

beauty, he looks beyond that and sees in it the result of many and wonderful arrangements and re-arrangements of molecular matter, and tries to trace those changes step by step from the inception to the finish. He is the very opposite of him of whom the poet of the English Lakes wrote—

“A primrose by the river's brim,  
A yellow primrose was to him ;  
And it was nothing more,”

and, although he cannot hope to experience the delight of Daguerre when accident showed him mercurial development, or of Talbot at the production of the first negative and print therefrom by his reasoned-out calotype ; or even of the many lesser lights who followed in their trail, yet, if properly equipped, experimental work will give a degree of pleasure unknown to the mere picture-maker, and the hope of being able to add another stone to the cairn will make the dark room his happy hunting ground, and every operation therein a labor of love.

But, as indicated in the last paragraph, the amateur who would enter these sacred portals, must come properly equipped, and of what that equipment must consist is the *raison d'être* of this article. The successful experimentalist must know all that has been done before ; not in the little knowledge which is a dangerous thing-way, as too often leads its possessors to the patent office, only to throw away their money on that which is little or no value, or that has been public property long before ; but know it thoroughly in all its bearings. Without being a scientist in the true sense of the term, he must know enough of chemistry to fully understand the actions and re-actions of the material employed, and to theorize and speculate on those that are still

under a cloud. His knowledge of optics must be sufficient to enable him to classify the ever increasing number of lenses that come into the market ; to realize the abilities and limitations of each group, and to trace the passage of the rays from the various points of the object through the various and varied curved components of the lens to the sensitive film.

Just how the light acts on the silver bromide he cannot yet learn from the writings of others, but he should know all that has been said about it, and by keeping his eye open to the for and against—both the chemical and the mechanical theories—he will be in a position to locate whatever items of evidence he may come across.

He must also have clear notions of the theory of development, not being content with the generally accepted statements that pyro, or any of the more recently introduced oxidizers, are the developers, and soda, or any other of the other alkalies the accelerators ; but know *how* such oxidizer and accelerator do their work. He must learn to look on the silver bromide that has been affected by light as in a *shaky* state, ready to give up its bromine to any suitable element, and that in ordinary development it finds that in hydrogen liberated by the decomposition of water. It is in this that the oxidizer gets in its work. Pyro, say, in the presence of an alkali, has an affinity strong enough to decompose water, and thus supply the necessary hydrogen ; and the greater the degree of alkalinity the more active the decomposition. But he must bear in mind another fact. Nature never wastes her energy ; never un-makes without making. The metallic silver deposited by the abstraction of the bromine is a secondary considera-