

ASTRONOMY

Sun May Be Blue, Too

Once in a blue moon, the sun may also be seen as deep indigo blue. Caused by smoke layer in the upper atmosphere.

► ONCE in a blue moon, there is a blue sun.

Scientists at the British Association for the Advancement of Science meeting in Edinburgh were assured by R. Wilson, of the Royal Observatory, Edinburgh, that the sun as well as the moon sometimes is a deep indigo blue. It happened in Edinburgh on Sept. 26 of last year. This remarkable phenomenon was first noticed at about 4 p. m., when a thinning out of cloud enabled the solar disk to become visible as a deep blue. From then on it could be seen through the cloud for considerable periods up to sunset. The phenomenon continued into the night when a "blue moon" was also observed. Next morning, the sun was normal.

The phenomenon was caused by a smoke layer in the upper atmosphere extending from 30,000 to 40,000 feet which cut off red light while allowing the passage of blue light. The source of this smoke layer was extensive forest fires burning in Alberta, Canada, on Sept. 23. The smoke from these fires drifted over North America, across the Atlantic, over the British Isles and then across to Europe where it finally dispersed.

To investigate the physical nature of the smoke layer, the 36-inch reflecting telescope of the Royal Observatory was trained on the "blue sun." By means of an instrument attached to the base of the telescope, the light was separated into its different wavelengths and its spectrum photographed. By repeating the procedure at a later date

in the case of the normal sun, a comparison of the two led to a determination of the actual loss of light at each wavelength, caused by the smoke layer. The results showed that while the layer was bluing the sun in the visible region of the spectrum, it was doing the reverse in the ultraviolet and reddening the sun.

The investigation showed that the particles in the smoke layer were not blue but transparent and that the red light lost in its passage through the layer was not absorbed by the particles but scattered or thrown to one side. Further, the individual transparent particles were identical in size and constitution, an unusual phenomenon in nature and a difficult one to produce in the laboratory. It appears that these transparent particles were actually globules of oil produced by the distillation of wood in the forest fires. The peculiar property of the oil globules is determined by their size. This was calculated to be one twenty-five-thousandth of an inch. Such a sized particle could only be seen with the aid of a powerful microscope.

There was another system of particles, localized in the smoke layer, which absorbed light of all wavelengths. Such a system of particles would constitute the carbon particles one would expect to find in the smoke of fires.

The "blue sun" occurrence is not unique but very rare. There have been others, usually connected with volcanic eruptions or sand storms in a desert.

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GENETICS

Uneven Chromosome Split

► SCIENCE now has its mystery of the missing chromosomes. When a germ cell divides in the process of building up the human body it has always been thought that the 48 chromosomes or particles within the cells, divide exactly evenly. Now Dr. R. A. Beatty, senior scientific officer of the Edinburgh University Genetics Laboratory, has told the British Association for the Advancement of Science that the neat picture of distribution of hereditary characters, that science has followed ever since the discovery of heredity by Gregor Mendel, is not true.

With the discovery of the chromosomes a classical picture was developed whereby the dividing fertilized germ cell equally

distributed its chromosomes between its daughter body cells, which in turn again made an equal distribution of chromosomes between their daughter cells, and so on.

This makes a nice tidy picture and explains observed genetic phenomena beautifully, but, Dr. Beatty pointed out, now that scientists have begun to count the chromosomes in the body cells they are learning it just isn't true. Some recent counts made of chromosomes in human cells from different tissues show a random deviation of the chromosome numbers from the expected 48. In most cases there were less than 48, though what happened to the missing chromosomes is still anybody's guess.

Further investigation of this unequal

chromosome distribution situation is of vital importance, as the Soviet school of Lysenkoist geneticists are claiming that it bears out their contentions on somatic—body cell—inheritance.

Science News Letter, August 25, 1951

EVOLUTION

Little Eohippus Not Direct Ancestor of the Horse

► THE ANCESTRAL family tree of the horse is not what scientists have thought it to be.

Prof. T. S. Westoll, Durham University geologist, told the British Association for the Advancement of Science at Edinburgh that the early classical evolutionary tree of the horse, beginning in the small dog-sized Eohippus and tracing directly to our present day Equinus, was all wrong.

The direct line of descendants of Eohippus led to a horse-like animal Hypohippus, which became extinct and so ended the line. It was from an offshoot of this line, starting a second line, and perhaps even from a further offshoot of the second line, that our modern horse, Equinus, eventually developed.

Prof. Westoll believes that all evolution is made up of such "finite stage" or blind alley patterns, with offshoots starting up new side lines. Through a series of these offshoots present animal stocks developed.

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METEOROLOGY

British Rain Starts As Ice High Up

► ALMOST all the rain that falls on England starts out as ice, regardless of the time of year, Dr. A. W. Brewer, Oxford University meteorologist, told the British Association for the Advancement of Science in Edinburgh.

What happens is that there are clouds of supercooled water drops and any drops which freeze grow rapidly because of the low vapor pressure on ice. Dr. Brewer finds that even if only a few ice particles are formed and grow quickly, they will fracture into numerous particles around which more pieces of ice will form, later to fall as rain and make England green. Previously the weather men were worried as to how nature furnished sufficient nuclei around which the ice crystals formed.

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CLIMATOLOGY

Climate Changed in 1300 A.D. in Europe

► ABOUT 1300 was a time of climatic change for northern Europe, studies of pieces of pottery and pollen indicate.

Dr. Axel Steensberg, of the National Museum of Copenhagen, told the British Association for the Advancement of Science meeting in Edinburgh, that the pottery and pollen show that the change in climate was not earlier than about 1250 and not later than 1325 to 1350.

Villages in Danish Zealand have been excavated in an attempt to discover what happened to the climate and why. Charred grain and wild seeds of various Middle Ages dates may throw light on the problem. About this time the Black Death devastated northern Europe.

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PHYSICS

Distance Best Protection

Shielding walls of lead or concrete are not necessary as defense against rays of radioactive materials used in industry.

► SHIELDING WALLS of lead or thick concrete are unnecessary and, in fact, undesirable for protecting foundry workers against stray rays from radioactive materials used for making radiographs of metal castings, a British metallurgist, J. S. Blair, told a group of scientists at the Isotope Techniques Conference in Oxford, England.

Shielding walls only cause dangerous back-scatter of the tissue-damaging rays, increasing the hazard to those working within the confines of the enclosure.

A simpler, safer and less costly procedure, said Mr. Blair, is to draw a 30-foot diameter circle, at the center of which the radioactive source is placed, and to instruct all

workmen to stay outside the circle when exposures are being made.

As the strength of the rays, following the inverse square law of all radiation, rapidly falls off with the square of the distance, beyond a 15-foot radius the amount of residual radiation from the commercial radioelements normally employed in industry is so small as to be no hazard.

The steel-penetrating gamma rays of the radioactive isotopes of cobalt, tantalum and iridium are being widely employed in England for detecting flaws in metal castings, whereas in the U. S. this job is still being done largely with X-rays, reported K. Fearnside of Isotope Development Ltd., Aldermanston, England.

Mr. Fearnside believes that the use of radioelements is a more practical proposition, as a small, easily maneuverable cylinder of metal, under an inch in each dimension, takes the place of the bulky and unwieldy X-ray machines.

This makes a great difference in the cost and time factors, especially when welds and repairs are to be radiographed in awkward situations on the job. Sometimes it may require three weeks to set up an X-ray machine to radiograph a particularly awkward installation, whereas the same job can be set up in a matter of minutes with a gamma ray source.

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MEDICINE

Pain in the Chest Not Always from Heart

► MANY PEOPLE think that chest pain is a sure sign of heart disease. But this is not necessarily true.

"Only a minority of individuals who seek medical advice for chest pain have heart disease," the American Heart Association declares in the first revised edition of its manual for physicians, "EXAMINATION OF THE HEART."

Of course the person who has a pain in his chest will be wise to consult his physician to find out what is causing the pain. A check with your doctor is wise in case of other symptoms which you may think have nothing to do with your heart disease. So-called indigestion, for example, may be a sign of stomach cancer or of heart disease.

The symptoms and signs of heart disease may be very much like those of disorders of other organs, the Heart Association points out. Trouble with blood circulation is often shown chiefly by disturbances in other organs than the heart. Examples are the lungs, kidneys, brain, stomach and intestinal tract, liver and feet and hands.

The heart and blood vessels, furthermore, may be involved secondarily by other diseases such as gland disorders, diet deficiencies, anemia, infection and cancer.

Because of all this, your doctor will not be satisfied just to "check your heart," as many a patient asks. The doctor will take a careful history and make a thorough physical examination to find whether your heart is all right or in trouble.

Many a person is unnecessarily worried by a sudden pounding or palpitation of the heart or a feeling that the heart has missed a beat. When a regular heart rhythm is momentarily interrupted by an early beat followed by a pause, a premature contraction, or beat, has occurred. Doctors call this an extrasystole. In most cases it is of no importance, but if you notice this often, see your doctor so he can make a careful examination to determine whether or not there is anything wrong with your heart

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NEW COMET—A greatly enlarged view of the faint 1951 comet discovered on August 6 by Dr. Albert G. Wilson and Robert G. Harrington of the California Institute of Technology and Mt. Wilson and Palomar Observatories on a photographic plate made with the 48-inch Schmidt telescope at Palomar. It is only one ten-thousandth of the brightness necessary to be visible to the naked eye. The straight line below the comet is a star caught as the telescope tracked the comet.