not for those who doubt it to offer arguments against it. So far as I can see, neither the old æther nor the new is more than a metaphysical concept of no utility, either in understanding natural phenomena or in predicting new ones, and accordingly neither forms part of the subject-matter of physics. In Prof. Eddington's own development of the theory he never makes any use of this concept. What he assumes is that physical laws can be expressed by differential equations with a certain mathematical property, and the whole of the verifiable results are deduced from this; but this assumption was chosen, not because it corresponded to any known property of space-time or æther, but because mathematically it was the simplest possible. The theory is not based on the concept of space-time, but on an unstated relation between physical laws and mathematical simplicity. Reasons why such an assumption is needed in any theory of scientific knowledge are given in a forthcoming paper by Dr. Wrinch and myself, and are independent of any views on the ultimate nature of the world, except that quantitative inference is possible.

Again, I must dissent from the statement of the interrelation of experimental geometry and mechanics. The essential feature of geometry, as the term is used by geometers, is that it is purely logical and not experimental. Consequently, "experimental geometry" is a contradiction in terms, and can neither have an outcome nor be one. The subject-matter of the mechanics of the world is the relations between the measured positions of bodies at different measured times; all the concepts involved in this statement are well-known physical magnitudes, and I see no use in trying to redefine them in terms of others that are either totally hypothetical or, at best, less comprehensible than those already in existence.

HAROLD JEFFREYS.

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The Origin of "Churning at 62°" on Dairy Thermometers.

WILL you permit me through NATURE to ask the following question: Why do the makers of floating dairy thermometers, both in the United Kingdom and in the United States, so mark their thermometers that 62° F. is said to be "churning temperature," when dairying experts in both countries are in agreement that it should be taken as 56° F.?

I recently had occasion to make myself familiar with the agricultural literature published in this country between 1831 and 1855, and found that where churning temperatures are given it is stated to be 50° to 55° F., and in doing so reference is usually made to experiments carried out by the Highland Society of Scotland in 1828 on the best temperature for churning butter. Various American authorities in dairying have commented on this curious marking of dairy thermometers, and have come to the conclusion that it is a "mystery" how dairy thermometer-makers arrived at the figure 62° F., and why they persist in recording on the thermometers they are making to-day that 62° F. is "churning temperature."

Perhaps some of your readers may be able to throw light on this "mystery."

R. HEDGER WALLACE.

April 12.

A FIRM of manufacturers of thermometers, Messrs. Pastorelli and Rapkin, Ltd., to which we submitted Mr. Hedger Wallace's inquiry, informs us that though they have supplied tens of thousands of dairy thermometers in recent years, they do not know the origin of the mark "churning at 62°," and no one has ever suggested to them before that this temperature is incorrect. Dr. W. Goodwin, principal of the Midland Agricultural and Dairy College, has favoured us with the following opinion upon the subject:

"I do not know that marking dairy thermometers with a churning temperature of 62° is such a common practice as Mr. Hedger Wallace indicates. Many such thermometers are just marked with the degrees only, and these are what we always recommend for our students. It is quite impossible to fix a churning temperature owing to the large number of factors which have to be taken into account. For example, thickness of cream, the degree of ripeness of the cream, the temperature prevailing at the time, the breed of the cow, and even such other factors as feeding and period of lactation, come into consideration. I agree with Mr. Hedger Wallace that 62° is generally too high, unless the churning is taking place in very cold weather, and I venture as an explanation that possibly this old custom dates back to the time when whole milk was churned, as this necessitates a higher temperature than in the case of separated or skimmed cream. It would be of interest to find how the churning temperature of 62° has arisen, but I can think of no justification for it. Probably on some popular make of thermometer this point was fixed, and has been blindly copied ever since."—ED. NATURE.

Young's Interference Experiment.

YOUNG'S interference experiment is a very difficult one to perform as he describes it. If slits are used for the apertures it requires a distance of two yards from the first slit to the double slit, and two yards from the double slit to the observer, and also a very bright source, the sun or the crater of the electric arc. For this reason the experiment is seldom performed, Fresnel's biprism or mirrors being substituted for it in laboratory courses.

If, however, the double slit is mounted on the table of a spectrometer the experiment can easily be performed with an electric incandescent lamp or a sodium flame, and the bands are considerably brighter than with the other arrangement, though not so bright as the bands produced with a biprism. The double slit can be made by painting a piece of glass dead-black and then drawing two parallel scratches on it with the point of a penknife. If the scratches are six-tenths of a millimetre apart, a natural distance to draw them, the separation of the successive bands is about three minutes in the field of the telescope, and ten or twelve bands can be counted. This method of performing the experiment is not mentioned in the text-books, and so it appears worth while to direct attention to it here.

It should also be stated that the diffraction bands produced by a straight edge are undoubtedly more easily observed with a spectrometer than with the expensive optical benches sold for the purpose. The diffracting edge —the blade of a penknife, for example—is mounted vertically on the prism table, and the telescope object-glass removed. The bands are then seen in the field, the distance between the first two maxima being about four minutes with a spectrometer of average size. In the formula for their position the a becomes infinite and cancels, and the angular distance from the edge of the geometrical shadow is $\sqrt{(\{2n-1\}\lambda/b)}$.

R. A. HOUSTOUN.

University of Glasgow, April 16.