BOOK REVIEWS

Analytic topology. By G. T. Whyburn. (American Mathematical Society Colloquium Publications, vol. 28.) New York, American Mathematical Society, 1942. 10+278 pp. $4.75.

In an effort to place the subject matter of this book within the larger domain covered by the title, we take up two illustrations that are in some sense typical of the contents. The first selection is for those who prefer to think in terms of invariants. One finds many-to-one transformations each of which preserves, a priori, certain topclogical properties, and a subsequent search for new invariants, rather than a study of isometric or other invariants that might seem to fall within the title. Let F be a class of transformations and S be a class of spaces. It is desired to choose S so that any element of S maps onto another element of S under every mapping from F, and that, furthermore, there be in S a particular "generator" E, such that, given any element S^* of S, there is an element f in F for which $f(E)=S^*$. For the case of locally connected continua S, and the continuous mappings F, this result is well known; here E may be taken as an arc. Other examples are: boundary curves S, simple closed curve E, and non-alternating transformations F; cactoids S, sphere E, and monotone mappings F; or hemi-cactoids, 2-cell, and monotone mappings. In many instances $f(S^*)=E$ is also possible for some f in F. The composition of two elements of F is always in F, at least on spaces from S. A similar situation in which F is unknown and S contains only one element, that is, when the original and image spaces are homeomorphic, is of considerable importance and largely an open question.

The second selection serves to emphasize the highly natural relationship between the older structural ideas and the analytic concepts that form the major part of this work. In order that a continuum M should be a simple continuous arc it is necessary and sufficient that M contain at most two points that do not separate M. This characterization is due to R. L. Moore. By its use of an array of cut points between the two end points, it strongly suggests a powerful technical use of the notion of a cutting for singling out linear arrays in continua. One might say that the theories of dimension and regularity given by Menger and Urysohn are based on a similar, but not the same, approach. When the cuttings are points this technique, roughly speaking, culminates in the cyclic element theory for certain special continua. For non-separated cuttings of more than one point this technique yields other results that are unfortunately not as well