## NIÉPCE DE SAINT VICTOR'S DISCOVERY OF NEW AND REMARKABLE PHOTOGRAPHIC PHENOMENA.

THE recently published discoveries of M. Niépce de St. Victor are certainly the most important which have been made since the discovery of photography itself. To the philosopher they are of the utmost importance; they will lead him to seek yet further into the conditions of radiant force, and they may probably compel him to adopt new views as to the actual state of light itself. To the artist and photographer they offer new and beautiful results, by which he may be enabled eventually to *reproduce in darkness the images of objects which have once been exposed to the light.* The importance, therefore, and the extreme novelty of the communication made by M. Chevreul to the Academy of Sciences, on the 16th of November, induces us to present, with as little delay as possible, the subject in full before the readers of the *Art-Journal.*

The conditions now determined are—that *any body, after having been exposed to light, retains in darkness some impression of this light.* M. Niépce remarks—"The phosphorescence and the fluorescence of bodies are well known, but I am not aware that any experiments have ever been made on the subject which I am about to describe."

Expose to the direct rays of the sun, during a quarter of an hour at least, an engraving which has been kept many days in obscurity, and of which one-half has been covered by an opaque screen; then apply this engraving upon a very sensitive photographic paper, and, after twenty-four hours *contact in darkness,* we shall obtain, *in black,* a reproduction of the white parts of the engraving, which, in the process of insulation, has not been sheltered by the screen.

If the engraving has been kept for many days in profound darkness, and we then apply it upon sensitive paper, without having previously exposed it to light, it is not reproduced. Certain engravings which have been exposed to light are reproduced better than others, according to the nature of the paper; but all kinds of paper, even the filtering paper of Berzelius and the *papier de soie,* with or without a photographic design, and others, are reproduced more or less perfectly after exposure to light. Wood, ivory, parchment, and the living skin, are reproduced perfectly under the same circumstances; but metals, glass, and enamels, are not reproduced. If an engraving is exposed to the rays of the sun for a very long time, it is saturated with light: and the intensity of the impressions obtained by contact in darkness is so great, that M. Niépce hopes to arrive at a process by which, operating upon very sensitive papers,—as paper prepared with the iodide of silver, for example, or upon the dry collodion or albumen tablets, and developing the image with gallic or the pyrogallic acid,—to obtain proofs sufficiently vigorous to form an original, from which impressions may be taken. A new means for reproducing engravings will thus be secured.

It may be satisfactory to our photographic friends to give some of M. Niépce's experiments, as described by M. Chevreul.

If we interpose a plate of glass between the engraving and the sensitive paper, the whites of the engraving are no longer impressed upon it. The same interruption of the radiations takes place if we interpose a plate of mica, or a plate of rock-crystal, or of yellow glass stained with the oxide of uranium. We discover further that these substances arrest equally the impression of the phosphorescent rays when placed directly in front of the sensitive paper.

An engraving covered with a film of collodion or of gelatine is reproduced; but an engraving covered with a layer of varnish or of gum is not reproduced. An engraving placed at three millimetres distance from the sensitive paper is very well reproduced; and if the design is of a bold character, it will be reproduced at the distance of a centimetre.* The impression is not, then, the result of action of contact, or of chemical action. A coloured engraving of many colours is reproduced very unequally; that is to say, the colours imprint their image with different intensities, varying with their chemical nature; some producing an impression which is very visible, whilst others scarcely tint the sensitive paper.

It is similar with characters printed with different inks. Printer's ink, whether it be such as is used with type or for copper-plate printing, and the ordinary writing ink, formed of a solution of nutgalls and sulphate of iron, do not give images; while certain "English inks give impressions sufficiently strong." Vitrified characters, traced upon a plate of varnished porcelain, or covered with enamel, are imprinted upon the sensitive paper without the porcelain itself leaving any trace of its presence; but a porcelain not covered with varnish or enamel, such as *biscuit china* or "*la pâte de kaolin,*" produces a slight impression.

If, after having exposed an engraving to the light during one hour, we apply it upon a white card which has remained in darkness during some days, and if, after having left the engraving in contact with the card during twenty-four hours at least, we put *the card in its turn* in contact with a leaf of sensitive paper, we shall have, after twenty-four hours of this new contact, a reproduction of the engraving; a little less visible, it is true, than if the engraving had been applied directly upon the sensitive paper, but yet distinct.

When a tablet of black marble, lightly strewn with white spots, after having been exposed to the light, is applied at once to a sensitive paper, the white parts of the marble only are imprinted upon the paper. Under the same conditions, a tablet of white chalk will produce a sensible impression, while a tablet of charcoal will produce no such effect. When a black and white feather has been exposed to the sun, and applied in darkness to a sensitive surface, the white parts alone imprint their image. The feather of a parrot—red, green, blue and black—has given scarcely any impression, acting as if the feather had been black. Certain colours, however, have left traces of a very feeble action.

Experiments have been made with textile fabrics of different natures and of various colours. The following are a few of the results:—

Cotton—*White* impressed the sensitive paper.
" *Brown* (by madder and alumina). Nothing given.
" *Violet* (by madder, alumina, and iron). Scarcely anything.
" *Red* (by cochineal). Nothing.
" *Turkey Red* (by madder and alum). Nothing.
" *Prussian Blue,* upon white ground, is the blue which produces the best impression.
" *Blue* (by indigo). Nothing.
" *Chamois* (by peroxide of iron). No impression.

Linen, silk, and woollen cloths give equally different impressions, according to the chemical nature of the colours.

M. Niépce calls particular attention to the following experiment, which is, as he says, curious and important:—

We take a tube of metal—of tin-plate, for example, or of any other opaque substance—closed at one of its extremities, and cover the interior with paper or white card: the open end of the tube is exposed for about an hour to the direct rays of the sun. Then apply this open end to a sheet of sensitive paper, and preserve it in this state for twenty-four hours, when the circumference of the tube will have designed its image. More than this. *If an engraving upon china paper is interposed between the tube and the sensitive paper we find the same reproduced.* Reproduced, be it remembered, by the radiations which have been absorbed and re-developed from the interior of the tube. "If we close the tube hermetically as soon as we cease to expose it to the light, we shall preserve, during an indefinite time, the faculty of radiation, which the insulation has communicated, and we shall see that this is manifested by the impression produced when we apply the tube upon a sensitive paper, after having removed the cover by which the tube was closed."

Niépce then informs us, that he has repeated upon images formed in the camera-obscura, similar experiments to those which he has made with the direct light. A piece of card which had been kept in darkness was placed in the camera-obscura for about three hours, and on it was projected an image brilliantly illuminated by the sun. Then the *card was applied to sensitive paper,* and after twenty-four hours there was obtained a reproduction of the primitive image of the camera-obscura. There must be a long exposure to obtain an appreciable result.

It will be remembered that some few years since Professor Stokes drew attention to some peculiar conditions of light, to which he gave the name of *fluorescence.* M. Niépce has made several experiments with substances which possess this peculiar property. A design was traced upon a sheet of white paper with a solution of sulphate of quinine, one of the most fluorescent bodies: the paper was then exposed to the sun, and subsequently applied to the sensitive paper. The fluorescent parts were reproduced in black, much more intense than that of the paper upon which the design was formed. A plate of glass interposed between the design and the sensitive paper prevented any impression. A plate of glass, coloured yellow by the oxide of uranium, produced the same effect. If the design in sulphate of quinine has not been exposed to light, nothing is produced upon the sensitive paper. M. Niépce then tells us that a design traced with phosphorus upon paper will, without being exposed to light, impress very rapidly the sensitive paper. This impression is, beyond all doubt, due to the formation of phosphide of silver—it is a chemical change quite independent of the luminous effect, and has nothing in common with the other phenomena. He says, however, that the same effects are produced by fluate of lime, rendered phosphorescent by heat.

Such are the principal matters to which M. Niépce now directs attention; and if his results are confirmed by further experiments, they must materially change our views of luminous variations.

Many readers may possibly remember the experiments of M. Moser, which excited much attention at the time of their publication (1842), and to those it may appear that the results above described are of a similar character. It is important that the agreement and the differences between them should be pointed out. M. Ludwig Moser stated *that light of a peculiar degree of refrangibility is absorbed by all bodies,* and *that they radiate it again in darkness.* This expresses nearly the same facts as those now discovered by M. Niépce, but a second statement by the Konigsberg professor separates the two sets of experiments widely from each other. Moser says—"*If a surface has been touched in any particular parts by any body, it acquires the property of precipitating all vapours which adhere to it, or which combine chemically with it, on those spots, differently to what it does on the other untouched parts.*"

These facts, and the experiments upon which they were founded, were published in two memoirs in *Poggendorff's Annalen,* under the titles of "Some Remarks on Invisible Light," and "On the Power which Light possesses of becoming Latent." These memoirs were afterwards translated, and published in the *Scientific Memoirs,* vol. iii., Part XI., February, 1843.

Having first stated the peculiar phenomena of the Daguerreotype process—in which the vapour of mercury is deposited on the silver along defined lines—he proceeds to show "*that contact is capable of imitating the action of light.*" Placing upon a plate of silver, stones, horn, glass, wood, and other similar bodies, Moser found, after contact for a short time, that they had all left traces of themselves on the metal, and that the images could be developed by the vapour of mercury. It was also shown by Moser that a mezzotint engraving would, if placed very near, but not touching an iodised silver plate, in the dark, produce eventually a copy of itself, which might be developed by the vapour of mercury. The author of this paper had, however, previously published in the *Philosophical Magazine,* for November and December, 1841, another process which appeared to explain the causes of the singular result: the following was the author's process:—A well-polished plate of copper is rubbed over with the nitrate of mercury, and then well washed, to remove any nitrate of copper which may be formed; when quite dry, a little mercury, taken up on soft leather or linen, is rubbed over it, and the surface worked to a perfect mirror. The engraving to be copied is to be placed smoothly over the mercurial surface, and a sheet or two of soft, clean paper being placed

* The millimetre is 0·03937 of an English inch. The centimetre is 0·39371 of an English inch.

upon it, it is pressed into equal contact with the metal by a plate of glass or a flat board; and in this condition the arrangement is allowed to remain for some time. Then the plate of metal—the print being removed—is placed in a closed box prepared for generating the vapour of mercury. The vapour is to be slowly evolved, and in a few seconds the picture will begin to appear: the vapour of mercury attacks those parts which correspond to the white parts of the printed page or engraving, and gives a very faithful but a somewhat indistinct image. The plate is now removed from the mercurial box, and placed in one containing iodine, to the vapour of which it is exposed for a short time; it will soon be very evident that the iodine vapour attacks those parts which are free from mercurial vapour, blackening them: hence there results a perfectly black picture, contrasted with the grey ground formed by the mercurial vapour. (See "Researches on Light," second edition, p. 261.) To this process, being at that time convinced that the result was due to heat radiations, the author gave the name of Thermography. Though still convinced that a very large number of the results obtained by Moser were due to the power of the bodies employed to absorb and radiate heat, the author thinks it is not improbable that some of the phenomena observed may have been due to the conditions now developed by M. Niépce. However this may be, it is clear that the French photographer has opened out a most important line of investigation, and, without doubt, many of our younger philosophers will seize upon this new ground, and determine the problem as it relates to the *luminous*, the *calorific* or the *chemical* principles of the solar radiations.

One of the earliest investigators of the chemical solar radiations was M. Nicéphore Niépce, who was the uncle of the present investigator, M. Niépce de St. Victor. An exile from his country, M. N. Niépce continued his investigations at Kew; and, judging from the brief records which he has left behind him, he appears to have made some important additions to the sum of human knowledge. Amongst other statements which have been recorded, we find that M. Niépce said,—"The sunlight cannot fall upon any body without producing either a chemical or a molecular change; and that, during the hours of night and darkness, all bodies possessed the power of restoring themselves to the same condition in which they were previously to the destructive action of the sunshine." The results obtained by the nephew fully confirm the views of the uncle, and prove him to have been one of those far-seeing philosophers by whom the knowledge of natural truths are greatly advanced.

There has been, from the earliest period of chemical research, an impression that light was absorbed, and that important changes were due to that absorption. The alchemists taught that "*gold only differs from silver in being interpenetrated and pierced through with the sulphureous principle of the sun's rays.*" Consequently, following out this hypothesis, they exposed everything to solar action, and hence discovered the peculiar blackening of horn-silver (*luna cornea*), chloride of silver, and some other similar facts. Step by step we are advancing towards a correct knowledge of the influences of solar radiations on matter, and the researches of M. Niépce de St. Victor appear to teach us that the alchemical speculation was more philosophical than we have thought it to be. Here we have the evidence that certain bodies possess in a remarkable manner the property of absorbing the solar rays, and of emitting them again in darkness.

Now we must entertain one of two considerations, in which we must be guided by our preconceived notions of the nature of light. On the one hand, it may be supposed that a material element, *luminiferous ether*, has been absorbed, and that it is again radiated in darkness; on the other hand, it will be conceived that the luminous undulations establish in the bodies exposed to the sunshine *motions*, which, so far from returning to a state of rest when removed from the exciting cause, continue in this state of disturbance, and become new sources of radiant force.

The researches of M. Niépce clearly show that the three phenomena united in the sunbeam—heat, light and chemical power, *actinism*—are absorbed and radiated differently according to the physical condition of the surfaces upon which the solar radiations fall. The laws regulating these absorptions and reflections have yet to be determined.

Within a few years, we have learnt that the moment a solar ray falls upon a chemically prepared tablet, a chemical change is set up; and hence we have the Daguerreotype, the calotype, the collodion, and all the other photographic processes. Pictures of the utmost beauty and unerring truth are produced in an exceedingly short time. Not only are we enabled to catch the play of the human countenance, and the varying aspects of light and shadow in a landscape, but the ever-changing and fleeting cloud is made to impress its own image; and ere the wave breaks in billows on the shore, its reflecting surface may be made to paint it on the tablet within the camera-obscura.

We have now advanced beyond this: engravings may be exposed for a short time to the sunshine, and become saturated with that principle which produces *chemical* (photographic) change. We have seen that this principle may be hermetically sealed up—that we may indeed bottle the solar rays, and employ them at some convenient time to produce pictures in actual darkness. We appear, indeed, to be advancing towards a proof of the correctness of the remarkable words of Dr. Taylor, who in his "Scheme of Scripture Divinity," in 1762, wrote that "light was a substance distinct from all other, existing in darkness, expanded through all things at all times (in a latent and invisible state), and rendered visible by being properly excited."

ROBERT HUNT.

## ART IN CONTINENTAL STATES.

PARIS.—A statue is being executed by M. Jules Cordiex, for the principal square of Algiers; it represents "France—Christian, Civilized, and Warlike."—Among the paintings purchased at the last *salon*, by order of the Emperor, were, "Cæsar passing the Rubicon," by R. Boulanger, for the museum of Amiens; the "Salutation of the Muse," by Frillé, for the museum of Aix; the "Banks of the Rhone," by P. Flaudrin, for the museum of Lyons; and the "Battle of the Tchernaya," by Charpentier, for the museum of Versailles.—The Academy of Fine Arts has elected M. Achille Fould an honorary member.—A picture by Murillo, representing the "Prodigal Son," has been presented by the Queen of Spain to the Pope, who has sent in return a superb mosaic.—Mr. Louis Fould has presented the Academy of Inscriptions and *Belles Lettres* with 20,000 francs, which is to be given as a prize to the author or authors of a work entitled "History of the Arts of Design; their Origin, Progress, and Transmission to the various people of Antiquity, up to the Period of Pericles." The award to be made in the *séance* of 1860; foreign authors are admitted as candidates. The essays are to be delivered to the secretary of the Institute before the 1st of January, 1860, they must be written in French or Latin.—The colossal statue of "Ceres," found in the campagna of Ostia, is destined for the Louvre.—A new medal by M. Depaulis, on the capture of Sebastopol, has just been issued.

MOSCOW.—M. Ramazonoff, a Russian sculptor of celebrity, is engaged upon a monument to be erected in this city, to the memory of the late Emperor Nicholas. It will be ornamented with four bas-reliefs, representing important epochs in the history of the monarch; one, a scene in the revolt of 1830, when, rushing into the midst of a band of infuriated peasants, he frightened them into submission, by exclaiming, in a loud voice, "On your knees!" another bas-relief also represents an incident in the same outbreak; the third, Georgey, the Hungarian leader, capitulating to the Russians; and the fourth, the first arrival of the imperial family, by railway, in Moscow.

BERLIN.—Professor Kiss has been commissioned to execute six statues of Prussian generals, to replace the old figures which stand on the Wilhelmsplatz, at Berlin. These statues are portraits of Keith, Schwerin, Winterfeldt, Dessauer, Seidlitz, and Ziethen, who commanded in the Seven Years' War. Those of our readers who have visited Berlin will recollect that three of these figures appeared in Roman costume, but the whole will hereafter be seen in the military uniform of the period of their time.—Wredow's group of "Nike carrying the Dying Warrior to Heaven," in marble, has been placed on the Schloss Bridge: it is the eighth and last group intended for this structure.

JENA.—A statue of the Elector John Frederick of Saxony, will be erected here next summer; it has been cast at the iron-foundry of Lauchhammer.

## THE ROYAL PICTURES.

### THE OPENING OF NEW LONDON BRIDGE.

C. Stanfield, R.A., Painter. T. A. Prior, Engraver.
Size of the Picture, 8 ft. 0½ in. by 5 ft.

LONDON of fifty years ago, and London of the present day, are almost two different and distinct cities; so dissimilar are they that the staid citizen who, in close-curled wig, deep-lapelled vest, and grey worsted stockings, perambulated the metropolis at the commencement of the century, would now, if alive and desirous of going "on 'Change," be scarcely able to find his way there, or indeed to know in what place he was at all. Improvements or accidents have removed all his old landmarks—highways have expanded, byways disappeared, churches been levelled with the ground, others, heretofore more than half concealed, are laid open to the gaze of the passenger; warehouses, externally gorgeous as palaces, have risen up everywhere; and shops, glittering with wealth exceeding a prince's ransom, would meet his astonished eyes at every turn he took, in lieu of the old, dark, and dingy edifices over whose doorways hung a golden lamb, or grasshopper, or "sign" of some sort, denoting the business carried on by the tenant. Bow Church, and the Monument he would find much as he knew them at first, except that the former looks sprucer and more cleanly, and the latter has lost the inscription concerning which Pope wrote—

> "London's huge column, pointing to the skies,
> Like a tall bully, lifts its head—and *lies*."

Yet the church and the column would only be recognisable in themselves; around each all is changed. "But where," asks the old citizen, "is the Exchange, and the newsvendors' shops, that seemed as if hewn out of the arches that formed the colonnade? where all the old inns at which I used to take coach for business or pleasure—the 'Saracen's Head,' 'Belle Sauvage,' 'Gerard's Hall,' 'Cross Keys,' 'Golden Cross?' what has become of them all? Where is St. Stephen's Chapel, in which I once heard Pitt and Fox in animated debate? What have you been doing to the Tower? I don't see the old Armoury: and where is London Bridge?" Such, and a score other similar remarks, would naturally be made by some octogenarian who had not visited the metropolis for half a century, or even less: he would find "old things have passed away, all things have become new:" the London of his youth is old London to us; and there is no surer sign of the restless, innovating, changing spirit of our times—restless for evil as well as for good, though not in matters to which reference is now especially made—than is exhibited by the works that the engineer, the architect, and the builder, are erecting everywhere around us.

Old London Bridge was not taken down till its removal became a necessity: independent of its condition through age (the foundations were laid in 1176), and the peculiarity of its structure as an impediment to navigation, its dimensions were too contracted for the living stream that, in the latter years of its existence, in annually increasing floods passed over it, and which the erection of other bridges scarcely tended to diminish. The foundation-stone of New London Bridge was laid on June 15, 1825; it was opened to the public August 1, 1831. The late Mr. Rennie designed, and partly carried out the structure, but it was completed by his sons George and Sir John, at the cost, including approaches, of £1,458,311 8*s.* 11¾*d.*! these odd farthings have the appearance of very close calculation in a work of such a nature.

Mr. Stanfield's picture of the opening ceremony was a commission from the king, William IV., who ordered a boat to be at the service of the artist during the day: the view seems to have been sketched from the centre of the river, "above bridge," and on the Surrey side. There is quite a pageant on the bosom of the Thames; royal state barges, and civic state barges, and barges of all sorts and all colours, float around and beneath the new bridge, over which the procession of royal, noble, and official personages makes its first passage: it is an animated scene, skilfully placed by the artist on his canvas.

The picture is in the Royal Collection at Windsor Castle.