

ASTRONOMY

Eclipse Expedition Ready

Two months of testing equipment preceded the undertaking. Will offer rare opportunity to gather additional information on the shape of the earth.

By DR. LYMAN J. BRIGGS

Chairman, Committee on Research,
National Geographic Society

Written especially for Science Service

➤ SCIENTISTS awaiting the annular eclipse of the sun on May 8-9 are confident that, weather permitting, observations will go off as scheduled.

All equipment to be used by members of the multiple eclipse expedition, sponsored by the National Geographic Society, was put through its paces for two months before being shipped to observation points from Burma to the Aleutians.

Seven cameras to be used at various land stations along the eclipse path, together with radio and other equipment, were first carefully tested for many weeks by technicians at the National Bureau of Standards. Then the astronomers and geodesists responsible for their smooth operation at eclipse-time were brought to Washington for final tests.

Central Line of Eclipse

The central line of this solar eclipse starts in the Indian Ocean. Following the west coast of the Pacific Ocean, it extends as far as the Aleutian Islands.

The eclipse takes place at noon in the Sea of Japan, where the sun will almost be totally hidden. At that point the tip of the cone of the moon's shadow comes very close to the earth's surface. Calculations show it will come within five miles of the earth at longitude minus 132 degrees 47 minutes, and latitude plus 40 degrees 51 minutes.

There the annular phase will last only 0.1 second. Thus second and third contacts—when the moon first hides the sun completely and when the sun reappears as the moon moves on—will occur practically simultaneously.

East and west from the above location the annular phase becomes longer the farther away the station is from the noon-point. In Indo-China and the Aleutians the annular phase lasts for about half a minute.

Since there is no real total phase, the usual investigations carried on dur-

ing a total eclipse cannot be undertaken. But this eclipse does offer a rare opportunity to achieve what has recently been called an "astronomical triangulation linkage."

If the times of contact are observed with great accuracy from stations of known geographic coordinates, they may be used for a check on longitudes. Prof. I. Bonsdorff of Finland has developed this method, suggested earlier by the Polish astronomer Prof. T. Banachiewicz.

The rapidly changing crescent near totality, when the Baily beads appear, is recorded on movie film simultaneously with time-signals. The sun's image, snapped 24 times each second, will be 11 millimeters in diameter.

Such determinations have the advantage of being independent of the local variations of the vertical which affect the positions obtained by the astronomical-geodetic method. They can be of great value in bridging large distances across inaccessible regions or bodies of

water, and thus connect geodetic nets which have been established independently in various countries.

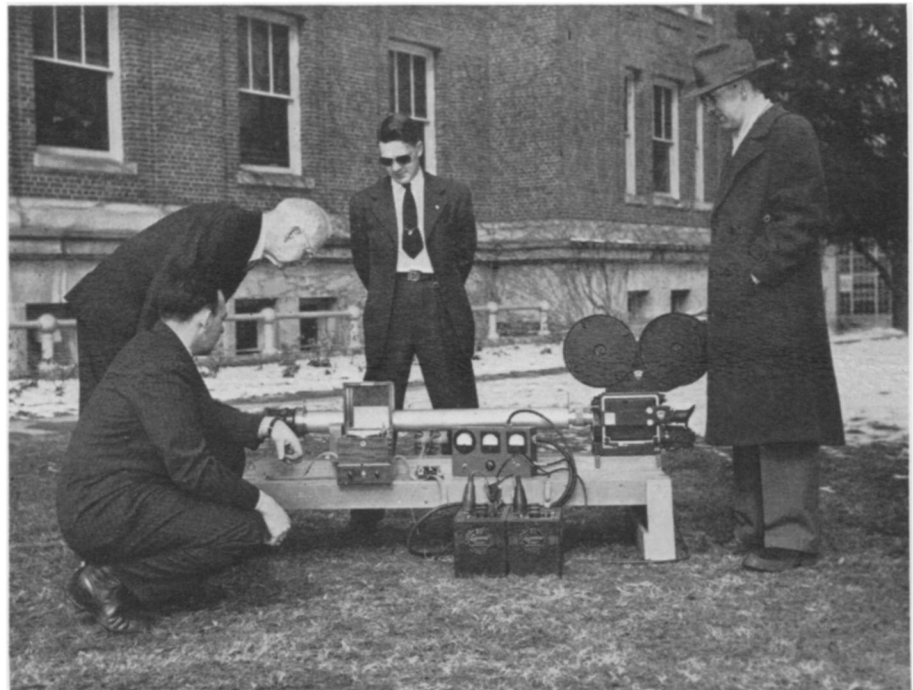
The present eclipse-line passes over a whole series of triangulation systems: the British Indian system in Eastern Burma, the Siam net, the Chinese and Japanese systems and even the American-Canadian one through the Aleutian Islands.

In view of the possibility of obtaining additional information regarding the figure of the earth as a basis for more accurate maps, the National Geographic Society is undertaking an expedition in cooperation with government agencies. They include the U. S. Air Force, the Army Map Service, the Signal Corps, the Naval Observatory, the Hydrographic Office, the National Bureau of Standards, the Coast and Geodetic Survey, and the State Department.

Seven Parties in Field

Seven land parties are now in the field. Each consists of an astronomer or geodesist, a radio-technician, a camera technician and a surveyor, together with the necessary camp personnel generously provided by the Army.

E. A. Halbach, director of the Milwaukee Astronomical Society, is in charge of the group at Mergui, Burma. At Bangkok, Siam, Prof. Charles H. Smiley,



PREPARING FOR ECLIPSE—Moving picture camera (35 mm) equipped with long focus lens and coelostat for observing 1948 annular eclipse is shown at the National Bureau of Standards.

director of Brown University's Ladd Observatory, is in command. The Rev. Francis J. Heyden, S. J., director of Georgetown University Observatory, is responsible for the observations at Wu-K'ang, China.

Dr. George van Biesbroeck of Yerkes Observatory is in command at Tenan, Korea. Reibun Jima, Japan, is under the supervision of Dr. John O'Keefe of the U. S. Army Map Service. Lt. Comdr. George R. Shelton and C. A. Shelton, both of the Coast and Geodetic Survey, lead two parties in the Aleutians

Weather conditions in the Aleutians

are not promising as the Islands average about one sunny day in ninety. Consequently the U. S. Air Force is supplementing the land observations by sending two airplanes to undertake observations above the clouds.

The positions of the airplanes will be determined from signals received from Shoran stations, the locations of which are precisely known. These signals will be accurately tied in with the successive exposures made in the long-focus moving picture cameras in the airplanes, and with a time scale provided by crystal clocks.

Science News Letter, May 1, 1948

PHYSICS-PHYSIOLOGY

Four Balls Measure Heat

➤ A NEW four-balls instrument that tells better than the thermometer how hot you really are in summer was announced at the meeting of the National Academy of Sciences in Washington.

The instrument was devised by Drs. James D. Hardy and Charles H. Richards of Cornell Medical College. Ball radiometer and the more dignified term, panradiometer, are the names they have given it.

The four balls of the instrument are tiny, hollow silver ones, about the size of shoe buttons. The diameter of each is slightly less than a quarter of an inch. One is highly polished, one is blackened, one is white and one has heat put into it to compare with the temperature shown by the thermometer.

The instrument does the job of telling how hot you are because it measures not only the heat from the sun that strikes you directly but also the heat reflected onto you from buildings, pavements, and the like. The measurements include the heat from sunlight and the heat from the invisible heat rays of the sun.

The heat reflected onto you from surrounding objects is what makes you so much hotter on a down-town city street than on a suburban lawn.

A man standing still in the direct sunlight in New York City in the sum-

mer absorbs as much heat from the sun and the buildings and pavement as he would develop if he walked down the street at a fast trot, the new instrument showed.

The reason why the sun does not feel as warm in winter as in summer is that buildings and other surrounding objects do not give off as much heat in winter as in summer. In winter, standing in the sunlight, your body cools off, or loses heat, at the rate of about 60 calories per hour. But if the sun goes behind a cloud or you move into the shade, you lose heat at the rate of about 200 calories.

In summer in the sunlight in a city you get hot from the total heat radiated onto you about three times as fast as you cool off by losing heat in the winter in the sunlight. Heat radiated on you in summer sunlight is at the rate of 100 calories.

The measurements actually made with the instrument take into account the surface area of the body, its weight, time in hours or minutes, and the reflecting power of the skin and clothing in different parts of the sun's spectrum.

The instrument, reported at the meeting for the first time, will probably have practical applications for the armed services. They may use it, for example, for protection for men on duty in the Arctic and Antarctic or in hot desert regions.

Science News Letter, May 1, 1948

PHYSIOLOGY

Examine Rage Mechanisms

➤ WHETHER or not you fly into a rage when someone steps on you or refuses to obey your orders apparently depends on several distinct mechanisms in your

brain which interact as a series of checks and balances.

That is the case for cats, at least, Drs. Philip Bard and Vernon B. Mount-

castle of Johns Hopkins Medical School reported at the meeting in Washington of the National Academy of Sciences.

By removing a certain part of the brain, the neocortex, these scientists were able to produce extremely placid cats who failed to show any sign of anger when subjected to rough handling or quite strongly unpleasant stimulation.

Cats deprived of the entire forebrain, however, tend to show rage on rather slight provocation. So evidently one or more parts of the forebrain besides the neocortex continuously exert a suppressing effect on mechanisms in the lower part of the brain. It is these mechanisms which are "executively involved" in the bodily expression of anger. That is, it is these mechanisms in lower parts of the brain that make an angry cat spit or, perhaps, make the boss pound the desk when things go wrong.

Placid cats could be changed to ferocious ones by removal on both sides of the brain of either the cortex of the midline or certain parts of the so-called olfactory brain. But of a variety of operations in which more restricted parts of the forebrain on both sides were removed, the only one which caused "a gentle normal cat to become savage" was removal of amygdala and pyriform lobes. These two brain structures, one almond-shaped and one pear-shaped, are parts of the so-called olfactory brain.

Science News Letter, May 1, 1948

GENERAL SCIENCE

Condon Attack Jeopardized U. S. Scientific Program

➤ WHEN the Thomas Un-American Activities Sub-Committee of the House attacked Dr. E. U. Condon, Bureau of Standards director, it jeopardized the effectiveness of the entire scientific research program of the government, the American Association for the Advancement of Science's Executive Committee declared.

Protesting against the House sub-committee giving wide publicity to charges against Dr. Condon without holding any hearing, the committee composed of 11 U. S. science leaders, warned that "the continuation of American scientific achievement for the purposes of both peace and war depends upon the freedom and peace of mind of our scientists."

While scientists have no right to ask special privileges, the resolution states, the rights of every citizen under the Constitution and Bill of Rights should protect them against such treatment as accorded Dr. Condon.

Science News Letter, May 1, 1948