creep curves reproduce the same features as the tensile-creep curves even though the stress is decreasing under constant load.

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[1] Greenwood and collaborators, *Proc. Aust. Inst. Min. and Met.*, Nos. 95, 101, 104, 109.
[2] Greenwood and Worner, *J. Inst. Met.*, 1 (1939).
[3] Greenwood and Cole, *Metallurgia* (April 1948).
[4] Hirst, H., *Proc. Aust. Inst. Min. and Met.*, No. 118.

Planetary Aberration

THE phenomenon of aberration is usually explained in text-books by considering the motion of the earth past a train of light waves. The special theory of relativity, however, tells us that only relative motions are apparent, and so aberration should occur when a light source is moving relative to an observer. In particular, stars having a component velocity perpendicular to the line of sight should produce an aberration effect. In most stars, this would not be observed, since it would be constant; but binary systems, in which one component has large velocities in its orbit, should show aberration effects. The angle of aberration is dependent only on the relative velocities, not on the distance, and has the direction of the velocity. Thus I would expects numerous observations of stars rotating about one another with large (apparent) angular separation but short period (that of average spectroscopics).

Is there something wrong in the above reasoning, or is it that the effects have been observed and not recognized as aberration effects, but included in the intrinsic orbits? Other possible reasons for not observing the effect are: (1) the spectroscopic binaries from which we deduce the large orbital velocities are not truly binaries, and some other explanation of them must be found; or (2) if none of the previous suggestions contains the answer, it would appear that an ether had been found, in which case only the observer's motion produces an effect.

Incidentally, the same reasoning applies to any star rotating on an axis nearly parallel to the line of sight—any measurement of diameter would be dependent on the linear velocity of its equator.

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NEITHER classical physics nor relativity supposes that the rays of light from a moving object are curved as a result of its velocity; the rays which left it at any given time can therefore be prolonged straight backwards (at any later time) until they intersect at the point which it occupied when they were emitted. If a fixed object is also at that point, any observer anywhere will thus see that at the instant of emission the two bodies coincided. Mr. Hines's difficulty has its origin in a misconception; light leaves the source in *all* directions, not in some specified direction, and although the direction of the particular ray that reaches the observer may depend on the motion of the source, some ray or other will reach him in every case; and every ray points straight back to the point where the source was at the time of emission. The argument in respect of that particular point is independent of any changes in the velocity of the source, whether before or after, and it thus applies to every point of the orbit of a binary; if the true orbit were visible as a fixed luminous wire, the star would always be seen on the wire.

Against this background, we may consider the pre-relativity treatment of aberration. In fact, the pre-relativity position already was that to the first order it is only the *relative* motion of the source and observer which matters, for aberration. The subject is treated in some astronomical text-books (for example, Newcomb, "Spherical Astronomy") under 'planetary aberration'. Relativity has extended this statement to all orders; but there is no astronomical case in which higher orders than the first are observable, so that in practice relativity has made no difference. With double stars, however, there is no advantage in considering systems of axes in which first one component and then the other is stationary; this merely introduces varying displacements of the entire binary system, and is liable to lead to confusion of the sort that has troubled Mr. Hines.

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Tissue Suspensions for Estimations of Radioactivity

THE biologist has frequently to devise an appropriate method for the estimation in a liquid counter of radioactive substances contained in tissues. It is desirable that the technique should be both simple and rapid, and the final fluid medium either a solution of the substance or at least a fine, stable, homogeneous suspension of the total tissue which permits dilution and the removal of representative samples. Coarse suspensions tend to produce erratic counting-rates, due, in part, to drifting of the suspended material into zones of reduced tube efficiency; this can often be verified by shaking such a suspension in the counter after particles have been allowed to settle. In the case of such elements as the halogens, preparation from the tissues of a solution containing the radioactive compound becomes a tedious process if loss is to be avoided, and in these cases a suspension appears satisfactory.

Of the common reagents used for this purpose, solutions of potassium hydroxide are unsuitable, since it is possible to obtain, in a counter of 10 c.c. capacity, counting-rates of more than 400 per minute from the presence of the active potassium (K^{40}) isotope alone. Sodium hydroxide, on the other hand, tends to produce from tissue a troublesome gelatinous mass. Working chiefly with brominated organic compounds, I have obtained satisfactory suspensions by boiling the tissue under reflux in a solution of lithium hydroxide containing 20 per cent of alcohol, afterwards washing out the condensers with a little alcohol. Under these conditions, a suspension is rapidly produced which remains reasonably stable for some hours.

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