ART. XIII.—*On the nature of the Invisible Photographic Image;*
by M. CAREY LEA, Philadelphia. In a letter to the Editors.

SOME experiments in which I have lately been engaged seem to me to finally settle the long-contested question as to the nature of the invisible photographic image, and I hasten to send a very brief description of them, hoping it will be in time for your July number.

The view that the change which takes place in an iodo-bromized plate in the camera, is a purely physical one, that no chemical decomposition takes place, and neither liberation of iodine nor reduction of silver, has obtained a pretty general acceptance. But latterly it has been opposed by two distinguished photographers, Dr. Vogel and Major Russel. The former affirms that iodid of silver is never sensitive unless there is a body present capable of taking iodine from it under the influence of light. And Russel believes that the developed image is chiefly produced at the expense of the silver haloid in the film.

The following experiments seem to me to decisively close this controversy in *favor of the physical theory*.

Experiment 1.—If the iodid or bromid of silver in the film undergoes decomposition in the camera, and still more, if the developed image is formed at its expense, the film of iodo-bromid must necessarily be greatly consumed in the development under the dense portions of the negative, which it has contributed to form.

To settle this point, I exposed and developed an iodo-bromized plate in the ordinary manner. Then, instead of removing the unchanged iodid and bromid by fixing in the ordinary manner, I took measures to *remove the developed image without affecting the iodid and bromid*. This I succeeded in doing with the aid of a very weak solution of acid per-nitrate of mercury. Now, if the iodid, or bromid, or both, had been in any way decomposed, to form, or aid in forming, the developed negative image, when this came to be removed, there should have been left a *more or less distinct positive image*, depending upon varying thicknesses of iodid and bromid in the film, much like a fixed negative that has been completely iodized. *Nothing of this sort* was visible, the film was perfectly uniform, just as dense where an intense sky had been, as in those parts which had scarcely received any actinic impression, and looking exactly as it did when it first left the camera, and before any developer had been applied.

This experiment seems sufficiently decisive. But the following is far stronger.

Experiment 2.—A plate was treated in all respects as in No. 1, except that the application of the nitrate of mercury for removing the developed image was made by yellow light. The plate, now showing nothing but a uniform yellow film, was carefully washed, and an iron developer, to which nitrate of silver and citric acid had been added, was applied. *In this way the original image was reproduced*, and came out quite clearly with all its details.

Now as every trace of a picture and all reduced silver had been removed by the nitrate of mercury, it is by this experiment absolutely demonstrated that the image is a purely physical one, and that after having served to produce one picture, that picture may be dissolved off, and the same physical impression may be made to produce a second picture by a simple application of a developing agent.

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P. S.—Since the above was written, I have repeated the experiment with a pyrogallic development with similar results. Both the first and second developments may be made with an iron developer, or both with a pyrogallic. The experiment succeeds without the least difficulty in either way.