Euchlorine

IN textbooks and dictionaries of chemistry the statement is continually made that Davy supposed the product of the action of hydrochloric acid on potassium chlorate to be a definite compound to which he gave the name euchlorine.

A careful reading of Davy's own words shows he knew quite well that the product was a mixture of chlorine and an oxide of chlorine and that he proposed the name euchlorine for the latter ingredient of the mixture. The following quotations from Davy's paper in the *Philosophical Transactions* for 1811, vol. 101, pp. 155–162, "On a Combination of Oxymuriatic Gas and Oxygene Gas", and reprinted in No. 9 of the Alembic Club Reprints, make the matter quite clear. (Pages given are from Alembic Club Reprint.)

P. 64. "The gas produced by the action of muriatic acid on the salts which have been called hyperoxymuriates, on the contrary, differs very much in its properties, according as the manner in which it is prepared and collected is different. . . . It is a compound of oxymuriatic gas and oxygene, mixed with some oxymuriatic gas." This last sentence put in modern terms reads: "It is a compound of chlorine gas and oxygen mixed with some chlorine gas."

P. 65. "I attempted to obtain the explosive gas in a pure form, by applying heat to a solution of it in water; but in this case, there was a partial decomposition; and some oxygene was disengaged, and some oxymuriatic gas formed."

P. 67. "That the explosive compound has not been collected before, is owing to the circumstance of water having been used for receiving the products from hyperoxymuriate of potash, and unless the water is highly saturated with the explosive gas, nothing but oxymuriatic gas is obtained." That "the explosive gas" and "the explosive compound" refer to the "compound of oxymuriatic gas and oxygene" in his mixture is clear from the contexts.

Finally, p. 70. "As the new compound in its purest form is possessed of a bright yellow green colour, it may be expedient to designate it by a name expressive of this circumstance, and its relation to oxymuriatic gas. As I have named that elastic fluid Chlorine, so I venture to propose for this substance the name Euchlorine, or Euchloric gas from ευ and χλωρος."

Evidently Davy knew he was dealing with a mixture and had a certain degree of success in separating the ingredients.

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THERE is no reason to suppose that Davy ever separated the chlorine from the chlorine dioxide in euchlorine, or that he deliberately gave the latter name to pure chlorine dioxide. In his "Elements of Chemical Philosophy" (1812, p. 239) he says: "Chlorine is rapidly absorbed by mercury; euchlorine has no action upon it, and chlorine may be separated from euchlorine, by agitation over mercury, and the last obtained pure." This is incorrect, since chlorine dioxide attacks mercury (King and Partington, *J. Chem. Soc.*, 925; 1926). There can be no doubt whatever that Davy's euchlorine was, as it is always correctly stated in textbooks to have been, a mixture of chlorine and chlorine dioxide, since (*op. cit.*, 240) he found that on decomposition by heat it gave 2 vols. of chlorine and 1 vol. of oxygen: "50 parts treated in this way, expand so as to become about 60 parts, which consist of 40 parts of chlorine and 20 parts of oxygene." The separation of pure chlorine dioxide from the mixture, by passing it over calomel, and the first proof that euchlorine is a mixture of chlorine dioxide and chlorine are due to Soubeiran (*Ann. Chim. Phys.*, **48**, 116; 1831; mentioned by Turner, "Elements of Chemistry", 1834, p. 341, who says "most chemists regarded the existence of euchlorine as problematical, suspecting it to be a mixture of chlorine with the peroxide of chlorine"). Soubeiran's work seems to have been overlooked. Pebal finally decided the matter, if that were necessary; his memoir (*Liebigs Annalen*, **177**, 1; 1875) is a model of experimental research.

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Frederick Guthrie

I WAS glad to see the reference to the late Prof. Guthrie in NATURE of October 14, p. 595. I had the good fortune to know him from 1870 onwards. In my recent Huxley Memorial Lecture (Macmillan and Co., Ltd.), I specially refer to him, in an aside (p. 9), to the way in which he taught real earthly physics, now a lost art, since the retirement of the last of the Mohicans, Prof. A. W. Porter. The student of to-day can only lisp electrons and other letons: heat, optics, sound, even battery-electricity, are no more! Physics is becoming all skittles, without any beer: the game is even puffed by wireless, for general consumption. We need to recover physical sense of proportion. I have, therefore, asked whether someone cannot be found to unearth Guthrie's incomparable practical course—if only to put it away in a case, in the British Museum, as the memorial of a former Brompton civilisation of high degree. Let the course be published, fully explained, together with a proper appreciation of the man and the poet. We have to remember that he was not only all but the last physicist—certainly the last with sense of humour—but also the last physical chemist: both chemist and physicist.

I have asked in my lecture:

"Why is it that, while remembering Huxley, the Imperial College has forgotten the great pioneers of practice, on their early staff, his companions Frankland, Tyndall, Guthrie?"

Huxley has been overrated relatively to these three men. The great scientific service his three colleagues rendered has been allowed to fall into oblivion; it were time to roll their logs too. Let us begin with Guthrie. Someone must have full notes of his course.

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New Band Systems in the Gadolinium Oxide Spectrum

I am sorry that in my letter under this title published in NATURE of September 23, p. 481, I included two formulæ not concerned with these spectra. The correct formulæ are:

$$\nu = 21700{\cdot}26 + 749{\cdot}20(n' + \tfrac{1}{2}) - 3{\cdot}30(n' + \tfrac{1}{2})^2 - 830{\cdot}00(n'' + \tfrac{1}{2}) + 2{\cdot}25(n'' + \tfrac{1}{2})^2.$$

$$\nu = 20470{\cdot}29 + 771{\cdot}30(n' + \tfrac{1}{2}) - 5{\cdot}45(n' + \tfrac{1}{2})^2 - 841{\cdot}00(n'' + \tfrac{1}{2}) + 3{\cdot}70(n'' + \tfrac{1}{2})^2.$$

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Oct. 10.