly forty feet long has been taken. Like all sharks, they have no real bones in their skeletons, only cartilage, so that when hauled out of water they "squash out" considerably, as did this huge specimen.

## PHYSICS

## Revived Ether Concept Sets Cosmic Explosion Speed Limit

SEEKING to link the extremely minute realms of the new quantum mechanics with the wide-flung scope of the mechanics of relativity, Sir Arthur Eddington, the Cambridge astronomer, presented to the famous Royal Society of London new mathematical equations which may receive acceptance by scientists and thus extend man's understanding of the physical world.

To obtain tractable equations in linking microscopic quantum mechanics and macroscopic relativity, Sir Arthur found it necessary to use something mathematically simpler than the kilogram as a comparison standard of mass. As an intermediary, therefore, he uses an ideal uniform distribution of matter, described as a sort of ether.

The link between quantum mechanics and relativity is given by a quadratic equation:  $10m^2 - 136mm_0 + m_0^2 = 0$ .

The letter  $m$  is the mass of the electric particle and the two roots of the equation give the masses of the fundamental units of matter, the proton and the electron, found to be in the ratio of 1847.6 to one. The letter  $m_0$  is the mass of comparison of the ether and it is calculable from a formula in terms of the following four fundamental con-

stants: Planck's constant, the velocity of light, the de Sitter radius of empty space time and the number of particles in the universe. This number is  $10^{79}$ .

In the maze of connections between physical constants developed by Sir Arthur this number of particles in the universe is the one pure number which has as yet no theoretical explanation.

One result of the equation that can be tested by observational astronomy is that there is a limiting speed of recession of the nebulae or the so-called red shift or Doppler effect. This limit is computed by Sir Arthur as 780 kilometers per second per megaparsec. This is a sort of upper speed limit for the explosion or expansion of the universe.

Sir Arthur Eddington, widely known as the author of "The Nature of the Physical World" and other books as well as for his scientific work in astronomy and theoretical physics, has in the past few years been developing a theory of the electron that can be reconciled with the relativity theory of Einstein, which incidentally Sir Arthur by his 1919 eclipse expedition did much to bring to the attention of science. (See SNL, Nov. 12, 1932, p. 303.)

Science News Letter, November 18, 1933

## DEMOGRAPHY

## Nevada and Missouri Lead in Homicide Rates

NEVADA had the highest homicide rate among white people for the years 1929 to 1931, while Missouri led the list for homicides among colored people, a statistical study conducted by the Metropolitan Life Insurance Company shows.

Statisticians who made the study, which has just been reported, are unable to give any reason for the geographic distribution of homicide. The rate for white people is three times as high in the United States as in Canada and ten or eleven times as high as in England.

Lowest homicide rates, for both white and colored people, were found in the New England states, particularly Maine, Vermont and New Hampshire.

Above-average homicide rates are concentrated in certain areas of the country. For white people there are two regions of highest homicide rates, one in the Southeast and the other in the Mountain states, with Oklahoma forming a connecting link.

The homicide rate for colored people was below average in the Southern states. The high homicide rates for negroes were found in states around Indiana, namely Illinois, Michigan, Ohio, West Virginia, Kentucky and Tennessee. In Indiana, however, the rate was lower than in these surrounding states.

The statisticians pointed out in their report that homicide is mainly a problem of cities, rural areas showing uniformly lower rates.

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## ECOLOGY

## Conifers Grow During Winter, Structures Show

EVIDENCE that the great evergreen trees of the Pacific Northwest grow all winter long has been found in microscopic details of their internal structure by Prof. Ansel F. Hemenway of the University of Arizona. The cambium, or growth layer just beneath the bark, appears to be in an active condition from early autumn until the summer drought sets in, as do also the sieve tubes, elongated cells whose function is considered by botanists to be the transportation of dissolved food substances.

Similar structures from the trunks of deciduous or broad-leaved trees of the

same region, as well as from trunks of both conifers and broad-leaved trees in Kentucky, appear to be in a "closed-down" condition in specimens collected during the winter months. The Oregon broad-leaved trees also seemed to have a period of little or no growth enforced upon them by the midsummer drought of the region.

Thus condemned to inactivity during two long periods in each year, while their evergreen competitors are able to grow continuously throughout nine or ten months of mild, moist autumn, winter and spring, the broad-leaved trees have lost the race for supremacy in the Northwest Coast region and the forest there has come to consist almost entirely of such conifers as Douglas spruce, grand fir, coast cedar and yellow pine.

Prof. Hemenway has communicated a brief preliminary report of his investigation to *Science*, with the statement that a complete detailed account will be published shortly.

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#### ENTOMOLOGY

### Bee Uses 22 Muscles When She Stings You

**W**HEN A BEE stings you, she uses 22 muscles to carry through three distinct movements of her weapon. So says R. E. Snodgrass of the U. S. Bureau of Entomology, in a report on the morphology of the insect abdomen which has just been issued by the Smithsonian Institution. The first movement thrusts the sting out, the second swings it downward, and the third works the little lancets that bury the sting in the victim's flesh.

The sting of a bee or wasp, Mr. Snodgrass states, is a modified ovipositor or egg-laying organ, and the poison-sac that supplies it with its peculiarly painful ammunition is one of the accessory sex glands. The idea that a bee "feels around" for a favorable place to thrust home its dagger is a fable, he continues. Stinging is largely an automatic art. When a bee "sits down" on her victim, "the highly mobile abdomen swings around in all directions and the decurved tip strikes at random until an object is encountered which, if nothing else presents, may be the body, head, or mouth of the bee herself."

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Tasteless quinine is a recent product of the laboratory.

#### ORNITHOLOGY

## American Ornithologists Celebrate Semi-Centennial

### "Native Wood-Notes Wild" Caught With Sound Truck; 58,000 Birds Banded by Businessman-Naturalist

**B**IRD SONGS, recorded with motion pictures of the birds themselves, were demonstrated before the meeting of the American Ornithologists' Union in New York by a hunting team consisting of two scientists and one financier: Prof. A. A. Allen of Cornell University, Albert R. Brand, New York banker, and P. P. Kellogg, Cornell graduate student.

Most ornithologists, even professional ones, are satisfied if they can get close enough to a bird and its nest to get a good photograph, either movie or still, but Mr. Brand has succeeded in stalking his shy quarry with the whole ponderous heavy artillery of a sound-recording truck.

Mr. Brand went about the business of hunting songs with a sound truck in a most business-like way. Having "graduated" from Wall Street, he enrolled as a student at Cornell University, and studied ornithology under Prof. Allen for a whole year. Then he made an alliance with him and Mr. Kellogg, and the three went a-hunting for bird songs.

Any one who has ever seen the elaborate precautions taken against extraneous sounds in a "talkie" studio, where a dropped leadpencil or a cough is almost a capital offense, will appreciate the difficulties faced by the song-hunting expedition in the field, where no amount of shushing can stop leaves from rustling, insects from shrieking close to the "mike," or lonesome cows from mooing.

#### Evolution in Tennessee

Tennessee, once the eruptive center of anti-evolutionary activity, is now the scene of one of the most interesting bits of contemporary evolution. For in that state there has been produced, by natural processes, a beautiful red variety of the native quail or bob-white. Dr. Herbert Friedman of the U. S. National Museum, told of the development of the new variety and of the good work of Tennessee naturalists and game au-

thorities in encouraging and propagating it.

Fifty-eight thousand birds, each with a light metal band around one leg telling where it had been, have passed through the hands of W. I. Lyon of Waukegan, Ill. Mr. Lyon makes his living as a real estate dealer, and follows ornithology as a scholarly hobby. At the meeting of the Union, he reviewed his years of activity as a bird bander. His records show that he has taken part in tracing the migrations and other life activities of no less than 58,000 birds.

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#### BOTANY

### Strange Puffball Has Stalk Ending in Foot

**A** PECULIAR fungous growth from the Colorado Desert is being studied by Elizabeth Eaton Morse, graduate student at the University of California. It looks like a tall puffball growing at the top of a woody stem with a much enlarged base.

At first sight, the finder might mistake the plant for the common shaggy-mane mushroom, *Coprinus comatus*. But if it is split along its length, one finds that the structure within is entirely different from that of any gill fungus. The scaliness of the outer coat contributes to the deception.

Miss Morse has received specimens from lands far removed, all from desert or sandy regions within forty degrees north and forty degrees south of the equator. Although widespread, occurring in north, west and south Africa, Madagascar, India, Hawaii, Brazil, Jamaica, the plant may be considered rare except in certain limited areas where conditions for growth are the most favorable.

After a careful comparison of all specimens with abundant Colorado Desert collections, Miss Morse is inclined to believe that there is really only one