Lithography As An Artistic Expression

Manuel Manzorro Perez

What is a Lithography?

This is the key question, both from an artistic and a technical point of view.
I believe that in order to be able to properly answer this question, which is the frontispiece of this reduced synthesis, we must infer the following reflections:

Since the ancient moments, when the oldest prehistoric civilizations emerged, up to the present time, the engraving has to be considered a very efficient and transcendental tool for the development of Mankind and Thought. In this context, we have to differentiate between the engraving and the print.

Through the huge period of time mentioned above, the engraving has never been either printed or printable, since obviously the engraving was not born for that purpose or finality. Consequently we must associate the print with the history of paper as the image support. The invention of this essential element for the progress of Humanity took place in China in AD 105. Certainly, the most notable historians of the engraving and the print propose a common origin for them and for the paper. From our current perspective, including both the East and the West, we can therefore assume two big parts for the multiple printed image: the reproduction engraving and the original print. The two of them have their own profiles, motivations, necessities, finalities and objectives, as well as their own techniques, procedures and historical evolutions.

The Reproduction Engraving

In the first place, and following a chronological order, we should have in mind that the basic nature of the print was essentially utilitarian and communicative. Its main objective was to spread and to extend ideas and knowledge. That is, the printed image or print has been above all a transmission instrument for the strictly visual communication of the religious, scientific, cultural, didactic and pedagogic necessities of the time. This feature of the print continued to subsist until the new photography procedures appeared in the 19th century became consolidated. Along this period, it was called "Reproduction Engraving" in the West. Presumably the print had the same utilitarian function in the East. In modern times the term "original print" is established.

The Original Print

In the second place, we have something that is historically nearer to us: the print or multiple printed image, as an object in the service of the appetencies and necessities of the artistic creativeness, whose unique supreme finality is the aesthetic expressive imperative. This is the way we conceive it and assume it, and as such is it ratified by the most selected international critics.

What I just indicated implies that the image is freely conceived, rendered, printed and signed by the artist with the absolute conviction of having produced an original work, which conveys the same attributes and exigencies as any other work of art.

Nowadays we conceive the *original print* as something opposed to the "reproduction print", having each of them radical differences from the viewpoint of execution.

The modern term "original print" (in Spanish "estampa original") is equivalent to the English concept "printmaking" and "susaku-hanga" in Japanese. This word was given by the Japanese printmaker Kanae Yamamoto between 1904 and 1915 *(1)*. The Oriental clearly differentiate between the expressions "ukiyo-e" and "susaku-hanga". This distinction also occurs in the West, where we distinguish the term "reproduction engraving" from "printmaking". Consequently, the words "printmaking" in English, "sosaku-hanga" in Japanese and "estampa original" in Spanish have the same meaning and signification. When we get to this point we ask a very habitual question:"What is a Lithograph?"

We can answer this question by saying that a lithography is an image freely conceived, rendered, printed and signed by the artist *(2)*. Such image has been drawn and treated on a lithographic stone, a zinc or aluminium plate or any other printing support that corresponds with the technical demands of the planographic printing, assuming also that it has the same art exigencies and considerations as any other work of art.

Definitely, the artist conceives the image, concretizes it into something visible and produces it, according to the technical requirements, on a metal or stone surface. It is then chemically treated in accordance with the peculiarities of every particular image. The phollowing phase is the printing phase, that is, the process of passing the image from the printing medium (aluminium, zinc or stone) to the paper. The litography is now done. It's either a trial or an original print. It's a work of art.

About lithography we could talk clearly and concisely, but understanding it, feeling it,

intuiting it, and finally producing it doubtlessly requires years of dedication, investigation and methodic efforts. It requests a steady vocation that turns into wisdom, which is an imperative in order to be in possession of the control necessary to rule this delicate beautiful complex technique. Goya(Figures 1-4), Toulouse Lautrec, Picasso(Figures 5-10), Chagall, Clavé, Miró and others paid their worthiest tributes to this expression of Art.

Lithography was accidentally invented by Alois Senefelder in Solnhofen, near Munich, Germany, in 1798 *(3)*. After some initial trials with this revolutionary technique, the French artists Gericault, Delacroix and Daumier, amongst others, paid a special attention to it; however it is nowadays admitted worldwide that Francisco de Goya is the main exposer of all the resource potential of lithography as an artistic language. In his series *Toros de Burdeos* (1825) this is clearly shown. So, concerning this art, Goya is in the 19th century an equivalent to Picasso in the 20th century. They are both the highest leaders, and they reached this recognition when they exiled from Spain. This was an example of the Spanish Government's lack of cultural perception. About this regrettable reality even nowadays, the Historian Scholar Enrique Lafuente Ferrari said that "Spain has been better in begetting talents than in bringing them up" *(4)*.

The technical process of lithography is based on the antagonism or incompatibility of grease material with water. This is the reason traditionally held to explain Senefelder's technique, who described it as "a chemical printing process" *(5)*. More recent scientific analyses show that such reason describes just the external effect of a complex chemical process that takes place in the calcareous stone when different acids, gum arabic and several lithographic dyes interrelate with one another for finally applying it *(6)*. This is called "preparation" and it's a mix of gum arabic, nitric acid, phosphoric acid, tanic acid, etc. With this process we fix the image and we separate the drawn areas (lipophilic) from the undrawn areas (hydrophilic) by the effect of chemical transformation. This makes the inking, visualization and culminating printing processes of the image possible
The steps are as follows:
1st, Selection, graining and disposition of the stone or metal surface.
2nd, Draw the image on the surface with ink, pencils or any other grease material *(7)*.
3rd, Chemically treat the image by applying the chemical mix.
4th, Finally the printing process: organizing and arranging the work so that the desired final print is obtained.

Alois Senefelder (1771-1834)

Due to economical reasons exclusively, Senefelder (whose vocation was becoming a

dramatist, which he did mediocrely) attempted to edit and print his literature works by himself. He first tried with copper plates but it was expensive. In Solnhofen, his birth region near Munich, there were lime stone quarries. By using these stones, Senefelder started a search for the unexpensive printing of his works.

After intensively working with these stones, he unexpectedly found out what we nowadays called lithography. Today nobody doubts that this invention was, and still is, a really transcendental evolution in the history of the multiple printed image, which implies a huge progress in the propagation of knowledge through image within the industrial, commercial or artistic fields.

Before Alois Senefelder found out the procedure he called "chemical printing", as he tells in his book *(8)*, artists followed the traditional procedure on the calcareous stones, this is, by making two level differences on the printing support surfaces as they did with the large printing methods: relief (xilography) and hollow (intaglio procedure). There is no doubt that in order to be able to obtain a printed image, with either technique, the level difference is needed: the ink deposits on the prominent areas (relief) or on the inferior areas (hollow or intaglio). Senefelder worked according to this technique since 1796 through 1798. This fact makes many authors difer about the exact year of the lithographic invention.

About this, both Donald Saff and Deli Sacilotto, professors of the Printmaking Department in the University of Tampa, Florida (USA), competently and reliably say the following: "It was not until about two years later in 1798 that Senefelder's investigations led to the development of true lithography" *(9)*.

Some scholars, like André Beguin *(10)*, identify 1799 as the year of the invention; however, other authors establish different dates: Antonio Gallego *(11)* proposes 1795 and Claude Roger-Marx *(12)* proposes 1796. According to recent investigations that focused on a rigorous analysis of Senefelder's manual, the famous eminent scholar Jules Heller *(13)* proposes that what we nowadays consider lithography was invented in 1798. Likewise, the competent lithography artists and authors Clinton Adam and Garo Z. Antreasian *(14)* state that definitely it was in 1798 when Senefelder found out how to print an image on a flat surface with no differences between the drawing area levels and by means of a "chemical cause" to simultaneously split the ink areas and the ink-free areas.

This event, basically chemical, made it possible for the first time in the history of the printed image that the printing process could be performed on a single plane or level; this is the cause why it's been also called "planographic printing".

We can say that since 1798 we have a new technical resource for multiple image printing. This new system has nothing to do with the previous ones and provides many advantages, like increasing the number of possible printing trials or final prints out of a printing element that is not the traditional wood or iron support, but the calcareous stone. This element represented a drastic change in the conception of the printing techniques, since it affected both the Art and the Commerce domains: the industrial needs demanded a faster and more regular production of the editions.

Compared to previous techniques, lithography became most suitable to cover such industrial needs. Due to this, the new technique was fully accepted and it spread very quickly. The new technique enhanced both the graphical and pictorial potentials, considering this concept according to the meaning proposed by the very well known English Scholar in the History of Engraving Arthur M. Hind *(15)* when explaining the differences between the linear and tonal procedures.

The tonal pictorial resource was, no doubt, the calling aspect for the progressive acceptance of lithography amongst the Plastic Artists during the 19th century.

In 1798, when he was 52 years old, Goya had reached the top. One year later, he produced "Los Caprichos", a series of 80 plates executed by means of the most tonal pictorial procedure possible within the calcographic engraving technique: aquatint.

Lithography came to Spain twenty years later. The most significant event for the history of lithography in Spain happened, according to Lafuente Ferrari, when Goya was intensely working on his outlines and then putting them to the plates.
While a revolutionary printing procedure was emerging in Germany, Goya was (according to Lafuente Ferrari and Charles Iriarte) leaving his habitual studio to rent a kind of penthouse, over San Bernardino St, where he installed a press, a table and some cardboards and produced his famous 'Caprichos'.

Goya was probably printing his trials for the eighty plates without any news about the new technique while Senefelder was concluding his experiments on the calcareous stones to make lithography a reality. This way, the german inventor was preparing everything for Goya, deaf and doleful but on the top of his art, to render the first great work in the history of creative lithography: *Los Toros de Burdeos*(The Bulls from Burdeos) in 1825.

I'd like to repeat that through history, up to the invention of photography, the print's key finality was didactic, cultural, pedagogic and informative. Its functions were essentially utilitarian; consequently, according to the great scholar in the History of Engraving, Jean Adhemar *(16)*, "the engraving's purpose is reproduction".

Xylography or xylographic books tried at their start to look like manuscripts, since – according to Paul Westheim - "in the beginning, it was just a procedure to substitute the calligrapher's job used by some idle engravers who wished to minutely chisel the master-author's calligraphy on a wood board" *(17)*. The same thing happened with the Etching Technique, which initially made large efforts to speak the burin's language. The popular variant of Etching, called Aquatint, is born with the exclusive intention of imitating and reproducing, as strictly as possible, wash-technique drawings. According to Thomas Harris, accredited Scholar in Goya's works *(18)*, aquatint means "water color".

In its primitive linear form, the soft varnish exclusively tries to do as the pencil's trace on the paper. Following that direction, the oldest lithographies show, along with their shyness, the pleasure of their makers when realizing the similarity between the engraving burin and the pencil's trace on the porous surface of paper. Those initial lithographic works have been called "Lithography Incunabula".

Writers, professionals and historians of the Print agree that Lithography moves preferably towards industrial solutions in its beginning when a group of medium level artists simultaneously start their curious timid approach to the new technique.

Claude Roger-Marx complains about Lithography History forgetting some of those medium level masters, like Nicholas Charlet who happens to have been "the first one who really digged down into the resources of lithography". We must then recognize the important contribution of such anonymous 19th century artists, although just about five or six of these established and imposed lithography as a means of artistic expression.

We already mentioned that Alois Senefelder obtains his exclusive patent in Munich in 1799. He then associates with Philip André and patents his invention in London in 1800.

Here, the first artist who tries to work with lithography is Benjamin West, but the most important activity in England is made by Charles Hullmandel in 1819. In this same year, a Royal Decree proclaims the foundation of the "Lithographic Establishment" in Madrid, which becomes the first one in Spain. In this place, managed by Cardano -a friend of Goya's- our Genius encounters the new revolutionary technique for the first time.

The Lithography as a Language of Freedom and Creativity

The knowledge and mastership of all the long delicate technical process of

lithography is only possible by exerting an enthusiastic dedication and methodic experimenting. The only way to obtain a legitimate print, creatively speaking, is by running through all the resources that the technique offers the artist as an expression medium. The gains obtained from it must be a consequence of liberty, and liberty can only be used when that who exercises it is in possession of a maximum number of options. Just in the personal choice of an option resides the basics of liberty, which in this case looks very much like wisdom. Leaving utopias aside, for any form of plastic expression, without wisdom, there is no way to become free and communicate amply. This statement is magnified if applied to pedagogy or teaching of the subject in question.

The artist that does not know "the laws, the process and the performance of one's own lithographies does not have the chance to feel or understand the real secret of this technique". In addition to these ideas that I wrote in 1976, I would like to say that even in the ideal case of working in cooperation with a great printer, an artist should know as much as the cooperator about the technique. This will lead to more fair and rigorous conclusions and will provide more selected authentic results. I insist in the fact that the lithograpic technique is complex and delicate. From the selection of the stone up to the printing process, the artist won't be able to elude the need to know and manipulate many diverse elements. All these elements somehow interact in the making of the creative work. The knowledge of every single element, their specific interrelating functions and the correct application and use of them all build the power of erudition needed by every artist that wants to express through lithography.

Based on this conviction, I consider convenient –both from the investigative and the pedagogic points of view- to systematize the lithographic technique by phases and then by phase sequences, and progressively analyze what a lithographic work implies.

Consequently, we should accept that such process is composed by the following four phases:
First Phase: selection, powdering, planing and disposition of the printing support, this is, the lithographic stone. The stone should be selected according to the needs of the project by evaluating its surface optimization for the drawing.

Second Phase: This phase could be called "creative phase", since here we determine the method to apply in order to draw, elaborate and visualize the image.

Third Phase: This very delicate phase covers the preparation and application of the formula that will chemically transform the stone surface where the image resides.

This chemical process is known as "stone acidulation". Such formula is composed by gum arabic (14° Baumé) plus a corresponding dose of nitric acid, tanic acid or even phosphoric acid.

Fourth Phase: This final phase comprises several steps: the image "washing" or "lifting", the image establishment and strengthening, the first state trials and then the complex action of "printing", "throwing" or "editing". The washing or lifting intends to signify, strengthen, fix and establish the image as correctly as possible in order to pass this on to the paper as veracious as is on the printing support.

Logically, all of these consolidated phases require a specific elaboration of each of them.Although I previously mentioned that the term lithography implies writing, designing or drawing on a stone, I would like to say that lithography also means writing on a zinc or aluminium plate, since in the field of Artistic Lithography these are the two mostly used supports after the calcareous stone.

Now, I would like to clarify as much as possible the steps needed to prepare the surface of a calcareous stone or a metal plate so that the lithographic process becomes possible. At this point, we should remember that except for serigraphy, all other printing systems (xylography, burin, aquaforte, water color, etc.), both hollow or relief, have a common feature: the level differences that structure the image on the matrix surface; either on wood or copper, the ink may stay on the top areas of the plate (xylography) or it may stay inside the grooves (intaglio). In both cases, those level differences configure the image, making the inking process and then the printing process possible. However, in the case of lithography, the possibility to print does not depend on the level differences at all. This is why it is also called "planographic printing", since it is possible to get the image from a flat surface. Apparently, this feature initially gave the technique a magic mysterious impression which, although applied, was not understood.

Senefelder's definition "Chemical Printing" is still accepted, since the process comprises a series of chemical reactions when the different elements interact.
There is another fact to consider, which is the key explanation to understand lithography: the antagonism between water and grease material. Leaving any other chemical or physical aspects aside, we can say that lithography could not be without such antagonism. Although this is the most significant external phenomenon for this technique, there is a chemical metamorphosis which is much more complex than such phenomenon.

The English expert Richard Vicary (agreeing with some other accredited lithography scholars), in his book *Advanced Lithography*, states the following: 'The Lithographic

technique principles are based on the natural phenomenon called adsorption'. The process of adsorption is a property that enables a solid object to attract and conserve molecules from other gaseous or liquid objects; and this phenomenon takes place unavoidably during the technical process of lithography.

Permeability is one of the natural features in the porous structure of the calcareous lithographic stone and due to its sensibility to absorb either grease material or gum arabic the process of lithography can be accomplished.

On the surface of the calcareous stone, we find two types of areas: hydrophilic areas, which reject grease (ink), and lipophilic or hydrophobic areas, which attract, retain and accept grease and discard water. Based on this grease-and-water behaviour on the stone surface emerged the popular phrase "antagonism between water and grease".

I repeat therefore that such fact is only one in a large number of complex delicate chemical processes that take effect on the stone when nitric acid, magnesium, potassium, calcium, gum arabic, soap, wax, grease, etc interact. The interaction of all these elements with the calcareous porous nature of the stone surface, the stone's physical components (calcium carbonate, carbon dioxide, magnesium, silicon, etc) and the workshop environment conditions (temperature, humidity, etc) produce multiple chemical effects that result in the final delicate generation of the print. Because of this, we must infer that lithography gets improved when the sum of all these settings is perceived. Experimenting the technique is, consequently, a delicious attractive challenge for professionals. Of course, there is the chance of producing master lithographies without controlling all those technical or chemical resources, but an investigation work must be oriented this way and also a deep knowledge of the technique will ease the production of the lithographic works. Anyhow, it is important to bear in mind that going beyond the limits of the scientific field in order to obtain creative results is not appropriate. However a clear vision of the power of the technical resources will enhance and improve the artist's scope in terms of decision and creative freedom.

This conception has to be mostly applied to the pedagogic field, where teaching the subject takes place in the University and implies a serious strict analysis of the historic, theoretic, technical and creative dimensions of lithography.

Hence, we can conclude that the lithographic process is not based on an unique cause, but on a set of causes that give way to the production of a print, which will allow a high number of trials with unnoticeable differences between one another. This is commonly known as limited or unlimited edition. All trials are the same worth,

but each trial is an independent art work. The artist will then evaluate, number and sign them all. So, if for example the edition is an 80-print edition, the artist will take the trial numbered 25/80 and, by signing it, will assume the responsibility to accredit an original unique trial.

Basically, it must be known that the material (pencil, ink –whatever grease grade it has-) used to produce an image on the stone surface along with the chemical preparation applied (gum arabic and acids) make a chemical change on the stone surface immediately. This is, there has been a substantial metamorphosis of the material, for instance: when the nitric acid and the gum arabic have been extended on the surface with the drawing, the following happens: when the acid that the gum contains meets the soap contained in the material used to do the drawing, an instantaneous drawing desaponification occurs. This event hardens the drawing and makes it water insoluble. The stone must be permanently wet while the printing process takes place. The chemical action generates heat and this dilates the pores on the calcareous material, which at the time makes the grease acids to deeply penetrate the stone body. This causes a solid image fixing into the calcareous material. Simultaneously, the gum arabic enters the pores and forms an insoluble extremely elastic substratum. This film is very sensitive to humidity and attracts water and repels ink, distinctly conforming the hydrophilic areas. At the same time, the following chemical process takes place on the areas taken by the drawing: when the stone and the drawing material (grease in all cases) get together, the alkaline nature of the stone reacts with the grease acids resulting in what Donald Saff and Deli Sacilotto call "oleomanganate of lime". This new element hardens the drawing trace making it a extremely persistent water insoluble base which allows a large number of prints. At the moment of inking and printing, when the ink is rolled over the wet surface, the water rejection and the ink reception happen at the same time all along the stone surface. Keeping rigorously a constant balance between those two elements represents a delicate challenge for the competent exigent professional and is known as image control or image stabilization.

All through these reflections about the lithographic technique, I have been specifically focusing the stone lithography. Consequently I must clear up that, although the technical principle for the zinc or aluminum lithography is the same, there are discernible differences between them.

I would also like to restate that in order to be in possession of a real knowledge and control of the lithographic technique we have to know and explore, as much as possible, the elements that take part in the image generation and visualization processes. This is the way it has to be understood from the initial artist's conception up to the final printing where the image remains in the service of vision

and independently takes life as a unique work of art.

The ideas that build this short synthesis have been extracted from my thesis on "Lithography and Engraving Experimental Techniques" (2 VL – 504 pages), University of Seville, 1986.

NOTES

1.Oliver Staetler, *Modern Japanese Prints*, Charles E. Tuttle Co., Tokyo, 1968.

2.Zigrosser Carl & Gachde Christa M., *A guide to the Collecting and Care of Original Prints*, Crown Publishers Inc., New York, 1973, p. 3-5.

3.The reasons why I mark 1798 as the year of the invention of Lithography are widely exposed in my thesis on *Lithography and Engraving Experimental Techniques* (p. 32-39), University of Seville, 1986.

4.His answer to Engraver Teodoro Miciano: *Breve Historia del Aguatinta (de Goya a Picasso)*, Real Academia de Bellas Artes de San Fernando, Madrid, Spain, 1972, p. 55.

5.See Senefelder's book.

6.See Paul J. Harsuch's book and Donald Saff's and Deli Sacilotto's *Printmaking. History and Process*, Holt Rinerbart and Winston Inc. New York, p. 210-243.

7.Conforming to recent techniques, it is possible to disregard the lithographic stone and produce beautiful images without any water or grease. The so-called "waterless Lithography" was discussed and developed at the Tamarind Workshop, University of Alburquerque, New Mexico, USA in 1994. We have to admit that magnificient works can be generated without using the traditional techniques, and this fact does not represent the replacement of traditional Lithography but the enhancement of the planographic procedures.

8.Alois Senefelder, *A Complete Course of Lithography*. Reprinted. Da Capo Press, New York, 1968.

9.Donald Saff and Deli Sacilotto, *Printmaking. History and Process*. Holt Rinehart and Winston, New York, 1978. P. 184.

10.André Beguin, *Dictionnaire Technique de Léstampe*. Bruxelles, 1977. P. 249.

11.Antonio Gallego, *Historia del Grabado en España*. Ediciones Cátedra. Madrid, 1979. P. 341.

12.Claude Roger-Marx, *Le Gravure Originale du XIXé. Siécle*. Editions Aimery Somogy. Paris, 1962. P.37.

13.Jules Heller, *Printmaking Today* (2nd Edition). Holt Rinebart and Winston, Inc. New York, 1972. P.17.

14.Clinton Adams and Garo Z. Antreasian, *The Tamarind Book of Lithography: Art andTechnique*. Harry M. Abrans Inc., Publishers. New York, 1971. P.75.

15.Arthur M. Hind, *A History of Engraving and Etching*. Dover Publications Inc. New York, 1963. P.257.

16.Jean Adhemar, Michele Herber, Jacques Lethcve et Pierre Mazars, *Les Estampes*. Grand. Paris, 1973. P.91.

17.Paul Westheim, *El grabado en madera*. Fondo de Cultura Económica. México, 1954. P.19.

18.Thomas Harris, *Engraving and Lithographies of Goya*. Oxford, 1964. P.24.

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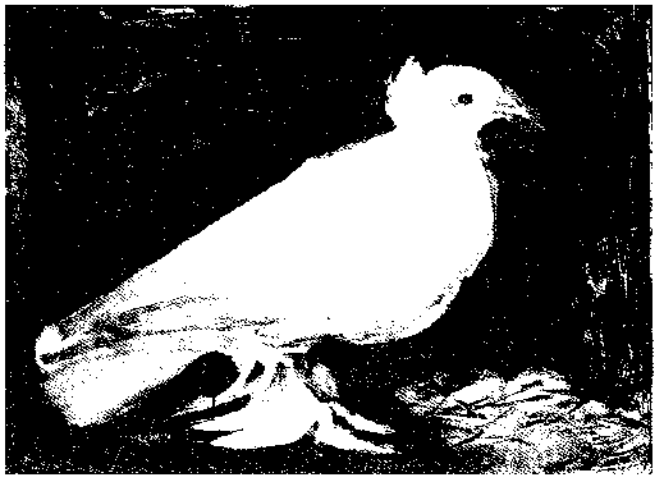

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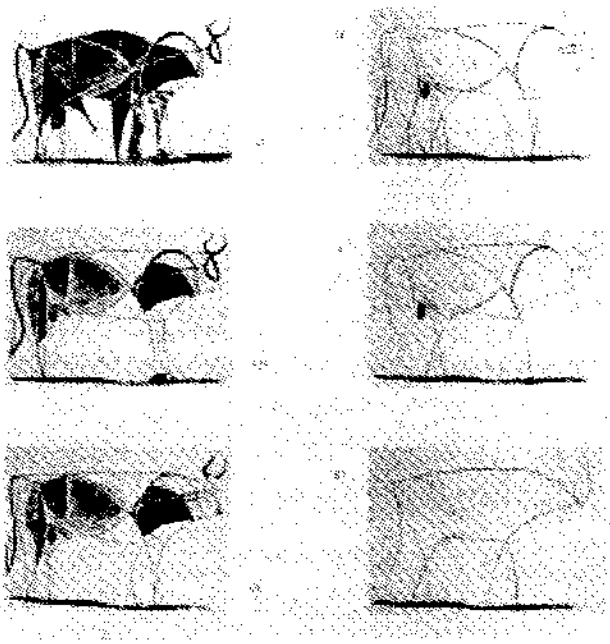

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