

highest order of mammalia. An allied species is also said to exist in the Philippines. Now this occurrence of quadrumana in the Australian region proves nothing whatever as regards a transition to the western islands, which, among their numerous monkeys and apes, have nothing at all resembling them. The species of Celebes and Batchian have the high superorbital ridge, the long nasal bone, the dog-like figure, the minute erect tail, the predaceous habits and the fearless disposition of the true Baboons, and find their allies nowhere nearer than in tropical Africa. The *Anoa* seems also to point towards the same region, so rich in varied forms of Antelopes.

In the class of birds, Celebes possesses a peculiar genus of Parrots (*Prioniturus*), said to occur also in the Philippines; *Meropogon*, intermediate between an Indian and an African form of Bee-eaters; and the anomalous *Scissirostrum*, which Prince Bonaparte places next to a Madagascar bird, and forms a distinct subfamily for the reception of the two. Celebes also contains a species of *Coracias*, which is here quite out of its normal area, the genus being otherwise confined to Africa and continental India, not occurring in any other part of the Archipelago. The Celebes bird is placed, in Bonaparte's "Conspectus," between two African species, to which therefore I presume it is more nearly allied than to those of India. Having just received Mr. Smith's Catalogue of the Hymenoptera collected during my first residence in Celebes, I find in it some facts of an equally singular nature. Of 103 species, only 16 are known to inhabit any of the western islands of the Archipelago, while 18 are identical with species of continental India, China, and

the Philippine Islands, two are stated to be identical with insects hitherto known only from tropical Africa, and another is said to be most closely allied to one from the Cape.

These phenomena of distribution are, I believe, the most anomalous yet known, and in fact altogether unique. I am aware of no other spot upon the earth which contains a number of species, in several distinct classes of animals, the nearest allies to which do not exist in any of the countries which on every side surround it, but which are to be found only in another primary division of the globe, separated from them all by a vast expanse of ocean. In no other case are the species of a genus or the genera of a family distributed in *two* distinct areas separated by countries in which they do not exist; so that it has come to be considered a law in geographical distribution, "that both species and groups inhabit continuous areas."

Facts such as these can only be explained by a bold acceptance of vast changes in the surface of the earth. They teach us that this island of Celebes is more ancient than most of the islands now surrounding it, and obtained some part of its fauna before they came into existence. They point to the time when a great continent occupied a portion at least of what is now the Indian Ocean, of which the islands of Mauritius, Bourbon, &c., may be fragments, while the Chagos Bank and the Keeling Atolls indicate its former extension eastward to the vicinity of what is now the Malayan Archipelago. The Celebes group remains the last eastern fragment of this now submerged land, or of some of its adjacent islands, indicating its peculiar origin by its zoological isolation, and by still retaining a marked affinity with the African fauna.

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ENGINEERING

30,000-Ton Rock Worried Prehistoric Engineers

A 30,000-TON rock that worried prehistoric Indians in Chaco Canyon 900 years ago has been examined by modern engineers and pronounced safe enough not to worry about. It is too late to help the Indians, but modern tourists who come to see the Indian ruins can feel safe.

A towering rock 100 feet high stood at the back wall of Pueblo Bonito, one of the larger and more important pueblos of about 1000 A. D., and the people of the town evidently thought it precariously unstable. Using primitive engineering tactics, they tried to brace it with a masonry wall along the foot.

Discussing the engineering problems involved, in a report to the *Engineering News-Record*, J. B. Hamilton and F. A. Kittredge, engineers of the National Park Service, say that the Indian tactics would never have stopped the tall rock from overturning, had it been really unstable. However, the wall they built did ably protect the base of the rock from eroding away by wind action.

The engineers of the Park Service have surveyed the place and find that, while the rock is extensively undercut, it is so stable that only an earthquake

could be expected to dislodge it. The problem, they concluded, is to protect it against wind erosion and frost action. Their tactics will be to build a masonry wall, the same remedy that the Indian engineers decided on, back in 1000 A. D.

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BOTANY

Warms Sap to Find Its Rate of Flow

HOW fast sap rises in trees and smaller plants has always been one of the toughest of the botanists' problems. And it is of great practical importance, too, in all applications of the science, from forestry to farming under irrigation. All methods hitherto in use have involved injuring the plant in some way, by boring holes in it or injecting foreign substances, and to that extent introducing unnatural conditions with the risk of falsifying the result.

But now Prof. Bruno Huber, of the Darmstadt Technical University, has devised a way to measure the speed of the transpiration stream in plants without injuring them. He wraps a wire

NO ONE NEED HAVE
SCARLET FEVER

an address by

Dr. Gladys H. Dick

The McCormick Institute for
Infectious Diseases

To be given Friday, July
21, at 1:45 p. m. Eastern
Standard Time over stations
of the Columbia Broadcast-
ing system. Each week a
prominent scientist speaks
over the Columbia System
under the auspices of
Science Service.

around the stem and heats it electrically for several seconds, which causes the temperature of the sap to rise by fractions of a degree. A few inches higher up the passage of the heated sap is registered by a tiny electrical thermometer which can be introduced between bark and wood without doing any harm.

This method, of course, is efficient only if the sap flows more quickly than it loses its heat, which is the case when the speed is more than one-half an inch a minute.

In this way it is easy to observe the daily speed fluctuations in one and the same plant throughout the year. For

instance, Prof. Huber found that the sap in a vine moved with a speed of 30 inches an hour between 6 and 7 o'clock in the morning, that at 1 o'clock the speed rose to approximately 28 feet an hour and fell again to about 30 inches an hour at night.

In the case of conifers, the condition that the sap should move more quickly than it loses its heat is not fulfilled, so that measurements are impossible. But in the case of foliage trees he found speeds from the measurable minimum up to 36 feet per hour, with vines even up to 150 feet per hour.

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PHYSICS

Electrical Gage Measures Springy Rubber Articles

PRECISE measurements of the dimensions of rubber slabs and cylinders are now possible by means of what might be termed a set of electrical gages developed by W. L. Holt of the National Bureau of Standards. It is obvious at once that the measurement of the thickness of a compressible substance like rubber would be rather inaccurate with the ordinary screw micrometer due to the difficulty of telling when the spindle and foot of the instrument just make contact with the surface of the material without pressing into it.

The new devices make use of the principle of the screw micrometer but substitute a "presser foot" with a spherical surface for the ordinary foot which is plane. When the contact surface of this presser foot is forced down by the specimen of rubber due to the pressure of the spindle acting on the upper surface, it makes contact in an electrical circuit thus causing the needle of a galvanometer in front of the operator to deflect. The indentations in the rubber made by the presserfoot are said to be practically zero so that no errors creep in from this cause.

For measuring the width of the rubber slab or the diameter of a rubber cylinder another gage has been built which operates, with slight modifications, on the same principle as the gages for measurement of thickness just described.

Measurements made with these electro-micrometer gages compare well with those determined from computation of

the volume of the specimens as well as those obtained with the usual types of dial gages. It is expected that the new device will be a boon to the rubber technologist who must know the exact dimensions of the specimens he is testing if his results are to mean anything.

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PHYSICS

Magneto-Optic Method Measures Minute Amounts

NOT ONLY can the presence of minute traces of chemical elements be detected in a solution by means of the magneto-optic method, but how much of each can be estimated, Dr. Edna R. Bishop of the Alabama Experiment Station, Auburn, Ala., told the American Association for the Advancement of Science.

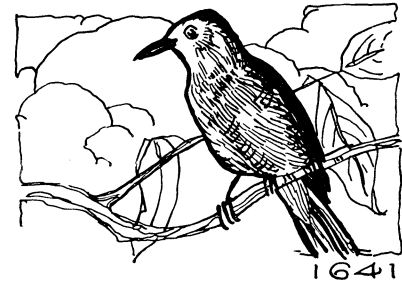
The magneto-optic method was invented by Prof. Fred Allison of Alabama Polytechnic Institute, and depends on the fact that if a beam of polarized light is shot through a solution, and a powerful magnetic field then suddenly applied, the direction of the wavefronts of the light is twisted out of line.

The use of this method for quantitative analysis, Dr. Bishop said, has the advantage of great sensitiveness, of being able to pick out any desired element without troublesome preliminary separations, and of not changing the original sample to be analyzed in any way.

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ORNITHOLOGY



Yankee Mockingbird

THE MOCKINGBIRD is the chief boast of all southern birddom, and justly so. He is an excellent songster, with an exceedingly varied repertoire.

But though the North is not blessed with the mockingbird, it has an almost equally talented cousin of his, in the catbird. The mockingbird and the catbird look a good deal alike, being slim, long-tailed birds of a general gray color scheme, and they have the same habit of ducking in and out among the branches when you try to get a good look at them; not flying away, but keeping inconvenient bunches of leaves between themselves and the observer.

The cousinship is most clearly traced through the catbird's song. This mockingbird of the North has an assortment of notes of his own, and of imitations of other sounds, that fairly rivals the stock of his more widely reputed cousin in Dixie. There are even some loyal Yankees who prefer the catbird. And indeed if it were not for the mewing call he sounds when excited or alarmed, the catbird might well have been formally named the Northern Mocker.

That catcall is the most realistic imitation in nature, though it is not a deliberate imitation. Catbirds were using it long before white men came to America and brought their pets with them. But it is so much like the voice of a somewhat distressed kitten that it will fool even a cat.

But let no cat presume on a similarity of language and try and get familiar. The catbird, like the mockingbird, has a decidedly combative streak, and will turn himself into a low-flying, strafing combat plane if anybody, no matter how big, gets too close to his nest.

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