

I-5.

Brian MacMahon and Thomas F. Pugh: Causes and Entities of Disease.
In *Preventive Medicine*, first edition, edited by
Duncan W. Clark and Brian MacMahon
Boston: Little, Brown, 1967.

Some of the content of MacMahon and Pugh's "Causes and Entities of Disease" can be found in their textbook *Epidemiology: Principles and Methods* [1970]. Nevertheless, I chose to include the article because the textbook presumably now sees little classroom use, and the points of overlap with the article are "classic" in that they remain valid and forceful today.

I also think the article nicely illustrates the sophistication in thinking about causation that evolved during the post-World War II era, when chronic-disease epidemiology underwent its first major expansion. For example, the section "Diversity of Effects" (p. 16) reflects a more critical attitude toward the criterion of "specificity of effect" engendered by the early debates and findings regarding smoking and health. In addition, the recognition of the circularity inherent in Koch's first postulate (p. 15) exemplifies the break from modes of thought that dominated much of epidemiology in the early 1900's.

The article also forms a bridge between the earlier works of Hill, Cornfield, and Sartwell, and more recent writings on causal inference. For example, MacMahon and Pugh's observation that the labeling of a risk factor as a necessary cause depends on the prevalence of the factor and its cofactors (p. 16) is offered in the practical spirit of Hill but anticipates the discussion of strength of risk factors in the Rothman article of this collection.

Reference:

MacMahon B, Pugh TF. *Epidemiology: Principles and Methods*. Boston: Little, Brown, 1970.