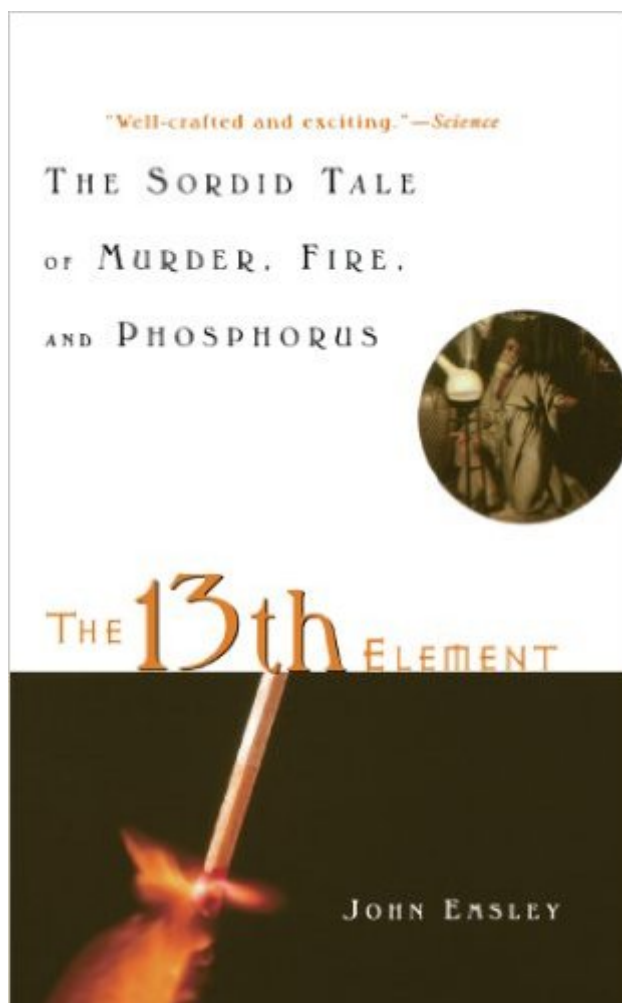


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The 13th Element: The Sordid Tale Of Murder, Fire, And Phosphorus



Synopsis

The incredible "glowing" history of the "Devil's element" phosphorus. Discovered by alchemists, prescribed by apothecaries, exploited by nineteenth-century industrialists, and abused by twentieth-century combatants, the chemical element phosphorus has fascinated us for more than three centuries. It may even be the cause of will-o'-the-wisps and spontaneous human combustion! Now John Emsley has written an enthralling account of this eerily luminescent element. Shining with wonderful nuggets—from murders-by-phosphorus to a match factory strike; from the firebombing of Hamburg to the deadly compounds derived from phosphorus today—*The 13th Element* weaves together a rich tableau of brilliant and oddball characters, social upheavals, and bizarre events.

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Customer Reviews

This was first published in Great Britain with the title *The Shocking History of Phosphorus*. Even with such a provocative title one might wonder how a book devoted to a single chemical element could find commercial success. The fact that the book has now been published in the United States and Canada suggests that author John Emsley knows what he is doing. He reduces the dry chemistry to a minimum and accentuates the sordid details, making this an interesting read. Emsley begins with

alchemy in the seventeenth century and how phosphorus was first manufactured from copious pots of urine, and how the small amounts obtained were used in demonstrations before royalty. By the by we gain some historical insight into the lives of the European alchemists and their methods. Emsley then delves into the medical use of phosphorus, proscribed for ailments as diverse as TB and melancholia, for which it worthless. Indeed it was worthless for all prescriptions. (Maybe this is how homoeopathy began: a vanishingly dilute prescription of phosphorus would be an improvement on the standard dosage!) Phosphorus was even seen as an aphrodisiac. The production of phosphorus really took off in the early nineteenth century with invention of the phosphorus match, aptly named "the lucifer." I thought this was the most interesting part of the book, bringing to mind a world before we had matches and fires had to kept going or started with flint and tender, or perhaps borrowed from your neighbor. Emsley writes that by the end of the nineteenth century "three trillion phosphorus matches were being struck every year" (p. 65). He emphasizes the word "trillion.

There are countless processes and materials that cycle through to keep life cycles on Earth going. Is there one material that is the bottleneck, the thing that limits populations and growth?

Surprisingly, there is a "supreme ruler" that if diminished slows all life down, no matter what the availability of other chemicals is. That bottleneck chemical is phosphorus. According to The Thirteenth Element: The Sordid Tale of Murder, Fire, and Phosphorus (John Wiley & Sons) by John Emsley, phosphorus is essential for, among other things, being the backbone of DNA and forming the basic chemistry for biological storage and use of energy. It does not get replenished by circulation as the other big four do; carbon, hydrogen, oxygen, and nitrogen all can circulate in the atmosphere or by water. It cannot be "fixed" from the atmosphere into the soil by microbes, as nitrogen can. Phosphorus does have its cycles, but they are slow, like the one that includes it being washed from the soil into the sea, forming part of the sea bed, and then in millions of years being lifted up as rock to form new land. The main land-based cycle is simply from soil to plants to animals and via urine, feces, or decomposition, back to soil again. Cultivation of land means that phosphorus in plants is exported away, and does not get re-deposited into the soil. Crops grown on the same land deplete it of other vital chemicals, but the one that is lost forever without deliberate replacement is phosphorus; this was not known until the nineteenth century. It was found that using bone meal as a fertilizer was effective, but it was originally assumed that the calcium in its calcium phosphate was the cause. Emsley has good fun describing the ins and outs of phosphorus, but his book is particularly wide-ranging.

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