# SCIENCE NEWS

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## THE LARGEST KNOWN STAR

RAS ALGETHI, the brightest member of the constellation of Hercules, a group now seen in the western evening sky, is now pronounced the largest known star. It is 690,000,000 miles in diameter, about 800 times the sun's diameter of 864,000 miles.

This is shown by new calculations of George H. Herbig, of the University of California at Los Angeles. These demote from first to fourth place Antares, the red star in Scorpius, the scorpion, seen in the south on summer evenings. It has, for a number of years, been considered the largest.

First diameter measurements were made about twenty years ago at the Mount Wilson Observatory by the late Francis G. Pease, using a method originated by the late Dr. A. A. Michelson, of the University of Chicago. Using an instrument called the interferometer, he found the angular diameters of several bright, near-by stars. This is the angle between two straight lines from opposite edges of the star, meeting at the earth. In order to find the linear diameter, in miles, it is necessary to know the distance. A big star far away might have the same angular diameter as a small star much closer.

Using distance determinations then available, Antares seemed to be the largest of the stars measured, with a diameter of 430,000,000 miles. Since then, however, the accuracy of distance measures has been improved. Using these new values, furnished by Dr. Adrian van Maanen, of the Mount Wilson Observatory, Mr. Herbig has recalculated the diameters.

Ras Algethi, in the constellation of Hercules, a group now visible in the west in the early evening, proves to be largest, its diameter being 690,000,000 miles. It it were hollow there would be room inside to put the sun and the planets Mercury, Venus, Earth and Mars, all revolving in their present orbits, with Mars 178,000,000 miles from the surface.

Second in size is Mira, in Cetus, the whale, 395,000,000 miles in diameter. Third is Betelgeuse, in Orion, the warrior, now seen to the east in the late evenings. This seems to vary in size from 260,000,000 miles to 360,000,000 miles. Antares is fourth, with only 245,000,000 miles diameter. This, however, is still considerably larger than the earth's orbit, which is 186,000,000 miles in diameter.

## THE ELECTRON MICROSCOPE AND TELEVISION

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THE electron microscope, now being made commercially in this country as well as in Europe, can be advantageously combined with television, according to U. S. Patent 2,219,113, granted to Martin Ploke, of Dresden, Germany. He has assigned his rights to the Zeiss Ikon Aktiengesellschaft, also of Dresden.

The size of the light waves themselves sets a lower limit to the dimensions of objects visible through an ordinary microscope. Electrons, behaving like waves of much smaller size, are used in the electron microscope to form the image, and they reveal smaller details. Though the electrons can not be focused with lenses, this is accomplished with coils of wire, setting up electrical and magnetic fields to bend the electron beams.

In his patent specifications, Mr. Ploke says that when the object to be examined is bombarded with electrons heat is produced, and that his invention avoids this. In one arrangement, he uses a beam of x-rays to throw a shadow of the object being examined on a thin metal foil closing one end of a vacuum tube. Where the x-rays fall, electrons are given off; these are focused, by electrical and magnetic means, on a sensitive television transmitting surface. The currents can be amplified many times, and the picture viewed on a television receiver.

Though the patent does not mention it, another advantage seems to be that the object under examination is in the open air, while in one form of electron microscope, now on the American market, the object must be in an evacuated chamber. Also, if desired, the television receiver could be some distance away, with a wire, or even a radio connection, to the microscope proper.

X-rays, being of much shorter wave length than light rays, reveal details as well as the electrons. For use where such extreme magnifications, of 20,000 diameters or more, are not desired, Mr. Ploke also describes a device that uses ultra-violet waves, shorter than visible light, though not as short as x-rays. These form an image of the object on a window at one end of the tube, electrons are given off where the rays fall, these are focused on a fluorescent screen at the other end, where they are changed to light, and the magnified image is clearly seen.—JAMES STOKLEY.

## AUSTRALIAN Q FEVER

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THE National Institute of Health of the U. S. Public Health Service reports the first proved epidemic in the United States of Q fever. The epidemic attacked fifteen members of the staff of the institute, one of whom died. The only other proved case of Q fever reported in the United States was an accidental laboratory infection picked up during investigations of a new kind of germ found in ticks at Hamilton, Mont., at the Rocky Mountain Spotted Fever Laboratory of the U. S. Public Health Service. The germ was found on investigation to be the rickettsia which causes Q fever in Australia.

This same germ was the cause of the epidemic at the National Institute of Health this year. The National Institute report does not say, because it has not yet been proved, that this rickettsia is also the germ that has been causing cases of a new, atypical pneumonia that has appeared in the United States within the past few years. These pneumonia patients, however, had symptoms simi-

lar to those of the Q fever patients. Examination after death showed changes apparently identical with those reported in the lungs at post-mortem examination of the atypical pneumonia victims.

Q fever and the atypical pneumonia are both mild ailments, not often fatal, and without x-ray examination of the patient's chest, either disease might readily be called influenza, rather than pneumonia. Neither, of course, is the same as influenza A, which is caused by a known virus. Patients with Q fever with an atypical pneumonia have fever, rarely any chills, frequently profuse sweating. They feel ill and exhausted, but do not have the breathing difficulty of typical pneumonia nor as severe body aches and pains as influenza.

"A comparison of the clinical features and physical findings in these cases," the National Institute's report concludes, "with various series reported from other sections of the United States in the past few years reveals suggestive similarities."

Q fever germs are kept at the National Institute of Health, but none of the persons handling these germs became ill. The fifteen patients in the epidemic were working in scattered places throughout the building with no known contact with these germs.—JANE STAFFORD.

## UNSUSPECTED HEART DISEASE

THAT civilian and military pilots and the young men about to train for the defense service should have the benefit of a new and highly efficient triple test for unsuspected heart disease, was reported at the Memphis meeting of the Aero Medical Association by Dr. Walter Merritt Bartlett, of Benton Harbor, Mich., and Dr. J. Bailey Carter, of Chicago. They stated, on the basis of their experience with the test in more than 500 patients and routine examinations of 200 civilian pilots, that use of the test detects 20 per cent. more cases of heart disease than would be found by the usual physical examination.

Recent deaths of two young pilots, who suffered heart attacks in mid-flight and were barely able to land their planes before dying, emphasizes the need of more thorough examination of the pilot's heart. The ages of these two victims of unsuspected heart disease, 27 years and 34 years, respectively, show that serious heart disease is not confined to middle and old age.

"We, as examiners of pilots," Dr. Bartlett stated, "should place more emphasis on the thoroughness of our cardiovascular examinations. We are often chided about our rigid eye examinations that require pilots to be able 'to see around corners.' It is much more important that the pilot should live to see the next landing field. We must recognize that we are training men who must be able to stand the heavy pressure of flight duty. We can not expect such endurance in the presence of cardiovascular disease."

The new three-way test of heart fitness advised by Dr. Bartlett and Dr. Carter involves the use of the familiar electrocardiograms and of two new technics, stethography and cardioscopy. Electrocardiograms are records in the form of wavy lines on paper of the electric currents accompanying heart activity. With cardioscopy, the physician does not have to wait for a record on paper of heart activity, but can look at the message from the heart as it is being sent. If he sees signs of heart damage, he can have a permanent record made of it. With stethography, the heart "speaks for itself," giving a sound track record of its condition. Sound waves made by the heart as it beats are thus recorded so that the physician can tell whether the heart tones are normal or whether there are murmurs indicating heart damage.

Synchronized electric and sound wave messages give much more information about the heart's condition than either one alone. The sound record was essential for diagnosis of one fifth of the cases reported, detecting early heart disease that would not have been discovered in otherwise thorough heart examinations.—JANE STAFFORD.

## ITEMS

AMATEUR photographers who wish to make correct exposures will be interested in a new light meter described at the meeting in Hollywood of the Society of Motion Picture Engineers by Captain Don Norwood, retired U. S. Army officer. Negative exposure control can now be put on the basis of an exact science. The meter measures the direct light, at the source, rather than that reflected from the subject, and its calibrations show how to set the lens. Reflectance problems occasioned by different tones, colors and shades are compensated for automatically, while effects of contrast, haze, color, etc., which are factors ordinarily inviting errors, are eliminated.

THE results of operations to restore hearing to the deafened are unpredictable, according to Dr. Samuel J. Kopetzky, of New York Polyclinic Medical School and Hospital, who reviewed the results of such operations performed by himself and others at the Chicago meeting of the American College of Surgeons. No cure of deafness can be promised to any patient from such operations, although a number of patients have had their hearing restored by operation. The reason why the operation succeeds in one case and fails in another can not be completely explained at present. Dr. Kopetzky is now trying, by what he calls "sampling," to determine the least amount of surgery that will restore hearing.

THAT proper balance of the amounts of the metals alloyed with iron in making stainless steel was found necessary to give the best corrosion resistance combined with good workability, was reported at the Cleveland meeting of the American Society for Metals. The research was carried out by Russell Franks, W. O. Binder and C. R. Bishop, of the Union Carbide and Carbon Research Laboratories. These types of stainless steel consist of iron with the addition of chromium, nickel and molybdenum. The best properties were found with the following percentages of these elements: 18–19 per cent. chromium; 12–14 per cent. nickel; 1.5–2.25 per cent. molybdenum, and not more than a tenth of a per cent. of carbon. By adding columbium, a somewhat rarer metal, still further improvement was obtained.