boring stars, as the sky is bluer than the yellow light of the sun.

On the other hand, if the nebulae consist of large pieces, such as particles of sand or of small stones or meteorites, they should merely dim the light of the stars without making it redder and their own color should be similar to that of the neighboring stars.

A study of the colors of the nebulae should therefore give a clue as to the size of the particles in the nebulae observed. Recent investigations made by Drs. Struve, C. T. Elvey and P. C. Keenan at Yerkes Observatory, have shown that the nebulae are slightly bluer than the stars in their vicinity. But they are not nearly as blue as would be expected if they were composed throughout of very small particles. The astronomers suppose therefore that the nebulae consist of particles of all sizes, but that the proportion of very minute particles is not sufficient to render the light entirely blue.

How many such particles are there in interstellar space? The total amount of gas between the observer and one of the most distant stars investigated is not more than that contained in a cube of air having half an inch on each side. In order to get an idea of the density of this material, imagine that such a cube of air were drawn out in length over a distance, such that light, which travels at the rate of 186,000 miles per second, would require 10,000 years to cover it. The resulting density would be approximately that of interstellar space. The number of larger particles cannot be determined accurately, but there is probably not more than one dust particle in each 15 cubic inches.

Science News Letter, June 10, 1933

Beautiful phosphorescent light given off by certain sponges living in shallow waters is really due to small worms that inhabit them, according to a discovery just reported by Prof. Emanuel Trojan, of Prague.

The little light-producing worm is scarcely a quarter of an inch long, but can send branches an inch and a half in all directions. Prof. Trojan writes in the London scientific periodical *Nature* how he coaxed the little animal out of its hiding place by attaching the sponge to the edge of an inclined bowl, allowing the water to drip slowly out of the sponge into the bowl. As the sponge became too dry for comfort, the water-loving worms came out.

PHYSICS

American and Dutch Physicists Reach New Low Temperature

Demagnetizing Substance Cooled by Liquid Helium Brings Workers to Quarter of Degree of Absolute Zero

THE GREATEST cold produced and measured by man has now been pushed to within a quarter of a degree of absolute zero, that unattainable heatless point where all motion of the molecules cease and where a gas would exert no pressure whatever.

Two groups of research workers, one at the University of California and the other in Holland, using novel methods identical in principle, have arrived at the extraordinary low temperatures of 0.25 degrees absolute and "certainly below 0.27 degrees absolute," respectively.

The University of California scientists are Drs. W. F. Giauque and D. P. MacDougall, while the Dutch scientists are Prof. W. J. de Haas and E. C. Wiersma of Leyden and Prof. H. A. Kramers of Utrecht. The Americans did their work earlier and published first, and so they now hold the record.

Dr. Heike Kamerlingh Onnes, the pioneer in low temperature research who worked at Leyden, Holland, used the method of lowering temperature by reducing the vapor pressure of liquid helium. He reached a temperature of 0.82 degrees absolute and the same method was used by his successor Dr. W. H. Keesom of Leyden last year to attain 0.71 degrees.

The new low temperature records have been made by taking advantage of the fact that when a substance is magnetized, it heats up. Using liquid helium, made by cooling, liquefying, and solidifying of air, and then liquefying hydrogen to cool the helium, a substance is cooled as low as possible. Then it is magnetized. It heats up. Liquid helium is used to remove that heat. Then it is demagnetized, taking care to keep it heat-insulated. It becomes colder as a result of the demagnetization. Thus lower temperatures than ever before attained have been reached. Technically the method is referred to as "adiabatic demagnetization of paramagnetic salts."

The Americans used a gadolinium sulphate while the Dutch physicists used cerium fluoride as the substance to be cooled.

It is difficult to visualize the low temperature which is now the "farthest south" of temperature. The absolute or Kelvin temperature scale, abbreviated K., has its zero at minus 273.1 degrees on the Centigrade scale or at minus 459.6 degrees on the Fahrenheit scale, the system used generally to designate everyday temperatures.

Near absolute zero strange things happen. Electricity flows almost without hindrance. Substances show their true nature and can be easily studied. That is a reason why scientists strive for such low temperatures.

Science News Letter, June 10, 1933

PSYCHIATRY

Mental Disease Develops From Early Infancy

ONE TYPE of a common mental disease, schizophrenia, develops very insidiously from early infancy on, members of the American Psychiatric Association were told by Dr. Jacob Kasanin of the Rhode Island State Hospital for Mental Disease.

Working with Dr. Karl M. Bowman of Harvard Medical School and the Boston Psychopathic Hospital, Dr. Kasanin has been studying 151 cases of schizophrenia for over two years.

Constitutional schizophrenia is the name they give to this type which develops in infancy. At a very early age, before the mental disease is recognized, the child is considered by his associates to be queer, different or odd. He doesn't mix well with others. The actual mental disease is largely an exaggeration of this peculiar personality, in the opinion of Drs. Kasanin and Bowman.

The peculiar personality increases as the little patient grows older, gradually and insidiously developing into the mental disease. In this type of case, the psychiatrists found no unusual environmental stress or strain nor any physical disease to account for the disorder.

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