

ABSTRACTS OF PAPERS PRESENTED AT THE RECENT
JOINT MEETING OF THE AMERICAN ASSOCIATION
FOR THE ADVANCEMENT OF SCIENCE AND THE
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ERRORS IN MICROMETER MEASUREMENTS

BY RALPH E. DELURY

A serious error has been finally traced to capillary action of oil between the nut and screw in certain micrometers,—an action which requires a minute or more to bring about equilibrium in the course of routine measurements of a spectrum line in several adjacent strips of spectrum. In the case of the Toepfer 300 mm. measuring machine employed at Ottawa during the past dozen years, a difference of 0.006 mm has been found between sets of measures of a spectrum line 5 seconds and 150 seconds after the spectrum line was brought beneath the spider thread from a distance of 2 mm (four turns of the thread), to right or left. The rate of settling to equilibrium was more rapid when the screw had been turned out of the nut than into the nut against the pull of the weight. The settling is away from the weight, and may consequently be due to slow return of the oil between thread and nut. This curious effect satisfactorily explains the difference obtained from “left” and “right” measures of the same lines. The mean is not necessarily the true value, since the rate of return to equilibrium is different following turnings into or out of the nut. Differences in the measurements of the same lines by different observers may be due to this cause. Conclusions which have been drawn from such purely differential measurements as those produced by the solar rotation, may be profoundly modified when this error is taken into account. The error may be eliminated by beginning the measurements after equilibrium has been reached, or by using no oil, or by using a lubricant which reaches equilibrium very rapidly or very slowly. In any case the order of the measurements of spectrum lines in adjacent strips of spectrum should be so arranged and repeated that mean values will be freed from this error where it is found to be present.

SECOND NOTE ON CEPHEID VARIATION

BY RALPH E. DELURY

A dozen years ago the writer outlined a theory of variable stars, and cepheids in particular, which assumed the action of a satellite to account for the variations in brightness and wavelength. Sometime later in reviewing the theories of cepheid variation, Shapley overlooked this form of the binary theory, pinning his faith on the "pulsation" theory. Recently, Father Hagen pointed out this oversight and advanced a theory similar to mine. Both the convection and pulsation theories assume motions of the gases normal to the star's surface, rising and falling during the period of variation, the former in currents, the latter in an expansion and contraction of the star as a whole. In the present note I wish to point out the possibility of periodic changes of wavelengths due to motions tangentially to the star's surface. It is assumed that in the star there are spots and pores having the characteristics of sunspots in that there is rapid motion (on a much larger scale than in sunspots) from their axes out along the surface of the star, and that as in spots, there is an excess of motion away from the observer (due, as I have suggested in the case of sunspots and presumably of pores as well—to funnel-shaped spots and pores). Greatest wavelengths would coincide with greatest development of the pores, that is lowest brightness of the star, as is the case in cepheids. No change in volume of the star need in this case be assumed.

MERIDIAN CIRCLE OBSERVATIONS ON CIRCUMPOLARS

W. S. McCLENAHAN

It was suspected that in the Meridian Circle work at Ottawa a different value of the azimuth of the instrument was obtained by using Polars at upper and lower culmination. To see if this were true the values of the polar deviation of the instrument (n) were tabulated for as many nights as possible throughout the different years. These results showed that the value of (n) for upper culminating polars was larger than that given by polars

at lower culmination. The values were also investigated to see if there was any magnitude or declination effect but neither was found.

The computations for mean place had to allow for this difference and to see how our results at Ottawa compared with other catalogues the positions of some twenty polars as determined at Ottawa, were compared with Boss's catalogue which is used as standard. The mean difference for the whole gave Ottawa—Boss, $-.011$ sec δ . The differences for the American Ephemeris show up larger than the Boss differences. One polar differing by over one second of time and others by .5 seconds.

ORBIT OF THE SPECTROSCOPIC BINARY H.R. 5992

BY J. W. CAMPBELL

The orbit of this star (1900, R.A. 16h 0.8m, Decl. $+8^{\circ} 22'$, vis. mag. 6.1, type A) was determined from 20 plates secured at the Dominion Astrophysical Observatory at Victoria during the past summer. It has a period of 8.855 days, an eccentricity of 0.376 and a mass-function .023 times the sun. The full details of the solution will appear in the *Publications* of the observatory.

THE INFLUENCE OF ASTRONOMY ON MEDICINE

BY JOHN B. FRASER

ONE of the chief characteristics of the ancient Greek and Roman was his veneration of the planets, a veneration that ended in worshipping the sun as a god; the moon as a goddess; Jupiter as the father of gods and men; Mars as the god of war; Venus as the goddess of love and beauty; Saturn as the god of time; and Mercury as the messenger of the gods.

Both Greek and Roman looked upon the stars as living spirits which exercised their powers over man from the time of his birth until his death, and which were able to give them public and private revelations regarding future events.

The Egyptians watched the helical rising of the star Sirius closely, believing that it indicated the rising of the Nile river, on

which depended a lean or fat harvest with consequent want or plenty. Sirius was said to be the Mother of Khensu and both were held in reverence by the Egyptians as guarding the health and lives of the people through their influence over the Nile.

During the middle ages the past belief that disease was due to evil spirits or demons, was supplanted by the theory that disease was due to the influence of the Sun, Moon and Stars; and that the constellation under which a man was born governed the type of disease he might expect. Thus if a man was born under the constellation of Aries, the Ram, he might expect headaches, earache, diseases of the eye or ear, meningitis or other brain disease and also diseases or affections of the scalp; but if born under the constellation of Pisces, the fishes, he might expect malformation of the feet, bunions, strains of tendons and joints, etc.; the same rule applied to all the different parts of the body, governed by the different signs of the Zodiac.

By taking a pill and retiring as the evening star appeared, taking a second and rising as the sun appeared, and taking one at midday fasting, this along with the hope inspired by the pill often helped the patient; for all physicians recognize the importance of rest, regular hours and restricted diet.

Readers of Shakespeare's "Macbeth" will remember that when the witches were brewing their charm that one of the ingredients was witches' mummy and to make it more powerful they added "Root of Hemlock digged in the dark", and "slips of yew slivered in the moon's eclipse"; but they may not know that over 80 per cent. of the remaining ingredients used were considered medicines at that time.

The use of such terms as cancer, lunacy, jovial, saturnine, mercurial, martial, etc., show the great influence of astronomy in past centuries.
