Nichteuklische Geometrie. By Dr. Max Simon. Edited by Dr. Kuno Fladt. Leipzig, Teubner, 1925. xviii+116 pp. 16 mo.

A careful writer always puts more pains into writing his preface, than any other part of his work, largely in the hope of presenting his wares attractively, and inducing the reader to go further. And in most cases it is lost labor, for the reader skips said preface. It would be a great mistake to do so in the case of the book before us, for Fladt's preface explains the nature of all that follows. The reader must understand, then, that this is largely a book of piety. The story is as follows: Simon, whose knowledge of elementary geometry was unparalleled, as all students of his report on the progress of that subject in the nineteenth century know, gave a course of lectures in 1905, and again in 1911 on non-euclidean geometry. He probably hoped to publish them in book form some day, but did not live to see this wish realized, and after his death in 1918 the material was handed to Fladt. The latter determined to publish it out of respect to his late teacher, and to stick as closely as possible to the spirit of the original. Simon, in a similar spirit of reverence always tried to follow as closely as possible the classical methods of the early writers, Gauss, Bolyai, and Lobachevsky. Hence the work was an act of piety on the part of both. But each had to modify his original plan. Simon could not leave the subject exactly where it had stopped a hundred years before, and Fladt, educated in the more critical modern school, felt constrained to introduce all of Hilbert's axioms, in order to have a really solid foundation. He shows unusual skill in reconciling what he takes from Simon, with what comes from Hilbert and Liebmann, but looked upon as a scientific work, rather than as a memorial, the book has many shortcomings.

To begin with, it is almost entirely given to hyperbolic geometry, to the exclusion of elliptic or spherical, the two being insufficiently distinguished any way. Then it is almost entirely "in plano"; the amount of solid geometry is negligible. This one-sidedness is painfully characteristic. The authors have apparently heard of none of the recent texts, which are not in German, not even of Somerville's compendious bibliography of non-euclidean geometry, or the earlier and less complete one of Halsted. The endeavor is to stick closely to the euclidean model, paying as little attention to the axioms as will "get by" in this critical age. The first five sections are devoted to preliminary discussions, and to what one might call "gossip" about parallels. Hilbert's axioms are introduced in §6 and a number of theorems having no reference to parallels are deduced. Then the axioms about parallels which distinguish euclidean, hyperbolic, elliptic, and spherical geometry are stated and compared; the possibility of a geometry where two lines intersect more than twice is ruled out in a foot note. Then much care is given to showing that if one of the parallel assumptions is true once, it is always true. A neater way of stating this is to say that if there exist one quadrilateral where three angles are right angles, then if in a single instance the fourth angle is less than, equal to, or greater than a right angle, just that will always be the case. The authors assume the Archimedean axiom (continuity) "So weit wie notwendig." From