however, is of a different type because it is fundamentally on oceanography designed to aid the meteorologist in securing information bearing on problems of the atmosphere which physical oceanography can furnish. In this respect the volume fills a need not adequately met by any other work known to the reviewer.

Sea-surface elements and processes which affect chiefly the atmospheric conditions receive especial emphasis. Included among these are the physical properties of sea-water, surface-currents and the processes which maintain them. Adequate discussion is accorded salinity, temperature, pressure, eddy viscosity and conductivity of sea-water as well as the observations and instruments for their determination. The heat-régime of the oceans requires particular treatment, including the effect of radiation to and from the ocean, exchange of heat between the atmosphere and the sea, and evaporation from the sea, all related in a complicated way to meteorological factors and their variations thereby affecting world weather conditions. Nearly one half of the text is devoted to a consideration of oceanic circulation and its various aspects—the water masses (counterpart of air masses) and the great oceanic currents which influence so profoundly the climates of the earth.

As the author remarks, "The theoretical discussion of the dynamics of the ocean currents and the factual information from many ocean areas are as yet incomplete, and therefore it may be premature to generalize. Nevertheless, it has been attempted to overcome difficulties arising from differences in interpretation of incomplete data by placing emphasis on application of the equation of continuity in the description of the ocean circulation."

The necessity of further expeditions to obtain oceanographic data is thus emphasized. The voyages of the *Challenger, Meteor, Carnegie* and other vessels have greatly broadened our knowledge of the ocean, both physical and biological, but it is to be hoped that, at the conclusion of the present conflict, new expeditions may be sent out to gather data which will fill the gaps in our knowledge of the oceans and settle outstanding problems regarding their relations with the atmosphere.

The book is attractively printed and provided with good text-figures. Four folding charts on Goode's homolosine equal-area projection exhibit surface temperatures of the oceans in February and in August, surface salinity in northern summer and surface currents in February–March. No bibliographical references are given other than a list of eleven outstanding general works at the end of the preface.

To meteorologists interested in the interrelations of their specialty with oceanography the volume may be recommended without reserve. The unique experience of the author in oceanographical and meteorological research, both practical and theoretical, which has earned international recognition, has eminently qualified him to make this contribution to geophysics.

H. D. HARRADON
DEPARTMENT OF TERRESTRIAL MAGNETISM,
CARNEGIE INSTITUTION OF WASHINGTON

ORGANIC CHEMISTRY

The Work Book of Fundamental Organic Chemistry. By ED. F. DEGERING and COLLABORATORS. 250 pp. New York: Barnes and Noble. 1942. $1.25.

THIS is intended for review work in organic chemistry and self-testing on the material of the given short summaries: also for self-testing on the material of a year course in organic chemistry. Each chapter contains (a) a review summary; (b) genetic charts in which the more important reactions of typical compounds are emphasized; (c) nomenclature, pronunciation and formula tables; (d) a composite review summary; (e) fill-in review questions, and (f) one or more objective tests. It is a compilation having distinct usefulness for students who desire to excel in organic chemistry, but it seems to this reviewer to be too comprehensive even for the excellent student. No purpose is served by burdening the memory of students with such a mass of detail in review material. I can imagine an excellent student getting 100 per cent. in each test, piece by piece, after reviewing a chapter, but I can not believe that the most learned teacher of organic chemistry could get more than 80 per cent. *in toto* without previous concentrated study for some time. But surely the purpose of a review book for students should be selection of material likely to be a minimum for certain specific purposes.

Fundamental Organic Chemistry. By ED. F. DEGERING and one hundred and six collaborators. Photo-offset. Planographed by J. S. Swift Co., Inc. Cincinnati, Ohio.

A TEXT-BOOK of 485 pages, of which 88 pages are devoted to a "kaleidoscopic survey" of organic chemistry with stress in relative electronegativity. The chapters in this first section of 88 pages are headed with figures, male and female, to represent positivity and negativity with respect to each other, the four valences of the carbon atoms which these figures represent being shown by their arms and legs. Thus methyl ethanoate is represented by a particularly hectic moment in a jitterbug contest of two drunken sailors and a dame, other compounds varying in "hectivity." The tables are very lightly printed. The electronic formulae are very confusing and are introduced too often. Photographs of Fisher-Hirschfelder models are scattered profusely throughout, together

with projections of pin models. Each chapter is headed in very thick type, which contrasts badly with the lightly printed tables and makes for strain in reading. The amount of descriptive material is more than adequate for a year course but the publication as a whole includes much unnecessary information (*e.g.*, "a new neoprene plant at Deepwater, N. J., established by E. I. du Pont de Nemours and Company, began operation in 1939"), many unnecessary models, figures and electronic formulae, and is not appealing in format. The analogy of negativity with femininity is not allowable in a civilization now reputed to be well on the way to a matriarchy.

GARFIELD POWELL

SPECIAL ARTICLES

THE VERATRINE ALKALOIDS. XIV. THE CORRELATION OF THE VERATRINE ALKALOIDS WITH THE SOLANUM ALKALOIDS[1]

FROM studies to be published elsewhere, evidence has been accumulating which has caused us to propose revisions of the older formulations of a number of the alkaloids of *V. album, viz.*, jervine, rubijervine and germine, which had been considered to be C_{26} compounds, to $C_{27}H_{39}O_3$, $C_{27}H_{43}O_2$ and $C_{27}H_{43}O_8$, respectively, so that like cevine, also $C_{27}H_{43}O_8$, they are C_{27} derivatives. Also, evidence has been obtained which suggests that they are built up, if not on a regular, at least on a modified sterol structure.[2] The fact that they are probably C_{27} derivatives is at once most suggestive in this respect.

The alkaloids of the solanum species, such as the alkaloidal aglycone solanidine of potato shoots, appear to have been definitely correlated with the sterols. Thus from the solanidine derivative, solanidiene, on dehydrogenation with selenium, Soltys and Wallenfels[3] reported the formation of the characteristic sterol degradation product, methylcyclopentenophenanthrene. Rochelmeyer[4] confirmed this and at the same time recorded a similar observation with solasodine. In the last instance, there was also obtained a pyridine base which was characterized as a picrate (m. p. 140–142°). However, its identity or homogeneity was not established and no analytical data were given.

It has now occurred to us that this base could have been identical with the 2-ethyl-5-methylpyridine which we have found to be a characteristic degradation product of all the veratrine alkaloids. We have, therefore, repeated the investigation of the dehydrogenation of solanidine obtained from potato sprouts.

The volatile material which distilled when a mixture of 2.1 gm of solanidine and 6 gm of selenium was heated at 340° for 2 hours was separated into basic and neutral fractions. The former was fractionated in a microfractionating column 5 cm in length (Table 1).[5]

TABLE 1

Fraction	Bath temp.	Pressure mm	Wt. in mg of fraction	Micro b.p.	Analysis C	Analysis H
1	92°	30	30	171°	79.15	8.79
2	92°	30	40	173°	79.32	9.21
3	95°	30	40	176°	79.00	9.09
4	120°	13	30	186°	79.70	9.40

The micro boiling point of 2-ethyl-5-methylpyridine[6] is 171°. (Analysis: $C_8H_{11}N$. Calculated. C 79.27, H 9.15.)

A picrate prepared from fraction 1 melted at 142–144° (micro m. p.) and proved indistinguishable from the picrate obtained from the cevine degradation product. A mixed melting point showed no depression. (Analysis: $C_8H_{11}N \cdot C_6H_3O_7N_3$. Calculated. C 47.98, H 4.03. Found. C 48.21, H 3.91.)

The investigation of the much less volatile hydrocarbon dehydrogenation fraction is now in progress and will be reported at a later time. However, the isolation of ethylmethylpyridine in such good yield from solanidine, taken together with the fact that the veratrine alkamines, like the solanum aglycones, can be C_{27} compounds, makes apparent at once the close correlation of the two groups of alkaloids and, therefore, of the veratrine alkaloids with the sterols.

It may be pointed out in this connection that the recent interest[7] which has attached to the study of the cardiac action of veratrine recalls to mind that the digitalis compounds are not only unsaturated lactones but also sterol derivatives. This raises the question whether the cardiac action of both the cardiac glycosides and veratrine is not a property inherent in the sterol nucleus itself, once given the proper supporting groups in certain positions and the necessary stereochemical configurations.

LYMAN C. CRAIG
WALTER A. JACOBS

[1] From the laboratories of the Rockefeller Institute for Medical Research, New York.

[2] L. C. Craig and W. A. Jacobs, *Jour. Biol. Chem.*, 141: 253, 1941.

[3] A. Soltys and K. Wallenfels, *Berichte d. deutsch. Chem. Ges.*, 69: 811, 1936.

[4] H. Rochelmeyer, *Arch. d. Pharm.*, 274: 543, 1936; 275: 336, 1937.

[5] The microanalyses were made by Mr. D. Rigakos of this laboratory.

[6] W. A. Jacobs and L. C. Craig, *Jour. Biol. Chem.*, 124: 659, 1938; 129: 79, 1939.

[7] O. Krayer and R. Mendez, *Jour. Pharm. Exp. Ther.*, 74: 350, 1942.