

MEDICINE AND THE CALL FOR A MORAL EPISTEMOLOGY

ALFRED I. TAUBER

ABSTRACT For over a century, medicine has prided itself on its scientific orientation and technological accomplishments. But a conceptual crack lies at the foundation of contemporary medicine, one that may be characterized as a conflict between medicine's scientific epistemology and its moral philosophy. *Moral* refers to value, and more specifically in the clinical setting, to how facts must be ordered by the values attached to them. A "moral epistemology" seeks to bring these two domains into closer proximity. Clinical facts always reside in a complex array of systems that confer specific and often unique meanings to any finding. An integration of unsteady norms and the intuitive inference arising from the individuality of disease expression require that judgments order facts into their proper placement. And beyond this relaxed view of objectivity, clinical care must also incorporate judgments arising from the patient's (as well as the physician's) social and psychological realms that are removed from scientific concerns. Together, these various kinds of value judgments erect the scaffold of clinical care, in which a more complex moral epistemology emerges. A comprehensive biopsychosocial model of illness and its treatment articulates this integrated orientation, but until medicine embraces a philosophy that legitimates the full integration of facts and values, the appeal of such an approach will remain limited and its application ineffective.

“FACTS” ARE ALWAYS PROCESSED—interpreted, placed into some overarching context—whether a scientific theory or an ill person. Inextricable from context, facts must assume their meaning from a universe of other valued facts. In a sense, value is the glue that holds our world together, for knowledge is inexorably valued; it is both useless and irrelevant divorced from the reality of

Center for Philosophy and History of Science, Boston University, 745 Commonwealth Avenue, Boston, MA 02215.

E-mail: ait@bu.edu.

Perspectives in Biology and Medicine, volume 48, number 1 (winter 2005):42–53

© 2005 by The Johns Hopkins University Press

the personal domain. This does not mean that knowledge is necessarily subjective, contingent, or arbitrary. These personalized elements certainly may be at play and compromise the pursuit of more objective or neutral assessments. We can hardly deny their role. But the challenge is to comprehend how such factors affect decision making and to recognize their influence and legitimate claims. To clearly understand the complex interplay of facts and values is the beginning of creating knowledge that acknowledges the complexity of choices and the agents who make them.

Others have explored the fact-value distinction in medicine, whether considered as constitutive to understanding causality and explanation in clinical practice or lying at the base of the scientific foundations of medical knowledge (Delkeskamp-Hayes and Cutter 1993; Engelhardt and Callahan 1980). So why raise the matter again? At one level, the discussion in medicine is part of the wider concern of how to understand objectivity in scientific discourse. Because medicine so clearly illustrates the intractable value-laden character of a scientific fact, the clinical scenario becomes important as a case example of science in action. This is hardly an academic exercise, for the use of scientific facts remains a matter of debate as the public continues its ongoing scrutiny of scientific practice and its application to policy (Tauber 1997, 1999a). But within the confines of medicine's own agenda, the relationships of facts and values raise different kinds of questions. While most discussion has focused on the epistemological status of facts and values, and I will review those matters here, I believe that how we understand this relationship actually reflects a deeper concern about medicine's ethics.

Although others have delved into the fact/value distinction, or lack thereof, in discussions framed by the debate over patient self-determination (Brock 1991), here I wish to probe in a different direction. First, I am not concerned specifically with adjudicating the basis by which patient autonomy might be framed by dissecting the place of facts and values in medicine. This is part of my concern, but only implicitly. Instead, I will explore the most general implications for medicine of how the relationship of facts and values defines the knowing subject and the moral structure of knowing. (*Moral* in this sense means "valued"—as opposed to the dichotomy, and discernment, of good and evil, or right and wrong.) In medicine, comprehending the limits of the fact/value distinction is to recognize the centrality of values in grounding medicine's philosophy. On my understanding, this is a philosophy firmly placed on the status of the individual patient and the values determining her care. One approach to orienting medical practitioners towards this ethical posture is to seek a "moral epistemology," namely to understand that clinical *science* never escapes its underlying moral agenda. If that precept is accepted, then a person-centered clinical science must be adopted and a biopsychosocial medicine becomes available. For those seeking further justification for this program, the philosophy grounding its claims must be strengthened. This paper endeavors to contribute to that effort.

HISTORY OF THE FACT/VALUE DISTINCTION

Contemporary medicine prides itself on scientific accomplishment and the objective status of disease. Indeed, the distinction of scientific “facts” and corrupting subjective “values” represents a crucial distinction in the development of modern science. This attitude was formally introduced in the 19th century as positivism, the philosophy that purportedly separated objective pursuits from those that were neither objective nor neutral. However, the positivists’ position originated earlier, with David Hume’s famous proclamation that one cannot infer an “ought” from an “is”: that a moral case cannot be deduced from a natural fact. This critique, sometimes referred to as Hume’s Law, was introduced in Book 3 of Hume’s *Treatise of Human Nature* (1739). For Hume, the fact/value distinction originated in an argument against the illogical deduction of religious belief from natural facts or of morality from rationalized natural law (Putnam 2002). He argued instead that ethics emerges from human emotions, needs, and caprices that are rationalized into moral justifications (Lindley 1986). Developing that issue takes us too far afield, but the salient point is that Hume’s philosophy supported the scientific aspiration of objectivity—facts divorced from contaminating personal values—and thereby set the agenda for the 19th-century positivists.

But already at the end of the 18th century, Goethe was resisting the allure of a radically objective science. Goethe appreciated that “facts” do not reside independent of a theory or hypothesis that must “support” them, a point that would be well developed in 20th-century philosophy of science (Tauber 1993). Goethe’s precept that “everything factual is already theory” was offered as a warning about the epistemological complexity of supposedly objective knowledge. Goethe understood the potential danger of subjective contamination of scientific observation and the tenuous grounds of any objective “fact” that relied in any way on interpretation. “Interpretation” stretches from inference to direct observation, for any perception must ultimately be processed to fit into a larger picture of nature and must cohere with previous experience.

The synthetic project of building a scientific worldview thus begins by placing “facts” within their supporting theory, and continues with integrating that scientific picture within the broader and less obvious intellectual and cultural forces in which science itself is situated. Thus “facts” as independent products of sensory experience are *always* processed—interpreted, placed into some overarching hypothesis or theory. In short, observations assume their meanings within a particular context, for facts are not just products of sensation or measurement, as the positivists’ averred, but rather they reside within a conceptual framework that places the fact into an intelligible picture of the world.

The Romantics placed important caveats on that approach to nature, on both epistemological and metaphysical grounds. From their perspective, each inviolate observer held a privileged vantage, and the vision so obtained was jealously protected (Tauber 2001). But to varying degrees, this constructivist interpretation was denied by the positivists. A world built from their principles would appear

essentially the same to all viewers, because for the positivists “facts” have independent standing and universal accessibility. Irrespective of individual knowers, facts constitute shared knowledge.

From the positivist orientation, the independence of the known “fact” rests on its correspondence to a reality that any objective observer might know. This assumes both a universal perspective, a “view from nowhere,” and a correspondence theory of reality. But as Hilary Putnam (1990) has argued, even the positivist standards or aspirations of natural science are values that are historically arrived at and chosen in everyday practice. So, radical objectivity is compromised, and as stubborn as the positivists might have been in attempting to stamp out subjective influences, they only succeeded in making them seem disreputable (Daston 2000). There is no escape from the constraints of an observer fixed by his individual perspective, contextualized in some observational setting, and committed to processing information through some interpretative (subjective) schema. Such an observer cannot adhere to a rigid identification of “facts” based on an idealized separation of the knower and the known. Various kinds of values knit the factual world together into a more or less coherent worldview (Tauber 2001).

THE CASE OF MEDICINE

How do these distinctions impact on medicine? Disease is dominated by fact: a synthesis and condensation of signs and symptoms, test findings, and a web of sorting categories. Illness, on the other hand, is value-laden: a composite of all those elements that conspire to incapacitate a person (Barondess 1979). Disease is an objective account of pathology, but disease is only one component of illness, and all those other elements of dysfunction that might arise from disease also require care. Biomedicine is shorthand for the clinical science of disease, and a more comprehensive biopsychosocial model has become the watchword for an attitude developed to address the greater global concerns of the ill. Formally presented by George Engel (1977) almost 30 years ago, this holistic approach to clinical care has a complex history with many cultural and clinical tributaries (Lindau et al. 2003; Spiro and Norton 2003).

Medicine, of course, was never monolithic, and well into the 20th century renewed challenges to reductive orthodoxy appeared, even within mainstream conventional medicine: constitutionalism, psychosomatic medicine, neo-Hippocratic medicine, neo-humoralism, social medicine, Catholic humanism, and, in Europe, homeopathy and naturopathy (Lawrence and Weisz 1998). These “holistic” systems have been espoused not only by various kinds of practitioners, but in noteworthy instances they have also been championed by “legitimate” basic scientists, such as Alexandre Besredka, Walter B. Cannon, and Henry Head (Lawrence and Weisz 1998). Today, although the influence—if not dominance—of a fact-driven clinical science has prevailed as medicine’s dominant ethos, a biopsychosocial approach has been widely adopted by primary care providers (Barbour

1995; Laine and Davidoff 1996). Despite the power and effectiveness of a disease-oriented model of care, another ethic persistently beckons.

To treat a person in his entirety requires more than reliance on some sterile objectivity, whatever that might be. And the catch-all for aspects of care that cover those dimensions beyond the scientific gaze, narrowly construed, is empathy. Accordingly, while technical expertise is expected (and under certain situations may even be sufficient), illness requires attention to psychological and social supports, and if framed differently, spiritual and existential challenges also demand address. Clinical tools are thereby instruments for application, in service to the doctor's ethical judgment, moral sensitivity, and self-awareness—the crucial prerequisites for the healing relationship. In this view, medicine is fundamentally ethical (Tauber 1999b).

At the bedside, the epistemological consequence of integrating facts and values calls upon both the cognitive functions of the scientific physician and the moral sensitivities of the humane doctor. The patient, thereby, has moved from being an entity—an organic construct—to a person (Toulmin 1993). The characterization of personhood is laden with values and choices, and so clinical judgment takes its own bearings from the interplay of social and natural realities understood in the context of the individual patient. “Facts” never reside alone in clinical care.

Yet a nagging demurral persists. In its biological formulation, disease is optimally based on objective—public—fact. But what is the status of objective fact in this restricted setting? First and foremost, all clinical facts are contextualized at several levels. From the strictly scientific perspective—and this, as we will see is already a false depiction—organic dysfunction is witnessed in a complex array of other integrated elements. One of the first lessons medical students must learn is that a laboratory finding or anatomic description is only the beginning of building an integrated clinical picture. What does it mean that a serum sodium level is low? To understand that “fact” is to understand the entire physiology of renal and endocrine regulation of electrolytes: the hormones effecting secretion or retention; the anatomic structures—kidney, intestines, lungs, skin—that are the targets of metabolism; absorption; and excretion. No fact stands alone. And the focus of the array of facts is the function of the whole person.

It is apparent that descriptive medical science encompasses a wide variety of facts, whose epistemological status and linguistic uses vary (Tauber 1997). For instance, sickle-cell anemia has a precise pathophysiological description at the molecular level, whereas the symptom, lethargy, does not. The nature of the fact describing each condition is thus quite different. One might say that sickle-cell disease is factual and lethargy is not, because the symptom is subjective, unobservable, and thus unverifiable. But the meaning of the so-called fact of sickle-cell disease's etiology and the subjectivity of lethargy is not so easily divided between a factual account and a valued one. What is intriguing about even the most sophisticated descriptions of conditions like sickle-cell disease is the pro-

tean manifestations of the illness. Some patients are virtually asymptomatic, while others have debilitating pain crisis, organ damage, hemolytic anemia, and other comorbid states that lead to a shortened life span. The molecular “fact” of an abnormal hemoglobin precisely defined goes only part way in describing an illness that requires individually specified assessment and care.

This general observation has important implications for understanding the contextual character of any scientific fact, and how in medical science in particular, each so-called “fact” exists in a context that confers a distinctive meaning. That meaning is determined by factors usually unrecognized, and thus the grounding of the molecular fact—its valuation, so to speak—only can assume its significance in the context of the individual patient. That contextualization immediately shifts the ontological character of clinical facts from a positivist aspiration to a more complex value-dependent ontology. Does this matter? Perhaps the most striking irony in treating sickle-cell patients is the physician’s reliance on the patient’s report of pain as the principal criterion of therapy. Intuition guides the therapeutic process.

A radical positivism might assert that descriptive facts are merely raw data, but this is never the case in medicine. Clinical data fall into an intricate continuum of “normality” that has its individual, or idiosyncratic, parameters, which in turn require judgment to assess their significance. George Canguilhem, in his celebrated *The Normal and the Pathological* (1989), showed the ever-changing shifts of the normal and the pathological as constructs, both as comprehended in their scientific context, but also as understood and then experienced by the suffering patient. Medicine both exists in, and helps create, a framework in which disease and illness are defined and treated as part of a complex web of values. Therapeutic tolerance or intervention requires a balanced judgment of diverse modes of interpretation. The cardinal decision in any clinical encounter is to distinguish what *may* be done diagnostically or therapeutically from what, in a universe of choices, is *actually* selected (Pellegrino and Thomasma 1981). In other words, what may be done is narrowed to what should be done, and that winnowing is determined by an array of value-based decisions. In a trivial sense, whether to intubate a patient with respiratory failure at the end stage of cancer of the lung is a judgment governed by values. What is the life expectancy if successful? What are the chances of success? Indeed, what is “success”? What resources must be allocated at the expense of another patient? What is the quality of life to begin with? What are the patient’s wishes?

Such decisions, usually not as dramatic, nor as easily formulated, arise in virtually all clinical decisions. And beyond this contextualization, the physician must place disease within an ever-changing nosography, a system of medical theory and classification that accounts for these facts. Considering the incompleteness of our scientific theory, the social construction of much of it, and the intimate relation of psychological and social factors in defining disease, the model of clinical medicine based on impersonal “facts” is not only incomplete, it is distorting.

Yet, the physician must seek objectivity. In the end, the doctor lives with a tension not easily reconciled: a calculus of knowing that seeks the asymptote of objectivity on a coordinate system of values.

CLINICAL JUDGMENT

Facts

The literature dealing with the character of clinical facts is immense, and here I wish to sketch in only two general ways of approaching the fact/value relationship in medicine. The first pertains to the efforts at establishing a medical heuristics, the so-called “silent adjudicators of clinical practice” (McDonald 1996). If we simply look at this decision-making process as an epistemological exercise, the intermingling of facts and values is obvious: robust scientific conclusions are too sparse to fully inform clinical decisions for the simple reason that few patients fall exactly into the same criteria of study groups. Physicians routinely must extrapolate from small study groups to the general population in which they must situate their particular patient. For instance, we treat moderately hypertensive women as we treat men, but the study upon which we base such treatment was conducted by the Veterans Administration (1970) and no women were enrolled. Given the increasing concern about sexual differences in the natural history of the same disease, this compromise is seen for what it is, a necessary extrapolation for the lack of good data for women. Another example: the evidence that certain anti-hypertensive medications are lifesaving has been extrapolated to every new anti-hypertensive drug regardless of chemical class. Indeed, most practitioners have replaced the older, well-proven agents with newer drugs on the basis of the extrapolation that because these agents are known to lower blood pressure, they also must save lives. However, at least in the case of calcium channel blockers, this value-based decision has been proven false (Psaty et al. 1996).

To counter such myopia, Bayesian inference, a statistical method that includes all previous data to assess likely future outcomes, is increasingly gaining favor. Instead of blind intuition, value is actually calculated as a likelihood ratio. After all, physicians must decide how to interpret a test or treat a patient from a limited yin/yang choice, but no test or intervention falls into a clearly defined positive or negative domain (Murphy 1997; Weinstein and Fineberg 1980). Every test result has false positives and false negatives when compared to some gold standard, which in itself may not be absolute. And every drug has toxicities and failure rates that not only vary within subgroups of patients but, more to the point, are unpredictable beyond a frequency figure as determined for a large population. This means that when applied to any given patient, a test result or a therapeutic outcome may only be described as an odds ratio. And when the confounding uncertainty of diagnosis is factored into the complexity of therapeutic

choice, then the circularity of decision making begins to look like the dog chasing its tail. More often than not, the probabilities are inferred, and even when clearly defined, probabilities change the ground rules of what constitutes an objective decision. The variation problem is simply beyond the horizon of most factual information bases in clinical science or the knowledge base of even the most earnest physician.

The choice of strategy is largely intuited from experience and hidden judgments that are biased in ways usually unrecognized, and, as noted, extrapolated by measures hardly supported by rigorous analysis. Nevertheless, decisions must be made, and the call for a clinical science that might address the particular concerns of proper development and application of clinical data has many origins. Various tools for clinical judgment have been proposed, such as the statistical formalized methods introduced in the 1960s or the formal decision analysis programs beginning in the 1970s (Feinstein 1967; Weinstein and Fineberg 1980), but such efforts, despite their obvious utility for measuring cost-benefit ratios in certain well-studied cases, have also pointed to how clinical choices are intractably value-laden. The “facts” of clinical care are only the beginning of the decision tree of options, exercised or forsaken. Factor in the mandates of patient autonomy, and the intricacy of care becomes even more complicated (Tauber 2003).

Values

The telos of medicine is determined by the aggregate needs of a patient as expressed in both the biogenic and sociogenic dimensions (Kurtz 1958). So, whether translated as “biogenic” or “sociogenic” in origin, needs are oriented by goals, which in themselves are determined by values. Here I follow the lead of Ruth Ann Putnam (1985), who has argued persuasively how values arise from the context of need. In this view, medical facts are aligned by values and their meaning adjudicated by a system of value-laden options determined by the perceived individual needs of a particular patient. Given this orientation, perhaps the most direct way of ascribing value in the clinical setting is to dissect “need.”

Need is both factual (in its various guises) and a value judgment, whether employed diagnostically or therapeutically. For example, Mr. Kramer reports fatigue. Is he depressed, or does he have an underlying disorder that is yet to be defined? The physician assesses the patient’s psychological state and remains uncertain. Is he somewhat lethargic because he lost his job, or did he lose his job because he was physically disabled due to an occult tumor? Does Mr. Kramer require a thorough evaluation, or should further tests be postponed? Or consider the statement: “Mrs. Smith needs antibiotics.” Mrs. Smith is recovering from chemotherapy and has a fever. Whether she has a bacterial infection or not, it is perhaps best to treat her conservatively and prescribe antibiotics. On the other hand, she more likely has a viral infection, so the drugs will not be effective and may cause her diarrhea or, worse, a superinfection. She lives alone and has early dementia. What is best? There is no simple answer, but rather a complex interplay of certain

“facts” (in this case fever, recent chemotherapy, immune compromise) and “values” (likelihood of bacterial infection, ability to care for herself, etc.). These examples highlight how “need”—the category that determines the *techné* of medicine, the requirement to do of clinical practice—inextricably combines facts and values. The facts assume their respective meaning only in the context of care of the person’s needs.

The health care crisis has made the social implications of these observations apparent to all, and these discussions have moved from the theoretical concerns of a few philosophically minded to the domain of public debate, as well as to the privacy of the doctor’s office. This is not the place to explore how health care policy makers are grappling with similar difficulties of defining complex choices in the interplay of objective data and value judgments about them, but suffice it to note that the same basic issue appears at play here. For instance, cost-effective analysis, which uses quality-adjusted life years (QALYs) as a measurement of clinical outcomes, is replacing an older cost-benefit analysis, which measures benefits and costs solely in monetary terms. (This analysis measures how much it costs to provide the same quality of life for each patient in a health care system for a given period of time, for example, one year.) But once QALYs are in place, value-laden choices loom before policy makers. Is health maximization the only relevant objective of health services? Are QALY analyses appropriately egalitarian (for example, are they potentially discriminatory against the elderly)? Are modifications required to achieve greater equality, in order to factor in those with greater needs? Critics have argued that QALY-based analyses favor life-years over individual lives, and the number of life-years over the number of individual lives (Beauchamp and Childress 2001).

The ethical drama is played routinely in the doctor’s office. Algorithms and managed care surveillance (based on “objective facts” of care) are often circumvented by the needs of individual patients. Recent surveys have demonstrated that some doctors lie to third-party payers to obtain services for their patients (Freeman et al. 1999; Wynia et al. 2000). Conversely, in refuting patient advocacy, some physicians deny patients possibly useful choices when their medical insurance does not cover such services or medications (Wynia et al. 2003). Even as policy makers have access to greater analytic tools and objective data about health care, there is no escape from the moral dimension of assessing distributive justice (access and distribution of health care resources), quality of life, and the competing ethical demands of a rational utilitarian use of resources and the requirement of caring for the individual patient (Tauber 2002).

In summary, from the socially based policy decisions of health care administrators to the attention paid to the individual patient, the care delivered is allocated by a distillation of value choices, whether declared or not. And thus the fact/value distinction moves from being a theoretical problem to one firmly planted in our everyday lives. In seeking humane care, we now recognize how a reified model of disease has contributed to converting the patient—with certain

moral characteristics—to a consumer, to a client, to a “covered life.” Each of these social and economic designations possesses a different moral profile from that of the original afflicted person. And more to the point, the objective characterization of those clients requires value-based interpretations. The clinical science and the social science thus mirror each other.

INTEGRATING FACTS AND VALUES

To understand the difficulties entailed in integrating facts and values, the profession requires a moral compass to orient its practitioners in the clinical application of its technological prowess, as well as to enable them to navigate the bewildering maze of health care. A medicine that fails to address those elements of personhood that have no firm and delineated objective basis—the social, the emotional, the moral—is ultimately fractional and therefore incomplete. As already described, an integrative attitude is contiguous with the demands of clinical science. After all, the organism as an integrated, functioning entity frames all approaches to the patient. Medicine is, by its very character, holistic in orientation, endeavoring to address all systems at once and to effect full function of each. This requires a global view of function, from molecule to intact organism. But beyond a science of an organic entity, care is ultimately judged as to how effectively it addresses the person.

We know this moral fact, but a deep tension remains between our aspirations for an objective clinical science and the calls for humane care. Why are these so difficult to reconcile? Part of the answer is that they call upon different philosophical justifications that are too often in conflict with one another. To simultaneously observe the patient objectively, as well as empathetically, calls upon two attitudes that at present cannot be easily reconciled: one persona peers out, dissociated and removed, while the other looks reflectively within. We may do each, and some do so better than others, but for most, this image of Janus remains just that, an image.

At the heart, then, of what I am calling a moral epistemology is the quest for the elusive synthesis of “personal” and “objective”—a search for their common foundation. By showing an integrated epistemology of facts and values, we might well regard medicine as a crucible in which this enigmatic and elusive problem is being played out with particularly intriguing consequences. And perhaps more saliently, the health care crisis is shown to include a moral quandary that regards the economic and political issues currently dominating public debate from a different perspective, one that shifts dollar-dominated choices into a different currency. The conclusion: we require a medical philosophy that throws its net wider than to cover the “thin” debates currently dominating the discourse of medical ethics (Evans 2002). Plumbing “thicker” concerns will renew worthy attention to philosophy’s contributions and better fulfill the ethicists’ original promise.

REFERENCES

- Barbour, A. 1995. *Caring for patients: A critique of the medical model*. Stanford: Stanford Univ. Press.
- Baroness, J. 1979. Disease and illness: A crucial distinction. *Am J Med* 66:375–76.
- Beauchamp, T. L., and J. F. Childress. 2001. *Principles of biomedical ethics*, 5th ed. New York: Oxford Univ. Press.
- Brock, D. W. 1991. Facts and values in the physician–patient relationship. In *Ethics, trust, and the professions: Philosophical and cultural aspects*, ed. E. D. Pellegrino, R. M. Veatch, and J. P. Langan, 113–32. Washington, DC: Georgetown Univ. Press.
- Canguilhem, G. 1989. *The normal and the pathological*. Trans. C. R. Fawcett. New York: Zone Books. Originally published as *Le normal et le pathologique*, Paris: Presses Universitaires de France, 1966.
- Daston, L. 2000. Scientific objectivity with and without words. In *Little tools of knowledge: Historical essays on academic and bureaucratic practice*, ed. P. Becker and W. Clark, 259–84. Ann Arbor: Univ. of Michigan Press.
- Delkeskamp-Hayes, C., and M. A. G. Cutter, eds. 1993. *Science, technology, and the art of medicine*. Dordrecht: Kluwer Academic Publishers.
- Engel, G. 1977. The need for a new medical model: A challenge for biomedicine. *Science* 196:129–36.
- Engelhardt, H. T., Jr., and D. Callahan, eds. 1980. *Knowing and valuing. The search for common roots*. Hastings-on-Hudson, NY: Institute for Society, Ethics, and the Life Sciences.
- Evans, J. H. 2002. *Playing God? Human genetic engineering and the rationalization of public bioethical debate*. Chicago: Univ. of Chicago Press.
- Feinstein, A. R. 1967. *Clinical judgment*. Baltimore: Wilkins and Williams.
- Freeman, V. G., et al. 1999. Lying for patients: Physician deception of third party payers. *Arch Int Med* 159:2263–70.
- Hume, D. 1739. *A treatise of human nature*. Reprint, Oxford: Clarendon Press, 1978.
- Kurtz, P. W. 1958. Need reduction and normal value. *J Phil* 55:555–68.
- Laine, C., and F. Davidoff. 1996. Patient-centered medicine. *JAMA* 275:152–56.
- Lawrence, C., and G. Weisz, eds. 1998. *Greater than the parts: Holism in biomedicine 1920–1950*. New York: Oxford Univ. Press.
- Lindau, S. T., et al. 2003. Synthesis of scientific disciplines in pursuit of health: The interactive biopsychosocial model. *Perspect Biol Med* 46:S74–S86.
- Lindley, R. 1986. *Autonomy*. Atlantic Highlands, NJ: Humanities Press International.
- McDonald, C. J. 1996. Medical heuristics: The silent adjudicators of clinical practice. *Ann Int Med* 124:56–62.
- Murphy, E. A. 1997. *The logic of medicine*, 2nd ed. Baltimore: Johns Hopkins Univ. Press.
- Pellegrino, E. D., and D. C. Thomasma. 1981. *A philosophical basis of medical practice: Toward a philosophy and ethic of the healing professions*. New York: Oxford Univ. Press.
- Psaty, B. M., et al. 1996. The risk of myocardial infarction associated with anti-hypertensive drug therapies *JAMA* 274:620–25.
- Putnam, H. 1990. Beyond the fact/value dichotomy. In *Realism with a human face*, 135–41. Cambridge: Harvard Univ. Press.
- Putnam, H. 2002. *The collapse of the fact/value dichotomy, and other essays*. Cambridge: Harvard Univ. Press.

- Putnam, R. A. 1985. Creating facts and values. *Philosophy* 60:187–204.
- Spiro, H., and P. W. Norton. 2003. Dean Milton C. Winternitz at Yale. *Perspect Biol Med* 46:403–12.
- Tauber, A. I. 1993. Goethe's philosophy of science: Modern resonances. *Perspect Biol Med* 36:244–57.
- Tauber, A. I. 1997. *Science and the quest for reality*. New York: New York Univ. Press.
- Tauber, A. I. 1999a. Is biology a political science? *BioScience* 49:479–86.
- Tauber, A. I. 1999b. *Confessions of a medicine man: An essay in popular philosophy*. Cambridge: MIT Press.
- Tauber, A. I. 2001. *Henry David Thoreau and the moral agency of knowing*. Berkeley: Univ. of California Press.
- Tauber, A. I. 2002. Medicine, public health, and the ethics of rationing. *Perspect Biol Med* 45:16–30.
- Tauber, A. I. 2003. Sick autonomy. *Perspect Biol Med* 46:484–95.
- Toulmin, S. 1993. Knowledge and art in the practice of medicine: Clinical judgment and historical reconstruction. In *Science, technology, and the art of medicine*, ed. C. Delkeskamp-Hayes and M. A. G. Cutter, 231–50. Dordrecht: Kluwer Academic.
- Veterans Administration Cooperative Study Group. 1970. Effects of treatment on morbidity in hypertension. II. Results in patients with diastolic blood pressure averaging 90 through 115 mm Hg. *JAMA* 213:1143–52.
- Weinstein, M. C., and H. V. Fineberg. 1980. *Clinical decision analysis*. Philadelphia: W. B. Saunders.
- Wynia, M. K., et al. 2000. Physician manipulation of reimbursement rules for patients: Between a rock and a hard place. *JAMA* 283:1858–65.
- Wynia, M. K., et al. 2003. Do physicians not offer useful services because of coverage restriction? *Health Aff* 22:190–97.