

The Evolution of the Camera.

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EARLY EXPERIMENTS IN PHOTOGRAPHY—THE CAMERA OBSCURA, THE SILHOUETTE, THE DAGUERRETYPE, AND THE WONDERFULLY SIMPLE AND EFFICIENT APPARATUS OF THE PRESENT DAY.

PHOTOGRAPHY is a child of the nineteenth century, but the camera may be said to trace its origin back to the middle ages. It began with an Italian philosopher, Baptista Porta, during the last half of the sixteenth century, and was called the camera obscura. It was simply a darkened room, to which light was admitted only through a single small hole in the window shutter. In such a room, when the sun shone brightly, a faint inverted image of the landscape outside of the window could be seen on the whitened surface of the wall opposite.

Porta's discovery was hailed with delight. " We can discover nature's greatest secrets! " he is said to have exclaimed in his enthusiasm. Later he improved this primitive camera by placing a double convex glass lens in the aperture of the shutter, and a mirror outside of the window, to receive the light and reflect it through the lens. This made the image clearer and brighter, even on dull days, and projected it on the screen or wall in a natural, or upright, position. Crowds of delighted sightseers flocked to Porta's house in Naples, to observe these wonderful pictures, painted by the light, as it were, and glowing with all the life and color of nature itself.

Soon other improvements were made on the camera obscura, and it became a frequent adjunct to the country villas of the rich. Some were erected in the form of a circular building, located, if possible, on a hill. The lens was placed in the apex of the conical roof, with a reflecting mirror above it, so as to throw the light from the surrounding landscape down through the lens, forming a series of pictures, or a panorama, on the whitened surface of a table placed in the middle of the room. Practically this is the camera obscura of our present time, which may still be seen at popular summer resorts. It frequently makes interesting revelations of the doings of unsuspecting outsiders, who are in blissful ignorance of the fact that their actions are vividly pictured for the amusement of those within the camera.

The first camera, then, revealed its pictures only to those who could stand within its darkened walls, and the operator, or original photographer, made his pictures from within his camera. Contrast with this the modern "pocket" camera, scarcely more than an inch in all dimensions, which makes instantaneous "snap shots" by the simple pressure of a button.

THE BEGINNINGS OF PHOTOGRAPHY.

But the first beginnings of photography go further back even than Porta's camera obscura. A lens was necessary to perfect that apparatus, and this is a device of very ancient origin. One that was found in the ruins of Nineveh is now on exhibition in the British Museum. During the middle ages the manufacture and properties of simple lenses were well understood in Europe. There is, moreover, an ancient Chinese tradition which credits the sun with producing pictures of the neighboring objects upon the ice covered surfaces of lakes and rivers. A similar idea must have possessed the mind of Fenelon when, in 1690, he wrote his fable called " Une Voyage Suppose," descriptive of the journeys of an imaginary personage, in which is the following passage:

There was no painter in that country ; but if anybody wished to have the portrait of a friend, of a picture, a beautiful landscape, or of any other object, water was placed in great basins of gold or silver, and the object desired to be painted was placed in front of that water. After awhile the water froze and became a glass mirror on which an ineffaceable image remained.

Ice, apparently, was nature's first lens, as water was her first mirror, and the darkened room of Porta the first camera. It was reserved for Tiphaigne de la Roche to make a still nearer guess as to the manner in which " nature printed " pictures would one day be produced. In 1760 he wrote a book entitled " Giphantle "-the title is an anagram of his own name-containing a series of wild imaginings, one of which must have appeared especially improbable to his contemporaries, although it has since been literally fulfilled. The hero of " Giphantie " is carried by a hurricane to a strange land, where the method by which the native genii produce pictures is explained to him.

"You know," said the guide, " that rays of light reflected from different bodies form pictures, paint the image reflected on all polished surfaces-for example, on the retina of the eye, on water, and on glass. The spirits have sought to fix these fleeting images; they have made a subtle matter by means of which a picture is formed in the twinkling of an eye. They coat a piece of canvas with this matter, and place it in front of the object to be taken. The first effect of this cloth is similar to that of a mirror; but by means of its viscous nature the prepared canvas, unlike the mirror, retains a facsimile of the image. The mirror represents images faithfully, but retains none; our canvas reflects them no less faithfully, but retains them all. This impression of the image is instantaneous. The canvas is then removed and deposited in a dark place. An hour later the impression is dry, and you have a picture the* more precious in that no art can imitate its truthfulness."

After reading this very remarkable prophecy, one can hardly help thinking that De la Roche must have conceived the idea after viewing the pictures shown with Porta's " dark chamber," a contrivance which, as we know, was already in vogue.

While the first pictures made by light were remarkable, both in color and form, they were in reality little more than fleeting

reflections, and not photographs at all. They were produced by the visual and not the chemical action of sunlight, while real photographs are produced by the chemical action of the sun's rays.

THE FIRST CHEMICAL PROCESSES.

"The power of the sun's rays to darken certain substances was known from the earliest times, and the old alchemists, in their eager search for the philosopher's stone, early discovered that horn silver, or *luna cornea*, as it was then called, quickly turned black when exposed to sunlight. J. H. Schultz, a German, who has been called "the Columbus of photography," actually obtained what may be called photographic copies of writing as early as 1727, by placing the written characters upon a level surface previously prepared with a mixture of chalk and silver nitrate. The rays of light passing through the translucent paper blackened the silver compound beneath, except where it was protected by the opaque ink forming the letters themselves, and thus a white copy upon a black ground was obtained.

Charles William Scheele, a distinguished Swedish investigator of the eighteenth century, made the first careful record of the behavior of silver chloride under the influence of light. A few years later Professor Charles, inventor of the hydrogen gas balloon, made the first use of the dark room for producing rudimentary photographs. By means of strong sunlight, he projected the shadow of the head of one of his pupils on a sheet of white paper, which had previously been rendered sensitive by being soaked in a solution of chloride of silver. Under the influence of the chemical action of the sun's rays, the exposed parts of the paper soon became blackened, while that part of the sheet which had been shaded by the student's profile remained white, thus giving a faithful silhouette of his head in white on a black ground. Professor Charles, however, had no way of "fixing" this fleeting image upon the sensitive paper and thus preserving it for future examination. His photographic profiles were the first silhouettes, or "shadowgraphs," as they were later called.

The making of mechanical silhouettes was very popular during the early half of the last century. A sitter was placed between strong sun or lamp light and a white wall or a sheet, and the outline of the shadow cast by the profile was drawn on the piece of paper placed to receive it. These shadowgraphs were large or small according to the sitter's distance from the wall, and the making of them still forms a pleasant amusement for young people. At one time, also, miniature silhouettes cut out of black paper by experts with the scissors were very much in vogue. These are the only authentic portraits we have of some prominent people of an earlier time.

The camera did not develop very much from Porta's darkened room until about the time of Daguerre's wonderful discovery, for practically all the intervening pictures made by means of light were optical and chemical, and did not require any special apparatus.

NIEPCE AND DAGUERRE.

The first man to obtain a permanent photograph, in the modern sense of the word, was Nicéphore Niepce, a Frenchman, who died in 1833. He left little written description of his methods, except in his letters to his brother Claude. In one of these letters Niepce tells us that his, first camera was fashioned out of a cigar box, while his lenses were " the lenses of the solar microscope which, as you know, belonged to our grandfather, Barrault."

In a letter written to his brother in 1816, Niepce describes how he secured what was probably the first picture ever taken With the camera:

My object glass being broken, and being no longer able to use my camera, I made an artificial eye with Isidore's ring box, a little thing from sixteen to eighteen lines square. I placed this little apparatus in my workroom, facing the open window looking on to the pigeon house. I made the experiment in the way you are acquainted with, and I saw on the white paper the whole of the pigeon house seen from the window. One could distinguish the effects of the solar rays in the picture from the pigeon house up to the window sash. The possibility of painting by this means appears almost clear to me. I do not hide from myself that there are great difficulties, especially as regards fixing the colors, but with work and patience one can accomplish much.

About the same time Daguerre was experimenting along independent lines. Daguerre was a scene painter, and in order to add realism to his stage views he invented an apparatus known as the diorama, which he opened to the public in Paris in 1822. He painted the pictures on both sides of the canvas, and produced some peculiar effects by showing the picture first by reflected and then by transmitted light. In his preliminary sketches from nature, as studies for his immense pictures, he frequently employed the camera obscura, and it was the beauty and perfection of its images that led him to seek a means by which they could be permanently retained. Learning of the experiments of Niepce, Daguerre formed a partnership with him.



LOUIS JACQUES MANDÉ DAGUERRE.

Drawn from a daguerreotype portrait made by J. E. Mayall in 1840.



The discovery of the Daguerre process itself, in 1839, was an accident. Daguerre records that he had been toiling year after year to realize his ideal, neglecting his regular duties, and shutting himself up for hours at a time in his laboratory. His wife sought medical advice as to his sanity, and was not greatly reassured, we may believe, when the physicians said that in their opinion the object of her husband's researches was "not absolutely impossible"! The happy accident which finally led to his discovery is thus described by W. Jerome Harrison, in his "History of Photography":

It appears that one day Daguerre removed from his camera a plate which, either from the shortness of the exposure or the dullness of the light, showed no sign of an image. He placed this blank plate in a store cupboard, intending to clean the surface and use it again. But what must have been our photographer's

surprise when, on taking out this plate the next morning, he found upon its surface a distinct and perfect picture! Another prepared plate was quickly exposed for an equally short time within the camera, and again a sojourn of twenty four hours within the magic cupboard sufficed to bring out a picture. The next step was to ascertain to which of the numerous chemicals kept within the cupboard this marvelous effect was due. By a process of elimination, it was at last traced to a dish full of mercury.

Delighted by this fortunate discovery, Daguerre at once proceeded to place the exposed plates over a dish of warm mercury, when the vapor proceeding from the liquid metal was found to settle upon the iodized silver in exact proportion to the intensity of the light by which each part of the plate had been affected. This was, in fact, a process of "development," an invisible or "latent" image being strengthened and thereby made visible. Some such methods of developing the originally feeble impressions produced upon sensitive plates by a short exposure to light have been found necessary in every photographic process.

THE DAGUERREOTYPE.

The discovery was not given to the world, however, until 1839, five years after the death of Niepce. The French government settled a pension on Daguerre and also on the heir of his partner, and then generously gave the process to the public. The daguerreotype was much improved after it became common property, and was extremely popular for portraiture, especially in America, where the first

attempts at picturing faces appear to have been made. Especially notable were the experiments made by Professor Draper and by S.F.B. Morse, the inventor of the electric telegraph.

In its perfected form, the daguerreotype is a beautiful production, unfortunately but too rarely seen at the present time. It is absolutely permanent, and possesses also a certain charm of color, due to the metals which compose its image. It has serious drawbacks, however, the chief one being that only one picture, can be made at a time, and for every portrait required the subject has to give a separate sitting. It cannot be duplicated from a negative, as in the case of the modern photograph. Moreover, it cannot be retouched, and is therefore too truthful a representation of the original to suit some people.

Nathaniel Hawthorne was impressed with this latter fact in regard to the daguerreotype, and made striking use of it in his "House of the Seven Gables." Holgrave, the daguerreotypist, while showing a portrait of his respected kinsman, Judge Pyncheon, to *Phoebe*, the heroine of the story, says:

There is a wonderful insight in heaven's broad and simple sunshine. While we give it credit only for depicting the merest surface, it actually brings out the secret character with a truth that no painter would ever venture upon, even could he detect it. There is at least no flattery in my humble line of art. Now, there is a likeness which I have taken over and over again, and still with no better results. The remarkable point is that the original wears to the world's eye—and, for aught I know, to his most intimate friends—an exceedingly pleasant countenance, indicative of benevolence, openness of heart, sunny good humor, and other praiseworthy qualities of that cast. The sun, as you see, tells quite another story, and it will not be coaxed out of it, after half a dozen patient attempts on my part. Here we have the man, sly, subtle, hard, imperious, and withal cold as ice. Look at the eye! Would you like to be at its mercy? At that mouth! Could it ever smile? And yet, if you could only see the benign smile of the original!

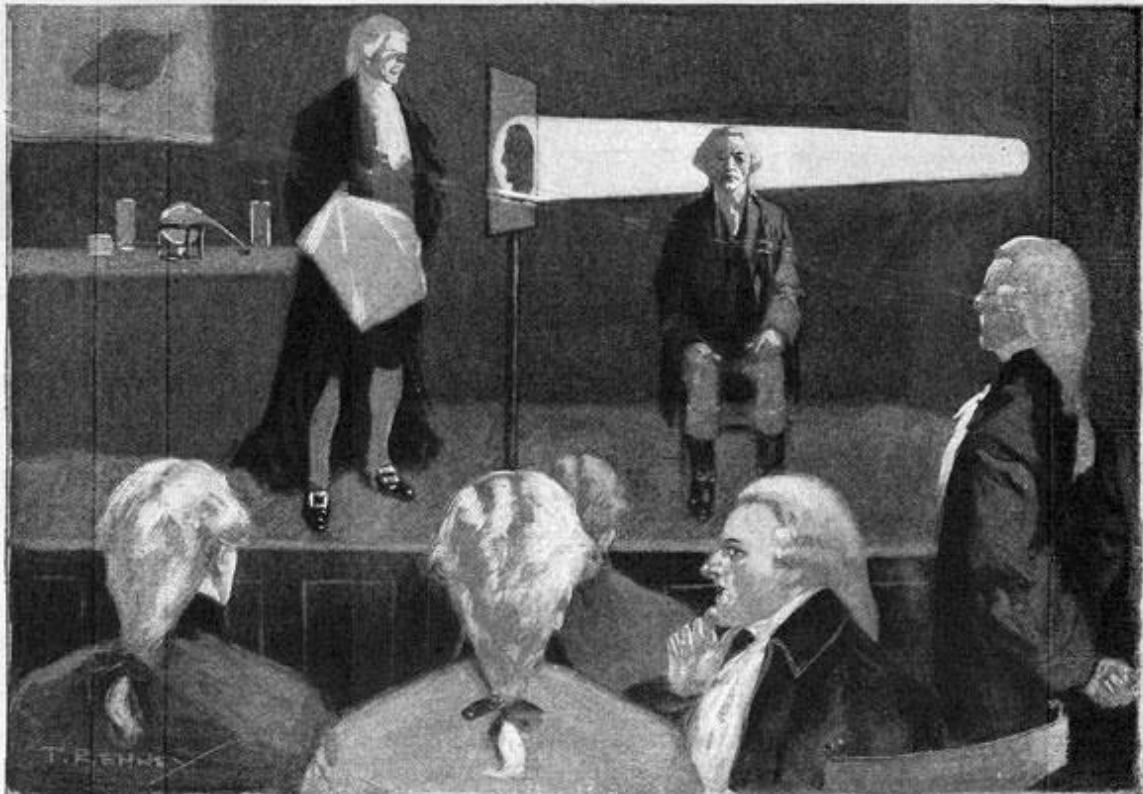
The unflattering quality of so many daguerreotypes suggests the debt that the modern sitter frequently owes to the retoucher who smooths down the hard lines of an over faithful negative.

THE MODERN RAPID CAMERAS.

The introduction of the collodion or wet plate "process, as it was called, was a great advance, as it made possible the duplication of



photographs from one original, or negative. It also made possible landscape photography on a larger scale, though few amateurs cared to carry about the cumbersome apparatus necessary to work it. Minor mechanical modifications of the camera followed the introduction of the daguerreotype process, but it did not become greatly changed until the gelatine or dry plate was introduced. This was a still greater advance than was the discovery of the collodion process. Now, for the first time, the clumsy apparatus required to develop the negative, while still wet, in the field, could be dispensed with and only a simple camera was necessary for making photographs out of doors.

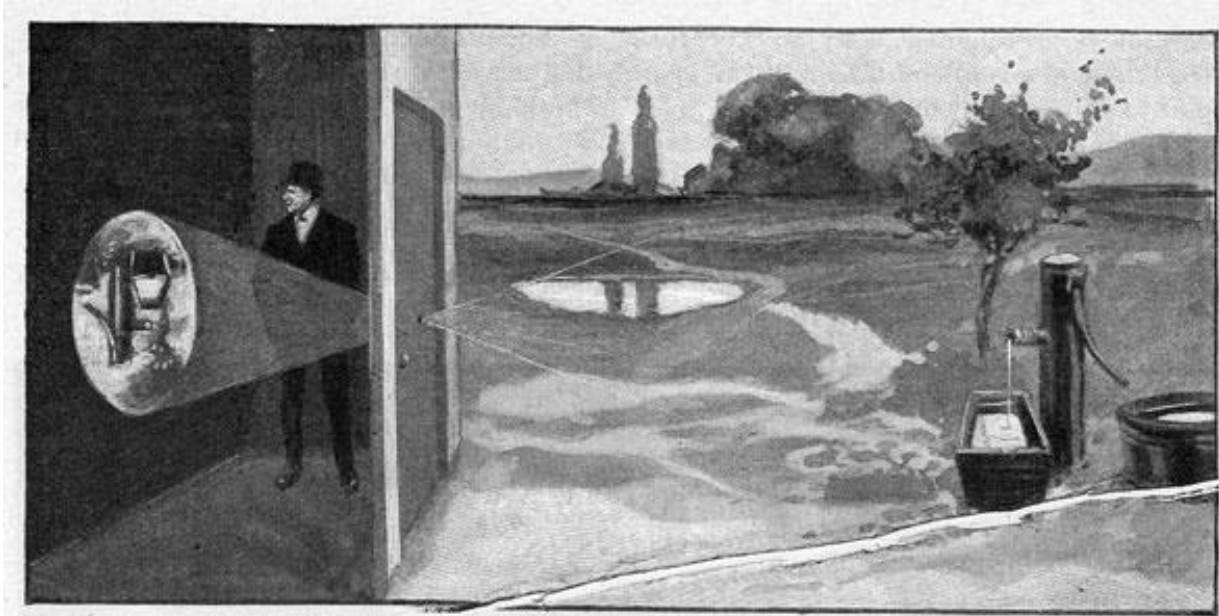


PROFESSOR CHARLES' EXPERIMENT—BY MEANS OF STRONG SUNSHINE HE PROJECTED THE SHADOW OF A MAN'S HEAD UPON A SHEET OF PAPER SENSITIZED WITH CHLORIDE OF SILVER, MAKING A WHITE SILHOUETTE, WHICH, HOWEVER, HE WAS UNABLE TO "FIX."

My father, the late W. Irving Adams, designed and commercially introduced the first real amateur camera. It was a simple tripod apparatus, without any of the modern improvements; but, being cheap in price, the complete outfit costing only ten dollars, and easily carried about, it placed the art within the reach of thousands, and gave amateur photography its first great impulse in America.

As lenses were improved, and dry plates became more sensitive, instantaneous photography was made possible, and this led to the manufacture of the "detective" or hand camera. Magnesium, as an artificial source of light for photography, made it possible to take pictures at night and in dark places where the sun's rays never penetrate. The types and forms of photographic apparatus were rapidly multiplied. The hand camera was developed into the folding camera by Henry Clay Price, and his design became the model for most of the present hand cameras of this class.

The hand camera for strictly snap shot work has been made in more forms than any other general type, the first object being, in many cases, to conceal the fact that it is a camera at all. Thus were made the " book " camera, in imitation of a package of books, and the " vest " and " hat ". cameras. The " pocketbook " and " opera glass " cameras were also popular with amateurs at one time; and there were also the "gun" camera and the " pistol " camera, not to mention various types of kodaks and film cameras which were later introduced.



THE FIRST CAMERA—THE CAMERA OBSCURA, INVENTED BY BAPTISTA PORTA IN THE SIXTEENTH CENTURY. A SMALL HOLE ADMITTING THE SUNLIGHT, AN INVERTED IMAGE OF THE LANDSCAPE IS PROJECTED ON THE OPPOSITE WALL.

The manufacture of a flexible transparent film in continuous rolls was the next great advance in photography. It is my opinion that to the late Rev. Hannibal Goodwin is due the credit for making and exhibiting the first successful transparent flexible film suitable for photographic purposes; and it was W. J. Stillman who first designed an effective roll holder. The practical genius of George Eastman made a commercial success of both the roll holder and the film, the combination of which may be said to have introduced a new system of photography.

We all know what the kodak, by simplifying the process, had done to popularize photography in this country and in Europe. Of late years there has been a natural reaction from " button pressing." Amateurs want to " do the rest " themselves, and this has made a demand for the modern folding type of camera which can be closed up in the most compact form or extended, when desired, for long distance, work, and which uses either films or plates. Such a camera, with its various attachments, rear and front swings, reversing adjustment, and portable holders, is a natural descendant of the darkened room or camera obscura of Porta. In its best form it is an almost perfect instrument.