PACIFIC JOURNAL OF MATHEMATICS
Vol. 43, No. 2, 1972

CONTINUA IN WHICH ONLY SEMI-APOSYNDETIC SUBCONTINUA SEPARATE

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E. J. Vought has characterized hereditarily locally connected compact metric continua as those which are hereditarily aposyndetic, and (subsequently) as those which are aposyndetic and have only aposyndetic separating subcontinua. Also, Vought characterized hereditarily locally connected, cyclically connected compact metric continua as those having no cut point and separated only by aposyndetic subcontinua. In this paper it is shown that similar characterizations can be obtained when a larger class of subcontinua are allowed to separate, namely those which are semi-aposyndetic.

A *continuum* is a nondegenerate closed connected set. If x and y are points of the continuum M, we say that M is *aposyndetic at x with respect to y* if there exists a subcontinuum $H \subset M - \{y\}$ containing x in its interior. The continuum M is *aposyndetic at x* if M is aposyndetic at x with respect to each point of $M - \{x\}$. If M is aposyndetic at each point $x \in M$, then we say that M is *aposyndetic*. If x and y are points of a continuum M, then M is *semi-aposyndetic at $\{x, y\}$* if M is aposyndetic at one (at least) of x and y with respect to the other. If M is semi-aposyndetic at each 2-point subset, then we say that M is *semi-aposyndetic*. Thus every aposyndetic continuum must be semi-aposyndetic. But the converse does not hold, indeed, M may be aposyndetic at *none* of its points yet still be semi-aposyndetic, as shown in the example below. A set D *separates* M if $M - D$ is not connected, and a point z *cuts* M if there exist points $x, y \in M - \{z\}$ such that every subcontinuum of M containing both x and y also contains z. A continuum M is *cyclically connected* if each pair of points of M are contained in a simple closed curve in M. A property (e.g., locally connected, aposyndetic, or semi-aposyndetic) of a continuum M is *hereditary* if each subcontinuum of M has that property.

The notion of semi-aposyndesis has recently been shown to be useful in the study of n-mutual aposyndesis in the Cartesian products of continua [8]. Also, C. L. Hagopian has a number of results concerning semi-aposyndetic plane continua [2; 3; 4], the most interesting being that non-separating semi-aposyndetic plane continua are arcwise-connected [3]. That semi-aposyndesis is weaker than aposyndesis is evident: the cone over any regular Hausdorff space S is semi-aposyndetic [8, p. 240] but clearly not always aposyndetic.

EXAMPLE. *A compact planar semi-aposyndetic continuum which*