

Transcription of the Patent issued to Miles Berry for the Daguerreotype in England

{Camera Obscura improvements in Berry's Specification}

To all to whom presents shall come I Miles Berry of the Office for patents 66 Chancery Lane in the County of Middlesex patent agent Send Greeting Whereas Her present most Excellent Majesty Queen Victoria by Her Royal Letters patent under the Great Seal of Great Britain bearing date at Westminster the fourteenth day of August in the third year of Her reign and in the year of our Lord One thousand eight hundred and thirty nine did for herself her heirs and successors give and grant unto me the Miles Berry her especial license full power sole privilege and authority that I the said Miles Berry my executors administrators and assigns and such others as I the said Miles Berry my executors administrators or assigns should at any time agree with and no others from time to time and at all times during the term of years therein mentioned should and lawfully might make use exercise and vend within England Wales the Town of Berwick upon Tweed and in all Her Majesty's Colonies and plantations abroad an Invention of "A new or improved method of obtaining the spontaneous reproduction of all the images received in the focus of the Camera Obscura" being a Communication from a Foreigner residing abroad. In which said Letters Patent is contained a Proviso obliging me the said Miles Barry by an Instrument in writing under my hand and seal particularly to describe and ascertain the nature of the said Invention and in what manner the same is to be performed and to cause the same to be enrolled in Her Majesty's High Court of Chancery within Six Calendar months next and immediately after the date of the said in part recited Letters Patent as in and by the same reference being thereunto had will more fully and large appear. Now know ye that in compliance with the said proviso contained in the above in part recited Letters Patent I the said Miles Barry do hereby declare that the nature of the said Invention and the manner in which the same is to be performed are particularly described and ascertained in and by the following description thereof reference being had to the plates of drawings hereunto annexed and to the letters and figures marked thereon (that is to say) Before proceeding to the description of this Invention I think it proper to make the following remarks. This Invention or discovery relates to Photogenic drawing or the spontaneous reproduction of images pictures or Representations of nature by the action of light, that is, by the process or method now well known under the Name of "Daguerreotype". I believe it to be the Invention or Discovery of Messrs. Louis Jacques Mande Daguerre and Joseph Isidore Niepce Junior both of the Kingdom of France from whom the French Government have purchased the Invention for the benefit of that Country. This Invention or Discovery was fully communicated to by me by a certain Foreigner residing in France on or about the fifteenth day of July in the year One thousand eight hundred and thirty nine with instructions immediately to petition Her Majesty to

grant Her Royal Letters Patent for the exclusive use of the same within these Kingdoms, and in consequence thereof I did apply for such Letters Patent and Her Majesty's Solicitor General after hearing all parties who opposed the same was pleased on or about the second day of August now last past to issue his Report to the Crown in favor of the Patent being granted and it consequently passed the Great Seal in the usual course being sealed on the day above named which is some days prior to the date of the exposition of the said Invention or Discovery to the French Government at Paris by Messrs. Daguerre and Niepce according to the terms of their Agreement And I will now proceed to describe this Invention or Discovery as communicated to me.

Description of the Process.

The reproduction of the images received at the focus of the Camera Obscura is effected on plates or surfaces of silver which may be plated on Copper. The copper serving to support the surface or sheet of silver, the combination of these two metals contributing towards the perfection of the effect. The silver employed should be without alloy or as pure as possible. The sheet of Copper should be sufficiently thick to preserve the perfect smoothness and flatness of the plate so that the images may not be distorted by the warping thereof but the copper should not be thicker than what would be required to attain that end on account of the weight of the metal. The thickness of the two metals united need not to exceed that of a stout card. The process is divided into five operations. The First consists in polishing and cleaning the silver surface of the plate in order to properly prepare or qualify it for receiving the sensitive layer or coating upon which the action of the light traces the design. The Second operation is the applying that sensitive layer or coating to the silver surface. The Third in submitting in the Camera Obscura the prepared surface or plate to the action of the light so that it may receive the images. The Fourth in bringing out or making appear the image picture or representation which is not visible when the plate is first taken out of the Camera Obscura. The Fifth and last operation is that of removing the sensitive layer or coating which would continue to be affected and undergo different changes from the action of light this would necessarily lead to destroy the design or tracing so obtained in the Camera Obscura.

Description of the First Operation Preparing the Silver Surface of the Plate

For this operation are required a small phial of olive oil some cotton very finely carded, a small quantity of pounce or pumice powder ground extremely fine and tied up in a small bag of muslin sufficiently thin in texture to allow the powder to pass easily through when the bag is shaken. A phial of Nitric Acid diluted with pure water in about the proportion of one part of Acid to sixteen parts of distilled water. A Wire frame or stand on which the plates can be placed so as to be heated by means of a Lamp. Lastly a spirit or other lamp to heat the plates. The

size of the plates or surfaces are limited by the dimension of the apparatus. The plates must first be well cleaned and polished. To effect this begin by sprinkling the silver surface with pounce by shaking the bag without touching the plate and then with cotton impregnated with a little olive oil rub it gently on lightly moving the hand round in circles from the centre **C (see Fig: 2 plate 1.)** the plates during this operation should be placed flat on sheets of paper which must be changed when necessary. The pounce must be sprinkled several times and the cotton changed several times during the operation of rubbing. The pestle and mortar used for pulverizing the pounce or pumice powder should not be formed either of Cast Iron or Copper but made of porphyry. The pounce should be ground afterwards on a glass plate with a glass muller pure water being used in the operation. The pounce should be used only when perfectly dry. It will be readily conceived how important it is that the pounce or pumice powder should be sufficiently finely pulverized so as not to cause streaks or scratches on the silver surface for it is in a great measure upon the fine polish of the surface of the plate that depends the beauty of the image picture or tracing produced thereon. When the plate is perfectly polished it must then be cleaned this is effected by dusting or sprinkling the powder over the surface and rubbing it with dry cotton the movements of the hand being made in circles and backwards and forwards and up and down crossing each movement in order to operate fully on all parts of the surface. This is the best mode of rubbing to gain the desired result. Next a small knot or tuft is made with carded cotton which is to be moistened with a little acid diluted in water as above stated. To do this the knot of cotton may be placed on the mouth of the bottle containing the diluted acid and pressed thereon the phial being then inverted and then placed again upright so that the centre of the tuft of Cotton may be moistened with acid without deeply impregnating it, very little acid is required and care must be taken not to wet the fingers with it. With this tuft so charged with acid the surface must be rubbed care being taken to carry the acid uniformly over all parts of the surface of the plate, the Cotton should be changed several times and the rubbing of the surface be made by moving the hand round and round and crossing as before so as to extend equally the acid, which never the less ought to do no more than cover slightly the surface of the plate. It will sometimes happen that the acid applied on the surface of the plate will be found to accumulate into small globules, these must be destroyed by changing the cotton and by rubbing the plate gently so as to spread evenly the acid, for on any place where the acid has been allowed to rest a time or has not be laid evenly it would form spots or stains. It will be seen that the acid is evenly spread upon the surface of the plate by its appearing covered with a uniform tint or what may be termed a thin veil or change of surface; the plate is finally to be sprinkled with pounce or pumice powder and cleaned by slightly rubbing it with a piece of carded cotton. Instead of ordinary pounce calcined Venetian Tripoli may be used. The plate thus prepared is then to be submitted to a considerable degree of heat. To do this it is placed on a wire frame such as shown at **Fig. 1 and 1 bis (Plate 1)** the silver surface being uppermost. Under the plate is to be placed a

lighted lamp which is to be moved about so that the flame shall act equally upon all parts, when the plate has been submitted for about five minutes to this operation (or until the heat has acted equally upon all parts of the plate) it will be perceived that the surface of the Silver has obtained a whitish tint or coating and then the action of the heat must cease. This effect may be obtained by other means, for instance, the heat of lighted charcoal may be used which may be preferable as the operation will be sooner finished. In this case the wire frame is unnecessary for the plate may be laid on the stove or held with tongs the silver surface always being upwards and it may be moved backwards and forwards on the furnace so as to heat it equally throughout until the silver surface becomes covered with a whitish tint as above stated. The plate is next to be cooled rapidly by placing it on a cold body or substance such as a marble seal or stone or metal surface; when cooled it must be polished again. This may be quickly done since it is only necessary to remove the white tint which has been formed on the silver surface. To effect this the plate is to be sprinkled with pumice powder and rubbed in a dry state with a portion of cotton this should be done on the surface of the plate several times taking care to change the cotton often. When the silver is well polished it is to be rubbed as above stated with acid dissolved in water and sprinkled with a little dry pounce powder and rubbed slightly with a knot of cotton. The acid is then to be laid upon the plate say three different times care being taken to sprinkle each time the plate with powder and to rub it dry and very lightly with clean cotton. Care should be taken not to breath upon the plate or touch it with the parts of the cotton touched by the fingers as the perspiration would produce spots or stains and dampness of the breath or of the saliva would produce the same defects in the Drawings. When the plate is not intended for immediate use or operation the acid may be used only twice upon its surface after being exposed to the heat. The first part of the operation may be done at any time. This will allow of a number of plates being kept prepared up to the last slight operation. It is however considered indispensable that just before the moment of using the plates in the Camera or the reproducing the design to put at least once more some acid on the plate and to rub it lightly with pounce as before stated- finally the plate must be cleaned with cotton from all pounce dust which may be on the surface or its edges.

Second Operation; Coating the Surface.

For this operation are required the following implements. The box represented in **Plate 2 Figures 1 and 2**. The thin board or frame shown in **Plate 1 Figs. 3**. Four small metallic bands of the same metal as the plates (seen also in **Figs. 3**). A small handle as at **Fig. 5 Plate 1** and a box of small nails or tacks. A phial of iodine. After having fixed the plate upon the board or frame (the silver surface uppermost) by means of the metallic bands and the small nails which are forced into the board by the handle. Some Iodine is then to be put into the cup or dish **D** placed in the bottom of the box **Plate 2 Fig. 1**. It is necessary to divide the Iodine

into pieces in order to render the exhalation more extensively and equally diffused otherwise on the middle of the plate would be formed circles of a kind of Iris or appearance of a Rainbow in Prismatic Colours which would prevent the plate from receiving a uniform impression. The thin board with the plate is then placed with the Silver Surface undermost upon small brackets or supports at the four angles of the box, its cover G is then closed. In this position the plate must be left until the surface of the silver be covered with a fine golden tinge which is caused by the evaporation of the Iodine condensing upon the surface of the silver. If the plate was allowed to remain too long, this golden yellow colour would turn purple or violet colour which must be avoided because in this state the coating is not so sensitive to the effect of light. On the contrary if this coating is too pale or not sufficiently yellow, the Image taken from Nature would be very deficiently or faintly reproduced. Therefore a coating of a golden yellow is particularly desired, because it is the most favourable to the production of the effect. The time necessary for this operation cannot be stated because it depends on several circumstances one is the temperature of the room wherein the operation is conducted; another the state of the apparatus; for this process should be left to itself and not be affected by the addition of any other heat than that of the room. It is very important in this operation that the temperature inside the box be equal to that outside if such were not the case on the plate being passed from a cold to a warm atmosphere it would become covered with condensed moisture from the atmosphere which would do great injury to the effect. This operation should be left entirely to the spontaneous evaporation of the Iodine also the more this box or apparatus is used the less time is required to effect the object, because the interior sides of the box become penetrated by the vapour of Iodine and as it is the nature of this vapour always to evaporate it will arise from all parts of the box and therefore will spread more evenly and more quickly on the surface the plate, which is very important, therefore it is proper to leave a little iodine in the cup on the bottom of the box and also to keep the box free from damp. It is therefore evident that the apparatus will operate better after being used several times. From the causes above stated it is not possible to fix precisely the time necessary for obtaining the coating of golden yellow tint as the same may vary from five to thirty minutes but rarely longer unless the weather be very cold. It is necessary to look at and examine the state of the plate from time to time to ascertain whether it has attained the golden yellow tint required, but, as it is important that the light should be allowed to fall and strike directly upon its silver surface. It may happen that the plate be more colored or tinted at one end than the other: in that case in order to equalise the tint care must be taken in replacing the plate to turn it endways or side for side In order to accomplish these repeated examinations without injuring the sensitive ground or coating, this process should be conducted in a darkened room into which light is admitted sideways not from the Roof. The box should be placed in a dark room where the light enters but feebly, as through a door ajar. When the plate is to be inspected the operator raises the lid of the box where the board may be taken by its edges

with the two hands and turned up rapidly very little light being required to show the true colour of the coating and if the plate has not obtained the golden yellow tinge it must be immediately replaced in the box and there kept until it attains the proper gold colour. If on the contrary the color is deeper then the coating will not be of any use and the plate is to be repolished and cleaned, the first operation being recommenced. From written description this operation may seem difficult and tedious but with a little practice and intelligent operator would be enabled to judge accurately of the time required to obtain the desired golden yellow tint and also to inspect rapidly the plate so as not to give the light sufficient time for acting upon the coating. When the surface of the plate has attained the proper colour the board with the plate must be introduced into the frame represented at Fig's 1, 2, 3, 4. Plate 3, which frame is adapted to the Camera Obscura. In this transference care must be taken to prevent the light striking the on the surface of the plate and for this purpose the Camera Obscura may be lighted with a Wax Taper the light of which has a much less effect upon the coated surface; even this ought not to be allowed to strike too long on the plate as it will cause marks or traces on the same if allowed to continue a long time. After this second Operation is completed the plate is to be passed to the third operation or that of the Camera Obscura. Whenever possible the one Operation should immediately follow or succeed the other. The longest interval between the two should not exceed an hour beyond this time the action of the Iodine and Silver surface will loose their Photogenic properties, But Previous to passing to the third operation I would add the following remarks or observations.

First Observation.

Before using the iodine box the interior should be well cleansed and the box itself turned upside down in order to empty it of all the particles of iodine which may have escaped from the cup, care must be taken not to touch the Iodine with the fingers. During the operation of the coating the surface with Iodine the cup should be covered with a wire or other gauze sketched on a frame; this gauze has the effect of regularly disturbing the evaporation or vapour of the Iodine upon the surface of the plate and at the same time to hinder whenever the lid of the box is closed the compression of air thereby occasioned from causing the particles of Iodine to be scattered or fly about within the box which particles might strike the plate and cause spots or blotches thereon for this reason the lid of the box should always be closed quickly. The same observation applies in case particles of dust should rise inside the box which being charged with the vapour of Iodine might injure the plate by coming in to contact with its surface.

Second Observation

The Iodine box on apparatus above described may be varied according to circumstances or be substituted by the following contrivance. A thin clear board

similar to the one used for fixing the plate upon is first to be saturated with the vapour of the Iodine; this may be done in a box similar to the one above described; or even in a box only two inches high. This board when once properly saturated may be placed in a small box two inches high of the proper length and width and provided with three grooves on ledges one to receive the metallic plate or silver surface and the two others to receive the saturated board which may be placed nearer to or further from the metallic surface. When placed in the first groove or ledge it may be at a quarter of an inch distance from the plate in the second it may be at a distance of half an inch or more. This second groove on further position need be used in case the Operation of coating the surface should be procured too fast in consequence of increase of temperature or in case the plate should have been withdrawn before it has reached its proper degree of golden colour.

This mode or process of coating the surface has advantages of enabling the operator to coat the plate with Iodine with great rapidity, that is to say generally in a very few minutes. If the Operation should proceed too fast, the saturated or Iodine board may be laced in the upper groove and the metallic plate underneath this position causes the operation to proceed slower. It is necessary that this Iodine box should be securely closed to hinder any current of air reaching the surface and moreover in the latter case the box should only open on one of its sides. The board saturated with Iodine may be serve to coat several plates during a whole day or even several days without the necessity of replacing it in the Iodine or saturating box. I will now proceed to describe the next Operation

Third Operation - The Camera Obscura

As before stated the Operation should proceed as quickly as possible from the second to the third Operation as this time the combination between the Iodine and the Silver has no longer the same property. The apparatus necessary for this operation is the Camera Obscura (see Plate 4 Figures 1 and 2) and fitted to receive the prepared plates and their boards. This third Operation is that in which by means of light acting through the Lens of the camera Obscura Nature reflects or impresses (to use Figurative language) an image of Herself of all objects enlightened by the Sun on the surface of the Photographic or prepared plates. The objects (of which the Image is to be retained upon the surface of the plate) should be as much as possible lighted by the Sun, because then the Operation is more expeditious. It is easy to conceive that the Operation being produced only by the Agency or effect of light that the action is more rapid according as the objects are more brilliantly lighted up or illuminated or in their nature are more intensely white or present bright lines or surfaces. After having placed the Camera Obscura opposite to or in front of the Objects of which it is desired to fix or retain the Image or obtain a representation it is essential first to properly adjust the Focus of the camera Obscura so that the Objects be represented perfectly clear and distinct; this is easily done by moving forward or

backward the frame of a plate of ground glass in the Camera which glass receives the Images of the Objects from the Lens when this frame is brought to the proper position this movable part of the Camera Obscura is fixed by means of screws applied for that purpose. The ground glass is then removed from the instrument care being taken not to move the Camera Obscura and in the place of the Ground glass is substituted the apparatus carrying the prepared metallic plate or surface (see Figures 1, 2, 4 and 5 Plate 3) which apparatus exactly fits the place of the ground glass plate on its frame During the time the apparatus with the prepared surface is being fastened in the instrument by small brass buttons or other fastenings the camera obscura is closed. The obscuring shutters or doors **BB** of the apparatus are then opened by means of the semicircles **AA**. The plate is then in a proper position to receive and retain the impression of the image of the Objects chosen. Nothing more need be done but to open the aperture of the Camera Obscura and to consult a Watch to reckon the minutes the prepared surface shall be under the action of the light. This Operation is of a very delicate nature and should be carefully attended to because nothing is visible and it is quite impossible to state the time necessary for the reproduction of the image as it depends entirely on the intensity of light received by or from the Objects the Image of which is intended to be reproduced; the time may vary from three to thirty minutes. It must likewise be remarked that the Seasons as well as the hour of the day have great influence on the rapidity of the Operation. The most favourable hours are from seven in the Morning till three in the Afternoon the process of reproduction which may be require from three to four minutes in the months of June and July will require from five to six in the months of May and August from seven to eight in April and September and so on in proportion as the seasons advance. This is only a general and approximate statement for objects strongly lighted as it often happens that twenty minutes are necessary for the Operation in the most favourable months that is when the objects are partially in shadow or darkness. It will be seen from what has been stated that it is impossible to name exactly the time necessary for obtaining the Images or tracings from Nature (or Photographic Designs) but by a little practice it may be easily ascertained – practice is the only sure guide and with this advantage an Operator will readily ascertain the required time correctly. Latitude of the situation is of course to be considered, for example it is conceived that in the South of France and generally in the countries where the light is very intense as in Spain or Italy, the plates will receive the impression much more rapidly. It is however very important to not allow more time to pass than what is necessary for the reproductions, because the clear parts would no longer be or remain while or clear, they would be darkened by the prolonged action of light allowed to strike upon the Iodine on the surface. If on the contrary the time allowed is not sufficient then the proof or the Image would be vague and without proper details. Supposing the Operator has failed in one proof it being imperfect account of having been withdrawn too soon or left to remain too long, another may be begun immediately a plate having previously prepared; the Operator is then more

certain of obtaining the proper effect the second Operation being corrected by the first. It is desirable and useful in order to acquire a proper practice to make some experiments of this kind. The plate or surface having being submitted to the action of the light the required time I will proceed to describe the fourth Operation.

The Mercurial Process.

The Operator must hasten to submit the surface of the plate to the fourth operation as soon as it is withdrawn from the Camera Obscura not more than one hour ought to be allowed to expire between the third and fourth Operation and it is much more certain to obtain good proofs or tracings of Nature when the fourth Operation takes place immediately after the third. For this fourth Operation are required the following implements. First a Phial containing a quantity of Mercury or Quicksilver. Second a spirit or other Lamp. Third, the apparatus represented in Plate 5, figures 1, 2, 3. Fourth, a glass funnel with a long neck. By means of the funnel the mercury is poured into the cup **C** situated at the bottom of the apparatus (shown in the figures) and in a sufficient quantity to cover the ball or globe of the Thermometer **F**. From this time no day light must be admitted and the room must be darkened, and the light of a candle or taper only be used to enable the operator to inspect the progress of the Operation. The board on which is fixed the plate must be withdrawn from the apparatus already mentioned as adapted in the Camera (see plate 3 fig 4) which apparatus preserves it from contact with light. The thin board with the plate is then introduced in the grooves or ledges of the blackened **B** plate 5, fig 1 this black board is then replaced in the box or apparatus which maintains it at a inclination of 45 degrees, the prepared metal surface being placed undermost so it may be seen through the glass **G**. The cover **A** of the box must be put down gently to prevent any particles of mercury flying about in consequence of the compression of air. When the whole is thus prepared the spirit lamp is lighted and placed under the cup containing the mercury an allowed to remain until the Thermometer (the ball of which is immersed in the Quicksilver Bath the tube extending outside the box) indicates a temperature of sixty degrees Centigrade, the lamp then must be removed.

If the Thermometer has rapidly risen it continues to rise even when the lamp is removed, but it should not be allowed to rise above Seventy five Degrees Centigrade. The impression of the Image of Nature exists on the plate but it is not visible, it is only after several minutes of time has elapsed that faint tracings of objects begin to appear as may readily ascertained by inspecting the Operation on looking through the glass assisted by the light of a candle or taper which must not be allowed to strike too long on the plate because it would leave marks on the same. The plate should be left in the box until the thermometer has fallen Forty five Degrees then the plate is to be taken out and this Operation is

finished. When the Objects or Articles (the reproduction of the Images of which is intended to be produced) have been highly illuminated and the light has acted a little too long in the Camera Obscura, this fourth Operation will be finished even before the Thermometer has gone down to Fifty five Degrees; this effect may be perceived by looking through the glass **G**. It is necessary after each Operation to wipe or clean well the interior of the apparatus in order to remove the slight coating or layer of mercury which generally covers or adheres to it. The black board or frame **B** must likewise be carefully wiped that it may not retain any particles of quicksilver. When the apparatus is to be packed up for carrying from place to place the mercury which is in the Cup must be poured into the Phial this is done inclining the box so as to let the mercury escape through the small cock **E** at the side of the apparatus. The picture or plate may now be inspected by means of a weak light in order to ascertain whether the Operation has succeeded or not. It may be taken off from the thin board by removing the metallic bands or straps which bands should be cleaned carefully from any Iodine or mercury they may have received by means of pounce and a little water this should be done after each tracing is taken or plate operated on. It will be readily conceived that this cleaning is necessary since not only these small bands are covered with a coating of Iodine but they also have received a portion of the tracing of Nature. The plate is then to be placed in a box provided with a cover and grooves as represented in Plate 2, Figure 3 until it can undergo the fifth and last operation. This operation need not be effected immediately, for the plate or sketch may be kept in this state for several months without undergoing any alteration: provided it be not frequently inspected or exposed in the open daylight. I will now proceed to the last operation viz: the

Fifth Operation

Fixing the Tracing Delineation or Picture

The Object of the fifth operation is to remove from the surface or plate the Coating of Iodine, which otherwise on its being exposed too long to the action of light, would continue to be decomposed and would thereby destroy the picture or tracing. For this Operation are required the following articles. First, Water saturated with Sea Salt in a weak solution of Hyposulphite of Lime Soda. Secondly the apparatus represented in (Plate 6 Fig's 4 and 4 bis:) Thirdly , two troughs of metal as shown in (Plate 6 Fig's 2 and 2 bis) Fourthly a vessel or jug filled with distilled water as (Platte 6 fig: 4). In order to remove the coating of Iodine the Operator must take common salt and put it into a bottle with a large mouth, the bottle be filled with pure water. To accelerate the dissolving f the salt, the bottle may be shaken from time to time. When the water is completely saturated (that is when it will dissolve no more Salt) it is to be filtered through Blotting Paper that no extraneous matters may remain in it and that it may be perfectly clear. Water saturated with salt may be prepared in sufficient quantity

before hand and kept in corked bottles; by this means the necessity and inconvenience of preparing it every time is avoided.

Into one of the troughs the salt water is to be poured until it is about an inch in depth, the other trough is to be filled with pure water. These two liquids are warmed or heated in temperature though not to the boiling point. In place of the solution of Salt may be substituted a solution of Hyposulphite of pure Soda, this latter is even preferable, because it completely removed all of the Iodine, which is not always the case when Sea Salt is used especially if the Designs or tracings have been obtained some time and laid aside between the fourth and fifth operations. The mode of Operation however is the same for the two solutions although the solution of Hyposulphite does not require to be warmed and a less quantity of it is required than of the salt and water since it is sufficient that the plate should be covered with the same when laid on the bottom of the trough. The plate is first to be immersed in the pure water since it is sufficient that the plate should be contained in one of the troughs. It must only be dipped in and drawn out immediately ; it is sufficient that the surface of the plate be covered with water and then without allowing it to dry it is to be plunged immediately in the Salt water. If the plate is not dip't in pure water before immersing it in Salt water or of the solution of Hyposulphite these solutions would make marks or spots on the surface of the plate. To facilitate the action of the salt water of the salt water or the Hyposulphite which absorbs the Iodine the plate should be moved about in the liquid by means of the small hooked instrument as shown at (Fig 3, Plate 6) the ends if being placed under the plate, so as to raise it and let it drop several times, thus producing a gentle washing of the surface when the yellow colours or tint of the Iodine is entirely removed from the surface of the plate it is to be removed and carefully taken by the edges so as not to removed and carefully taken by the edges so as not to touch or injure the Drawing and then dipt immediately in the first trough of pure water. The apparatus shown in Plate 6, Fig. 4 and 4 bis, ad the vessel Fig 5 are then brought into use; these must all be perfectly clean and the vessel Fig. 5 filled with distilled water which should be hot but not boiling. The plate on being withdrawn from the trough of water is to be placed immediately on the inclined plane **E** Fig. 4 Plate 6 and without allowing it time there to dry The Operator is then to pour upon the surface bearing the Drawing the hot distilled water beginning at the top of the plate and pouring the water in such a manner that it shall flow over the surface and carry away with it all the solution of sea salt or Hyposulphite which has already been considerably weakened by the immersion of the plate in the first trough. If the Hyposulphite solution has been used the distilled water to be poured over the surface need not be so hot as for the Common Salt Solution. Not less than a quart of hot distilled water is required for thus washing the surface of a plate measuring eight or nine inches long by six or seven inches wide. It sometimes will occur that after having poured warm water on the surface some drops or globules of water will remain on the plate. In this case they must be removed before they have time to dry as they might contain some particles of sea salt or

Iodine and injure the drawing; they are readily removed by strongly blowing on the plate. It will be understood how important it is that the water used for this washing should be perfectly pure for part of it will dry on the surface of the plate notwithstanding the rapidity with which it may have passed over it, and if it contains extraneous matter then numerous and indelible spots would be formed on the Drawing or Tracing. In order to ascertain that the water is suited for washing, a drop may be let fall on a unburnished plate, and if, when evaporated by heat, it leaves no stain or mark behind, it may be employed without fear; distilled water is always sufficiently pure for this operation without testing it. When this washing is completed the Picture Drawing or tracing is finished the only thing now to be done is to preserve the surface from being touched, also from Dust and from Vapours which tarnish Silver. The Mercury which traces the images or in other words by the action of which the Images are rendered visible is partly decomposed, it adheres to the Silver, it resists the washing by the water poured upon it, by its adhesion, but will not bear any rubbing or touching. To preserve these Drawings they must be covered with glass securely placed a little above the surface both the edges of the glass and plate secured by pasted paper, or other means and they are then unalterable even by the light of the Sun. It may happen that in travelling the Operator may not be able to conveniently to thus secure the plates. They may be preserved by enclosing them in a box similar to the one represented Plate 2, Fig 3. For greater safety small bands of paper may be pasted over the junction of the box and its cover. It may be necessary to state that the Silver surfaces may be used several times in succession provided the Silver may not be polished or ground through to the copper and it is very important to remove after each time of using, the Mercury placed [Sic] on or adhering to the surface which is to be done as before described by means of pounce or pumice powder and Oil and by changing the cotton after otherwise the Mercury would finally adhere to the Silver and the Proofs obtained on that combination would always be imperfect because they would be deficient both in clearness.

Explanation of the Drawings here unto annexed of the apparatus used in these processes or operations of the Daguerreotype.

Plate 1, Fig 1 represents a plan view of a wire frame Fig 1, bis is a side view of the same, this frame serves to receive the plates when they are to be heated by spirit lamp as shown at **B** fig. 6. **A** being its cover a stopper to prevent the Spirit evaporating when the Lamp is not in use. Fig. 2 represents a plate with a Silver surface upon which the tracing is to be taken. Its size may be varied at pleasure. To make tracings of large dimensions the focus of the object glass must also be increased as also the other parts of the apparatus. Fig 2 bis, shows the edge or thickness of the plate, it may be very thin but it is essential it should have a very flat surface. Fig 3 is a plan view of the thin board or tablet on which is fixed the plate for the subsequent operations; The plate is secured on it by means of four thin metal bands **B** (one of them being shown detached above Fig. 3 bis) plated with silver they should be of the same thickness as the Plate, these bands

are fixed on the board by small nails forced or driven into the board through holes **D** by pressing the handle shown at Fig. 5 upon them. The surface of these bands being nearly level with that of plate retain it by small projections or pieces soldered on the as seen in the drawings These metallic bands have two offices to perform. One to secure the plate and the other to facilitate the equalization of the Coat of Iodine which might otherwise be more intense on the edges or borders of the plate than the centre. Fig. 3 bis shows the board and plate as seen edgeways. Fig 4 represents the muslin bag containing the pounce or pumice powder. Plate 2 fig. 1 is a vertical section of the Iodine box or apparatus taken in the line **AB** Fig.2 wherein the coating of Iodine is obtained upon the Silver surface. Fig2 is a plan view of the same. **C** is an interior cover closing the lower part of the box: it serves when the apparatus is not in operation to concentrate the evaporation of the Iodine , which condenses on the wooden surface of this part of the box. **D** is the Cup or Dish for containing the Iodine E is the thin board to which is fixed the plate (as represented in plate 1, Fig. 3) the Silver surface being downwards, it is thus placed in order to obtain the coating of Iodine as the vapour there of rises upwards The board rests on brackets **F** placed at the four angles of the box, the cover C, being previously removed. **G** is the lid or cover of the box which should be kept shut excepting when the plate is taken out for examination **H,H**, are small rods at the four corners of the inclined lining K of the box to support the cover **C**. **J** represents a disc or sieve or other gauze, which is to be placed over the cup in order to equalize the dispersion of the evaporation of the Iodine, it serves also to prevent , in case the box should be closed too rapidly, the compressed air from driving out of the Cup particles of Iodine which might adhere to the plate and cause spots on the Drawing. **K** is the wooden lining formed with inclined sides in the shape of a square funnel – this shape assits to diffuse equally the vapours of Iodine which spread as they rise. Fig 3 represents a magazine box or case and its cover, in which may be enclosed the plates or surfaces before and after the Drawings have been taken. The plates are introduced into and secured by small grooves in the insides, so that they cannot rub against one another, they being at the same time preserved from dust. By pasting strips of paper, on the junctions of the cover and box they may be preserved from all injurious vapors, but this is requisite only only for plates or drawings completely finished , or in the case the box should not close well.

Plate 3. This plate represetns four different views of the frame which recieve the thin board carrying the plate or Silver surface and serves to preserve it from the effect of light as soon as it has recieves the coating of Iodine in the box shown in plate 2. Fig. 1 is an edge view. Fig 2 a front view showing the covers or doors to shade the Silver surface. Fig 3 is a section showing the doors in the position they will be in when the plate is exposed to the action of light in the Camera. Fig 4 is a view of the back side, the reverse of Fig 2. **AA** are semicircular pieces for opening the doors **B**, whenever this frame with the plate is placed in the Camera Obscura. **C** is the thin board on which is fixed the plate. **DD** are buttons on both

sides of the frame to fasten the board and the doors. **E** shews the thickness of the frame. **F** is the plate or surface intended to receive the picture. Fig 3 represents the frame with the doors open as they are at the time when a Tracing is taken in the Camera Obscura.

The Camera Obscura Process

Plate 4. Fig 1 is a vertical section taken through a Camera Obscura adapted for the process of Daguerreotype or Photogenic delineation furnished with a frame for carrying a plate of ground glass **A**. The distance this glass plate is to be from the object glass or lens is the same at which the distance at which the surface intended to receive the image is placed with the frame and shading doors as shewn in **C** Fig 2 which figure is a horizontal section of the Camera Obscura; **B** is a mirror for observing the effect of objects and selecting points of view, this mirror serves to enable the operator to choose the Scenery the Image of which is to be reproduced; it should be inclined about forty five degrees to the Horizon by means of the rod **L**. In order to bring the objects precisely in the focus the ground glass should be completely exposed and the Objects looked at as reflected on the ground glass. The image of the objects is easily brought into proper focus by moving forward or backward the sliding box **D**, taking hold of it at the bottom with both hands by the projections **E** Fig 2 and forcing it to or from the Operator. When the focus is properly adjusted the thumb screw **H**, is turned to fix the parts on this position. The mirror is kept closed by the means of two hooks at **F** which take into small eyes at **G**; the frame and ground glass plate is withdrawn and in its place is substituted the frame carrying the prepared plate or surface which is so represented in Fig 2 with the shading, doors **B** open in the Camera Obscura. These doors should be intentionally lined with black velvet as well as the sliding box **D** to avoid all reflection of light. The Object glass is achromatic and Periscopic, the concave part must be outside the Camera Obscura, its diameter is about three and a half inches and its focus about thirteen inches. A Diaphragm is placed before the object glass at a distance of about 3 and a half inches and its aperture may be closed by means of a plate on a pivot. This Camera Obscura reverses the Objects from right to left which is not of much consequence in a great number of cases but if it desired to have an image or tracing in the natural position of the object a flat looking glass or mirror is to be placed on the outside beyond the aperture of the Diaphragm as at **K** to **J** Fig. 2. it being fixed by means of a screw at **K** But as this arrangement of reflexion occasions a loss of light and injures the Photogenic Process therefore about one third more time must be allowed to obtain a Tracing or Drawing.

The Mercurial Process

Plate 5 represents the apparatus in three different views- Fig. 1 is a vertical section of the apparatus. Fig. 2 front elevation and Fig. 3 is a side view showing

the Thermometer. **A** is the cover of the apparatus. **B** the black board with grooves to receive the board H, carrying the Silver surface or metallic plate. **C** the cup containing the mercury or quicksilver. **D** the spirit lamp. **E** is a small cock through which the mercury may be withdrawn the apparatus being inclined on one side for that purpose. **F** is the thermometer. **G** is the glass window through which the progress on the silver surface may be inspected; H, is the board carrying the metallic plate which has received the Image or design. **I** is a stand or support for the spirit lamp held by the ring **K** so that its frame may play on the centre of the cup. All the interior parts of this apparatus ought to be blackened and varnished.

The Washing Operation

Plate 6, Fig 1 represents a funnel lined with blotting paper in order to filter the solution of water and sea salt or the solution of Hyposulphite of Soda. Fig. 2 is a plan view of one of the troughs made of copper tinned. In the bottom of this is represented the plate **B** with a drawing on it. Two such troughs are required one for the salt water and one for the pure water. Fig. 2 bis is a side view of one of them. Fig. 3 represents a small hook of copper tinned which serves to raise the plate in the basins to agitate it and draw it out more easily. Fig 4 is a front representation of the washing apparatus made of tin varnished. To wash the designs on the plates they are placed on the stand or angular ledge **D**. **E** is a ledge to conduct the water to the receptacle **C** and Fig. 4bis is a side elevation of this washing apparatus. Fig. 5 shews the jug or vessel with a large spout or lip, it may serve to heat the distilled water in and to pour it on the drawing when placed on the ledge **D** as seen at **B** Fig. 4 .

In Witness whereof I the said Miles Berry have hereunto set my hand and seal this fourteenth day of February One thousand eight hundred and forty. **Miles Berry**

Duckworth

And it be Remembered that on the fourteenth day of February in the third year of the Reign of Her Majesty Queen Victoria the said Miles Berry came before Our said Lady the Queen in her Chancery and acknowledged the Instrument aforesaid and all and everything therein contained and specified in from above written and also the Instrument aforesaid was stamped according to the tenor of the Statute made in the Fifty fifth year of the Reign of His Majesty King George the Third Inrolled the fourteenth day of February One thousand eight hundred and forty.