THE WORLD OF THE SYMBOLIC—A WORLD OF THE MACHINE

For Sepp

*A*ccording to Aristotle's commendable formula—το ευσυνoπτον—the beautiful is defined as that which the eye can easily embrace in its entirety and which can be surveyed as a whole.[1] The tragedy of King Oedipus may well arouse pity and fear, but according to *The Poetics* it is beautiful because it fulfills the temporalized optical requirement of having a beginning, a middle and an end.[2] Perception of its form is not resisted by boundlessness. Thus, long before Baumgarten's modern foundation of the concept and the subject matter of Aesthetics, and longer still before the term arose which will have guided my commentary, Aesthetics begins as 'pattern recognition.'*

The Aristotelian το ευσυνoπτον secretly carries over beyond the transcendental turning-point, possibly even as far as Nietzsche's Apollonianism. If in Kant, the Beautiful was distinguished, above all other notions, as that which was most advantageous to the imagination and understanding's joint enterprise of synthesizing facts or data (as Kant also said[3]), then the Beautiful continued to function primarily as an optical *gestalt* that would foster its own recognition as if by itself. By definition, the sublime was excluded from the Beautiful because of its boundless size (in the case of the mathematically sublime) or its endless strength (in the case of the dynamically sublime),[4] both of which resist any simple surveyability. Thus, from a simple mechanism of recognition, Kant created a mechanism of recognition to the second degree: henceforth, Aesthetics had mechanisms pertaining to its object, mechanisms which optimized the mechanism of recognition in general. In this

* [Tr.—The term 'pattern recognition' in English in the original text.]

context, an elaboration of the philosophical or at least techno-historical facts underscores that the recognition-mechanism—Kant's reflective judgment—could not be transferred to any mechanism, whether intellectual or material. Angels have no need to reflect on temporo-serial and spatio-discrete data; machines have no possibility of doing so.[5] The former skip over the problem; the latter over its solution. Consequently, in a very technical sense, Man has been the subject of Aesthetics.

This was reason enough to conduct or adjust a thought-experiment that proceeded from the hypothesis (ten years before Foucault) that Man did not survive the death of God by a single minute. The setting for the experiment is a mountainous region from which all human life, but not Aesthetics, has disappeared. "There are only waterfalls and springs left—lightning and thunder too," writes Lacan, in order to append the question of whether even without living beings, "the image [of these mountains] in the mirror, the image in the lake—do they still exist?".[6]

The answer is obviously positive if "still" designates all time t_1 at which the rays of light coming off an existing mountain are refracted on the water's surface and project a picture of the mountain, however virtual, into imaginary space. The answer is negative, however, if "still" designates all time t_2 at which the reflection of the lightning bolt endures only as long as the flash itself. Mirrors are a medium not for recording, but for transmitting nature. They perform only the function of αισθησις or perception, and at least in Lacan's inhuman model, this is already sufficient to cut through "the metaphysical . . . problem of consciousness" with a "Gordian" sword-stroke.[7] More precisely, in a "materialist definition" of consciousness any "surface" suffices where the refraction index biuniquely transfers individual points in the real to corresponding though virtual points in the image.[8] So-called Man, distinguished by his so-called consciousness, is unnecessary for this process because nature's mirrors can accommodate these types of representation just as well as the visual center in the occipital lobe of the brain.[9]

Lacan's aesthetic materialism has provoked opposition from the philosophers. To the question posed by the title of his book *Was ist Neostrukturalismus? [What is Neostructuralism?]*, Manfred Frank responds, "the dream of a machine without a subject," and

goes on to present the following counter-argument: "Nothing in the play of visual reflections directly indicates that the mirror images sent back and forth exist for themselves as that which they are." On the contrary, any connection between the reflection and the object requires "a witness *for* whom it exists, or more exactly, exists *as* a reflection."[10] Moreover, Lacan must concede Man's necessary presence because his experiment ultimately re-invokes the humanity which had been expunged from the planet, in order to be able to demonstrate to those humans the possibility of machine consciousness.

The philosopher's objection has, however, two weaknesses. First of all, it remains open to question whether representations of bijection, which are only controlled logically by an algorithm, require additional witnesses in order to be what they are. Well before the advent of digital image processing, geometry and topology made do without this witness function. And secondly, Lacan returns to humanity at the end of the test in order to verify a different function which Frank's criticism for the most part overlooks: the storage of data. This is to say that any representation of the mountain "exists," according to Lacan, "for one very simple reason—at the high point of civilization we have attained, which far surpasses our illusions about consciousness, we have manufactured instruments which, without in any way being audacious, we can imagine to be sufficiently complicated to develop films themselves, put them away into little boxes, and store them in the fridge."[11] A photoelectric cell registers the flash of lightning and triggers the camera which records its reflection in the lake, until a humanity returning at time t_2 can witness the short-lived phenomenon of time t_1.

Philosophy teaches of an original "familiarity-with-ourselves," through which Man can both perceive representational relations as such and store a "continual process of iteration,"[12] so that all individuals become authors or Goethes narrating their own life stories. However, this philosophical teaching is precisely the point where psychoanalysis diverges from philosophy, by insisting that consciousness is only the imaginary interior view of media standards. Psychoanalysis contrasts the illusions of consciousness with a technically clean separation of functions. There are, first of all, media of transmission such as mirrors; secondly, storage media such as film;

and thirdly (to anticipate already), machines that manipulate words or figures themselves. So-called Man is not determined by attributes which philosophers confer on or suggest to people in order that they may better understand themselves; rather, He is determined by technical standards. Presumably then, every psychology or anthropology only subsequently spells out which functions of the general data processing are controlled by machines, that is, implemented in the real. Kant's "I think," which in Goethe's time had to accompany every reading or aesthetic judgment,[13] was within the true so long as no machine took over pattern recognition for him. A contemporary theory of consciousness which does not situate consciousness in the technical realm, as does Lacan, but has consciousness simultaneously transmit, store and calculate like a true behemoth without specifying the media or the technologies involved is merely an euphemism.

In contrast to philosophy, psychoanalysis was established during Freud's lifetime "on foundations similar to those of any other science,"[14] namely the strict separation of transmission and storage functions, so as not to fall prey to any "scientific self-misunderstanding."[15] The *Project of a Scientific Psychology* of 1895 made clear that consciousness and memory, transmission and storage, are mutually exclusive. If the φ-neurons of perception were not able to transmit data registered immediately and thereby expunge them so as to be available for subsequent data, there would be no possibility of responding to environments and their random series. If, on the other hand, ψ-neurons of the later so-called unconscious were not able to retain registered data and store it in unlimited amounts, there would be no fulfillment of the stipulation that "any psychological theory deserving consideration must provide an explanation of memory."[16] A Random Access Memory (RAM) and a Read Only Memory (ROM) are thus mutually in play because, according to Freud, "we cannot off-hand imagine an apparatus capable of such complicated functioning [wherein it is both influenced and also unaltered]."[17] This problem, which Freud's colleague Breuer incorporated into his formulation of the localized difference in brain-physiognomy between the "perceptual apparatus" and the "organ" where "memory-images"are stored,[18] remained critical until the *Mystic Writing Pad* of 1925.[19] Instead of attacking Lacan, whose experiment was obviously only a return to Freud, Manfred Frank should have attacked psychoanalysis itself, for a self-familiarity

that must be immediately forgotten again by the φ-neurons, and a life-continuum that remains totally inaccessible in the ψ-neurons, eliminate any concept of the individual.

Freud's materialism reasoned only as far as the information machines of his era—no more, no less. Rather than continuing to dream of the Spirit as origin, he described a "psychic apparatus" (Freud's wonderful word choice) that implemented all available transmission and storage media, in other words, an apparatus just short of the technical medium of universal-calculation, or the semicomputer.

The transmission medium in psychoanalytic treatment was a telephony which transformed sound or the patient's unconscious into electricity or conscious speech so that the unconscious could be transmitted, and then, through the synchronized vibrations of the attentive analyst, could be transformed back again into sound or the unconscious.[20] These are almost Freud's precise words. What he does not reveal, however, is that at Berggasse 19 in Vienna the telephone cable had (in 1895) only been laid in the family's living quarters and not in the consultation room, so that therapy as telephony was a wireless system, or more specifically, radio *avant la lettre*. The transmission medium of *The Interpretation of Dreams* was an optical, camera-like apparatus that converted latent dream thoughts into a system of conscious perception—and Lacan could easily decipher these virtual images as film.

Finally, to give due honor ultimately to Edison who invented both the kinetoscope and the phonograph, Freud (as did all physiologists of his time) conceived of pyschoanalytic data storage as functioning like the grooves which phonographs—instruments which, in contrast to Berliner's later Gramophone, could both play back *and* record—etch onto wax or tinfoil rolls. From 1880 on, having been freed from the archaic memory-model of the alphabet, Delbœuf and Guyau were teaching that "the Spirit is a collection of phonographic recordings."[21] This was supported not only by the *Bahnungen* [facilitations] or memory tracks in Freud's *Project*, but also by his descriptions of the talking cure itself. Although his case histories may not have been "absolutely—phonographically—exact," he nonetheless claimed that they possessed a remarkably "high degree of trustworthiness."[22] Furthermore, Freud's *Introductory Lectures on Psycho-*

Analysis were "word for word" presentations based on improvised drafts because according to his own testimony, he "still possessed the gift of a phonographic memory"[23] at age sixty. This is the degree to which the foundation of psychoanalysis was based on the end of the print monopoly and on the historical separation of different media. Telephone, film, phonograph and print (typewritten by Freud since the Spring of 1913) shaped the psychic apparatus.[24]

Only Lacan understood this. The first, and for that reason also the last, writer whose writings were simply called *Écrits*, whose seminars were called *Séminaires*, whose radio interview was called *Radiophonie*, and whose television broadcast was called *Télévision*, brought psychoanalysis to the level of high-tech. The plain media language of his chosen titles already contradicts their reception by German-speakers, who had "always" (with the exception of the lost *Wunderblock**) and only placed Lacan "in dialogue with philosophy,"[25] as if the print monopoly over data processing had not lost any of its power.

Hegel and Freud are separated (according to Lacan) by a technical invention: Watt's steam-engine centrifugal governor, the first negative feedback loop, and with that Mayer's Law of Constant Energy, the numerical basis of Freud's general economy of desire.[26] Similarly, Freud and Lacan are separated by the computer, Alan Turing's Universal Discrete Machine of 1936. Under high-tech conditions, therefore, psychoanalysis no longer constructs psychic apparatuses (if they are still psychic) merely out of storage and transmission media, but rather incorporates the entire technical triad of storage, transmission and computation. Nothing else is signified by Lacan's "methodological distinction"[27] of the imaginary, the real and the symbolic.

In all other German versions of Lacan, as we all know, one refers to reality [*Realen*] instead of the real [*Reelen*]. Thus, in order to clarify both the spelling of these *Technical Writings*** and the antonymous pair of terms real/imaginary, an excursion will be necessary into the history of that science which introduced them as a pair: modern mathematics.

* [Tr.—On the relation of the name *Wunderblock* to the German analytical discourse on Lacan, cf. Kittler, "Dracula's Legacy," n. 27, in this volume.]
** [Tr.—*Draculas Vermächtnis. Technische Schriften* is the full title of the collection of Kittler's essays in which the present essay appeared.]

"Neither the true nor the false roots are always real; sometimes they are imaginary; that is, while we can always conceive of as many roots for each equation as I have already assigned, yet there is not always a definite quantity corresponding to each root so conceived of. Thus, while we may conceive of the equation

$$x^3 - 6x^2 + 13x - 10 = 0$$

as having three roots, yet there is only one real root, 2, while the other two, however we may increase, diminish, or multiply them in accordance with the rules just laid down, remain always imaginary."[28]

That is the Cartesian *Geometry* of 1637. Descartes asserts here (though admittedly without the use yet of Gauss' proof) the fundamental law of algebra according to which a comparison to the *n*-th degree will have *n* solutions.[29] He first distinguishes these roots, in the speech of his day, as true and false, referring to either a positive or a negative sign before the radical; secondly, however, as real and imaginary, referring to either a positive or a negative sign under the radical. According to his definition, the example he provides of a comparison to the third degree has three solutions, only one of which, however, is real, whereas the other two, the complex numbers $2 + \sqrt{-1}$ and $2 - \sqrt{-1}$, were absolutely meaningless for the mathematics of his time. Descartes' innovation (going beyond Cardano) lies precisely in his giving a name to imaginary numbers like $\sqrt{-1}$, thus assuring mathematics that one could quite simply incorporate them into further computation. Just as in the *Meditations*, where thoughts in dreams are as indubitable as the act of thinking, the very "conception" of imaginary numbers is sufficient to their being used in mathematical operations, "without determining their values."[30] With that, however, Descartes' mathematical project, which through algebraic methods succeeded the ancient geometry of the compass and the ruler,[31] is temporarily brought to completion.

In 1936, Lacan, an avid reader of Descartes, may well have derived his term, the imaginary, primarily from Freud or more probably Jung's *Imago*. But as soon as he coupled it with the counter-term, the real, his connection to the Cartesian *Geometry* is clear. With explicit reference to the "theory of complex numbers," Lacan records the "imaginary function" of the phallus as $\sqrt{-1}$. Accordingly, "the

phallus, that is, the image of the penis, is negativity in its place in the specular image," and, "as a part lacking in the desired image," is even the determination of a square root. However, this does not in any way prevent psychoanalysis, no more than it does modern mathematics, from further computation. Consequently, psychoanalysis is the only science which can conceive of, or rather formalize, the imaginary—"that is why [the erectile organ] is equivalent to the $\sqrt{-1}$ of the signification produced above, of the *jouissance* that it restores by the coefficient of its statement to the function of lack of signifier (-1)."[32] Mathematical psychoanalysis thus computes, apparently through squaring, beyond the imaginary value i arrived at in an intermediate step, until the final solution of i to the second power "restores" a real number. It is precisely these types of roots, however—and by no means the trigonometric functions employed by Euler, which Lacan, for his part, never applied—that were beyond the scope of Descartes' imaginary numbers. In full justification, therefore, Lacan, for once in direct contradiction with his mathematical advisor Jacques Riguet, could celebrate the radical sign itself:

> It is enough to note that by means of your 0 and 1, that is, the connotation of presence-absence, we are capable of representing everything which presents itself, everything which has been brought about by a determinate historical process, everything which has been developed in mathematics. We are in perfect agreement. All the properties of numbers are there, in these numbers written with binary numbers. Of course, that isn't how one discovers them. It took the invention of symbols, for instance, which made us take a giant step forward the day it was simply inscribed on a bit of paper. We were left for centuries with our mouths open when faced with equations of the second degree without being able to get it out, and it is through writing it down that an advance was made.[33]

This dispute with the proverbial ahistoricism of the mathematicians delivers not only a brief historical theory of the operators of mathematics, but also an example of the methodological distinction of the real, the symbolic and the imaginary.

Numbers are symbolic as long as they are, like signs in general, substitutable, that is, ultimately fully representable through the two binary numbers—under the condition, of course, that binary numbers already exist as an historical notation system. The same numbers are real, on the other hand, if their figures and operators require a

specific and historically datable notation in similarly real media. Only media afford the real any guarantee of being "always in its place,"[34] and the radical sign, in particular, of finding this place "on a bit of paper."

Thus numerical roots are symbolic to the extent that a typographical symbol permits us to manipulate them mathematically, even without having to calculate their value. In the process, the symbols used never constitute anything but subsets of a principally finite set of operators. On the other hand, these same roots are real or imaginary to the extent that the calculation of their values yields numbers which are generally described as uncountable, or in other words, complex numbers.

A media theory which transfers Lacan's methodological distinction to information technologies does not distort it back into object categories, notwithstanding some criticism to that effect. That first of all, the medium of the symbolic is called the computer, or with Turing and Lacan, "the universal machine,"[35] follows directly from its conceptual coincidence with the natural numbers. That secondly, the medium of the imaginary must be optical follows not only from the primacy of *gestalt* recognition, but also, and more elegantly, from Cartesian geometry. To the eternal dismay of every computer graphics programmer who must eliminate unfriendly divisions and roots whenever possible because of operating time, the conditions for an object in three-dimensional space either reflecting other objects or allowing them to shine through or rather neither are determined solely by the question of whether the root of a scalar product of two vectors, the moment of direction and the perpendicular line on the object's surface, is real or imaginary.[36] Precisely these types of reflections and transparencies are referred to in Lacan's model experiment with a non-human medium, film. That thirdly, and finally, the medium of the real is to be found in analog storage devices is proven by every phonograph record. What is etched into its grooves can assume an infinite number of different numerical values but remains a function of a single real variable, time—at least so long as Stephen Hawking is merely keeping his counter-theory of imaginary time secret from the Pope, but has not yet proven it.[37]

Lacan also occupies himself with these assignments of the real, the imaginary and the symbolic to media. The mirror stage—his

discovery of precisely the same year in which Alan Turing invented the universal discrete machine—is quite simply cinema. Lacan cited a film about infants (produced without his help) as the experimental proof of the imaginary's being the specifically human act of (mis)recognizing exact images.[38] On the one side we have the real of a prematurely born body, whose sensory neurons in the first months of life—none other than Flechsig, Schreber's psychiatrist, delivered the anatomical evidence to Lacan though he left it nameless—are myelogenetically still too immature (in Flechsig's words) to "associate visual perceptions with bodily sensations"[39] or (in Lacan's terms) not to have a fragmented body. On the other side of this fragmentation—a fragmentation similar to the 24 discrete film stills which comprise one second of a motion picture—we have a purely sensorial feedback of the mirror image which transmits optical illusions of unity to the infant, exactly as the film feed which appears to the eye as an imaginary continuum. Thus it follows that Manfred Frank's direct question whether "even mistaken consciousness is not also consciousness in general"[40] can remain open for the time being because Lacan is concerned with the control mechanism, not with perception. That this relation to the mirror image, however comprehensive or ενουνοπτου, does not yet allow for homeostasis is demonstrated to him by two robots (higher degrees of the inhuman automatic camera at the mountain lake) that stand in a mutual relation of positive feedback through optical sensors, until the circumstances of their shared system necessarily ends in disastrous oscillations—aporia of all imaginary, of all *gestalt* recognition. According to Lacan, only a sound recording device engaged between the two robots could stop these oscillations because of "the unconscious mathematical subjacency" of every discourse.[41]

The reason is clear. Like film, even the phonograph is an analog medium which, before the development of the compact disc, was not equipped with the 'no'-function. It does not, however, record an imaginary continuum as does the motion picture, but rather a real one: the voice with all the stochasticism of its oscillations or frequencies. In reference to Marey's chronograph of 1873, Lacan emphasizes what philosophers "always forget"—technical sound recording proves that language is "something material."[42] On these grounds, it is Edison's phonograph that first allows for the possibility of a

methodical, distinct separation between the real and the symbolic, between phonetics and phonology, which is to say the possibility of structural linguistics itself.

Lacan demonstrates this split by referring to Claude Shannon, the famous wartime engineer at Bell Labs. Lacan's theory of "resonance" between the patient and the analyst is only an inversion of Shannon's redundance,[43] which haunts all amorous whisperings on the telephone. Neither information theory nor psychoanalysis has anything "to do with knowing whether what people tell each other makes any sense. Besides, what is said on the telephone, you must know from experience, never does. But one communicates, one recognises the modulation of a human voice, and as a result one has that appearance of understanding which comes with the fact that one recognises words one already knows."[44] Shannon could thus continue his work on optimizing the capacity of the medium's transmission wires—through band-pass filters, linear prediction coding, or even according to his own scanning theory by which discrete values per temporal unit are extracted from the analog continuity of telephone or gramophone vibrations—without worrying about sense or telephone love. The implication of this is that digital information is all of the information present in amorous telephone whisperings, whereas everything of the real falls under the category of noise. Lacan greets Shannon's technical slang word 'jam' as "one more symbol"—no more, no less—"It is the first time that confusion as such . . . appears as a fundamental concept."[45]

Structural psychoanalysis has every reason to adopt this stance. Only media technologies allow for the conception of a structure which itself emerges from stochastic disorder, instead of philosophically representing ontological or subjective orderings, which means to continue to write a metaphysics of genealogy.[46] Conversely, the ordering of the signifiers—that is, phonemes, letter-cases or typewriter keys[47]—is simply the other of 'jam.' According to Lacan, it is only due to the existence of the computer as universal machine that "we've gone beyond confusing symbolic intersubjectivity with cosmic intersubjectivity."[48] The symbolic, always transformed back into the God of the theologians or the philosophers in the reception of Lacan among German-speakers, is simply an encoding of the real in cardinal numbers. It is, *expressis verbis*, the world of the information

machine.[49] In its primary stages, Shannon's machine calculated the probability of every single letter in the English language, and from these calculations produced a beautiful gibberish. It then went on to take into account the transition probabilities between two letters, that is, digraphs, and the gibberish began to sound a bit more like English. Finally, through the use of mechanical tetragrams (not to be confused with names of God) there arose that 'impression of comprehension' which so loves to hallucinate sense from nonsense.

Lacan's analysis of Poe works with precisely these types of transition probabilities, the major mathematical discovery of Markoff and Post, even if in Derrida's *Post Card* the Markoff-Post post does not appear to have been delivered. The input to the symbolic machine is a throw of the dice in the real because the French *dé*,* to the delight of Mallarmé and Lacan, is derived from the Latin *datum*.[50] And according to the calculation of transition probabilities of transition probabilities, etc., the output is chains or knots, oracles or fairy-sayings, because the French *fée*** is derived from the Latin *fatum*. Straightforward encoding transfers unlimited chance (the real) into a syntax with requirements and exemptions, that is, with laws. As a result, Poe's detective subjects, "grasped in their intersubjectivity," must follow the destiny of the symbolic "more docile than sheep."[51] They are indistinguishable from machines. Although the popular objection maintains that computers cannot think because they must always first be programmed, Lacan counters that human beings, who carry out the same operations as machines, think just as little for the same reason.[52]

As a rule of nature, this destiny would be scandal itself, but Lacan's theory, in distinction to Freud's psychoanalysis, is quite deliberately not a natural science. This is not because the theory concerns human beings, but rather because its unit of measure does not consist of the clocks which established the energy constants in Mayer and in Freud,[53] but of information machines such as dice, gates and digital calculators.[54] When Alan Turing's principle computer circuit of 1936 was being constructed in the course of World War II—a machine which would prove critical to winning the war because it

* [Tr.—French for 'dice.']
** [Tr.—French for 'fairy.']

cunningly decoded all of the secret radio transmissions of the Wehrmacht—Turing made the off-hand comment that computers do not answer the physicists' questions concerning nature nearly as "easily" or elegantly as they do the questions of the secret service concerning the enemy.[55] And when Shannon forged a machine English out of Markoff-chains, he did it in the service of American war-time cryptography.[56] Psychoanalysis also became a game of strategy from 1950 onwards, with Lacan's proposal that the conjectural sciences succeed the human sciences, which is to say, that in distinction to the natural sciences, chance rather than randomness is calculated.[57] In the place of a natural "science of what is found at the same place" and hence can be written down with real numbers, a science of the exchange of places as such emerged.[58] However, this discrete mathematics, for example between King and Queen or Minister and Detective in Poe, is war and it is destined to a computer simulation simply because digital calculators can process the yes/no of orders or prohibitions, wishes or fears, more elegantly than the curved lines of nature can.

In his lecture *Psychoanalysis and Cybernetics*, Lacan states the following:

> The one thing which cybernetics clearly highlights is the radical difference between the symbolic and the imaginary orders. A cybernetician recently admitted to me the extreme difficulty one has, whatever is said about it, in translating cybernetically the functions of *Gestalt*, that is the coaptation of good forms. And what is good form in living nature is bad form in the symbolic. [. . .] [O]ne encounters unprecedented difficulties, except in the most artificial manner, in getting one circle to correspond to another by means of a dialogue between two machines.[59]

This is a surprisingly explicit text in 1954, when human scientists had not yet responded to either the word 'pattern recognition' or Shannon's soup of digraphs. And in 1993,* it must be noted that 18 billion US-dollars from the treasury of the Japanese Office of Industrial Affairs have come somewhat closer to Aristotle's ευσυνοπτον or Lacan's good form. A digital signal processor—which, in contrast to the typical personal computer, is capable of

* [Tr.—Year in which German version of this essay was published.]

performing parallel multiplications in micro-seconds—probes the mirror image of mountains or infants in strict accordance with Shannon and calculates through discrete integration the affinity and through discrete differentiation the contrast between image fields, until out of the 'jam' of the real the diagram of a symbolic system of equations emerges. And if the signal processor were to proceed further and remove image modulations caused by irregularities in the mirror or ripples in the lake, that is, not only note them but cancel them out, then Kant's reflective power of decision would finally be automated—a machine can recognize figures and can distinguish reflections from given patterns. Fifth generation calculators answer Manfred Frank's question. (If not, then development will certainly continue.)

But as the most objective Aesthetic, Hegel's Berlin lecture, could have already taught us: pattern recognition is a prologue and is quickly disposed of under the title of natural beauty. Problems of *gestalt* recognition are only played out between an individual—which according to Lacan could just as well be a dove or a chimpanzee—and its environment. Where tragedy begins (also from the Lacan lectures), pattern recognition, that is, design, is no longer of consequence. Consciousness is tied to the contingent presence of eyes or ears, to analog media;[60] from the encoding of the real, on the other hand, the location of the other necessarily emerges—a combinatorial matrix of strategies. No one desires or fights (which is the same thing) if others do not desire or fight. That infants, in contrast to young chimpanzees, (mis)recognize their mirror image with identificatory exultation, only opens a gap that makes room for war, tragedy and cybernetics.[61]

In this context, it is already clear that humanity could not have invented information machines, but to the contrary, is their subject. Lacan tells his seminar participants directly that they are today, to a greater extent than they could ever imagine, the subjects of all types of gadgets from the microscope to "radio-television."[62] If the real is unconditionally in its place, while the symbolic is the exchange of place itself,[63] then the exchange of place between the subject and the specular *I* only opens up spaces of play, which, without implementation, would not stop not writing themselves. Media and information machines, and culture as their independent variable, exist only when

something "function[s] in the real, independently of any subjectivity."[64] Tombstones, the oldest cultural symbols, remain with the corpse; dice remain on their side after the toss; only the door, or 'gate' in technical slang, permits symbols "to fly with their own wings,"[65] that is, to control presence and absence, high and low, 1 and 0, so that the one can react to the other—sequential circuit mechanism, digital feedback.

Lacan simply says "circuit,"[66] and does not hesitate in equating oscillation, the master clock of every computer system, with scansion, the rhythm of intersubjective or strategic time.[67] An inconspicuous but decisive step from the clock to circuit algebra, from natural to conjectural sciences, from Freud to Lacan. The enigmatic question of the *Project* concerning "an apparatus which would be capable of the complicated performance" of simultaneously transmitting and storing, of being both forgetting and memory, finds its answer at last. In circuit mechanisms, a third and universal function—the algorithm as the sum of logic and control[68]—comprehends the other two media functions. Computers release theory from the age-old constraint of having to conceive of storage as an engram—from cuneiform characters in sound through to sound-grooves in vinyl.

"Suppose," Lacan tells the participants of his seminar in Paris, "that I send a telegram from here to Le Mans, with the request that Le Mans send it back to Tours, from there to Sens, from there to Fontainebleau, and from there to Paris, and so on indefinitely. What's needed is that when I reach the tail of my message, the head should not yet have arrived back. The message must have time to turn around. It turns quickly, it doesn't stop turning, it turns around in circles.

It's funny, this thing turning back on itself. It's called feedback"[69] (and not, as should be noted, reflection).

It makes no difference whether these types of sliding registers are large as in the case of France, incarnate as in the family of the Rat-Man, or miniaturized as in silicon chips. Of primary importance is that information circulates as the presence/absence of absence/presence. And with sufficient storage capacity, that circulation is immortality in technical positivity. Two of Freud's riddles, the indestructibility of desire and the repetition of the death drive, are solved—without the biological miscalculation of instinct[70] or the metaphysics of writing.

That the unconscious is the discourse of the other is already repeated in the feuilletons. But that this discourse of the other is the discourse of the circuit[71] is cited by no one. And yet Lacan's entire teaching would remain mere theory without this clarification or technicality. It is not for nothing that Lacan forbid himself from talking about language with people who did not understand cybernetics.[72] Only when a theory is implemented in algorithms, graphs or knots (as in the later Lacan), is it possible that something stops not writing itself. Only when the Other, which is posited as a circuit mechanism or a set of signifiers, is "the pure subject of modern game theory, and as such perfectly accessible to the calculation of conjecture,"[73] does structural psychoanalysis become science. Because Lacan's wager, even more risky than that of Poe's Minister, literally reads:

> If there is such a thing as the Freudian unconscious, then we must say: if we understand the implications of the teaching of the experiences which he takes from the pathologies of everyday life, then it is not altogether unthinkable that a modern calculator might come to win the game of 'even and odd' beyond all customary proportions by disengaging the phrase that modulates the long-term choices of a subject without his knowing it.[74]

Thus the hermeneuticists with their divinations, as well as the analysts with their efforts at uncovering, can stand down. A computer which could win at dice, in Monte Carlo or anywhere else, would verify Lacan's dictum that the computer is more dangerous to mankind than the atom bomb.[75] Implemented in machines, the theory of risk—and psychoanalysis as conjectural science is nothing other—becomes the risk of theory.

As a result, it would not be difficult to demonstrate that Lacan's famous definition of human language which, in contrast to Frisch's 'wagging dance,'* simultaneously accounts for the subjectivity of the other in the act of address, is just as applicable to Cruise Missiles.[76] And the no less famous reproach that neo- or post-structuralism celebrates the death of the subject could be purged from the world because the remote-controlled subject of the weapon is located within it. According to Norbert Wiener's own testimony, the inven-

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* [Tr.—'Wagging dance' refers to the communication code employed by bees.]

tion of cybernetics coincides with the automatically controlled weapons of World War II.[77] There is no post-modern; rather, only the or this modern post.[78]

Thus, according to Lacan's most concise statement on Aesthetics, there remain only three things for subjects who do not speak any formal languages: dance, jazz and libido.[79] At least for an inter-war period.

Translated by Stefanie Harris

23. Regarding Speer's theory that the design of all architecture must incorporate its eventual "value as ruins," cf. Paul Virilio, *War and Cinema*, trans. Patrick Camiller (London, New York: Verso, 1989), 55.

24. Cf. Ellie Howe, *Die schwarze Propaganda. Ein Insider-Bericht über die geheimsten Operationen des britischen Geheimdienstes im Zweiten Weltkrieg* (München: Beck, 1983).

25. After seeing this film of a rocket flight to the moon, one of Pynchon's characters theorizes: "Real flight and dreams of flight go together" (159). Regarding UFA (Universum Film AG) and Prof. Oberth's first liquid-fuel rocket project, cf. Ruland, 57–67. Regarding *Frau im Mond* and, consequently, the power of film, Virilio, 58–9: "The film came out on 30 September 1929, but without the intended publicity of a real rocket launch from the beach of Horst in Pomerania to an altitude of forty kilometres. By 1932 jet technology, being developed at Dornberger's newly opened Kummersdorf West Research Centre, was set to become one of the major military secrets of the Third Reich, and the German authorities of the time seized Lang's film on the grounds that it was *too close to reality*. A decade later, on 7 July 1943, von Braun and Dornberger presented Hitler with film of the real launch of the A4 [= V-2] rocket. The Führer was in a bitter mood: 'Why was it I could not believe in the success of your work? If we'd had these rockets in 1939 we'd never have had this war.'" There exists no clearer proof for the power of film: Hitler the cineaste, who was bored by all demonstrations of the real V-2 (cf. Dornberger 73–7, 99–101), was convinced through film.

26. Cf. Virilio 11, regarding Marey's chrono-photographic gun.

27. Compare the confessions of the head of this department, Reginald V. Jones, *Most Secret War* (London: Hamish Hamilton, 1978).

28. Function and picture of this gun, cf. Siegfried Giedion, *Mechanization Takes Command: A Contribution to Anonymous History* (New York: Oxford UP, 1948), 21ff.

29. For details, cf. Friedrich Kittler, "Romanticism-Psychoanalysis-Film," in this volume.

30. Cf. Virilio, 81.

31. Cf. Dornberger, 259.

32. Regarding Kammler's building activity (also for Nordhausen) from the Chief Economic Administration Office of the SS, cf. Enno Georg, *Die wirtschaftlichen Unternehmungen der SS* (Stuttgart: DVA, 1963) 37ff.; and Bornemann 43, 82ff., 125. For his resumé through 1932 (Eastern Boundary Defense, Rosbach Storm Troopers, Danzig Housing Development Office, Employment Ministry of the Reich, etc.), cf. Hans Kammler, *Zur Bewertung von Geländerschliessungen für die grossstädtliche Besiedlung* (Hannover: Diss.ing., 1932). If readers can oblige with any further information. . . .

33. Cf. Ruland 170, where, incidentally, no mention is made of Kammler's motives. In Pynchon's case, on the other hand, one knows from *Gravity's Rainbow* that he also asks of his readers: "Is that who you are, that vaguely criminal face on your ID card, its soul snatched by the government camera as the guillotine shutter fell?" (134).

34. As a model for the conversation between Weissmann and Pökler, read the long dialogue between Dornberger and Dr. Steinhoff, the electrician at Peenemünde, in Dornberger, 147–9.

35. Cf. Dornberger 286: "Kammler did not want to believe in the forthcoming collapse. He raced from the fronts in Holland and in the Rheinland, to Thüringen and Berlin. He was underway day and night. Always there and back. Meetings were called at one in the morning somewhere in the Harz, or we met at midnight somewhere on the autobahn, in order to return again to our work after a short briefing and quick exchange of opinion. An inhuman nervous tension held our breath in check. We were irritated, nervous, over-worked. We didn't take any of his words at face-value. Once, when things weren't going fast enough for him, Kammler woke his accompanying officer with a blast from his gun before travelling further."

36. Cf. Ruland 282ff: "Because the SS-General Kammler, Hitler's special proxy of the V-weapons, could not be found [after the war], London wanted to put Dornberger on trial in his place. No one knew at the time what had happened to Kammler. Certainty only arises several years later: On May 4, 1945, Kammler arrived with an airplane in Prague. On May 9, he defended a bunker with 21 SS-soldiers against 600 Czech partisans. Triumphantly, Kammler emerged from the bunker and fired with his gun on the attacking Czechs. Some months precedent to this date, Kammler's adjutant, Storm Trooper leader Starck, had received the order, under no circumstances to allow his leader to fall into the hands of enemies. Rather, he was to follow him from 10 paces—'shooting distance.' Here, in this hopeless situation, Starck fired a bullet from his gun into the back of the SS-General's head."

The World of the Symbolic—A World of the Machine

1. Cf. Aristotle, *The Poetics*, 1451 a 4.

2. Cf. Aristotle, 1450 b 22–31.

3. Immanuel Kant, *Kritik der Reinen Vernunft [Critique of Pure Reason]*, A 239. Regarding this point and more generally, Bernhard Dotzler, "Die Revolution der Denkart und das Denken der Maschine: Kant und Turing," *Diskursanalysen 1: Medien*, eds. Friedrich A. Kittler, Manfred Schneider, Samuel Weber (Opladen, 1987), 150–163.

4. Cf. Immanuel Kant, *Kritik der Urteilskraft [Critique of Judgment]*, B 79ff.

5. Cf. Kant, *Kritik der Urteilskraft*, B 16.

6. Jacques Lacan, *The Seminar of Jacques Lacan. Book II: The Ego in Freud's Theory and in the Technique of Psychoanalysis 1954–1955*, ed. Jacques-Alain Miller, trans. Sylvana Tomaselli (New York: W.W. Norton & Company, 1988), 46.

7. Lacan, *Seminar II*, 46.

8. Jacques Lacan, "Remarques sur le rapport de Daniel Lagache," *Écrits* (Paris: 1966) 679.

9. Cf. Lacan, "Remarques sur le rapport . . .," 66ff.

10. Manfred Frank, *Was ist Neostrukturalismus?* (Frankfurt/M.: 1983), 398.

11. Lacan, *Seminar II*, 46.

12. Frank, 358 and 538.

13. Cf. Friedrich Kittler, "Das Subjekt als Beamter," *Die Frage nach dem Subject*, eds. Manfred Frank, Gérard Raulet and William van Reijen (Frankfurt/M.: 1988), 403–5.

14. Sigmund Freud, *An Outline of Psychoanalysis*, in *The Standard Edition of the Complete Works of Sigmund Freud*, Vol. XXIII, ed. and trans. James Strachey et al., with Anna Freud (London: Hogarth, 1964), 196.

15. Jürgen Habermas, *Knowledge and Human Interests*, trans. Jeremy J. Shapiro (Boston: Beacon, 1971), 214ff.

16. Sigmund Freud, *The Origins of Psychoanalysis. Letters to Wilhelm Fliess, Drafts and Notes: 1887–1902*, eds. Maria Bonaparte, Anna Freud and Ernst Kris, trans. Eric Mosbacher and James Strachey, (New York: Basic Books, 1954), 359.

17. Freud, *The Origins of Psychoanalysis*, 360.

18. Josef Breuer, *Studies on Hysteria*, in Freud, *The Origins of Psychoanalysis*, 363, n.1.

19. Cf. Jacques Derrida, "Freud and the Scene of Writing," *Writing and Difference*, trans. Alan Bass (Chicago: U Chicago P, 1978), 196–231.

20. Sigmund Freud, *Recommendations to Physicians Practicing Psycho-Analysis*, in Freud, *Standard Edition*, Vol. XII, 115ff.

21. Jean Marie Guyau, *La mémoire et la phonographe* (1880).

22. Sigmund Freud, *Fragment of an Analysis of a Case of Hysteria*, in Freud, *Standard Edition*, Vol. XII, 10.

23. Sigmund Freud, *New Introductory Lectures on Psychoanalysis*, in Freud, *Standard Edition*, Vol. XXII, 5.

24. Freud acquired a typewriter in his house in 1913. Cf. Ernest Jones, *The Life and Work of Sigmund Freud*, Vol. II (New York: Basic Books, 1955), 98.

25. Frank, 394.

26. Lacan, *Seminar II*, 74ff. (It is true that Lacan dates Watt's centrifugal governor, which actually went into operation in 1784, after Jena, Auerstedt and the "Phenomenology of Spirit.").

27. Jacques Lacan, *Écrits* (Paris: 1966), 720.

28. René Descartes, *The Geometry*, trans. David Eugene Smith and Marcia L. Latham, in *Great Books of the Western World*, vol. 28, ed. Mortimer J. Adler (Chicago: Encyclopaedia Britannica, 1952/1990), 564.

29. Descartes, 560.

30. Descartes, 562.

31. Cf. Descartes, 526ff.

32. Jacqes Lacan, *Écrits: A Selection*, trans. Alan Sheridan (New York: W. W. Norton & Company, 1977), 318 ff.

33. Lacan, *Seminar II*, 285.

34. Jacques Lacan, "Seminar on 'The Purloined Letter,' " trans. Jeffrey Martin, in *The Purloined Poe: Lacan, Derrida & Psychoanalytic Reading*, eds. John P. Muller and William J. Richardson (Baltimore: The Johns Hopkins UP, 1988), 40. On the difference between the mathematical self-sufficiency of the symbolic and the physical measurement of the real, cf. Bernhard Riemann, "On the Hypotheses Which Lie at the Foundations of Geometry," trans. Prof. Henry S. White, *Source Book in Mathematics*, 1st ed., ed. David Eugene Smith (New York: McGraw-Hill, 1854/1929) 424: "The question of the validity of the postulates of geometry in the indefinitely small is involved in the question concerning the ultimate basis of relations of size in space. In connection with this question, which may well be assigned to the philosophy of space, the above remark is applicable, namely that while in a discrete manifold the principle of metric relations is implicit in the notion of this manifold, it must come from somewhere else in the case of a continuous manifold. Either then the actual things forming the groundwork of a space must constitute a discrete manifold, or else the basis of metric relations must be sought for outside that actuality, in colligating forces that operate upon it."

35. Lacan, *Seminar II*, 284.

36. Cf. Andrew S. Glassner, "Surface Physics for Ray Tracing," *An Introduction to Ray Tracing*, ed. Andrew S. Glassner (London: 1989), 130–137.

37. Cf. Stephen W. Hawking, *A Brief History of Time* (Toronto: Bantam, 1988) 134, 143ff.

38. Lacan, *Écrits* (Paris).

39. Paul Flechsig, *Über die Associationscentren des menschlichen Gehirns. Dritter Internationaler Congress für Psychologie in München vom 4. bis 7. August 1896* (München: 1897) 58. As if in formulation of Lacan's theorem of *corps morcelé*, Flechsig says the following: "The newborn, the infant, probably has a great number of *distinct consciousness circles*. Initially, every sensory sphere represents a distinct, independent organ which absorbs sensations of a particular quality, processes them to a greater or lesser degree, that is cathects them, transmits them to the locomotor system of the corresponding sensory instrument, practices perhaps the movements of the same, and the like. In the beginning, therefore, the undeveloped areas of the cerebral lobes lying between the individual sensory centers appear as isolators, like the ocean surfaces which separate the continents of the Earth." One should compare Frank's elegiac discussion of Lacan, the infant, and the mother (Frank, 383) with Flechsig's precision as a physiologist.

40. Frank, 399.

41. Lacan, *Seminar II*, 54.

42. Lacan, *Seminar II*, 82.

43. Lacan, *Écrits*, 86ff.

44. Lacan, *Seminar II*, 82.

45. Lacan, *Seminar II*, 83.

46. Cf. Lacan, *Écrits* (Paris), 658.

47. Cf. Lacan *Écrits*, 153: Because language consists of differentially determined elements, "one sees that an essential element of the spoken word itself was predestined to flow into the mobile characters which, in a jumble of lower-case Didots or Garamonds, render validly present what we call the 'letter,' namely, the essentially localized structure of the signifier."

48. Lacan, *Seminar II*, 47.

49. Lacan, *Seminar II*, 47.

50. Lacan, "Seminar on E.A. Poe's 'The Purloined Letter,' " *Écrits* (Paris), 61.

51. Lacan, "Seminar on 'The Purloined Letter,' " *The Purloined Poe*, 43.

52. Lacan, "Seminar on E.A. Poe's 'The Purloined Letter,' " *Écrits* (Paris) 60; cf. Lacan, *Seminar II*, 304.

53. Lacan, *Seminar II*, 298.

54. Lacan, *Seminar II*, 300.

55. Alan Turing, *Intelligent Machines* (1969).

56. Cf. Friedrich-Wilhelm Hagemeyer, *Die Entstehung von Informationskonzepten in der Nachrichtentechnik. Eine Fallstudie zur Theoriebildung in der Technik in Industrie-und Kriegsforschung*. (Diss. phil. FU Berlin, 1979).

57. Cf. Lacan, *Seminar II*, 298–300.

58. Lacan, *Seminar II*, 299.

59. Lacan, *Seminar II*, 306.
60. Cf. Lacan, *Seminar II*, 48.
61. Cf. Lacan, "Seminar on E.A. Poe's 'The Purloined Letter,' " *Écrits* (Paris), 53.
62. Jacques Lacan, *Seminar XX: Encore* (Paris: 1975), 76.
63. Cf. Lacan, *Seminar II*, 297–300.
64. Lacan, *Seminar II*, 300.
65. Lacan, *Seminar II*, 300.
66. Lacan, *Seminar II*, 77–90.
67. Lacan, *Seminar II*, 302.
68. Cf. Robert A. Kowalski, "Algorithm = Logic + Control," *Communications of the Association for Computing Machinery* (2: 1979), 424–436.
69. Lacan, *Seminar II*, 88.
70. Lacan, "Seminar on E.A. Poe's 'The Purloined Letter,' "*Écrits* (Paris), 42.
71. Lacan, *Seminar II*, 89.
72. Lacan, *Seminar II*, 83.
73. Lacan, *Écrits*, 304.
74. Lacan, "Seminar on E.A. Poe's 'The Purloined Letter,' " *Écrits* (Paris), 59.
75. Cf. Lacan, *Seminar II*, 88.
76. Cf. Friedrich Kittler, *Grammophon Film Typewriter* (Berlin: Brinkmann & Bose, 1986), 372ff.
77. Cf. Norbert Wiener, *Cybernetics: or Control and Communication in the Animal and the Machine*, 2nd ed. (Cambridge: MIT Press, 1948/1961), 28.
78. Niklas Luhmann, oral.
79. Cf. Lacan, *Seminar II*, 72.

There Is No Software

1. See Klaus Schrödl, Quantensprung, DOS 12/1990: 102f.
2. See Alan M. Turing, *On Computable Numbers, with an Application to the Entscheidungs problems*, Proceedings of the London Mathematical Society, 2nd ser. 42 (1937), 249.
3. Stephen C. Kleene, quoted by Robert Rosen, "Effective Processes and Natural Law," in Rolf Herken, ed., *The Universal Turing Machine: A Half-Century Survey* (Oxford: Oxford University Press, 1988), 527.
4. See Johannes Lohmann, "Die Geburt der Tragödie aus dem Geiste der Musik," Archiv für Musikwissenschaft (1980), 174.
5. See Andrew Hodges, *Alan Turing: The Enigma* (New York: Simon and Schuster, 1983), 399.
6. See *TOOL Praxis: Assembler-Programmierung auf dem PC*, 1st ed. (Würzburg: Vogel, 1989), 9.
7. Nabajyoti Barkalati, *The Waite Group's Macroassembler Bible* (Carmel, Indiana: Howard H. Sams, 1989), 528.
8. See Friedrich Kittler, "Protected Mode," in this volume.
9. See Friedrich Kittler, "Signal-Rausch-Abstand," in Hans Ulrich Gumbrecht and Karl Ludwig Pfeiffer, eds., *Materialität der Kommunikation* (Frankfurt a. M.: Suhramps 1988), 343–45.
10. Charles H. Bennett, "Logical Depth and Physical Complexity," in Herken, ed., 230.
11. With thanks to Oswald Wiener/Yukon.