by chapters VIII and IX, the clastic and carbonate sediments, and the book concluded with chapter XIV, the structural features of sedimentary rocks. These portions of the book describe the rocks most commonly encountered and illustrate all the general principles. An edition containing the material mentioned above (278 pages), and selling for two thirds of the present price, would be a boon to college students.

The book is to be commended for the impartiality with which the various facts and theories are presented. The bibliographies are excellent, up to date and well placed. There are, of course, some statements with which not all will agree and a few minor errors. There are remarkably few typographical mistakes. One of them might well be repeated in future editions, for when the compositor makes the author say that in many dolomites the fossils are "silified," many who have studied these rocks will think he has achieved the *mot juste*.

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SUBMARINE CANYONS

The Origin of Submarine Canyons. By DOUGLAS JOHNSON. 126 pp. 4 figs. 4 plates. New York: Columbia University Press. 1939. $2.50.

ONE of the most puzzling features on the face of the earth is the series of spectacular submarine canyons which notch the margins of the continental platforms and extend downward and outward to depths of eight or ten thousand feet below the surface of the sea. Their origin is perhaps the most baffling problem faced by geologists at the present moment, and their presence has caught the interest of the general public to an unusual extent. This slender volume from the pen of Columbia University's well-known geomorphologist should therefore be called to the attention of a larger audience than the small group of specialists working on the problem.

Professor Johnson reviews critically the numerous hypotheses that have been under consideration and rejects the idea that the canyons are a result of subaerial erosion at a time when the continents stood higher with respect to sea level than they do to-day. He also concludes that erosion by turbidity currents has "such doubtful validity that one is impelled to seek elsewhere a more satisfactory explanation of the great trenches found beneath the sea." He therefore attempts to explain the canyons "as the result of long-continued sapping by submarine springs fed . . . by waters, chiefly artesian, migrating through the sediments of the continental shelf to appear on its steeper seaward face." Although that explanation may appear incredible at first glance, Professor Johnson's marshaling of data and cogency of logic are such as to give much plausibility to his ideas.

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A NEW GERMAN SCIENCE DICTIONARY

German-English Science Dictionary for Students in the Agricultural, Biological and Physical Sciences. By LOUIS DE VRIES, professor of modern languages, Iowa State College, and collaborators. Pp. x + 473. New York and London: The McGraw-Hill Book Company, Inc. 1939. $3.00.

ATTENTION should be called to this much-needed valuable little dictionary for aid in reading scientific German, especially when one must traverse other fields outside one's own. It measures only *ca.* $7\frac{1}{4}'' \times 5\frac{1}{4}'' \times \frac{3}{4}''$, but contains 48,000 entries; the book has been kept "pocket-size" by omitting many compound words, whose meaning can readily be derived from the components. There has been a crying need for just such a volume to serve general science in the manner that Patterson's serves chemistry. Included among the collaborators are men and women in the fields of botany, bacteriology, genetics, entomology, zoology, psychology, biochemistry, nutrition, etc., etc.; by this means, the vocabulary selection and word-meanings have been broadly selected and will serve a large group of people.

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SOCIETIES AND MEETINGS

PENNSYLVANIA ACADEMY OF SCIENCE

THE regular spring meeting of the Pennsylvania Academy of Science was held at Washington and Jefferson College, Washington, Pennsylvania, on Friday and Saturday, March 22–23, 1940. Ninety-six persons registered. A general session occupied the members on Friday morning. In the afternoon Geologic and Biologic sections met separately. Saturday was given over to another general session. A total of forty-four papers appeared on the program. The annual dinner was held on Friday evening at the George Washington Hotel. After the dinner, Dr. E. T. Wherry, of the University of Pennsylvania, gave a public address on "Notable Native Plants of Pennsylvania." This was illustrated with colored slides.

Simultaneously with the Senior Academy, 258 members of the Junior Academy met under the guidance of Professor K. F. Oerlein. The next regular spring session of the Academy is scheduled for April 11–12, 1941, at Coatesville, Pennsylvania, under the auspices of the Chester County Natural History Society. The place and date of the 1940 summer meeting have not

yet been decided. The annual award of the Academy's grant-in-aid was made to Dr. E. R. Eller, of the Carnegie Museum, Pittsburgh, to finance his further search for Scolecodonts. The following officers were elected:

President, W. H. Thurston, Jr., Pennsylvania State College; *President-elect,* E. A. Vuilleumier, Dickinson College; *Vice-president* (western Pennsylvania), Anna A. Conn, Uniontown, (eastern Pennsylvania), Walter S. Lapp, Lansdale; *Secretary-Treasurer,* V. Earl Light, Lebanon Valley College; *Press Secretary,* Bradford Willard, Lehigh University; *Editor,* Robert T. Hance, Pittsburgh; *Junior Academy,* Karl F. Oerlein, California State Teachers College.

BRADFORD WILLARD,
Press-Secretary

SPECIAL ARTICLES

BISULFITE BINDING SUBSTANCES (B.B.S.) AND THIAMIN DEFICIENCY

THIAMIN plays an important role in the metabolism of pyruvic acid. Keto-acids and aldehydes, including pyruvic acid, react with bisulfite (and hence are termed bisulfite binding substances—B.B.S.) affording a basis for their determination.[1] Thompson and Johnson[2] found a marked increase in the quantity of B.B.S. in the blood of thiamin-deficient rats and pigeons. Estimations of pyruvic acid in the latter showed that the rise in B.B.S. was due almost entirely to this substance. Lu[3] found a marked increase of pyruvic acid in the blood of thiamin-deficient rats.

Adapting the technic of Clift and Cook[1] to urine we have investigated further the relationship of B.B.S. and thiamin deficiency with the view to working out a method of appraising the status of thiamin nutrition in humans and as a means of estimating the content of thiamin in foodstuffs and biological materials.

It was early found in working with rats that the quantity of food intake is an important factor in the results obtained. Consequently, the amount of food must be limited to an arbitrary level during urine collection periods. The addition of considerable NaCl to the diet during collection periods assures sufficient urine so that animals can be studied individually. The salt has no vitiating effects on the results.

There is a rapid and progressive rise in the urinary B.B.S. of young adult rats on a thiamin-deficient diet. Frequently in as little as one week, after restriction to the diet, the increase is 200 to 400 per cent., confirming the findings of Banerji and Harris[4] published while this study was in progress. In advanced deficiencies the increase is as much as 600 to 900 per cent. When the food intake is limited at a constant level and thiamin is given, the B.B.S. of deficient rats drops to normal within 24 hours. This effect is partially masked when food is given *ad libitum,* since thiamin quickly stimulates the appetite. In animals receiving the standardized level of the deficient diet, adequately supplemented with thiamin, consecutive daily B.B.S. values are within a narrow range, 3–8 ml (expressed as ml of 0.005 N iodine) per 24 hours.

It is generally recognized that high fat diets can prevent or cure polyneuritis in rats.[5,6] We have made some observations on this relationship, in connection with the effect of diet on B.B.S. values. When fat (autoclaved lard) is substituted isocalorically for sucrose in the thiamin-deficient diet, there is some immediate decrease in B.B.S., but the values remain high (300 to 400 per cent. above normal) with no further change even after feeding the fat for two weeks. During this interval the growth rate and appearance markedly improve. Thiamin administration causes a B.B.S. drop to normal within 24 hours. Control animals on the same schedule receiving adequate thiamin showed no change in B.B.S. It is hoped that our studies now in progress will contribute to a satisfactory interpretation of these results.

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[1] F. P. Clift and R. R. Cook, *Biochem. Jour.,* 26: 1788, 1932.
[2] R. H. S. Thompson and R. E. Johnson, *Biochem. Jour.,* 29: 694, 1935.
[3] G. D. Lu, *Biochem. Jour.,* 33: 774, 1939.
[4] G. G. Banerji and L. J. Harris, *Biochem. Jour.,* 33: 1346, 1939.
[5] W. D. Salmon and J. G. Goodman, *Jour. Nutrition,* 13: 477, 1939.
[6] F. E. Stirn, A. Arnold and C. A. Elvehjem, *Jour. Nutrition,* 17: 485, 1939.

A NEW METHOD FOR STUDYING THE PROPERTIES OF LUBRICATING OILS BASED ON THE USE OF A NEW INSTRUMENT

WE have recently succeeded in making an automatic recording tensiometer. This instrument takes one measurement every two minutes, and being equipped with synchronous motors (of the electric clock type) will record the value of the surface tension practically indefinitely on a roll of paper. The recording box is connected to the tensiometer through an electric cable, so that the tensiometer itself can be placed in a separate room, an ice box, an incubator or even in a tightly closed chamber submitted to high pressure or vacuum.