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Report of the Commission of the French Photographic Society for awarding the Prize of 8000 francs founded by the Due de Luynes for printing Photographs in Ink.

Gentlemen,—Scarcely had your infant Society been constituted when the Due de Luynes, full of confidence in your future, and appreciating from the first the services you were called to render, placed at your disposal a considerable sum, to be devoted in the form of prizes to the progress of photography. Part of this sum was devoted to the encouragement of investigations on the improvement of positives, the other was intended to found a prize of 8000 francs, to recompense the best methods of photographic printing with ink, a result of considerable importance and one especially desired by the donor.

The Duc de Luynes in fact recognized that photography alone has the merit of fidelity and undoubted authenticity which are so necessary in scientific researches; but while doing justice to the beauty and freshness of prints obtained with silver salts, he was reluctant to entrust to such ephemeral methods the reproduction of works which were to be transmitted to future ages.

The results known at this time, the easy alterability of positive proofs, justified too fully the fears of the Duc de Luynes. It may also be added that the comparatively high price of impressions made with the precious metals was a hindrance to their being brought within reach of all likely to consult then:" The experience of the past proved, on the contrary, that prints obtained by ink mixed with carbon easily resisted the influence of time; the un alterability of carbon being one of the most certain guarantees of the durability of these impressions ; on the other hand, the facility of printing enabled the prints to be distributed in a greater number of examples. Hence the Due de Luynes, desirous of uniting the special advantages of both methods, established the prize of 8000 francs to stimulate the zeal of inventors, and selected the French Society to award the prize to whoever should succeed in reproducing photographic prints by the ordinary methods of printing.

The conditions of this prize, drawn up by Regnault, President of the Society, were published in the sitting of the 18th July, 1856.

One of the first of these conditions, which represent the intentions of M. de Luynes, is that of uniting with the un alterability of printing in ink, the authenticity of photographic copying, so valuable for historic documents, and which ought to exclude all the merely manual work of retouching.

Another of the conditions is that the prize ought not to be divided among several competitors, *except in case no single one should satisfy the conditions of the programme for obtaining the grand prize.*

In your sitting in July 1865, you nominated as jury of competition a Committee consisting of M. Regnault, M. Balard, M. P. Perier, 21. Mailand, Count Aguado, M. Bayard, M. E. Becquerel, M. Cousin, M. Leon Foucault, Count Leon de Laborde, M. Peligot, M. Robert. M. Davanne, as Vice-President of your Committee of administration, is a member of the Committee.

The first business of the Commission was to clearly ascertain the spirit of the program and the intentions of the founder. This intention was clearly to reward, not the most beautiful print, but the inventor who, while giving a method at once good and practical, would make the greatest step in photographic printing by ink, and render its application easy and general. (cont. July 16, 1867 pp. 68-76)

It was not sufficient, then, to examine specimens presented by the competitors; it was necessary to go further back and estimate the principle of the inventors, the value of the method. To succeed it was necessary to inquire into the most important researches which preceded the foundation of the prize, to follow those published during the competition, and even go further and judge the progress made after closing the competition; for this progress might confirm the judgment of the Commission without determining it.

This investigation could not properly be limited to the competitors alone; it was necessary to examine all the other methods which have made any noise either at home or abroad, so as to estimate both the ideas which an inventor might have borrowed from his predecessors and the elements furnished by him to those who, pursuing the same object, have borrowed from his work ; that is, we had to draw up a complete history of the question, a history which naturally divides itself into three parts :

The inventions and researches which preceded the competition;

Those which were made known during its progress;

Lastly, those which have come afterwards and have confirmed without causing the judgment.

First Period. —*Inventions and researches on photographic printing with ink before the foundation of the Duc de Luynes's prize*.

However difficult might appear to be the conditions laid down in the program, previous attempts were sufficient to prove that these conditions might be realized; for long before the year 1856, light had been used to produce engraved and lithographed plates, and the first idea goes as far back as the first inventor who endeavored to fix the image in the camera obscura.

Nicephore Niepce produced the first heliographic plate by means of bitumen, which under the influence of light and oxygen becomes insoluble in its ordinary solvents. The insoluble bitumen forming the relief, Niepce etched his plate by means of acids, and then printed some copies: a remarkable specimen of these first attempts forms part of the collection of historic relics belonging to our Society. However, the absence of the grain necessary for the half-tints restricted this method to the reproduction of outline engravings.

Until the year 1839, when Daguerre's method was made public, we find no attempt of this kind ; but the perfection of the Daguerrian image itself, obtained directly on a metallic plate, and quite ready, in some sort, for engraving, could not but direct men's thoughts in this direction. We see, in fact, some little time after this, the birth of several methods the object of all of which was to change the Daguerrian plate into an engraved one by which copies of a single image could be indefinitely increased.

Among inventors we find the names of MM. Donne, Berres, Grove, and the Duc de Luynes himself, and especially M. Fizeau, whose methods, used by M. Hurlimann and M. Lemaitre, have given us the most beautiful specimens of this kind.

M. Fizeau's method consisted in etching the metallic plate by nitric acid to which a chloride was added (hydrochloric acid or common salt, etc.). This mixture attacks the blacks formed by pure silver, while it leaves the amalgamated whites. After a first etching, the hollowed and attacked part was preserved by means of a drying-oil, and the whites were gilded by the battery; they thus became more resisting, and the metal could be further etched by acids. These plates, which at first only yielded a limited number of prints, owing to the small resistance of the silver, yield now an unlimited number of prints, thanks to galvanoplastic reproductions in copper and other metals. "When Talbot's method replaced in practice Daguerre's, the possibility of obtaining a considerable number of copies with an original negative type appeared likely to supersede engraving. But it was soon found that the prints were neither comparable with one another, nor durable, nor economic; and these considerations, which M. de Luynes so well understood, had already led to new attempts to carry out printing in ink.

In the year 1852 we find the first attempts at lithographic photography. MM. Barreswill, Lemercier, and Lerebours, taking up Nicephore Niepce's bitumen, made an application of it to lithographic stone. In this method the stone, covered with a solution of bitumen in ether, is washed with this same solvent, after having received a luminous impression under a negative. It is then acidulated, gummed, and inked. The ink takes wherever the bitumen, rendered insoluble by the action of light, forms a reserve and has hindered the action of the acid. A pretty large number of specimens have been obtained in this manner; some of them in conjunction with M. Davanne.

About the same time M. Mante also made attempts at engraving, which he has since then improved and perfected, but without publishing his mode of operating.

In 1853 Mr. Talbot endeavoured to obtain heliographic engraving by using as reserve a mixture of gelatine and bichromate of potass. From this time we see the use of soluble bichromates resumed, by means of which Mungo Pinto in 1839 had obtained proofs on paper. But while Mungo Pinto only wished to produce a design with the bichromates, Mr. Talbot wished to use as a reserve gelatinous, albuminous, and gummy masses which chromic acid under the influence of light has rendered insoluble; and from this time date the most interesting applications to engraving and lithography. This method of Mr. Talbot consists in covering a steel plate with a mixture of gelatin and bichromate, and then, after exposure and washing, in etching it by bichloride of platinum or iron. The impressions possess great delicacy, but they do not give the photographic half-tones.

In this same year 1853, M. Niepce de St. Victor resumed also the investigation of bitumen, and, modifying the method of his uncle Nicephore Niepce, prepared, with benzole, pure essence of lemons, and bitumen, a layer of extreme sensitiveness; and he produced, with the aid of M. Lemaitre, several engraved plates, on which the bitumen forming a reserve was printed behind a positive proof. After washing with benzole or any other solvent, a first etching was made with acid; then it was covered with a granulation of resin, after which the etching was continued. Several plates were produced by this method, which too frequently required retouching.

A year later M. Negre introduced a considerable modification into the treatment with bitumen, which enabled him to obtain remarkable results.

In this method the bitumen only affords a temporary reserve, which enables M. Negre to gild by the ordinary electrical processes all the parts of the plate which are not to be attacked by acid; moreover, instead of forming a continuous reserve, the bitumen is, as it were, eaten at all points, and even on the reserved parts there is formed a network of gold, which forms the grain necessary for engravings. This gilding having been effected, the bitumen is removed by means of an essence; the plate has then the appearance of unmasking, in which the gilded parts form the whites, while the uncovered parts of the steel alone remain liable to etching by the acid.

At the same period M. Dufresne used an analogous method for obtaining unmasked plates; and he pointed out the use which might be made of it for engraving.

M. Poitevin, in 1855, observed the property which mixtures of gummy, gelatinous, mucilaginous, and albuminous substances possess of taking and retaining lithographic ink; and he made the first application of it to lithography.

By coating a suitably stippled stone with a mixture of gum or of albumen and of bichromate of potass, it is sufficient after drying to place it under a negative to obtain the design. The ordinary lithographic process is then followed; the ink adheres only to the parts modified by light.

In the account which he gave of this method, M. Poitevin points out the means of obtaining at will metallic proofs either in relief or sunk, which can be used either for engraved-plates or letterpress printing, by utilizing the property which gelatine mixed with a soluble bichromate possesses of not being swelled out by water when it has been acted upon by light, while the parts unacted upon present on the contrary a decided relief. By casting, reliefs and depressions may be obtained, which galvanoplastics easily changes into plates or blocks for printing.

When, in December 1855, M. Balard presented to the French Photographic Society M.Poitevin's method above described, M. Pretsch, of London, claimed priority, saying that he had patented a method of engraving based on the action of light on bichromatized gelatine and the use of the relief of this gelatine for obtaining by moulding and galvanoplastics plates suitable for printing. M. Pretsch's method was from the outset based on the following reaction:—When a layer of gelatine mixed with a soluble bichromate has partially undergone the influence of light, the part unacted upon dissolves in warm water and disappears, the part acted upon, having become insoluble, resists the action of warm water, and in

drying solidifies and forms a relief. This relief in gelatine, dried and solidified, M. Pretsch takes as a mould. Subsequently M. Pretsch, in an additional claim, also patented the method of moulding obtained by swelling. M. Poitevin observes that, even allowing the claims in dispute of M. Pretsch, the patent of the latter relates merely to engraving, and leaves quite aside the discovery relative to lithography, to which he then devoted all his care, and a method of which he has brought to completion. But in fact M. Poitevin may claim also a great share in the application of bichromatized gelatine to engraving, and assert his right to the progress which this art has made in the hands of those who have used his method. Your Commission thought it unnecessary to dwell further on this question of priority: the two inventions were patented at times very near each other; and there is found moreover in the previous investigations of M. Poitevin, in his investigations of the properties of gelatine, the path which must have led him to the discovery of helioplastics.

Under these circumstances the question of date had but a secondary importance. The description, more or less tardy, of an idea, does not constitute an inventor. To confer this title, the new idea must become fruitful, and bear, in part at least, the fruits which it promised. Thus M. Poitevin's claims could not be effaced by those of M. Pretsch.

In this same sitting of December 1855 MM. Rousseau and Musson also produced a method of lithography, based on the use of a mixture of soluble bichromates and of organic matter. This mixture spread on stone is exposed, then first washed with water and afterwards with a solution of gallic and pyrogallic acids. Washed again with pure water, and then with a solution of white soap, after a last washing the stone goes through the ordinary lithographic processes. This method, which is more complicated than M. Poitevin's (which acts directly on stone without these successive manipulations), only appears to have given prints of doubtful merit.

MM. Rousseau and Musson have also given a mode of engraving on steel and other metals, using as a reserve the mixture of soluble bichromate and gelatine. After washing they render these reserves more resisting by a solution of gallic acid; they then pour on the plate a weak solution of nitrate of copper; this metal deposited on the unprotected parts increases the thickness, and the design is represented by the sunk surface of the steel. It appears that this method, however simple from the chemical point of view, does not easily succeed in practice ; for the dark parts of the engraving, corresponding to the smooth steel, must take ink very badly for want of grain, while the copper deposited, which corresponds to the whites, must tend greatly to become stippled.

We shall not touch the question of priority as to the lithographic method between MM. Rousseau and Musson and Poitevin: the two communications are of the same date; but while M. Poitevin advanced his method from infancy to maturity, MM. Rousseau and Musson have limited themselves to this single communication, and since then have made no progress.

Before terminating this list, which is already so long, we must rapidly study a last method, decidedly original, due to MM. Gamier and Salmon—a method which the inventors communicated to the Academy of Sciences at the commencement of the year 1855, and which is based on the following reaction :—

1. If a brass plate be taken and exposed to the vapours of iodine in darkness, and over the plate be passed a cloth containing globules of mercury, the plate will quickly amalgamate; it will not do so if it has first been exposed to the action of light.

2. If over a brass plate amalgamated in places, an ink-roller be passed, the mercury, acting like water, repels the ink, which becomes fixed wherever there is no mercury.

An iodized brass plate is placed under a photographic positive; the parts corresponding to the lights will not amalgamate; those, on the contrary, which correspond to the darker parts will be depicted on the white of the amalgam. Pass over this plate an inked roller, the mercury repels the ink, which only takes on the parts influenced by light, and consequently gives an inverse proof of the model. This ink forms at the same time a reserve; and all the non-reserved parts may be etched by means of a solution of nitrate of silver. With this first etching, a copper-plate engraving is produced like the model; the ink must be removed, and it can be printed from. But a lithographic plate may also be made by immediately following the first etching with a coating of iron, without removing the ink. When the iron is once deposited where the amalgam originally was, the ink forming the reserve is removed, the brass exposed is iodized and immediately coated with mercury. The mercury does not take upon iron; but it takes on the iodized mass; and when the roller is passed over, proofs may be taken; for the ink attaches itself to the iron parts and not to the amalgamated ones. To print from as a block, instead of forming galvanically a deposit of iron, a deposit of gold should be made, and then, by means of an acid, the parts not gilded should be hollowed out.

MM. Gamier and Salmon claim as against M. Poitevin the first invention of a direct inking on the surface exposed; but this idea is previously met with in the lithographic method of MM. Barreswill, Lemercier, and Lerebours; it seems moreover that the two methods differ sufficiently to constitute a real invention; and in strictness MM. Garnier and Salmon might just as well be reproached with a certain analogy (though the effect is inverse) between their method and the daguerreotype, in which is used the action of mercury on an iodized metallic surface which has been exposed to light.

This, then, was the condition of the art of photographic reproduction by ink when the competition was founded for the Duc de Luynes's prize.

On the one hand we find the use of bitumen by M. Nicephore Niepce, by MM. Barreswill, Lemercier, and Lerebours, by MM. Niepce de St. Victor and Lemaitre and by M. Negre, the use of iodized metallic plates and of mercury by M. Fizeau and MM. Fizeau and Garnier, and the use of soluble bichromates mixed with organic matters by M. Talbot, M. Pretsch, MM. Rousseau and Musson, and M. Poitevin.

Among the names of those to whom new inventions are due, we shall only retain as competitors for the prize of 8000 francs those who have offered themselves as competitors and have continued to progress—viz. MM. Negre, Pretsch, Poitevin, and Garnier.

Thus, before the foundation of the prize, we find four competitors; and in summing up their claims we say —

M. Negre appropriated Nicephore Niepce's bitumen, and made of it a special method by using a gold resistant, the first idea of which he might have found in the previous researches of M. Fizeau.

M. Pretsch, taking Talbot's mixture of soluble bichromate, utilized the insolubility in warm water of the parts influenced by light, to obtain, not a reserve, but depressions and relief, which, by moulding and galvanoplastics, would yield engraved plates. He also used, but probably after M. Poitevin, the partial enlargement of gelatine in cold water to make moulds with a higher relief.

M. Poitevin takes this same mixture of soluble bichromate and of organic matter, and derives from it an entire series of applications:-

1. Spreading this mixture, or its analogue, on stone, then inking after exposure, he gets a practical method, actually in use, of lithophotography on stone or metal. This method belongs entirely to him.

2. Utilizing the swelling of gelatine, he obtains by moulding other depressions or reliefs, which he changes into plates by galvanoplastics.

3. The same method he uses for ceramic decoration.

4. By means of a mould, or countermould, or countermould he makes proofs in tinted gelatine.

MM. Salmon and Garnier have proposed the action of iodine, of light, and of mercury, on a brass plate; by a series of very ingenious reactions of their own, they change this at pleasure into one for copper-plate, letterpress, or lithographic printing ; but at the time of which we speak, and even three years later, the method gave results too mediocre to be taken into account.

Second Period.—*Investigations published during the Competition*.

Such was the state of things in July 1856, when the competition for the Duc de Luynes's prize was started, the termination of which had originally been fixed for the 1st of July 1859, but which the Commission thought advisable to extend to the 1st of April 1864. We shall have, then, to examine two successive phases—that between 1856 and 1859, and that comprised between 1859 and 1864.

First phase of the competition — For this first period our colleague M. Perier made a Report on the various competitors; and it was in consequence of this Report that the Commission decided the extension of the competition to the 1st of April 1864. It will be sufficient rapidly to enumerate the persons mentioned in this Report and the conclusions which terminate it.

On the 1st of July, the various communications which had reference to M. de Luynes's prize and had been left with the Secretary of the Society, were from MM. Rousseau, Musson, Poitevin, Pretsch, Thevenin, Ch. Negre, l'Abbe Laborde, Asser, Bertschold, Talbot, Pouncy, Newton, Dufresne, Jobard, Renaud-Saillard, Garnier, and Salmon. A rapid examination of these names enables us to eliminate those who having furnished interesting notes, have not offered, or could not be admitted, to compete.

Thus M. Newton points out, four years after MM. Rousseau and Musson, a lithographic method with soap, which has the greatest analogy with that of preceding inventors.

M. Jobard proposes the use of vapours of iodine on zinc and on steel for producing photographic inking. This is a reminiscence of Gamier and Salmon's methods.

MM. Rousseau and Musson, after communicating their various methods, have not continued them, and have offered no specimens in support.

M. Thevenin has sent from Rome several photographic specimens, but he has given no account of his mode of operating.

M. Dufresne, after having announced himself as candidate, has withdrawn, expressing his goodwill for M. Poitevin.

M. Renaud has sent some remarkable specimens, among others the copy of a bust of Apollo; but in support of his prints he has produced neither notes nor description, in spite of reiterated requisitions for them. His candidature, moreover, has been protested against. He is said to have been only a workman of M. Prestch, making use of his methods, and having merely introduced some modifications in the galvanoplastic part.

M. l'Abbe Laborde has made a communication on the use of lithargized oil applied to heliographic processes; but this communication, was not followed by a demand or a specimen, and he could not be received on the list of applicants. "We think it right, however, again to mention the name of M. Laborde, who pointed out the impossibility of obtaining half-tints by methods based on the partial solubility of the gelatine, at the moment the surface is washed on the side rendered insoluble. This difficulty has since been happily obviated by M. Fargier.

Mr. Talbot did not offer to compete.

Mr. Pouncy published a method which had no connection with engravings or lithography.

To these names succeed those of the inventors whom the Commission has thought right to eliminate after examining the methods and the specimens communicated.

M. Bertschold does not present any new method; he used bitumen or bichromate of potass; but he points out a device which, as he says, while giving the grain necessary for engravings renders all the various methods possible.

This method consisted in making on the plate after exposure a series of hatchings, more or less crossed, by means of a glass plate mechanically covered with fine parallel lines; these lines by their successive crossings and suitable combination give a grain which, by its too great regularity, suggests mechanical engraving. This improvement did not seem to the Commission sufficiently important to be taken into account. The death of M. Bertschold, which occurred during the competition, put a stop to any improvement.

M. Asser, of Amsterdam, in his method utilizes the action of bichromate on cellulose and starch; these substances, under the influence of chromic acid, become impermeable to water. Paper impregnated

with starch and bichromate, after being exposed, is washed, dried at a high temperature, then exposed again to the action of moisture; this penetrates wherever the bichromate has not acted, and arrives at the surface; if an ink roller is passed over the paper, the ink sticks only to the dry parts, and leaves those which are moist. If transfer-ink has been used, it is sufficient to place this paper on lithographic stone to fix there a design of which a large number of copies may be taken. This method does not differ much from that of M. Poitevin, who uses the stone directly; the copying is not effected without impairing the fineness of the image; and, while admitting the ingenuity of the method, we cannot see that its claims are serious enough to be taken into account.

MM. Salmon and Garnier have deposited a complete memoir, which is a repetition of methods described above and invented by them before 1855; but the results presented are still so primitive as not to induce the Commission to dwell on them.

After having thus removed these various competitors, there only remained on the list MM. Prestch, Negre, and Poitevin, who so labors, while affording the hope of a satisfactory conclusion, did not appear complete enough to justify an award of the prize; and consequently, the Commission extended the period of the competition until April 1, 1864.

Second phase of the competition.—The names cited for this are those of MM. Pretsch, Negre, and Poitevin (whom the Commission, so to speak, kept in office, and who have continued their labours), MM. Pouncy, Gamier, and Salmon, Asser, and Toovey (whom the preceding Report eliminated, but who have resumed and and endeavoured to improve their methods), and MM. Colombat and Couvez, Fontaine, Placet, James, Marquier, Morvan, de la Follye, Marie, and Regnault (who have appeared subsequent to the extension of the competition).

Among these names we shall first take out already known, and who make neither demand nor communication.

M. Marie, in sending a series of prints in ink, states that they are obtained by known methods.

M. Toovey, from the description he gives of his method, only applies with greater care the method of M. Asser of Amsterdam. He coats an unsized paper with gum and bichromate of potass, exposes it to light, and puts this paper on a lithographic stone; he covers this paper for a few minutes with some folds of moist and compressed bibulous paper; wherever the mixture of gum and bichromate has not been acted upon, the gum dissolves, and, penetrating the stone, prevents the ink from taking; wherever, on the contrary, the gum has become insoluble, the lithographic stone remains clear and takes the lithographic ink. These practical improvements in Asser's method did not seem of sufficient importance to keep M. Toovey's name on the list.

MM. Colombat and Couvez have applied to engraving the hygrometric properties of a mixture of tartaric acid and perchloride of iron, already pointed out by M. Poitevin for photography with coloured powders. They cover a metal plate with a slight layer of gum, then passing over this dried layer the solution of tartaric acid and perchloride of iron, they expose it, and dust it with resin; the parts acted on by light become hygrometric, and retain the powdered resin. This granulation of resin, very plentiful in

the lights, less so in the half-tints, and scarcely existent in the blacks, is made adherent by strong heat; it forms the reserve; after which the etching is done in the ordinary manner. However intelligent be this inverted application of a known method which has been described by M. Poitevin, the Commission has not thought right to keep the names of MM. Colombat and Couvez on the list of competitors. This method, moreover, appears to have had no results; and the authors have not kept us acquainted with the course of their labours.

M. Fontaine, of Marseilles, not having manifested any desire to take part in the competition, having sent no specimen of his method, cannot be placed on the list; his method, moreover, does not constitute a new invention. He takes, in fact, the mixture of gelatin and soluble bichromate already mentioned, spreads it upon a metallic plate, and washes with warm water. There only remains on the plate the relief of insoluble gelatine; this he hardens and makes more regular by treatment with a solution of pyrogallic acid; He then obtains a very fine cast by means of a solution of gutta percha in bisulphide of carbon. After evaporation, he completes the mould by pressing warm gutta percha upon it, and on this fine impression he deposits a galvanoplastic plate. This part of the process is a repetition of that of M. Pretsch. To obtain, lastly, the grain, when photographs, or other objects which only possess tints, are to be copied, M. Fontaine interposes a perforated metal leaf, which resembles the finely striated glass plate of M. Bertschold.

M. de la Follye also uses the mixture of gelatine (or of gum) and bichromate, with which he covers a sheet of paper, as do MM. Asser and Toovey. After exposure, he puts the sheet on water, and then places the moist sheet on lithographic stone, which, according to its permeability, it leaves more or less gummed; he then inks this stone by placing on it a sheet of paper previously covered by ink by means of a roller. This small detail in manipulation would not constitute a new invention—any more than a second device, by which he proposes to ink the sheet of paper on which is the image, by applying it directly on a stone previously blackened in the same manner.

Colonel James uses this same mixture of gum and bichromate, with which he coats a sheet of paper. After exposure the paper is covered with lithographic ink in a uniform manner; it is then washed with warm water, which detaches the ink wherever the light, not having struck, has left the gum soluble and consequently prevented the complete adherence of the ink to the paper. The resultant print is then placed on stone, on zinc, or on copper. This is, as will be seen, Poitevin's method, in its original simplicity, published in April 1855. The first attempts of Colonel James go back at furthest to the year 1858.

M. Marquier deposited photographic prints in November 1863, announcing his intention of competing for the prize; but he gave then no account of his method, which, according to M. Poitevin, consists in the use of a mixture of gum and bichromate of potass.

M. Morvan also presented, in April 1864, some lithographic prints. His method consists in covering the stone with a mixture of albumen and bichromate, and then, after exposure, washing the stone with soap and water and inking. The relief on the stone would be negative. This method suggests that of MM.

Rousseau and Musson; it is the exact copy of Newton's, and cannot give any claim whatever to M. Morvan.

M. Regnault has sent, with some specimens, a long memoir, in which he speaks of many things quite wide of the subject; we simply find toward the end a few obscure indications as to a new method of etching steel, and some attempts too incomplete to give to their author a title to the proposed prize. In the preceding series of names, none need be reserved.

M. Placet alone among competitors who have arrived since the prorogation of the competition, has successively presented to the Society engraved plates, which indicate sustained and persevering labour. His method is, at bottom, the moulding indicated by M. Poitevin or M. Pretsch; but he has protected it by using a device of M. Fargier, which consists in washing and swelling the proof, not on the side on which the light has struck it, but, on the contrary, on the opposite side—the only means of obtaining delicacy in the half-tints, as has been mentioned by M. Laborde. By means of devices (or rather, we may say, of methods) which are peculiar to him, M. Placet obtains galvanoplastic plates which may serve for copper-plate, for letterpress, and, by transference, for lithographic printing. The specimens presented by M. Placet are sufficiently remarkable to entitle his name to a place among the important candidates.

Examining now the claims of the various inventors who, having competed in 1859, have presented new researches, and maintained their candidature for 1864 (these are MM. Pretsch, Negre, Poitevin, Asser, Pouncy, and Gamier): -

M. Asser appears to have ceded all his claims to M. Toovey; and the improvements of the latter are not of sufficient importance to keep his name on the list, especially after examining the proof he has presented.

M. Pouncy has sent in large photo-lithographic prints. He obtains them, according to his patent, by a mixture of sensitive substance (bitumen, or bichromate, or a mixture of the two) with colouring-matter; then, after exposure, he washes, as much as possible, on the inverse side to that of the exposure, so as to remove by a suitable solvent the parts not fixed by light. If either engravings or lithography be required, he adds to the colouring a fatty substance, and then transfers to metal or stone. The patent taken out in 1863 by M.Pouncy, only gives general indications; and the results obtained do not call for a new distinction in addition to that granted in 1859 to M. Pouncy.

The candidates whose claims remain for discussion are MM. Pretsch, Negre, Gamier, Placet, and Poitevin. And while writing M. Poitevin's name, ought we not to mention that of M. Lemercier, who for so long a time has devoted his personal skill to the service of lithophotography?

Third Period. —*Progress effected from the close of the Competition in 1864, until the year 1867*.

At first sight it might seem right not to extend these researches any further. Yet, inasmuch as causes independent of the wish of the Commission have until now delayed the Report, it desired to profit by it still further, not with a view of admitting fresh competitors (for the list closed on the 1st of April, 1864),

but to examine the results which various methods have led to since that time, whether in the hands of competitors or even in strange hands.

With this object we resume the investigation of the methods and the specimens which may have been put forth during these last three years, either by new inventors or by those whose names have been reserved. We shall only mention the following names:-

M. Loewe gives a theoretical method, but without having made serious attempts; for he has given no prints in support of its application.

M. Bullock confines himself to pointing out the various methods used by him for forming on lithographic stone the grain necessary for obtaining the half-tints.

M. Marie sends in now prints, but does not communicate the method.

M. Amand Durand, resuming Nicephore Niepce's old bitumen method, and the improvements in it of M. Niepce de St. Victor, modifies it without giving any detail as to his modifications, commences the industrial reproduction of engravings or other outlines, and finishes by an extensive retouching whatever might have been incomplete in his prints.

M. Baldus has presented to the Society some remarkable engravings after photographs from nature. The shading of the tints is well rendered; and his prints prove once more that photographic engraving is now a realized fact.

M. Pinel Peschardiero has also presented remarkable specimens of engravings and lithographs, especially reductions and reproductions of geographical maps. In this case the absence of the half-tones facilitates the work of M. Pinel Peschardiero, which we confine ourselves to mentioning.

These names are a proof of the activity with, which it has been attempted to obtain and. perfect heliographic methods, but they furnish, no new element. This is not the case with. MM. Tessie du Motay and Marechal, of Metz, and with M. Woodbury.

Under the name phototypy, MM. Tessie du Motay and Marechal have given in prints in ink, among which you must have remarked. several untouched portraits of a remarkable kind. Without exactly giving their methods, these inventors have made known that the prints were obtained by means of a mixture of gelatine and chromic compounds very rich in acid, like the trichromates, spread on a metal plate, then exposed under a photographic print, washed, and dried. By a method which is peculiar to them, the parts of the chromogelatinized mixture remaining on the plate become extremely hard and adherent; and it is to this plate that they apply the ink. This method partakes both of typography and of lithography, and arises directly from the applications which M. Poitevin and M. Pretsch have made of chromatized gelatine; it is therefore a new and happy development of the methods of these inventors.

Mr. Woodbury has also made a very happy application of the method of M. Pretsch and of M. Poitevin.

Given a gelatinized relief, which Mr. Woodbury obtains by exposing on one side and washing on the other, according to the method of the Abbe Laborde and of M. Fargier, he lets it harden, and then makes a mould out of a perfectly plane sheet of lead; then, by means of feebly tinted gelatine, which he runs into these moulds and transfers to paper, he produces very fine, well-shaded tints, which have a very great resemblance to photographic impressions in silver. This is neither engraved plate nor lithographic, but a new and very ingenious mode of printing, which hitherto, however, has only produced proofs on a somewhat small scale.

In concluding this lengthened review, there only remains to examine what, during the period elapsed since the closing of the competition, has been the progress of the competitors whose names we reserved in 1864, as worthy of being seriously discussed; these labours, which could not be the starting-point of a judgment, may nevertheless sanction the merit of the competitors, and confirm the choice of the Commission.

M. Negre, after a rest of several years, necessitated by the state of his health, has lately presented to the Society some heliographic engravings made on cliches ' which the Due de Luynes brought from his journey to the East. If these plates exhibit numerous retouches, ought these not rather to be attributed to photographic imperfections than to the engraving?

M. Garnier, whom we find to have been for a long time alone, has deposited in the bureau of the Society some very remarkable engraving proofs, which readily sustain comparison with the silver-salt positives obtained from the same negative.

M. Pretsch, by successive consignments, has kept the Commission informed of his labours; and among the large number of prints which have been produced and sent by him, several are worthy of attention. Examination by a lens has shown in all these plates a vermicular grain, which at first suggests manual labour; but the formation of this grain, after a more careful examination, appears inherent in the method itself, and is probably the result of a chemical action. In any case the examination both of the first and of these latter proofs does not appear to indicate a very marked progress.

M. Placet, if he cannot be considered an inventor as regards the method he uses, is an earnest worker, employing, as we have seen, M. Pretsch's or M. Poitevin's gelatine relief, applying to the proof the directions of M. Fargier; but, usefully modifying this operation by introducing into his preparation a means of obtaining a grain (of vermicular appearance), he obtains directly, by galvanoplastics, plates of remarkable delicacy and of such clearness that on the proof retouches are discovered which are invisible on the plate, and are only, says M. Placet, the consequence of the delicacy of the workmanship.

M. Poitevin is represented, if not by himself, at all events by the numerous series of lithographic proofs which M. Lemercier has exhibited to the *Societe de Photographie*.

We think that we must here remark once more on the assiduous care and perseverance with which M. Lemercier has never ceased to apply his rare skill as a lithographic printer to the development of M. Poitevin's method; and, without wishing to detract from the skill of the inventor in whom originated so many applications, ought we not equally to do justice to him who by his persevering labours has

improved the method, and shown by a series of applications that this was a practical method? M. Lemercier, however, cannot be placed in competition with M. Poitevin, who, before parting with his patent, produced prints easily and regularly, and had edited several lithographic works.

There only remain five names the claims of which are to be discussed: MM. Garnier, Placet, Pretsch, Negre, and Poitevin.

The merit of M. Garnier's prints cannot be contested; but the small number of prints hitherto produced, and the delay in sending them in (for they only arrived after the competition had closed), do not give M. Garnier a sufficient claim; and, moreover we do not know whether his work is really the result of the original method; everything would seem to indicate the application of a new one.

As regards M. Placet, we have seen that the basis of his process is an ingenious application of discoveries which are foreign to him; by combining, modifying, and adding to them, he has endeavoured to assimilate them; but the merit of the plates he has executed do not constitute rights superior to those of true inventors; and there only remain the three competitors whom the Commission had reserved in 1859—MM. Negre, Pretsch, and Poitevin.

The object mentioned in the programme might be obtained in two ways—by photography and by engraving.

As regards engraving, two candidates have almost solved the problem; these are M.Pretsch and M. Negre; but both leave something to be desired in the results obtained. M. Pretsch has sent a great number of specimens, which proves that the production is abundant; but they do not seem to indicate any real progress; and the process has remained what it was in 1859, when, judging that there was no occasion for awarding a prize, the Commission asked for a delay until 1864. As regards the claim of priority which M. Pretsch raises as against M. Poitevin, it does not apply to M. Poitevin's principal claim, which is lithography, but to the application to engraving of gelatine reliefs; and we have seen that each of the inventors had equal claims, since the methods patented at the same time each referred to a different mode of obtaining and using these reliefs. Let us add, lastly, that M. Poitevin, giving up his patent, the improvements of which he could not prosecute, as he devoted himself entirely to the study of lithography, has allowed other inventors by successive modifications to take advantage of it and arrive at results superior even to those of M. Pretsch.

M. Negre had also, and a long time ago, exhibited specimens of photographic engraving: as regards dimensions and delicacy he had produced remarkable plates ; his prints are superior to those of M. Pretsch: the constant efforts and the remarkable results obtained by this skilful operator make us regret that a recompense should not be the reward of his labours. But turning to the idea of M. de Luynes, which was certainly to see popularized by practical methods documents useful for scientific men, archaeologists, and artists, we must allow that M. Negre has not completely attained this object; for his delicate method has remained confined to himself; there is no pupil, no operator, to show us that some other person might, stand in his place; this method has thus received neither the extension nor the popularization of the methods of M. Poitevin.

M. Poitevin, on the contrary, has completely realized the conditions propounded by the Duc de Luynes. By this mode of printing in ink, which is typographic, he easily produces without retouching, and in a perfectly reliable manner, any photograph whatever, and in such a number of examples as may be necessary to place within reach of any one documents useful for the arts and sciences.

He has thus fulfilled the intentions of the founder of the prize; and with this view the Commission nominated by you as judge of the competition, decided by a unanimous vote that the prize of 8000 francs founded by the (Duc) de Luynes should be awarded to M. Poitevin.