Assuming the null result of the Michelson-Morley experiment, it is possible to show that the phase relationship of the interfering systems depends on the translational velocity of the system unless the time is given by the Lorentz-Einstein transformation. The experiment therefore consists in building a very stable interferometer and observing the fringes at different parts of the sidereal day, the circumferential velocity of the earth being alternately added to and subtracted from the motion of the solar system in the universe. The interferometer was built entirely of fused silica and was kept in a vacuum in a constant temperature bath. The 5461 line of mercury was excited in a special lamp to give very homogeneous light and a path difference of about 30 cm. was used. Special methods were used to measure the photographs of the interference pattern to 1/1,000 of a fringe. The result showed that the relativity expression was verified, provided that the velocity of the solar system is not less than a few kilometres per second. The apparatus was found to be stable enough to enable comparisons to be made over an interval of six months and thus to utilise the orbital velocity of the earth; and here it was found that an effectively null result was obtained. Since internebular velocities run in thousands of kilometres a second, this is interpreted as meaning that time—as measured by the radiation from a mercury atom—varies according to the Lorentz-Einstein law.

Hæmocyanin of *Octopus vulgaris*. Svedberg and Eriksson (*J. Amer. Chem. Soc.*, Dec. 1932) have determined the molecular weight of the hæmocyanin of *Octopus vulgaris*, the chemical and physico-chemical properties of which have been much investigated. The sedimentation method was used and it was found that solutions of the crystallised hæmocyanin contained two constituents, for one of which (called *B*) the sedimentation constant varied strongly with the hydrogen-ion concentration of the solution whilst the sedimentation constant of the other is independent of hydrogen-ion concentration. This second component, called *Ao*-hæmocyanin, is regarded as a definite molecular species, like the hæmocyanins of snails (*Helix*, *Limulus*) previously investigated. It has a molecular weight of about two million, thus resembling the other hæmocyanins, and differing markedly from other proteins. The molecule is not spherical in shape. The molecular weight is the same in the oxygenated and in the reduced state. The results show that the *A* and *B* components are not two different proteins but represent two different kinds of aggregation in equilibrium, the change from *A* to *B* being reversible. This peculiar behaviour with regard to its dependence on hydrogen ion concentration is without parallel in the other proteins so far investigated by the ultra-centrifuge method. The hæmocyanin from octopus gave a titration curve with three inflection points, one at *p*H 4·8, the isoelectric point, one at 6·3 and one at 7·5, the first two being characterised by great change in hydrogen ion concentration when the amount of acid or alkali present is but slightly changed.

Astronomical Topics

Astronomical Notes for February. Jupiter, Mars and Neptune are all near opposition, and are observable for most of the night. The northern hemisphere of Mars is turned towards us; this is less well known than the southern hemisphere, being turned to us at aphelion oppositions. The diameter of Mars increases during February from 12″ to nearly 14″. There is an eclipse of Jupiter IV on February 12; the disappearance is at 8.11 P.M. when Jupiter will be too low; but the re-appearance at 11.54 P.M. is observable. Two stars in the Pleiades are occulted by the moon on February 3, disappearing at 8.43 and 9.34 P.M.

Minima of Algol occur conveniently for observation on February 17 at 11.24 P.M. and February 20 at 8.18 P.M. It should be noted that the times in the B.A.A. Handbook are one day too great from February 18 until the end of April. Mira Ceti reaches maximum towards the end of February, and should be watched; it is only observable very early in the night. Its magnitude at maximum is subject to fluctuations, so comparisons with other stars are useful.

February and March are the best months for observing the zodiacal light in the evening; it should be looked for along the ecliptic as soon as it is dark when the moon is absent.

The central line of the annular eclipse of February 24 crosses Africa; a small partial eclipse is visible in southern Sicily and Greece.

Tidal Shifts in the Earth's Crust. Dr. Hecker announced about twenty years ago that the crust of the earth has tides of a few feet in height. Drs. H. T. Stetson and A. L. Loomis suggested the existence of a much larger shift in a paper read at the recent meeting of the American Astronomical Society at Atlantic City. They have discussed the differences between the time-signals distributed by wireless from the leading observatories of Europe and America, and find discordances between them that are considerably larger than the probable errors of observation. If the whole discordance be ascribed to an actual change in the distance between Europe and America, it would correspond to an oscillation of 63 feet every 12 hours. They also note that the time of transmission of the wireless waves is longer than the light-time for the distance, nearly in the ratio of two to one; they infer that the waves travel by a zigzag route, with about thirty reflections between the Heaviside layer and the surface of the earth or ocean.

Stars of the μ-Cephei Type. Mr. W. Zessewitsch, of Leningrad University Observatory, has sent a note dealing with the double periodicity of stars of the above type. He tabulates for nine stars of the type the shorter period *P*, the longer period *M*, the ratio *M*/*P* and the logarithm of *P*. From these data he deduces the following empirical relation between *M* and *P*:

$$M/P = 80{\cdot}2 - 44{\cdot}5 \log P + 6{\cdot}7 (\log P)^2.$$

P ranges from 16·5 days to 907 days; *M* from 600 to 6,200. The above equation gives sufficiently small residuals to suggest that some such equation exists between the two periods. He states that stars of the RR Lyræ type give a similar formula and expresses the hope that it will give a clue to the nature of the pulsations.