

the second half of the year, an average of about a dozen meteors per hour may be seen, but around Aug. 11 they come at the rate of about one a minute.

Sometimes the bright light of the moon seriously interferes, but that will not happen this year. The moon is at first quarter on Aug. 10, when it sets about midnight.

The best display of meteors always comes after midnight, for then we meet them head on. Those we see in the evening must catch up to the earth to be visible, for then we are on the rear of the planet as it hurtles through space.

Celestial Time Table for August

Times are given in Eastern Standard. Subtract one hour for Central Standard, two hours for Mountain Standard, and three for Pacific Standard. Add one hour for the corresponding Daylight Saving time.

Friday, Aug. 2, 11:00 a.m., Venus greatest brilliancy. **Saturday, Aug. 3,** 3:09 p.m., new moon. **Monday, Aug. 5,** 10:00 p.m., moon nearest, 225,800 miles from earth. **Saturday, Aug. 10,** 5:00 a.m., Mercury farthest west of sun, morning star; 7:00 a.m., moon at first quarter. **Sunday, Aug. 11,** Perseid meteors visible. **Thursday, Aug. 15,** 8:00 a.m., Jupiter passes Saturn. **Saturday, Aug. 17,** 6:02 p.m., full moon. **Wednesday, Aug. 21,** 5:00 p.m., moon farthest, 252,000 miles from earth. **Saturday, Aug. 24,** 10:53 a.m., moon passes Saturn; 11:33 a.m., moon passes Jupiter. **Sunday, Aug. 25,** 10:33 p.m., moon in last quarter. **Thursday, Aug. 29,** 2:56 p.m., moon passes Venus.

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RADIO

Two-Way Communication On Ultra-Short Waves

ULTRA-HIGH frequency radio waves were successfully used in two-way communication over a considerable distance for the first time in experiments by the Mt. Washington Observatory staff. Using a frequency of 225 megacycles, or about 1.3 meters, communication was established at a distance of 90 miles. Hitherto two-way ultra-high frequency radio has been limited to a few miles only. In the present experiments both voice and code were satisfactorily transmitted.

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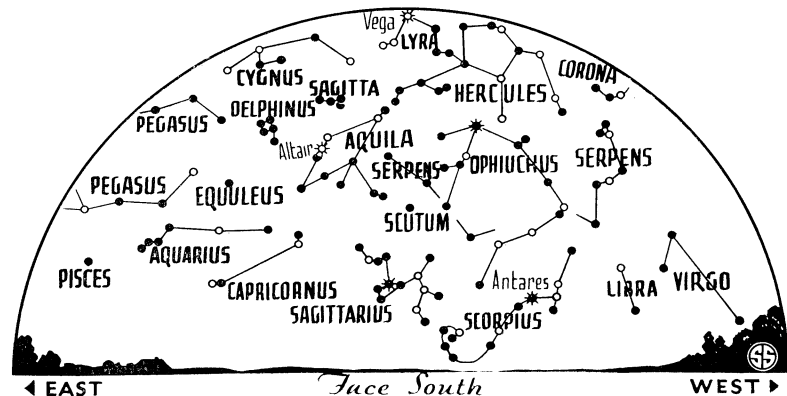
Earth Trembles

Information collected by Science Service from seismological observatories resulted in the location by the U. S. Coast and Geodetic Survey of the following preliminary epicenter:

Sunday, July 14, 1:52.7 a.m., EST

In the Aleutian Island region. Latitude 52 degrees north. Longitude 176 degrees east. Moderately strong shock.

For stations cooperating with Science Service, the Coast and Geodetic Survey, and the Jesuit Seismological Association in reporting earthquakes recorded on their seismographs, see *SNL*, Feb. 24.



☉ * ○ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

ASTRONOMY

University of Pennsylvania Acquires Cook Observatory

THE MOST fully equipped amateur astronomical observatory in America will assume professional standing, when the University of Pennsylvania soon takes over the Cook Observatory, at Wynnewood, Philadelphia suburb. Dr. Charles P. Olivier, director of the University's Flower Observatory and professor of astronomy, announced that this bequest by Dr. Gustavus Wynne Cook, its founder who died June 4, had been accepted. Important observational programs which he began will be carried out, said Dr. Olivier.

A complete photographic map of the Milky Way, on plates 20 by 24 inches, was one of Dr. Cook's most ambitious tasks. This was being done with the world's largest "star camera." Photographs have already been made of a little more than half of the Milky Way which can be seen from this location. This will be continued by Lewis I. Tabor, who made the previous exposures, and has now been added to the University's staff, on a part-time basis.

Cooperating with American and foreign observatories in an international program, I. M. Levitt has been observing the sun with special instruments, including a spectrohelioscope, which shows the sun in the light of a single glowing element. Mr. Levitt, of the astronomical department of The Franklin Institute, has also been made a part-time member of the staff of the University, so his work will continue.

Another important instrument is a 15-inch horizontal refracting telescope, with

which Dr. A. M. Skellett, of the Bell Telephone Laboratories, recently succeeded in observing the sun's corona by television. Until recently, it has only been possible to observe the corona at a total eclipse of the sun. The observatory also has a 28½-inch reflecting telescope, which is combined with a 9-inch refractor. The reflector is equipped with a powerful spectograph, for analyzing starlight, and will be used for special problems. A 14-inch Schmidt camera, a new and powerful tool for stellar photography, acquired shortly before Dr. Cook's death, will be used for star observations, and also for meteor photography.

To work with these instruments, two other members have been added to the University's staff. One, full time, is Dr. P. H. Taylor, who has just completed

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the work for his doctorate with Dr. Olivier. The other, part time, is Dr. Roy K. Marshall, assistant director of the Fels Planetarium of The Franklin Institute.

For the present, the observatory will remain on the Cook estate, Roslyn House, but the work will be coordinated with that of the Flower Observatory at Highland Park, a few miles away. Later, it is expected, both observatories will be moved to a new location, but the Cook unit will maintain its identity and Dr. Cook's name will be perpetuated.

Dr. Cook, 72 at the time of his death, was president of the South Chester Tube

Co. and of the South Chester Terminal and Warehousing Co., and a director of a national bank and two trust companies. He received the honorary degree of Doctor of Science in 1936 from the University of Pennsylvania for his astronomical work. In addition to being an amateur astronomer of note, he also had many other interests, for he built ship models, was an enthusiastic amateur photographer, collected rare orchids and rare books. It is estimated that he spent approximately \$200,000 to equip the observatory, over a period of about ten years.

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gun in both directions of motion when desired, but which can instantly be released to shift to another target.

To Paul Kollsman, of Stamford, Conn., went patent 2,206,506 for a compass that can be used on airplanes, speedboats or other craft, indicating by a dial on the dashboard. A rather large magnet, hung on a jeweled pivot, and supported by the buoyancy of a liquid surrounding it, responds to the earth's magnetism. Below this are a pair of smaller magnets, which follow the large one. These, in turn, are geared to the hand which moves around the dial, indicating direction.

Captain Leslie A. Skinner, of the U. S. Army, received patent 2,206,057 for a rocket projectile, which, he suggests, may be used for signalling, or for carrying an explosive or incendiary charge, a message or a parachute. In ordinary rockets burning black powder, the flow of gases to propel the rocket can be discharged through a hole of fixed size. More powerful nitrocellulose explosives used by Captain Skinner for the driving force require high pressure to start the ignition. When the pressure increases, the burning rate also is raised. Thus, it is necessary to regulate the pressure as the burning takes place. This is done by discharging the gases through a small opening made in solder, or some other material having a low melting point. The diameter of the hole is increased, and the pressure reduced, as the rush of hot gases melts away the lining of the opening.

The day when participants in a telephone conversation will be able to see each other may be brought nearer with the invention of Dr. Vladimir K. Zworykin, of Philadelphia, granted patent 2,206,654, by which two-way television may be accomplished over a single pair of wires. Essentially this consists in sending both ways over the wires at once. A blurred image, like a photographic double exposure, would normally be obtained at each end. Dr. Zworykin provides "blinking out" amplifiers at each end of the line, which permit the transmitting tube to send and the viewing tube to show only alternate pictures in the series that is constantly coming over the line. These automatically switch back and forth so that first a picture is sent in one direction, then one goes in the opposite direction. All this is so fast that the persons at each end see a continuous picture, though not with as good quality as if the transmission were continually in the same direction.

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Turtle shells were cradles for Indian babies in Lower California.

INVENTION

Latest Patents Include Airplane Gun Turret

Gunner Is Protected From Wind, Yet Can Turn and Aim His Weapon as Freely as Was Possible on Open Mount

LARGE caliber machine guns can be fired from modern high speed airplanes with greater accuracy than heretofore, using a flexible gun turret invented by Clem G. Trimbach, Eggertsville, N. Y. and Camille R. Lemonier, Kenmore, N. Y. They have just been granted United States Patent 2,206,065 for the device.

In older planes, the machine gunner was exposed, and could aim in all directions. However, as the patent states, "it has been found in practice that the conventional flexible gun mounts of the past have been found inadequate in present high speed aircraft, due to the terrific air reactions on exposed parts of the mount by which the gunner is prevented from accurately training the gun and holding an aimed position. Since the use of a flexible gun mount in aircraft is mandatory from a military standpoint in certain types of craft, the present invention pro-

vides for full flexibility, and by its organization, will enable a gunner to maintain an accuracy of fire even better than that which was obtainable in the older type gun mounts used on low speed aircraft."

The gun is pivoted at the center of a hemispherical dome made of transparent plastic material. This can turn around its base, so that the gun, pointing through it, may be moved from side to side.

Up and down motion is arranged without an open slit through which air can enter. The inventors accomplish this with a sliding shutter. When the gun is horizontal, the shutter extends from the barrel to the top of the dome, but as it is aimed higher, the shutter slides on tracks down the other side. Below the barrel is a flexible curtain, wound up on a spring roller, like a window shade, as the gun comes down. There is also a movable seat for the gunner, and a clamp to hold the

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