### 196. Paul A. White: *On additive properties of compact sets.*

A property $p^i$ concerned with $i$-dimensional Vietoris cycles of a compact set is called *additive* with respect to $i$ if the following theorem is true. If the compact sets $A$ and $B$ have $p^i$ and $A \cdot B$ has $p^{i-1}$, then $A \cdot B$ has $p^i$. It is shown that local $i$-connectedness and simple $i$-connectedness are two additive properties. Finally it is shown that the property $P(n, j)$ of being a compact, simply $i$-connected $(i = 0, 1, \cdots, m-2)$ $lc^{n-2}$ embedded in $E_n$, having only simply-$j$-connected $(j \leq n-2)$ generalized closed manifolds as boundaries of its complementary domains, is additive with respect to $n$ and $j$ simultaneously. (Received April 10, 1944.)

### 197. G. T. Whyburn: *Interior mappings into the circle.*

In this paper it is shown that any continuous transformation of a locally connected cyclic continuum $M$ into the circle $S$ is homotopic to an interior mapping of $M$ into $S$. If $M$ is not assumed to be cyclic, it is shown that any mapping $f(M) = S$ is homotopic to a mapping $\phi r(M) = S$ where $r(M) = M'$ is the monotone retraction of $M$ onto the smallest $A$-set $M'$ in $M$ containing all cyclic elements on which $f$ is essential and where $\phi(M') = S$ is interior. (Received April 14, 1944.)

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