

set up in the resting system, according to Article 1, the observer determines at what points the beginning and the end of the rod to be measured are at a given instant t . The distance between these two points, measured with the same measuring rod used before, but in this case at rest, is also a length, which may be considered as the "length of the staff."

According to the principle of relativity the length found by operation a), which we will call "the length of the rod in the moving system," must be the same as the length l of the rod at rest.

The length which we find by operation b), which we will call "the length of the (moving) rod in the resting system," we will determine, making use of our two principles, and we will find that it is different from l .

The generally accepted kinematics tacitly assumes that the lengths determined by the two operations described will be exactly equal to each other, or, in other words, that a moving rigid body at the instant t could be replaced in all its geometric relations by the *same body* when it *rests* in a given position.

We consider further the two clocks (A and B) located at the ends of the rod, which are synchronous with the clocks of the resting system, that is, their reading corresponds to "the time of the resting system" at the places where they happen to be at that time; these clocks are therefore "synchronous with the resting system."

We assume further that with each clock there is an observer who moves with it, and that these observers apply to both clocks the criterion for the synchronous running of two clocks which we set up in Article 1. Let a ray of light leave A at the time t_A ,² let it be reflected at B at the time t_B , and return to A at the time t'_A . Taking account of the principle of constancy of the velocity of light we find:

$$t_A - t_B = \frac{r_{AB}}{V - v}$$

and

$$t'_A - t_B = \frac{r_{AB}}{V + v}$$

where r_{AB} denotes the length of the moving rod measured in the resting system. The observers moving with the moving rod would therefore find that the two clocks were not running synchronously, but the observers in the

² Time here means "time of the resting system" and at the same time "position of the hand of the moving clock which is at the same place that we are discussing."

resting system would declare that the clocks were running in synchronism.

We see therefore that we are not able to ascribe to the concept of simultaneity any *absolute* meaning, but that two events which, viewed from one co-ordinate system, are simultaneous, viewed from another co-ordinate system in motion relative to the first can no longer be considered simultaneous events.

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PSYCHOLOGY

The Psychology Of Adolescence

THOSE whose interest in last week's classic causes them to desire to read more of G. Stanley Hall's discussion of adolescence will find that "Adolescence" is published by D. Appleton & Company, New York, and that this book has gone through many editions since its original publication in 1904.

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There are a number of kinds of so-called cow trees which yield milk, a Field Museum technologist states.

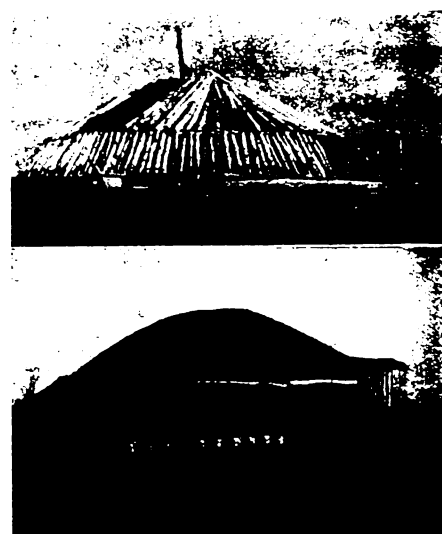
MEDICINE

Men Brave Death to Help Solve Monkey Disease Mystery

THREE brave men have again offered their lives to help science fight disease. Fortunately they escaped death, modern methods of treatment having cured the disease which they voluntarily contracted for the sake of their fellow men.

They made their heroic contribution to the advancement of science at the Panama laboratory of the Gorgas Memorial Institute. The disease they acquired was relapsing fever, in itself no trifling ailment. But when the three men submitted to the experiment, they had no certain knowledge that the disease they were risking was one known to science and for which science had found fairly effective methods of treatment.

The problem which the three volun-



THE MAKING OF A MONUMENT

A unique monument to the memory of three Indian tribes has been erected on the grounds of the State Capitol at Bismark, N. D. The monument is a faithful reproduction of the earth lodges in which the Arikara, Mandan, and Hidatsu tribes lived before the coming of white men. The suggestion that the Indian house would be an appropriate historic state monument was made by Dr. Melvin R. Gilmore, formerly in charge of the State Historical Society. The project was started by the society last September, under the direction of Russell Reid, acting superintendent. The earth lodge is circular.

teers helped to solve was one of those scientific mysteries the account of which, even in the technical report of the Institute, reads like a good detective story.

The wild monkeys of Panama have been the subject of study at the laboratory for some time. In the blood of one of these animals, a juvenile squirrel monkey commonly known as a marmoset, a new disease germ was found. This germ belonged to the spirochete family. Members of this family cause various forms of relapsing fever, syphilis, and other diseases.

"This particular animal had spent three nights on its way into the laboratory in native villages that are endemic centers for relapsing fever, a spirochetal disease," the scientist detectives found. "We first concluded that

the monkey had accidentally acquired human relapsing fever."

Because this would mean that this type of monkey could be a reservoir for the disease, from which humans might acquire it, the scientists decided to investigate. A jungle expedition in an area out of contact with human beings yielded two animals which had been infected naturally in the jungle. Back in the laboratory, the disease transferred easily to practically all laboratory animals and monkeys. Most of them recovered quickly from it, but the infant and juvenile squirrel monkeys showed a high death rate.

"We considered this of such importance that another call for human volunteers was made," Dr. Herbert C. Clark, director of the laboratory, reported.

Fear of the virulence of the organism limited the human experiment to one man at first. Proof that the disease was transferred to him from the monkey was made by finding the spiro-

chete in his blood. After he had responded well to treatment for relapsing fever, the other volunteers were used.

Human ticks native to the locality were next fed on monkeys acutely ill with the disease. They later fed on the second human volunteer to whom they transferred the disease. The progeny from the eggs of these ticks were then fed on the third volunteer, but without success in the transference of the disease.

Further links in the chain of evidence needed to prove the identity of the mysterious monkey disease are now being taken. However, the investigators feel they have progressed far enough to say that the disease is either identical to or very closely related to human relapsing fever. Meanwhile, the three brave volunteers are entirely recovered. To avoid publicity, their names are withheld and they themselves are once more engaged at their regular occupations.

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ASTRONOMY

Eros, Unlike Large Planets, Has Elliptical Outline

EROS, the tiny planet that recently paid a visit to the near neighborhood of the earth, has been seen as a solid object for the first time. Hitherto it has been visible only as a minute pinpoint of light, without any measurable diameter. But two astronomers at Union Observatory, Johannesburg, South Africa, have turned the powerful instruments there on the asteroid, now so far south that northern-hemisphere observers can no longer see it very clearly, and they have been able to see that the asteroid is not a spheroid, like the larger planets, but is an ellipsoid, considerably longer in one diameter than in the other.

This information was cabled to Science Service by the international clearing house for astronomical information at Copenhagen, and interpreted by Dr. Harlow Shapley of the Harvard College Observatory, Cambridge, Mass., and by William M. Browne of the U. S. Naval Observatory.

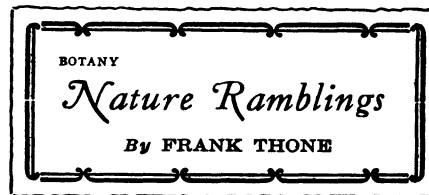
Eros has been observed visually to be elongated about 29 to 25 miles in length and from 8 to 10 miles in average width, according to preliminary interpretations of observations of the

visiting planet, when only about 16,000,000 miles from the earth, it was announced at the Harvard Observatory last week.

The astronomers have arrived at their conclusions about the size and shape of Eros through observations of the period of variation in the range of intensity of light which comes from that planet. The latest observations settle a long controversy as to whether the planet was elongated, or merely so pitted and spotted as to cause variations. The conclusion that it is elongated was arrived at from seeing that it has four variations in a period of 5 hours, 16 minutes and 12.94 seconds. It is explained that as one side is turned towards the earth the intensity increases, then falls as one end turns toward the earth, increases as the other side comes into view, and falls as the other end appears.

The observations at Johannesburg were made with a 26-inch aperture refracting visual telescope and not by photography. Other observatories in that part of the world reported to Copenhagen.

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Wintergreen

ONE of the most attractive of the lesser plants that stays green all winter long is the wintergreen, better known by flavor than by sight to many of us. However, a walk in the richer woods, in a region where the soil has a tendency to go acid, will enable us to make its acquaintance.

It is really a vine, but its main stem runs along just under the surface of the ground, so that it appears to us like a tangle of tiny, erect shrubs, with the small, stiff oval leaves characteristic of the members of the heath family, to which it belongs, and attractive bright red berries. The bunched leaves are rich with the aromatic flavor which we have learned to associate with the name of the plant.

There are approximately one hundred species in the wintergreen genus, all but one of which are natives of eastern Asia. All of the wintergreen plants that grow in America belong to the same species, and it is only this species that furnishes the wintergreen flavor.

In addition to its commercial and culinary importance, the American species has also some interest as a monument in the history of nature study on this continent. It is the "type species" of the wintergreen genus, whose botanical name is *Gaultheria*. The name was given in honor of a pioneer naturalist, one Hughes Gaultier, who was court physician at Quebec, in the middle of the eighteenth century.

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White-shelled eggs are produced by chickens of Mediterranean origin, such as Leghorn, Minorca, and Blue Andalusian; whereas brown-shelled eggs are produced by American developed breeds, such as Plymouth Rock, Rhode Island Red, and Wyandotte.