dry, these cannot be lumped together for correlation purposes, as the whole effect will be masked. We are reminded of the sun-spot maximum of 1893, which was associated with great heat in England and France, but was exceptionally cold in America and other parts of the world. This limitation of districts may not, as the author recognises, be the same for short periods as for long ones, but he finds the major characteristics in mountain regions very much alike over distances of fifty or sixty miles, and relies upon the evidence of the trees themselves for the demarcation of the districts.

One other small difficulty Prof. Douglass has met in an ingenious manner. It is often noticed that such an element as rainfall, when expressed as departure from the mean, as it must be in correlation problems, is arithmetically lacking in symmetry, since the defect can only be 100 per cent. at most, while excess can be very much larger. Geometrically, this can be avoided by using a logarithmic scale, but this flattens the variation very much. Prof. Douglass's device is to leave the deficient amounts unaltered, but in the case of excessive falls to invert the fraction and measure upwards from the normal. Thus a rainfall of twice the normal is indicated by a point just so far above the normal line as the point indicating a rainfall of half the normal is below it. The symmetry is not perfect, as, of course, no possible wetness can give a point corresponding to zero rainfall, but the method is convenient in places where zero rainfall in the unit period is unknown.

W. W. B.

The Interferometer in Physical Measurements.[1]

A FOURTH volume describing the researches of Prof. Carl Barus with interferometers has recently been issued. The classical work of Fizeau, who applied interference methods to the determination of expansion coefficients, directed attention many years ago to the possibility of the kind of work which has been so well developed by Michelson and others, and in the present series of papers Prof. Barus seeks to develop the methods of application of the interferometer to a somewhat wide range of physical measurements. These include spherometer measurements, elastic deformation of small bodies, elongations due to magnetisation, pressure variation of specific heat of liquids, and even electrodynamometry. The remainder of the volume deals with various modifications of the interferometer methods and with certain gravitational experiments.

Doubtless such an investigation of methods will be useful to workers in any of the foregoing fields, but so far as a first impression is to be trusted it would appear that the main interest has lain in the *method* rather than in any results which have been attained.

In order to study the motion of a contact lever, it may be made to carry two small mirrors reflecting normally two beams which are afterwards caused to interfere. Any rotation of the lever obviously causes a difference of path, which appears in the shifting of the easily recognisable and distinctive central "achromatic" interferometer fringes, such motion being measured by a plate micrometer or "graticule" in the observing telescope.

The two mirrors form the limbs of a "T" piece, which is pivoted about a hinge at the end of the foot. One limb ends in a contact pin which abuts against the surface, the motion of which is to be measured.

In such circumstances Prof. Barus estimates the limiting sensitiveness to be 33×10^{-6} cm., or perhaps even a third of this amount, but it should not be forgotten that the very simple interferometer system of an optical test-plate has a sensitiveness of about a quarter wave-length, say 12×10^{-6} cm., and this without a doubtful hinge and another contact. The contact lever can, of course, deal with non-specular surfaces, but to use it as a spherometer for a glass lens seems quite needless. Naturally, an apparatus of this nature is excellently adapted to such a problem as that of investigating the changes of length of a magnetised rod, and, although no very novel results are obtained, the investigation has been comparatively easy, and the method is well adapted for demonstration.

Suitable self-adjusting interferometers, such as are described in chap. vii., ought to find an increasingly useful place in the physical laboratory, and students should be taught the practical use of such instruments and their modifications. There is too great a tendency to treat an interferometer as a piece of apparatus sacred to one or two highly specialised purposes, but with little more than a few pieces of good plane parallel glass a set of instruments can be made up which should be of the greatest use in teaching and research.

One could wish, perhaps, that some one problem had been attacked and solved thoroughly. The curiously unfinished nature of the work is disappointing, but we must conclude that the method is the chief object. As regards the text, the descriptions are clear and praiseworthy, but the diagrams are both inadequate and unsatisfactory.

L. C. M.

[1] "Displacement Interferometry by the Aid of the Achromatic Fringes." Part iv. By Prof. Carl Barus. (Carnegie Institution of Washington, 1919.)

Canvas-destroying Fungi.

WHEN men again began to take to their tents at the outbreak of war, many noticed that dark brown and black spots, frequently of a diamond shape, were not uncommon on the canvas. Small, surreptitiously acquired bits began to be scattered around for information as to the identity of the moulds causing the rot. Now it is very surprising that so little work has been done on canvas-destroying fungi. That canvas is liable to suffer from moulding seems generally to be known, judging from the fact that any material likely to get wetted is usually "cutched." Shortly before the war aircraft workers began to interest themselves in the fungi concerned in the damage, but it was not until war broke out that one realised the extent of the destruction of sails, tents, etc., by these organisms.

Major W. Broughton-Alcock, in the Journal of the Royal Army Medical Corps for December last, gives a short account of investigations carried out by him in Malta, Italy, and (in conjunction with Miss A. Lorrain Smith) at the Natural History Museum. In Malta attention was soon attracted to the rapid spotting and destruction of tentage—awnings last there only about a year. The investigators found that the principal agents of destruction of cotton- and flax-made canvas are Macrosporium and Stemphylium. The latter is the more prevalent in Malta, and could be isolated by exposing culture plates to the air. The colours of the spots on canvas correspond to the colours seen in cultures, being first brown and then black. The variation in the colour of the spots, especially noticed in flax-made and more resistant canvas, was found to be due to other fungi in association with the above genera—Septoria, Alternaria, Helminthosporium, Chætomium, Exosporium, Penicillium, Oospora, Torula, Saccharomyces, and yellow pigment-forming and other air-borne bacteria. Though

© 1920 Nature Publishing Group