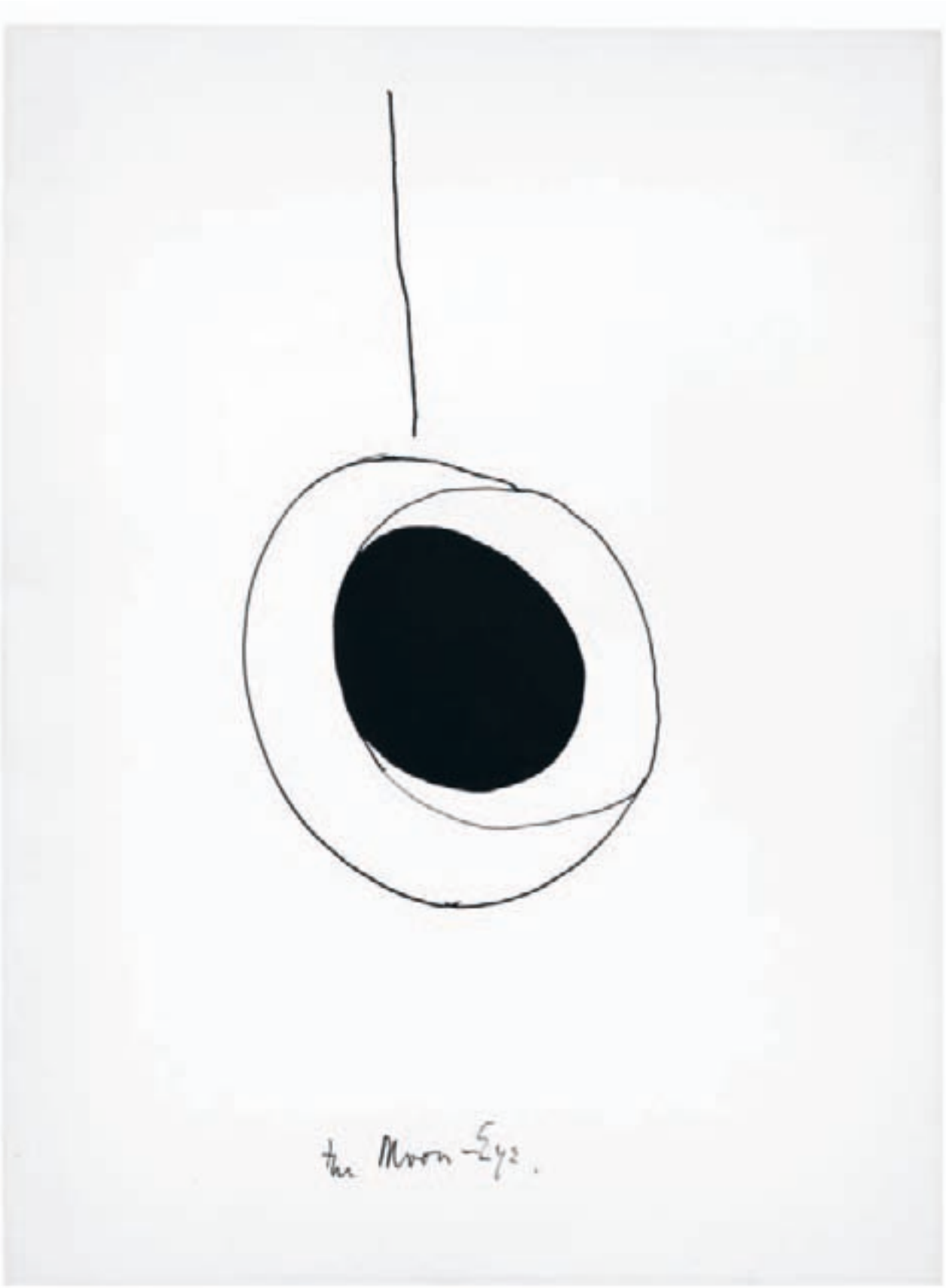
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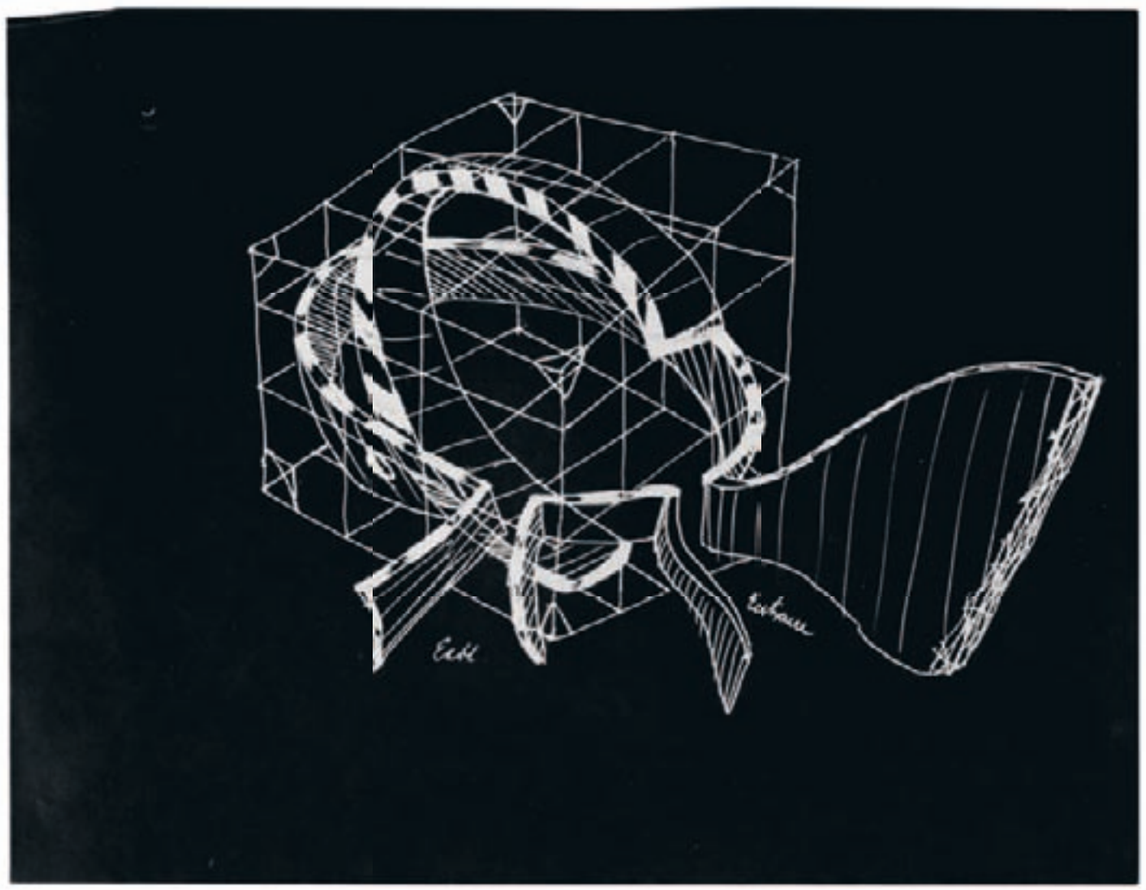

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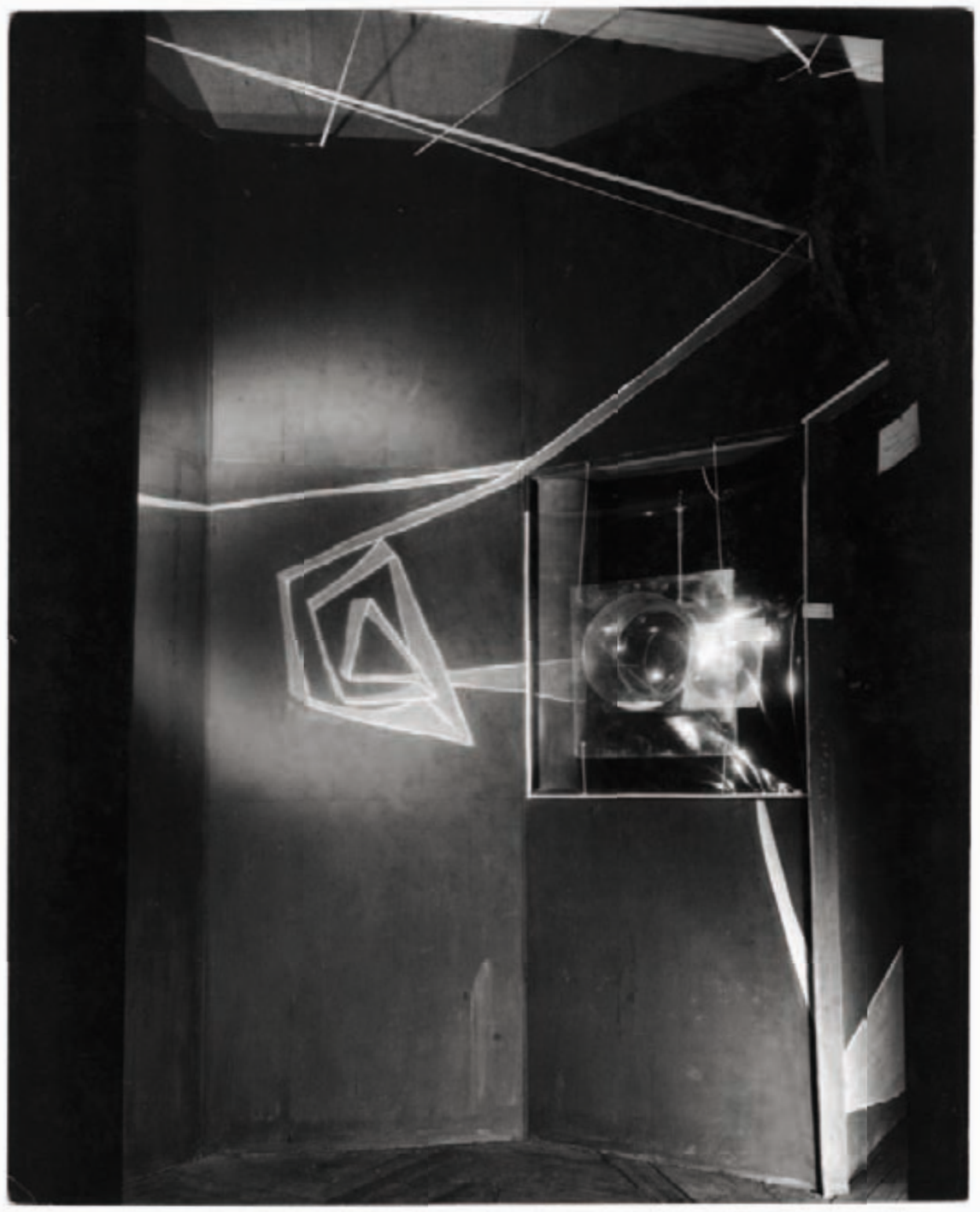

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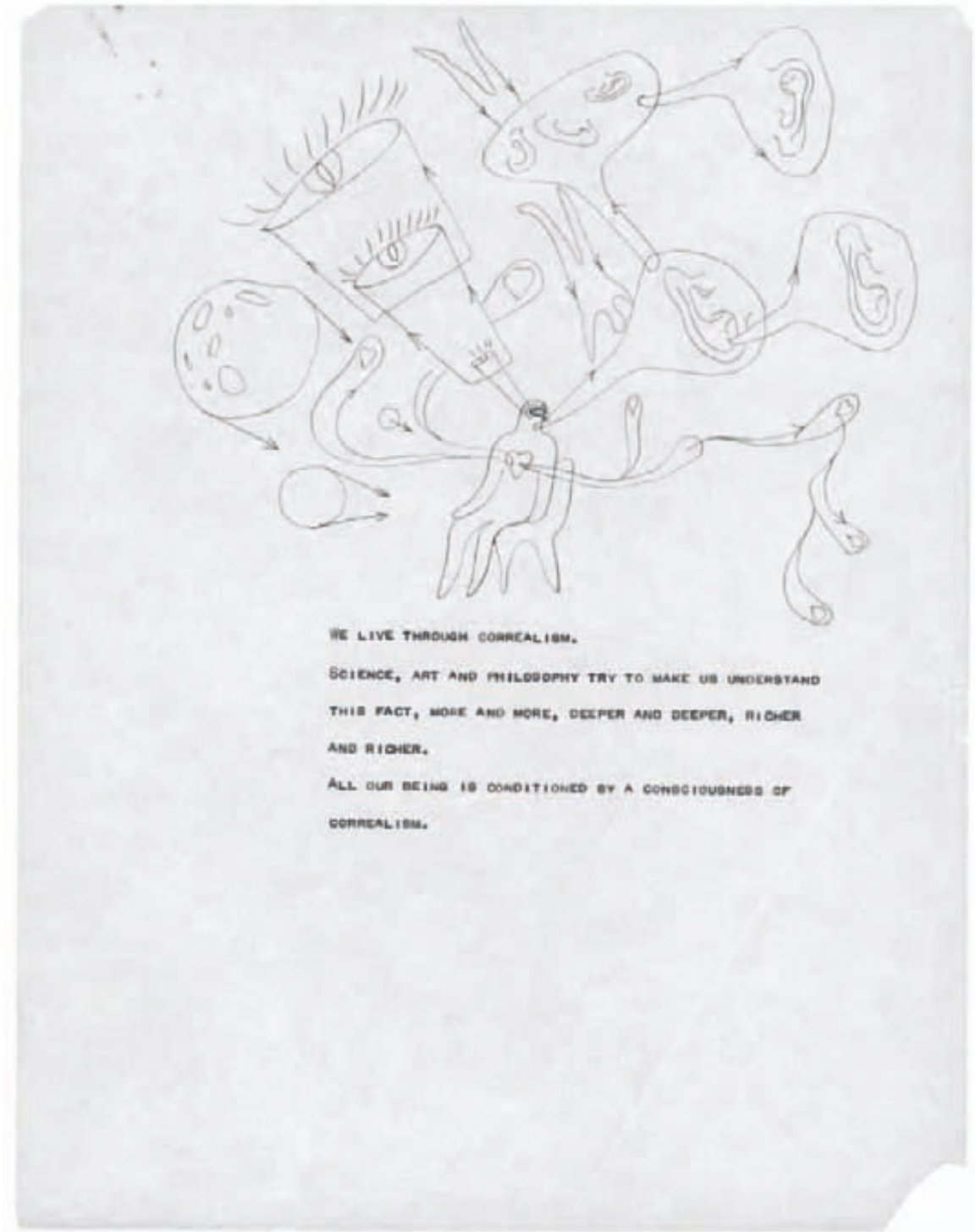


Correalism*

In this paper[1] I propose to show that the perennial[2] crisis in architectural history is due to the perennial lack of a science dealing with the fundamental laws which seem to govern *man as a nucleus of forces*; that until we develop and apply such a science to the field of building design, it will continue to exist as a series of disparate, overspecialized, and unevenly distributed products; and that only such a new science can eliminate the arbitrary divisions of architecture into: Art, Technology, and Economy, and make architecture a socially constructive factor in man's daily activities.
Today we face the task of formulating the *general* laws of the foundations that underly the many specialized sciences, not in terms of metaphysics (such as religion or philosophy) but in terms of work-energies; and the *specific* task of formulating those that govern building design. But the two are intimately related and we in the building field cannot solve our special problems without comprehension of the foundations of such part-sciences, e. g. physics, chemistry, biology, etc. Thus, it would seem imperative that we summarize some of the concepts of modern science and investigate their validity for our specific problem.

Concepts of sciences and the building designer
Man is born in evolution of hereditary trends. He is the nucleus of forces which act upon him, and upon which he acts. Forces are energies. We assume, with contemporary science, that they are of an electromagnetic nature. The interrelation of organic and inorganic matter is a mutual bombardment of energies which have two characteristics: those of integration and those of disintegration.
By means of gravitation, electricity generates energy into solids of visible matter. This is integration. By magnetism and radiation, electricity degenerates energy into tenuous, invisible matter. This is disintegration.
If this general principle of anabolic and catabolic energies were the sole principle of existence, we would have a static, unchanging world. But these two forces (positive and negative) interchange through physico-chemical reactions, one force striving always for a preponderance over the other. In this way *variations* are constantly created; and in this process of creation, new nuclear concepts and new environments are in continual formation.

Reality and form
The mutual biological interdependence of organisms is, in the final analysis, the result of the primary demands of all creatures: proper food, habitat, reproduction, defense against inimical forces. Life is an expression of the cooperation, jostling, and strife of individual with individual, and of species with species, for these primary needs.
The visible result of these activating forces is usually called matter and constitutes what is commonly understood as reality. The reason for this superficial interpretation of reality lies in the limitation of man's senses in relation to the forces of the universe. For matter is only one of the expressions of Reality, and not reality itself. If matter alone were reality, life would be static.
What we call »forms«, whether they are natural or artificial, are only the visible trading posts of integrating and disintegrating forces mutating at low rates of speed. Reality consists of these two categories of forces which inter-act constantly in visible and invisible configurations.
This exchange of inter-acting forces I call CO-REALITY, *and the science of the laws of interrelationships,* CORREALISM. *The term »correalism« expresses the dynamics of continual interaction between man and his natural and technological environments.*

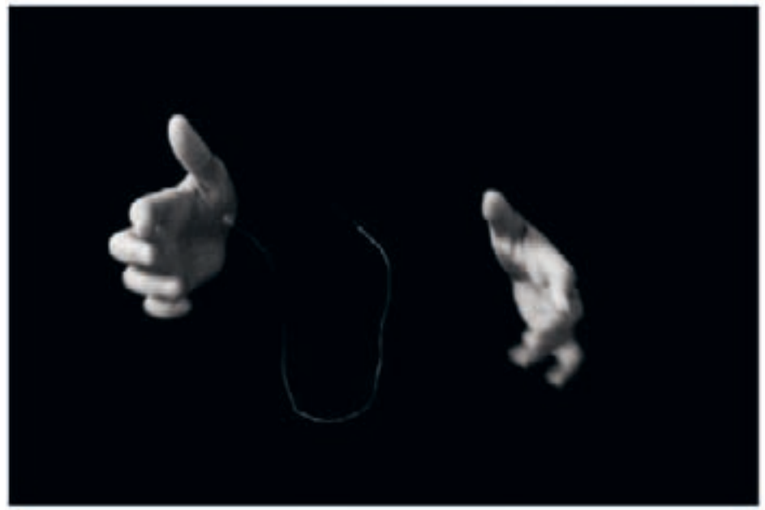
Natural, social, and technological heredity
Biology has divided these forces into two main categories: Heredity and Environment. Man had to evolve a method for dealing with the effects of these overwhelming forces upon himself. For this purpose he created technological environment to help him in his physical survival even within the short span of the age-potential of his own species. This is made more difficult because man is biologically unfit to transmit his experiences to his offspring: each child has to begin anew its adaptations to nature. In short: contrary to prevailing belief, acquired traits and habits of parents can not be transmuted into the make-up of body cells and, by way of procreation, given to their children.[3]
By providing unchangeable genes within the germ-cells *Nature* has safeguarded herself from man interfering fundamentally with her aims, whatever they may be. This »sealed order« of the germ cell contains nature's will which man can influence *during his own life-time, but not beyond that*. This places a deep responsibility upon those who »design« technological environment, because the restriction of its application to only *one* life-span makes it so much more needed as part of man's defense-mechanism. It appears, then, that the only human experiences that can be inherited by children are those of customs and habits by way of: training and education, thus »social heredity« is the only tool man can rely upon. Just as all living organisms are generated through their own species from a long chain of generations, so do ideologies or man-made objects generate from a long line of older ideologies or objects of similar functions. Thus a contemporary chair, for instance, is the product of many generations of other tools for man to rest his body in fatigue. This is heredity in technology transmitted through education.

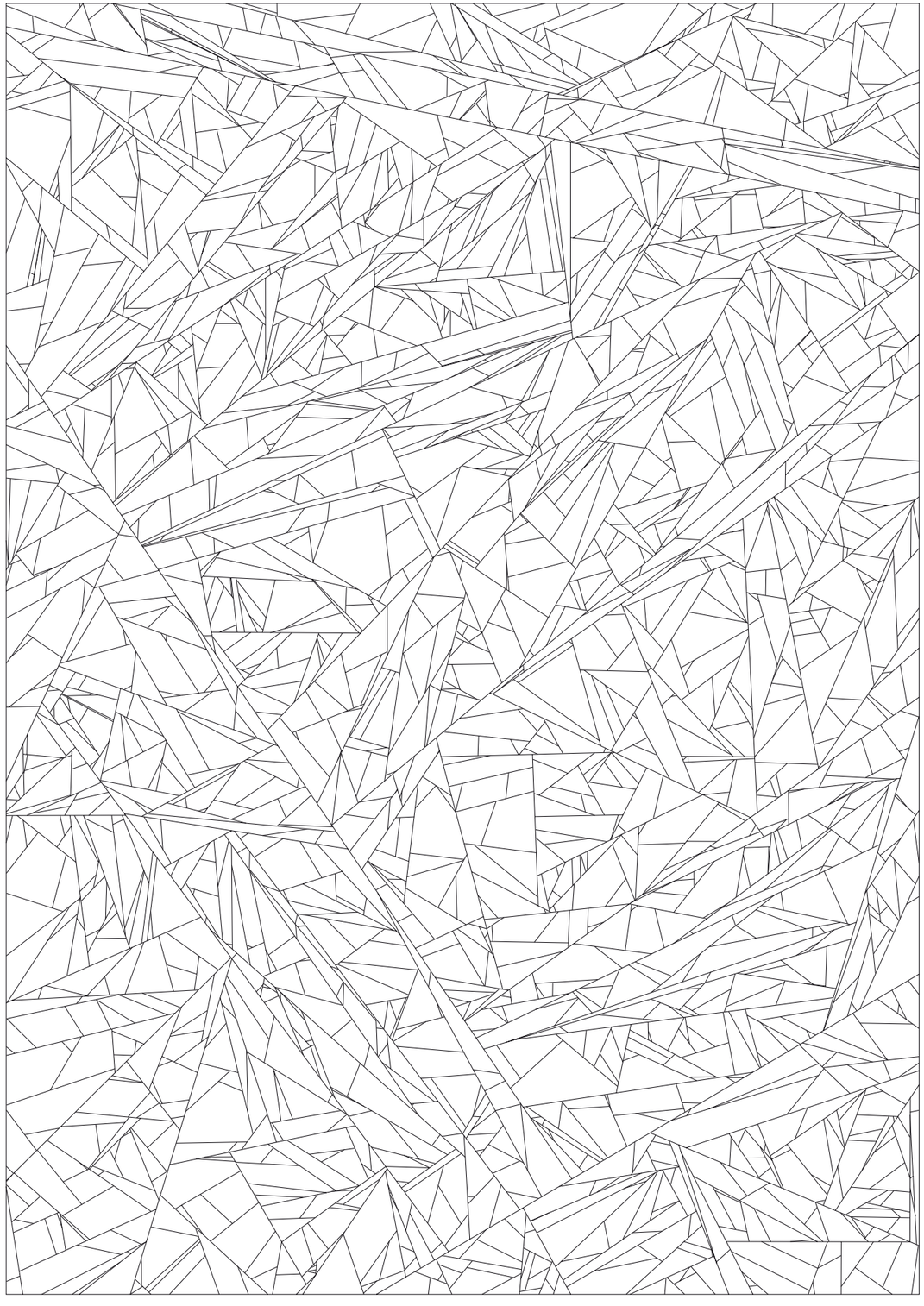
What is technological environment?
When the biologist speaks of environment, he invariably means the geographical and animal environment. This definition is perhaps accurate for all creatures except man. For man alone has developed a third environment: *a technological* one which has been his steady companion from his very inception. This technological environment, from »shirts to shelter« has become one of the constituent parts of his total environment. Thus, the classification of environment becomes three- instead of two-fold:

1. natural environment
2. human environment
3. technological environment

But it is this last factor of technological environment which concerns us here, since it is in this field that the architect works. Man-made, technological tool-objects have been in existence since the Ice Age. *But no branch of science so far has undertaken to investigate, analyze, chart, and measure the direct and indirect, voluntary and involuntary effects of technological environment upon man:* nor has any branch of science charted and formulated the laws which govern the development of technology. We have had numerous accounts of the history of technology but no study of the need-morphology of its growth.

Fortsetzung auf Seite 63





Von der Geometrie des Abrupten

Auf der Suche nach Synonymen für das Adverb »abrupt« finde ich »unvermittelt«, »unzusammenhängend« und »abgebrochen«.

abrupt – unvermittelt

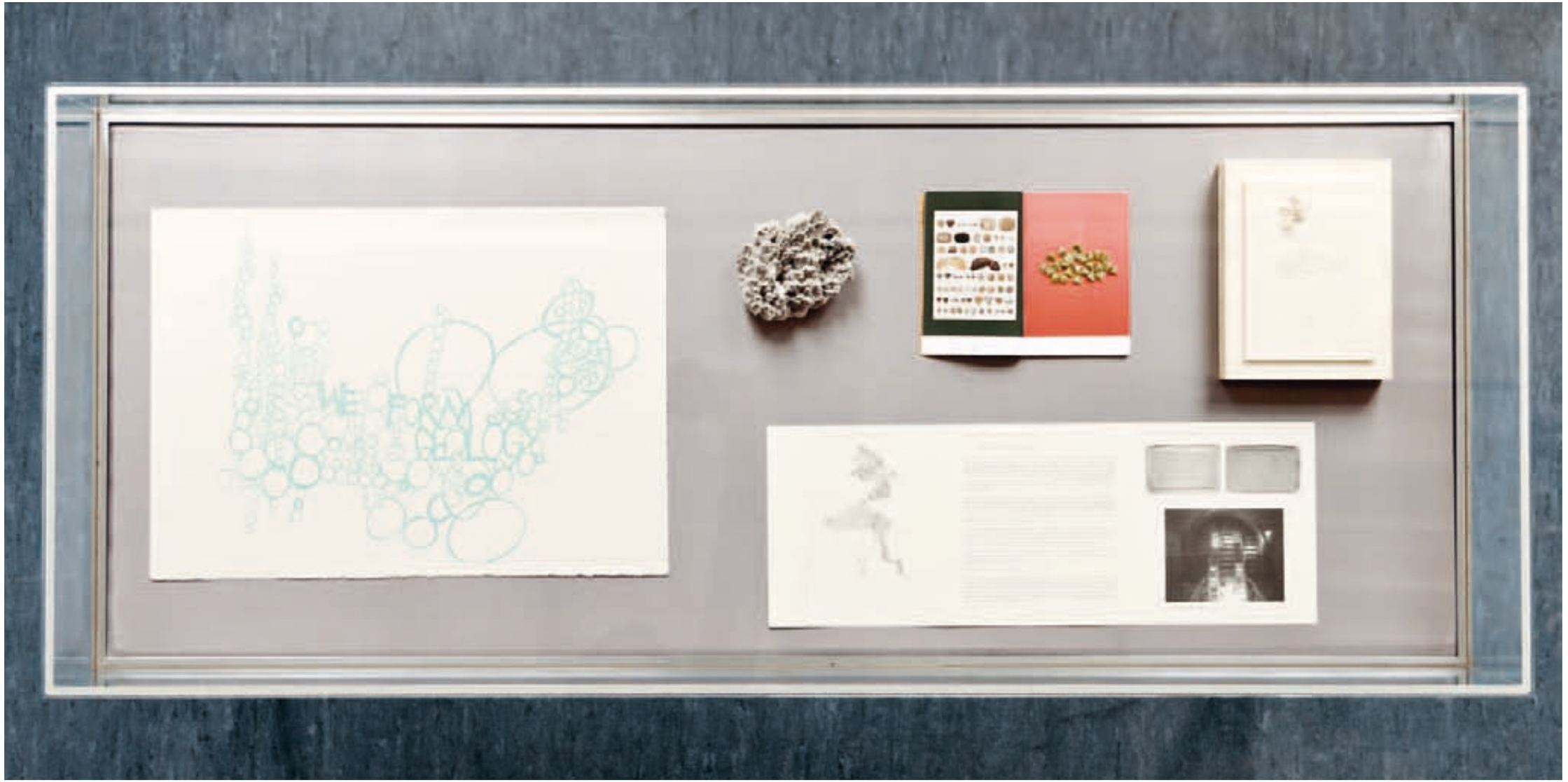
Die Forschung zur Physik des Abbrechens und der Brüche beschäftigt sich in erster Linie mit der Nukleation der Brüche und Risse. Ausgehend von einer mikroskopisch kleinen Fehlstelle, einer winzigen Unregelmäßigkeit, entsteht ein kleiner Riss, der sich – wenn er eine bestimmte Größe erreicht hat – mit großer Geschwindigkeit ausbreitet. So entstehen auch Risse, die man manchmal nicht einmal mehr mit dem bloßen Auge erkennen kann, die aber trotzdem Brücken zum einstürzen bringen können. Der Übergang vom Mikroskopischen zum Makroskopischen geschieht nicht kontinuierlich, sondern plötzlich, unvermittelt, abrupt.
Die mechanischen Spannungen, die zu den Rissen in bestimmten Keramikglasuren führen, haben ihren Ursprung im Unterschied der Wärmeausdehnungskoeffizienten der dünnen Glasurschicht und der Keramik (dem Substrat). Die Spannungen entstehen während der Abkühlung des Werkstücks; die Risse in der Keramik aber können noch Jahre, gar Jahrhunderte später entstehen. Anhand von diesem Beispiel können wir dem Begriff »unvermittelt« eine konkrete, quantitative Bedeutung geben: die Entstehung und Ausbreitung eines Risses dauert wenige Millisekunden. Die Zeit, die zwischen zwei aufeinanderfolgenden Rissen verstreicht, messen wir in Stunden.
Das Verhältnis zwischen diesen zwei Zeitskalen ist ungefähr 1:1000 000.
Dieses Verhältnis bedeutet, dass zwei Brüche sich fast nie zur gleichen Zeit ausbreiten und deshalb auch nicht miteinander in Wechselwirkung treten können. Die Physik der Brüche ist streng hierarchisch: Zwar wird ein erster Bruch einen wichtigen Einfluss auf die folgenden haben (denn der erste entlädt einen Teil der mechanischen Spannung); Die späteren Brüche werden aber einen schon entstandenen Bruch nicht weiter verändern.

abrupt – unzusammenhängend

Die Risse in Keramikglasuren haben eine weitere, charakteristische Eigenschaft – die Teilung unabhängiger Flächen. Ein Riss breitet sich so lange aus, bis seine zwei Extremitäten auf andere Brüche treffen, um sich dann mit diesen zu verbinden. Ein Riss bildet so eine Trennlinie zwischen zwei Flächen. Man kann mit Hilfe von komplexen Berechnungen zeigen, dass diese zwei Flächen nun mechanisch unabhängig sind – im physikalischen Sinne unzusammenhängend.
So bildet sich neben der zeitlichen Hierarchie eine weitere, geometrische Hierarchie: Eine Flasche z. B. wird durch einen Riss in zwei, von nun ab unabhängige Flaschen geteilt. Ein weiterer Bruch wird nun eine dieser Flächen wiederum zweiteilen, ein dritter Bruch wird dann eine der drei Flächen zerteilen usw.

abrupte Simulation

Die zwei abgebildeten Grafiken sind das Resultat einer einfachen Simulation. Ziel dieser grafischen Darstellung war es nicht, ein Rissmuster nachzubilden, sondern neue geometrische Muster abrupt entstehen zu lassen. Mit einfachen Regeln sowie dem Einfluss des Zufalls wurde so das Unvermittelte und das Unzusammenhängende digital generiert.



GEOLOGIC INTIMACY/ PHYSICAL GEOLOGY

Please explain this impulse to me –
attempting physical contact with geological time.

The human consciousness may have begun to leap and boil some sunny day in the Pleistocene, but the race by and large has retained the essence of its animal sense of time. People think in five generations – two ahead, two behind – with heavy emphasis on the one in the middle. Possibly that is tragic, and possibly there is no choice. The human mind may not have evolved enough to be able to comprehend deep time. It may only be able to measure it. At least, that is what geologists wonder sometimes, as they have imparted the questions to me. They wonder to what extent they truly sense the passage of millions of years. They wonder to what extent it is possible to absorb a set of facts and move beyond them, in a sensory manner, beyond the recording intellect and into the abyssal eons. Primordial inhibition may stand in the way. On a geologic time scale, a human lifetime is reduced to a brevity that is too inhibiting to think about.[1]

While conducting research at the Manchester Museum, in the »oddities drawer« of the Geology Department I came across a fine collection of lava medallions from Mount Vesuvius – magma pressed between forged steel plates to form an imprint (imagine a waffle iron that uses lava as batter). In the same drawer, a small stone relief sculpture appeared to be carved out of pure white alabaster. In fact, it was a limestone cast created via the same process that forms stalactites in a cave – a cave cast, or cast stalactite.

I have been thinking about physical geological time – the fast moving lava flow vs. slow time inside a cave. The impulse to understand geothermal water through boiling milk in a 100 degree Celsius sulphur spring in the crater of an active volcano. I spoke with a paleontologist who told me a fossil is the presentation of the moment of death, that trace fossils record an action-eating or walking, but not the organism itself.

Jim said to me, a volcano buries itself. It perpetually erases its own history. A volcanologist explained the nature of love to me. He said, you love what you get to know, what you pay attention to and therefore become more aware of. This is not a passive form of love.

This is how I feel about the volcano.

The cave etching experiment

I went to Saint Nectaire, a small thermal town in the mountains of the Auvergne in France. I met with Eric Papon, whose family founded the Fontaines Petrifiantes seven generations ago. His ancestor was exploring the limestone caves of the area, when he came upon a perfect cast of a leaf – even the tiny veins of this small leaf were etched in stone. He realized the carbonate waters could be harnessed and used to a different effect, and the art of cave casting was born. In a normal limestone cave it takes 100 years for a stalactite to grow one centimeter, in these caves one centimeter grows in one year.

Today, there are twenty-four meter high ladders installed in the caves. Natural rubber plates with relief impressions on one side are placed on the rungs of the ladder. Every day Eric and his assistant turn every object – hundreds of them – so they do not become part of the cave. Carbonate waterfalls cascade over the plates. At the end of one year they are entirely encrusted in limestone. When the casts are ready to come out, like an ice cube in the freezer that is no longer part water, the experiment is done. One side a rough stalactite, one side a delicate orchestrated ornate intrusion.

Notes on physical geology

The lava medallion is an imprint of a specific action – a grave marker, a marker for an event in time. It is akin to a snapshot – a photograph taken in one moment as opposed to the long exposure, which we could say is more akin to the pin-hole photography (geology) evident in the caves of Saint Nectaire – the gradual accumulation.
The cave cast can be likened to a drawing, a record of incremental change. It is a miniscule representation of geological time – durational time – in that 1.5 years is nothing in a geological time context. Within a daily context it is quite long, a lot can happen in a year and a half. Within an arts context, this is also quite a long duration, a continually occurring process forming a piece of work. Recently someone asked if I would be interested in exploring natural phenomena like slow erosion, or how mountains move – really deep time processes that we as humans will not see the results of within our lifetime, but nonetheless continue to take place on an ongoing basis.
My response is, though of course I am interested in such processes, a key aspect of what I do is finding approximations in real life that make sense of things that are, in effect, incomprehensible. What does 300,000,000 years mean, just like what does 30,000 dead mean? I can't understand the temperature of underground magma; I can however make contact with its cousin – a geothermal pool in which to boil milk.
There are two carbonate activities that take place inside the caves of Saint Nectaire. Encrustation and casting. You have read detail about the casting process. For encrustation to take place, the following occurs. An animal dies. It is stuffed. It is placed beneath the waterfalls, turned every day, and at the end of a year, maybe two, the animal is entirely encrusted in limestone. You could say it is petrified, but it is not. If it were petrified it would turn to stone – from a living thing to geology complete. In Saint Nectaire, the animals are encased, surrounded by a stalactite.

But at what moment does wood become stone, peat become coal, limestone become marble?[2]

The plan is to make a geological time diptych – new lava medallions, new cave casts – slow time and fast time alongside each other.

1 From *Getting the Picture* by John McPhee.
2 From *Fugitve Pieces* by Anne Michaels

»Die Chaldäer hatten mit der regelmäßigen Beobachtung der Gestirne begonnen. Die Pythagoreer setzten deren Bemühungen, die Himmelserscheinungen arithmetisch zu berechnen, fort, indem sie dem Vergleich bzw. der Beziehung der gewonnenen Zahlenwerte besondere Aufmerksamkeit schenkten. So stießen sie zum Beispiel darauf, dass sich die Umlaufzeiten der Planeten wie ganze Zahlen zueinander verhielten. Aufgrund der Kombination ihrer astronomischen Forschungen und musiktheoretischen Erkenntnisse unternahmen es die Pythagoreer dann, die im griechischen Mythos manifestierten uralten Vorstellungen vom Welteinklang näher zu präzisieren. Über frühere Versuche den Wandelsternen bestimmte Töne zuzuordnen, hinausgehend, bekam nunmehr jeder der sieben ›Planeten‹ einen Ton der siebentönigen Tonleiter zugewiesen.«

F. Zipp, *Vom Urklang zur Weltharmonie*, Kassel 1985, S. 28

»Jede Figur, jede Zahlenverbindung, das ganze System der Harmonie und des Umlaufs der Gestirne muß als einziges und gemeinsames großes Ganzes erscheinen. Denn jedem aufmerksamen Beobachter wird es einleuchten, dass ein natürliches Band alle diese Gegenstände umschlingt.«

Platon, nach H. Pfrogner, *Musik – Geschichte ihrer Deutung*, Freiburg 1954, S. 36

»An den beiden äußersten Enden des Weltalls ist die ›Spindel der Notwendigkeit‹ (anànkes àtraktos) befestigt, durch die alle Himmelssphären in Umdrehung versetzt werden. An der Spindel sind wiederum acht Wirtel angebracht, die einer im anderen liegen und deren Ränder, von oben her gesehen, als Kreise erscheinen und rings um den Schaft die zusammenhängende Oberfläche eines einzigen Wirtels bilden…
Die ganze Spindel aber, drehe sich im Kreise, in einer gleichmäßigen Bewegung. Und während sie sich als Ganzes drehe, bewegten sich in ihr die sieben inneren Kreise langsam in der dem Ganzen entgegengesetzten Richtung herum…
Es drehe sich aber die Spindel im Schoße der Notwendigkeit. Und oben auf jedem Kreise stehe eine Sirene, die sich mit ihm drehe und ihre Stimme hören lasse, jede einen bestimmten Ton; alle acht Töne aber klängen in einer einzigen Harmonie zusammen.«

Plato, *Der Staat*, Zürich 1950, S. 378 f.

»Töne entstehen bei Schwingungen, die in gleichen Zeiten wiederkehren. Die halbe Anzahl der Schwingungen in der gleichen Zeit ergibt den Ton eine Oktave tiefer, der vierte Teil zwei Oktaven usw. Zuletzt kommen Schwingungen heraus, die einen Tag, ein Jahr, ein ganzes Menschenleben dauern. Vielleicht sind diese von großer Wichtigkeit. Die Umdrehung der Erde um ihre Achse zum Beispiel mag einen bedeutenden Ton ergeben, das ist die Schwingung ihrer inneren Verhältnisse, die dadurch veranlasst ist; der Umgang um die Sonne einen zweiten Ton, der Umlauf des Mondes einen dritten. Hier bekommt man die Idee von einer kolossalen Musik, von der unsere kleine gewiß nur eine sehr bedeutende Allegorie ist. Wir selbst, das Tier, die Pflanze, alles Leben mag in diesen Tönen begriffen sein. Ton und Leben werden hier eins!«

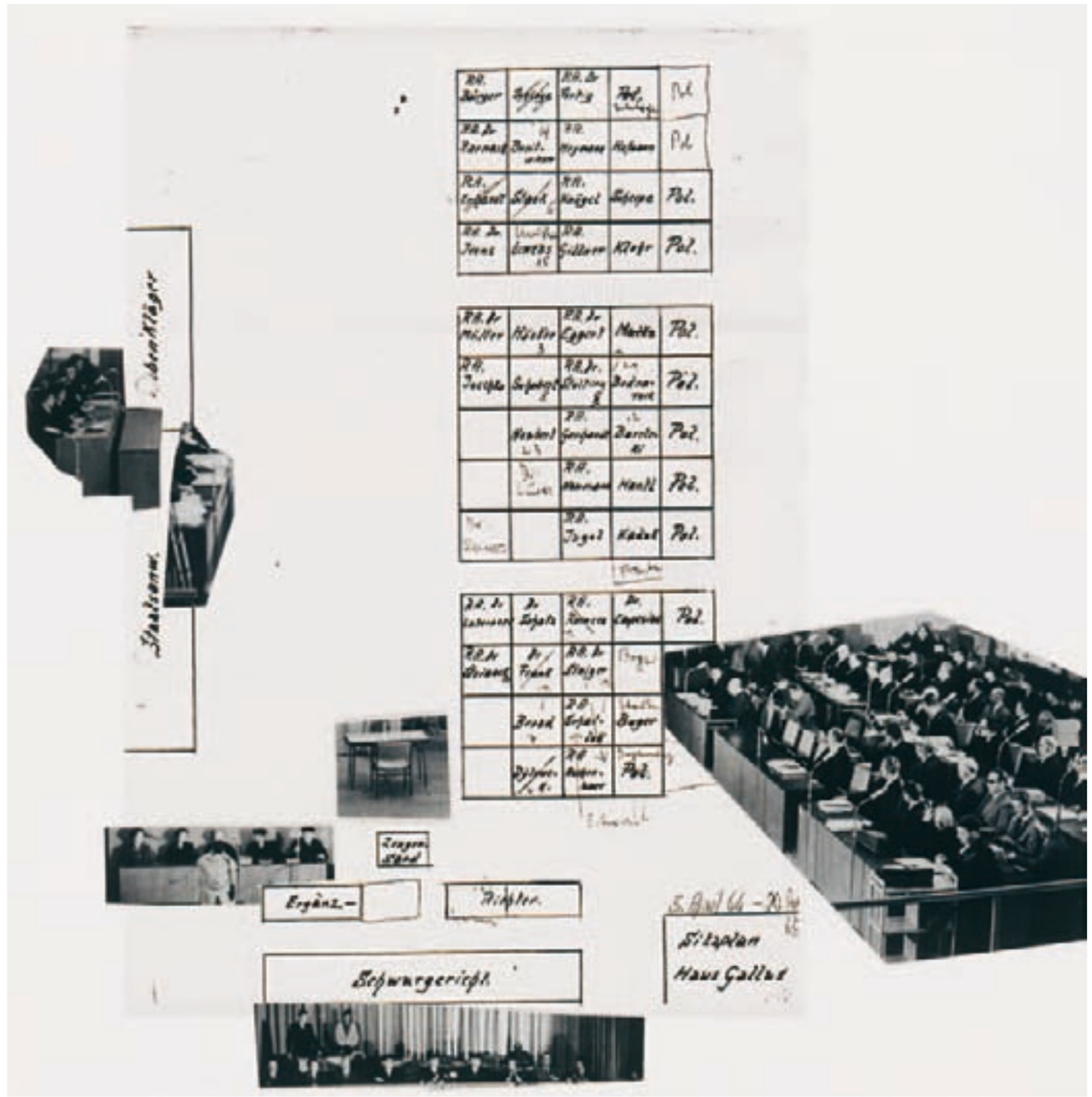
Johann Wilhelm Ritter, nach R. Haase: *Geschichte des harmonikalen Pythagoreismus*, Wien 1969, S. 127

»Ich frage nicht nach dem toten Stoff, sondern wenn du willst, nach der Form, in der es geschah; nach jener Energie und Konsequenz, die sich ins Unendliche zu verlieren schien und dennoch auch in das Entfernteste die Übereinstimmung mit dem Mittelpunkt trug, die in jeder Variation den Klang der ursprünglichen Melodie festhält.«

Friedrich Hölderlin in einem Brief an Friedrich Hegel, nach H. Kayser, *Vom Klang der Welt*, Zürich 1937, S. 130


GÖTTERDÄMMERUNG.
呂氏春秋


RAUPLANE DES MIKROKOSMOS
Neuen Mufik


Staatsanw.
Ergänz.-
Richter.
Schwurgericht
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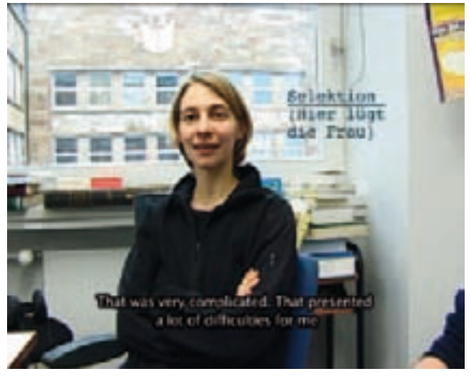
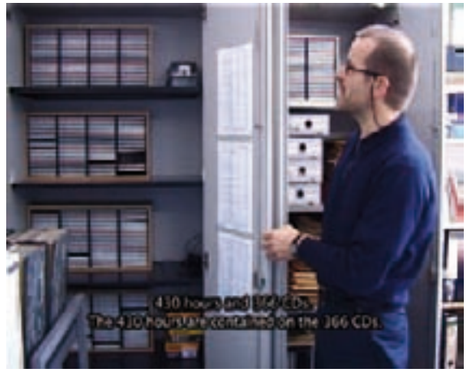
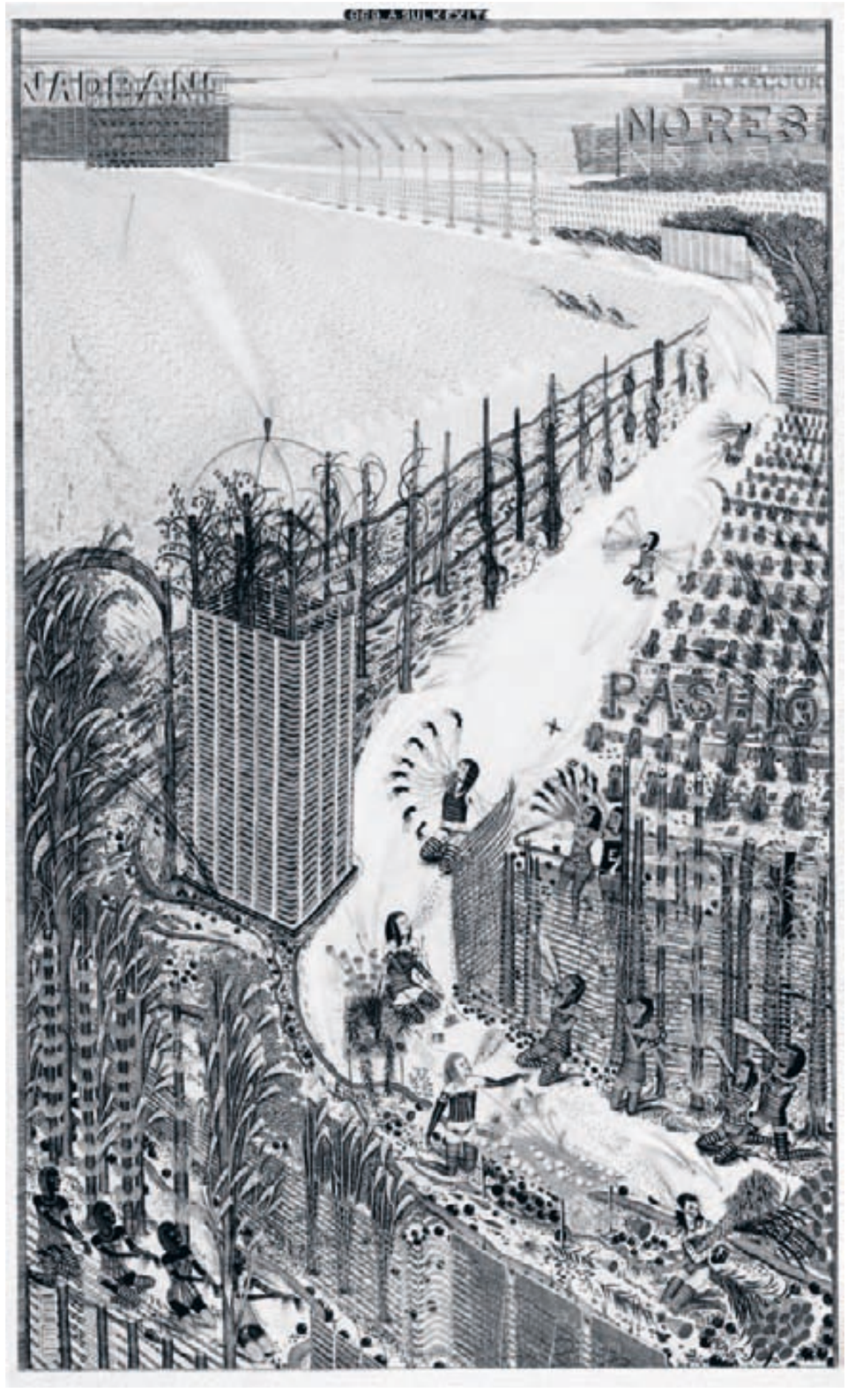
Gitte Villesen's *authentic.objective.subjective. Or which rules does one follow?* (2004) was commissioned for the exhibition *Auschwitz-Prozess 4 Ks 2/63* in Frankfurt am Main. The work consists of a video and five collages. The show documented the first Auschwitz trial, which took place from 1963 to 1965. The biggest jury trial in the West German court system up to that time, it finally brought the issue of the Holocaust into the public arena. At the centre of the exhibition was a reconstruction of the trial including excerpts from the original sound recordings of the trial, giving an almost too vivid illustration of the atmosphere in the courtroom. The historical background to the trial was traced, as was the history of the trial's reception in literature, philosophy, journalism and theatre. Twelve contemporary artists were asked to respond to this history. That there even was a trial is due partly to chance and partly to the persistence of a few people, such as Fritz Bauer, the Hessian Attorney General whose investigations made it possible to carry the whole process through despite years of silence. For her video, Gitte Villesen interviewed six staff members at Frankfurt University's Fritz Bauer Institute, who had mounted the Auschwitz trial exhibition and produced a DVD with a large volume of archival material concerning the trial, including 100 hours of tape recordings transcribed from different languages and indexed minute by minute. The original audio source material amounts to 430 hours. Gitte Villesen's interviews focus on the technical problems of objectivity and subjectivity regarding scientific standards. One could also say they concern the impossible search for the truth, and the human factor, which tends to complicate matters. The video is accompanied by five collages in black and white made from historical photographs and documents relating to the trial. Some of these are used as graphic elements in the video. Villesen's subtle manipulation of the archival material, which carefully, sometimes nearly imperceptibly, highlights certain people and objects, also tends to highlight »history« and its visual documents as mere constructions.






JARDIN
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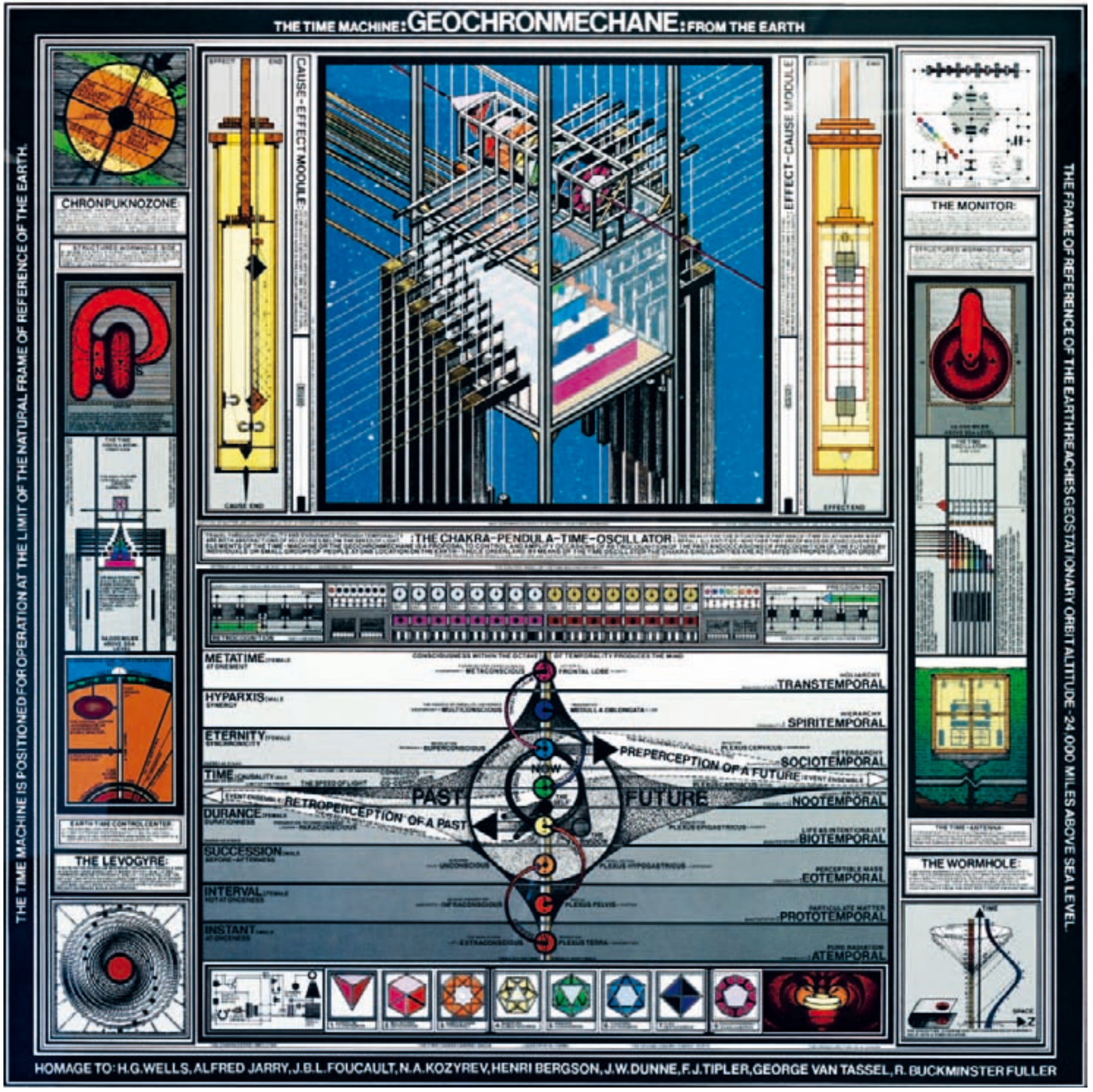
THE TIME MACHINE: GEOCHRONMECHANE: FROM THE EARTH
THE LIMIT OF THE NATURAL FRAME OF REFERENCE OF THE EARTH.
THE FRAME OF REFERENCE OF THE EARTH REACHES GEOSTATIONARY ORBIT ALTITUDE -24.000 MILES ABOVE SEA LEVEL.
CHRONPUKNOZONE:
CAUSE-EFFECT MODULE:
EFFECT-CAUSE MODULE
THE MONITOR:
THE CHAKRA-PENDULA-TIME-OSCILLATOR:
METATIME
HYPARXIS
ETERNITY
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SUCCESSION
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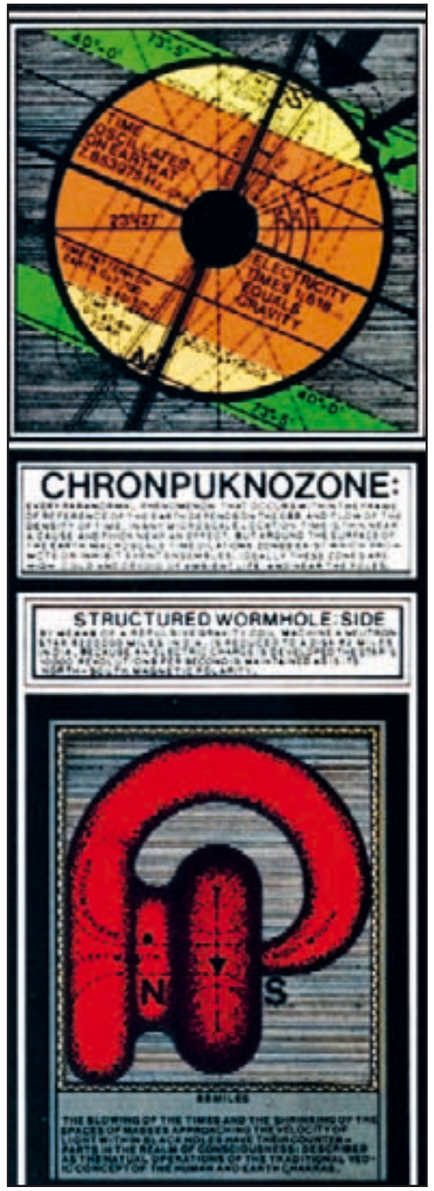
TRANSTEMPORAL
SPIRITEMPORAL
SOCIOTEMPORAL
NOOTEMPORAL
BIOTEMPORAL
EOTEMPORAL
PROTOTEMPORAL
ATEMPORAL
NOW
PAST
FUTURE
PREPERCEPTION OF A FUTURE
RETROPERCEPTION OF A PAST
THE LEVOGYRE:
THE WORMHOLE:
HOMAGE TO: H.G.WELLS, ALFRED JARRY, J.B.L. FOUCAULT, N.A.KOZYREV, HENRI BERGSON, J.W.DUNNE, F.J.TIPLER, GEORGE VAN TASSEL, R. BUCKMINSTER FULLER


CHRONPUKNOZONE:
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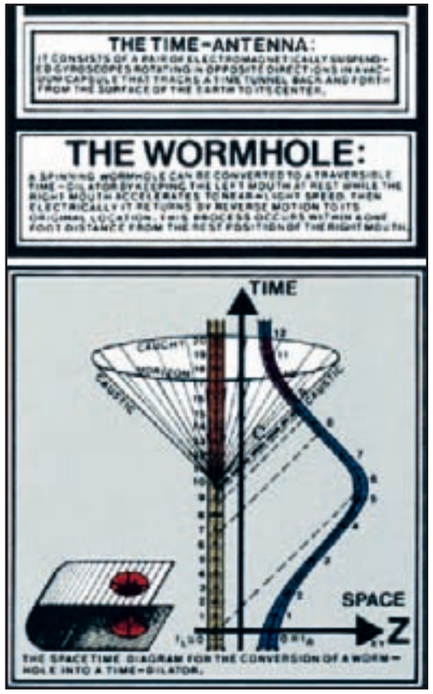
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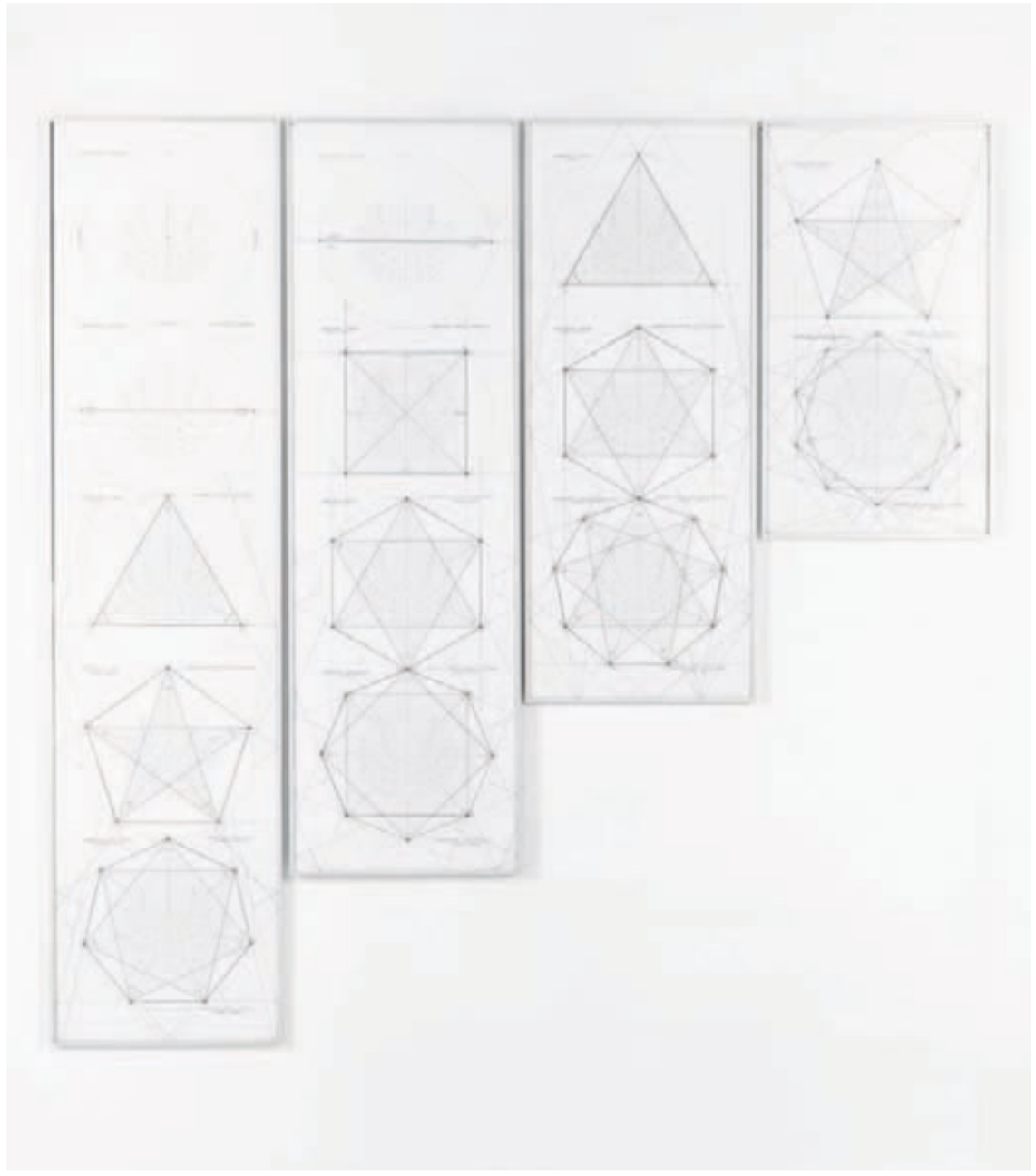
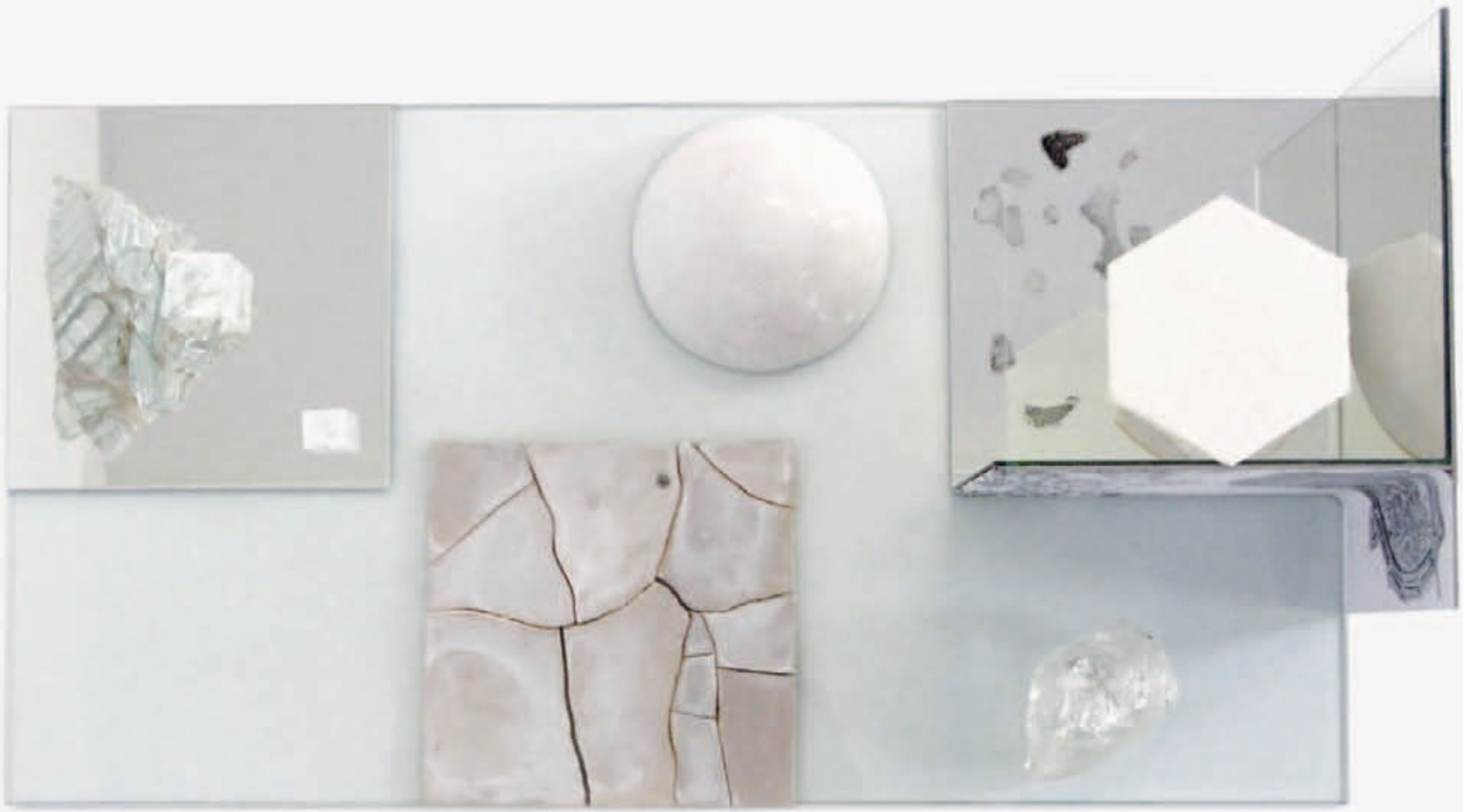
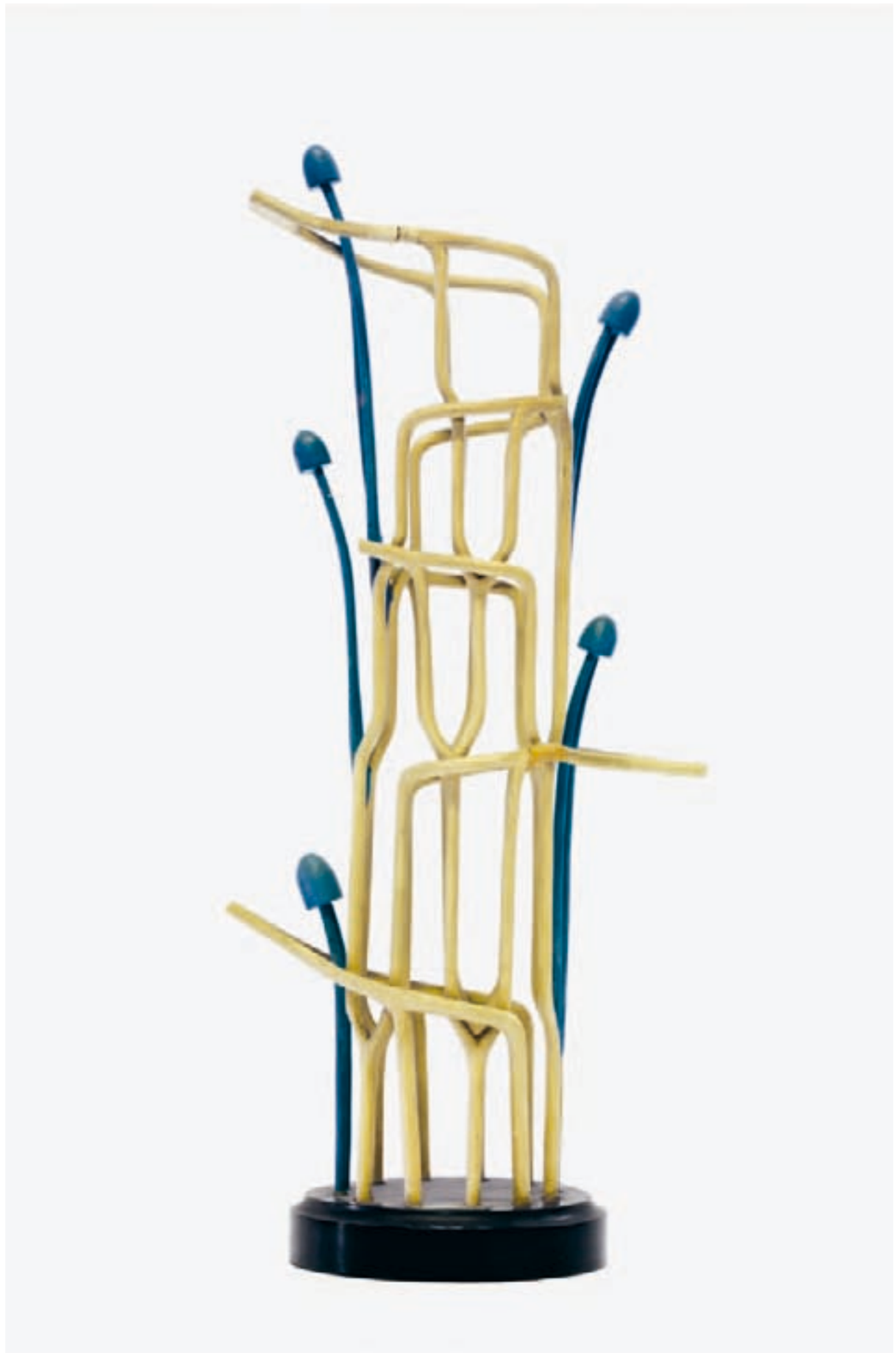


Prometh!

Geschmiedet an die Ketten der ›Natur‹ und zerfleischt vom Fremdwortgeier? – Verzeih, Feueranbeter! Aber Feuerbringer mit Pathos? – Mit dem Feuer spielen!! Das müssen wir. HOCH MOZART!!! Im Anfang ist viel Mozart. – – – Mutiger Prometh, Urschleimzeuger, suchst Du das absoluteste Bauen, Bauwachsen? Heil, wenn du es findest! Auch Dein Weg ist ein Weg. Allein musst du ihn durch alle Finsternis gehen. Dein Name scheint so Symbol, aber er kann auch ›Fensterlein‹ bedeuten. Dank, dass Du uns durchsehen lässt! – – – Nun bitte: übersetze auch dem humanistisch Gebildeten die schwierigsten Fremdwörter! Am Ende ist unendlich-fach = einfach
Proteus = … Kind – – ?–!



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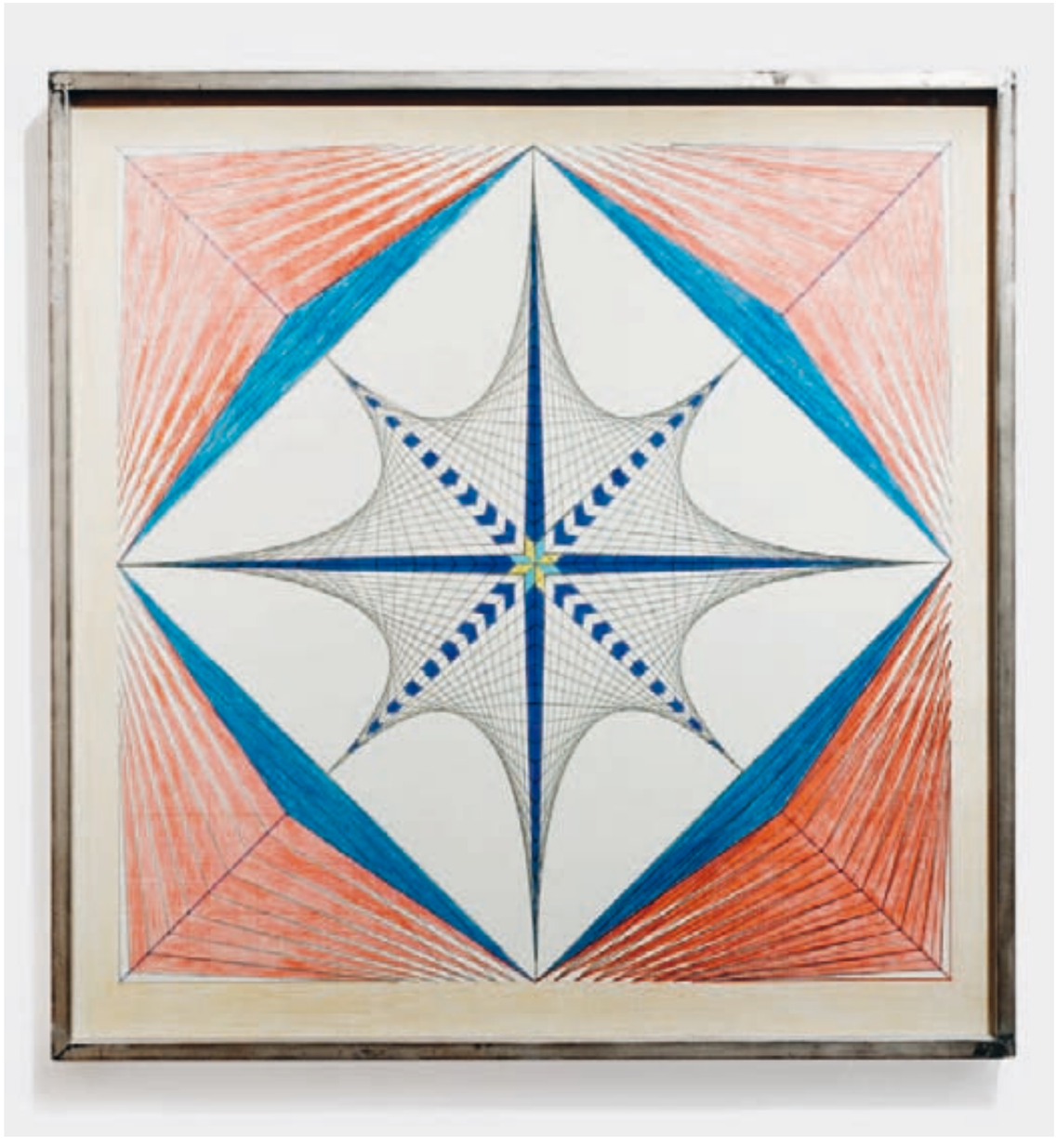

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We Make Versions

Der vorliegende Katalog ist im Rahmen der Ausstellung *We Make Versions* am Westfälischen Kunstverein, Münster (7. Oktober – 23. Dezember 2011) entstanden. Er stellt keine vollständige Dokumentation aller in der Ausstellung vertretenen Positionen dar. Vielmehr sollen hierin Texte und Informationen vermittelt werden, welche in der Präsentation nur teilweise Platz gefunden haben oder welche eine Ergänzung der Arbeiten darstellen. Diejenigen Arbeiten, welche nicht explizit erwähnt werden, waren in keiner Weise weniger wichtig für das gesamte Projekt. Die Ausstellung widmete sich der Idee des Modells in Kunst, Wissenschaft und angrenzenden Disziplinen. Dabei stand vor allem eine parallele Betrachtung im Hinblick auf erkenntnisbildende und produktive Fähigkeiten der jeweiligen Darstellungs- und Erzählmodelle im Vordergrund.

Der Unterschiedlichkeit der einzelnen Fachsprachen sollte bewusst Rechnung getragen werden, indem es nicht um einen Dialog der Disziplinen im Sinne einer Interdisziplinarität ging, sondern vielmehr um die vielfältigen Möglichkeiten der Weltbeschreibung, denen nebeneinander gleichermaßen ein jeweils eigenständiger Wahrheitsanspruch eingeräumt wurde. Durch eine nicht wertende parallele Betrachtung unterschiedlicher Modelle sollte eine größere Toleranz verschiedener Wahrheiten ermöglicht werden.

Das Projekt folgte damit der Behauptung des amerikanischen Philosophen Nelson Goodman, dass die Unterscheidung von Kunst und Wissenschaft falsch bewertet werde. Er ist der Ansicht, dass beide Felder gleichermaßen erkenntnisbildend wirken können. Wie er eindrücklich in seinem Buch *Ways of Worldmaking* (1978) formuliert, gibt es keine eine Wahrheit oder Realität, sondern vielmehr eine Vielzahl von Welten, in deren unterschiedlichen Bezugssytemen lediglich etwas als angemessen oder unangemessen bewertet werden kann. »Werke [der Kunst ebenso wie der Wissenschaften] wirken, wenn sie das Sehen in-formieren; informieren nicht dadurch, dass sie Information liefern, sondern das Sehen formieren oder re-formieren oder transformieren; das Sehen nicht als auf okulare Wahrnehmung begrenzt, sondern als Verstehen im Allgemeinen. Auch Werke der Naturwissenschaft wirken ersichtlich in diesem Sinne; und auch die Sammlungen naturwissenschaftlicher Museen und kultur- und naturhistorischer Museen wirken so, ebenfalls die Sammlungen von botanischen und zoologischen Gärten […]. Ich meine, dass die Unterschiede zwischen den Künsten und den Wissenschaften falsch verstanden und überbewertet worden sind; überholte Dichotomien haben sie auf irreführende Weise in Gegensatz zueinander gebracht und sogar zu Antagonismen geführt.«
(Nelson Goodman, *Vom Denken und anderen Dingen*, 1987)

In diesem Sinne präsentierte die Ausstellung unterschiedliche Bild- und Modellentwürfe sowohl aus der Kunst, der Wissenschaft sowie Beispiele »visionärer« Positionen und stellt sie gleichberechtigt nebeneinander. Dabei unterscheiden sich die Sprachen der jeweiligen Modelle und Darstellungen formal und inhaltlich erheblich, aber gleichzeitig beschäftigen sich alle ausgewählten Werke mit komplexen Systemen oder Phänomenen, die meist wissenschaftlichen Ursprungs sind. Sie stellen Versuche dar, die Funktionszusammenhänge physikalischer, künstlerischer, sozialer oder methaphysischer Art mit den Mitteln einer konzentrierten als auch ausschweifenden Darstellung zu erzählen.

So waren Positionen in der Ausstellung vertreten, die naturwissenschaftliche Phänomene, Beschreibungen oder Erkenntnisse als Material und Ausgangspunkt ihrer eigenen Arbeiten wählen (u. a. Kerstin Stoll, Nina Tobien, Ilana Halperin, Edith Dekyndt, Carla Guagliardi), diese aber in eine künstlerische Narration überführen bzw. das Persönliche zu einem Teil der Forschung werden lassen. Ebenso waren wissenschaftliche Modelle und Forscher selber vertreten (Steffen Bohn, Emma Kunz, Friedrich Kiesler) sowie Positionen, die jenseits der Konventionen definierter Disziplinen ein eigenes überbordendes Bild von Weltzusammenhängen formulieren (u. a. Chris Hipkiss, Paul Laffoley). Eine weitere wesentliche Rolle in der Ausstellung spielte die Frage nach der Position des Subjekts im Prozess der Erkenntnissuche (u. a. Michael Pfisterer, Rune Mields, Gitte Villesen) und die Begegnung des Mythischen, Paranormalen und Transzendenten mit der täglichen Realität (u. a. Gyan Panchal und Susan MacWilliam).

Letztere begibt sich mit dokumentarischer Liebe zum Detail und zur einzelnen Person in die Welt der Hellseher, Geisterforscher und Parapsychologen. Hier finden sich Apparaturen, die Objektivität garantieren und Experten, die ihre fundierten Kenntnisse physisch und historisch verankern. Ihr Interesse gilt vor allem den Phänomenen der Wahrnehmung, des Unsichtbaren sowie der Frage nach dem Boden der Realität und den Optionen der Illusion. MacWilliams Protagonisten, die sie filmisch portraitiert, wirken trotz ihrer scheinbar »zweifelhaften« Materie meist sehr geerdet in ihrer Welt, die ihr Fachgebiet ihnen bereitet. Objektivität spielt auch in der Arbeit von Gitte Villesen eine entscheidende Rolle. Allerdings erfährt sie hier eine grundlegende Infragestellung. Vielmehr ist es die Subjektivität, die ständiger Begleiter des Prozesses der wissenschaftlichen »Objektivierung« zu sein scheint. In doppelter Hinsicht schildert sie anhand von Interviews mit Historikern die Schwierigkeit der Objektivität in der historischen Aufarbeitung der Frankfurter Auschwitzprozesse aus den 1960er Jahren, die am Fritz-Bauer-Institut archiviert werden. Ihre Arbeit *authentic. objective.subjective. Or which rules does one follow?* entstand im Rahmen einer Ausstellung des Instituts, zu der sie 2004 eingeladen war. Sowohl in den Ausschwitz-Prozessen selber, die anhand persönlicher Zeugenaussagen ein »sachliches« Urteil über die Naziverbrecher fällen sollten, wird deutlich, dass eine Trennung von subjektiver – zutiefst existenzieller – Erfahrung der Opfer und einer objektiven Schilderung der Sachverhalte eine Unmöglichkeit darstellt. Aber auch die Historiker stehen vor dem Dilemma, ihre eigenen Emotionen, Vorurteile und subjektiven Wertinterpretation beim Auswerten des Originalmaterials nicht ausschalten zu können.

Als der Vergangenheit abgewandt und den Blick bestimmt in die Zukunft gerichtet, können die visionären Positionen von Hermann Finsterlin und Friedrich Kiesler beschrieben werden. Beide lebten zu Anfang des 20. Jahrhunderts und entwickelten Ideen und Entwürfe, die ihrer Zeit weit voraus waren. Der Theosophie nahestehend, entwarf Finsterlin vorwiegend visionäre Architekturskizzen, die von organisch-amorphen Strukturen geprägt waren. Die Idee des Einklangs von Lebensraum, Geist und Bauwerk klingt darin ebenso an, wie ein poetisch-romantisches Streben nach transzendentaler Harmonie und Ganzheitlichkeit. Die Entwürfe scheinen manch' zeitgenössischen Architekturen näher zu stehen, als sie es den avantgardistischen Weggefährten Walther Gropius oder Bruno Taut waren. Mit beiden stand Finsterlin zu Beginn des Jahrhunderts in engem Kontakt, entfernte sich jedoch später zusehends von deren angewandten, rationalen Ideen, die sich in der Entwicklung des Bauhaus manifestierten. Finsterlin favorisierte die Utopie – den nicht realisierten Modell- und Gedankenentwurf – und bereitete damit eine Formensprache in der Architektur vor, die erst über ein halbes Jahrhundert später u. a. durch neue Technologien Analogien in gebauter Form finden sollten. Eine vergleichbar einflussreiche und außergewöhnliche Position stellt zur selben Zeit der österreichisch-amerikanische Designer, Architekt und bildende Künstler Friedrich Kiesler dar. Die Architektur war für ihn nur ein Gebiet im Kanon einer spartenübergreifenden Gestaltungsidee, die er sowohl in Theorie als auch in konkreten Projekten auslotete. Kiesler entwarf visionäre Raumgestaltungen, die sich als exzentrische Ausstellungsarchitektur, zukunftsweisende Bühnenbilder oder in Form einer umfassenden Wahrnehmungsstudie (*Vision Machine*) ausdrückten. Sein Schaffen war einerseits durch die enge und produktive Zusammenarbeit mit den Vertretern der damaligen Avantgarde wie z. B. Karel Čapek, Marcel Duchamp, André Breton und Peggy Guggenheim gekennzeichnet. Andererseits hatte er einen analytischen und Disziplin übergreifenden Ansatz, der geprägt war von der Idee der ständigen Anpassung künstlerisch-gestalterischer Prozesse an die sich verändernden Lebensverhältnisse. Sowohl seine ganzheitliche Anschauung von Gestaltungs- und Wahrnehmungsprozessen, als auch sein Interesse für die Zusammenhänge organischer und technischer Strukturen, welche er in seiner Theorie des »Correalism« beschrieben hat, machen ihn zu einem wichtigen Vordenker im Hinblick auf die Verquickung von Ästhetik, Technik, Natur und Kulturtheorie.

Ebenfalls an ganzheitlichen Zusammenhängen, aber vielmehr im Bereich heilender Kräfte, war die Forscherin Emma Kunz interessiert. Sie lebte zur selben Zeit wie Kiesler und Finsterlin und war – im Gegensatz zu ihnen – ohne akademische Ausbildung zeitlebens als Heilpraktikerin in der ländlichen Schweiz tätig. Seit Ende der 1930er Jahre hat sie eine große Anzahl von streng geometrischen Linienzeichnungen auf Millimeterpapier angefertigt. Sie selbst betrachtete sich nicht als Künstlerin, sondern als Forscherin. Das Pendel diente ihr dabei als Instrument, das auf mannigfaltige Fragen an das Leben und seine geistigen Zusammenhänge Antworten gab. Und so sind die Zeichnungen allein durch den Ausschlag ihres Pendels entstanden, dem sie mit Bleistift, Kreide und Lineal folgte und so ihre Erkenntnisse in bildhafter Form »niederschrieb«. Zur Deutung der einzelnen Zeichnungen ist so gut wie kein schriftliches Zeugnis vorhanden. Jede einzelne Zeichnung stellt dennoch eine Antwort des Pendels auf eine spezifische Frage dar und fügt sich zu einem sinngebenden Ganzen. Als Künstlerin, die heute vorwiegend im Bereich Video und Sound arbeitet, führt Edith Dekyndt das Modell als schlichte Form der Erkenntnis mit seiner gleichzeitigen Möglichkeit zur »Verzauberung« vor. Mit ihren meist sehr einfach produzierten aber gleichzeitig vereinnahmenden Bildern stößt sie bewusst an die Grenzen der Darstellbarkeit technischer Reproduktionsmedien. In einer Zeit, die geprägt ist von visuellem Evidenzbedarf, gibt sie dem visuellen Vermögen moderner Darstellungstechnik ihre Kraft der Magie zurück. Ihre Bilder und Filme erschließen sich weder auf den ersten Blick, noch sind sie von hoher Komplexität gekennzeichnet. Vielmehr loten sie das Verhältnis zwischen Subjektivität und objektiver Faktizität aus. Sie muten wie die Dokumentation einfacher Versuchsanordnungen an, die aber durch ihre ganz eigene Geschwindigkeit eine Loslösung vom scheinbar pragmatischen Anlass erfahren und sich in tautologischen Schleife auflösen.

Den thematischen Anstoß für die Ausstellung hat die Künstlerin Kerstin Stoll mit ihrer eigenen Arbeit geliefert. Sie beschäftigt sich darin mit aktuellen sowie vergangenen Erkenntnissen und Forschungsmodellen der Naturwissenschaften. Dabei stehen häufig die Beschaffenheit von Materie und die Sehnsucht nach einem übergeordneten Willen zur Form- und Sinngebung im Fokus ihrer Auseinandersetzung. Die Recherche und das Experimentieren mit chemisch-physikalischen Prozessen sind ein wichtiger Bestandteil ihrer künstlerischen Praxis. Wobei ihre Arbeit weniger auf Ergebnisse abzielt, sondern häufig in einem performativen Sinne um die Durchführung von Versuchsanordnungen kreist. Die subjektive Erfahrung mit dem Material, seiner Beschaffenheit und Wandelbarkeit hat für sie dieselbe Relevanz wie der Anspruch auf neue Erkenntnisse. Ihr Interesse gilt neuen Perspektiven auf existente oder bereits wieder verworfene Erkenntnisse. Dabei überprüft sie in ihren Experimenten verschiedene Blicke auf Modelle von Welt und setzt inadäquate, subjektive und bildliche Vorstellungsweisen parallel zur Wirklichkeit.

In der Ausstellung wurde versucht, die Grenzen zwischen der bildenden Kunst und den nicht-künstlerischen Praktiken bewusst uneindeutig zu setzen, um einen gleichberechtigten Blick auf die unterschiedlichen Vorstellungswelten, Experimente, Modelle und Utopien zu öffnen. Der temporär genutzte Ausstellungsraum in einer alten Schule bot dafür eine geeignete Umgebung, da er selbst per se nicht als White Cube definiert war. Bei der Auswahl der Arbeiten war sowohl ein hohes Maß eigenständiger Erzählkraft der Werke ausschlaggebend, als auch der nicht von einer klar umgrenzten Disziplin definierte Umgang mit Wissensproduktion. Das Entwickeln formatunabhängiger Ideen und Perspektiven sollte anhand der ausgewählten Exponate nachvollziehbar gemacht werden, um das visionäre und ausschweifende Potenzial von Forschung im Hinblick auf (welt)erklärende Modelle zu beleuchten. Da, wo auch eigenständige, gestalterische und subjektive Prozesse einen Platz in der Produktion von Wissen finden, ist das Interesse der Ausstellung begründet. »Zur Entdeckung von Gesetzen gehört es, sie zu entwerfen. Das Erkennen von Strukturen besteht in hohem Maße darin, sie zu erfinden und aufzuprägen. Begreifen und Schöpfen gehen Hand in Hand.«
(Nelson Goodman, *Weisen der Welterzeugung*, 1978)

Fortsetzung von Seite 5

In studying the history of the science of biology one can find with amazement the lack of observation and systematization of natural phenomena: for twenty centuries after the Greeks, no new theory of natural science came until the appearance of Lamarck and Darwin. The scientific theory of evolution is essentially the product of the last hundred years.
An analogous situation exists in technology, and we need not be surprised that no new theory on the phenomena of design has been forthcoming. Just as the scientists of the Middle Ages thought that horses produced wasps; asses, hornets; and cheese, mice, so modern men think that it is industry which produces the technological environment. In reality, the technological environment is produced by *human needs*: absolute needs and simulated needs.
Of what does this technological environment consist? In its simplest terms, it is made up of a whole system of tools, which man has developed for better control of nature. I use the term »tool« advisedly. It is generally agreed that the difference between a machine and a tool is the power by which it is driven, whether manually or by the forces of man's environment e. g., natural (water) or synthetic (electricity). But this distinction of isolated technological fields must be replaced by an understanding of technological invention as a whole. For the purposes of this analysis, I therefore define »tool« as: *any implement created by man for increased control of nature*. The term »tool« is preferable to the term »machine« because it brings us back to the origin of the machine, and to its ultimate purpose: *enabling man to reach levels of higher productivity*. In this sense, *everything which man uses in his struggle for existence is a tool* and, as such, part of a man-made technological environment, from shirts to shelter, from cannons to poetry, from telephones to painting. No tool exists in isolation. Every technological device is co-real: its existence is conditioned by the flux of man's struggle, hence by its relation to his *total environment.* The persistence of technological environment is marked by constant, if only indirect, infiltration of converted forces embodied in the manufacture of our homes, workshops, transportation shelters, etc. The ratio of fabricated environment to natural environment varies according to the ways in which men make their living. Today, men in urban areas spend about 88% of their time indoors; in suburban areas about 70%; and in rural areas about 43%.

A qualitative classification of tools
But we must keep in mind that the *technological environment affects man's development, and that technology itself follows laws of hereditv in its own development*. We then observe that the principle of heredity also operates in technology. Thus the progressive development of any tool–a knife, a factory, a home – does not follow a straight line any more than does a species of plant or animal. On the contrary, production of any tool in our industrial era seems to develop along three characteristic lines.

The *Standard Type*	developed by absolute need.
The *Variation*	evolved from the Standard Type for auxiliary purposes.
The *Simulated*	springs directly or indirectly from one of the two foregoing types. This third group of products – and it is by far the largest – distinguishes itself from the *Standard* and the *Variation* chiefly by a lack of material efficiency and insignificant changes in design and materials.

Each of these three types has its special fertilization grounds in which it develops. The *Standard* grows out of scientific knowledge. The *Variations* are a natural adaptation of the Standard to specific conditions, and are therefore valid. The *Simulated* product and its temporary survival is only made possible by a lack of knowledge within its social environment. The Simulated are the widest in distribution, the shortest lived, and the most rapidly replaced. The result is a dispersion of energy and a conflict of creative forces whose destructive effect is to slow down the rise of the original standard to higher levels of efficiency.
Adjustments to the basic needs of man require the elimination of the Simulated and control of the Variations. In the readjustment of industry, the forces (man- and machine-power) which are producing the Simulated will be absorbed into the areas of the Standard and its Variations, thus reinforcing their productivity.

Evolution of Need: from deficiency to efficiency
Since nature demonstrates her will toward *mutative continuity*, man's aim seems also to be: *to sustain and prolong life*. By experience he learned that he was unable to do so with the physical equipment which he inherited. He was therefore compelled to extend the powers of his natural equipment to meet the forces of environment. He had to add to his natural equipment, artificial equipment of defense and offense. Tool-making began. *Man's inherent desire for higher productivity* began to find its material expression.
Man, then, builds tools; and from them arises that man-made complex of relationships which we have called the technological environment. But in order to correct the many obvious maladjustments of this environment, it is necessary to ask: What is the nature of its origin? What is a need? How do needs arise? Are they natural or artificial? Are they static or in evolution? A definition of needs has today become of prime importance to the designer of technological environment. *Investigation on this crucial point cannot be based upon the study of architecture but must be based upon the study of man*. Our duty would therefore be to re-define needs, and upon this basis to re-organize the technological environment. The accompanying chart of the evolution of technological needs may help to clarify the problem. [Anm. d. Red.: hier nicht wiedergegeben]
We must keep in mind that science in all its branches is based upon man's deficiencies. The direction of man's creation tends constantly from deficiency to efficiency. The main stages in this recurring development are marked by a rise from one standard of living to another. Sociologists speak of »higher« and »lower« standards, but we can only speak of correalist standards, since concepts of higher and lower are entirely relative.[4]
Needs are not static: they evolve. The intermediary stages of the evolution of needs seem to develop in the following progression:

1. Present standard
2. Standard is absorbed
3. Absorption demonstrates inefficiency
4. Inefficiency leads to observation
5. Observation leads to discovery
6. Discovery leads to invention
7. Invention meets resistance
8. Resistance leads to »projected need«
9. Projected need leads to small-scale production
10. Small-scale production generates promotion
11. Promotion leads to quantity production
12. Quantity production creates need
13. Absolute need becomes new standard

Actual needs are not the direct incentive to technological and socio-economic changes, as is commonly assumed. Needs evolve, and that evolution is based on the nuclear character of the human structure and its environment. [5]

Health is man's ultimate need

The failure of an artificial tool to protect man, leads to impaired physical resistance. His health is unbalanced. If by the power of his tools the re-generation of his de-generated physique fails, man's health declines in a progression from fatigue to death. *The fundamental denominator, therefore, to account for the validity of any technological environment, is man's health*.
Measured by this crucial, all-embracing criterion of health, technology is one of the most powerful factors for preserving man's energy.
Health appears to be that bodily condition in which the various materials and processes that maintain life-activity are in functional equilibrium.
The resistance-capacity of an individual is the degree in which this equilibrium is able to withstand or absorb the impacts of the environment. There are two sets of these factors: external and internal. The external factors belong to the exigencies of the natural environment. The internal factors are psycho-physiological and are intrinsic to the individual.
Health was originally maintained by organic adaptation to environment. Some of these adaptations are essentially functional (digestion, temperature, blood pressure, etc.), or essentially structural (pigmentation, posture, etc.). There are also adaptations to the human environment, as represented by socio-economic relations (state institutions, industry, trade, marriage, etc.).
The concept of health recognizes fatigue as apart of a continuous natural process. Fatigue is normally produced by the expenditure of energy incident to psycho-physiological action (voluntary and involuntary). This expended energy, under normal conditions, is replaced by means of physico-chemical processes in the body. *When the processes of expending and replacement are in proper balance, we may speak of an optimum efficiency. When this is not the case, we have inefficiency, or waste of energy: de-generation*. [6]

Environmental control and the maintenance of health

What are the factors which impair the efficiency of the body? Obviously, maladjustments between the body and some parts of its environment, external or internal. Technological environment can be of vital importance in relieving such maladjustments by *protection against fatigue* (preventive) and by *relief of fatigue* (curative).
Unfortunately, history proves that this technological environment has not always been per se beneficial to man's health: on the contrary. Thus, we come to the second factor: In which direction, then, shall technological environment be developed? Development of industry for industry's sake is worse than art for art's sake. Imperative, therefore, is the control of direction of technological production. What is environmental control? Since the means of control are part of the environment, the term would appear to mean simply control of environment by environment. The term becomes clearer, however, when we remember that environment is threefold: natural, human, and technological. Environment control, then, is control of the human and natural environment through *technological environment*.
But control in relation to what? From the correalist viewpoint there can be only one answer: *in relation to man's health*.
Control of environment becomes, then, control of health: not control of the environment's health, but control of the health of man and society by environment. The proper term will then read: technological control of environment or *environmental control by technology*.
The maintenance or adequate »*management*« of technological environment can have only one purpose: *to maintain the equilibrium of its health*. In turn, the maintenance of the technological environment in proper health can have only one purpose: *the maintenance of the equilibrium of man's health*.

Health, the criterion of building design

Hitherto architecture has been judged from four viewpoints: (1) beauty, (2) durability, (3) practicability, and (4) low cost. But these four factors have never altogether coincided in a single work. If a piece of architecture is not beautiful, it is excused on the ground of being cheap; if not cheap, it is excused as being durable; if not practical, it is perhaps beautiful. It would appear, then, that the only way to resolve these age-old contradictions is to find one criterion which will do for all. *This criterion, in my opinion, can only be health*. The rest may be left to personal idiosyncrasies on the part of the consumers and producers, so long as these do not impair the essential criterion. Thus, architecture, in the future, will not be judged chiefly by its beauty of rhythm, juxtaposition of materials, contemporary style, etc.; it can only be judged by its power to maintain and enhance man's well-being-physical and mental. *Architecture thus becomes a tool for the control of man's health, its de-generation and re-generation*.

»Form follows function« an obsolete design formula

In the early Twenties, there was again much loose talk about functional design. But when we examine the buildings which were then built, and the drawings which were then presented, we find that no new functions had been invented. All that happened was that, by debunking old *décor* and adding new gadgets, new forms had been wrapped around conventional ways of living. No one could define what function was. Worse still: no new building principles adequate to a new idea of environmental order had been conceived.
The problem was posed in the manner of the Scholastics: should function follow form, or form follow function? Architecture was thus saddled with a new version of an old conundrum: which came first, the hen or the egg? What was overlooked was the very essence of the problem: the inter-relation of form and function with *structure* and the fact that, genetically, all three are contained within the protoplasm of thought.
If we abandon the Scholastic approach, the contemporary designer can learn a valuable lesson from the hen and the egg. In 1912, [7] at the Rockefeller Institute for Medical Research, a hen's egg in process of hatching was opened. The developing chick was removed, and the tiny fleck of its heart was cut out. This bit of living tissue was transferred to a solution in a test tube. There, protected from germs, poisons, heat, and cold and provided with a never-failing supply of oxygen, sugar, and other nutrients, it lived and flourished far better than the heart cells in any living chick ever did.
This experiment confirms the view that, while life comes only from life, it is also dependent on its technological environment. By changing the physical environment, life may be quickened and increased, retarded or destroyed. [8]
What was done for the bit of living tissue at the Rockefeller Institute, experimenters have not yet been able to accomplish for the animal as a whole. But the experiment indicates that a planned chemical environment can be as beneficial for man as for other animals; equally important for man is a properly planned technological environment.

The question investigated in connection with the chick's heart is: at what point and by what means does inanimate matter pass over and become alive? »To find that bridge between nature and man has become the grand quest of science.« Similarly, finding the bridge between man and artificial, man-built, technological environment must become the grand quest of future building design.

New definition of function

We must examine what function has meant, and what function will come to mean in the future, as it concerns the designer.
We cannot conceive of function as something static, else growth would cease. The inter-action of environment and man, and the evolution of that inter-action to new possibilities, is not a direct result of environment. It is rather the development by environment of something which was *already inherent physiologically in the organism*.
Function depends not only on natural environment, but also on artificial environment. If functional design depended on the status quo of man, it could never develop. It would take care only of man's traditional aspects. But man's evolution has proven that changing environment increases or decreases man's potentialities. Technological environment, being apart of the complex of environmental forces, must consciously contribute to the extraction and development of man's inherent possibilities into a higher order. What these possibilities are depends on the designer's ability to envision and realize them. [9]
Any form is incomplete in itself: it is identified by what it emanates, visibly or invisibly, voluntarily or involuntarily. The new designer will therefore define function as: a specific nucleus to actions. It is erroneous to suppose that form follows function. This concept must be replaced by the proper progression of: (1) structure, (2) function, (3) form. All functions and all forms are contained in the structure.

Defining design and Biotechnique

As in the case of electricity, a polarization creates a nucleus of relationships. These relationships are latent potentialities for further development. In this respect, *all possible needs of man are ever-present, but it is only by the demands of the special environmental stimuli that the specific need is brought to the fore*.
Thus it appears that not only is the formula »form follows function« inadequate; the »functional design« based on that formula is likewise inadequate. The term »design« must be re-defined. Since the building designer deals with forces, not objects, design is therefore, in my definition, *not the circumscription of a solid but a deliberate polarization of natural forces towards a specific human purpose*.
Such a science of design I have called BIOTECHNIQUE [10] because it is the *special skill of man which he has developed to influence life in a desired direction*. Biotechnics, a term which Sir Patric Geddes has employed, can be used only in speaking of nature's method of building, not of man's. There can be no inter-change of these two methods, because nature and man build on two different principles: *nature builds by cell division with the aim of continuity*; man can only build by *joining parts together into a unique structure without continuity*. Nevertheless, man-made joinings are ultimately controlled not by man but by nature. The process of disruption through natural forces becomes imminent from the very moment of joining parts.
Building design must, therefore, aim at the reduction of joints, making for higher resistance, higher rigidity, easier maintenance, lower costs. Such considerations led me to develop *Continuous Construction*. [11]

The more man recognizes his limitations in building »for a lifetime« the more valid is his structure. As a biologist has said: »We doubt that an engine might be conceived to which we might bear witness that, after we might have broken it into a hundred pieces, it would reform immediately into a hundred single complete engines. But take that graceful animal, the fresh-water polyp, that is found attached to water lilies in the pond, and cut it into pieces: tomorrow you will find that each piece has become a complete polyp.«
The new designer will learn to understand the methods by which nature builds to meet her purposes (biotechnics): but he will not imitate her methods. He will draw the necessary conclusion from the disaster which befell London's Crystal Palace. [12]
The Biotechnical approach tries to develop the possibilities of specific actions contained in any nucleus of human physiology. These potentialities remain at first undiscovered. Only with time are they individually or collectively developed until finally they are consciously demanded. The result will be entirely *new functions* within the old framework of what was considered »human nature« sustained by inventions.

The objective: minimum biotechnical standards

The two approaches – biotechnical and functional – develop from unlike sources and lead to unlike results. On the one hand, functional design derives from the traditional behavior of any tool; on the other hand, biotechnical design derives from the evolutionary potentialities of man. Functional design develops an object. Biotechnical design develops the human being. Functional design is oscillating. Biotechnical design is inventive. A functional object is inert. A biotechnical object is re-active. The biotechnican emerges as an important factor in the evolution of society toward a higher standard of living through the control of elements of fatigue and forces of re-generation. This leads to the discovery that no part of the human body is mono-functional; rather, each minute detail is again of nuclear make-up with corollary functions. [13]
Such development can be furthered by the biotechnician who formulates and helps to realize a biotechnical minimum standard. Such a *biotechnical minimum standard* must be based on Correalism and not on mere architectural derivations, which tend to house lower-income groups in dwarf reproductions of giant villas. *The biotechnical minimum standard is that technological environment of home, workplace, and their corollaries which meets the optimum needs of man's health*.
Every object that meets a need is living: it is only dead when it ceases to meet a need or when the need itself disappears. Anything of nature's creation which fulfills a need is a living organism. Similarly, every creation of man's technology is a living organism, whether it be a pillbox, a house, or a motor. Since the criterion of life is activization, we assume that a man no longer active is dead. By analogy we assume that because an object does not express itself in visible activity, it also is dead. Here our judgment is determined by the limitations of our senses; for, as a matter of fact, when an object moves (a moving locomotive, a flashing electric bulb) we automatically say: it is alive. Conversely, when an object does not move, we automatically assume: it is dead. Our assumption of what is alive or dead is chiefly the result of optical observation. But this nerve center is »short-sighted.« With a microscope we can see that a dead piece of cheese is very much alive. The revision of our judgments as to what is »alive« or »dead« must, for the time being, depend solely upon a more profound observation of facts.

Architecture: generator and de-generator of human energy
The floor on which one walks, the chair on which one sits, the bed on which one rests, the wall that protects, the roof that shelters, and all other units of the man-built environment are significant for what they are: but they also possess nuclear multiple-force. It is commonly assumed that these are dead objects; actually they represent an interplay of action with one another and with nature. They are a constant exchange of anabolic and catabolic forces within themselves, and in their coordination with human beings, and through human beings with themselves again, they constitute high potential energy centers. The modern physicist speaks of constant bombardment of the earth by invisible cosmic rays, of radiation and radioactive elements which cannot be seen or felt, but which, in time, can exert a deadly or beneficent effect upon all life. *This is equally true of the »inter-stellar« organization of a house, a town, or a city*. But here the forces at work are composed not only of animate and inanimate matter, but also of artificial technological bodies.

Biotechnique as a force of re-generation
The orbit, region, and scope of the activity of technological bodies (be they houses, machinery, or any other tool) are the objectives of the future biotechnician. He will find that any structure he builds is *worth only as much as the ratio of its force of re-generation*.
Despite the imperative need for health-yielding technological tools, obsolete manufacture clutters the market.[14] As far as the building designer is concerned, his contribution to halting such anti-social types of production will be the constant use of the biotechnical approach.
The biotechnical approach has led me to the *evolutionary method of design which, instead of taking its departure from prevailing commodities, employs the study of general physiotechnics*. This enables the biotechnician to avoid giving a mere narrative survey of phenomena, and – on the basis of a genetic account of an unfolding process – to create the necessary need-service. The Mobile-Home-Library represents a test of the validity of biotechnical design. The storing of books in the home was chosen as an objective
for the first laboratory test because: (1) it is a need in every family's home, and (2) it has become so standardized in the form of a »bookcase« that its re-design seemed at the beginning a wasteful undertaking. The Mobile-Home-Library thus constitutes a documentation for this general statement: *Functionalism shifts the strain from the technological tool to the human being: but, here, biotechnique shifts the strain from the human being to the tool*.

* ***On Correalism and Biotechnique.***
A Definition and Test of a New Approach to Building Design,
Fredrich Kiesler, erschienen in: *Architectural Record*, 86/3, September 1939. Der Text ist in der Originalausgabe mit zahlreichen Abbildungen versehen, auf die im Text verwiesen wird. Aus redaktionellen Gründen sind in dem vorliegenden Abdruck die Bildverweise nicht wiedergegeben.

1 In an earlier manuscript of Mr. Kiesler's (»From Architecture to Life«, for Brewer, Warren and Putnam, 1930) the groundwork of this paper was laid; it was first read in approximately its present form at a Symposium on Science and Design held by the Alumnæ Assocaition of the Massachusetts Institute of Technology, June 6, 1938; this is its first appearance in print.-Ed.
2 See Index [Anm. d. Red.: hier nicht wiedergegeben]
3 The part of Darwin's theory which stated that »acquired characteristics are inheritable« has been disproven. (August Weissmann, 1880.) Thomas H. Morgan: »... the belief in the inheritance of acquired characteristics is not based on scientific evidence but on the very human desire to pass on one's acquisitions to one's children.«
4 PROGRESS OF TOOLS RELATIVE TO TIME STRATUM: There is no abstract technological progress. Each stratum of the social development in man's history has produced its own tools to deal with various old and new forces. Each new environment creates new varieties or new standard types of tools which lose their validity if applied backward or forward in history.
5 Examples of nuclear production in industry: corn, subjected to mechanical and chemical treatment, also yields starch, dextrin, glucose, oils, feeds, and other valuable by-products. The hulls of oats yield furfural, a valuable starting point for chemical synthesis. Waste sugar cane, from which the sugar has bean extracted, forms the raw material for making wall-board and insulation. Saw mill wastes are converted into building materials. Similarly, carbon is the nuclear factor for many products: we encounter it in our heating arrangements in the form of coke, charcoal, and coal; we use it in our pencils as graphite, etc.
6 FATIGUE–Fatigue may arise in: (1) the central nervous system, (2) the muscular system, (3) in both combined. »Fatigue may be subjective as experienced by the worker or objective as noted in his actions end output. From a thorough consideration of the literature it is quite evident that a vast amount of emphasis has been laid upon the mechanical or extrinsic factors influencing the working capacity while the multiplicity of original physical and mental states that may limit the working capacity have become almost wholly neglected.« From WASTE IN INDUSTRY, published by Federated American Engineering Societies, Washington, D.C.
7 From W. Gray.
8 Jickeli (1902) and Carrel (1912) put forward the hypothesis and finally experimental proof that aging (and death) result from imperfect metabolism within the cell and the subsequent clogging of the cytoplasm with injurious waste. Carrel has shown clearly (tissue-work) a relative potential immortality of the cell, and at the same time its subordination to the fate of the whole organism.
9 In attitudes toward the technological environment, we observe three tendencies as to morphological principle: (a) the functional or synthetic, (b) the formal or transcendental, (c) the mechanical-materialist or disintegrative. The mechanical-materialist attitude is not distinctively biological, but is common to nearly all fields of thought. (It dates back to the Greek atomists. The self-deceiving triumph of mechanistic science in the nineteenth century led many to accept mechanical materialism as the only possible scientific method.) Even in biology, but especially in design, it is more akin to the formal than the functional attitude.
10 The term »biotechnique« appeared first in my treatise of »Town Planning,« as »Vitalbau« in »De Stijl« No. 10/11, Paris 1925, and in America first in »Hound and Horn,« May 1934. After that the term »biotechnic,« appeared in writings of other authors, not the term biotechnique. See also Arch. Forum Dec. 1932, for biotechnical design of my plans for a Community Center, Woodstock, N. Y.
11 Not actually formulated until my plans of The Endless were exhibited in Paris, 1925, and New York, 1933 (left). View of my Space-House (New York, 1933) showing first continuous construction in shelter design and also continuous window framing (right). See Architectural Record 1930 and 1934.
12 That structure was built in 1851 by Paxton in imitation of the structural principles of the African water lily's foliage, with its longitudinal and transverse girders. This was an essentially romantic attempt to fashion a men-built structure by literal application of nature's design principles. The collapse of the Crystal Palace (1936) was inevitable. (The fireproofing of buildings – then as now – is far more important than the pursuit of »new forms«)
13 J. R. de la H. Marett: RACE, SEX, AND ENVIRONMENT. Hutchinson's Scientific and Technical Publiciltions, London, I936: Page 127: Not only the evolution of the erect attitude, but also the expansion of the brain and skull, and the loss of body hair, are all viewed as the results of atavistic, and probably rapid, reactions to mineral-deficiency. A single relatively short period of severe iodine-shortage is thought to have precipitated the large anatomical change from ape to man.
14 WASTE IN INDUSTRY. By the Committee on Elimination of Waste in Industry of the Federated American Engineering Societies, Washington, D. C., 1921.

Impressum

This catalogue is published on the occasion
of the exhibition *We Make Versions*
at Westfälischer Kunstverein,
October 8 – December 23, 2011.
Dieser Katalog erscheint anlässlich der Ausstellung
We Make Versions im Westfälischen Kunstverein,
8. Oktober – 23. Dezember 2011.

Curated by / kuratiert von
Katja Schroeder und Kerstin Stoll

Herausgeber / Editor
Katja Schroeder

Texte / texts
Steffen Bohn
Ilana Halperin
Friedrich Kiesler
Lotte Møller
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Bruno Taut

Design / Konzept
Michael Pfisterer, Kerstin Stoll

Fotos
Michael Pfisterer,
wenn nicht anders angegeben

Print / Druck
Laserline Berlin

ISBN 978-3-925047-53-4

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Acknowledgement / Dank
to the lenders / an die Leihgeber
Österreichische Lillian und Friedrich Kiesler Privatstiftung, Wien
Aargauer Kunsthaus, Aarau
Galerie Susanne Zander, Köln
F. R., Köln
LWL-Landesmuseum für Kunst und Kulturgeschichte, Münster
Galerie Karin Guenther, Hamburg
Kent Fine Art Gallery, New York
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Galerie m, Bochum
Ancient & Modern, London

to the artist / an die Künstler
Steffen Bohn, Edith Dekyndt, Carla Guagliardi, Ilana Halperin, Chris Hipkiss, Paul Laffoley, Susan MacWilliam, Rune Mields, Gyan Panchal, Michael Pfisterer, Kerstin Stoll, Nina Tobien, Gitte Viellesen

Thank You / Danke
Beate Holtmann, Jutta Tholen, Claudia Musolff, Dr. Tanja Pirsig-Marshall, Team Herr Müller, Marion Thomma, Monika Pessler, Tatjana Okresek, Dr. Thomas Schmutz, Jan Biermann, Nicole Delmes, Douglas K. Walla, Katja Bürkle, Christine Lemke, Daniela Lehmann Carrasco, Jelka Plate, Eike Böttcher, Ingrid Jäger, Bernhard Mielke, Dr. Anna Lammers, Dr. Claudia Blümle, Stephan Mörsch, Susanne Schröder, Inga Krüger, Margarete Rippel, Geelke Gaycken, Heinz Fischer, Ingrid Dohnhauser, Stephan Brunnert, Anna Sabrina Schmid, Tono Dreßen, Amir Kazemloo, Glashütte Zwiesel

Die Ausstellung wurde freundlich gefördert von
Ministerium für Familie, Kinder, Jugend, Kultur und Sport des Landes Nordrhein-Westfalen,
Stadt Münster und Kulturamt der Stadt Münster,
Pro Helvetia Schweizer Kulturstiftung,
Danish Arts Council Committee for Visual Arts und der Firma Walbaum

Der Westfälische Kunstverein wird gefördert vom Landschaftsverband Westfalen-Lippe und der Stadt Münster

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