Synthetic folic acid, 200 μg./cc., was dissolved with a trace of ammonium hydroxide at pH 7.0. Benzyl alcohol, 1.5 per cent, was added, and the solution was sterilized by filtration and filled into vials. The potency of the solution was standardized by microbiological assay using *L. casei* and was checked twice during the assay period. Day-old Black Leghorn chicks were fed the basal diet previously described (*Proc. Soc. exp. Biol. Med.*, 1946, 61, 65). The chicks were divided into 6 groups of 8. Three of the groups were given dilution aliquots of the folic acid solution orally by pipette in amounts of 5, 10, and 20 μg./day. The remaining three groups were given similar dilutions by intramuscular injection at levels of 2.5, 5, and 10 μg./day. The data are shown in Table 1.

TABLE 1

Group	Folic acid per chick per day γ	No. of chicks		4 weeks		8 weeks	
		Started	Surviving	Body wt. (grams)	Feathering	Body wt. (grams)	Feathering
Injected subcutaneously	2.5	10	9	204	Poor	362	Poor
	5.0	7	6	242	Subnormal	492	Subnormal
	10.0	8	8	243	Normal	517	Normal
Given orally by pipette	5	10	8	183	Poor	279	Poor
	10	8	7	244	Poor	405	Subnormal
	20	8	5	234	Poor	569	Subnormal

These data indicate that folic acid is approximately twice as effective by injection in chicks as when given orally. Campbell, Brown, and Emmett (*J. biol. Chem.*, 1944, 154, 721) concluded from a somewhat similar experiment of 4-week duration that the two forms of administration have the same biological effect. Analysis of their data shows that folic acid by subcutaneous injection actually evoked a slightly greater response both in the weight gain and hematopoiesis than did the same amounts given orally. As seen in the above table, the difference in growth response between the two forms of administration is accentuated to a clearly noticeable degree in the longer period of our study. There was also a higher survival among the animals receiving folic acid by injection in both sets of experiments.

DOUGLAS V. FROST and F. PIERCE DANN
Nutritional Research Department
Abbott Laboratories, North Chicago, Illinois

Book Reviews

An outline of organic nitrogen compounds. **Ed. F. Degering and collaborators. Ypsilanti, Mich.: University Lithoprinters, 1945. Pp. vi + 752. $7.50.**

This book, which is a revision and enlargement of the previous (1942) planographed edition, covers in outline form many of the more important types of open-chain organic nitrogen compounds and, to a lesser extent, heterocyclic nitrogen compounds. Its scope is indicated by the following list of topics treated in 45 chapters: a chronological survey, general concepts of structure, nitrogen fixation, the ammonia system of compounds, aliphatic nitro compounds (5 chapters), aromatic nitro compounds, nitroso compounds, oximes, aliphatic and aromatic amines, amino acids, polypeptides, proteins, aliphatic diazo compounds (diazenes) and azides (triazenes), aromatic diazo compounds, azoxy compounds, derivatives of hydrazine, urea, thiourea, guanidine, sulfamic acid and sulfamide, amides, imides, nitriles, carbylamines, isocyanates, cyanogen and related compounds, organic nitrogen dyes, alkaloids, medicinals and vitamins containing nitrogen, high polymers containing nitrogen, pyridine, quinoline and the synthesis of nitrogen ring compounds, explosives, some miscellaneous nitrogen compounds, and isomerism of organic nitrogen compounds.

The extent of treatment of these topics varies from fairly comprehensive in certain cases (for example, aliphatic and aromatic nitro compounds, amines, oximes) to very brief in others (proteins, polypeptides, alkaloids, polymers containing nitrogen). The material is presented in outline form, usually under the following main headings: (a) history, occurrence, structure, and uses; (b) nomenclature; (c) preparation; (d) physical properties of some examples; and (e) reactions. Although the outline form permits the presentation of a maximum amount of material in the allotted space, it also tends to obscure the relative importance of various methods of preparation and the degree of usefulness of the reactions. In some cases an evaluation by the author partially offsets this, but a wider inclusion of yields, where available, would have been helpful from this standpoint and would have enhanced the value of the work as a reference book.

For the most part the presentation of material is clear and concise, with the inclusion of equations and formulas. In places, however, the treatment is so condensed or cursory as to give the student little insight into the nature of the reactions. Thus, the treatment of the Arndt-Eistert reaction (p. 270) would leave the student at a loss to know how (or if) the first step could be controlled to give a diazoketone instead of a chloroketone, how the rearrangement step is carried out and the need for a catalyst, and gives no indication of the value of the reaction. The brief mention of the Bucherer reaction (p. 294) also is unenlightening. In neither case is reference given to the reviews in "Organic Reactions." Other examples might be cited.

Nevertheless, the book should be of value as an organ-

ized, although not too critical, compilation of reactions with extensive references (over 5,200) to the literature. There is a good index, referring to paragraphs, which makes the material in the book readily accessible.

A. L. WILDS
Department of Chemistry, University of Wisconsin

Mammals of Nevada. E. Raymond Hall. Berkeley-Los Angeles: Univ. California Press, 1946. Pp. xi+710. (Illustrated.) $7.50.

This product of 35 years of field and museum work began with Miss Annie M. Alexander's trip of 1909. For a third of a century Nevada was one of the training grounds of some 60 or 70 students and staff from Berkeley. This contemporary remembers Miss Alexander's wise choice of Jordan's student, Joseph Grinnell, and does not think of the Museum without the triumvirate of Grinnell, Dixon, and Hall coming to mind.

Seventeen thousand eight hundred sixty-one Nevada (15,000+ in M.V.Z.) specimens were examined, and "232 kinds (species and subspecies) of 111 full species which belong to 57 genera of 23 families of 6 orders" are treated. The treatment of each subspecies is under six headings: scientific name, common name, synonymy, distribution, remarks (measurements, weight, related forms), and records of occurrence. Under species the author gives notes on color, trapping, pelages, reproduction, size, habitat, habits, and other ecological items. Some species have extended accounts, such as the badger (10 pp.), coyotes (22 pp., including trapping, control, control methods, why control, alleged gains and losses, facts, personal views, suggested plan), townsend ground squirrel (10 pp., including Alcorn's work), black-tailed deer (9 pp.), and striped skunk (10 pp.). Occasionally this account appears under the genus, as in the case of the pocket gopher, *Thomomys* (13 pp.).

The book contains 81 large distributional Nevada maps (with N.A. insets), 11 full-page fine representative habitats, 470 skull and tooth figures and 15 other figures (8 of which are maps of relief, precipitation, life zones, faunal areas and center of differentiation, Lake Lahontan, type localities, counties), and the customary appreciated colored life-zone chart of former Museum publications. Factors responsible for geographic distribution as given by the author, are: edaphic factors, plants, moisture, number of mammals (20 per acre), fluctuations in Lake Lahontan (pre- and post-populations), cline gradients of size, etc., speciation (e.g. 4 species or 29 subspecies of *Thomomys*, pocket gopher, or 9 species and 13 subspecies of *Eutamias*, chipmunk), and desert character of mammalian fauna. Usually the subspecies are ecologically in distinct habitats, but in Nevada, as elsewhere, there are puzzling overlaps. There is a convenient check list and classification schema of Nevadan mammals and a well-planned key to genera and species. The illustrations (copies) should have the customary "after ——." The book closes with a hypothetical list, appropriate map and list of type localities, gazetteer, glossary, literature, and index. The gazetteer (23 pp.), like those of Linsdale, is very helpful.

This volume's author, sponsors, and press are to be congratulated on this handsome book and its excellent format. Not even the most populous state can claim such a thoroughgoing, extensive account of its mammal fauna. It is a standard, set by one of the best living authorities on North American mammalogy, which future students of western mammals will use constantly.

Cornell University, Ithaca, New York A. H. WRIGHT

Scientific Book Register

ALLEN, H. B. *Rural education and welfare in the Middle East.* (A report to the Director General, Middle East Supply Centre, September 1944.) London: His Majesty's Stationery Office; New York: British Information Services, 1946. Pp. v + 24. $0.45.

BAXTER, JAMES PHINNEY, 3RD. *Scientists against time.* Boston: Little, Brown, 1946. Pp. xv + 473. (Illustrated.) $5.00.

CLARK, AUSTIN H. *Echinoderms from the Pearl Islands, with a revision of the Pacific species of the genus Encope.* (Smithsonian Miscellaneous Collections, Vol. 106, No. 5.) Washington, D. C.: Smithsonian Institution, 1946. Pp. 11. (Illustrated.)

CORWIN, E. H. L. *The American hospital.* New York: Commonwealth Fund, 1946. Pp. xii + 226. (Illustrated.) $1.50.

ERLANSON, C. O. *The vegetation of San Jose Island, Republic of Panama.* (Smithsonian Miscellaneous Collections, Vol. 106, No. 2.) Washington, D. C.: Smithsonian Institution, 1946. Pp. 12. (Illustrated.)

FEIBLEMAN, JAMES. *The theory of human culture.* New York: Duell, Sloan and Pearce, 1946. Pp. xiv + 361. $5.00.

FULTON, JOHN F. *Harvey Cushing: a biography.* Springfield, Ill.: Charles C. Thomas, 1946. Pp. xii + 754. (Illustrated.) $5.00.

MCKAY, HERBERT. *The world of numbers.* Cambridge, Engl.: At the Univ. Press; New York: Macmillan, 1946. Pp. 198. (Illustrated.) $2.50.

MCKEEN, B. A. *The agricultural development of the Middle East.* (A Report to the Director General, Middle East Supply Centre, May 1945.) London: His Majesty's Stationery Office; New York: British Information Services, 1946. Pp. xii + 126. (Illustrated.) $1.50.

PANTIN, C. F. S. *Notes on microscopical technique for zoologists.* Cambridge, Engl.: At the Univ. Press; New York: Macmillan, 1946. Pp. viii + 75. (Illustrated.)

SHANNON, JAMES I. *The amazing electron.* Milwaukee, Wisc.: Bruce Publishing Co., 1946. Pp. xii + 248. (Illustrated.) $4.00.

WORTHINGTON, E. C. *Middle East science: a survey of subjects other than agriculture.* (A Report to the Director General, Middle East Supply Centre, August 1945.) London: His Majesty's Stationery Office; New York: British Information Services, 1946. Pp. xiii + 239. (Illustrated.) $2.15.