

successful reproduction when the food supply is restored.

Guarente makes a good case that *SIR2* epitomizes one kind of gene action of the sort that Harrison and Holliday envisaged. It is responsive to cellular nutrient status, and reacts to high NAD levels (and hence food shortage) by shutting down gene activity. Precisely which genes are turned off may differ between organisms. Genes in the insulin/IGF-like pathway, of which *SIR2* may be part, are also nutrient-sensitive regulators of gene expression, and affect the rate of ageing in worm, fruitfly and mouse.

The indications so far from model organisms are that interventions that slow down ageing can also improve age-specific health. Caloric restriction, for example, slows down the accumulation of multiple forms of age-related damage and pathology in rodents.

Guarente is an optimist. He thinks that drugs targeted at products of genes such as *SIR2* will become available in the next 10 or 20 years to improve age-specific health and slow down ageing. Although voluntary caloric restriction is not a feasible approach to improving human health, it may be possible to target the pathway that mediates the response. Indeed, Guarente devotes much of his time to his biotech company Elixir, and has much of interest to say about the synergies and conflicts of interest between academia and business. *Ageless Quest* conveys some quite difficult ideas and complex experimental results with a clarity and freshness that deserve to make it widely read. ■

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Bonding the two cultures

The Art of Chemistry: Myths, Medicines and Materials

by Arthur Greenberg

Wiley: 2003. 357 pp. £41.95, \$59.95, €66.70

John Emsley

The Art of Chemistry is a companion to Arthur Greenberg's earlier book, *A Chemical History Tour* (Wiley, 2000), and again he offers us a selection from his unique collection of historical material. If you enjoyed the earlier book, which I did, then you will enjoy this as well. It should appeal to chemists, historians and artists, particularly those who are fascinated by alchemy and how this base science was transmuted into the gold of chemistry.

The 71 essays are lavishly illustrated with page after page of reproductions that capture the chemical mood of the time, with Greenberg providing the necessary commentary. A few chapters merely whet the appetite

Base instincts

Alchemy conjures up images of mysterious men in dark laboratories, battling with forces they don't understand in a vain effort to turn base metal into gold. But on what are these images based? *Transmutations: Alchemy in Art* by Lawrence M. Principe and Lloyd DeWitt (Chemical Heritage Foundation, \$25) brings together alchemical paintings from the Eddleman and Fisher collections at the Chemical Heritage Foundation, based in Philadelphia, including *The Search for the Alchemical Formula* by Charles Meer Webb, shown here. This short book provides an introduction to the dark dawn of modern chemistry.



without satisfying it. The one entitled 'Secrets of a Lady Alchemist' concerns Marie Meurdrac, who was the first woman to write a book on chemistry, which was published in 1656, but the coverage is all too brief. So too is 'A Promising President', which gave me a glimpse of unexpected depths to former US president Herbert Hoover. He did a scholarly translation of a 1556 book by Georgius Agricola, *De re metallica* (*Of Things Metallic*), from Latin into English.

While those essays left me hungry for more, they are the exception — most of them provide a meaty meal. I particularly enjoyed the one on William Prout's hypothesis of 1815, in which he theorized that all elements are derived from hydrogen. This theory was seen as demonstrably wrong in the nineteenth century: if hydrogen's atomic weight is 1, how can chlorine's be 35.5? Nevertheless, his hypothesis explained why most atomic weights are integral numbers, and it was indeed prophetic. A century later, chemists learned that an element is identified by the number of protons in its nucleus and, as hydrogen's nucleus is a single proton, it can be seen as the element of the elements.

In a book that is largely pictures, one might expect the accompanying text to be merely an add-on, but *The Art of Chemistry* is well written and peppered with Greenberg's witty comments and cynical asides, providing light relief along the way, although some are more toe-curling than amusing.

Sometimes his remarks require specialist knowledge, such as an understanding of baseball, because he likes to make comparisons between the achievements of great chemists and the giants of his favourite sport.

The more of the book I read, the more I kept on wanting to read, and indeed for me the more interesting essays come in the second half, culminating with the whimsically titled 'Section VIII (Some Fun)' with its articles on occult chemistry and cigarette cards of famous chemists. If your interest is alchemy then the first dozen or so essays in 'Section I (Spiritual and Mythological Roots)' and 'Section II (Stills, Cupels, and Weapons)' will be the main attraction.

In the 1950s, C. P. Snow wrote of 'two cultures' and the lack of communication between them, and it really did seem that the worlds of art and science were like oil and water: impossible to mix. They represent different, though equally valid, ways of looking at the world. But that should not prevent artists from producing works with scientific themes, or scientists from appreciating the work of artists. The two worlds have often drawn strength from each other and *The Art of Chemistry* proves that it can be done. I hope that it will encourage those who are currently struggling to meld the two. ■

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