Section of Photography and Microscopy.

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Photographing Water in Motion.

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Among the many charming bits of landscape scenery found almost everywhere over the country perhaps no single class has greater charms for the eye of the photographer, or gives him more pleasure, than does the ever popular brook. Its charms have been sung by the poet and its beauty painted by the artist; it is therefore not surprising that the budding photographer should try to catch and perpetuate its beauties.

Doubtless most persons will agree that the beauty of the brook consists largely in its winding, verdure-fringed border and its clear rippling water. If the vegetation be dry and lifeless, as in spring and autumn, the brook still retains its chief charm, the sparkling water. If by the construction of a temporary dam, or other cause, the water be cut off, the scene at once loses its attractiveness. Who admires a dry brook? Rob the ravine of its water and you rob it of its chief beauty.

Many beginners in photography imagine that because the movement of water is rapid, it would be useless to attempt a picture of the sparkling ripples, wavelets, or little water-falls, so frequently found in brooks, with anything short of a rapid lens and quick-moving shutter; and they frequently complain that they are unable to take good pictures of landscapes containing water, because the lens or shutter on their camera is not sufficiently rapid to photograph water in motion.

It is to correct this mistaken notion, and encourage the beginner to try what he can do with his camera, that this short article is written. As a matter of fact, thousands of excellent land-

scape pictures are taken with the ordinary rapid rectilinear lens and low-priced shutter, even when there is considerable wind agitating the leaves and swaying the branches of trees and rippling the surface of the water. An old-time professional photographer told the writer, that even with wet plates and their slow disposition, he had taken many landscapes for the trade, especially along streams, showing bridges, and was thought to be quite successful in photographing moving water, although the time required was

Turk bridge, near Doylestown, Pa. Exposure 1 second. Negative by the author.

what we would now call excessively long. A collection of marine views, which show the ocean in its different moods, from a rippled surface to waves breaking over the deck, were all taken by an officer of a large ocean steamship, with a Waterbury lens and a sliding shutter that was anything but rapid; and these pictures, wherever shown, were always admired.

The reasons why a liberal exposure frequently yields natural-looking water pictures, may be better understood if we remember that the average eye is incapable of forming a distinct impression of an object instantaneously. It requires a fraction of a second

to do so. By careful training the eye's speed may be somewhat increased. Robert Houdon claimed to have trained his eye to a point of time and accuracy of observation much beyond its natural capabilities. It is said that a positive image, strong and sharply marked, may be made on the retina, by a good light, in one-third of a second; and yet this does not hold true in all cases, because eyes differ. One may require nearly half a second, while another may have a clear perception in much less time, possibly one-tenth of a second. Again, an impression once made, may last on the retina as much as one-thirtieth of a second. Therefore it appears that the position of the moving object, as seen by the eye, is not its real position at that point of time, but rather the position it occupied a fraction of a second before. Again, the field of distinct vision is extremely limited; at the same moment we see clearly only a very small portion of the visual field; in reading a book the eye moves along the lines, clearly and sharply seeing only a small portion at once. By careful training this faculty may be greatly increased. Houdon, the noted French magician, by persistent practice, became able to walk past a show window, occupying perhaps two seconds of time, and then name to his son the many articles displayed in the window.

The rapid lens and quick-moving shutter have revolutionized our ideas of the movements of birds flying and animals running, and corrected many long-standing errors; but a rapid lens is not necessarily a universal lens.

In photographing a rapidly moving object, we may wish to portray what actually took place, although it may differ materially from what the eye saw; in fact the movement may have been too rapid for the eye to see it. The movement of water is very different from the movement of birds, animals, or other objects of definite shape. In photographing a rapidly-moving bullet, falling shot, a trotting horse or flying bird, we expect to show the definite shape of the moving object, rather than the movement of the object; that is, we show a bird with outstretched wings, apparently suspended in mid-air, rather than the moving of either the bird or its wings in the air. In the case of water, the individual particles are not visible, as in falling shot, therefore we show the shape of the general mass or small aggregations of the mass, and by their shape or position obtain the idea of motion. While a very short exposure may, and will, give the wave formation, sharply

defining every ripple upon the surface of the water, the resulting photograph will lack the softness of the scene as observed by the eye; and except in the matter of outline or shape, will probably lack the semblance of movement, which gave to the scene its principal charm, and to preserve which, the plate was exposed. It is true that an exposure of $1/1000$ of a second would show the water of a cascade, but the resulting picture would probably resemble suspended motion more nearly than moving water.

Experience appears to show that the slight blurring caused by a

Little dam at Ogontz, Pa. Exposure 1-25 second. Negative by the author.

slow shutter, instead of detracting from the appearance of movement in water, rather enhances the idea of motion.

In photographing a landscape, with or without water in the view, we usually wish to depict the scene as we saw it, preserving that charm which appealed to us at the time; therefore the desired picture should be a representation of what the eye actually saw, rather than the details of a movement too rapid for the eye to perceive or form a clear conception of. In the opinion of the writer this effect can readily be obtained at a moderate speed, say

1/10th to 1/25th of a second, under ordinary conditions, with a good rapid rectilinear lens. We should also recognize the fact that the lens, unlike the eye, sees the whole visual field at once, and the exposure should be sufficient to show the trees and other surrounding vegetation as well as the flowing water, otherwise the short exposure for water, would give underexposure for the trees and grass.

While the writer would recommend the purchase of as good a lens as your purse can readily afford, he would advise the amateur that extreme rapidity is rarely needed in landscape work; and a good lens with shutter set at moderate speed will usually yield satisfactory work.

The paper was illustrated by thirty-one photographic slides, as follows:

- 1/100"—Dam in Bethlehem.
- 1/75"—Cruiser Brooklyn.
- 1/75"—Battleship Texas.
- 1/60"—Sunset.
- 1/50"—Cruiser Fulton.
- 1/50"—Breakers.
- 1/40"—Iron bridge—Bethlehem.
- 1/40"—Lighter and Tug.
- 1/25"—Ogontz Dam.
- 1/25"—Stone Bridge.
- 1/25"—Schooner.
- 1/25"—Bathers.
- 1/25"—Rustic Bridge.
- 1/25"—Breakers.
- 1/25"—Little Dam at Ogontz.
- 1/25"—Tacony Creek.
- 1/25"—Willows.
- 1/25"—Foot-bridge.
- 1/25"—Wanamaker's Lake.
- 1/25"—Sloop.
- 1/25"—Tree and Race.
- 1/25"—Schooner.
- 1/25"—Wave.
- 1/15"—Darby Creek.
- 1/10"—Dam at Rocks.
- 1/10"—Quarantine Boat.
- 1/5"—Upper Falls—Childs' Park.
- 1/2"—Bushkill Falls.
- 1/2"—Liberty Falls.
- 1"—Turk Bridge.
- 90"—Valley Green Bridge.