

and most obvious means of procedure, and presented itself at once. My earliest experiments were made in January, 1839, and in my notebook I find:—

"Exp. 1012.—1839, Jan. 20. Experiments tried within the last few days since hearing of Daguerre's secret, and also that Fox Talbot has got something of the same kind." (Here follow some trials of the relative sensitiveness of the nitrate, carbonate, acetate, and muriate of silver. I should observe that at that time I did not even know what kind of pictures Daguerre had produced. This process was not revealed till August, 1839.)

"Exp. 1013.—Daguerre's process: attempt to imitate. Requisites—1st, very susceptible paper; 2nd, very perfect camera; 3rd, means of arresting further action. Tried hyposulphite of soda to arrest the action of light by washing away all the chloride of silver or other silvering salt; succeeds perfectly. Papers half acted on, half guarded from the light by covering with pasteboard, were withdrawn from sunshine, sponged over with hyposulphite, then washed in pure water, dried, and again exposed. The darkened half remained dark, the white half white, after any exposure, as if they had been painted with soap."

"Jan. 30, 1839.—Formed image of telescope with the aplanatic lens \* \* and placed in focus paper with carbonate of silver. An image was formed in white on a sepia-coloured ground \* \* which bore washing with hyposulphite of soda, and was then no longer alterable by light. Thus Daguerre's problem is so far solved," &c., &c.

"Exp. 1014.—Jan. 30. Tried transfer of print and copperplate engraved letters," &c., &c.

The publication of Daguerre's process (according to Dr. Monckhoven, for I cannot refer at present to the original document) took place on the 19th August, 1839. My early experiments were printed in the notices of the proceedings of the Royal Society of March 11, 1839, in which occurs this passage in the abstract of a paper read to the Society:—

"Confining his attention in the present notice to the employment of chloride of silver, the author inquires into the method by which the blackened traces can be preserved, which may be effected, he observes, by the application of any liquid capable of dissolving and washing off the unchanged chloride, but leaving the reduced oxide of silver untouched. These conditions are best fulfilled by the liquid hyposulphites."

"Twenty-three specimens of photographs made by Sir J. Herschel accompany his paper—one a sketch of his telescope at Slough, fixed from its image in a lens."

This is the image above-mentioned as having been taken on Jan. 30, 1839, and was, I believe, the first picture ever fixed from an optical image ever taken in this country—at least, I have heard of none earlier.

At the time of making these experiments, as already mentioned, I had no knowledge of M. Daguerre's process further than the mention of the existence of a process (a secret one) in a note from Admiral (then Captain) Beaufort some time about Jan. 23, 1839. Of course I used paper, not silver, and it was not a suggestion, but a regular and uniform practice, to use the hyposulphite; I never used anything else.—I am, sir, your obedient servant,  
J. F. W. HERSCHEL.

In reference to the subject of fixing the photographic image I find the following passage in a paper read before the Royal Society on January 31, 1839, by Mr. Talbot. After referring to the improvements of Wedgwood and Davy in 1802, and the difficulties they found in making the paper sufficiently sensible to receive the impression in a camera obscura, and their inability to fix the pictures, the author states that "his experiments were begun without his being aware of this prior attempt; and that in the course of them he discovered methods of overcoming the two difficulties above related. With respect to the latter he says that he has found it possible by a subsequent process so to fix the images or shadows formed by the solar rays that they become insensible to light; \* \* and states that he has exposed some of his pictures to the sunshine for the space of an hour without injury."

In the abstract of the paper given in the proceedings the method adopted for fixing the image is not stated; but in a paper read before the same society on February 21 of the same year, it is stated that the prints were fixed in a weak solution of iodide of potassium. Ammonia had been tried, but not very successfully; but the method preferred was a strong solution of salt. It will be seen, therefore, that up to the date of the publication of Sir John Herschel's paper, hyposulphite of soda had not been used in photography excepting by himself.  
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## NOTE ON THE FIRST USE OF HYPOSULPHITE OF SODA IN PHOTOGRAPHY.\*

DURING an investigation into the early history of photography, I met with the statement that Daguerre used hyposulphite of soda in his process for fixing the pictures, and also that in Mr. Talbot's patent the use of that substance was included. I was under the impression that Sir John Herschel had pointed out that hyposulphite of soda would fix the photographic image, but was unable to ascertain where or when the discovery was first published. In order to determine this point I wrote to Sir John Herschel, requesting him to inform me whether the discovery was his, and the date when it was published. To these questions I received the following reply:—

Collingwood, October 29, 1864.

SIR,—I think I may very fairly claim the discovery of the hyposulphites as fixing agents, as I believe I was the first to call the attention of chemists to that class of salts and their peculiar habitudes, especially in relation to the insoluble salts of silver.

In my paper *On the Hyposulphurous Acid and its Compounds*, which bears date Jan. 8, 1819, and which appeared in Brewster and Jamieson's *Edinb. Phil. Journal*, 1819, occur these words:—

"One of the most singular characters of the hyposulphites is the property their solutions possess of dissolving muriate of silver and retaining it in considerable quantities in permanent solution." (p. 11.)

"Hypsulphite of Potash.—It dissolves muriate of silver, even when very dilute, with great readiness." (p. 19.)

"Hypsulphite of Soda.—\* \* \* Muriate of silver newly precipitated dissolves in this salt when in a somewhat concentrated solution in large quantity, and almost as readily as sugar in water." (p. 19.)

"Hypsulphite of Strontia.—\* \* \* Like the rest of the hyposulphites, it readily dissolves muriate of silver, and alcohol precipitates it as a sweet syrup." (p. 21.)

"Hypsulphite of Silver.—Muriate of silver newly precipitated is soluble in all liquid hyposulphites, and, as before observed, in that of soda with great ease and in large quantities. This solution is not accomplished without mutual decomposition, as its intense sweetness proves—a sweetness surpassing that of honey, and diffusing itself over the whole mouth and fauces, without any disagreeable or metallic flavour." (p. 27.)

In a second paper on the same subject, which appeared in the same journal, vol. 1, p. 336 *et seq.*, it is shown (*inter alia*) that the affinity of this acid for silver is such that oxide of silver readily decomposes hyposulphite of soda and likewise the soda in a caustic state, "the only instance, I believe, yet known of the direct displacement of a fixed alkali *via humidum* by a metallic oxide." (p. 397.)

"Hypsulphite of Ammonia and Silver.—Its sweetness is unaltered by any other flavour, and so intense as to cause pain in the throat. \* \* One grain communicates a perceptible sweetness to 30,000 grains of water." (p. 399.)

In a third communication, dated November, 1819—"The habitudes of this acid with the oxide of mercury are not less singular than its relation to that of silver." "The red oxide is readily dissolved by \* \* \* Hypsulphite of soda, while the alkali is set at liberty in a caustic state," &c., &c.

The very remarkable facts above described, I have reason to believe, attracted a good deal of attention at the time, and thenceforward the ready solubility of silver salts, usually regarded as insoluble by the hyposulphites, was familiar to every chemist. It would not, therefore, be surprising if Daguerre tried it to fix his plates (*i.e.* to wash off the iodide coating); but I have been informed, though I cannot cite a printed authority for it, that at first he fixed with ammonia, or with a strong solution of common salt.

For my own part the use of the hyposulphites was to myself the readiest.

\* Read at a meeting of the Photographic Section of the Literary and Philosophical Society of Manchester, April 12, 1866.