statistical evidence for the opinion, that the trustworthiness of official thunder forecasts declines steadily throughout August.

These remarks are made with all diffidence and in full recognition of the fact that a mere amateurish interest in the weather is a very different thing from meteorological knowledge. I should be grateful to learn, however, whether the tendencies I have tried to point out are at all generally recognised.

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A Determination of the Dielectric Constant of the Ground.

IF an electromagnetic wave spreads from a small source situated in free space, then it is known that the amplitude of the oscillatory magnetic intensity (H) at any point is inversely proportional to the distance (d) of the point from the source, provided that the distance is greater than about 1·5 wave-lengths. Under these conditions, therefore, the product Hd is independent of distance. If, however, the source is situated on the surface of a conducting dielectric, the electrical properties of which can be expressed in terms of a dielectric constant k, and a conductivity σ, then Sommerfeld (*Ann. d. Physik*, (4) **28**, pp. 665-736; 1909) has shown, theoretically, that the product Hd is no longer constant, but varies with the distance in a manner depending on the constants k and σ.

In the case where the source is a wireless transmitter on the surface of the earth, the departure of the product Hd from a constant value can be determined by measuring the magnetic intensity H at different distances from the transmitter. By comparing the resulting 'attenuation curve' with that obtained theoretically from Sommerfeld's theory, assuming various values of σ and k, it is possible to find a theoretical curve which has the same form as the experimental curve, and thus to fix the values of k and σ for the ground. It has been pointed out previously (Ratcliffe and Barnett, *Proc. Camb. Phil. Soc.*, **23**, p. 288; 1926) that measurements on long and medium wave-lengths lead only to a value for σ, and it is not possible to calculate k from them. Up to the present, the only measurements which have been made have been on wave-lengths so long that it has been impossible to deduce from them a value for k.

We have recently carried out measurements on a shorter wave-length (30 m.) up to a distance of 1400 m. The resulting attenuation curve, in which Hd is plotted as a function of d, shows a maximum when d is about 600 m. This curve has been compared with the numerical calculations on Sommerfeld's theory which have recently been published by Rolf (Ingeniörs Vetenskaps Akademien. *Handlingar* Nr. 96, "Numerical discussion of Prof. Sommerfeld's attenuation formula for radio waves". Stockholm, 1929), and its shape is found to be in agreement with the theory, if we assume the values $k = 20$ e.s.u. and $\sigma = 2 \times 10^{-14}$ e.m.u. for the ground constants. The value for σ is in agreement with the values previously found by using longer wave-lengths. The maximum on the curve is the characteristic feature which enables a reasonably accurate estimate of k to be made. No such characteristic feature is present when longer waves are used.

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Sept. 19.

Adaptation.

NOTWITHSTANDING all the discussion that has taken place since 1859 concerning evolution, adaptation, and selection, biologists are still far from agreement, not merely concerning the explanations that have been proposed, but also concerning the things to be explained. Mr. J. B. S. Haldane (NATURE, Sept. 21, 1929) cites evidence that differential survival may be due to physiological differences associated with visible characters not themselves useful or harmful. Prof. D. M. S. Watson, in his presidential address to Section D of the British Association at the recent meeting in South Africa, suggested that structural adaptation may be in many cases imaginary, or may have been the cause of habit, not the consequence. He stated that in extreme cases it was not possible to doubt the special function to which a structure was adapted, but in others a similar habit occurred without any corresponding structural adaptation. As an example of this he referred to the paddle-like limbs of ichthyosaurus as proving that it was an aquatic animal, but stated that there was no indication in the post-cranial skeleton of hippopotamus that it also was aquatic: "its limbs show no swimming modification whatever".

It can scarcely be disputed, however, that the hippopotamus is not an aquatic animal in the sense in which that description may be applied to ichthyosaurus. It is a question of aquatic locomotion: we may conclude from its general resemblance to a whale, and the resemblance of its fore-limb to that of a whale or of a turtle, that the ichthyosaurus lived exclusively in water and probably in the sea, and moved only by swimming. The hippopotamus, on the other hand, spends much of its time walking on land, and when in the water swims neither continually nor rapidly. A horse occasionally enters the water and can swim, but we do not call a horse an aquatic animal.

It seems to me that the important matter is to explain the evolution of such obvious adaptations as those of the fore-limbs of whales, turtles, and ichthyosauri to exclusive aquatic locomotion, not to suggest that the modification of the limbs in these animals is not necessarily and invariably correlated with aquatic locomotion because other air-breathing vertebrates pass more or less of their time in water along the banks of rivers or lakes without similar modification of the limbs. Impartial study of the facts shows that the more constant and specialised the habit the more specialised the adaptation of the structure, while where the habits are variable the structure is more generalised and retains more of its primitive character. This applies to the limbs of air-breathing vertebrates and to vast numbers of other cases.

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Melting Point of Chromium.

No accurate determination of the melting point of chromium has been published recently, so far as we are aware, and the accepted value of 1550° C. usually quoted appears to be based on measurements made in 1907–8.

Various properties of metallic chromium appeared to us to be inconsistent with such a low value, particularly the very slow rate of diffusion of chromium into iron and nickel. We have found (*J. Inst. Metals*, **40**, 273; 1928) that even in pressed bars of nickel and chromium powders heated to just below the melting point of nickel (1450° C.) very little diffusion takes place, whereas under the same conditions nickel and iron rapidly form solid solutions. An attempt was made to melt electrolytic chromium in an atmosphere