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GREAT SCI-TECH READS

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NATURAL DYES: Sources, Tradition, Technology and Science by Dominique Cardon. Translated by Caroline Higgitt.

Archetype Publications Ltd., 2007
TP897 .C369 2007

Natural Dyes by Dominique Cardon has a microscopic view of colored fibers on the cover and hundreds of pictures of historic textiles and textile processes inside, but it is more than a book on dye plants and recipes. This book provides an encyclopedic overview of 330 plants and animals used for dyes throughout history. It includes chemical formulas of the known coloring agents from these natural extracts and 34 pages of references. The book was expertly translated from the original in French by Caroline Higgitt.

In spite of its academic rigor, *Natural Dyes* is amazingly browsable. In the chapter on madder root, Cardon begins by quoting from an 11th Century Cairo cloth merchant's note to his dyer. She provides agricultural and botanical information about the plant from which a range of red dyes is extracted. We learn the 19th century history of the chemical isolation of alizarin, a major dye ingredient. We also learn that madder root is mentioned as early as c.1900 BC in a Mesopotamian text. This chapter's illustrations include ancient textiles, paintings that depict madder merchants, a molecular model and a cross section of a madder root. Recipes and techniques are presented for each dye plant or animal.

This book should be of interest to anyone studying the history of early technologies, those interested in the chemistry of plant products, textile technicians and artists, and the general reader. You are unlikely to read *Natural Dyes* from cover to cover, but you may return to it from time to time with a specific question or just to learn more about how early civilizations took advantage of the chemistry of plants and animals to decorate their world.

☞ Review by Christine Taft

THE PLUTO FILES: The Rise and Fall of America's Favorite Planet by Neil deGrasse Tyson.

Norton, 2009
QB701 .T97 2009 STAR

Demoting a planet is serious business among astrophysicists, but Neil deGrasse Tyson manages to have some fun chronicling Pluto's recent history in science and culture.

In 1993 the trustees at the American Museum of Natural History's Hayden Planetarium in New York City began to re-imagine the planetarium experience to attract 21st century visitors. Tyson was hired as a project scientist to oversee the creation of the museum's new \$230 million Rose Center for Earth and Space.

After much discussion and consultation with the expert community, Tyson and team deviated from the tradition of displaying the planets in orbit around the sun according to their relative size; instead, the team decided it would be pedagogically more meaningful to group the planets as "families of objects with similar properties, rather than as an enumeration of orbs to be memorized" (75-76). Grouping space objects into families based on physical features requires critical thinking skills. Understanding compositions, seeing patterns and making connections involves analysis, synthesis and evaluation, which are more engaging than memorizing planet factoids and repeating planetary sequence.

While the Rose Center's new exhibit design has desirable learning outcomes, one popular little planet was cut from the grand display. Neither a terrestrial planet, nor a gas giant, Pluto was identified and grouped with like objects in the Kuiper Belt (pronounced Ki-Per). This departure from convention escaped media notice for almost a year before a *New York Times* reporter visiting the museum overheard a dismayed conversation between a parent and her child when they were unable to locate Pluto in the main exhibit. The headline—"Pluto's Not a Planet? Only in New York."

Outrage and confusion ensued among children and adults alike. Angry letters of protest poured into Tyson's office. While he did not make this decision alone, as project scientist and Hayden Planetarium Director, he bore the brunt of the public indignation.

Tyson relates his role in the Pluto story honestly. He and his team examined the data and assessed the needs for modernizing the exhibits; and while Tyson had his opinions about Pluto's status, he "had no intention of unilaterally imposing [his] personal perspective on the Rose Center's presentation of the planets" (65). He assures the reader that the decision was not made whimsically; rather consensus was achieved among staff after much research, thought and deliberation.

On August 25, 2006, after several years of debate, the International Astronomical Union articulated a set of criteria for defining celestial objects as “planets,” and created a new (and not without controversy) category for the likes of Pluto and its kin Ceres, Haumea, Makemake, and Eris.

The Pluto Files is an entertaining and highly readable work. Tyson takes a lighthearted approach and his experience as an educator is obvious as he explains key concepts in planetary science in clear and engaging prose. Best of all, Tyson offers his recommendations for teaching Pluto in the classroom. Hopefully, these recommendations will reduce the chance of receiving angry letters from third graders, as he has since the publicity in the *Times*. ☞ Review by Jenny Bruenger

***FAUST IN COPENHAGEN: A Struggle for the Soul of Physics* by Gino Segré**

Viking, 2007

QC15 .S437 2007

This book does a very good job of relating a fairly important topic - the interpretation of quantum mechanics - and setting it within the contexts of historical events and the characters of the physics community of the 1920s and early 1930s. Gino Segré is a theoretical physicist by profession, and the nephew of another great theorist, and his ability to understand and communicate the nature of complementarity and the Bohr-Heisenberg interpretation reflect this pedigree.

However, the unique narrative falls short of being great. Niels Bohr invited a group of talented physicists to Copenhagen each year to discuss the problems of the moment. Big science had yet to develop, and it was possible to gather all the most influential thinkers in developing this new science, plus their selected graduate students, into a small lecture room at Bohr's Institute. An annual part of the meeting was a skit put together by the younger invitees that spoofed their elders. In 1932, the greatest skit of all was performed, a satirical reinterpretation of Goethe's *Faust* with Bohr cast as the Lord God, Wolfgang Pauli as Mephistopheles, and Paul Ehrenfest as the troubled *Faust*.

Perhaps this was great because of how well the scientists' personalities corresponded to the characters of Goethe's drama. However, for Segré the drama also represents symbolically the "Faustian bargain" physicists would soon face in unlocking the secrets and dark power of nuclear energy, as well as the last gasp of exuberance and unity before the darkness of war descended again over Europe.

Segré weaves the story of the birth of the Copenhagen

Interpretation together with the personal narratives of the key theorists (and one notable experimentalist, Lise Meitner). The climax of the narrative is the agreement between Bohr and Heisenberg on the interpretation, and unfortunately the story does not end there. The *Real World* is chronologically messy, and does not fit the requirements of literature. The story of the discovery of the neutron and the messy developments of the 1930s-1940s and beyond in nuclear physics intrude on Segré's storytelling, because Chadwick's discovery of the neutron was a major point of discussion at the 1932 meeting and occurred before the *Faust* skit that was used as Segré's plot vehicle. This means that the reader must necessarily encounter another raft of new physics (antimatter, neutrinos, and weak forces - oh my!). For an account intended for the general audience, it would be better to explain the quantum mechanics without looking into nuclear physics and the future.

This is a very good and readable account, and would be enjoyable for those who are not familiar with the science involved. ☞ Review by Scott Curtis

***PLANETOLOGY: Unlocking the Secrets of the Solar System* by Tom Jones and Ellen Stofan**

National Geographic Books, 2008

QB602.9 .J66 2008

A goal of the International Year of Astronomy 2009 is to “help the citizens of the world rediscover their place in the Universe...and thereby engage a personal sense of wonder and discovery.” If you are looking to embark on a personal voyage of wonder and discovery without leaving your home, *Planetology* is a fascinating place to begin the journey. Four-time Shuttle astronaut Tom Jones and planetary geologist Ellen Stofan deliver an insightful and beautiful new book on recent geological discoveries in our solar system. The authors illustrate how various geological features found on Earth— from deserts and ice caps to flood channels and super volcanoes—can be found on other planets. And by studying these features on our celestial neighbors, much can be learned about how Earth's volatile geological forces operate.

Written for the non-scientist, *Planetology* includes 250 color photographs (many from the Space Shuttle and NASA missions throughout the solar system) along with clear, easy-to-understand text. The book is a “must have” for anyone interested in space exploration and geology. As an added bonus, Jones and Stofan will appear at the Linda Hall Library on September 16, 2009, for a lecture on planetary science and to sign copies of *Planetology*.

☞ Review by Eric Ward