Reduction of 17α-hydroxypregnenolone diacetate with lithium aluminum deuteride and then acetylation afforded Ia, m.p. and mixed m.p. with the H-analog 198–201.5° (the infrared spectra are different), found: C, 71.61; H/D, 8.96. Refluxed with activated zinc in xylene, Ia gave 17β-deuterioisopregnenolone acetate (III), m.p. and mixed m.p. 166–168.5°, αD −138° CHCl₃; found: C, 76.67; H/D 9.74. The n.m.r. spectrum of III shows two acetyl peaks. In the infrared spectra III lacks a band at 1170 cm.$^{-1}$ which appears in the spectrum of the hydrogen analog. Heated with sodium methoxide in methanol. III is isomerized with loss of deuterium to pregnenolone acetate, m.p. and mixed m.p. 140–146° (identical infrared spectra).

Hydrolysis of 17α-hydroxypregnenolone 20-ethyleneketal with H_2O^{18} (purity 80%) afforded 20-O^{18}-17α-hydroxypregnenolone; λ 1655s cm.$^{-1}$ (C=O^{18}), 1690w cm.$^{-1}$ (C=O^{16}). Reduction with lithium aluminum hydride followed by acetylation gave Ib, m.p. 188–194°. When refluxed with activated zinc in xylene, Ib gave 20-O^{18}-isopregnenolone acetate, m.p. 166–169°; λ 1680m cm.$^{-1}$ (C=O^{18}), 1715w cm.$^{-1}$ (C=O^{16}), 1740s cm.$^{-1}$ (acetate).

17α-Hydroxypregnenolone was converted into the tetrahydropyranyl ether (m.p. 188–195°, found: C, 74.76; H, 9.74), which on reduction with lithium aluminum hydride gave the 20-epimeric diols: V, m.p. 186–189° (found: C, 74.42; H,

10.14), and VI, m.p. 181–182.5° (found: C, 74.21; H, 9.99). The mixture of V and VI shows a m.p. depression. The 20-monotosylate of V, m.p. 112–113° dec. (found: C, 68.31; H, 8.49) when heated with methanolic potassium hydroxide gave the oxide IV, m.p. 132.5–134° (found: C, 77.63; H, 9.86). When refluxed with activated zinc in xylene, IV afforded no isopregnenolone derivative.

Although Wagle's ionic mechanism seems to fit these results well, it probably is not fully correct since the Serini reaction proceeds also in the presence of dibenzoyl peroxide instead of activated zinc and it is inhibited completely by hydroquinone or by exclusion of atmospheric oxygen. These facts suggest that an oxygen radical participates in the Serini reaction.

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　　　　RECEIVED NOVEMBER 25, 1960

BOOK REVIEWS

Studies in Crystal Physics. Reprinted from RESEARCH, Vol. 11, 1958. By M. A. JASWON, M.A., Ph.D., Reader in Mathematics, Imperial College of Science and Technology, London. Butterworth and Co. (Canada), Ltd., 1367 Danforth Avenue, Toronto 6, Ontario, Canada. 1959. 42 pp. 18 × 24 cm. Price, $2.25.

This refreshingly written pamphlet on several unusual aspects of Solid State Physics is based in part on the scientific papers published by the author in the last five years or so. The first four chapters are reprinted from the periodical Research; the fifth has been added to round off the story. The Chapters are: (1) Some Properties of Crystal Lattices, (2) Imperfections in Nearly Perfect Crystals, (3) X-ray Diffraction by Imperfect Crystals, (4) The Martensite Phase Change in Metals, (5) The Thermodynamic Behaviour of Solids.

The topics are treated on simplified models and with mathematics used by way of illustration rather than for derivation; wherever possible, the argument is a physical one. This makes for interesting reading, to those who are acquainted with the subject. A reader knowing nothing whatever of the topic may find himself baffled by the introduction of some terms without adequate definition, for instance on p. 9 'Edge Dislocation' (which was previously spoken of simply as 'Dislocation'), or 'Screw Dislocation' (mentioned on p. 8 but nowhere defined). Most illustrations are schematic and to the point. In Fig. 12, p. 20, back reflection rings at approximately the same angle obtained on steel with radiations of wave lengths 1.8 Å. (Co) and 0.7 Å. (Mo) can obviously not both be indexed (310) as the legend purports.

In spite of such minor defects, the author's stimulating discussion throughout, and in particular of twinning in crystals, the Austenite–Martensite transformation and the thermodynamics of first and second order transitions in metal crystals can be warmly recommended.

The book is obtainable for sh 10/6 = $1.47 at English booksellers. Why is the Canadian publishing house permitted to surcharge this by 53%?

19 FORDYCE ROAD　　　　　　　　　　　　　P. P. EWALD
NEW MILFORD, CONN.

A Statistical Manual for Chemists. By EDWARD L. BAUER, Winthrop Laboratories, Rensselaer, New York. Academic Press Inc., 111 Fifth Avenue, New York 3, N. Y. 1960. x + 156 pp. 13.5 × 21 cm. Price, $4.75.

The author states (p. v) that, "this book was written for chemists who perform experiments, make measurements, and interpret data." It is not meant to be a complete text on statistics, but rather a manual for the working chemist. Use is made of methods of calculation (involving ranges) which require only addition, subtraction and the ability to use the slide rule.

The first chapter on fundamentals discusses experimental error, the normal distribution and "students" t-distribution. Examples are given to show how to compute the range, the variance and the standard deviation for small groups of data.

A chapter on the average discusses the problem of replication and shows how to compute confidence limits for an average. Data are divided into k small groups with n individuals per group. ($k = 5$; $2 < n < 10$.) Ranges of the subgroups are computed and confidence limits set about the grand average using a table of factors corresponding to k, n and $(1 - α)$ probability levels of 95 or 99%.

A chapter on experimental design and the analysis of variance gives a detailed explanation on how to compute and interpret the ANOVA for a two factor experiment with replication. Models and basic assumptions are listed and discussed. In the final section of this chapter the author suggests that much of the tedium of computing ANOVA