



The History of Science Society

Review: [untitled]

Author(s): Patrick E. McGovern

Source: *Isis*, Vol. 81, No. 3 (Sep., 1990), pp. 563-565

Published by: The University of Chicago Press on behalf of The History of Science Society

Stable URL: <http://www.jstor.org/stable/233453>

Accessed: 24/07/2009 11:32

Your use of the JSTOR archive indicates your acceptance of JSTOR's Terms and Conditions of Use, available at <http://www.jstor.org/page/info/about/policies/terms.jsp>. JSTOR's Terms and Conditions of Use provides, in part, that unless you have obtained prior permission, you may not download an entire issue of a journal or multiple copies of articles, and you may use content in the JSTOR archive only for your personal, non-commercial use.

Please contact the publisher regarding any further use of this work. Publisher contact information may be obtained at <http://www.jstor.org/action/showPublisher?publisherCode=ucpress>.

Each copy of any part of a JSTOR transmission must contain the same copyright notice that appears on the screen or printed page of such transmission.

JSTOR is a not-for-profit organization founded in 1995 to build trusted digital archives for scholarship. We work with the scholarly community to preserve their work and the materials they rely upon, and to build a common research platform that promotes the discovery and use of these resources. For more information about JSTOR, please contact support@jstor.org.



The University of Chicago Press and The History of Science Society are collaborating with JSTOR to digitize, preserve and extend access to *Isis*.

friendly, humorous, and modest person of unbelievable erudition, with no tolerance for sham and with but one standard of performance: the highest. However, I did not learn of his standing within the international community of Assyriologists until the summer of 1963, when I went to the British Museum to look at tablets on mathematical astronomy that Abe had noticed in the course of his survey of the texts there.

I was fortunate enough to share a table with Abe in the Students' Room in the Department of Western Asiatic Antiquities in the museum. There were many visiting Assyriologists that summer, and they were the very opposite of amateurs. Yet I soon discovered that if one of them was in trouble with a text, he or she went to Abe. He would take his glasses off, squint at the tablet, and say that he didn't know anything about its genre or period, but to him it looked like such and such, to which the reply was usually "Fits perfectly." He told me once that if one studied cuneiform texts of a certain period, one ought to know everything that went before, and since he dealt with the very latest texts the implication for himself was clear.

Whenever I get stuck with my work my immediate reflex is still to ring Abe, and in this I am surely not alone, for he was generous to a fault with help and advice.

It is a measure of his colleagues' and friends' admiration and devotion that they brought out this volume dedicated to his memory. It contains twenty-seven articles by thirty-one authors and a bibliography of Sachs's published works. An unusually large number of these studies deal with astronomical and mathematical texts—which, of course, reflects Sachs's particular concerns—and it is this group that makes the volume of interest to historians of ancient and medieval science. I shall limit my further comments to these studies.

Alan C. Bowen and Bernard R. Goldstein have a long and thoughtful article on the so-called Metonic cycle, which equates 19 years with 235 synodic months and was used for intercalary purposes in Babylonia well before Meton's time. Hermann Hunger, who completed and published the first volume of Sachs's *Astronomical Diaries* in 1988, presents a long text of Mercury observations from 196 to 180 B.C., very likely extracted from the diaries.

E. S. Kennedy and Jan Hogendijk publish and analyze two tables (for lunar paral-

lax and for visibility of the new moon) from an Arabic astronomical handbook for the Mongol viceroy of Tibet (the manuscript is truly unique: it contains lists of fixed stars with their Chinese names written in Arabic characters and with glosses in Mongol and Tibetan). Karen Rhea Nemet-Nejat writes on the role of cuneiform mathematical texts in the arduous training of scribes.

David Pingree and Christopher Walker publish in copy, transcription, and translation a Babylonian star catalogue from roughly the seventh to the fifth century B.C. Most of the fixed stars are arranged in "strings"—groups with roughly the same right ascension. F. Rochberg-Halton treats of benefic and malefic planets in Babylonian astrology and adduces a new text. G. J. Toomer writes elegantly about Hipparchus's reliance on Babylonian astronomy.

The most spectacular contribution is by Otto Neugebauer; it is also the shortest. He publishes a fragment of a Greek papyrus, privately owned, from Roman Egypt that, so help me, could be taken for a transcription of a Column G of a Babylonian lunar text of System B. It is a zigzag function giving the variable length of the synodic month, taking in account only lunar anomaly, whose mean value (1 month = 29;31,50,8,20 days) enabled Franz Kugler to show dramatically the Greek indebtedness to Babylonia in the matter of astronomical parameters. We have just begun to explore the consequences of the discovery that Greek control of Babylonian astronomy was not limited to parameters, but was extended to the complicated arithmetical schemes as well, for this column makes no sense in isolation.

The other articles in this handsome volume range in subject from Sumerian to Seleucid texts.

ASGER AABOE

Ehud Spanier (Editor). *The Royal Purple and the Biblical Blue* (Argaman and Tekhelet): *The Study of Chief Rabbi Dr. Isaac Herzog on the Dye Industries in Ancient Israel and Recent Scientific Contributions*. Foreword by **Chaim Herzog**. Introduction by **Moshe Ron**. Preface by **Sidney Edelstein**. 220 pp., illus. Jerusalem: Keter, 1987.

This book on early Jewish sources related to purple dyeing has been eagerly awaited, since it includes a fully annotated

publication of Rabbi Isaac Herzog's Ph.D. thesis "Hebrew Porphyrology" (until now only available as a faded microfilm), together with a synopsis of the thesis presented to the Belfast Natural History and Philosophical Society, a selected bibliography, and other relevant published and unpublished material. Although written early in this century, Herzog's thesis is an exacting treatment of the available historical sources in light of the then-current biological, chemical, and archaeological data. It provides the indispensable starting point from which to evaluate Herzog's interpretations according to more up-to-date research, as presented in six appended articles, primarily written by modern Israeli scholars.

Herzog's thesis highlights the difficulties in identifying the specific mollusk species that were exploited for purple dyeing, since only the general Hebrew word *hillazon*, for "shell," was used in the Jewish writings and the shape, color, habitat, and biological behavior of the marine animals briefly described. Whereas the color of the purple molluscan dye is virtually certain (Heb. *argaman* = Gk. *porphyra* = Lat. *purpura*), the hue of a second dye (Heb. *tekhelet*, which is probably equivalent to Gk. *iakinthos*) is debatable. According to Greek usage, a violet or reddish-blue is the most likely coloration, but allusions in the Hebrew sources to *tekhelet* being the color of the sky or sea suggest a purer blue. Primarily on the basis of its violet-colored shell and dye and its rarity, as implied by Talmudic sources, Herzog opted for the genus *Janthina*, several species of which occur in the Mediterranean, as the source for *tekhelet*. Various other details of the dyeing process are also of interest: extracts were boiled, *sammanin* (literally, "drugs," of uncertain significance) were added to the mixture, and only wool was dyed. Tests of *tekhelet*, apparently to detect imitations made from plant indigo, included mixing it with urine, alumina, and fenugreek or with fermented barley flour dough. As hypothesized by Herzog, the chemical rationale for these procedures was that the molluscan indigoid dye was less easily hydrogenated (reduced) than plant indigo and was consequently a faster dye.

The identity of the marine animal yielding *tekhelet* is especially important for Talmudic scholars, because this dye was used to color the fringes (*šišit*) of the prayer

shawl (*tallit*), as well as being an important dyestuff in the adornment of the temple and the vestments of the priests. The art of dyeing *tekhelet* had been lost by the early eighth century A.D. It was only in the later nineteenth century that an attempt was made by a rabbi in Russian Poland, Gershon Enoch Leiner of Radzin, to produce the dye from secretions of the cuttlefish, *Sepia officinalis*. Herzog details the initial enthusiastic reception of this dye as genuine *tekhelet*, although it was later shown to be Prussian blue, which might be produced from any organic material by fusion with iron filings and potash.

More recently, as the appended articles demonstrate, another marine source has been advocated for *tekhelet*—*Trunculariopsis trunculus*. In support of this hypothesis, piles of *T. trunculus*, with the shells often preferentially broken for removing the hypobranchial gland, have been discovered along the Eastern Mediterranean coast, and glandular extracts of the species have been shown to give a violet or blue, depending upon which sexes are exploited at specific times of the year. Yet two other mollusk species, *Murex brandaris* and *Thais haemostoma*, which are also commonly found in ancient midden heaps as preferentially broken shells, cannot be ruled out as sources of *tekhelet*. The 6,6'-dibromoindigotin purple dye, which is the exclusive product of these mollusks in the presence of purpurase and on exposure to air and light, might have been reduced to the colorless, soluble leuco base in a chemical or fermentative reduction system (R. H. Michel and P. E. McGovern, "The Chemical Processing of Royal Purple Dye: Ancient Descriptions as Elucidated by Modern Science, Parts I and II," *Archeomaterials*, 1987, 1:135–143, 2:93, 3:97–104). Photodebromination of the dibromo compound, as the leuco base, readily occurs, resulting in a mixture of indigotin and 6,6'-dibromoindigotin or even pure indigotin, if the process goes to completion, upon reoxidation to the dye(s).

Lacking more definitive textual evidence, it is doubtful whether any one theory of the origin of *tekhelet* can prevail over another. Certainly, a prime prerequisite of the *trunculus* theory, as stressed by both Otto Elsner and Israel Ziderman, is the finding of an ancient *šišit* whose blue or violet coloration can be shown chemically to derive *only* from this mollusk.

The failure of the *trunculus* theory should not detract from the evident value of the volume in fully publishing Herzog's study of early Jewish dyeing and in apprising the reader of current biological and archaeological findings from Israel. An excellent synopsis is provided by Ehud Spanier and Nira Karmon of muricid marine distribution, biological characteristics, and behavior. The cannibalism of *T. trunculus* in drilling through shells of conspecifics and congeners when kept in a closed environment is especially noteworthy, since similarly drilled shells have been found in ancient middens and suggest that this species was raised in fisheries. The seven-month hiatus between ideal collecting periods for *T. trunculus* in early winter and early spring is intriguingly related to the Talmudic descriptions of the *hillazon* coming up once every seventy or seven years. The archaeological overview of the evidence for purple dyeing along the coast of Israel is also valuable, although these data are not correlated with finds from farther north along the coast or elsewhere in the Mediterranean.

Much more remains to be learned about the chemistry of the molluscan indigoid dyes and the characteristics and behavior of various mollusk species in relation to ancient descriptions and archaeological evidence. For example, more exact tests are needed to discriminate plant indigo from mollusk indigo. The significance of the tests for true *tekhelet* in the early Jewish sources might also be determined by chemical experiments in which various red, blue, and violet dyes of plant and animal origin are mixed with urine, alumina, and fenugreek, as well as fermented barley flour dough, to note any changes in composition and dyeing characteristics. Still, even as the basis of speculation is improved by experimentation, our understanding of the ancient processing of purple dyes will always have inherent limitations in the available textual evidence.

PATRICK E. MCGOVERN

Ralph Jackson. *Doctors and Diseases in the Roman Empire.* 207 pp., illus., bibl., index. Norman/London: University of Oklahoma Press, 1988. \$27.50.

Writing for "the interested but non-specialist reader," Ralph Jackson has "tried to

give a broad but concise account of classical [sc., Greek] medicine as it culminated in the Roman Empire" (p. 7). To achieve this goal he has drawn from a very wide variety of primary sources: medical and lay literature ranging from geographical writings to satire, as well as papyrological, epigraphic, archaeological, and paleopathological evidence. He has indeed done his homework well, as is further shown by his thorough, but not overwhelming, bibliography of secondary sources cited in the endnotes.

In Chapter 1, "Origins," Jackson gives a reliable sketch of the nature of that "startling mixture of sound scientific procedures and bizarre practices that comprised classical medicine" (p. 9). Most of the chapter is a survey of the history of Greek medical theory and practice, which Jackson, with what strikes me as a rather innocent reductionism, fondly lauds at times as "a truly scientific approach."

Chapter 2, "Fitness, Food and Hygiene," is a fast-paced *mélange* always relevant to conditions of private and public health in the Roman Empire. Here the reader encounters many fascinating bits of information that one would be hard pressed to track down in primary sources. How many classicists taking their children on a tour of the ruins of the baths of Roman Ostia, while gazing at the well-preserved public latrine, would be able to answer the inevitable question, "What did the Romans use for toilet paper?" This chapter will give the answer (one important for our understanding of how certain diseases may have been spread) and other data that in the aggregate provide a well-rounded and informative picture of common but important features of everyday life.

Beginning with a short description of the nature of the medical "profession" in the Roman Empire, Chapter 3, "Physicians and Their Medicine," soon focuses on Galen's career. The remainder of the chapter is a survey of the diagnostic and therapeutic techniques and logistics of ancient medical practice. Jackson opens his fourth chapter, "Women's Diseases, Birth and Contraception," with a brief discussion of the sparse extant evidence for women doctors and then turns to the much more amply documented range of subjects involved in the doctoring of women and infants: midwives; wet nurses; conception; the processes, techniques, and hazards of birthing; infant