hypothesis, without bringing any compensatory advantages. As a matter of fact, the whole chemical and physical behavior of proteins and other biochemical substances would suggest a Van der Waals' binding, which does not have extended electron states, rather than the electron band binding typical of salt or the diamond. There are other mechanisms already well known to which appeal may be made.

It is well known that neutral or excited atoms, molecules or free radicals may be adsorbed on solid or liquid surfaces as a mobile two-dimensional gas. Such excited mobile entities constitute a second possible mechanism for the effects which Professor Szent-Györgyi discusses. Others are known, and it would be a daring biologist who would suggest that there are no more undiscovered mechanisms.

To summarize, this note suggests that Professor Szent-Györgyi's hypothesis may be of greater use to biology if it is left in its simplest and most general form, "There exists *a* mechanism which permits the energy of absorbed light or chemical reaction provided in one portion of a living system to be available, without degradation or dispersion, for chemical reactions in relatively distant portions of the system," without tying to any particular mechanism or even to any known mechanism, until much more information is available.

EUGENE W. PIKE

WESTERN ELECTRIC COMPANY,
KEARNEY, N. J.

F. H. PIKE

COLUMBIA UNIVERSITY

ONE SOURCE OF CLAY BALLS

THE Smoky Hill River has a variable flow like all the streams of Western Kansas. Commonly it occupies only part of its channel. During high water and its recession much mud is plastered on the banks and bars. During the succeeding low-water stages mud cracks develop in this layer, often penetrating to considerable depth. As the mud dries further the layers become separated. The oblong, flattened chunks of dried mud which result from the cracking and separation of layers are later washed or otherwise tumbled into the stream.

The mud, having been water-laid in that fashion, is of finely divided clay particles, giving a uniform clay which is quite plastic when wet. I have molded bits of this mud and fired them. The chunks which fall into the stream cohere during transport and are rounded by rolling along the stream bed. Some of them are shunted out of the current and come to rest among the pebbles and sand on the shoals and bars, where they may be further rolled, accumulating an armor of sand and pebbles, or they may be buried among the other sediments in the stream bed.

All stages of this process have been observed. My interest was first aroused by finding some isolated clay masses in the sand on the bank of the stream south of Gorham, Kansas. Knowing that the available clays along the course of the stream west of this point are quite limy, I looked for a source of more plastic clay such as in these masses. The stages of development were found just east of Highway U. S. 183 near Schoenchen, Kansas.

GEORGE M. ROBERTSON

FT. HAYS KANSAS STATE COLLEGE

A FLORIDA WHITE BLACKBERRY

THE author recently discovered a large wild colony of a white-fruited blackberry near Gainesville, Florida, and has named it *Rubus cuneifolius* Pursh, forma *albifructus*. The plants closely resemble those of the species and the fruits differ chiefly in lacking the black color. Experiments will be undertaken to determine the origin of this form and to improve it, if possible, for local use. The white blackberries at present offered for sale are not suited to the Florida climate.

W. A. MURRILL

UNIVERSITY OF FLORIDA

AN ANALYSIS OF THE MAJOR INTERESTS OF THE MEMBERS OF THE BOTANICAL SOCIETY OF AMERICA

THE recently published Year Book (1940–41) of the Botanical Society of America[1] includes a list of members with their addresses and major fields of interest. A study was made of the latter to determine the distribution of interests among the various botanical subsciences. Table 1 presents the results of this analysis. It will be noted that approximately one half of the total "interests," *i.e.*, 948, lie in the morphological sciences. The low percentages of women interested in the fields of plant pathology (6 per cent.), plant geography (3 per cent.), economic botany (6 per cent.) and phylogeny (0 per cent.) are noteworthy.

It should be emphasized that the figures in the table do not indicate numbers of individuals in the various divisions of plant science, for many of the botanists listed in the Year Book have given several fields of interest. Therefore, this table is a summary of *interests*, not *individuals*. Accordingly, the fact that the total number of "interests" listed in the table is 1,829, whereas there are but 1,365 members in the society, should occasion no surprise. It should also be pointed out that this table gives but a partial picture of the "interests" of American botanists, for many plant scientists are not members of this society but may be affiliated with various special organizations, such as

[1] Miscellaneous Series, Publication 124, January, 1941, Office of the Secretary, New Haven, Conn.

the American Phytopathological Society, the American Society of Plant Physiologists, the Ecological Society of America, the American Society of Plant Taxonomists, the Genetics Society of America, the Mycological Society of America and numerous other organizations. For example, the American Phytopathological Society has a membership of 1,128; the American Society of Plant Physiologists, 623; the American Society of Plant Taxonomists, 514; and the Mycological Society of America, 384.

TABLE 1

Sub-science	"Interests" of men	"Interests" of women	Total	Per cent. of women
Systematic botany .	199	34	233	15 per cent.
Morphology	165	54	219	25 " "
Cytology	124	32	156	21 " "
Mycology	107	22	129	17 " "
Anatomy	79	26	105	25 " "
Algology	30	9	39	23 " "
Paleobotany	31	4	35	12 " "
Bryology	17	7	24	29 " "
Phylogeny	8	0	8	0 " "
Total of morphological sub-sciences	760	188	948	20 " "
Physiology	349	57	406	14 " "
Pathology	143	9	152	6 " "
Ecology	122	17	139	12 " "
Genetics	100	20	120	17 " "
Plant Geography ..	32	1	33	3 " "
Economic Botany ..	29	2	31	6 " "
Grand Total	1,535	294	1,829	

Table 1 does not include some of the minor subdivisions listed in the Year Book, such as kryobiology, atmometry and micrurgy. One botanist gives as her interests—"pathology; morphology; peanuts."

The five universities with the largest numbers of members are Cornell with 37, California (Berkeley) with 35, Harvard with 33, Wisconsin with 25 and Illinois with 22. Thirty-five members are listed from the U. S. Department of Agriculture in Washington.

OSWALD TIPPO

UNIVERSITY OF ILLINOIS

SCIENTIFIC BOOKS

PHYSICAL CHEMISTRY

Physical Chemistry, A Brief Course. By LOUIS J. BIRCHER, Ph.D., professor of physical chemistry, Vanderbilt University. xvi + 429 pp. Prentice-Hall Chemistry Series, Wendell M. Latimer, Ph.D., editor. New York. 1940.

THE preface states:

> The value of specific training in theoretical or physical chemistry is being recognized not only for students who are majoring in chemistry and chemical engineering, but also for those who are preparing for medicine, biology, geology, agriculture, and other branches of engineering. . . . In an effort to meet the needs of students who can profit by a brief course in physical chemistry taken in the intermediate college years, certain materials which seem particularly useful have been selected from the larger field of theoretical chemistry. . . . This material and certain other topics that are included should serve as a background for advanced work in chemistry or for those other sciences in which chemistry plays an important part.

"Each part of the book stresses a phase of the problems of solubility and reactivity." Part I (pp. 3–108) deals with the role played by atomic and molecular structure; Part II (pp. 109–220), transitions from state to state and fugacity as a controlling factor in chemical reactivity; Part III (221–358), physicochemical change, reaction velocities and the methods of measuring reactivity; Part IV (359–420), directions for 12 laboratory experiments.

Simple proportion and the natural logarithm constitute the mathematics necessary for understanding the equations in this book. Most of the subject matter is to be found to-day in the better type of college texts on inorganic, qualitative and quantitative analysis. The merit of the book consists in the organization of this material in one volume for those students of agriculture, biology and medicine who do not have the preparation for a standard course in physical chemistry for which a knowledge of elementary calculus is prerequisite. For this group of students the book can be recommended as a readable and appropriate text.

However, if the book is addressed to students of chemistry, chemical and other branches of engineering, it should be pointed out that the American Chemical Society's committee has recently taken the position that they do not recognize a course in physical chemistry which does not require the use of the calculus as meeting their requirements for accrediting a school.

The use of fugacities is properly emphasized as "more exact measures of reactivity," but it is questionable if fugacity merits the space assigned when more immediately practicable concepts for the students addressed are necessarily dismissed with elementary statements and problems.

The distinction between reactivity and rate of reaction is not clear. This is evident from the highly plausible, but nevertheless incorrect statement (p. 226): *"The number of collisions between the molecules involved in a chemical reaction is proportional to the product of the active masses (activities), a,* or often, less accurately, the partial pressures or concentrations of the several reacting substances. (Italics mine.)

On pages 226–227, this "generalized" treatment leads to equations for the velocity of a reaction as proportional to the product of activities! Later in the