

# SCIENCE

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## THE PRIVILEGES AND RESPONSIBILITIES OF THE CHEMICAL ANALYST<sup>1</sup>

IN his presidential address on "The Dignity of Analytical Work," delivered before the American Chemical Society in 1897, Dr. Charles B. Dudley directed attention to the claims which may be asserted in behalf of analytical chemistry as an important and dignified branch of chemical science, and the necessity for intelligent, careful work on the part of even the routine analyst. From a somewhat different standpoint, Dr. W. F. Hillebrand, of international reputation as an analyst, presented at the Philadelphia meeting of the Society, in 1904, a critical review entitled "Some Thoughts on the Present Conditions of Analytical Chemistry," which was based upon his experience as chairman of committees intrusted with the formulation of standard methods of analysis and the investigation of the causes for the remarkable variation in the results of different analysts examining a given sample of material. He sounded a definite and clear note of warning with respect to the prevalence of a lack of care and intelligence, and ascribed the conditions, in part at least, to faulty training in our educational institutions. Within the past month there has appeared an interesting brochure from the pen of Dr. Wilhelm Böttger, professor at the University of Leipzig, entitled "Der Stand und Wege der Analytischen Chemie," in which he criticizes the too empirical nature of much of the analytical

<sup>1</sup> Read at a joint session of the American Chemical Society and Section C of the American Association for the Advancement of Science at Washington, December 27, 1911.

warning is pronounced against a too wide generalization of the fact that a few species of fishes have been proved to react to tones. Sections are devoted to the chemical senses, with special reference to investigations on invertebrates, and to unknown senses.

It is in the treatment of the nervous system that the author breaks farthest away from conventional paths and takes a partisan stand on debatable ground. The neurone theory is not accepted, but throughout the whole nervous system there is a complete continuity of living substance. Neurofibrillæ are merely the skeleton of the nerve cell; the neuroplasm is the conducting part. Poisons have revealed the presence of at least six different kinds of living substance in the nervous system: the irritability of the end-organs of cross-striated muscle, of the end-organs of glands, the cardiac branches of the vagus nerve and of smooth muscle, and of sympathetic ganglion cells being depressed by curare, atropin and nicotin, respectively; the irritability of motor cells, intercalated cells and sense cells being augmented respectively by phenol, by strychnine and by neither phenol nor strychnine. Motor differ from non-motor cells in possessing less fatiguability, less need of oxygen and less sensitiveness toward narcotics. The central type of nerve substance is sharply differentiated from the peripheral type by various characteristics, such as its power of summation, certain peculiarities of its conductivity, its greater tendency toward fatigue and its greater need of oxygen—all of these differences, however, being quantitative and capable of being overcome by experimental devices. The author discusses the "adequate," or normal, stimuli for the successive nerve elements that partake in a reflex action, and raises the question whether internal secretions may not constitute the adequate stimuli for the cells of the sympathetic system. Reflex actions are discussed and numerous examples are cited to illustrate their principles. Brief sections are devoted to tonus, to inhibition, as to the theory of which no definite stand is taken, and to instincts; and the chapter ends with a dis-

cussion of the motor reactions of animals, which cites Yerkes's work. The final chapter deals with a comparison of organisms.

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*Star Lore of All Ages.* By WILLIAM TYLER OLCOTT. G. P. Putnam's Sons. 1911. Pp. xxii + 453, illustrated.

The star groups or constellations, so fantastically figured in the ancient maps, are of unknown antiquity; they are found described in the earliest writers of the Greeks, and upon the tablets of Babylon. Around each group has collected a vast number of traditions, myths and legends; and these traditions Mr. Olcott has traced to their sources, the legends and myths he has collated, and has put all into a very readable form. The book is most attractively printed and illustrated and should be of interest to all who like to watch the stars.

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#### SCIENTIFIC JOURNALS AND ARTICLES

THE opening (January) number of volume 13 of the *Transactions of the American Mathematical Society* contains the following papers:

E. Landau: "Ueber eine idealtheoretische Funktion."

R. G. D. Richardson: "Theorems of oscillation for two linear differential equations of the second order with two parameters."

E. J. Miles: "The absolute minimum of a definite integral in a special field."

E. G. Bill: "An existence theorem for a problem of the calculus of variations in space."

L. E. Dickson: "Linear algebras."

R. L. Moore: "A note concerning Veblen's axioms for geometry."

Joseph Lipke: "Natural families of curves in a general curved space of  $n$  dimensions."

F. R. Moulton: "A class of periodic orbits of superior planets."

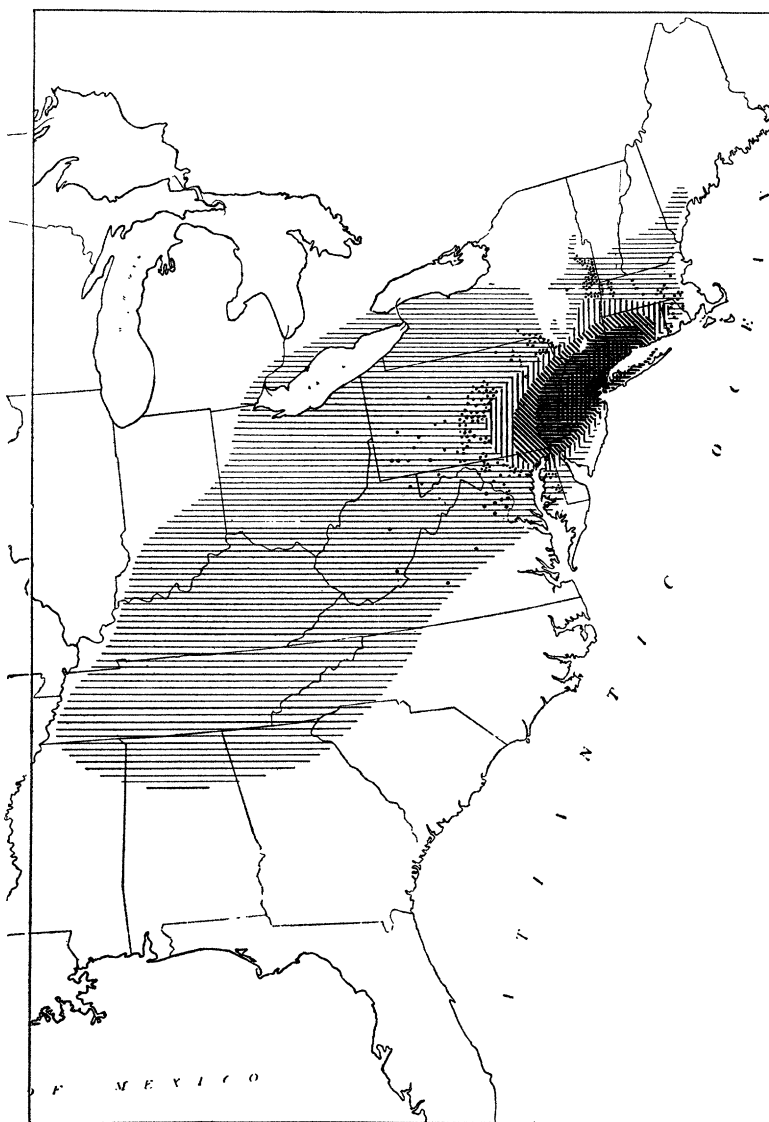
O. D. Kellogg: "Harmonic functions and Green's integral."

THE February number (volume 18, number 5) of the *Bulletin of the American Mathe-*

*matical Society* contains: Reports of the eighteenth annual meeting of the society and of the fifth regular meeting of the South-western Section, by the secretaries; "Series of Laplace's functions," by B. H. Camp; "On a new mixed problem of the partial differential equation of telegraphy," by A. G. Webster; "Non-Euclidean geometry" (review of Sommerville's "Bibliography of Non-Euclidean

Geometry"), by R. C. Archibald; "Notes"; "New Publications."

THE first number of a new architectural journal, entitled the *Architectural Quarterly of Harvard University*, will be published this month. The purpose of the periodical is to present in easily accessible form important work by students, special lectures delivered in the school, and contributions by members of



THE DISTRIBUTION OF THE CHESTNUT BARK DISEASE

the teaching staff and graduates. The principal article in the first number will be an illustrated paper on "Architectural Acoustics" by Professor W. C. Sabine, with a practical discussion of a number of recent theaters, lecture halls and churches. The number will also contain several drawings of important examples of European architecture and an essay on "The Mediæval Town Halls of Italy" by H. E. Warren, S.M. in Architecture, 1905. Early numbers of the *Quarterly* will contain examples of recent work in architectural design by students of the school, a paper on professional practise, the substance of three lectures recently delivered before the school by Mr. Cass Gilbert, of New York (lately president of the American Institute of Architects), and papers on the teaching of architectural design by Professor Duquesne, on the study of architectural history in its relation to the professional study of architecture by Professor H. L. Warren, and further papers on acoustics by Professor Sabine.

#### THE PRESENT KNOWN DISTRIBUTION OF THE CHESTNUT BARK DISEASE.

THE writers published in Farmers' Bulletin 467, page 6 (issued October 28, 1911), a map showing the distribution of the chestnut bark disease as known in June, 1911. Since that time the disease has spread considerably, also our detailed knowledge of its distribution has increased. In the map here published, thin horizontal lines show the general distribution of uninfected *Castanea dentata*. Thick lines variously arranged in concentric bands indicate general regions of gradually increasing infection which culminate in the region of practically complete destruction of the tree about New York City. Black dots represent the location of advance infections, many of which have already been eradicated. The writers are under obligations to Dr. Perley Spaulding, Professor A. H. Graves, Mr. I. C. Williams, Mr. S. B. Detwiler and the members and employees of the Chestnut Tree Blight Commission of Pennsylvania, Mr. W. H. Rankin, Mr. J. F. O'Byrne, Mr. F. W. Besley, Dr. Ernest S. Reynolds, Mr. H. G.

MacMillan, Professor H. R. Fulton and Mr. A. B. Brooks, for much of the data used in compiling this map.

HAVEN METCALF,

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WASHINGTON, D. C., February 1, 1912

#### SPECIAL ARTICLES

##### SENILITY IN MERISTEMATIC TISSUE

MERISTEMATIC tissue in perennial plants is commonly believed to retain its embryonic condition unchanged. Senility is considered to occur only in specialized cells. A twig cut from a mature tree and planted or grafted is said to produce a new tree as youthful in its protoplasmic vigor as a seedling. While these are almost the unanimous opinions of the botanists, it is interesting to note that many fruit growers and gardeners have always held that vegetatively propagated plants tended to run out, as if through senility.

In order to determine, if possible, which of these views is better justified, a series of investigations on meristematic tissue in perennials of different ages have been carried out, and this article is a brief preliminary statement of one of the more obvious results.

The structure of the adult leaves gives valuable insight into the meristematic tissue, since any minute changes occurring in the latter will be made larger and more obvious in the leaves, just as the inherent characteristics of seeds become more apparent in the plants into which they grow. If, therefore, the meristematic tissue of a perennial is changing with the increasing age of the plant, the new leaves appearing each year should reveal differences. In order to eliminate differences due to external factors, leaves were taken from cuttings of *Vitis riparia* of different ages grown under identical conditions. Comparisons were also made between leaves borne by vines growing wild, side by side under apparently identical conditions, and on many other kinds of trees and vines.

An interesting condition in the venation of the compared leaves was one of the results