

## SHORTER NOTICES

*Theorie der Kristallstruktur.* By Arthur Schoenflies. Berlin, Gëbrüder Borntraeger, 1923.

This book is essentially a new edition of Professor Schoenflies' *Krystall-systeme und Krystallstruktur* which appeared in 1891. Like its predecessor its primary concern is the deduction of the 230 crystallographically significant space groups. Though remaining purely geometric in the details of its reasoning, this deduction has been so rewritten as to make it somewhat shorter and more concise. The insertion of numerous figures is a great help towards the picturing of individual groups. As before these groups are described through the statement of both their sub-groups and the co-ordinates of equivalent positions within them. This description has, however, been amplified and improved through a listing of the symmetry properties associated with points lying in elements of symmetry.

Since the discovery of X-ray diffraction the theory of space groups has become of immediate and every day use in experimental physics. The realization of this changed importance has inevitably influenced Professor Schoenflies' treatment and has led him to lay greater stress upon items of applied crystallographic interest. A chapter has accordingly been inserted which outlines the practical usefulness of space groups in studies of the positions of atoms in crystals. Although this account will not meet the needs of the practicing crystal analyst, Professor Schoenflies' books remain the only suitable source of information for those interested in the derivation of space groups.

R. W. G. WYCKOFF

*Mathematics in Liberal Education.* By F. Cajori. Boston, Christopher, 1928.

Do you believe in the "transfer of training"? Do you think that the study of mathematics yields a certain discipline which can be applied to situations outside of mathematics—which can be "transferred"? If you do, psychologists today would mostly agree with you.

But when they proceed by standard tests and other devices to measure the amount of this transfer, their findings are meager or nil. Professor Cajori doubts the psychologists' methods and suggests that in the absence of adequate objective measures it is not unscientific to consider subjective measures such as the opinions of philosophers and men of science.

His little book presents the recorded opinions of leading thinkers of all ages on the disciplinary value of mathematics. These quotations are arranged in chronological order, and include all opinions *contra* as well as *pro*. Which being counted, it appears that the *pro*'s have it.

This is a book for the believer, for the regeneration of faith in the faithful. And for him who battles daily with those who value mathematics only as a tool, or who sit in the seat of the scornful, it increaseth strength.

RALPH BEATLEY