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MAGNITUDES AGAIN[1]

By Dr. FREDERICK H. SEARES

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(1) A YARDSTICK WITHOUT SUBSTANCE

AN assemblage of astronomers scarcely needs reminding that stellar magnitude is the measuring stick with which we sound the depths of space. Upon this unit, in some way or other, depend our distances of all the more remote objects in the heavens and, indeed, the dimensions of the universe itself, as far as we know it. Triangulation, the perspective-sharpening of star streams and the backward sweep of stars which reflects our own forward motion through space locate our nearer neighbors; but we quickly pass the useful limit of such methods and thereafter must deal with distances so great that no change in the position of the observer produces any answering shift in the faraway star. The principle of measurement is exhausted, and a new one must be found.

[1] Address of the retiring vice-president and chairman of the section on astronomy, American Association for the Advancement of Science, Indianapolis, December 28, 1937.

You all know how this need has been met: The intrinsic brightness of an object being known—how we find that item is of no concern here—we observe its apparent brightness, which is only intrinsic brightness dimmed by distance, and apply the faithful inverse-square law. Magnitude is, of course, only a convenient numerical expression of the brightness. A sound and satisfying principle, you say, which meets our need admirably. It oversteps ordinary limits of distance and demands only that the object send us enough light to tell us what it is, and thus enable us to say how bright it is intrinsically.

As astronomers you know that in practice matters are not quite so simple as this expression of the essence of the problem would imply; but I have ignored difficulties in order to emphasize once more that stellar magnitude, our customary measure of brightness, takes rank as an observational datum of major importance.