

## Comment by the Editor

### *STANDARDS*

People yearn for certainty. There is satisfaction in conclusions. To establish bounds is natural, even though the limits be tentative like horizons.

In a world of relativity, what can be known precisely? A thing is large or small only in comparison with other objects. The span of a person's life is shorter than a sequoia tree's existence but longer than a squirrel's. A commodity has value in terms of other goods.

If a train runs between two towns in a certain time, how far could it run in a different time? There can be no calculation until the elements of the problem are accurately defined. Since both space and time are infinite, they can be comprehended only in finite measurements. Let a specific distance be determined and the extent of the universe can be described in terms of that unit; let the duration of daylight be known and age can be stated in terms of that phenomenon. Without criteria of measurement, science would lose validity and history its sequence. People must know,



and the process of learning involves the use of established instruments of judgment. Thus the quest for standards began.

In primitive times the dimensions of the human body, being convenient and reasonably constant, were utilized as units of measurement. From the point of the elbow to the tip of the middle finger was a cubit; the distance from the point of King Henry's nose to the end of his thumb was a yard; and the reach of both arms from tip to tip was the spatial length of an embrace or a fathom. A single grain of wheat weighed a grain; three dry barleycorns from the middle of the ear laid end to end constituted an inch; and shoes are still numbered according to the length of a grain of barley in a system of numeration by thirteens.

But such variable standards were inadequate for the complicated relations of the modern world. From universal constants, such as the movement of the stars, the length of a terrestrial meridian, or a correlation of temporal and spatial factors in the vibration of a pendulum, mathematicians derived more accurate units. The French meter, which is a fractional part of a meridian, is 39.37 inches long, while the seconds pendulum measures 39.13 inches. Through comparison with such precise standards, it has been possible to establish uni-



formity in common units. Thus haphazard custom has been wedded to science.

If a physicist should determine the ideal width for a railroad, considering the weight, mass, velocity, and other essential qualities of the traffic, how closely would it approximate the wheel span of the old English cart? Perhaps the fifty-six and one-half inch standard gauge, which had that humble origin, is relatively scientific.

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