TWO-WAY CONTINUOUS CURVES*

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A continuous curve M will be said to be a two-way continuous curve, or to be "two-way continuous," provided it is true that between every two points of M there exist in M at least two arcs neither of which is a subset of the other. A point P of a continuum M is a cut point of M provided it is true that the point set $M-P$ is not connected. Every point of a continuum M which is not a cut point of M will be called a non-cut point of M.

In a paper *Concerning continua in the plane*,† among other results, I have established the following theorems which will be used in the proofs given in this paper.

I. *If K denotes the set of all the cut points of a continuum M, then every bounded, closed, and connected subset of K is a continuous curve which contains no simple closed curve.*

II. *Every cut point of the boundary of a complementary domain of a bounded continuum M is a cut point also of M.*

III. *If K, H, and N, respectively, denote the set of all the cut points, end points,‡ and simple closed curves of a continuous curve M, then $K+H+N=M$.*

IV. *If N denotes the point set consisting of all the simple closed curves contained in a continuous curve M, then every connected subset of $M-N$ is arcwise connected.*

These results will be referred to by number as here listed. We shall now prove the following additional theorems.

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‡ For a definition of this term see R. L. Wilder, *Concerning continuous curves*, FUNDAMENTA MATHEMATICAE, vol. 7 (1925), p. 358.