

LETTERS TO THE EDITOR

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ON YOUNG'S MODULUS FOR INDIA RUBBER

It is generally made out that the dynamical value of the Young's modulus for India rubber is greater than the statical value E_1 .¹ In some cases it is found that E is almost equal to E_1 .² Various reasons have been put forward for explaining this discrepancy. It is found that Hooke's Law, which does not hold good for large values of the longitudinal stretch, is used for statical values. In experiments conducted with India rubber the stretch is not small, and hence the theory of Finite strain³ should be used for determining the statical value.

If E' be the value of the Young's modulus as given by the Finite strain theory, we find

$$E' = \frac{2l^2w}{l^2 - l_1^2}, E_1 = W \frac{l_1}{l - l_1} \quad (1)$$

w being the weight hung and l and l_1 being the stretched and unstretched lengths of the specimen used. Thus

$$\frac{E'}{E_1} = \frac{l}{l_1} \cdot \frac{2l}{l + l_1} \quad (2)$$

which shows that $E' > E_1$. In fact if $l = \frac{3}{2} l_1$, we get $E' = \frac{9}{8} E_1$, which is practically the dynamical value found in certain cases. Thus the mistake lies in using Hooke's Law.

If w , the weight per unit length of the speci-

men, is also to be taken into account, we get the result

$$\frac{lw}{E'} = \left(1 - \frac{2w}{E'}\right)^{\frac{1}{2}} - \left[1 - \frac{2}{E'}(l_1 w + W)\right]^{\frac{1}{2}}. \quad (3)$$

Hindu College,
Delhi,
August 14, 1946.

B. R. SETH.

1. Deodhar, G. B., and Kothari, D. S., *Ind. Journ. Phys.*, 1928, 2, 305. 2. Puri, A. N., *Proc. Nat. Acad. Sci.*, 1937, 7, 45. 3. Seth, B. R., *Phil. Trans. Roy. Soc.*, 1935, 234, 231.

WHY LESS OZONE OVER EQUATORIAL LATITUDES¹

THE problem of lower temperature at the tropopause over the equator than in the temperate latitudes has again come into prominence.

In discussing the sounding balloon data of Agra, Ramanathan suggested that the lower temperature at the equatorial tropopause may be due to one of the two causes, the relevant one being strong convective action in the higher layers of the tropopause.² The strong convective action can arise if more moisture is present. He found, on an average, more water vapour at all levels of the troposphere in the tropics than in the temperate regions.

Dobson found during the war (1939-45) with the new Hygrometer devised by him that the amount of water vapour about the level of