

Scientific American.

ESTABLISHED 1845.

MUNN & CO., Editors and Proprietors

PUBLISHED WEEKLY AT NO. 37 PARK ROW, NEW YORK.

A. D. MUNN.

A. E. BEACH.

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VOL. XXXVI., No. 20. [NEW SERIES.] Thirty-second Year.

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RECENT IMPROVEMENTS IN PHOTOGRAPHY.

Two interesting improvements, of promising practical importance, have of late been made public. The first relates to the production of negatives, for gallery and other work, without the use of the nitrate of silver bath.

The common method of photography, that universally practised in all galleries for portraiture, and for the best outdoor work, is known as the wet plate process. It consists in sensitizing the collodion plate by dipping in a liquid charged with nitrate of silver. The sensitization is effected in about three minutes' time; the plate is then withdrawn from the bath, quickly placed in the camera, and the picture taken and developed before the plate has time to dry. When all the chemicals are in good order, the bath pure, the exposure rightly timed, and the development skilfully done, the most beautiful results are produced. Indeed, there seems to be no room for improvement in picturesque details, as realized by the best wet plate operators.

But the method is attended with many inconveniences and irksome details. The gallery photographer must keep in readiness a first-class bath, the purity of which is lessened by every plate that goes in; and the bath soon requires renovation. The plates cannot be prepared and sensitized so as to be ready for use in advance of the opening of the day's business, but must be prepared and developed after the customer comes. Should the negative prove unsatisfactory, a new plate must be prepared and developed; and thus the bother of the plates involves the loss of so much time that the operator has little chance to consider the best positions for his subject or to study the artistic accessories that go to make up a finished picture. For outdoor work, wherever the photographer goes, he must lug his bath along, even to the mountain top, and must there have a dark tent, and water for washing and developing; otherwise his efforts are fruitless. For several years past it has been the study of photographers to discover a reliable method of preparing highly sensitive plates without the use of the bath—a method by which the plates could be used when dry. Among the results of these efforts are a variety of dry plate processes, some of which, in the hands of skilled operators, yield excellent results. But nearly all of them have proved less sensitive or less excellent in their results than the wet process; and none have been able to compete with the latter for portraiture or gallery work.

The French Photographic Society in 1876 offered a prize for the best dry process which should unite rapidity with all the other qualities that go to make a good negative. The competition was closed in December last, and the jury have recently awarded the prize to Mr. Alfred Chardon. The process appears to have advantages over some of its predecessors, but there are inconvenient details about the development and some uncertainty in the summering and wintering of the emulsion; while the prepared plates require twice as much time for taking the picture as the wet plate. Moreover, the process is not suitable for the ordinary routine work of the gallery.

The author of the new process which we have now to describe, and to which we would direct the attention of photographers as a complete and perfect substitute for the wet process, both for indoor, gallery, portrait, outdoor work, and all descriptions of photography, is Mr. Henry J. Newton, of this city, President of the Photographic Section of the American Institute.

We have seen the process worked under the author's hands and examined some of the results. We believe that practical photographers, when they come to examine the negatives and prints, will agree with us when we say that they are unsurpassed by anything as yet produced by the wet process. They will also agree with us that Mr. Newton's process is simpler, quicker, easier, less expensive, and more certain in the excellence of results than the old method. Moreover, for gallery and outdoor work, it presents the striking advantage of enabling the photographer to prepare in advance a stock of sensitive plates, and of keeping them on hand ready for instant use when wanted.

The Newton is an emulsion process. The silver is mixed with the collodion, which remains good for use at any time within a year or more. A glass plate is flowed with this collodion in the usual manner; the plate is then dipped in water; it is then ready for use either before or after drying. The picture being taken, it is developed by simply flowing the plate, in the ordinary manner, with a solution of carbonate of soda and pyrogallic acid; then fixed with hypo, or cyanide as usual. This is all the manipulation required for the most beautiful, clean, and splendid negatives. As to sensitiveness, the Newton plates require, in the gallery, less than half the time necessary for wet plates. Portraits by the Newton plates are taken in from five to ten seconds; while the wet process, same light and lenses, requires from twenty to forty seconds. For outdoor work, the Newton plates yield as good or better instantaneous pictures than wet plates.

The exact formula for the emulsion has not yet been made known by Mr. Newton, but will in due time be freely given to the public. It is sufficient for the present to say that the emulsion is prepared with an excess of free nitrate of silver, which is allowed to remain for a certain number of hours, when chlorides are added. The Scoville Manufacturing Company of this city supply the new emulsion, with practical directions for its use.

The second photo improvement relates to printing, and is that of Mr. William Willis, Jr., of Birmingham, England. The surface of the paper, sized with arrowroot, is first moistened for a moment with nitrate of silver solution (six grains to the

ounce) and dried. In this condition, the paper keeps for any length of time. The paper is further sensitized by coating with a solution of chloro-platinite of potassium and a solution of ferric oxalate. It is then exposed under the negative for only one sixth of the time required for a common silver print. The picture is then toned with gold, treated with hypo, washed, and finally placed in a weak solution of oxalic acid, again washed and dried. The permanency of these prints is remarkable. Mr. T. Rodger recently submitted specimens to the Edinburgh Photographic Society, which he said he had put to extreme tests. One of them, for example, had been subjected to sulphuretted hydrogen for twelve hours, and then to twelve additional hours in the acid solution employed to form the gas, all without change. We have lately had the pleasure of examining some of these platinum prints, brought to this country by the author, which in tone and color, were in every way equal to the best silver prints.

NEURALGIC STORM BELTS.

Dr. S. Weir Mitchell, a physician of Philadelphia, Pa., has recently conducted an important series of very interesting investigations with reference to the relations of bodily pain to the weather. It is an old popular idea that diseases and injuries of the bones, chronic rheumatisms, and ancient wounds produce a renewed pain on the approach of a storm; so much so, indeed, that persons thus afflicted frequently are able to predict impending changes of weather with remarkable accuracy. In the course of study of many of the curious symptoms belonging to the stumps of amputated limbs, Dr. Mitchell frequently encountered the above notion; and he became so impressed by the repeated testimony of patients, who stated that their comfort depended largely on the state of the weather, that he resolved to undertake careful research into the subject. He was fortunate enough to obtain the cooperation of Captain Catlin, U. S. A., who had lost a leg in action during the war, and had become a sufferer with neuralgia in the stump, the pain seemingly residing in portions of the absent foot. This officer kept records of his painful sensations, in connection with the weather reports as shown by the Signal Service, for three years; and he prepared elaborate maps and charts, showing just how certain attacks corresponded to certain periods of barometric depression and other meteorological phenomena. In brief, he conducted his self-examination with an accuracy and scientific thoroughness which cannot be too highly commended.

The result now adduced by Dr. Mitchell is that there is every reason to believe that the popular view which relates some pain fits to storms has a distinct foundation; but that, as the single element of mischief has not been detected, he is driven to believe that it is the combination of atmospheric conditions which starts the pain into being. The separate factors of storms, such as lessened pressure, rising temperature, greater humidity, and winds, appear as a rule to be incompetent, when acting singly, to give rise to attacks of pain. Either it is, as above stated, a combination which provokes the pain, or it may be some as yet unknown agency, acting alone. It was observed by Captain Catlin that his sensations of pain prevailed when the aurora was intense. Whether this was due to the magnetic or electric disturbance prevalent or to the succeeding storm, Dr. Mitchell thinks is questionable.

About the most striking conclusion reached is that relating to the neuralgic storm belt. Every storm, as it sweeps across the continent, consists of a vast rain area, at the center of which is a moving space of greatest barometric depression known as the storm center, along which the storm moves like a bead on a thread. The rain usually precedes this by 600 miles; but before and around the rain lies a belt, which may be called the neuralgic margin of the storm, and which precedes the rain by about 150 miles. This fact is very deceptive, because the sufferer may be on the far edge of the storm basin of barometric depression, and, seeing nothing of the rain, may yet have pain due to the storm. "It is somewhat interesting," adds Dr. Mitchell, "to figure one's self thus—a moving area of rain girdled by a neuralgic belt 150 miles wide, within which, as it sweeps along in advance of the storm, prevail, in the hurt and maimed limbs of men and tender nerves and rheumatic joints, renewed torments called into existence by the stir and perturbation of the elements."

A NEW EXPLOSIVE COMPOUND FOR LARGE GUNS.

The dangerous element to a gun, from any explosion taking place within it, is the rate at which that explosion occurs. Stress due to a blow is very much more difficult to resist than strain gradually applied; and for this reason it is that the slow burning and comparatively weak gunpowder is retained when so many much more powerful explosives exist. No gun has yet been invented capable of withstanding the effects of explosion of gun cotton charges for any length of time, although abundant experiment has been made in this direction in the hope of substituting gun cotton for gunpowder. It is known that an immense advantage would be gained if the whole force of a nitroglycerin explosion could be concentrated on the base of a projectile; but the trouble is that no one has discovered how to harness nitroglycerin for artillery purposes; or in other words, no one has yet devised an apparatus whereby nearly the whole power of the explosion can be directed upon the ball, and merely a minimum left to act towards rending the gun asunder.

It follows from this that the theoretically most advantageous explosive for gunnery purposes is one which has an accelerating action, and that it must focus its power upon