has asked the High Commissioner for the Malay States to appoint Mr. Theodore Hubback, lately honorary Game Warden in Pahang, to report on the whole question of the wild fauna of Malaya. It is contemplated that a high official of the Federated Malay States government should be associated with him as assessor. In general the object of the appointment is to make regulations for the preservation of wild life, including the administration of national parks, wild life refuges and game reserves, and to suggest methods for dealing with any damage to agriculture done by wild animals.

DISCUSSION

THE "GIBBS PHENOMENON"—A MISNOMER

A FOURIER series corresponding to a function, $f(x)$ of period 2π, and convergent over an interval on the X-axis over which $f(x)$ is continuous, under very general conditions converges uniformly over any closed subinterval. If, however, $f(x)$ has a discontinuity of the kind sometimes called a "finite jump" in an interval over which it is otherwise continuous, convergence is not uniform over any neighborhood of this point. The approximation curves, $y = s_n(x)$, have maxima and minima whose distances from the limit curve, $y = f(x)$, do not approach zero when n becomes infinite, although the abscissa of each such extreme value identified by counting from the discontinuity approaches the abscissa of the discontinuity. Briefly, this is what is known as the "Gibbs phenomenon." It seems to have been first noticed by Gibbs and was briefly described by him in a note in *Nature*[1] published in 1899. The name was applied by Bôcher in his widely read paper[2] on Fourier series. The approach by Gibbs and Bôcher and generally by subsequent writers was graphical, and the "phenomenon" should be thought of as a graphical one.

However, this "phenomenon" is in no way limited to Fourier series but is characteristic of the approximation curves of many non-uniformly convergent series. In two papers[3] now classical in the theory of uniform convergence Osgood treats with exhaustive care the behavior of "peaks" in the neighborhood of points of non-uniform convergence. He does not explicitly study Fourier series. But the behavior of approximation curves is a general problem and it is treated by Osgood in a general way. There is nothing essential to the so-called "Gibbs phenomenon" which he does not study and illustrate by examples. His approach is primarily graphical and his papers antedate the note of Gibbs by three years. His treatment is careful and thorough as against the somewhat casual character of Gibbs's note.

If the name of any individual is to be applied to the behavior of "peaks" in the neighborhood of points of non-uniform convergence it should be the name of Osgood. The term Gibbs phenomenon has been applied to such behavior in the study of series of Bessel's[4] functions. Even if the name is retained for Fourier series, I do not see that it is justified for other series. Its only justification is that Gibbs remarked for Fourier series a situation the essentials of which were already widely known for other series.

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JANUARY, 1930

[1] Josiah Willard Gibbs, *Nature*, 59: 606.

[2] Maxime Bôcher, *Annals of Mathematics*, 7: 129, 1906.

[3] William Fogg Osgood, "Non-uniform Convergence and the Integration of Series Term by Term," *Amer. Jour. of Math.*, 19 (1897), read August 31, 1896; "A Geometrical Method for the Treatment of Uniform Convergence and Certain Double Limits," *Bull. Amer. Math. Soc.*, 3: 59, November, 1896, read August 31, 1896.

[4] For example, C. N. Moore, *Bull. Amer. Math. Soc.*, 34: 414, 1928.

THE PROBLEM OF SALINE DRINKING WATERS

IN the February 21, 1930, issue of SCIENCE, V. G. Heller and C. H. Larwood reported experiments on the deleterious effects of certain saline drinking waters. In the course of a ground-water survey of northwestern Minnesota a few years ago, the writer had opportunity to observe in the field similar effects from waters of moderate concentrations, mostly lower than those reported by Heller and Larwood. The worst waters appeared to be those rich in sulphates. The waters are commonly (though often incorrectly) referred to as "alkali" waters. The sulphates in some waters are accompanied by true alkali, *i.e.*, soda or potash, but lime and magnesia generally are more abundant. Some are associated with high chlorides and others are not.

These high sulphate waters in Minnesota are common in the till-plain just east of the glacial Lake Agassiz basin and in the lake-bed itself (now the Red River Valley). Thus nine representative samples taken from various depths and localities in Stevens County range in salinity from 664 to 2,800 p.p.m., and the average of the nine is 1,575 p.p.m. anhydrous salts. The minimum sulphate is 29 per cent., the maximum 58 per cent. and the average 49 per cent., or approximately 770 p.p.m. The averages of the other main constituents are: Ca 14 per cent., Mg 5 per cent., Na 11 per cent., K 2 per cent., CO_3 (including HCO_3, recalculated) 16 per cent., Cl 1 per cent. In four of the nine samples, Na is more abundant than Ca. The low amount of chloride is noteworthy.

In the Cretaceous waters which are tapped by drilling in the Red River Valley farther west, sul-