PHILOSOPHY IN EPIDEMIOLOGY

To the Editor: A need for philosophical discourse in medicine to go beyond ethical topics has been emphasized in recent articles in this journal [1–3]. In the editorial that provoked the discussion [4], Lindahl perceived a deficiency of such discourse. He excepted ethics; the burgeoning of formal interest in that area in recent decades is apparent to any reader of medical journals. His call is for a broadening of “the philosophy and methodology of medicine in general”. Lindahl proposes to address these issues in the journal as they relate to medical research in particular.

This dearth of philosophy and theory in medicine and allied sciences characterizes the modern era. For a long stretch of time, the case was quite opposite. During the centuries preceding Francis Bacon’s promotion of empirical research, theory took priority over observation: well-entrenched theory challenged the observation, rather than the reverse. Once empirical science gathered momentum in the eighteenth and nineteenth centuries, however, theory and philosophy were displaced from their prime position. Along with that, the term “natural philosophy” went into limbo as an appropriate description of science. From Lindahl’s perspective, the pendulum has swung too far.

In a formal sense, epidemiology does not escape this stricture. Contributions by philosophers to the epidemiological research literature are few and far between. And, until recently, epidemiologists have seldom brought contending philosophies into the center of their discourse. Nonetheless, in an unstated way, some aspects of philosophy have been pervasive in the discipline from its beginning, for instance, in causal inference.

It is not fanciful to trace the roots of epidemiology to the very origins of science. Hippocratic medicine, Benjamin Farrington argued in his illuminating works on Greek science, was an important part of the original scientific foundation [5]. Farrington stressed the empirical nature of the Hippocratic works, their reliance on observation, on inference and on trial. An examination of the Hippocratic works from an epidemiological perspective [6] leads one to recognize the affinity of their concepts with the epidemiological territory defined by consensus over the past four decades. In this current definition, epidemiology is the study of the distribution and determinants of health status in populations. One can add too that epidemiology is at once an applied science and a human science. Like medicine, it is endowed with the task of preventing or alleviating human ills.

Once the search for the impact of environmental determinants of disease begins, and it has been learned that these must be quantified to the studied, the
necessity for enumerating observations and their relations enjoins on such science a careful regard for the logical requirements of causal inference. Human beings are constrained not by cages but by existence in a fluid and everchanging social, economic and political structure.

Epidemiologists are deprived of the masterful control of the experimental situation which permits unimpeded manipulation of a single variable. They must be social as well as biological scientists. This entails a struggle with a multitude of situations and an infinity of variables, only some of which can be isolated. Amid this chaos of individual wills impinging on an uncontrollable society, the scientist who would discover and establish links between causes and effects needs all the help to be had from related disciplines, including philosophy. The requirements are many. To ground the problem under study in the biology that underpins it and the social milieu that enwraps it is an obvious necessity [7]. Without a degree of numeracy, the quantification required for any population science is not achievable. In the absence of an understanding of the logic of causal inference, however, interpretation of such quantitative data even by the numerate is likely to be misleading or fruitless.

This causal logic is not freestanding and axiomatic. The secular changes in views about how a cause can be recognized, as society changed, are apparent [8, 9]. Major English writings alone — say from Francis Bacon through David Hume, John Stuart Mill, Bertrand Russell and Karl Popper — are sufficient to make the point. Some identity of the logical problems remains from era to era, but the solutions selected are different. In parallel, epidemiology has shifted its predominant causal paradigms [10]. Over the greater part of the nineteenth century, these were miasma and multicausality. In the late nineteenth and early twentieth centuries, the paradigm revolved around the germ theory and specific cause. In the second half of the twentieth century, it shifted back to multicausality. The triumphs of molecular biology may portend a shift once more to a narrower view of specific cause.

In both expressing and guiding these trends towards one or another paradigm, philosophy has had and will continue to play an important part. Bacon inspired the empirical scientists of the nineteenth century. The skepticism of Berkeley and especially Hume undermined materialist certainty and the dogmatism of pundits. To that extent, they made the subversions of received knowledge by new discovery more tolerable to scientists. In our time, Popper, without abandoning materialism, has brought a new radical skepticism to bear. Although he too has been extreme, he has served to curb the excesses of the mechanistic models that had come to dominate much of biology.

At the same time, I have argued elsewhere that strict adherence to any radical philosophical doctrine is a scientific straitjacket [7]. We need the philosophies, or the parts of philosophies, that can serve the pursuit of reality. For epidemiol-