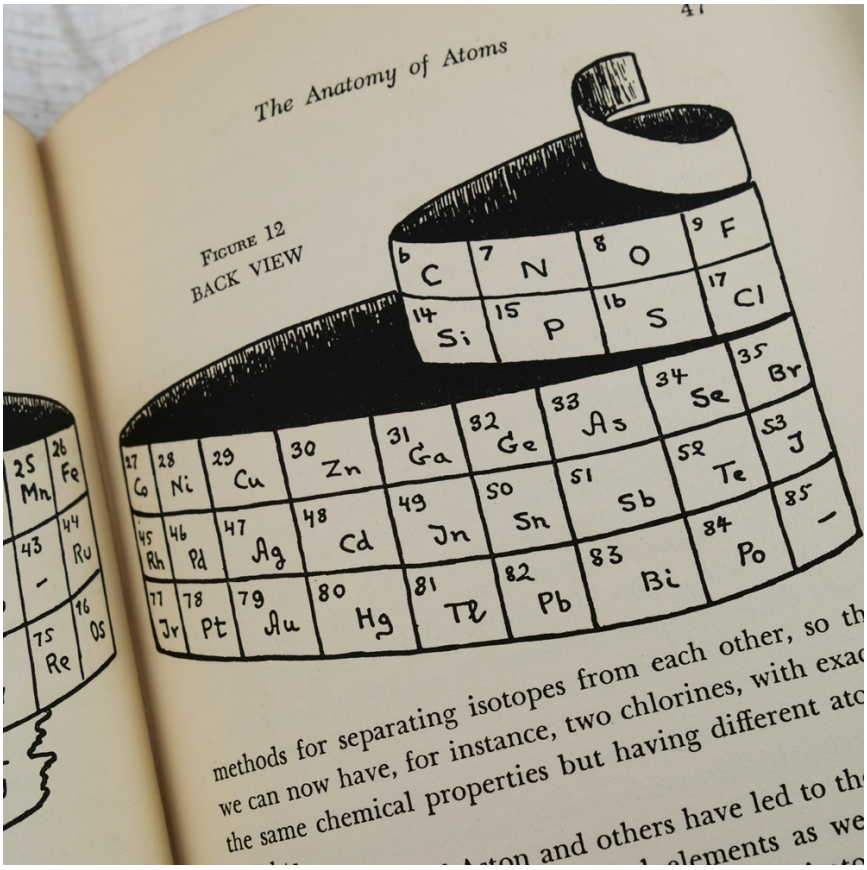
UNCLE TUNGSTEN:
BOOKS FROM A CHEMICAL BOYHOOD

ALEMBIC RARE BOOKS, APRIL 2023



I recently read Oliver Sacks's memoirs and was enchanted by *Uncle Tungsten: Memories of a Chemical Boyhood*, which is both an account of his scientific education and a history of chemistry and physics. Many children of the 1940s and 50s were budding scientists, but Sacks was luckier than most in having doctors for parents, as well as extended family with scientific backgrounds (not to mention a local chemical shop that was happy to supply children with dangerous substances!) One of the most important things these relations provided was access to science books, old and new. *Uncle Tungsten* is so reliant on Sacks's memories of these volumes that it comes close to being a book historical account of mid-century science education. In that light, I thought it would be interesting to gather some of these texts together.

All quotations from *Uncle Tungsten* cite the 2016 Picador paperback edition.

16 CHEMISTRY OF THE

to the butter. This is very liable to become sour and to be converted into *butyric acid*, which makes butter to become rancid. It may, however, be removed by repeated washing with hot water.

Butter is usually salted, in order that it may be kept longer. It may be preserved quite fresh for a long time, by covering it with syrup, without the addition of any salt. The syrup may be washed off it when the butter is required for use. The water of milk holds in chemical solution a considerable per-centage of curd, or *caseine*. Fresh milk contains nearly one-half per cent. of soda in solution, which has the property of dissolving the curd. It serves for the formation of the blood, and for the nutrition of the animal tissues. *Cheese* is a mixture of caseine with a greater or less quantity of butter.

When fresh milk is allowed to stand for some time, the lighter suspended particles rise, and form, as is well known, *cream*. When kept for five or six days, at a low temperature, it evolves nearly the whole of its cream, and underneath is found a liquid resembling milk and water. According to Berzelius, cream consists of

Butter	4.5
Caseine	3.5
Whey	92.0
	100.0

Milk, when left to itself, as is well known, becomes

BREAKFAST-TABLE. 17

sour and curdles. This is owing to the fact, that the *sugar of milk*, (*lactine*), which gives sweetness to it, becomes converted into an acid. This *lactic acid* combines with the soda, which holds the caseine in solution; and, as the latter is insoluble in water, the milk is converted into curds and whey. After the cream has been removed, there still remains a large per centage of cheese, as the following analysis of skimmed milk will shew:—

Water	92·87
Curd, with little butter ...	2·80
Sugar of milk	3·50
Ash	0·83
	100·00

Skimmed milk will therefore likewise curdle on exposure to air. The whey still contains sugar of milk, a substance similar to white of egg, and various salts. The composition of fresh cow milk, according to Henry and Chevallier, is as follows:—

Caseine	4·48
Butter	3·13
Sugar of milk	4·77
Soda and salts	0·60
Water	87·02
	100·00

These few remarks will have enabled you, in some degree, to appreciate the value of milk as an article of food.

C

1. **Bernays, Albert J. Household Chemistry, or, Rudiments of the Science Applied to Every-Day Life.** London: Sampson Low, 1852.

Octavo. Original burgundy morocco-grain cloth, title to spine gilt, decorative spine compartments and elaborate design to boards in blind, yellow coated endpapers. Bone and Son binder's ticket to the rear pastedown. Heraldic bookplate of James H Gamble. Spine faded, bumped, and worn at the head, corners worn, a few light spots of dampstain affecting the cloth of the lower board. A very good copy, the contents clean.

> "There were other old chemistry books lying around the house, some of which had been my parents' when they were medical students, and some, more recent, belonging to my older brothers… [one of these was] *The Science of Home Life*, by A. J. Bernays, which focused on coal, coal gas, candles, soap, glass, china, earthenware, disinfectants— everything that might be contained in a Victorian home (and much of which was still contained in houses a century later)" (p. 73).

The rare first edition of this popular and much-reprinted introduction to chemistry by Albert James Bernays (1823-1892). Beginning with the chemistry of the breakfast table, the book ends with simple experiments that could be performed at home.

Bernays studied at Giessen under Remigius Fresenius and Justus Liebig and was awarded a PhD for his work on limonin, a bitter substance he discovered in the seeds of citrus fruit. He was particularly interested in food and hygiene, and "in 1852 he published the first edition of *Household Chemistry*, a popular work, reissued under various titles" [Oliver Sacks's copy was one of these reprints] (ODNB). Bernays worked as a lecturer at hospitals, was an examiner for the Royal College of Physicians, and was also public analyst to several London boroughs. He was a genial man and a capable and popular teacher; he took a great interest in social matters generally, and gave more than a thousand free public lectures during his lifetime... He also carried out investigations on the atmosphere of Cornish mines and on dangerous trades, and made inventions in water filtration" (ODNB).

00745 **Sold**

6 THE AIR WE BREATHE

taper be now introduced into the bottle, it will immediately be extinguished, showing that only nitrogen remains (fig. 3). In this process, the burning phosphorus removes the oxygen from the air contained in the bottle, and leaves only the nitrogen.

Fig. 3.

Oxygen is one-ninth part *heavier*, and nitrogen one thirty-sixth part *lighter* than common air.

Carbonic acid is a kind of air which, like oxygen and nitrogen, is void of colour; but, unlike these, possesses a slight odour, and a perceptibly sour taste. Burning bodies are extinguished, and animals cease to breathe when introduced into it. It is one-half heavier than common air, and can therefore be poured through the air from one vessel to another (fig. 4). When passed

Fig. 4.

7 CARBONIC ACID.

through lime-water,* it makes it milky (fig. 5), forming with the dissolved lime an insoluble white powder, which, because it contains carbonic acid, is called *carbonate* of lime, and is the same thing as chalk. It is the escape of this gas which gives their sparkling briskness to fermented liquors, to soda-water, and to the waters of some mineral springs.

Fig. 5.

Carbonic acid is easily prepared by pouring vinegar upon common soda, or diluted spirit of salt (muriatic acid) upon chalk or limestone. The gas rises in bubbles through the liquid, and, in consequence of its weight, remains in the lower part of the vessel. As it collects it gradually ascends, driving the common air before it, and at last flows, as water would do, over the edge of the vessel. Its rise may be shown by introducing two lighted tapers, as in the figure (fig. 6), when the lower one will be seen to go out, while the upper one is still burning.

Fig. 6.

* Lime-water is formed by pouring water upon slaked lime, shaking them well together, and allowing the mixture to settle. The clear liquid contains a portion of the lime in solution, and is therefore called *lime-water*.

2. **Johnston, James F. W. The Chemistry of Common Life.** London & Edinburgh: William Blackwood and Sons, 1855.

2 volumes, octavo (178 x 113 mm). Contemporary brown half calf, spines gilt in compartments, red morocco labels, marbled sides, endpapers, and edges. Steel engravings throughout the text. H7 and 8 unopened. Lacking the ads normally present. Bindings rubbed, occasional light spotting to contents. A very good set.

> "Very different in style and content, though equally designed to awake a sense of wonder was *The Chemistry of Common Life*, by J.F.W. Johnson… This had fascinating chapters on 'The Odours We Enjoy," "The Smells We Dislike," "The Colours We Admire," "The Body We Cherish," "The Plants We Rear," and no less than eight chapters on "The Narcotics We Indulge In" This introduced me not only to chemistry, but to a panorama of exotic human behaviors and cultures" (p. 73).

First complete edition of this "classic popularization of up-to-date science", published in two volumes the year after the first volume appeared singly (ODNB).

Author James F. W. Johnston (1796-1855) was a chemist and lecturer, and together with David Brewster one of the founders of the British Association for the Advancement of Science. His association with J. J. Berzelius "brought him prestige and fuelled his interest in the way atoms might be arranged in compounds; though chemical atomic theory was still very hypothetical in the 1830s, some inferences could be made... Johnston became a successful popular lecturer and writer at a time when such activity did not diminish a professional reputation" (ODNB).

00737 **£250**

3. **Dana, James D. The Geological Story Briefly Told. An Introduction to Geology for The General Reader and for Beginners in the Science. With Numerous Illustrations.** New York & Chicago: Ivison, Blakeman, Taylor, and Company, 1875.

Octavo. Original green pebble-grain cloth. Title, ammonite design to spine, and illustration of basalt columns to the upper board gilt, elaborate decorative patterns to spine and upper board in black, yellow endpapers. Steel engravings throughout the text. Ownership signatures dated 1885 to both free endpapers, the same signature also on pages 100 and 200. Corners bumped, cloth a little worn at the extremities with a few small spots, contents lightly toned. Very good condition.

> "I had visions (especially after listening to stories of my uncles in their prospecting days) of being a sort of boy geologist myself, armed with chisel and hammer and collecting bags for my trophies, coming upon never-before described mineral species. I did try a little prospecting in our garden, but found little beyond odd chips of marble and flint. I longed to go out on geological excursions, to see the patterns of the rocks, the richness of the mineral world, for myself. This desire was fanned by my reading, not only accounts of the great naturalists and explorers but also more modest books that came to hand, such as Dana's little book, *The Geological Story*, with its beautiful illustrations…" (p. 59).

First edition of this introductory account by "the foremost American geologist of the nineteenth century" who was "adept at grand geological synthesis" (Natland, "James Dwight Dana: Mineralogist, Zoologist, Geologist, Explorer", *GSA Today*, February 2003).

Author James D. Dana (1813-1895) attended Yale, where he developed a new mineralogical classification system based on chemistry and crystallography. Published as *System of Minerology* in 1834, it would go through four editions in his lifetime.

Dana's career in the earth sciences was firmly set when he served as the official geologist on the US Exploring Expedition to the Pacific between 1838 and 1842. "For American science, the expedition was without precedent—the first blue-water oceanographic expedition funded by the U.S. Navy. With six ships, it was far larger than earlier European ventures to the Pacific. It was also the first American exploration on land or sea to make systematic geological observations. Only Darwin, whose career Dana's paralleled in many ways, had done geological work on volcanic islands and reefs (on the Beagle a few years earlier)" (Natland).

Though it was Darwin who first published the correct explanation for the development of coral reefs, Dana "added key facts, establishing that embayments of the volcanic stumps within the lagoons are drowned, deeply subsided remnants of river valleys that could not have been carved by waves. Also, the corals finally die, and the atolls slip beneath the waves. Later, in his volume on corals, Dana predicted the existence of deeply submerged, drowned atolls, today's guyots, in the far western Pacific" (Natland). He went on to publish monographs on crustaceans and corals and an important book on the volcanoes based on research undertaken in Hawaii. His *Manual of Geology* became the standard reference, found "on the shelf of almost every American geologist" (Natland).

00734 **£150**

4. **Lodge, Oliver. Atoms and Rays. An Introduction to Modern Views on Atomic Structure.** London: Ernest Benn Limited, 1924.
Large octavo. Original burgundy cloth, titles to spine gilt, borders to boards blocked in blind. Bookplates of E. Harland Duckworth and Donald H. Francke. Spine rolled, cloth rubbed and bumped with a few tiny spots and marks, partial fading to the top and bottom edges of the boards, some scuffs affecting the bottom edge of the text block, endpapers toned. Very good condition.

> "I was puzzled when I first came across reference to the Ether… confusing this with the inflammable, mobile, sharp-smelling liquid my mother kept in her anesthetic bag…clearly the idea of the Ether was still very strong in the minds of many scientists at the time when radioactivity was discovered, and it was natural that they should turn to it first for an explanation of its mysterious energies… For Oliver Lodge, writing in 1924, it was still the needed medium for electromagnetic waves and gravitation, even though the theory of relativity, by this time, was widely known" (p. 265 & note)

First edition, first impression of this "outstanding popular exposition of the Bohr theory" of atomic structure (ODNB).

Oliver Lodge (1851-1940) was one of the most versatile and popular British physicists of the late 19th and early 20th centuries. His early work focused on electromagnetism, to which he made a number of significant contributions. Most important was his prediction that electromagnetic waves could be generated from electromagnetic fields, and his successful production of them using a Leyden jar. He carried out important research on radio waves and gave the first public demonstration of radio-telegraphy using Morse code.

"This was a particularly exciting time in the development of physics and Lodge was quick to follow up the major discoveries then being made. Early in 1896 he lectured on X-rays to massive audiences in Liverpool, and made a pioneering medical application by locating a bullet in a boy's hand. He had long before suggested the generation of electromagnetic waves from vacuum tubes and he now speculated on X-ray diffraction and on the sun as an X-ray source… and he was early in stating that atoms are mostly empty space, and could be represented by planetary models

(1902). He gave immediate support to the Rutherford–Soddy theory of radioactive transmutation when many people opposed it, associated radioactivity with the source of the sun's energy (1903), and discussed the fusion of elements in the formation of stars in nebulae as a reverse radioactive process (1908). Later he was involved in the naming of the proton (1920), and speculated that the particle might be composite (1922)" (ODNB). *Atoms and Rays* was his last purely scientific book.

00800 **Sold**

5. **Jeans, James. The Stars in Their Courses.** Cambridge: at the University Press, 1931. *Octavo. Original blue cloth, titles to spine gilt. With the dust jacket. Black and white frontispiece and 46 plates, 2 folding astronomical charts. Contemporary bookplate of Edward Beldam Diver. Spine very slightly faded, cloth a little rubbed at the tips. A very good copy in the rubbed and creased jacket with tanned spine panel and some nicks and small chips.*

> "Auntie Len had given me James Jeans's book *The Stars in Their Courses* for my tenth birthday, and I had been intoxicated by the imaginary journey Jeans described into the heart of the sun, and his casual mention that the sun contained platinum and silver and lead, most of the elements we have on earth" (p. 214).

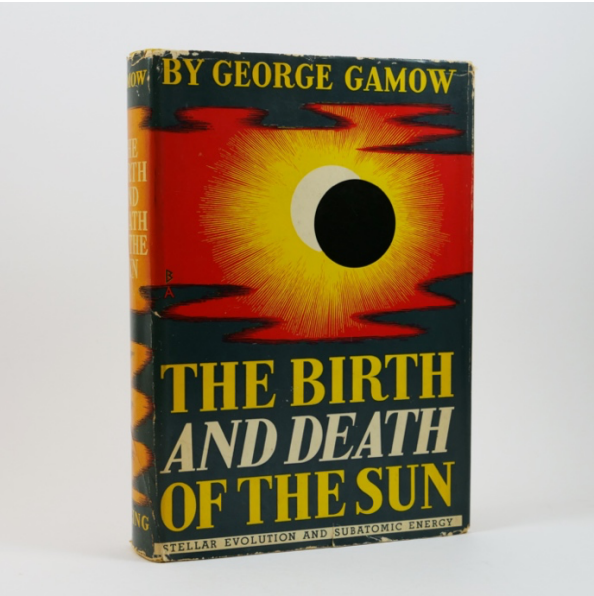
First edition, first impression. Rare in the jacket and much less common than the US edition published by Macmillan in the same year. This copy with the bookplate of Edward Beldam Diver, London manager of the Cambridge University Press (*The Historical Register of the University of Cambridge. Supplement*, 1921-1930).

James Jeans (1877-1946) was a respected Cambridge mathematician and astronomer, best known for his work on rotating, gravitational bodies, "a problem of fundamental importance that had already been tackled by some of the leading mathematicians" (ODNB), and the motions, structures, and life-cycles of stars and stellar clusters.

"In 1928 Jeans's academic work *Astronomy and Cosmogony* came to the attention of S. C. Roberts, the secretary of Cambridge University Press, who appreciated the general interest of its subject matter and the attraction of Jeans's writing style. He persuaded Jeans to write a popular account, *The Universe Around Us*, which was published by the press in 1929" (ODNB). Jeans' popularity as a writer "depended partly on his topic — new, thought-provoking views of the universe — and partly on his style, which combined an authoritative knowledge of the subject with a vivid turn of phrase" (ODNB).

The present volume was his third popular work, with the dust jacket prominently advertising the previous two. It is based on a series of radio broadcasts written for listeners with no previous scientific knowledge, introducing them to "the fascination of modern astronomy" and "the wonder of the universe we see through the giant telescopes of to-day" (preface).

00735 **£150**



6. **Gamow, George. The Birth and Death of the Sun. Stellar Evolution and Subatomic Energy. Illustrated by the Author.** New York: The Viking Press, 1940.
Octavo. Original yellow cloth, titles to spine and astronomical design to upper board in red, star chart endpapers, top edge dyed black. With the dust jacket. Half title. 8 double-sided plates from photographs, illustrations and charts throughout the text. Ownership inscription of Thomas Van Sigrist dated April 18, 1943. Cloth very slightly rubbed at the tips. A very good copy in the rubbed and price-clipped jacket with small chips and nicks along the edges, some creases affecting the spine panel, and faint dampstain visible on the backs of the front panels.

> "The inside of the sun reaches enormous temperatures, something on the order of twenty million degrees. I found it difficult to imagine a temperature like this —a stove at this temperature (George Gamow wrote in *The Birth and Death of the Sun*) would destroy everything around it for hundreds of miles" (p. 305).

First edition, first printing. Uncommon in the stylish dust jacket designed by prominent illustrator and graphic artist Boris Artzybasheff (1899-1965).

Physicist and cosmologist George Gamow (1904-1968) devised the theoretical explanation of alpha decay by quantum tunnelling, developed the first mathematical model of the atomic nucleus, and studied the origins and physics of stars. He was an early proponent of the Big Bang theory developed by Georges Lemaitre, and also wrote numerous science books for a popular audience.

"Gamow directed his second science book for the layman to a comparatively highbrow audience—i.e., those who might be curious about the origins and implications of Bethe's breakthrough solution of the stellar-energy problem. His initial plan was to have a university press publish this book as an advanced text similar to his 1931 monograph on nuclear theory. However, his inquiries at Chicago and Oxford indicated that such a work was not likely to yield royalties from their university presses. So Gamow arranged instead to do a semipopular version with Viking Press entitled *The Birth and Death of the Sun: Stellar Evolution and Subatomic Energy*... The many drawings that Gamow created to illustrate the points he was making were a special feature of this entertaining narrative of physics' recent interpretive contributions to stellar theory. Such drawings, which had long before begun appearing in his handwritten correspondence, became one of the trademarks of his science writing" (Hufbauer, "George Gamow 1904-1968", National Academy of the Sciences, 2009).

00736 **Reserved**