

of the early days, when a physician was also a philosopher [, and] . . . reinstate the patient to the position he ought to hold; i.e., that of the central figure. Thus, properly viewed, the history of medicine becomes the very basis of medical education.” I sincerely believe that this is precisely why *Obstetrics and Gynecology* should find its place on the shelf of every modern obstetrician and gynecologist, as well as with anyone interested in the medical or cultural history of women’s health.

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**THE BRAIN TAKES SHAPE:
AN EARLY HISTORY**

By Robert L. Martensen. 247 pp., illustrated.
New York, Oxford University Press, 2004. \$49.95.
ISBN 0-19-515172-0.

THIS IS A WELL-RESEARCHED BOOK ABOUT an important topic that is underrepresented in the history of science: the transformation, mainly during the 17th century, of the widespread belief that the heart is the primary locus of personhood to the belief that, in fact, the brain serves this function. The story Martensen tells, however, is not just of anatomical discovery. The author weaves a theme throughout the book about the declining importance in natural philosophy of “presence” — which he defines as the “tendency to imagine knowledge of the world and the world itself as dependent on the spiritual capacity and interaction of knower and known” — in favor of “likeness” — “the epistemic assumption that one may know substantial aspects of material nature and depict them accurately without relying heavily on spiritual capacities and relationships of the observer and observed.” (Both terms are drawn from the German art historian Hans Belting.)

The increasing importance of “likeness” (as we would now call it) in science brought with it a growing acceptance of, and even a preference for, precise imagery. Whereas medieval anatomical sketches tended to be rather crude and schematic, the Renaissance gave greater attention to accurate and detailed pictorial rendering. Martensen notes that this shift, ironically, occurred at almost the very time that the Protestant Reformation was downgrading

the significance of religious imagery in favor of biblical text.

The book has nine chapters. The first two set the scene by introducing a number of major background figures: Vesalius, Harvey, Paracelsus, Bacon, and Van Helmont. Then Martensen discusses the anatomical work of René Descartes, arguing that although pictorial imagery played a much greater role in Descartes’s writings than in those of his predecessors, Descartes was still more beholden to the tradition of presence than to the emerging value of likeness in his thinking about the brain and its relation to the mind. At the center of the book is Thomas Willis and his seminal works on the anatomy of the brain. Willis and his fellow Oxfordians rejected Descartes’s fascination with the pineal gland and his speculative view of the mind as an “unextended substance” in favor of a description of the nervous system in its own right. Martensen is careful, however, not to make the old mistake of casting Willis and his colleagues as “pure” scientists, wholly detached from the world around them. This was, after all, the time of the English Civil War, the execution of Charles I, Cromwell’s Protectorate, and finally, the restoration of the monarchy. Throughout the book, Martensen details the religious and political pressures that informed Willis’s work.

Unlike Descartes, who believed the soul to be unitary, Willis, following Galen and Plato, held that there were multiple human souls — rational, sensitive, vital, and so forth — corresponding roughly to what we today might call different mental functions, and that these can come into conflict with one another. This concept enabled Willis, in turn, to reclassify a number of pathologic conditions, widely believed at the time to be humoral in origin, as neurologic disorders. Sometimes he was right (as in the case of convulsions) and sometimes wrong (scurvy), but his hypotheses marked an important transformation in the understanding of the person nonetheless. In one chapter, Martensen considers the transformational effect of Willis’s “neurocentric” position specifically for the understanding of women’s anatomy and pathology, especially of “hysteria.”

He concludes the book with consideration of the medical and broader philosophical consequences of Willis’s approach. These include the empiricism of the 18th-century British Enlightenment, which, it may surprise the reader to learn, arose at least as much from a critique of Willis’s

method as from an adherence to it. Martensen also briefly traces the sequelae of these debates to modern times, in the works of figures such as Walter Canon, Antonio Damasio, and a variety of phenomenologists and cognitive scientists.

Martensen's writing combines the expert technical knowledge of a working physician with the professional historian's sensitivity to matters of context and wariness of histories that are too eager to celebrate rather than to carefully describe and analyze. This is an excellent book.

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MICROBIAL BIOFILMS

Edited by Mahmoud Ghannoum and George A. O'Toole.
426 pp., illustrated. Washington, D.C., ASM Press, 2004.
\$115.95. ISBN 1-55581-294-5.

SINCE THE DISCOVERY OF MICROORGANISMS several hundred years ago, our study of the microbial world has largely concentrated on characterization of planktonic (free-living) organisms. Adherence to Koch's postulates and the use of standard microbiologic culture techniques have allowed us to understand and successfully control many acute epidemic infectious diseases. However, more recently, there is an increasing appreciation that planktonic microbes account for only a very small proportion of microbial life, and in both natural environments and human disease, the bulk of microbes are found in a sessile form in biofilms.

A biofilm is a community of microorganisms that are associated with a surface and typically enveloped in an extracellular matrix. Examples of biofilms are extensive, ranging from the slippery mat of organisms found on rocks in a pristine mountain stream to the complex microbial milieu of the plaque on human teeth.

Mahmoud Ghannoum and George O'Toole have assembled 50 well-recognized authors to write an authoritative 21-chapter textbook on the subject, the first of its kind. The book describes well-accepted, biofilm-associated infections that are related to biomaterials and implants, such as infection associated with intravascular catheters and prosthetic-valve endocarditis, and infections that only recently

have been thought of as involving biofilms, such as osteomyelitis, prostatitis, and otitis media. The importance of biofilms in infections that are associated with health care is also discussed. This comprehensive, yet concise, book covers biofilms of ecologic, industrial, and medical importance and also describes specific organisms (*Pseudomonas*, staphylococci, and *Candida*) that are commonly encountered in biofilms. Other topics discussed are mathematical modeling of biofilms and biofilms of agricultural importance.

As the authors relate, the tools of laser confocal microscopy, fluorescent imaging, and molecular biology have greatly expanded our ability to characterize biofilms, and we now view them not as static, monolithic entities but as dynamic, architecturally complex environments in which single-cell organisms cooperate, communicate, exchange genetic material, and behave in coordinated groups. The microbial biofilm constitutes an optimal environment for cell-to-cell processes, such as genetic exchange and intercellular signaling. One of the most important features of microbes that are found in biofilms is their profound resistance to antimicrobial agents — the same agents that are quite effective against their planktonic brethren. Our level of understanding of this medically important phenomenon is well described in several areas of the book. Future therapeutic methods that may be effective against biofilm-associated microbes may take advantage of this burgeoning volume of knowledge and may include interference with cell-to-cell signaling and communication with the use of so-called antipathogenic drugs.

Microbial Biofilms will have widespread appeal and is written at a level appropriate for students and scientists wishing to gain a broad exposure to the field. The illustrations and figures, including some in color, are adequate. Some chapters have sacrificed references in favor of brevity. This excellent book fills a real need and is enthusiastically recommended. In their introductory comments, the editors say that they hope to repeat this task in 15 to 20 years. However, it appears that the fast pace of the biofilm field will make a second edition a necessity much sooner.

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