

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  $t_A$ ,<sup>2</sup> 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

<sup>2</sup> 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.

*Science News Letter, February 14, 1931*

#### PSYCHOLOGY

### The Psychology Of Adolescence

**T**HOSE 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.

We appreciate copyright permission from the publishers to reprint this classic. (See SCIENCE NEWS LETTER, Feb. 7, 1931.)

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

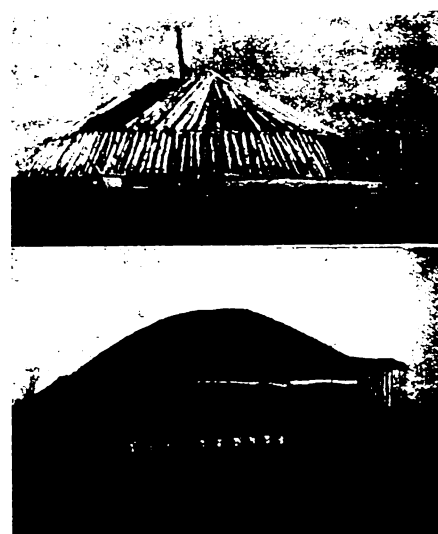
#### MEDICINE

## Men Brave Death to Help Solve Monkey Disease Mystery

**T**HREE 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