



**SPECTROGRAPH TUBE**—Crane carries 52-foot-long cylinder for the giant spectrograph at the University of Michigan's McMath-Hulbert Observatory. The tube is four feet in diameter and will be a major part of the device to analyze the chemical composition of the sun.

## PSYCHOLOGY

## Canaries Have High I. Q.

► CANARIES HAVE surprised psychologists with their intelligence in tests at Queens College, Flushing, N. Y.

Out of sight is not necessarily out of mind with these bright birds, Dr. Nicholas Pastore told the meeting of the Eastern Psychological Association in Philadelphia.

When 22 identical objects and one that was different were equally spaced around a tall cylinder and a morsel of food was hidden under the odd object, the seven canaries tested learned to hop around the cylinder until they came to the odd object under which the treat was hidden. They would do this even though at the start of the experiment the odd object was hidden from their view by the cylinder. They mastered this problem in about 100 tries.

Another trick learned by the birds was even more remarkable. This involved pulling a string-drawn "truck" until it was alongside a bin holding a hoard of bird treats. To move the truck, the bird had to tug on a string emerging through a hole in an opaque screen that hid both truck and bin from him.

First the bird was allowed a look at the truck to size up its distance from the bin. Then the canary went behind the screen and pulled the string. Four different distances between truck and bin were used in the experiment. Sometimes one tug would bring them abreast of each other. At other

times it would take two, three or four tugs.

One bird learned to pull the required number of tugs and then hop to the truck and perch on it to get his reward. Another bird learned the problem but for only two different distances.

Two birds could not go through the experiment because they developed fear of the whole situation.

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## MEDICINE

## Amplify Joint Squeaks To Detect Diseases

► NORMAL JOINTS in the human body move silently, except for the familiar "cracking" at times, but in arthritic and other diseases they may squeak or otherwise make noises. These noises are too slight to be heard, but scientists of the Canadian Department of Veterans' Affairs at Toronto are picking up these noises by amplifying them several thousand times.

The amplification is easily done by using a standard electrocardiograph machine routinely available in hospitals for measuring electrical potentials of the beating heart.

The noises in knee and other joints make possible the localization, measurement and permanent recording of abnormalities.

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## ASTRONOMY

## Sun's Sodium Lines To Test Spectrograph

► THE SODIUM lines of the sun are being used to test a new 50-foot vacuum spectrograph at the University of Michigan's McMath-Hulbert Observatory, Dr. Robert R. McMath told the American Astronomical Society meeting in Princeton, N. J., in his address as retiring president.

The instrument, the only one of its kind in the world, is now being given its final installation tests on the many lines in the rainbow-like solar spectrum. The bright yellow line characteristic of sodium can be seen when salt, or sodium chloride, is heated in a flame.

Other lines used to test the new instrument include those of mercury, iodine, magnesium and potassium, Dr. McMath reported.

The device has a resolving power of 600,000, which means it can separate one part in 600,000.

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## BIOPHYSICS

## "Assembly Line" of Life Photographed

► NOT VISIBLE under ordinary microscopes, what appears to be a highly organized "assembly line" for the basic materials of life has been photographed for the first time.

The work is reported from the division of cell biophysics in the University of California at Los Angeles Medical School and is a continuation of joint research by the late Dr. O. L. Sponsler of the botany department and Dr. Jean Bath.

Highly magnified electron microscope photos of the naked protoplasm of slime mold, a classic protoplasmic material, were made. The specimens were not treated chemically or sectioned, and are thus expected to appear more like they exist in nature.

In addition to fibrillae the photos revealed tiny particles of a variety of shapes and internal structures. These particles are not visible under ordinary microscopes. Some of them contained several "reaction" chambers. On the walls of the chambers were small nodules.

The nature of the chambers suggests that they may be part of a highly organized production line. The nodules are perhaps enzyme complexes which help process raw materials into the complicated substances necessary for life processes within the cell.

Other particles appearing in the protoplasm exhibited within them regular arrays of dark bodies of uniform size. The density of the particles indicates they may contain nucleic acid. Thus the dark bodies may have a gene-like function and, therefore, may help to determine characteristics of the cell cytoplasm.

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