and the points of S', a one-to-one reciprocal correspondence preserving limits.*

The following theorems may be easily established with the assistance of Theorem 18 of § 2 and Theorem IV of my paper "On a set of postulates which suffice to define a number-plane."†

THEOREM A. *Every two-dimensional space that satisfies Hilbert's plane axioms of Groups I and II (or Veblen's I–VIII) together with Axiom A is equivalent, from the standpoint of analysis situs, either to a two-dimensional euclidean space or to an everywhere dense subset thereof.*

THEOREM B.‡ *Every two-dimensional space that satisfies Hilbert's plane axioms of Groups I, II and III (or Veblen's I–VIII, XII) together with Desargues' theorem and Axiom A is descriptively equivalent either to a two-dimensional euclidean space or an everywhere dense subset thereof.*

COROLLARY. *Pascal's theorem§ is a consequence of Hilbert's plane axioms of Groups I, II and III together with Desargues' theorem and Axiom A.*

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A TYPE OF SINGULAR POINTS FOR A TRANSFORMATION OF THREE VARIABLES.

BY DR. W. V. LOVITT.

(Read before the American Mathematical Society, December 31, 1915.)

IN the *Transactions* for October, 1915, I discussed some singularities of a point transformation in three variables

$$(1) \qquad x = \phi(u, v, w), \quad y = \psi(u, v, w), \quad z = \chi(u, v, w)$$

* The statement that such a correspondence preserves limits signifies that if A is a *point* of S, M is a *point set* of S, and A' and M' respectively are the corresponding point and point set of S' then P is a *limit point* of M if, and only if, P' is a limit point of M'. Here P is said to be a *limit point* of M if, and only if, every *triangle* of S that contains P *within* it contains *within* it at least one *point* of M distinct from P.

† *Transactions of the American Mathematical Society*, vol. 16 (1915), pp. 27–32.

‡ For a corresponding theorem regarding Axiom B (cf. footnote in § 2) see Vahlen, loc. cit., pp. 158–163.

§ Cf. Hilbert, loc. cit., p. 40.