

physical sciences notes

ASTRONOMY

New comet brightening

The last comet of 1967, discovered almost simultaneously on Dec. 28 by two Japanese astronomers, Kaoru Ikeya and Tsutomu Seki, is now a bright object of magnitude seven, easily observed with binoculars or a small telescope.

Preliminary orbit calculations by Drs. Brian G. Marsden and Zdenek Sekanina of the Smithsonian Astrophysical Observatory in Cambridge, Mass., indicate that the comet will be closest to the sun on Feb. 26, with a perihelion distance of 1.7 astronomical units. The A.U. is the average distance between earth and sun, roughly 93 million miles.

Comet Ikeya-Seki will brighten as it travels rapidly northward across Ophiucus and Hercules in the morning sky. Its position on Feb. 24 is predicted to be 17 hours, 14.0 minutes in right ascension and plus 35 degrees, 39 minutes in declination; on Feb. 29, 17 hours, 16.4 minutes and 42 degrees, 21 minutes.

On the morning of March 1, it is predicted to be very close to the globular cluster M-92, which is at 17 hours, 15.6 minutes and 43 degrees, 12 minutes—near the head of Draco.

Comet 1967n is approaching Polaris, the Pole Star, and will pass it, maintaining about the same brightness, at the end of March, after which it will become an evening object.

ASTRONOMY

Unique stellar eclipse foreseen

In any binary stellar system one companion will eclipse the other if the plane in which the two objects orbit is close enough to the line of sight. However, if two stars are so widely separated that they can be seen separately, their orbital inclination must be extremely close to 90 degrees for eclipse to be possible.

No trustworthy case of a visual binary system having been eclipsed is now known. Nevertheless, there is a chance this phenomenon will occur this year, according to Dr. Paul Couteau, a double star expert at Nice Observatory in France.

The visual binary $0\Sigma-536$ has a period of 27 years and an orbital inclination of approximately 90 degrees. The components, both stars rather like the sun, each have a radius of some 418,500 miles, or 0.0045 of an astronomical unit, whereas their separation ranges from five to 25 astronomical units.

Dr. Couteau calculates that if eclipses occur, one should take place around mid-April. However, he notes in the February *SKY AND TELESCOPE* the orbital parameters are sufficiently uncertain that the eclipse could occur weeks earlier or later.

The binary 0Σ is located at 22 hours, 56.0 minutes in right ascension and nine degrees, five minutes in declination, which is near rho Pegasi. The constellation of Pegasus will be in the eastern sky during pre-dawn hours in mid-April.

The stars have magnitudes of 7.2 and 7.3, with a combined magnitude of 6.5, just too faint to be seen with the naked eye but easily visible with binoculars.

HIGH ENERGY PHYSICS

Protons accelerated in electron ring

A new kind of accelerator for protons and other positive ions that promises much lower energy costs uses the field of an electron ring to trap positively charged particles, then accelerates the entire collection.

Physicists at the Joint Institute for Nuclear Research in Dubna, U.S.S.R., starting with electrons having an energy of 1.5 million electron volts, are planning to accelerate protons as energetic as one Bev. The protons have been successfully trapped in a model, V. P. Sarantsev of the Institute told Dr. Denis Keefe of the University of California, Berkeley.

The machine built by the Russians is known variously as a collective linear ion accelerator, or CLIA, electron ring accelerator or even smokatron, because the circulating electrons suggest a smoke ring. The work is reported in the February *PHYSICS TODAY*.

METEOROLOGY

Effect of climate on agriculture

An attempt to assess the effect of significant climatic variations on agricultural production in New Zealand and their ultimate impact on agricultural incomes has been made by Dr. W. J. Maunder of the University of Victoria in British Columbia.

He notes that little attention has been given by meteorologists to the non-scientific gains of their profession, of which those affecting the agricultural community are of primary importance. Although the model Dr. Maunder used was developed for New Zealand agricultural production, it could be modified for use in other countries as well as to trace the impact of weather changes on other aspects of the economy.

The major finding of his analysis, reported in the January *MONTHLY WEATHER REVIEW*, concerns the significance of climatic factors on butterfat production—a “wet January, for example, being worth about \$2 million to the dairy farmers in South Auckland—New Zealand’s premier dairying area.”

ASTROPHYSICS

Origin of diffuse interstellar bands

Broad diffuse absorption features in the light spectra of distant stars have defied identification for more than 30 years, although the interstellar origin of the bands is beyond question.

Now Dr. N. C. Wickramasinghe of Britain’s Institute of Theoretical Astronomy in Cambridge and four colleagues at the Royal Observatory in Edinburgh have devised a theoretical explanation that appears to fit observations, although further observations are needed. They suggest that the unidentified bands are caused by electronic transitions of impurity ions that occupy a lattice site in crystals of dust grains in interstellar space.

This model is satisfactory for the absorption band at 4430 Angstroms, the scientists report in the Feb. 3 issue of *NATURE*.

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