

same shining crystallin surfaces. Melts at $211-212^{\circ}$ to a dark purple liquid.

Calculated for $C_{10}H_{12}BrOBr.I_2$: I_2 , 37.89. Found: I_2 , 37.50.

In conclusion we wish to thank Prof. M. Gomberg, of this laboratory, for his kindly interest and many helpful suggestions during the progress of this investigation.

ANN ARBOR, MICH.

NEW BOOKS.

Essentials of Volumetric Analysis. BY HENRY W. SCHIMPF. Second Edition, re-written and enlarged. New York: John Wiley & Sons. London: Chapman & Hall. pp. 358. Price, \$1.50.

The first edition of this book was primarily intended for the use of students of pharmacy. This edition will appeal to a wider circle of readers and is a marked improvement. The treatment follows in the main the lines laid down by Mohr. Analyses are classed as by Neutralization, Precipitation, Oxidation and Reduction. Then follows a second part on the estimation of alkaloids; assaying of vegetable drugs; phenol; fats; sugars; formaldehyde. After this we have a third part on a few gasometric analyses, and an appendix in which indicators are described.

EDWARD HART.

A Research on the Pines of Australia. By RICHARD T. BAKER, F.L.S., and HENRY G. SMITH, F.C.S. Published by Government of the State of New South Wales.

A magnificently printed volume of the Technical Education Series, No. 16, has appeared under the above title by Richard T. Baker, economic botanist and curator of the Technological Museum of Sydney, and Henry G. Smith, assistant curator and economic chemist. The volume is a record of pioneer work done by the authors on a number of species of the pine family indigenous to that country. No less than thirteen genera and thirty-nine species were studied, some of them for the first time.

The larger part of the volume is devoted to structural, botanical and chemical work with numerous photographs and colored plates. The chemical work follows the botanical descriptions and is, for the most part, a simple chemical examination of the oils, terpenes and resins, including the sp. gr., optical rotation, refractive index and the saponification and iodine values, when possible. Some attention has also been given to the lumbering industries.

The following general plan of work was observed under each species:

1. A field knowledge of the trees.
2. Morphology of fruit, leaves, inflorescence and their functions.
3. The anatomy of the organs.
4. Anatomy, nature and character of the timber and bark.

5. The chemical and physical properties of the oils, gums, oleoresins, oleo-gum resins, tans and other properties that would assist in establishing natural affinities or differences in the species.

A large part of the book is given to the genus *callitris*. No less than eighteen different species have been described. The authors have completely reclassified the genus and studied a number of new species. It would not be within the bounds of the review to discuss the botanical work in detail. The chemical work, however, is of considerable interest not only to the industrial but also to the organic chemist. Among the many interesting facts may be mentioned: (1) The presence of a manganese compound of the resin in all of the species. The authors believe that the manganese in these species shows a strong resemblance to that in the fossil woods of past geological times.

(2) The optical rotation of the terpenes from the leaves of some of the species is in the opposite direction to that obtained from the fruit, even if collected from the same tree. So far as is known, this is the first time the fact has been noted.

(3) The acetic ester of geraniol is more pronounced in the leaf oil than is the borneol and it continues to increase until a maximum of over 60 per cent. is reached in *C. Tasmanica*.

(4) The limonenes and the dipentenes occur in the leaf oil. The leaf oil is in many cases comparable with the best "Pine Needle Oil" of commerce.

(5) The characteristic odor of the *callitris* is shown to be due to a phenol. It appears to be the constituent which renders the *callitris* timber proof to white ants.

(6) The resins vary widely; however, several of them agree closely with the sandarac resin of commerce.

From work done, the authors believe that the genus *callitris* will eventually be of inestimable value to Australia and will doubtless play an important part in the forestation of land which can not in the future be used successfully for farming purposes. In addition to the value as timber, several species are rich in the tannins, yielding from 14-30 per cent. Some of the species also yield sandarac resins but no methods have yet been devised for their collection.

The genus *araucaria* has also been studied but not so exhaustively as *callitris*. Only one species, a *cunninghamii* or "Hoop pine" has been exhaustively studied. This species is the largest of the Australian pines and is of special interest on account of the high-grade timber, gums and resins it produces. The gum was found to contain two resin acids, one an isomer of abietic and the other a new acid with a formula, $C_{21}H_{33}O_3$. Unfortunately, details concerning this acid are very meager.

Phyllocladus rhomboidalis, another genus, is also of considerable

interest to the chemist, inasmuch as it contains a solid di-terpene and also a sesqui-terpene. But little concerning methods of preparation and general properties is given. The di-terpene is given as crystallin with a melting point of 95°

Agathis robusta is another species, the resins of which are studied. The terpenes are largely pinene. The resin acids, on the contrary, were distinct. An acid, dundathic, $C_{21}H_{33}O_5$, and dundatholic, $C_{19}H_{28}O_2$, were obtained. The author depended entirely upon the combustion of the free acid and the determination of silver in the silver salt for the formula. To one familiar with the extreme difficulties experienced in the isolation of the pure resin acids, the work seems hardly sufficient to settle on the formula of a new resin acid. A molecular weight determination should have been made, if possible, and other salts, as for example, the calcium and barium salts, prepared and analyzed before finally settling on the formulas.

The conclusions drawn by the authors are of considerable interest to the botanical chemist and emphasize the absolute necessity of cultivating the various species of the pine family if, in the future, the supply of the terpenes and resins is to continue.

There is no good reason why, with proper cultivation, the resin and the terpene industry should not be developed and the various species of the pine family made to yield much more of both resin and the terpenes than they do at present. The highly cultivated sugar beet has been made to yield an average of 13 per cent. of sugar, whereas the old uncultivated beet averaged but 3 per cent. Similar results in resins and the terpenes may be obtained by the forester, with proper care. Although the authors studied the gums, resins and terpenes pretty carefully, no effort was made to explain their functions and they remain as much of a mystery as ever.

GEO. B. FRANKFORTER.

Biochemisches Handlexikon. Herausgegeben von PROF. DR. EMIL ABDERHALDEN. Vol. II. Gummisubstanzen, Hemicellulosen, Pflanzenschleime, Pektinstoffe, Huminsubstanzen, Stärke, Dextrine, Inuline, Cellulosen, Glykogen, die einfachen Zuckerarten, stickstoffhaltige Kohlenhydrate, Cyklosen, Glucoside. Berlin: Verlag von Julius Springer. 1911. Price, bound, 46.50 Marks.

The second volume of the "Biochemisches Handlexikon" is devoted entirely to the chemistry of those substances of natural or synthetic origin which are in any wise related to the carbohydrates. In the compilation of the work the field has been divided as follows: Gums, Hemicelluloses, Plant Mucilages, Pectins, and Humus Substances, by Dr. Viktor Grafe, Vienna, 113 pages. Starches, Dextrins, Carbohydrates of the Inulin Group, Celluloses, etc., by Dr. Geza Zemplen, Selmeczbanya, 142 pages. Glycogen, by Dr. Carl Neuberg and Dr. Bruno Rewald, Berlin, 10 pages. The Sugars (mono-, di-, tri-, and tetra-saccharides; alcohol

and acid derivatives, etc.), by Dr. Carl Neuberg and Dr. Bruno Rewald, 261 pages. Nitrogenous Carbohydrates, by Dr. Geza Zemplén, 24 pages. The Cyclosoles (inosites, etc.), by Dr. Viktor Grafe, 28 pages. The Glucosides, by Dr. H. Euler and Dr. J. Lundberg, Stockholm, 144 pages.

The only works which have treated the same special field as Vol. II of the Handlexikon, are the "Handbuch der Kohlenhydrate," by Tollens, published in 1898 (now somewhat out of date), and the more recent "Chemie der Zuckerarten," by Lippmann, published in 1904. For a description of analytical and technical processes the Handlexikon cannot displace the work of Tollens any more than it can supplant the work of Lippmann for its wealth of descriptive matter and fulness of presentation. On the other hand for a concise and up-to-date review of the biochemistry of the carbohydrates the Handlexikon stands alone.

The authors of Vol. II of the Handlexikon have made full use of the exhaustive compilations gathered by Lippmann in his "Chemie der Zuckerarten." It is to be regretted, however, that in their use of this mass of material greater care was not taken in correcting the numerous typographical errors which have crept into Lippmann's work. A few examples of this lamentable recopying of printers' mistakes is given in the case of the formulas of a number of hydrazones and osazones.

Compound.	True formula.	Formula of Lippmann copied by Handlexikon.
<i>l</i> -Xylose- <i>p</i> -bromophenylosazone	$C_{17}H_{18}Br_2N_4O_3$	$C_{17}H_{18}Br_2N_3O_4$
<i>l</i> -Glucose osazone	$C_{18}H_{22}N_4O_4$	$C_{18}H_{22}N_2O_4$
<i>l</i> -Gulose phenylhydrazone	$C_8H_{12}O_5N_2HC_6H_5$	$C_8H_{12}O_5N_2H_2C_6H_5$
<i>d</i> - <i>l</i> -Gulose phenylhydrazone	$C_8H_{12}O_5N_2HC_6H_5$	$C_8H_{12}O_5N_2H_2C_6H_5$
α -Glucanose phenylosazone	$C_9H_{16}O_7(N_2HC_6H_5)_2$	$C_9H_{16}O_7(N_2HC_6H_5)_2$
<i>d</i> -Mannonose phenylosazone	$C_9H_{16}O_7(N_2HC_6H_5)_2$	$C_9H_{16}O_7(N_2HC_6H_5)_2$
Melibiose phenylhydrazone	$C_{18}H_{28}N_2O_{10}$	$C_{18}H_{28}NO_{10}$

In the case of *d*-*l*-arabinose diphenylhydrazone, $C_{17}H_{20}N_2O_4$, Lippmann gives $C_{17}H_{20}N_4O_4$ and the Handlexikon $C_{17}H_{10}N_4O_4$; the error in Lippmann has not only been recopied but an additional blunder has crept in. Whether similar parallelisms are to be found in case of the oximes, carbazones, mercaptals, ureides, and other numerous compounds of the sugars has not been ascertained. Mistakes of this kind might have been avoided, had the original articles, rather than Lippmann's digest, been made the basis of compilation. But apart from typographical errors, which are unavoidable in a work of such magnitude, Vol. II of the Handlexikon will be found to offer many features of distinctive merit.

It is impossible to find in any monograph a fuller account of the plant gums, hemicelluloses, pectins, etc., than that contained in the 113 pages by Dr. Grafe. The same may also be said of the 144 pages devoted by Drs. Euler and Lundberg to the chemistry of the glucosides. In fact a comprehensive work upon the glucosides was wanting prior to the appear-

ance of this part of the Handlexikon. The methodical arrangement and systematic review of the sugars and their compounds by Drs. Neuberg and Rewald will be found of especial value to those chemists who have difficulty in finding their way in Lippmann.

One very valuable feature of this volume of the Handlexikon is the unusually complete bibliography. The references to original sources are given as footnotes and make up on the average about one-fourth the space of each page. The compilers have covered all work published down to the close of 1910, so that the chemistry of the subject is brought practically up to date.

Vol. II of the "Biochemisches Handlexikon" will be of inestimable value not only to the research or physiological chemist, who is interested in the study of plant and animal carbohydrates, but also to the technical chemist who desires to keep abreast with the latest investigations in the chemistry of cellulose, starch or sugar.

In its typography the present volume of the Handlexikon is a pattern which publishers of other chemical reference books may follow with advantage.

C. A. BROWNE.

RECENT PUBLICATIONS.

- ABENDROTH, W.: *Leitfaden der Physik*. 4 Aufl. Leipzig: S. Hirzel. 4.50 M.
- BAUR, E.: *Themen der Physikalischen Chemie*. Leipzig: Akademische Verlagsgesellschaft. 4 M.
- BAYLEY, T.: *A Pocket-book for Chemists, Metallurgists, Dyers, Distillers, Brewers, Sugar Refiners, etc.* 7th Ed. New York: Spon & Co. 559 pp., \$2.00.
- BILLIG, G.: *Untersuchungen in der Anthrachinonreihe*. Berlin: E. Ebering. 8°, 56 pp., 1.30 M.
- BOCK, O.: *Der Ziegelofen*. 3rd Aufl. Leipzig: Carl Scholtze. 8°, 2.25 M.
- BORCHERS, W.: *Metallurgy: A Brief Outline of the Modern Processes for Extracting the More Important Metals*. New York: Wiley. 8°, 271 pp., \$3.00.
- BUJARD, A. AND BAIER, E.: *Hilfsbuch für Nahrungsmittelchemiker zum Gebrauch im Laboratorium für die Arbeiten der Nahrungsmittelkontrolle, gerichtlichen Chemie und anderen Zweigen der öffentlichen Chemie*. 3 Aufl. Berlin: J. Springer. 8°, 730 pp., 12 M.
- BURNET, E.: *Microbes et toxines*. Paris: E. Flammarion. 3.50 Fr.
- CAVEN, R. M.: *Systematic Qualitative Analysis*. London: Blackie & Son. 3s, 6d.
- COHNHEIM, O.: *Chemie der Eiweisskörper*. 3 Aufl. Braunschweig: F. Vieweg & Sohn. 8°, 11 M.
- DIETERICH, K.: *Die wichtigsten medizinischen Drogen, ihre pharmazeutische Verarbeitung und Nutzenwendung für die menschliche Gesundheit*. Berlin: Anker Verlag. 1 M.
- EHRlich, P.: *Grundlagen und Erfolge der Chemotherapie*. Stuttgart: F. Enke. 1.60 M.