# Book Reviews

**Electro-Sleep.** V. A. Giliarovskii, N. M. Liventsev, Yu. E. Segal, Z. A. Kirillova. State Publishing House of Medical Literature, Moscow, U.S.S.R., 1953. 126 pp. Illus. (In Russian)

I. P. Pavlov postulated that sleep represents an irradiation of inhibition. This spread of inhibition is a protective mechanism that is designed to shield the cerebral cortex from excessive stimulation. This inhibitory state or sleep permits the cells of the higher nerve centers to recuperate.

Pavlov, therefore, conceived the idea of the extensive utilization of sleep as a therapeutic measure, particularly in patients with mental disease. In fact, Pavlov considered schizophrenia, with its attendant fixation, confusion, negativism, and so forth, as a form of protective inhibition of the cerebral cortex in the face of excessive traumatizing bombardment with stimuli. The task of the physician, according to Pavlov, is to deepen further this protective inhibition by placing the patients in a calm, restful environment and by utilizing sedative or hypnotic doses of central nervous system depressants—for example, bromides.

Soviet physicians have utilized with apparent success a wide variety of pharmacologic hypnotic agents, including barbiturates, as a means of inducing protective sleep in patients with mental diseases as well as in patients who are suffering from diseases with important psychosomatic components—for example, hypertention and peptic ulcer. Sleep was induced for rather long periods of time: 3 to 4 weeks. The patients were kept asleep for a large portion of each 24-hour period. Naturally, the administration of hypnotics for such long periods produced many undesirable toxic side effects. The result was a search for other means of inducing sleep.

The authors began to investigate the possibilities of using electric currents to produce sleep. Their first experiments dealt with attempts to utilize the methods of electronarcosis that were originally described by S. Leduc [Compt. Rend. Akad. Sci., Paris (1902)]. Electronarcosis is achieved by the application of strong currents that produce a condition which, according to Leduc, resembles either natural sleep or anesthesia.

After extensive experiments on animals and on themselves, the authors of this book came to the conclusion that electronarcosis does not possess the characteristics of either sleep or anesthesia, but that it is a condition closely resembling, if not identical with, the phenomenon of parabiosis that was described by N. E. Vvedenskii [*Survey of Psychiatry*, No. 2, 3 (1902) (in Russian); *Excitation, Inhibition and Narcosis*. Collected Papers, Vol. IV (Leningrad State University, Leningrad, 1935) (in Russian)].

Vvedenskii described parabiosis as a form of nerve block resulting from unusual or strong stimulation. Briefly, Vvedenskii conceived parabiosis as fitting in with the following scheme:

$$\text{Rest} \rightleftarrows \text{activity} \rightleftarrows \text{parabiosis} \rightarrow \text{death.}$$

Parabiosis is thus the last reversible condition resulting from the application of unusual or excessive stimuli. Originally, Vvedenskii observed this phenomenon in nerve-muscle preparations. Later, he applied this concept to the central nervous system.

The authors consider electronarcosis to be a form of parabiosis. The effects on animals and human subjects are more comparable to those induced by electroshock than they are to those induced by anesthesia or natural sleep. They consider electronarcosis to be unsuitable for clinical use for at least two reasons: (i) the occurrence in many cases of "hyperkinetic" reactions, and (ii) unpleasant sensations by the patient lasting for about a day following the application of the current. Moreover, the "narcotic" state lasts only as long as the current is applied, which can be done for only short periods (several minutes).

For these reasons, the authors developed an apparatus that can induce a condition referred to as electrosleep. This is based on I. P. Pavlov's observation that sleep could be induced in dogs by the application of rhythmic electric stimuli of low intensity to the skin of the animals. The authors applied electric stimuli of low intensity and constant polarity at a low frequency (½ second). The duration of each stimulus was 0.2 to 0.3 milliseconds, a period corresponding to the chronaxie of the brain cells. The electrodes were placed in the temporal-frontal position. Application of these stimuli usually produced drowsiness during the passage of the current and was often followed by a deeper sleep after the stimuli were removed. In some cases, sleep developed after the electric stimuli were discontinued. During this therapy, many of the patients also showed improvement and regularization of sleep during the nights.

The authors cite a number of case histories to indicate the encouraging results obtained with electrosleep in patients with mental diseases (including schizophrenia), neuroses, and asthenic conditions. Successful therapy was also reported in cases with encephalitis and in early stages of toxemias of pregnancy. Investigations are being conducted in applying this form of therapy to patients with hypertension and peptic ulcer.

SAMUEL A. CORSON
*Department of Physiology and Pharmacology, University of Arkansas School of Medicine*

**Clays and Clay Minerals.** Proceedings of the second national conference on Clays and Clay Minerals. University of Missouri, 15–17 Oct. 1953. Ada Swineford and Norman Plummer, Eds. National Academy of Sciences–National Research Council, Washington, 1954. 498 pp. Illus. $4.

The proceedings of the second national conference on Clays and Clay Minerals contain 36 papers by 64 contributors. These include mineralogists, crystallographers, petrographers, and other geologists as well as physicists, chemists, ceramists, soil scientists, and petroleum and civil engineers, all of whom are actively engaged in research in their respective fields. The book begins with an annotated mileage guide to the diaspore and flint clays and to the Putnam soil of Missouri that were visited on a field trip during the conference, which was held at the University of Missouri in October 1953. Papers are presented on the genesis, occurrence, and diagenesis of clays, methods of identification, fundamental crystallographic and chemical studies, and a variety of subjects including thermodynamics, ion exchange, and the mechanism of the deformation of clay.

The origins of Missouri fire clays, some Pennsylvanian shales of Indiana and Illinois, clays in the northern Gulf of Mexico, and some formations that outcrop on the Gulf Coast are discussed. Several papers are devoted to the clay mineral composition of Recent sediments and

soils and its relationship to the diagenetic changes that are taking place in these sediments and to the weathering processes in soils. Illustrations are drawn from the Chesapeake Bay area, from Iowan loess, and from a soil profile on limestone. Variations in the properties of bentonites are connected with the clay minerals present. The occurrence of chlorite and mixed layered minerals and new techniques for identifying the components of complex clay minerals are adequately described.

Not everyone will agree with everything that appears in this collection of voluntary contributions of papers representing the entire field of clay studies, but everyone who reads this volume will find many things of interest and of value. I recommend this book as an important contribution to the literature on clays and clay mineralogy; as such, it is indispensable to anyone who wishes to keep informed of the progress in research on clay materials.

VICTOR T. ALLEN
*Institute of Technology,*
*Saint Louis University*

**Biochemical Preparations.** vol. 4. W. W. Westerfeld, Ed. Wiley, New York; Chapman and Hall, London, 1955. vii + 108 pp. $3.75.

This volume continues the presentation of carefully checked and annotated methods for preparation of substances of biochemical interest. This series may profitably be consulted not only for complete directions to follow to obtain specific materials, but also for information about the techniques that are employed in these procedures; the techniques are described fully and in an essentially critical way.

The current volume includes chemical methods for the preparation of a number of relatives or possible catabolites of several of the amino acids and sugars: L-histidinol dihydrochloride, carnosine, *N*-acetyl imidazole, homogentisic and L-argininic acids, DL-methionine sulfoxide and the sulfones of DL-methionine and DL-ethionine, *a*-D-glucose-1-phosphate, tetraacetyl-D-ribofuranose (tetraacetyl-D-ribopyranose, a by-product), glycolaldehyde, and sodium glyoxylate monohydrate. Urocanic acid is prepared from histidine by the action of histidase, *a*-D-glucose-1-phosphate from starch by the action of phosphorylase, and D-glutamic acid from the racemic mixture by destroying the enantiomorph with L-glutamic decarboxylase (2 procedures). Preparations of crystalline *a*-lactalbumin, β-lactoglobulin, alcohol dehydrogenase, and inorganic pyrophosphatase are included. Column chromatography has been used to isolate (dipalmitoleyl)-L-*a*-lecithin, and fractional distillation to obtain linoleic acid and methyl linoleate.

A cumulative index for volumes 1 through 4 and a listing of the compounds of biochemical interest that have appeared in *Organic Syntheses* (through volume 34) are included.

RALPH C. CORLEY
*Department of Chemistry,*
*Purdue University*

**The Marine and Fresh-Water Plankton.** Charles C. Davis. Michigan State University Press, East Lansing, 1955. 562 pp. Illus. $10.

American aquatic biologists have been eagerly awaiting this unique work on plankton, but many of them will experience variously mixed feelings of satisfaction and disappointment when they examine it. It is admittedly pitched toward the level of "graduate students and seniors" in colleges and universities, but in my estimation, and from the student's standpoint, the first 141 pages will probably prove to be the most useful. These well organized chapters comprise discussions of limnetic plankton ecology, adaptations, plankton production, spatial and seasonal distribution, food and feeding, and so forth. Although these pages deal with both marine and fresh-water plankton, the treatment is blended and handled in an efficient manner so that the reader is not likely to confuse or misinterpret the planktonic and ecological factors of the two environments.

For the most part, the material is necessarily general rather than critical, but unfortunately the generalizations are sometimes carried too far. For example, a student who reads the section on the annual cycle of oxygen in lakes will probably gain the impression that the hypolimnion *always* becomes anaerobic in all lakes during the summer months. Undoubtedly many readers will take exception to the accuracy of certain statements, such as the following selections: "A pond is a shallow lake with rooted submerged vegetation" (p. 3); "Like most salt lakes, the Caspian Sea has many inlets" (p. 7); "The area of . . . Lake Chad may . . . decrease to only 6,000 sq. mi. in the dry season" (p. 8); "Lake Superior with a depth of 1,000 ft. . . ." (p. 8); ". . . lakes vary greatly in their hydrogen and hydroxide ion concentrations (*p*H)" (p. 10); "The line of demarcation between the two layers [epilimnion and hypolimnion] is known as the thermocline" (p. 13); ". . . stonefly larvae, mayfly larvae . . ." (p. 258); "Book lung —in certain of the Arachnoidea, an external respiratory device" (p. 282).

Pages 142 to 279 include short characterizations of the main taxonomic categories of marine and fresh-water zooplankton and phytoplankton, as well as keys to common genera. Examples of the scope of a few selected keys are as follows: Cyanophyta, 19 genera; Bacillariaceae, 22; Mastigophora, 41; Foraminifera, 8; Coelenterata, 95; Rotifera, 17; Cladocera, 14; and Urochorda, 7.

Pages 281 to 295 contain a glossary of terms used especially in the keys. The literature list (pp. 297–320) is, in general, well chosen and fairly inclusive through 1952.

Although the discussion material in the first quarter of the book contains some captioned line cuts, most of the figures (49 to 681) are included all together on pages 353 to 539. It is unfortunate that these figures are indicated by number only, all of the captions being completely isolated *en masse* on pages 321 to 351. Some of the figures are good, others are acceptable, but a surprisingly large number are poor. Few figures are original. A great deal of space has been wasted by inadequate grouping of the figures. Page 354, for example, shows only *Coelosphaerium* and *Microcystis*; page 358 has two diatom figures; page 380 shows just two green algae cells; and page 458 contains one needlessly large diagram (unlabeled) of a rotifer.

ROBERT W. PENNAK
*Department of Biology,*
*University of Colorado*

**Semimicro Qualitative Analysis.** Frank J. Welcher and Richard B. Hahn. Van Nostrand, New York–London, 1955. vii + 497 pp. Illus. College, $6.50; reference, $8.

Welcher and Hahn have added another textbook to the already voluminous literature of qualitative analysis. The authors have organized their treatment into three main divisions—theoretical, reference, and experimental.

The principles necessary for an understanding of qualitative analysis are discussed in the theoretical section. A brief description of the structure of the atom is included in order to aid the student in correlating and predicting behavior of the various elements. Whenever possible, the examples cited in this section have been drawn from the experimental procedures. Following each chapter there are a number of questions for the student, together with numerical problems where they are applicable.

The reference section treats each element covered in the experimental scheme by listing oxidation states; coordination numbers; formulas of ions; complex ions formed; and reactions of the element and its compounds with acids, bases, and re-