

cases. In Chapter IV several theorems on the linear representations of the various rotation groups are proved by making use of the infinitesimal generators of the groups.

The first chapter of the second volume extends the spinor theory to spaces of any odd number of dimensions while the following chapter does the same for spaces of an even number of dimensions. In each of these cases the chapter closes with a brief discussion of reality conditions.

The last three chapters (totalling thirty pages) are entitled: Spinors in the Space of Special Relativity; Linear Representations of the Lorentz Group; and Spinors and Dirac Equations in Riemannian Geometry.

Comparison of this exposition of the spinor theory with the work of Veblen and his students<sup>1</sup> reveals a surprisingly small amount of common material. Thus Cartan does not employ Veblen's useful concept of a linear family of geometric transformations, which is a generalization of the well known linear family of involutions on the projective line. The avoidance of any use of the index notation is also interesting since the use of dotted indices has sometimes been regarded (quite erroneously) as a characteristic feature of the theory. These monographs do contain a full and excellent account of the group representation aspect of the theory and are an invaluable contribution to the literature of the subject.

Aside from a few misprints, the only error noted was on page 18 of the first volume, where the first lemma is false in case the fundamental quadratic form in  $n$  variables is of signature  $\pm(n-2)$ . Even in this case a weakened form of the lemma suffices for the following proofs.

WALLACE GIVENS

*Gesammelte Werke.* By Johannes Kepler. Vol. 1. *Mysterium Cosmographicum. De Stella Nova.* Edited by Max Caspar. 1938. 15+493 pp. Vol. 2. *Astronomiae Pars Optica.* Edited by F. Hammer. 1939. 467 pp. Vol. 3. *Astronomia Nova.* Edited by Max Caspar. 1937. 488 pp. Munich, Beck.

In 1936 Max Caspar published the *Bibliographia Kepleriana* as a part of this series.

The three imposing volumes of Kepler's collected works represent

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<sup>1</sup> In his introduction Cartan refers to Veblen's work as unpublished, although in his bibliography he lists Veblen's paper in the *Comptes Rendus Congrès Oslo* and the reviewer's dissertation, which was done under Veblen's direction. The most complete publication of the work at Princeton was in the form of mimeographed notes on lectures by Veblen and Givens under the title "Geometry of Complex Domains."