# REVIEWS

OSCILLATIONS OF THE ATMOSPHERE BY M. V. WILKES, CAMBRIDGE MONOGRAPHS ON PHYSICS, CAMBRIDGE UNIVERSITY PRESS, 1949. pp. 74; 12s. 6d.

The tides in the atmosphere form the subject of Dr. Wilkes' book in the new series "Cambridge Monographs on Physics." He gives a lucid and concise discussion of our knowledge regarding the subject.

In the first chapter he gives an account of the development of theory of atmospheric tides and the determinations of solar and lunar tides. Laplace's hypothesis that the tides are caused by the daily thermal variation alone, Kelvin's resonance theory to explain the predominance of the semi-diurnal over the diurnal component on the probability of there being a free period of atmosphere nearer to 12 hours than to 24 hours, Lamb's determination of the depth of equivalent atmosphere of about 8 kms for resonance of the semidiurnal tides, G. I. Taylor's estimate of depth of 10 kms of the equivalent atmosphere from velocity of waves observed during the Krakatoa eruption in 1883 and the Great Siberian Meteor in 1908, which appeared at one time to be fatal to the reasonance theory, G. I. Taylor's further work showing that the atmosphere might under certain circumstances have a whole series of equivalent depths, Pekeris's work showing that an atmosphere conforming to accepted ideas up to 60 kms, but falling to a lower temperature of about 200°A at 80 kms could give two equivalent depths of the correct values, and that pressure variation becoming opposite in phase and highly magnified at high level, removal of a discrepancy between the theory of atmospheric oscillation and the dynamic theory of magnetic variations, difficulty of explaining the phase of lunar tide in E. Region determined by Appleton and Weekes, and explaining of this difficulty by Weekes, Wilkes and Martyn (more fully dealt with in Chapter V) have been dealt with in a concise manner in this chapter. He has also given a brief account in this chapter of the work on solar tides, and by Chapman and his colleagues and others on lunar tides.

In the second chapter the author gives a theoretical discussion of the oscillations excited in a rotating atmosphere in which the temperature varies with height, but is independent of latitude and longitude. Forced oscillations, free periods, propagation of a pulse and damping have been considered. In the third chapter, he deals with numerical evaluation of air tides. In the fourth chapter, he obtains an appreciation of the factors involved in atmospheric resonance by considering the flux of tidal energy out of the atmosphere. The trapping of tidal energy in the earth's atmosphere and the height of earth's atmosphere are considered, and computations of resonance curves carried out by means of a differential analysis for various assumed temperature distributions are given.

In the fifth and the final chapter the extent to which the theory of air tides developed in the previous chapters explains the facts is discussed. As mentioned by the

author the general features of both the lunar and solar tides are well explained, but there is difficulty about seasonal and annual changes and with the air tides in the ionosphere The author also discusses the possibility of another low temperature region above a hot E-region to explain the result of Appleton and Weekes.

Dr. Wilkes is to be congratulated on the way he has carried out his task. He has produced a very useful book which can be thoroughly recommended to students of Mathematical Physics and Geophysics.

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