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The Scientific Methods of Max Ernst: His Use of Scientific Subjects from *La Nature**

Charlotte Stokes

Science is an all-pervasive influence on twentieth-century life and ideas. Whatever their opinions of science, modern artists cannot but reflect to some degree the methods, ideas, and subjects of scientific study in their works of art. Some artists attempt a "photographic" objectivity in their works. Others explore — to the exclusion of all other trends — one narrow artistic problem mirroring the narrowing of topic demanded of modern scientific method. Still others react in more subtle ways.

Max Ernst was drawn to science not for its objectivity or narrow approach, but rather for the subjects open to the scientist that were traditionally closed to the fine artist. In this search for fresh subjects, Ernst joined many modern artists who found traditional landscapes, academic nudes, and, especially, religious subjects powerless to move the members of an industrialized and fast-changing society. In the early twentieth century, artists like Ernst also looked to drawings by children and the sculptures of Africa as non-traditional sources of inspiration. Scientific subjects, however, provided sophisticated European and American artists with obviously Western, complex, and modern visual prototypes. For example, in *The Large Glass* or *La Mariée mise à nu par ses célibataires, même* (1915-1923, Philadelphia Museum of Art), Marcel Duchamp pictures human courting and sexual rituals in what can be seen as an elaborate parody of the research scientist's chemical and mechanical procedures. And Paul Klee's *Analysis of Various Perversities* (1922, Collection of Heinz Berggruen, Paris) is an inventive "child's" drawing of an anatomy study complete with fanciful laboratory apparatus. In a different vein, a dynamic modern way of seeing is found in the *Flight of the Swifts* (1913, Collection of Mr. and Mrs. Joseph Slifka, New York) by Giacomo Balla, the Italian Futurist, which evokes the chronophotographs of birds in flight that Étienne-Jules Marey produced in 1887 while researching the nature of animal movement. Scientific subjects were seen by these and other twentieth-

century artists as rich sources of visual ideas that could be developed in highly individualized ways.

Ernst's approach to science was also highly personal. He saw in scientific illustrations a visual form relatively free from the meanings conventional in artistic images. He also found in these diagrams and photographs not aspects of external reality or of absolute truth, but, rather, tantalizing associations with his own values and emotional states. He was not concerned with the abstractions of science — with mathematical formulas or graphs. He turned instead to the images that revealed scientific processes and investigations: how scientists visualized what was previously invisible. (Many of Ernst's choices come from articles on the use of photography in scientific investigations.) Ernst found in scientific images a fresh way of seeing, and he used them to help make visualizations of the invisible within himself. A good indication of the importance of scientific sources in Ernst's working methods is found in the following quotation in which he describes one aspect of his early development as an artist:

Un jour de l'an 1919, me trouvant par un temps de pluie dans une ville au bord du Rhin, je fus frappé par l'obsession qu'exerçaient sur mon regard irrité les pages d'un catalogue illustré où figuraient des objets pour la démonstration anthropologique, microscopique, psychologique, minéralogique et paléontologique. J'y trouvais réunis des éléments de figuration tellement distants que l'absurdité même de cet assemblage provoqua en moi une intensification subite des facultés visionnaires et fit naître une succession hallucinante d'images contradictoires, images doubles, triples et multiples, se superposant les unes aux autres avec la persistance et la rapidité qui sont le propre des souvenirs amoureux et des visions de demi-sommeil. Ces images appelaient elles-mêmes des plans nouveaux, pour leurs rencontres dans un inconnu nouveau (le plan de non-convenance).

*I would like to express my appreciation to the Oakland University Research Committee for awarding me a grant to pursue research on this topic. My thanks go also to my colleagues Professors John Cameron and Carl Barnes, Jr., for their continued support and encouragement, and to Mr. Steven Patchen who instructed me in the use of the word-processing

computer on which this article was composed. The staffs at Wayne State University Science Library, Detroit, and the University of Washington Science Reading Room, Seattle, were most understanding of my need to photograph engravings from *La Nature*. And my special thanks are owed to the late Marian Wilson who edited and typed this manuscript.

Il suffisait alors d'ajouter sur ces pages de catalogue, en peignant ou en dessinant, et pour cela en ne faisant que reproduire docilement *ce qui se voyait en moi*, une couleur, un crayonnage, un paysage étranger aux objets représentés, le désert, un ciel, une coupe géologique, un plancher, une seule ligne droite signifiant l'horizon, pour obtenir une image fidèle et fixe de mon hallucination; pour transformer en drames relevant mes plus secrets *désirs*, ce qui auparavant n'était que de banales pages de publicité.¹

A series of small works (approximately 6" × 9"), paintings upon scientific diagrams, done from 1919 to the early 1920's, were probably the results of the inspirational experience described above.² Ernst did not conceal (or seek to destroy) the found images or their scientific content; rather he subverted the images. He covered the explaining labels, and the connecting links within the images, but glass flasks, tubing, bits of anatomical details, and the like peep through the paint. In one of this group, *Winter Landscape: Gassing of the Vulcanized Iron Maiden to Provide the Necessary Warmth for the Bed* (1921, location unknown), the artist subverted the intent of the original illustration further by turning it upside down.³ This work was created from a diagram showing the fabrication of nitrogen and nitric acid.⁴ Ernst took as a base for his sexually suggestive "gassing of the vulcanized iron maiden" the title and the process described on the original diagram. Thus both the words and the picture contain hints and reminders of the real world, but it is a world disoriented.

In this group of early works Ernst established methods of dealing with scientific subjects. He changed the supposed objectivity of science to make very personal statements by cancelling some elements, by exposing others, and by turning the original upside down. Prophetic also is the choice of subject which is a transformation created by the force of energy. This visualized energy was turned by Ernst into a new satiric view of sexual energy — often his own. But intertwined with and equated with his own sexual nature is his concern with his powers as a creative artist. The view that sex was an important — if not the most important — inspirational force in life and art was shared by the Surrealist group in general.

In Ernst's subversion of scientific images (as in the one above) we see an ambivalence toward science. On the one hand, Ernst was attracted to the subjects that suggested a wealth of psychological meanings, and on the other hand

he saw the scientific method as being part of the bankrupt social system whose rationality and technology had created the destruction of so many young lives and young hopes in World War I. This ambivalent attitude was a direct product of Dada experiments that occurred in Germany right after the war. The whole intent of Dada was to satirize and to fragment the old discredited values and reassemble them in a new form that would show their meaninglessness.

When Ernst moved to Paris in 1922, the references in his works to his own life became more noticeable. In addition to the satirical comments on society, his newer works reflected his own past, especially his own psychological development. He continued to subvert previously existing images, especially scientific diagrams, in his work, but he made a major shift in his methods of using these sources. Earlier Ernst had made a number of "collages" combining a previously created image and painted additions. As he turned from Dada to Surrealism he made more paintings with elements copied in a large form from sources he had used directly in collages before. In his direct use in collages of previously created pictures, he avoided simply painting over the images, but rather assembled elements cut from several sources — often using no painted additions at all. As a consequence, in both painting and collage Ernst had more control over the composition and choice of elements. In both method and content Ernst was responding to the development of the Surrealist approach which included a personalization of subject and a refinement of approach.

Au Rendez-vous des amis, 1922 (Fig. 1), is a good and early example of one aspect of this change. Although it is completely painted, there is a sense that it was "assembled" from many separate images. The participants in the rendezvous do not look at or relate to one another and shadows and scale are not wholly consistent. The painting seems to be a collage of Ernst's recent experience with this group of the Paris avant-garde. The mountainous landscape suggests the Tyrol, where Ernst had made contact with the members of the Paris group in 1921 and 1922. The separate portraits may even have been painted from photographs.⁵ In this painting Ernst shows the shifting relationships that will eventually lead to the forming of the Surrealist group. Tzara and Picabia, very important Dadaists but inconsistent Surrealists, are missing; and Breton, the soon-to-be Pope of Surrealism, seems large and dynamic. The depiction of de Chirico, represented by a legless statue, is a monument to a member of the avant-

¹ Max Ernst, "Au-delà de la peinture," *Cahiers d'art* (special Ernst issue), Nos. 6-7, 1937, in Max Ernst, *Écritures* [Paris], 1970, 258, 259.

² Examples of this group are: *The Enigma of Central Europe*, 1920, private collection; *Hydrometric Demonstration of Killing by Temperature*, 1920, J. Tronche, Paris; and *Stratified Rocks, Nature's Gift of Gneiss Lava Iceland Moss 2 Kinds of Lungwort 2 Kinds of Ruptures of Perineum Growth of the Heart (b) The Same Thing in a Well Polished Box Somewhat More Expensive*, 1920, Museum of Modern Art, New York.

³ Werner Spies, *Max Ernst — Collagen: Inventar und Widerspruch*, Cologne, 1974, figs. 111, 561.

⁴ Loni and Lothar Pretzell, "Impressions of Max Ernst from His Homeland," in *Homage to Max Ernst*, ed. G. di San Lazzaro, New York, 1971, 6, 8.

⁵ Hans Richter, *Dada: Art and Anti-Art*, New York, 1965, fig. 85 facing p. 161 (see Fraenkel in group photograph); and Uwe M. Schneede, *Max Ernst*, New York, 1973, 47, fig. 84 (see Gala Eluard in group photograph).



1 Max Ernst, *Au Rendez-vous des amis*, 1922, oil on canvas, 51¼ X 76¾". Cologne, Museum Ludwig (courtesy Museum)

garde who has become a conservative. This satiric image is probably based not only on the tailor's dummies that appear in de Chirico's work but also on the tailor's dummy that had stood in place of the "defendant" Barrès in a mock Dada trial of a writer who had also retreated from radical to conservative production.⁶

Interspersed among the members of the budding Surrealist group and their "mentors" are images taken from *La Nature*, old copies of which Ernst found while browsing in secondhand bookstores. *La Nature* was a popular science magazine founded in France in 1873 by Gaston Tissandier. Before 1900 it was richly illustrated by engravings produced by many craftsmen. These engravings range from representations of serious scientific diagrams to illustrations of circus acts; from drawings after Mr. Wizard-like experiments to engraved reproductions of photographs showing modern technology as applied to a slaughter-house. (After 1900 photographs began to replace the engravings.) The founder of the magazine was also very concerned with new investigations into visual phenomena made by photographers; many of the earliest discoveries of Muybridge and of Marey were first published in *La Nature*.⁷ And some of these representations eventually found their way into Ernst's collages and paintings (see the discussion for Figs. 19 through 24). John Russell in his monograph, *Max Ernst: Life and Work*

(New York, 1967, 188), shrewdly pointed out the link between the serious scientific illustrations in *La Nature* and Ernst's depictions of his inner world.

Ernst's interest in scientific images was not in those published almost contemporaneously with the paintings and collages they influenced. Rather, he chose the archaic images of the nineteenth century (many of which were contemporary with his own childhood). Not only were nineteenth-century scientific concepts easier to understand, but, more important, the nineteenth-century scientific investigator was more likely than his twentieth-century counterpart to be concerned with the same issues that contemporary artists were. One of the main concerns of the scientists of the last century was to develop ever better ways to "make visible what lies beyond the limits of human perception."⁸ When Eadweard Muybridge, the great American photographer, went to Paris to show the discoveries he had made in photographing the motion of animals, especially horses, he showed the results of his research at the residence of Jean-Louis-Ernest Meissonier, a prominent French academic painter.⁹ Photographer and artist alike wished for and saw the revelations made by photographs about the nature of movement to be a boon to painters. So Ernst not only made extensive use of old scientific illustrations but saw in them vestiges of the older simpler methods and goals that characterized art as well as

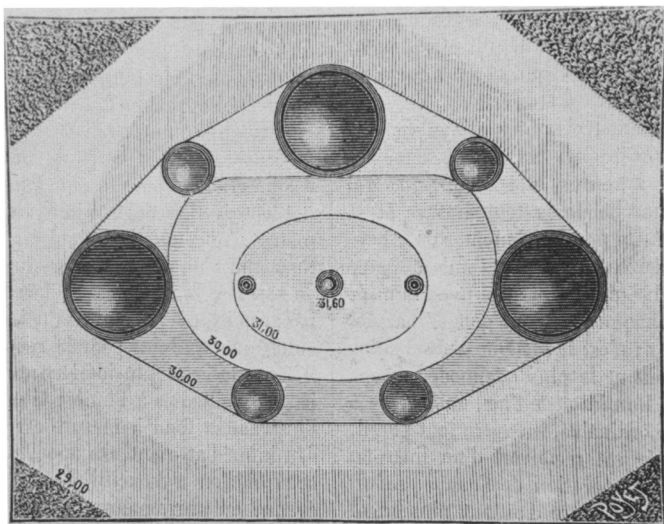
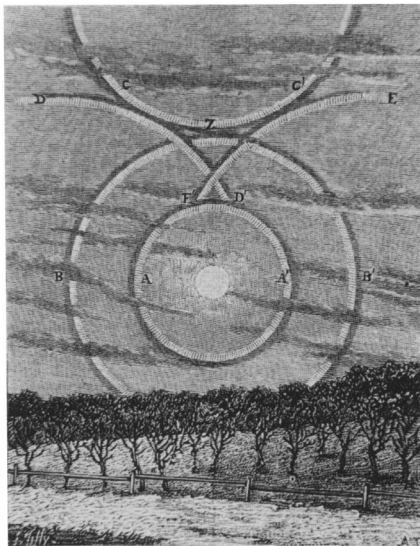
⁶ Richter, 184.

⁷ Françoise Forster-Hahn, "Marey, Muybridge and Meissonier: The Study of Movement in Science and Art," in *Eadweard Muybridge: The Stanford Years, 1872-1882*, Stanford, 1972, 86, 87.

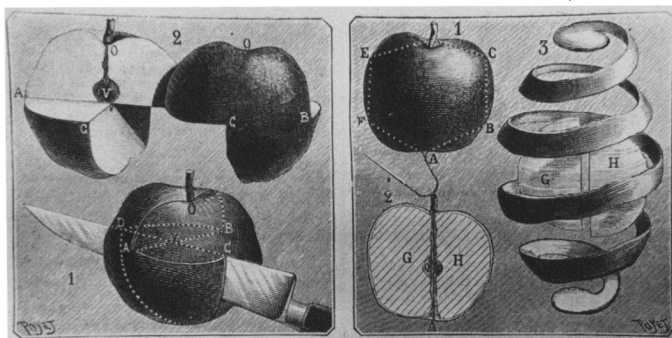
⁸ *Ibid.*, 85.

⁹ *Ibid.*, 86.

2 "Halo solaire observé dans les environs de Neuchâtel en Suisse, le 28 mars 1892," *La Nature*, 1892, Pt. I, 336



3 "Plan à vol d'oiseau du fort souterrain," *La Nature*, 1888, Pt. II, 248



4 (left) "La Pomme coupée en deux morceaux d'équerre"; (right) "La Pomme coupée dans sa peau," *La Nature*, 1888, Pt. II, 272

science.

La Nature provided an abundant source for the rational and naïve images that Ernst could cut up and rebuild via collage into a new Surrealist world. And it was necessary that the images used — either in collages or copied into paintings — be both recognizable and recognizably subverted. Thus in the sky behind the figures in *Au Rendez-vous des amis* is pattern derived from the haloes observed around the sun (Fig. 2). Ernst turned this pattern on its side. As in the *Winter Landscape*, his means of subversion was to put the image in an "impossible" position. Two other representations used in this work also come from *La Nature*: the apple and knife, and the "plate" at the lower left. The "plate" is derived from a bird's-eye view of an underground fortification built with the advanced technology of the day (Fig. 3). As in the halo pattern in the sky, Ernst has made changes in the original; the most obvious is a simplification of the plan. He has also made a radical and typically Surrealist change of scale — at least in relation to the human figures; the relationship of the plate/fortification to the landscape is ambiguous. Ernst based the way the fort is set into the land on another of the engravings of the fort on the opposite page from the plan.¹⁰ He turned the flat plan of the fort into a definitely concave form unable to protect its interior from the penetration of the knife. The knife itself and the apple are derived from an engraving of a trick cutting of an apple — an easy-to-understand application of geometric principles as well as an explanation of a clever illusion (Fig. 4). This odd image, like so many of the images in Ernst's works, suggests much without stating anything exactly. The apple is the symbol of Eden's original sin, sex. The cleverly cut apple suggests Ernst's clever cutting of his serious sources in order to make collages. The proximity of the apple to Ernst's self-portrait in the painting reinforces this impression. In a larger sense, the cut apple suggests the dissection of sin and of sex that occupied the creative energies of the Surrealist artists and poets. In his use of these items, Ernst disobeyed the rules of scale and the laws of physics, yet the scientific (or pseudo-scientific) references are clear. The painter has even used numbers which appear in scientific and technological diagrams to identify the participants of the Surrealist meeting.

In all the methods Ernst used to subvert the intent of the original images runs the theme that our perceptions of the physical world are untrustworthy. Apparently he based the arrangement of several figures in *Au Rendez-vous des amis* on several puzzling illustrations from an article in *La Nature* on center-of-gravity experimentation. The strange family group of three generations of men, the younger

¹⁰ Lieutenant-Colonel Hennebert, "Les Forts souterrains: Le 'Fort de l'Avenir' du Commandant Mougin," *La Nature*, 1888, Pt. II, 249, fig. 3.

sitting on the lap of the next oldest (bottom of Fig. 5), is the source for the seated group in *Au Rendez-vous des amis* of which Ernst made himself a part. The striding figures at the right of Figure 6 are reversed and modified at the right in the finished painting.¹¹ The article these engravings illustrated makes the point that a relatively weak person, a little girl, if placed in the right position could do things that would seem to demand great strength. In all Ernst's uses of his material from *La Nature*, he deliberately overturns our preconceptions of size, depth, or orientation.

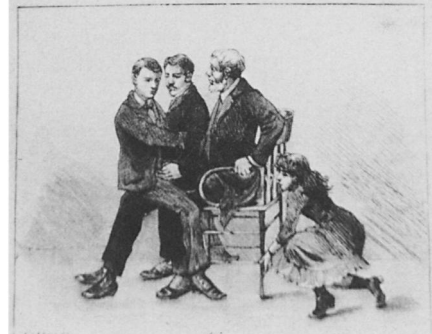
In later poetic writings Ernst would speak of being blind yet seeing.¹² In *Au Rendez-vous des amis* he negates the sense of hearing — he gives us a dumb show. The German painter among Parisian avant-garde poets shows them neither speaking nor writing but communicating in a mysterious sign, i.e., visual language. These are deaf-mute poets. The irony of such a designation is that Ernst believed the evidence of the senses was only part of one's perceptions. Only by limiting the senses would the poet or painter "hear" or "see." So at the most basic level Ernst subverts scientific method and scientific evidence by denying that the sights and sounds of the objective world are all-important or to be trusted.

Au Rendez-vous des amis also deals with an aspect of scientific investigation that was to have great influence on the Surrealists: psychoanalytic investigation of the mind. Ernst had been a psychology student before World War I and at that time had read several of Freud's books in the original German, not having to wait, as did many of his friends, for a French translation. Ironically, Freud's writings may have planted the seeds of distrust of science in Ernst's mind. In his analysis of works of art Freud comments on the richness of artistic perceptions in contrast to the coldness and limitations of the scientific approach.¹³

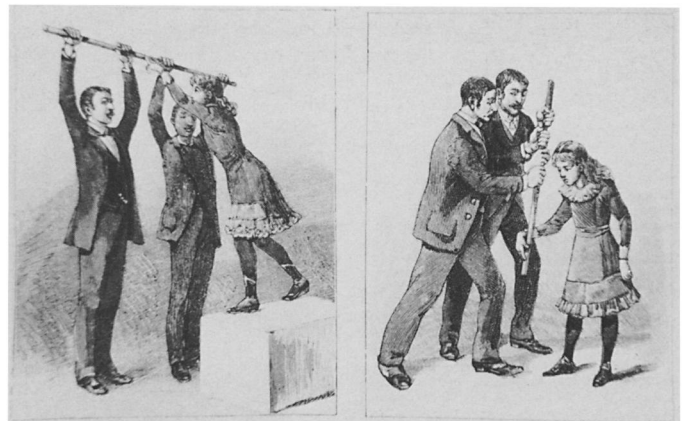
More central to Freud's theories was the belief that childhood experience affected the actions and thoughts of the adult. Ernst made his own childhood, especially his relationship with his father, Philippe Ernst, a central concern in his poetry and painting. *Au Rendez-vous des amis* looks like a strange, nearly all male family portrait with family members stepping on each other's toes and individuals grouped in small alignments. A young-looking Ernst sits on the lap of the paternal and bearded figure of Dostoevsky. Indeed, Dostoevsky was seen as a nineteenth-century writer who delved into the powerful inner life of his characters.¹⁴ It was therefore as a precur-



Fig. 5
que les hommes font leurs efforts | toutes les directions sans grande
opposée pour y résister, la jeune fille | difficulté n'est pas accrue en m



5 Demonstrations of principles of leverage, *La Nature*, 1892, Pt. 1, 173



6 Demonstrations of principles of leverage, *La Nature*, 1892, Pt. 1, 172

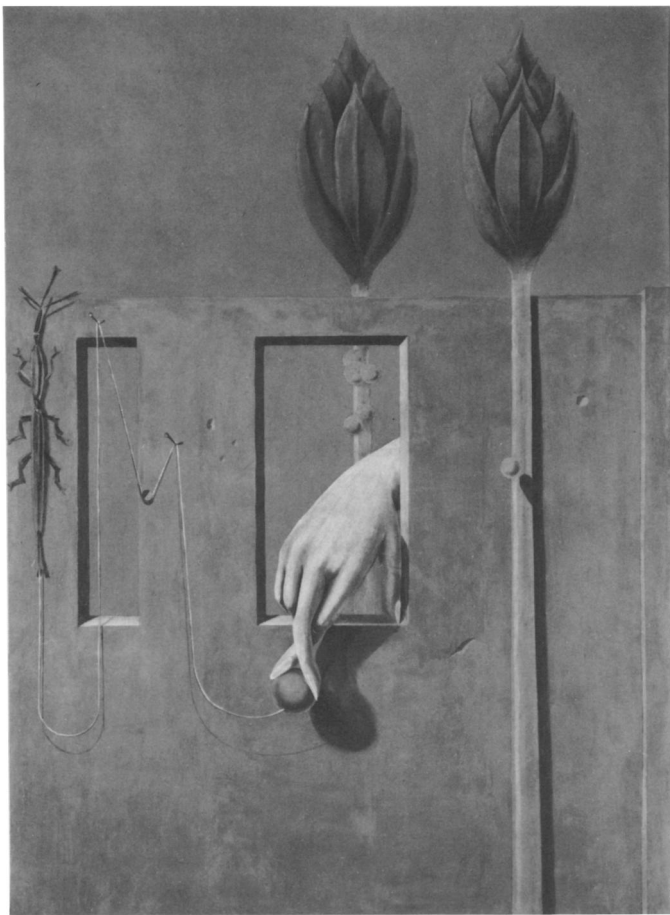
¹¹ Spies (as cited in n. 3), 117. The transition from the *La Nature* engraving to the painting is seen more clearly in a drawing for *Au Rendez-vous des amis* that Spies repros. as fig. 161. Elements from this group of illustrations are found in three of the collages in *La Femme 100 têtes*, pls. 47, 48, 94. See my "La femme 100 têtes by Max Ernst" (Ph.D. diss., University of Washington, 1977), 178, 179, 248, 249.

¹² Ernst (as cited in n. 1), 245.

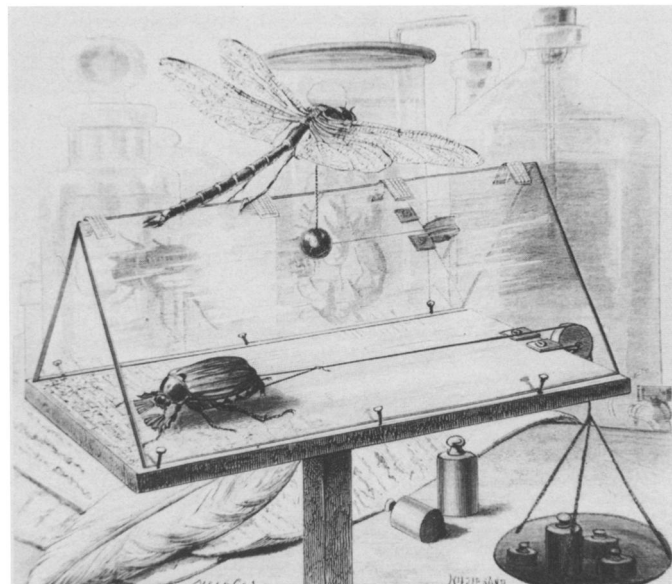
¹³ Jack J. Spector, *The Aesthetics of Freud: A Study in Psychoanalysis*

and Art, New York, 1972, xi, 49, 55.

¹⁴ As might be expected, Freud was also interested in Dostoevsky and his work. Although he had shown an interest in 1920 (Spector, 72), well before Ernst painted *Au Rendez-vous des amis*, he did not write "Dostoevsky and Parricide" until 1926-27 (pub. 1928). Therefore Ernst's insights into the psychological interpretation of Dostoevsky and the associations of Dostoevsky with a father figure are his own or are from a source other than Freud.



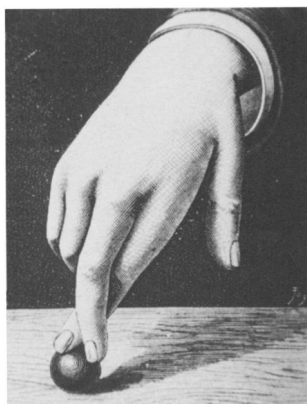
7 Ernst, *Au Premier Mot limpide*, 1923, oil on canvas, 91 $\frac{3}{4}$ X 65 $\frac{3}{4}$ ". Düsseldorf, Kunstsammlung Nordrhein-Westfalen (courtesy Kunstsammlung)



9 "Appareil servant à mesurer la force musculaire des insectes," *La Nature*, 1881, Pt. II, 300

the deaf,¹⁵ and Ernst was familiar with the sign language used by them. The gestures in this painting seem to be part of an evocative rather than an explicit language.¹⁶ As a depiction of a gathering of friends, the painting has been compared to Raphael's *Disputa*.¹⁷ Ernst's father, an amateur painter and devout Catholic, had made a copy of this work.¹⁸ (Perhaps a better analogy to *Au Rendez-vous des amis* might be Raphael's *School of Athens*, which not only contains a symmetrically arranged gathering of kindred spirits but also includes the self-portrait of Raphael that Ernst reversed in *Au Rendez-vous des amis* in figure No. 7.) In any event, Ernst's family portrait of his artistic forebears and brothers subverts artistic traditions as it subverts the principles of science.

Ernst painted a set of murals on the walls of Paul and Gala Eluard's house at Eaubonne in 1923. These murals contain many examples of the flora and fauna typical of the sorts that appear in *La Nature*. Like the objects in *La Nature*, the objects in the murals seem strange and isolated. In one of the sections, *Au Premier Mot limpide* (Fig. 7), for example, Ernst derived the hand from an illustration of sense perception (Fig. 8). In the experiment, the person perceives two balls from the sensation derived from the crossed fingers touching a single ball. Here again Ernst deals with the untrustworthiness of sensations, but this concept is located in his source rather than in the finished work. As in his prototype, Ernst isolated the hand within a frame, cutting it from the body. He also modified



8 "Figure montrant la position qu'il faut donner au médium et à l'index pour éprouver la sensation de deux billes en n'en touchant qu'une seule," *La Nature*, 1881, Pt. I, 384

sor to the Surrealist poets that Ernst depicted him. Another "family" reference are the gestures of the poets and painters. Ernst's father was a teacher in a school for

¹⁵ Patrick Waldberg, *Max Ernst*, Paris, 1958, 21. Not only was Ernst's father a teacher of the deaf but Ernst's sister took her father's place when he left the position. Ernst also uses engravings on this subject from *La Nature* in *La Femme 100 têtes*, pls. 90 and 134. See my diss., 239, 240, 313.

¹⁶ Werner Spies, *Max Ernst — 1950-1970: The Return of La Belle Jardinière*, New York, 1971, 134, n. 30.

¹⁷ *Ibid.*

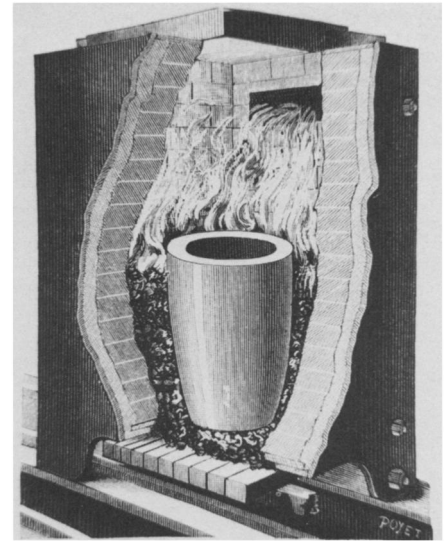
¹⁸ Waldberg, 20, shows Philippe Ernst with his copy of the *Disputa*.



10 Ernst, title page of *La Femme 100 têtes*, 1929 ed.



11 "La Femme à trois têtes," *La Nature*, 1882, Pt. II, 237



12 "Nouveau fourneau à creuset," *La Nature*, 1883, Pt. II, 272

the original drawing to heighten the similarity of the fingers to very feminine crossed legs. The crossed legs imply either sexual inhibitions or denial of sex to another. The autobiographic aspect of the image is seen in the MX (for Max) formed by the string and the fingers. (The figure of Ernst in *Au Rendez-vous des amis* crosses his fingers in a similar gesture.)

An indication that Ernst may have made indirect use of *La Nature* in *Au Premier Mot limpide* is found in a similar association of string, ball, and insects in an illustration (Fig. 9) that appears in the same bound volume of *La Nature* with the illustration containing the crossed fingers. This illustration was from an article telling of the great strength of insects in relation to their size; in order to make the experiment, weights were attached to the insects. The sadistic aspect of this attachment as well as the incumbance of the weights themselves are exploited in Ernst's image.¹⁹

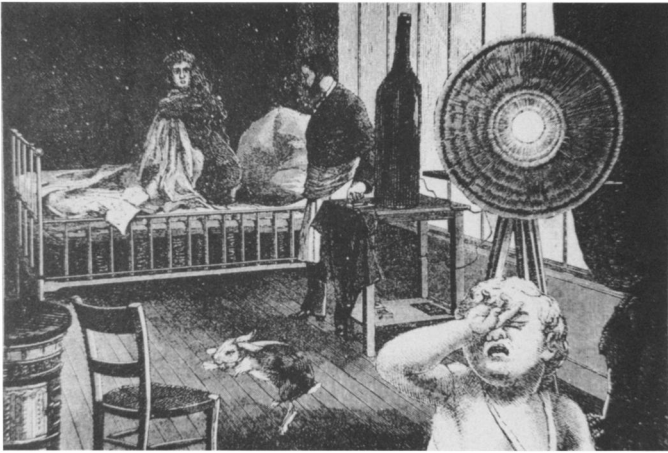
In *La Femme 100 têtes* Ernst continued to look to scientific source material. The artist called this work a "collage novel." It is made of 147 collages published with poetic captions in 1929. The novel begins with a hero descending from Heaven and a not-so-immaculate conception and ends with contemplations on death and the same plate that began the novel. *La Femme 100 têtes* (her

name is a pun meaning either "the hundred-headed woman" or "the headless woman") is our guide through the novel. She is introduced on the title page (Fig. 10 is from the original edition of 1929).²⁰ The female torso (Fig. 11) comes from an illustration in the article, "La Science foraine: Les Femmes à trois têtes," which probably supplied Ernst with the inspiration for the novel's punning title (Fig. 11). The article explains the theatrical illusion of a three-headed woman. This kind of article clearly made a separation between modern science and the illusions that had been part of such older "scientific" practices as alchemy — a separation Ernst subverted. Like an alchemist, Ernst puts the torso from "La femme à trois têtes" into a cutaway view of a crucible being heated in a furnace (Fig. 12). The ambiguities in many of Ernst's sources and his skill at playing on them are demonstrated by the bricks at the bottom of the furnace, which may be seen as the keys of a drawing-room piano when placed in conjunction with the elegant torso.

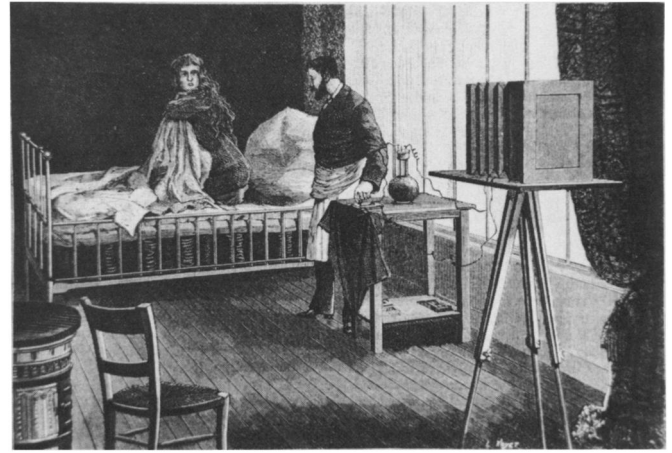
In the second collage of the novel (Fig. 13), Ernst refined his manipulations of his sources and unified in one image many themes derived from science. The picture that served as a base for this collage is an illustration of Dr. Charcot's methods of studying and treating hysteria (Fig. 14). The choice of this image is consistent with the Surrealist

¹⁹ Spies, 1971, 48, 53, has pointed out the possible link between this painting and Freud's analysis of *Grädiva*. According to Freud, this little-known story concerns sexual frustrations and repression. At one point in the story, an anthropologist has a dream in which a lizard, associated with maleness, appears. A woman devises a noose in which to trap the man-lizard. Freud, *Delusions and Dreams in Jensen's "Grädiva,"* 1907.

²⁰ There are at least three versions of the title page (each with a different collage) of *La Femme 100 têtes*. The three were pub. by: Editions du Carrefour, Paris, 1929 (title page repro. in fig. 10); George Wittenborn, New York, 1956; and Gerhardt Verlag, Berlin, 1975. Each of the collages used on the title pages, though different, contains a headless female form. To my knowledge, the original title page of 1929 has not been used in any subsequent edition.



13 Ernst, "L'Immaculée conception manquée," pl. 2 of *La Femme 100 têtes*, 1929



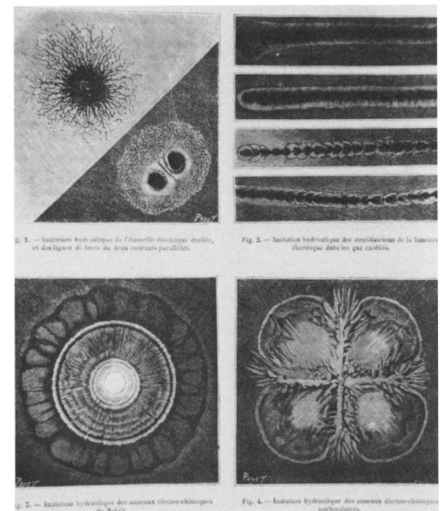
14 "Disposition de l'appareil photo-électrique pour les études médicales. Le médecin, placé près du malade, agit à distance au moyen de l'électricité," *La Nature*, 1883, Pt. II, 216



15 "Les Lapins dressés du Cirque d'Hiver, à Paris," *La Nature*, 1890, Pt. I, 249



16 "Manière d'éteindre une bougie placée derrière une bouteille," *La Nature*, 1883, Pt. I, 336



17 Illustrations for "Imitation des phénomènes électriques," *La Nature*, 1883, Pt. I, 353

interest in the creative implications of mental disorders. The year before Ernst created *La Femme 100 têtes*, Breton and Aragon celebrated the anniversary of Charcot's research into hysteria:

L'hystérie est un état mental plus ou moins irréductible se caractérisant par la subversion des rapports qui s'établissent entre le sujet et le monde moral duquel il croit pratiquement relever, en dehors de tout système délirant. Cet état mental est fondé sur le besoin d'une séduction réciproque, qui explique les miracles hâtivement acceptés de la suggestion (ou contresuggestion) médicale. L'hystérie n'est pas un phénomène patholo-

gique et peut, à tous égards, être considérée comme un moyen suprême d'expression.²¹

The women that Charcot studied reported visions like those of religious mystics.²² Ernst took the opportunity this engraving offered to parody an Annunciation scene, the vision of the Virgin Mary. Acting as the Virgin is a sick woman sitting in bed. Beside her is the announcing angel, the doctor, who in the original illustration (Fig. 14) is taking her picture for scientific purposes. The doctor's apron, similar to those of workmen and butchers, makes him appear somewhat dishevelled. This and his demeanor strongly suggest a sexual as well as authoritarian

²¹ André Breton and Louis Aragon, "Le Cinquantenaire de l'hystérie," *La Révolution surréaliste*, No. 11, 4e année, 22.

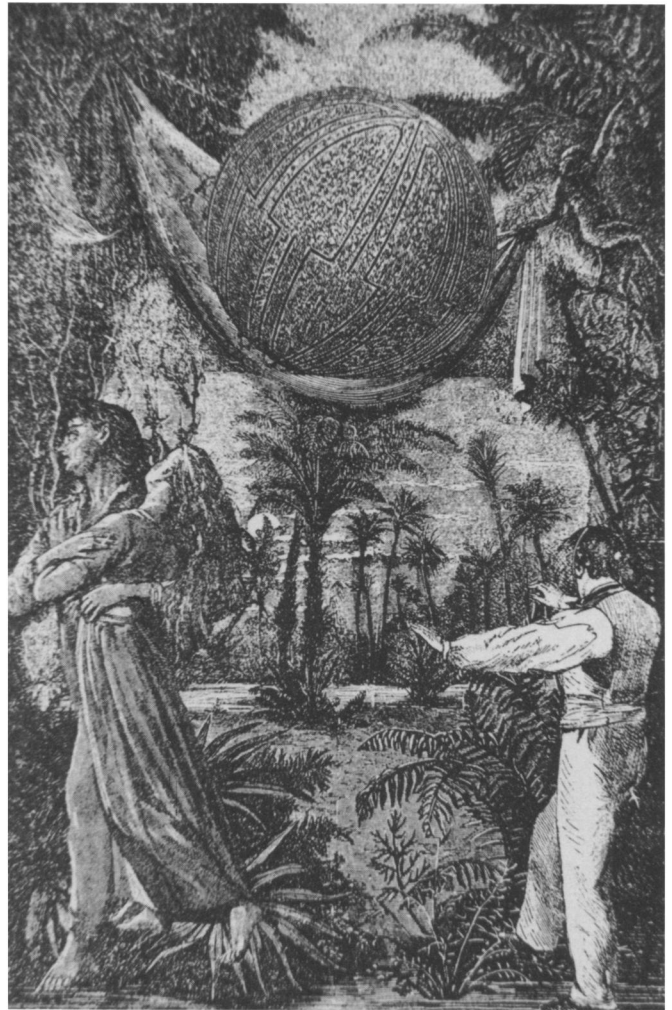
²² J.-M. Charcot, *Lectures on the Diseases of the Nervous System*, London, 1877, 278.

relationship to the woman, which Ernst exploits. The suspicious and sullen look on her face indicates that she is anything but enthusiastic over the prospect of this “immaculate conception” described by the caption. Ernst’s modification of this scene also represents the creative disordering of the mind that Charcot studied and that Aragon and Breton celebrated. Ernst was concerned with the problems of visualizing the invisible — here a mental state. He altered the original image to conform more closely with the truth seen by his inner eye.

Ernst not only used the images of science directly in Figure 13 but subverted the artistic tradition of the Annunciation by inserting elements drawn from scientific or pseudo-scientific engravings in *La Nature*: a wine bottle, a rabbit, a “sunburst,” and a child. These elements both cover the original photographic apparatus — thus obscuring the original meaning of the scene — and parody the insistent symbols usually included in traditional depictions of the Annunciation. The prolific rabbit, originating in a picture of a circus act (Fig. 15), replaces the Dove of the Holy Spirit. From a popular science article on how air currents move around an object, Ernst took a wine bottle (Fig. 16). The bottle, associated with free good times, replaces the vase of lilies, symbolic of the Virgin’s purity. The bottle’s phallic shape is juxtaposed to the hollow-centered “sunburst” (lower left of Fig. 17). This image of an electric charge visualized in water as concentric circles of light has implications of female orgasm and the moment of conception. Ironically, this electric image refers back to the original subject of the scene, for the illustration is the photographic image of electrical charges. As such, it is a modern, scientific visualization of light and energy which parodies the rays of divine light coming from God. This collage is a compact statement of Ernst’s major scientific themes. On several levels he examines methods of making invisible energy visible as he exploits the creative potential of the disordered mind.

As in many of Ernst’s other works, he has tapped his own experience in this collage and in *La Femme 100 têtes* in general. The rhetorical gesture of despair made by the child in plate 2 of *La Femme 100 têtes* and the caption are related to the autobiographical statement Ernst made in “Au-delà de la peinture”:

Un jour, à l’âge de la puberté, en examinant la question de savoir comment mon père avait dû se conduire dans la nuit de mon engendrement, surgit en moi, comme réponse à cette question de respect filial, le souvenir très précis de cette vision de demi-sommeil que j’avais



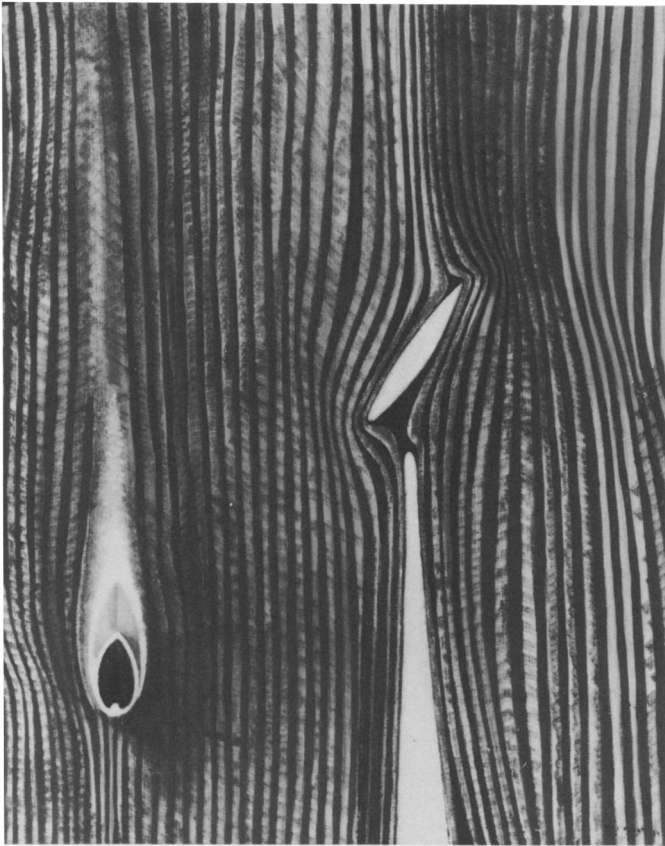
18 Ernst, “La Forêt s’écarte alors devant un couple accompli suivi d’un corps aveugle,” pl. 108 of *La Femme 100 têtes*, 1929

oubliée. Depuis, je n’ai pu me défaire pendant longtemps d’une impression plutôt défavorable sur la conduite de mon père à l’occasion de mon engendrement, impression toute gratuite d’ailleurs, très injuste peut-être, car, bien réfléchi ...²³

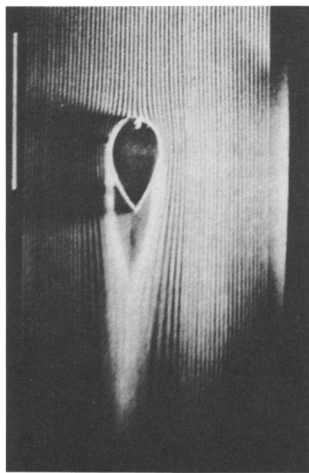
Likewise, the same theme placed at the beginning of *La Femme 100 têtes* establishes an autobiographical tone that is maintained and reinforced throughout the novel. Further, the creative disordering of the mind, the pseudo-religious images, and the subversion of scientific images found in *La Femme 100 têtes* are intimately linked to his own way of seeing himself.²⁴

²³ Ernst (as cited in n. 1), 238.

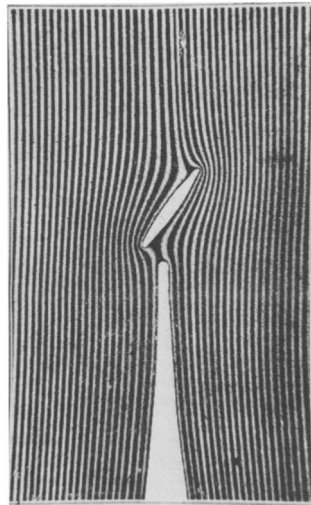
²⁴ See my diss., 3-11, for further discussion of its autobiographical aspects.



19 Ernst, *Blind Swimmer (The Effect of Touch)*, 1934, oil on canvas, 36¼ × 28⅞". Bridgewater, Conn., collection of Mr. and Mrs. Julien Levy (photo: Robert E. Mates, courtesy Solomon R. Guggenheim Museum)



20 "Corps pisciforme plongé dans le courant d'air avec la grosse extrémité en avant," *La Nature*, 1901, Pt. II, 233



21 An object placed in a liquid current, *La Nature*, 1901, Pt. II, 248.

Later in the novel, Ernst introduces the important theme of blindness. In plate 108 (Fig. 18), the *corps aveugle*, blinded by a mask or wrap, feels his way into a forest. Above him floats a ball²⁵ in a swag. In the novel, the *corps aveugle* is associated with the inability to see one's own future or to see beyond one's own death. (Indeed, in the last chapter, at the end of the hero's life, he is dominated by blind beings.) In *La Femme 100 têtes* the image is the *corps aveugle* (blind body); in later works Ernst changed the term to *nageur aveugle*, blind swimmer. Having made this change, he also modified the meaning of blindness. Blindness is a quality Ernst explored as a means of self-revelation. Sight and blindness are not opposites; rather, blindness is an aspect of sight, and it is the sight of the inner eye.

In the number of *View* magazine devoted to Ernst, he wrote that when he was a child and was asked, "What is your favorite occupation?" he regularly answered, "Looking."²⁶ Yet when confronted by the realism of his father's paintings, Ernst said of his childhood reaction: "The child felt a revolt growing in his heart against candid realism and decided to direct himself towards a more equitable conception of the relationship between the subjective and the objective world."²⁷ Blindness is a metaphor for a limitation and focusing of an artist's receptivity, freeing his mind from the unnecessary detail of the visible world so that the sights of the inner world can become visible also. In "Au-delà de la peinture," speaking of this systematic disorientation of his senses, he wrote, "... j'ai tout fait pour rendre mon âme monstrueuse. Nageur aveugle, je me suis fait voyant. J'ai vu. Et je me suis surpris amoureux de ce que je voyais, voulant m'identifier avec lui."²⁸

Blind Swimmer is also the name of several paintings dated to 1934 and later. Consistent with many of his uses of images from *La Nature*, Ernst took the idea for these paintings from photographs of energy visualized.²⁹ *The Blind Swimmer (The Effect of Touch)* (Fig. 19) was based on two illustrations. The motif on the left is from a set of photographs showing experiments with air flow: objects of various shapes are positioned at various angles in relation to parallel jets of smoke (Fig. 20). The right-hand image in the painting is based on a drawing of the same experiment done in water (Fig. 21). Although both illustra-

²⁵ *La Nature*, 1890, Pt. I, 80. The "ball" is from the illustrations for a popular science article that shows how to cut the skin of an orange so that it can be spread out flat.

²⁶ Max Ernst, "Some Data on the Youth of M. E.: As Told By Himself," *View*, 2nd ser., 1, April, 1942, 30.

²⁷ *Ibid.*

²⁸ Ernst (as cited in n. 1), 245.

²⁹ Besides the paintings illustrated here, at least three others bear similar configurations. See *Landscape with Tactile Effects (Paysage, effet d'attouchement)*, 1934-35, private collection, ill. as No. 165 in Solomon R. Guggenheim Museum, *Max Ernst: A Retrospective*, New York, 1975, 169; *Nageur aveugle*, 1948, collection the artist; and *Une Belle Journée*, 1948, both ill. in Waldberg, 62 and 64.

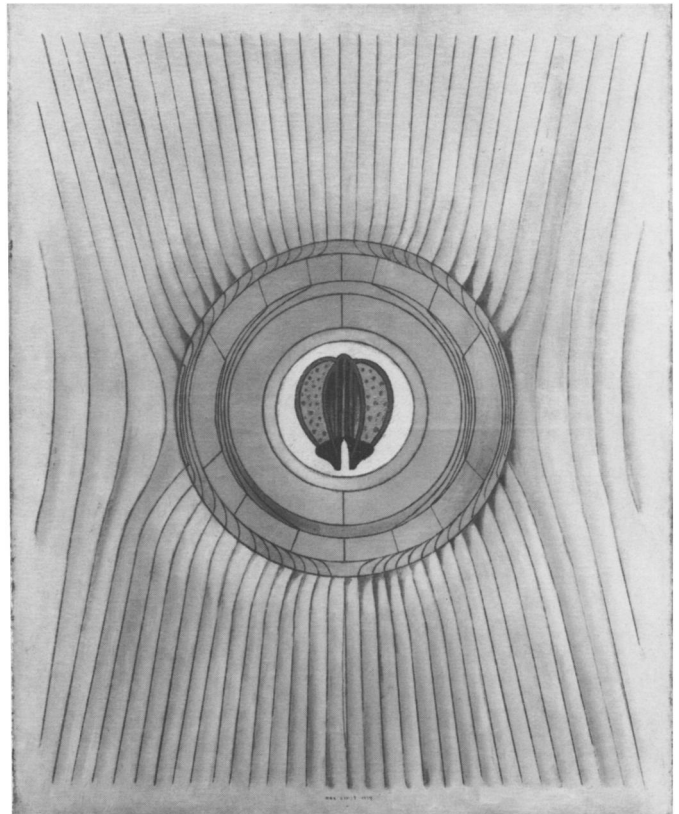
tions show a stationary object placed in a substance flowing toward and around it, the experiments were designed to test the way objects (such as propellers and boat hulls) move through air or water. Ernst plays on the peculiar interchangeability of movement and stasis of these images. Ernst's other painting on the theme, entitled *The Blind Swimmer* (Fig. 22), is based on a schematic drawing after a photograph showing the effects of magnetism (Fig. 23).

Ernst turned these scientific images of energy into personal and, according to Lippard, erotic images. Blindness may be a metaphor for the lack of intellectual intervention in sexual experience. Of the *Blind Swimmer* in Figure 19, she wrote: "... a seed is impelled by a phallic rod through channels of rhythmic stripes, but misses the egg nestled to one side."³⁰ Of the other *Blind Swimmer* (Fig. 22), she wrote:

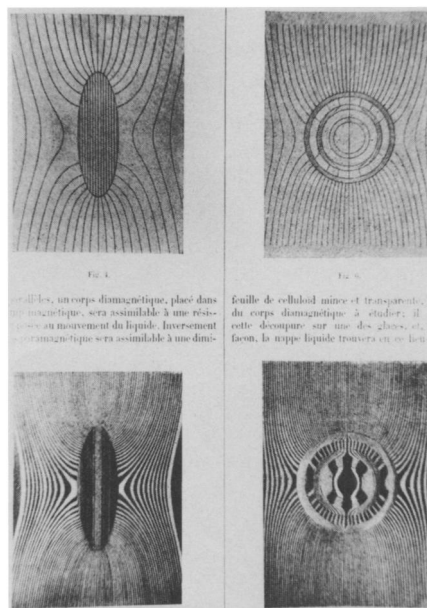
... the imagery is clear enough; the "blind swimmer" being a poetic euphemism for the male organ (its image seen head-on, as an eyeless fish with a large "mouth") and the image in the painting being an obvious "illustration" of the passage of the seed (doubling as egg and the pupil of an eye) through the vagina, implying as it does, by its rhythmic and repetitive stripes, the curving pressures of the act of love and possible procreation, while the vertical scheme implies the "soaring" aspects of orgasm.³¹

(Consistent with Lippard's erotic interpretation of blindness, the male figure in Figure 18 groping through the landscape, the ball floating out of his reach, is a version in nineteenth-century imagery of the ideas Ernst expressed in 1934 in his *Blind Swimmer* paintings.)

Although these paintings by Ernst exploit sexual imagery of penetration and of magnetic forces, they have other implications as well. Ernst used the term "blind swimmer" in his writings to refer to the creative process of making art in particular and to the intense experiencing of life in general. As in other cases of Ernst's uses of scientific diagrams, the *Blind Swimmer (The Effect of Touch)* (Fig. 19), contains paradoxes. Even though it presents a unified image (rather than a fragmented collage image), an examination of the sources in *La Nature* reveals that the current depicted at the right flows down and the current at the left flows up. The meaning of the image has been changed from an illustration of scientific investigation into a personal questioning of action and counter-action — or of action and stasis. What is still? What is in motion? It is contradictory and invisible inner energy that Ernst has



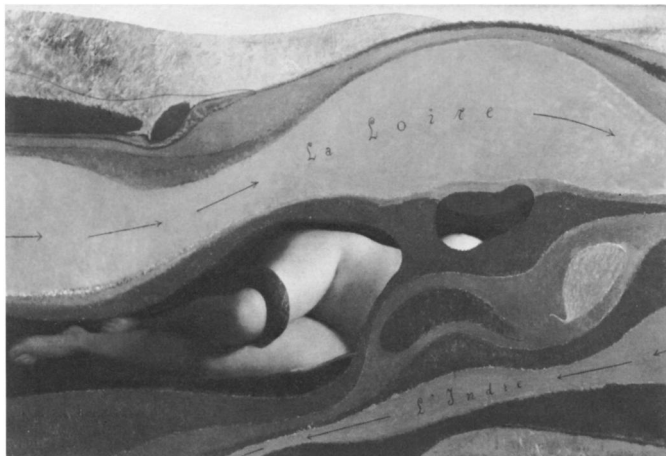
22 Ernst, *The Blind Swimmer*, 1934, oil on canvas, 36 $\frac{3}{8}$ × 29". New York, Museum of Modern Art, gift of Mrs. Pierre Matisse and Helena Rubinstein Fund (courtesy Museum)



23 Figures showing magnetic lines of force, *La Nature*, 1901, Pt. II, 249

³⁰ Lucy Lippard, "The World of Dadamax Ernst," *Art News*, LXXIV, April, 1975, 29.

³¹ *Idem*, "Max Ernst: Passed and Pressing Tensions," *Art Journal*, xxxiii, Fall, 1973, 16.



24 Ernst, *Garden of France (Touraine)*, 1962, oil on canvas, 44 $\frac{7}{8}$ X 66 $\frac{1}{8}$ ". Private collection (courtesy Solomon R. Guggenheim Museum)

thus visualized. If we look at the articles for which the illustrations were made, we see that Ernst examined the text as well as the illustrations. The articles do more than simply report experiments; the articles and the illustrations demonstrate the usefulness of photography in such experimentation.³² Ernst's painting, like its sources, is concerned with making felt — but invisible — force visible.

Probably Ernst's last use of the motif of objects caught in a current is in 1962 in *The Garden of France* (in the upper left corner of Fig. 24). In this work Ernst depicts the object in its original context; that is, he places it in a liquid current, but enlarged to the geographic scale of the flow of rivers. Like the *Blind Swimmer* of 1934 (Fig. 19), *The Garden of France* has contradictory flows of water and implications of frustrated eroticism: the thrust of the water-flow pattern misses the female figure as it had missed its more abstract counterpart in the earlier painting. At center stage parts of a female nude peep through a maplike landscape. Like the hand/legs that protrude from the window in Figure 7, the hips and legs exposed in *The Garden of France* seem to frustrate as much as tempt. This nude is probably based on the famous *Birth of Venus* by Alexandre Cabanel. Cabanel, a French academic painter of the nineteenth century, was famous for "luscious and

suggestive" paintings such as this.³³ This nude represents the erotic aspects of academic traditions that seem to have fascinated Ernst and which he quoted in many of his collages derived from nineteenth-century sources.³⁴

As in the earlier use in the *Blind Swimmer (The Effect of Touch)* of the motif of the object caught in a current, Ernst used the motif to visualize an otherwise invisible energy that is powerful and surging yet frustrated. And, as the title of the earlier painting indicates, the energy is perceived by the sense of touch. Yet the two paintings (Figs. 19 and 24) do not look alike; each is a reflection of its own place within Ernst's career. In the later work a sense of whimsy and voluptuousness replaces a more stark approach. Both works, even though painted, are made by the collage method: Ernst assembled the image from elements drawn from different sources.³⁵ Taking a scientific tone, Ernst said of the collage method: "Il me semble qu'on peut affirmer que le collage est un instrument hypersensible et rigoureusement juste, semblable au sismographe, capable d'enregistrer la quantité exacte des possibilités de bonheur humain à toute époque."³⁶ Thus the differences between the paintings reflect a necessary and predictable change.

In 1964, two years after executing *The Garden of France*, Ernst made a limited edition of original etchings called *Maximiliana ou l'exercice illégal de l'astronomie*. The subject of the work is Wilhelm Tempel, a little-understood nineteenth-century astronomer. (He and his work were ignored or dismissed largely because he held no official degrees, being self-taught.) Typical of Ernst's relation to scientific subjects and his works in general, Ernst intersperses reference to his own life into this story, equating himself with Tempel and with Maximiliana, the heavenly body discovered and named by Tempel. Throughout are mysterious illegible writings and whimsical drawings. For *The Illegal Practice of Astronomy*, a film made in conjunction with this project, Ernst returned again to *La Nature* for the collage on the theme of the observatory (Figs. 25, 26).³⁷ So until late in the artist's career he went back and made direct use of the scientific illustrations in *La Nature*, finding in their objectivity and naïveté evocations of the events of his own life.

Throughout his career Ernst viewed the scientific im-

³² A good example is L. Bull, "La Photographie: Des Mouvements invisibles: Expériences de M. Hele-Shaw," *La Nature*, 1901, Pt. II, 247-250.

³³ Philadelphia Museum of Art, *The Second Empire 1852-1870: Art in France under Napoleon III*, 1978, 263.

³⁴ Like the water-flow pattern, this Venus is associated with water; but the title, *The Garden of France*, gives the figure implications of La Belle Jardinière, sometimes associated with Eve, a character that often recurs in Ernst's oeuvre. Associations of Eden with *The Garden of France* seem to be supported by Ernst's choosing to name two of the fruitful rivers of

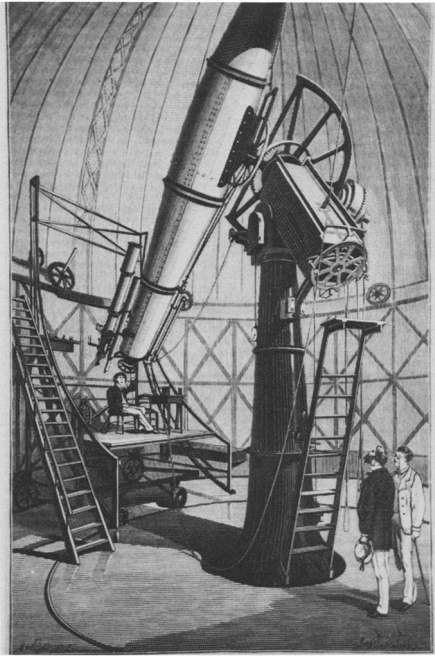
France — the Loire and the Indre — on the painting itself. The juxtaposition of an erotic academic nude and a rich farming area seems to comment on certain aspects of French culture and tastes as well.

³⁵ Ernst considered "collage" to be more than simply pasting images together. Rather, "collage" was a principle of putting elements together. See Ernst (as cited in n. 1), 256-59.

³⁶ *Ibid.*, 263.

³⁷ See Schneede (as cited in n. 5), 198-201, which includes a good, albeit brief, discussion of the project.

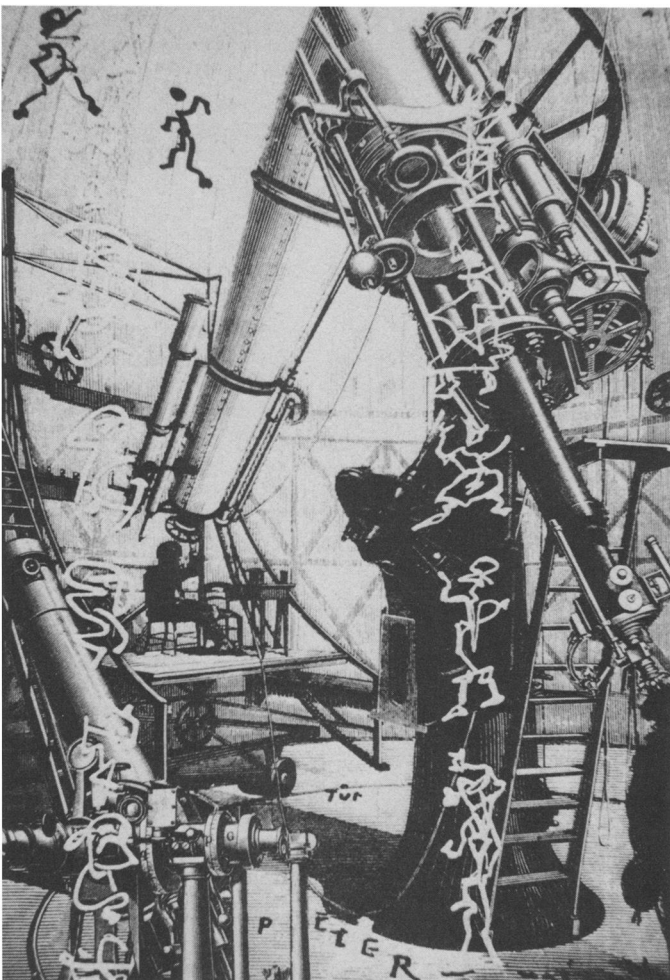
25 "La Plus Grande Lunette du monde, construite à Newcastle par M. Newall," *La Nature*, 1874, Pt. II, 217



ages that he used on a number of levels. He saw in them not illustrations of objective reality but evocations of an inner subjective life. He frequently chose representations of energy states that would otherwise be invisible. The scientific images as well as the methods of their making seem to have been important to him. Yet within his concern with the fresh subjects provided him by science and the methods of science is a desire to subvert the rational, to satirize the seriousness of scientific investigations. But the energy Ernst pulls from these scientific images is a representation of a personal force. It can be seen as a sexual force, yet in his pictures, and especially in his writings, is a concern with his creative life as an artist — with the forces in himself that keep him artistically potent.

For Ernst, science is a metaphor for knowledge gained through the senses. He undermines this knowledge by bringing out the ambiguities within scientific perceptions. But when he mixes Surrealist methods of free association and exploitation of chance with scientific perception he makes scientific images "valid" and vital. Hence, the overturning of the evidence of the senses and the representation of the sense of touch in a visual form are not simple satires of scientific method but a means of self-exploration. As Ernst would have said, his experiments took him to the other side of sight — beyond painting, beyond the rationality of science.

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26 Still from *The Illegal Practice of Astronomy* (by permission Oxford University Press)