

PARTING SHOTS

The World's Largest Hydrogen Sulfide Test

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Any chemist who ever owned a chemistry set as a kid knows that they often contained some rather bizzare chemicals, such as logwood and azurite, which one has never encountered since in the course of one's professional career. The reasons for this atypical selection are not obvious, though I have always assumed they were related in some way to an index of the (colorful reactions)/(cost) variety. Among the arcane items in my chemistry set was a packet labeled sulfide test paper, a square of filter paper coated with lead acetate and used to detect sulfide via the formation of a black coating of PbS. Again, I confess to having wondered about the precise utility of this item, given the fact that, in the aqueous environment of the home laboratory, sulfide ion is almost always in equilibrium with hydrogen sulfide gas and the characteristic odor of the latter, coupled with the incredible sensitivity of the human nose, seemed, at best, to make the test paper redundant.

Nevertheless, its existence was filed away in my chemical subconscious and, surprisingly, proved useful during the course of my graduate research at the University of Wisconsin. Our work required the use of some rather outdated dry boxes, which were continuously springing leaks in the hot, humid Wisconsin summers. On one occasion, we had been shut down for over a week. Application of soap solution to the joints under a positive nitrogen pressure in the box had failed to find the leak. Filling the box with Freon gas and testing the joints with a flame to detect the tell-tale green of escaping halogenated hydrocarbons was equally futile. Finally, I remembered the reputed sensitivity of the sulfide test paper in my childhood chemistry set. Ignoring the protests of my advisor, we released some hydrogen sulfide in the box, wrapped all the joints in filter paper dampened with lead acetate solution and went to lunch. Upon returning, the guilty joint was quickly detected via a black stain on the test paper. Of course, we then had to spend another day removing the hydrogen sulfide from the



Lyon Playfair

box, a rather curious procedure involving the inflation of an army surplus weather balloon, but nonetheless I felt I had at last found the ultimate use for sulfide test paper - at least, that is, until I read the memoirs of Lyon Playfair (W. Reid, *Memoirs and Correspondence of Lyon Playfair*, Cassell, 1899, p. 94).

Playfair (1818-1898) had studied chemistry under Thomas Graham and was the first Englishman to receive a German Ph.D. in chemistry (from Liebig at Giessen in 1840). Upon returning to England, he became a proponent of Liebig's views on agricultural chemistry and a government consultant on matters of sanitation, agriculture and science education. His increasing involvement in government work eventually resulted in his election to Parliament and to a successful political career, culminating in his receiving the title of Baron Playfair of St. Andrews in 1892.

In 1845 Playfair left his position as Professor of Chemistry at the Royal Institution of Manchester to accept a government post with the Museum of Economic Geology in London, and shortly thereafter was asked to investigate the sanitation of Buckingham Palace. He quickly discovered that it was in a frightful state as "a great main sewer ran through the courtyard, and the whole palace was in untrapped connection with it." To forcefully illustrate this to the government officials, he had a small room in the basement of the palace freshly painted with white lead $[Pb(CO_3) \cdot Pb(OH)_2]$ and closed up for the night. In the morning the entire room was found blackened from the hydrogen sulfide in the sewer gas.

Though not done on filter paper, this surely qualifies as the world's largest hydrogen sulfide test and puts my graduate school innovation to shame - thus doth history humble us all. It is also of interest to note that some things do not change, as Playfair also reported that "the condition of the palace was so bad that the Government never dared to publish my report".

