to refer to the total energy involved in nuclear changes, and I employed them to refer to the free energy of chemical reactions, no confusion is likely to arise from these analogous and consistent applications of these words.

W. BLUM

U. S. BUREAU OF STANDARDS

THE EFFECTS OF CIGARETTE SMOKING UPON THE BLOOD SUGAR

OUR attention has been called to the fact that observations similar to those published by us in SCIENCE, February 16, 1934, under the title "The Effects of Cigarette Smoking upon the Blood Sugar" have been reported previously by E. T. and S. Lundberg in one section of their general study of the internal secretions (Beitrag zur Kenntniss des Innersekretorischen Gleichgewichtsmechanismus, *Acta medica scand.* Suppl. 38, 1931).

Our observations were made in 1932. We regret our oversight.

HOWARD W. HAGGARD
LEON A. GREENBERG

SCIENTIFIC BOOKS

THE LOWER EOCENE FLORA OF SOUTHERN ENGLAND[1]

THE pyritized fruits and seeds found at Sheppey in the Thames estuary have been objects of interest for over two centuries. It was their apparently mature condition which led James Parsons in 1757 to controvert the ideas of John Woodward that Noah's Flood had occurred in the spring of the year and to insist that this important event had taken place in the fall, since the fossil fruits are mature, which they could scarcely have been in the spring.

Gideon Mantell also writes about Sheppey in his "Medals of Creation" and quaintly describes the outcrop and how to reach it conveniently from London. In 1840 James Scott Bowerbank published a work, "On the Fossil Fruits of the London Clay," the copper plates for which were engraved by Sowerby, and this, which is practically the only previous scientific work on these objects, is a model of careful description and illustration, such shortcomings as it has—and these are fairly numerous—being due to the lack of recent material for the purposes of comparison and correct botanical identification of the fossils.

The authors of the present work have had long experience in this field of research and have spent seven years on the present undertaking. They have conceived their problem in a comprehensive way and discuss not merely botanical questions and methods of study, but the geology, distribution, origin, climatic inferences and other considerations to be derived from their study.

It will be conceded, I think, that no previous work of a carpological nature has been as extensive or has been as well done, and the work is a mine of information not only on the fruits and seeds of the London clay, but is similarly informative on the carpological nature of any flora, fossil or recent, which contains considerable Indo-Malayan elements—information not to be found in works on systematic botany, nor to be obtained in any of the larger American herbaria, where little attention has been given to fruits and seeds and in which the collections are pitifully inadequate.

It is perhaps wise that the authors limit their interest almost exclusively to the field in which they excel, but this results, to cite but a single instance, in only one American flora—that of the Brandon, Vermont, lignite, receiving consideration, whereas the exceedingly rich and varied Wilcox flora, which is in part at least the same age as the London clay (Ypresian) but is largely based upon foliar remains, is barely referred to, and is not taken into consideration in their generalizations.

One of the most interesting results of this work is the very considerable number of extinct genera disclosed. This has been suspected for a long while, but is something which it is not possible to demonstrate in fossil floras which are almost wholly foliar in character.

Of the 234 named and satisfactorily identified species in the London clay flora, it is possible to refer almost all with a considerable degree of certainty to living families. However, many of the fossils show an emphasis or lack of emphasis of certain characters or have the family characters in different combinations than are exhibited in the still living genera, so that the authors quite rightly consider these to represent extinct genera. The families in which these extinct genera belong and their number are well worth enumerating.

There are one each in the families Juglandaceae, Urticaceae, Nymphaeaceae, Saxifragaceae, Hamamelidaceae, Linaceae, Meliaceae, Vitaceae, Tiliaceae, Sterculiaceae, Flacourtiaceae, Haloragaceae, Onograceae, Myrtaceae, Boraginaceae and Solanaceae; two each in the Palmae, Burseraceae, Euphorbiaceae, Celastraceae, Nyssaceae and Sapotaceae; three each in the Lauraceae, Sapindaceae and Apocynaceae;

[1] "The London Clay Flora." By Eleanor Mary Reid and Marjorie Elizabeth Jane Chandler. 4to, viii + 561 pp., 17tf., 33 pls. British Museum (Nat. Hist.) London, 1933.

four each in the Menispermaceae, Anacardiaceae, Icacinaceae, Lythraceae and Cornaceae; five in the Rutaceae and 5 of unknown relationship; making a total of 67.

In addition to the 234 identified species there are 80 additional of doubtful relationship or unnamed. Only one wood is named, and the description of the abundant woods in the clays is reserved for later publication.

Bowerbank's genus Petrophiloides (Juglandaceae) is found to belong to the same genus as the eastern Asiatic tree for which Siebold and Zuccarini proposed the term Platycarya, and as the evidence is conclusive and the former term is 3 years older it replaces the latter. Another of Bowerbank's species, *Cupressites sulcatus,* is found to belong to the genus Toona (Meliaceae), although living forms were not discovered until six years after the fossil species was described.

The most prominent family is the Lauraceae with 31 species; next the Icacinaceae with 19, the Euphorbiaceae with 15, the palms with 14, Anacardiaceae and Anonaceae with 13 each, Sapindaceae with 11, Magnoliaceae and Vitaceae with 10 each, Rutaceae and Cornaceae with 9 each, Menispermaceae with 7, and no other dicotyledonous family with more than 5. Strangely enough, there is but a single species belonging to the Leguminous alliance. This may be contrasted with the 19 genera and 87 species of Leguminosae in the contemporaneous American Wilcox flora. The London clay flora contains 8 conifers, which seem to me to be somewhat discordant with the strictly tropical character which this flora is said to indicate.

The authors conclude that the London Clay flora has its major affinities with the floras of the present Indo-Malayan region, and was mainly a tropical rain forest, living at its northernmost range, under conditions of great precipitation suitably distributed, rather uniform temperatures and frostless winters, and that it reached England along the shores of Tethys.

Most of these conclusions can be relied upon as being as close approximations to the truth as it is possible to obtain with the evidence available, although the reviewer is inclined not to go the whole way in regard to the lowland tropical character. There are a number of things unaccountably absent which should be present in such an assemblage, and it seems to illustrate the difficulty, which has been often stressed, of visualizing a tropical rain forest from the literature or even from counselors who have actual first-hand knowledge of their features and permutations.

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

A DEVICE FOR AUTOMATICALLY PLOTTING CHANGES IN RATE OF AN INTERRUPTED SIGNAL

IN the course of a study in which the rate of heart beat and respiratory movements were compared (Gesell and Nyboer, 1929) it was desirable to record automatically changes in rhythm as a continuous curve during the progress of an experiment. Such a method was developed and demonstrated at the 1930 meetings of the Federation of Biological Sciences. Inasmuch as the device has been helpful in saving tedious measurements and computations a short description is now published.[1]

The contour of the curve is indicated by a series of short vertical marks described on smoked paper by

[1] A somewhat similar device has been described by Fleisch, *Zeitschrift für die gesammte experimentelle Medizin,* 72: 384, 1930.

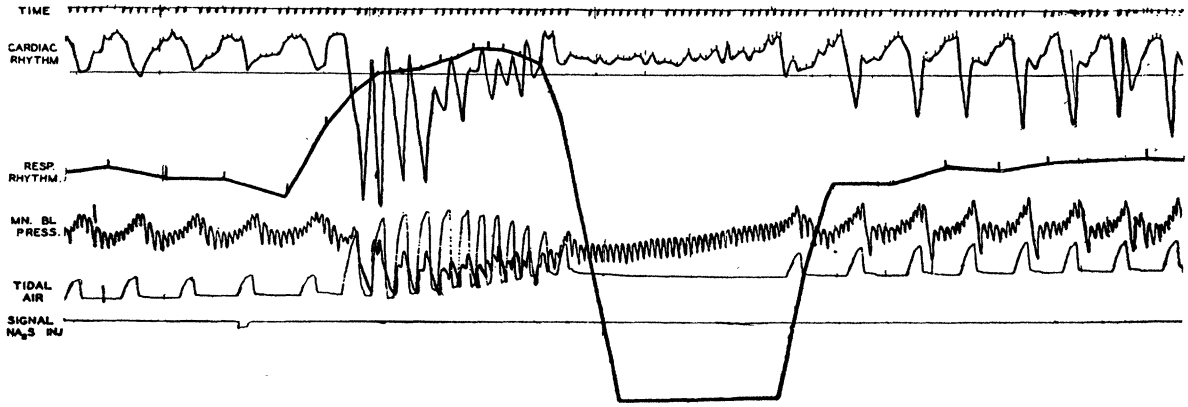

FIG. 1. Record of spontaneous changes in cardiac and respiratory rhythm and changes resulting from an intravenous injection of sodium sulphide. The vertical dashes indicating the contour of the rhythm curves have been connected by a continuous line.