lens of popular culture. She shows that fiction, nursing manuals, and sociological studies sought to set standards of behavior for nurses that would accommodate nursing to both the new standards in medicine and the resurgence of domesticity and femininity. Ultimately, according to Melosh, literature seized upon the 19th-century solution to the conflict between work and womanhood. It portrayed women as ideally suited for the work of nursing—healing, helping, caretaking—simply because they were women.

While Tomes and Melosh emphasize the importance of gender in the history of nursing, Jane Pacht Brickman reveals the significance of other variables as well. In her essay, "Public health, midwives, and nurses, 1880–1930," she presents an analysis of the decline of midwifery in early 20th-century America that moves beyond the popular explanation that female midwives were the victims of the sexism of male physicians. Pointing to the example of Europe, where midwives survived and thrived, Brickman argues that gender alone does not explain the demise of American midwifery. Instead, she suggests that the fate of midwifery was tied to two major goals of doctors in the early 20th century: the creation of a hierarchy in medicine with themselves at the top, and the demise of the public health movement. According to Brickman, midwives threatened doctors' campaign to make scientific training and expertise the cornerstone of the medical profession. At the same time, midwives were trapped in the contradictions of the public health movement. On the one hand they were victims of doctors' assault on the Sheppard-Towner Act, which gave public funds for education in maternal and children's health. Yet they were also defeated by the acceptance among public health advocates themselves of "expertise" as the foundation of the public health movement. Brickman argues that, ultimately, desire for professional status and economic self-interest, rather than sexism, were at the heart of doctors' assault on midwifery in the early 20th century.

Other essays in this book provide illuminating perspectives on issues such as the cross-class alliances among nurses and upper-class women and the conflicts among nurses themselves. Ellen Lagemann's introduction discusses the evolution of nursing history, and Mary Ann Dzuback's bibliographic essay provides a valuable listing of the literature on the history of nursing from 1960 to 1980.

The breadth and depth of the essays in this book reveal the richness and complexity of nursing history. Indeed, they show that the new history of nursing is an integral part of women's history, labor history, and the history of medicine and society.

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The Polar Magnetosphere

High-Latitude Space Plasma Physics. BENGT HULTQVIST and TOR HAGFORS, Eds. Plenum, New York, 1983. x, 543 pp., illus. $75. Nobel Foundation Symposia, 54. From a symposium, Kiruna, Sweden, March 1982.

The aurora borealis has been the subject of speculation and folklore for northern peoples since prehistoric times. The connection between auroras and ground magnetic observations was suggested by Halley in 1716, and by the end of the 19th century scientific observation of the aurora and magnetic activity was organized on an international scale. It was Birkeland in 1908 who suggested that corpuscular radiation from the sun was diverted by the geomagnetic field into the high-latitude regions to form the aurora, establishing the connection between the geometry of the earth's field and the northern lights.

In the last 25 years, this high-latitude region of the earth's upper atmosphere has been probed with balloons, radar, rockets, and satellites as well as ground magnetic observations. Although often overlooked in the excitement of missions to the outer planets, observations of the earth's magnetosphere have achieved a high level of sophistication in the past ten years. This collection of papers from a symposium reviews our present understanding of the intricate dynamics of the polar regions of the earth's magnetosphere.

The book is organized about two upcoming European research efforts, the EISCAT incoherent scatter radar facility in Scandinavia and the Swedish Viking satellite scheduled to be launched into a polar orbit in 1984. The main sections of the book review recent developments in radar observation of the ionosphere and satellite observation of the polar magnetosphere, with a transitional section discussing recent theories of the connection between solar activity and the high-latitude region.

The magnetosphere is a highly dynamic region, especially during times of high solar activity when plasma is injected toward the earth from the plasma sheet, a reservoir of plasma in the magnetic tail that extends from the earth in the direction away from the sun. Measurements from a single satellite are difficult to interpret since a change in plasma characteristics may result either from crossing a boundary or from a temporal change in the system. Thus, as is stated in a paper by Winningham and Heelis, we are in the position of blind men describing an elephant, able to sample isolated portions of the object without directly observing the whole picture. Those who study the magnetosphere occupy a middle ground between laboratory plasma physicists, who have a great deal of control and diagnostic capabilities, and astrophysicists, who can observe only the end product of the physical processes that produce the detectable radiation.

Comparison with the previous Nobel symposium in this field (*Physics of the Hot Plasma in the Magnetosphere*, Bengt Hultqvist and Lennart Stenflo, Eds., Plenum, 1975) illustrates the progress that has been made since then despite these limitations. Although it has long been recognized that the discrete aurora is caused by 10 keV electrons, how these electrons are accelerated has been in dispute. In the previous book, the case for acceleration of particles by static electric fields parallel to the magnetic field was argued by Evans, despite theoretical objections based on the high conductivity of the plasma along the magnetic field. Today, thanks largely to observations by the S3-3 satellite (Mozer and Temerin) and the two Dynamics Explorer satellites (Chappell), the existence of such fields is accepted and the discussion has turned to mechanisms (Goertz and Borovsky, Galeev, Lyons, and Haerendel).

Another major advance since the previous symposium has been the realization that the earth's magnetosphere is populated not only by the solar particles but also by ions ejected from the ionosphere. Again, in the previous Nobel symposium this was first being suggested; now thanks to S3-3 and the International Sun Earth Explorers (Johnson) and the European GOES satellites (Balsiger) the existence of ionospheric particles is accepted and the consequences for plasma dynamics are being studied (Gendrin).

In short, for the worker or student in magnetospheric physics, this book collects a wide selection of the exciting new subjects in the field. Readers from outside the field may find the specialized

terminology a bit frustrating, although radio scientists, plasma physicists, and astrophysicists should discover some subjects of interest. This book does provide clear evidence that the investigation of the polar magnetosphere continues to be as dynamic as the region of space under study.

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Sedimentary Processes

Geochemistry of Sedimentary Ore Deposits. J. BARRY MAYNARD. Springer-Verlag, New York, 1983. xii, 306 pp., illus. $29.80.

In many respects this book is a sequel to a recent book, *Sedimentology of Shale* by Potter, Maynard, and Pryor, also published by Springer-Verlag. Unlike the earlier work, however, this book focuses on processes of sedimentary ore formation, with two principal objectives—to acquaint sedimentologists with sedimentary processes that are often best represented in sedimentary ore deposits and to give greater emphasis to aqueous geochemistry in the study of sedimentary ore deposits. To consider deposits that do not sensu stricto have a sedimentary origin, the author has expanded the definition of "sedimentary" to include ore deposits hosted by sedimentary rocks or soils. Though this redefinition may appear unconstrained, the author has taken care to consider only deposits formed at or near the earth's surface under low to moderate temperatures.

Chapter 1 gives a brief introduction to the principles of stable isotope chemistry, thermodynamics, and the applications of predominance-area diagrams. Subsequent chapters consider sedimentary deposits of iron, copper and silver, aluminum and nickel, manganese, uranium, and lead and zinc and volcanic-sedimentary deposits. The types of deposits considered range from those accumulated at the sediment-water interface (for example, iron formations, sedimentary manganese, and exhalative sediment-hosted and volcanic-sedimentary sulfide deposits) to those precipitated from ground waters (for example, infiltrational uranium) and diagenetic fluids (for example, copper in sandstone and shale) and those formed during tropical weathering (for example, aluminum and nickel laterites). Deposits of sedimentary origin excluded from consideration are phosphorites, evaporitic deposits, clastic-hosted barite, and placers other than uranium and gold.

Most chapters consider the mineralogy, geochemistry, petrography, and local stratigraphy in turn and end with a discussion of genetic theories drawing on some of the more extensively studied and often most representative deposits as examples. In discussions of deposits having minerals of supergene origin (for example, iron formations, copper in sandstone), a separate section is devoted to supergene processes. Likewise, the tectonic setting is emphasized for polymetallic volcanic-sedimentary deposits. Overall, the treatment of each type of deposit is balanced, although the role of tectonic processes in the formation of exhalative sediment-hosted lead and zinc deserves greater consideration. Extensional tectonism is probably the single most important process controlling basin formation, the episodic discharge of metalliferous fluids onto the sea floor, and ultimately the precipitation and preservation of lead-zinc sulfide deposits.

Much emphasis is placed on aqueous geochemistry in understanding the manner in which ore-forming elements are transported and precipitated. Reference is commonly made to equilibrium relationships illustrated with Eh-*p*H or activity diagrams constructed under a given set of conditions. When considering some deposits, particularly those formed at or near the earth's surface at low temperatures (for example, infiltrational uranium, sandstone copper), these diagrams are effective in predicting their mineralogy and mineral zonation. The higher-temperature (250° to 350°C) hydrothermal systems responsible for the formation of exhalative sulfide deposits have been modeled by several workers in the field but are considered only briefly here. When lower-temperature ore-forming fluids are examined, it is not always clear how the initial compositions of metalliferous fluids were estimated or whether or not they are realistic for a particular type of deposit. Furthermore, because ore formation is commonly a dynamic process, the products of which overlap in space and time, there are inherent difficulties in using static models to simulate an ore-forming system. The value of this approach is that it places constraints on the fluid composition and therefore geologic environment necessary to generate a particular mineral assemblage.

The book is clearly and concisely written and well illustrated with figures. Errors are rare and generally minor with the exception of figure 6-2, where the wrong figure has been reproduced from an earlier publication. References are for the most part up to date and a fair representation of the literature. When describing deposits that were discovered tens of years ago, the author very wisely cites some of the older papers documenting the geology, mineralogy, and petrography in greater detail.

The book should prove valuable not only to the sedimentologist seeking to understand sedimentary processes, but also to the economic geologist and geochemist attempting to unravel the often complex processes of sedimentary ore formation.

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