THE CYCLIC CONNECTIVITY OF PLANE CONTINUA

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Suppose that p and q are distinct points of the compact plane continuum M. If no point separates p from q in M and M is *locally connected*, then it is known [5] that M contains a simple closed curve which contains both p and q. But in the absence of local connectivity such a simple closed curve may fail to exist. Even if no point *cuts*[1] p from q in M, there does not necessarily exist in M a simple closed curve which contains both p and q. For example, no point of the continuum C indicated in Figure 1 cuts p from q in C, but C contains no simple closed curve whatsoever. However, if M is the continuum obtained by adding to C either of its complementary domains, there does exist in M a simple closed curve which contains both p and q. Here M fails to separate the plane and this is indicative of the general situation.

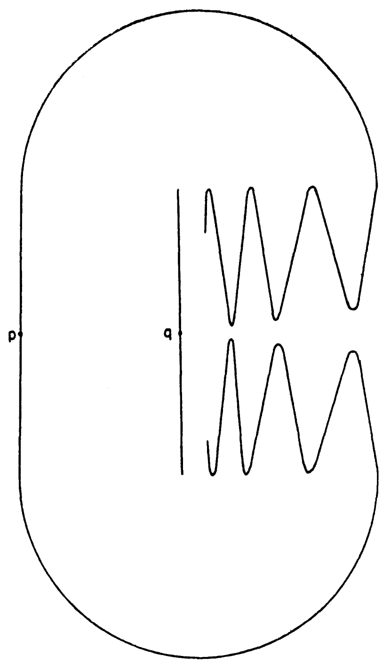

Fig. 1

LEMMA. *If p is a point of the compact subcontinuum M' of the plane S and L' is a nondegenerate compact continuum containing p*

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[1] A point x $(p \neq x \neq q)$ cuts p from q in M if every subcontinuum of M containing both p and q also contains x. Obviously a *separating* point is a cut point but for continua in general a cut point is not necessarily a separating point.