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The Product System

by

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Dissertation for PhD research in Industrial Design,
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VOLUME CONTAINS CLEAR OVERLAYS

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Objects help make us who we are. Making and designing are moments of making and designing ourselves. (Clive Dilnot, *Ideas*, I.D. magazine, December 1992, New York, page 37).

It was some years ago after practising as an industrial designer that I experienced the power of design to convey meanings through the coordinated use of attributes which materialised out of a diversity of manufacturing processes. I was fascinated by the fact that a piece of transformed material, a curve or the enhancement of a product displayed in a shop could so strongly attract the attention of a viewer. I was puzzled by the ability of certain designers to trigger evident or obscure connotations by the complexity of the shapes of their designs. Objects have the ability to define groups of people or personalities by unconscious criteria. I observed how objects can influence cultures and nationalities and we find ourselves influenced and limited by their appearance, function and value. Can we say that designed objects function only as commodities or as marks of economic wellbeing?

At the beginning of this investigation my intention was to bring some answers to general questions like this. I realised that my research would involve investigating the most recondite accounts of philosophy, sociology and the theory of knowledge. I had to start from the very foundations of the complex act of understanding and, in order to organise all the different concepts, the research is constructed from three main sections. I will present a series of original contributions.

I consider the *meaning of things* as a suitable basis for understanding the three-dimensional world. In my research, I have made the basic assumption that the meaning of the object lies within it and that the designer enables the object to support certain formal actions. Meaning in objects has to represent various philosophical, epistemological, sociological, linguistic and semiotic theoretical dilemmas. As a result of this, in the first section the meaning of objects is presented in various ways, the first chapter supporting a classification of contextual meanings. Starting from the most elementary ones, such as visual perception to more complex ones, such as history, my intention is to gather in the same research all possible major contexts in which the meaning of an object can be found. The most basic mechanisms of thought have similar connections to the meaning of things. This is a notion that is constantly elaborated in various segments of the research.

The application of semiotics to the Product System constitutes the beginning of a methodology which reveals the *reality* and *fantasy* of the designed object. It summarises questions that arise in the first chapter and leads to the application of a methodology in the second chapter. I also propose the use of semiotics as a means of bridging the gap between those realms of *reality* and *fantasy* in the object and of being a basis for considering the designed object as a semiotic entity. The sign exists in reality with a shape. It exists in our minds without a real tangible definition, without a form. But it can also create a potential correspondence between the word and its formal representation. Yet, all context of meaning is favoured by the use of language. The bridge I am referring to is mainly concerned with a basic duality that also refers to those elementary mental processes. In different ways, this duality is carried

throughout the whole research and becomes the main nexus between different theoretical domains. One of the most important challenges in the first section is to demonstrate first, that the realms of Language and Epistemology are close enough to give an understanding of design as a means for formal argumentation and semiotic signification and second, that this is thanks to the direct application of semiotics.

The second section supports this viewpoint by understanding every single element of the designed object as a significant element which complies with semiotic theory. The application of semiotic theory *in praxis* will be assisted by the findings of two important researchers, and will help me to suggest a possible methodology for the creation of signification in the elements of a product. The production of a checklist to assist this more graphically will develop into another method for efficient design criticism.

The immediate contribution in the second section is that the constituent elements of the designed object support an unlimited amount of fragmented signification. As if it was a text, the object is a composition of visual arguments that are constructed and related with the original application of several mechanisms. This correspondence can be understood by seeing the designed object as *writing*. The *form of writing* in design is associated with the phenomenon of *deconstruction* as a source for dramatic formal expression. Similarly, the Product System aims to see the discourse as a gathering of fragments or meaningful visual statements but, unlike the deconstruction, the product System does not see the form as more important than the content. Neither form nor content should react against each other. This view will be supported by rhetoric theory. Writing and reading of the designed object are two elements that precede to the emergence of rhetorics and the third chapter of my study. This also makes a direct analogy between the written discourse and the visual discourse through the process of design.

In structuring my research I have felt it necessary to be essentially demonstrative rather than argumentative. Hence, in each chapter a case study is used as a practical example of the application of theory. In the first chapter I have chosen personal computers which function and influence in the society of the late XXth century and are likely to have an even stronger influence in the XXIst century. Personal computers have entered most homes in industrialised societies and this has an important effect not only economically but also sociologically and behaviourally. Computers manufacturers may not have fully considered the impact in the environment: their size in the surrounding space, the user or their own image.

While effects which are concerned with economy, marketing, technology and ergonomics may be matters for other research, this study will take into account issues such as history, identity, visual perception and theories of form. The first chapter is a structured study of these issues. The second chapter makes strong use of the case study in order to "slice" the product into semiotic elements and demonstrate that the object is a sign. It also addresses the application of the logic of semantics, syntax and pragmatics in a manner which develops into a method for creative design. The earlier positivist, structuralist thinking matures into a post-structuralist view that marks a breach between the search for *causation* of meaning and the *form* in discourse. Previous concerns

for causation are overcome and my investigation matures and becomes more of an objective explanation of how meanings and forms group together and what happens when they interact.

This leads directly to the introduction of rhetoric theory, its mechanism and the concepts in the third chapter. The importance of this section lies in the fact that rhetoric is the ancient art of persuasion in discourse. This is thanks to a number of rhetoric figures extracted from different researches. The main issue is to apply this theory directly to design. The novelty lies in the combination of previous findings in the earlier sections to develop a complete formal argumentation based entirely on the idea of understanding the object as a visual discourse.

Out of this develops an ideology for the creation of true visual discourses. The structure of this thesis will help the reader to understand the progression towards the design of three products based on the chapter one case study in order to demonstrate the effectiveness of my new design methodology. This methodology is imbued with a strong sense of ideology because the Product System seeks to provide clues to creating designed objects and to provide knowledge and awareness of the inner processes involved in learning about, understanding and giving form to three-dimensional objects. My aim has been to raise the level of consciousness about these issues and about the intricate intellectual and perceptual processes involved in creativity. The Product System teaches about the working of the profession of design and suggests a new approach and attitude for creating more communicative objects for society.

Making and designing can become moments of making and designing ourselves. This is why the title of my thesis has been inspired by Roland Barthes. The Product System combines a range of different influences or agents which are always present in a designed object but which have tended to have an unconscious existence.

CHAPTER ONE: THE THREE DIMENSIONAL WORLD

Introduction

I wish to propose a general question around which a great part of the research revolves: *what processes are involved in the conceptualisation of products?* In addition, what allows the object to support shapes in a way that we are able to interpret the most inner feelings of a designer? We will see in the course of this research that these questions are complemented with concepts and substituted by more specific questions. With these questions, my intention is to propose different approaches to the creation of objects and to observe their incidence in human cognition. They will allow me to express a diversity of answers which, ultimately, will lead to investigating the meaning of the objects.

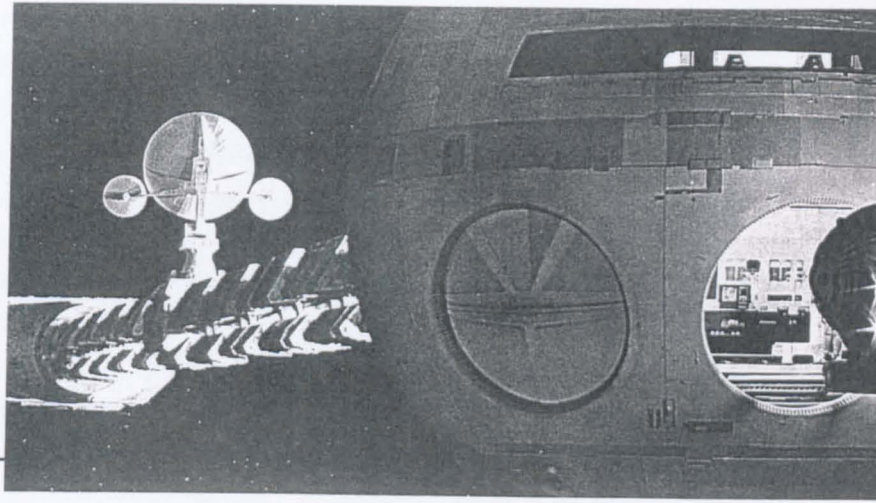
Even from the very beginning, the fact of existence was not enough for our ancestors' state of mind. They imagined that there could exist something more than material in the objects they produced from surrounding nature^{1&2}. We understand the existence of our *touchable* world through things which are created from nature. A vivid interpretation of the relationship between the object and nature is exemplified in S. Kubrick's *2001: Space Odyssey*³. As the film very expressively suggests, the images of the australo-pithecus community recreates a possible structuring of an embryonic stage of development of the brain. Dealing recklessly with the first hammer-bone of history (fig. 1) they discovered the precarious function of hitting.

But the discovery of function was only a step in the chain of events of developing humanity. The film also illustrates the notion of *Homo Faber*⁴ and makes analogies of the bone as a manned space station through the construction of the object (fig. 2). In this sense and not surprisingly, there are common aspects between the activities of the craftsman and the designer.

Finally, the monolithic representation in the same film of an intangible, perfect entity whence everything begins and returns is certainly a metaphor for that interest in divinity. In this sense, the monolith (purposefully represented by the geometric figure of a pure rectangle⁵) is again used to represent the unknowable, the untouchable and ultimately, the perfect. How do we enable things to reach higher peaks of understanding? Can intangible notions, concepts or ideas be represented through the objects surrounding us? One thing is true: we have traditionally used objects and we are used by them to reach for understanding through icons, idols or symbols.

This introduction of the object as something more tangible than its natural or artificial composition leads us to believe that the creation of objects, is understood somewhat irrationally. Formerly it was certainly a matter of spirituality when craftsmen managed more closely than actually the relationship between Nature and Man, ultimately God and Man. This spirituality was promulgated in Architecture and Crafts (fig. 3) by people like John Ruskin, William Morris⁶ and more recently, Kandinsky⁷ in modern art. But, with the industrial revolution and the progression of positivism in the sciences, the bridges between the intangible and the objects that

Figs., 1, 2



Images of the film 2001, an Odyssey in space The image of the space station as a bone is directly associated to the image of the australopithecus crushing bones with an elementary tool in the same film.

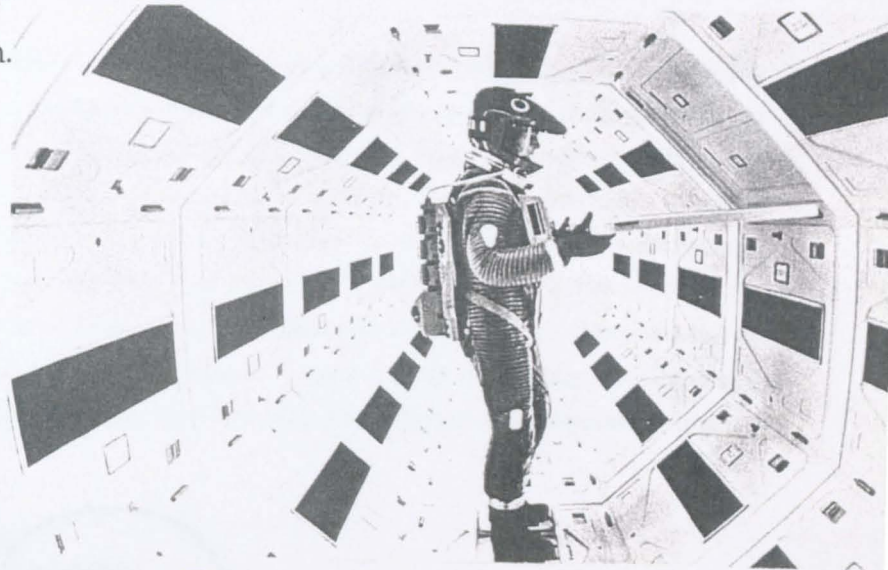


Fig. 3

The Arts & Crafts movement reacted against the industrial revolution



physically symbolised it were destroyed (we note that Zen culture has avoided this⁸). The object mass produced loses its identity to a certain extent. An identity that was conferred by the craftsmen has now been supplanted by the machine. The object has little more identity than the one that the machine aesthetic⁹ provided.

In relation to the spiritual or metaphysical in objects, two questions require investigation: are the non-objects related, evoked by or dependent on objects? If so, what is the degree of interactivity between objects and the structures of mind that make them possible and are enabled by them? I will try to answer these questions, allowing for a probable supremacy of the tangible aspect of things over their intangibility.

Objects are considered as the outcome of the activity of the mind and they serve to recall and reshape these mental processes. At this stage, it is difficult to state what comes first. The mental activity that produces objects or the objects themselves that, throughout the history of the first man made tool, have helped us to develop our senses in the surrounding environment. The first approach comes from the experience we have about things.

The work of Janet Daley¹⁰ introduces to us an argument which is contrasted with Hume and the theories of Solipsism in which experience of things is directed to an absolute criterion of knowledge. In contrast, cartesian rationalism knowledge is a product of reason while experience is a source of confusion. Her argument seeks to adapt from Kant some notions from *Prolegomena*, pointing out that: *perception is not a passive process with mind as a pure receptor but an active process in which the mind is an agent*¹¹. The structuring of a world of objects through experience is, then, central to human knowledge and understanding, an act of mind (fig. 4). Perception or experience and its subsequent intelligibility are two activities interrelated and dependent one on the other.

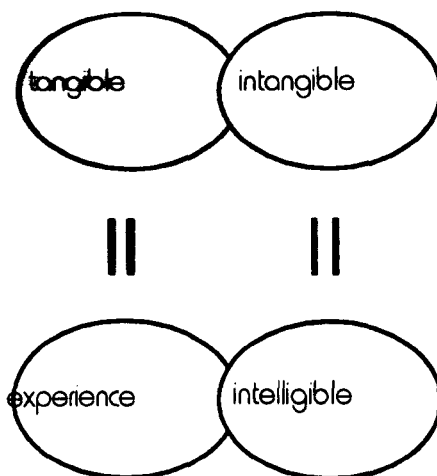


Fig.4: Kant's duality in human cognition is associated to the world of objects

In the same investigation, Kant suggests that our innate cognition is limited by our ability to construe a reality of continuous objects. The structures of mind help us to build up certain schemata that allocate the meaning of things. These are the same

structures that started by discovering simple functions and developed into more complex ones. Therefore, it is feasible to believe that experience is very important in the development of intelligence. According to Kant, this is because of two main activities: sense experience and sense intelligibility. The duality of this mental framework in which both senses act together and inseparably is the most suitable basis to explain the creation of objects. I will refer later to this explanation and will endeavour to interpret it as a struggle to merge the material, the experienced with the immaterial or ideological. In this sense, the systems of thought are intuitive, unconstrained and wild¹². But it becomes clear that these two main activities, perhaps after centuries and centuries of intensive training, are harmonised unconsciously in our minds.

When we are too used to touching things, to reacting against or according to preconceived behaviour or when we are constantly learning through proof-and-error activities, we do not realise that a whole structuring mechanism is set up from the early stages of our lives. What we experience from things sooner or later becomes intelligible. It is therefore quite feasible to incorporate into this transformation of senses the notion of meaning.

The meaning of things

Meaning has been one of the polemic concepts that, inescapably, has not been clearly defined, because to do so would be as intricate as to demonstrate the idea of God. But we still understand that the world has meaning to us and, according to Krippendorf¹³, this arises as soon as we interact with things.

If this is true, any object would serve to start a possible research of meanings. What is the meaning of an Apple computer¹⁴ (fig. 5)? I have offered the computer as a subject for research because an object such as this offers the reader multiple and varied interpretations. The amount of technology involved in its production and the connotations of the machine provides the opportunity to show the complex undertaking of joining materiality and immateriality. In addition, it will allow me to examine a family of past computers and other related concepts such as corporate image or product strategy.

Thus, the premise of the research starts from the question: what is the meaning of an Apple Classic computer? The answers will be more concerned with the previously mentioned duality of thinking. The sense experienced and the sense intelligibility or the tangible aspect of the meaning versus the intangible character of the object. A similar approach will be developed throughout the research, not only to define the meaning of this computer but to reinterpret a possible new role in design activity. The starting point of the research is to outline the possible major contexts of meaning that the case study may refer to. With a survey of a number of major contexts of meaning I intend to evaluate the meaningful aspect of the case study.

The tangible aspect of meaning: Topography and development

Is the meaning of an Apple Classic a matter of topography? As geologists considered the surface of the earth a matter of topographical knowledge the

topography of the object is analogous to a geography of the object. Studies of child development show that the activity of touch was predominant prior to visual perception¹⁵. The physical activity of touch gives us the first sensation of the material world. Therefore, touch allows us to understand the world through the sense experience rather than the sense intelligible. Sense experience is predominant thanks to the activity of touch. Ralph William Pickford¹⁶ ascribed the name of "haptic" to this action. He affirmed that we inherited this early activity of our development but that it was soon constrained by visual perception. The sense of touch is very important in the activity of the perception of objects. It is a subject that is frequently neglected.



Fig. 5

Apple Classic 1992, designed in-house by Robert Brunner, Larry Barber and Daniele

Notwithstanding this, the untouchable is still considered closer to the intangible than ever. In this sense, we know that emperors could not be touched¹⁷, because to do so could cross the boundaries of what was divine and supernatural. The untouchable, with the progress of technology and the development of the consumerist society, is materialised in other terms. In a simplistic way, the influence of untouchable things is expressed, for instance, with economically unreachable goods. It is revealing that many shops *punish* us with "do not touch" labels on some shelves. Similarly, who dares to finger a shiny and impressive red Italian car? In a way, we experience that the touchable is reaffirmed by the untouchable.

Perhaps it is arguable that, in the progress of the consumer society less effort has been put into the durability of products resulting in built-in-obsolescence that has affected, among other things the durability and the strength of materials. The focus has been on the production of economical objects, which is the essence of the consumer society. The contrast, then, is that users are not encouraged to use a product too much in case its life is shortened. This confirms that the predominance of visual aesthetics has largely restrained the former experience of the quality and pleasure of touch and sensitivity.

The term "haptic" is not just concerned with touch but with the structuring of our sense experience. We see that the first steps to complementing the senses in order for them to become intelligible were appraised by Ralph William Pickford¹⁸ through four relevant principles: a) the perceived is dependent on the kind and amount of activity; b) this is emotionally toned; c) the whole is the sum of the addition of parts and d) experiencers tend to form symbols of attributes.

I will try to follow these four principles by exploring, with the help of haptic perception, the external qualities that our case study offers. As the first principle says, we could spend a certain amount of time in touching. But could the sensibility be overridden after a certain amount of time as when we spend several hours looking at hundreds of pictures in a museum? Obviously, the more time we spend the more information we accumulate. But to what purpose? We could deduce, therefore, that perception in this case is not a matter of quantity but of quality. When we move to the second emotionally toned principle we start a possible unconstrained path to an unknown route of perception, discovering textures, depressions, edges, etc. It is because we have already acquired categories of texture and warmth from the very beginning of our contact with our mother's breasts that we start having some sort of unconscious criteria when we experience any kind of texture. These categories are also referred to the proof-through-test behaviour we develop from our learning activity and we are constantly reminded that, for instance, a sharp edge can cut, or that an edge can have other historical and socially contextual meanings¹⁹.

According to the following principle, the whole is a sum of the parts. Step by step we link perceived parts and we build up a three dimensional scheme. This activity has, as others do not, the characteristic of having no hierarchy in the order of experience at all as it happens in a film, for instance, except the one dependent on gravity. Under the fourth principle we symbolise through mental associations what we touch: hole, edge,

warm-cold, plastic-metal, texture, round, flat, *ad infinitum*. This represents the first step to form categories of perceived attributes and to experience the use of Language.

According to Ralph William Pickford this complex and taken for granted motor activity is totally disregarded in the education of children. It is mastered by those who suffer from blindness and it is a very remarkable epitome of expressionist art. Perhaps a characteristic of current aesthetics is the rediscovery of the haptic after the long domination of the study of the visual over the superficial. In contrast, the surface is treated not as a description of form but as a topography where our senses find a material response. This is broadly experienced in modern art.

The reader will have noticed that the list of aspects of meanings has started from the very early activity of the recently born child (or even pre-birth). As our senses mature, the list of contexts of meaning undergo a similar development. Step by step, this innate activity of arriving at our meaningful world is enriched by some factors that sooner or later overlap. To know them is something that is basic not only to assisting the creation of objects or to framing the meaning of an object but to also to allowing us to know ourselves. It is implied, therefore, that the teaching of these activities should be considered crucial for the development of children, not to mention the teaching of design. Topography is a fundamental step which has been traditionally disregarded. Topography and development may be the clue to achieving true interaction from objects, structuring the three dimensional world, relying on textures, experiencing warmth in surfaces and to recreate, with the help of technology, new topographical patterns.

The tangible aspect of meaning: Visual perception.

All too soon the haptic experience is superseded by the visual activity of our eyes. As soon as we learn to focus our eyes, what we haptically perceived is given a visual continuity, a contour. How are the external attributes of the computer understood? Is the meaning of every haptically perceived part of the object just the projected form of its external, superficial attributes?

Gestalt theorists tried to give an answer to the perception of the natural and tangible forms of the environment by visual perception theories alone²⁰. The second law of Gestalt visual perception is the phenomenon of Isomorphism²¹: *The dynamic events that occur in a physical configuration such as a physical form, are paralleled by the dynamic events of the brain and in perception. Thus, if physical phenomena show configuration, so should the brain.* The form is a projected form. Visual perception of attributes is not ruled by Isomorphism alone. Gestalt found several golden rules in which the perceived dynamic forms of our mind had a much more complex behaviour and outcomes. Under these laws, Gestalt explained the relationships and the ensuing natural human response from them.

The principles of simplicity²² concealed a whole world of shapes and attributes through its basic and pure geometric formal representation. With simplicity the viewer finds himself visually and, ultimately, psychologically more relaxed. Gestalt investigators asserted that a form tends always to become as *good* as possible²³, i.e. as simple, symmetric and regular as possible. Existing electrical fields outside the

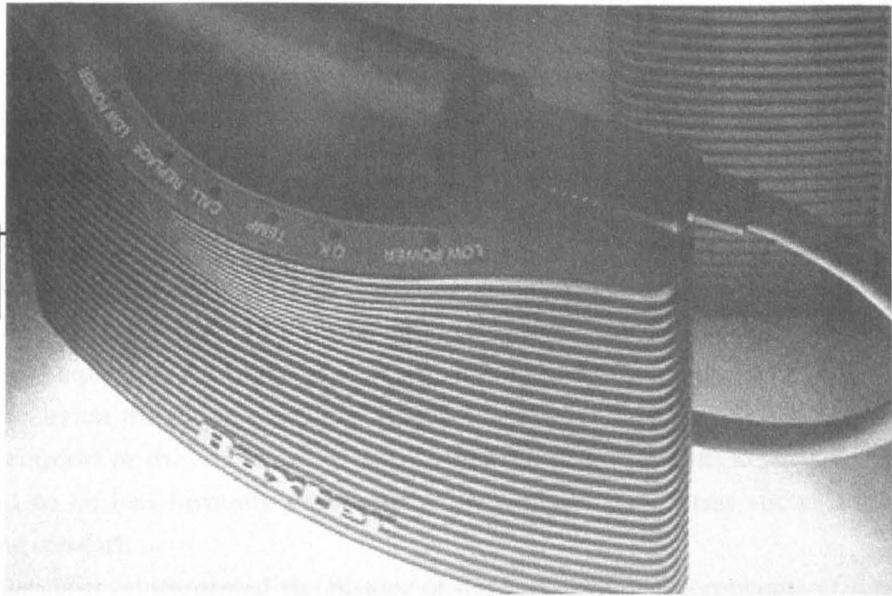
organism were directly related to such tendency. It is implied, as well, that if a form is not *good* it tends to become better by turning complexity into simplicity or asymmetric into symmetric, formally uninterrupted and so on. It is apparent that, although their work was more concerned with the tangible aspect of the three dimensional world, they strived to give answers to questions such as pleasure, relaxation, *goodness* in shapes and beauty.

Is the notion of *goodness* subjectively biased by the epoch in which this theory rejected decorativism, eminently formal approaches to applied arts and architecture and, therefore, denies any visual form of baroque and rhetoric? Still the academicism of rationalists, Pearce & Pearce²⁴ explained very accurately the different *fathers* that a form may belong to. The importance of their research relied not only on the novelty and accuracy of the methodology proposed but on the different interpretations that an underlying structure could generate a similar structure to that structural skeleton with visual points of reference that Arnheim observed in the work of art²⁵. Ranging from the geometric simplicity of the Gestalt to the other more organic or even cellular approaches, the resulting explanations were more concerned with maximum envelopes of structures than with pure shapes. All shape, therefore is the result of the action of a skin covering a definite inner structure. Depending on the criteria, some things have skins more supple than others and that gives the degree of complexity a form may have. But there is a difficulty in understanding the inner structure of an object from its external skin. By the same token, we barely see our bodies as an immense combination of muscular fibre covered by a multi-layered skin. Pearce's research is a very complete investigation of the phenomena of shapes. However, since we cannot see the generating structure of a given shape we can only use Pearce's research for the creation and not evaluation of shapes.

Similarly, we could understand perceptually those relationships between rectangles, circles and other shapes inherent and concealed in our computer. The notions of closure and simplicity of form are inherent in our innate dynamic mind processes, defined isomorphically and contributing to improving our senses.

The conception of an envelope concealing inner structures is a fact of nature in objects. But when the human hand tries to emulate it, the conceptualisation of the world appears to be forced and not so obvious. We are often amazed by the capacity of certain designers to convey meanings that are associated with *organic machines*²⁶ (fig. 6). These designs certainly strive to belong more to the natural than to the machine, and understanding a shape as a result of maximum envelopes promotes this kind of meaning. Those envelopes are identifiable in our computer specially in its feet, or the diskette slot or others which will be better identified in the second chapter. Pure Gestalt aspects such as closure can be observed in the top of the computer where a spherical form is cut or in the rear feet. These are adjoined to the main box of the volume creating another visual effect which strives to play with our already learned conception of existing pure geometrical shapes.

Fig. 6



The tangible aspect of meaning: Hartmut Ginnow-Merkert's sensitivity

The visual perception of an object's contour and the activity of our sense of touch is not necessarily more important than the rest of our disregarded senses. Man is endowed with five main senses which will determine the tangibility of an object. Nevertheless, it is recognised²⁷ that the whole range of experiences associated with designed objects is reduced to one or two senses.

Ginnow-Merkert²⁸ very wisely perceived this lack of perception in relation to objects and he sought to develop a methodology for designers to enhance their interaction of objects. The use of *information channels* will assist the designer the production of more effective interfaces. These are: the *visual, acoustic, olfactory, tactile and gustatory* (transmitters and receivers). His research is important not simply because it is concerned with the tangibility and experience of things but because it tends to bridge and overlap the intangible with the intelligible. For instance, when we hear the triumphal noise of a Macintosh computer as it is switched on, we actually notice and understand that it is beginning to set itself up, ready to offer a whole range of possibilities with the help of the *information channels*.

This section becomes an early explanation of how we can establish connections between the tangible or the experienced and the intangible or the possible connotations we extract from them. For Ginnow-Merkert, this is through the simultaneous use of all the five senses.

The tangible aspect of meaning: Technology and Buchanan's *technological reasoning*

Richard Buchanan²⁹ identifies a technological reasoning devised by designers when the material and technological knowledge is set up in a product. The outcomes of this vision of the designer as an accomplice with industry will be treated more thoroughly in the third chapter but it is necessary to state here that technological reasoning is basic to understanding the object as a premeditated arrangement of material associations. In addition, the object communicates the underlying

relationships that a consumed product has within the contexts of industry, economy of materials, statics, dynamics and/or marketing. Objects referring to technology and to technological reasoning would show, but may also conceal, different characteristics including: the manufacturing process that has determined its shape—the plasticity of the material, its capacity to embody perception and experience of attributes—; the medium in which this form is working—aerodynamic or hydrodynamic shapes are determined completely by function—or its use; the economy of processes and materials used; or the ability to ease its distribution or purchase. In respect to these characteristics of a product, concerns about ergonomics or anthropometry have led some designers to focus on the physical relationship between man and machine. Although the issues of comfort or the reduction of strain injuries in dealing with keyboards, for instance, tend to be less formally expressed some designs have been successful in communicating comfort.

Susan Lambert reinterpreted the history of design through the concepts of form and processes³⁰. The axiom *form follows function* changed to *form follows process*. The object in which form follows process makes a direct reference to the processes involved in its invention, its manufacture or its placement in certain marketing activities. The difficulty lay in separating this technological reasoning from other contexts of meaning since every designed object has the direct implication of a technology that conceptualises and produces it.

Technological reasoning has other implications. Some texts have identified problems in dealing with a technology that eventually provides evidence of that lack of correspondence between human and natural. The proliferation of the *fuzzy technology* in the 80's has resulted in a lack of interrelation between machine and user. It is a technology that proposes, under a helpful mask, to override the human interaction, our intuitive or rational response to mechanisms or rituals. Some contemporary design currents have reacted against this lack of interaction. Product semantics strives to make sense of use.

In the future, technology should approach better the interactivity of human operation, establishing a correspondence in the operation with machines that *fuzzy technology* usually overrides. Designers should take into account that the user is always the active part of the process, not the passive. The concept of *fuzzy technology* originated when *fuzziness* was intended to respond to the complex, often contradictory intentions of the user as regards multiple functions. The study of human interaction in computers, for instance, aims to improve this human response in relation to the accumulation of functions in products such as VCRs. But it is aimed at constructing a more transparent, more intelligible interface without assuming that the user is *incapable*. This is also a matter for designers to enhance visually this clarity and intelligibility through attributes.

Taking this premise as true, the people who developed the necessary software to run the first Macintosh, conceived the computer as a friendly environment in which users could interact clearly and almost intuitively. The outcome of this was the enhancement of the computer interaction devising a highly innovative virtual desktop with icons which symbolised folders and the creation of the mouse interface.

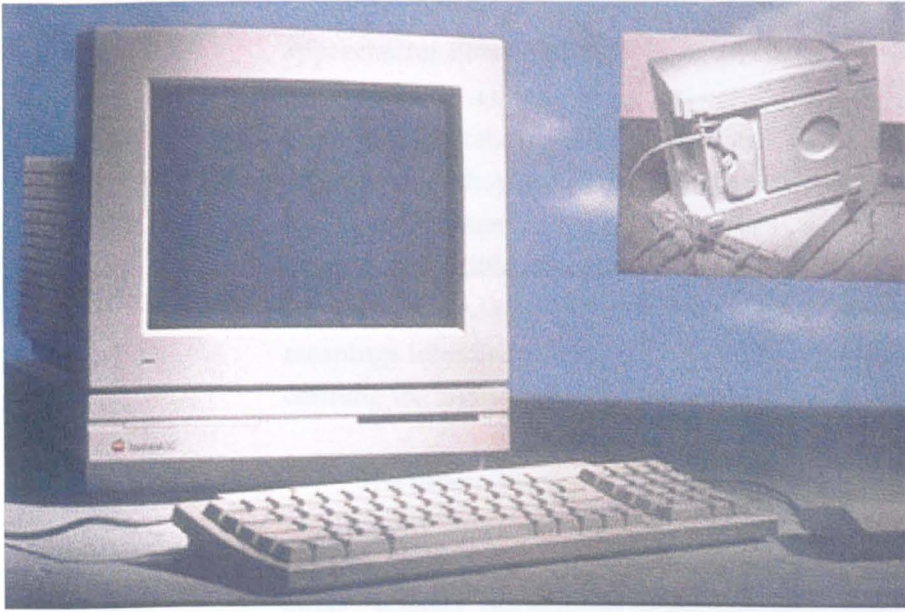


Fig. 7

The first Apple Macintosh was impersonated with the name of a woman,



Fig. 8

The new Beetle is entirely based on historical parameters

The intangible aspect of meaning

The whole perceptible activity would be pointless unless we were capable of appreciating those material attributes as connotative. These connotative elements are the intangible aspects of an already perceived attribute. I will attempt to separate them into logical contexts in order to explain their nature of being and doing and to indicate that they are inseparable and dependent on each other. Inescapably, they also have relationships with issues such as history or idiosyncrasy and this tends to make it more difficult to closely define meanings.

The boundaries are blurred and this is because of overlaps with other indefinable meanings inherited during the whole of human existence. In this sense, a logical step in defining the significance of a computer is to investigate its past or historic meanings.

The intangible aspect of meaning: History

Is the form of the Apple Macintosh 1992 Classic a direct reference to its predecessors? Is the handle or the fact of being a self-contained computer a reference to other Classics? The concept of the self-contained Classic marked a breakthrough from the design of contemporary computers. It included a handle within its shape and a light weight configuration that incorporated CPU and screen (fig. 7). Its configuration was popularly described in America as: *a bust with its remarkable chin*³¹. With the addition of four feet it has now become more animal than human or a hybrid of both³². Furthermore, can we relate this computer to the whole history of computers ranging from the abacus to CRAY super-computers? Are the edges of its cover the reminders of an evolution of a past technology which was constrained in terms of a morphological response which no longer applies? Are the materials themselves a source of historical research and a *reservoir* of new possibilities in dealing with them?

History is complex. According to Manfredo Tafuri, *an object without historic value only lives in the present...and rapid consumability is built-in*³³. For Roland Barthes, history is understood as a reservoir of meanings ready to be recalled at any time³⁴. For others, it would be more concerned with the history of design (fig. 8). The historical meanings that a simple computer can generate not only refer to the object. These can refer to the experience we have had both with this particular one and others of its kind, extrapolating, the experience we have had with machines in general. Just to mention the word *experience* also evokes individuality as well. Because experience is essentially individual, subjective and is now focused on the good or bad experiences we have suffered with machines. As this is very difficult to describe or to explain, its meaning lacks definition. Nevertheless, we can learn from errors and try to introduce new and conscious solutions to improve machines. For Product Semantics³⁵, an error in the interaction of man and machine was seen as an inability of the designer to make sense of its function. It is also difficult to separate the notions of experience of things and history. Their relationship puts in evidence strong links between the tangible and the intangible and subjective.

The intangible aspect of meaning: Identity or ethos

When we see that a product is tied to the image of its company, as in the case of Apple, we recognise a character that no other company can convey. Otherwise it would not be an Apple; it would lose its identity. It is now that we introduce the notion of identity or idiosyncrasy in cultures or micro-cultures. The basic attitude when people bought an Apple computer in 1984 meant that a whole generation of young *yuppies* wanted to be more adventurous, more individualistic and less globalised or absorbed by the ethos of big companies. The advertising campaign for the launch of the '84 Apple Macintosh called *Lisa* used the analogy of George Orwell's book *1984* to mark a breach between the *dictator* IBM and its potential market. According to Howard Oakley, Steve Jobs invented the computer for *the rest of us*³⁶. For that, he meant that it was the only computer affordable and usable with graphical interface. Heird and Gruman asserted, first, that the *dearest difference* is intangible. Secondly, it is based on *how it feels*. Finally, it has *its own personality*³⁷. Chris Espinosa, finally confessed that *we tried to create the religious experience*³⁸ when the first Apple Macintosh was designed. Finally, Steven Ley emphasised the birth of the Mac more as a political rebellion than a economic enterprise stating its status as a fetish: *it wasn't solely the technology that made the system so compelling. It was us too: the people who used it*³⁹. And it can be your *friend* as well: *she can talk to you*. How can we transfer human characteristic to objects? How can they impersonate humans, receive a name and even a nickname —the mac—? Talk like this has gone a long way in making the Apple Macintosh a cult ably guided by a skilled advertising campaign⁴⁰. Although the product was not very reliable in terms of software and was operationally limited, the computer was designed to represent something other than purely functional aspects. The fact of having a name such as *Lisa* showed the intention of giving a personality to a product, an identity of its own. The focus has recently been changed: *what suits you better?* is the new motto for a company that has been given a new identity through another of its products, the lap-top computer. An Apple Macintosh for everybody and for every personality. The object has to be individual, with its own identity. But the goal of this product is that it can be reshaped as many times as you want or need. So it has a changing personality, it grows.

We cannot disassociate the forms of our case study —the 1992 Classic— from the whole company experience. This is one aspect of the products that cannot be controlled and gives them an extra capacity to convey meanings that perhaps are tangibly inherent in them or visually recognisable.

The intangible aspect of meaning: Emotion or pathos

Another of Buchanan's discoveries⁴¹ about objects is the emotion they arouse. The attribute of an object can generate in us the emotive aspect of the product. Humans show certain unconscious attraction for certain kinds of objects. Who does not have many favourite objects in different spheres? Do we really know what provokes that unconscious response?

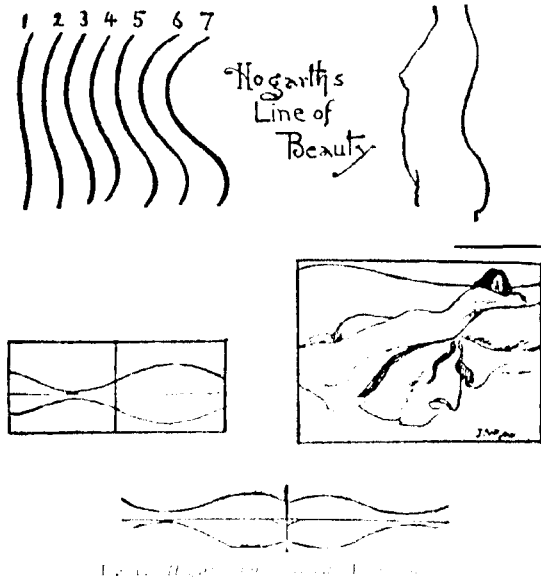
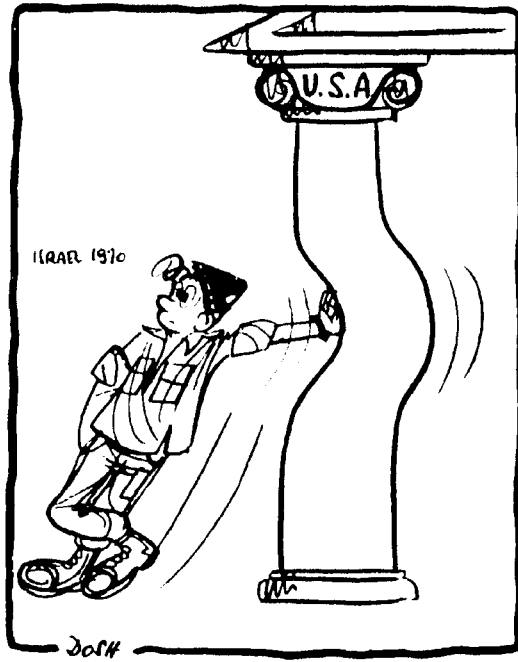


Fig. 9

Hogarth's Lines of Beauty

Fig. 10



THAT STRANGE FEELING

The cartoon 'That Strange Feeling' by Dosh. An example of the use of shape as

pathy can be found in every life objects

Some authors would argue about the involvement of issues such as taste, value and beauty. Beauty was defined by Hogarth⁴² through the artistic use of the *line of beauty* which was more related to the profile of a woman's body than anything else (fig. 9). To this argument may be added terms of sexual irrationality mainly borrowed from Freud's theories about the repression of sexuality in things or the controlling or lessening of stimulation to achieve equilibrium. According to these concepts, one experiences beauty in relation to the social context in which one lives. Beauty is, therefore, a socially oriented term that is influenced by the repression or control of what is not socially accepted. Beauty is certainly a notion that is not only socially oriented but an utopian ideal that has been pursued during the whole history of the world and evolved in many different forms. Moreover, the term *beauty* has always been associated to the terms *pleasure, desire, taste* and *value*.

Under this heading, the Apple would be assessed in terms that, ultimately, appeal to desire or taste of the time. Its forms are more pleasing than other computers of comparable performance. It has traditionally portrayed the company's commitment towards the implementation of the latest aesthetics in design. Other notions such as pleasure and value are also considered in this section: Gestalt theorists would speak of equations to measure the degree of pleasure of shapes. Connor writes about the universal pleasure of Kant in his *Of pleasure*. The notion of universal pleasure is characterised by its indifference to the individual, subjective pleasurable profit⁴³. He also explained the concepts of *purified pleasure* from Bourdieu, the political anglo-american aesthetic pleasure studied by Eagleton and the antagonism between hedonism and moralism. Connor concluded that the value of aesthetic lies in its refusal of pleasure and *its stimulation of suspicion as to every form of gratification* ⁴⁴. This seems to have a close connection with Freud's ideas about the repression of pleasure and desire in objects.

Gestalt theory attempted to demonstrate mathematically the degree of pleasure⁴⁵. Zusne⁴⁶ compared Birkhoff's and Barnhart's investigations to show statistically the correlation between aesthetics and form using the following equation: $M(\text{the aesthetic measure of polygonal forms}) = O/C$ where O represents geometrical order and C complexity. I investigated Kandinsky's use of the synesthesia of colours and empathic pure abstract shapes inherent in the object but these do not appear to be a single objective pattern of judgment but many subjective ones acting together.

At this stage of the argument I prefer to substitute the word empathy⁴⁷ for that of emotion. To provoke empathy is to put human characteristics into objects (fig. 10). The notion of *atmosphere* in painting or architecture appeals to emotion. As *synesthesia* is the phenomenon that associates colours with musical instruments, music itself triggers inner emotions. Designers have the ability to convey these notions in objects and to shift certain amount of empathic emotions which, in turn, have uncertain connotations. It is this uncertainty in the definition of emotions that we feel in designed objects.

The line of beauty was not only associated with the female's body but with other forms such as landscape. Empathy is a perceptual influence that goes beyond the search

for lines that embody organic, natural characteristics. In looking for these lines in the material world, natural and organic forms are usually copied. As the preference for shapes and attributes is a matter of taste and culture, only general views can be considered. Nevertheless, the work of Pickford should be noted in researching pleasurability and preferences for attributes. He understood pleasure through preferential judgments on colours, designs, shapes and cultural influences in this order. For instance, preference for colours depended on the objective (saturation, for instance), psychological and associative aspects⁴⁸. Our preference for shapes is also based on gender (*masculine* shapes are attractive for women and viceversa)⁴⁹. Preference is also determined by the semantic and linguistic connotations and other researches have added more knowledge to the understanding of preference for shapes. Finally, cultural influences mainly related to geographic contexts strongly affect the preference for the aforementioned subjects but preferences seem to be mainly socially and historically generated.

Summary

The first section of the research started with the basic assumption that the meaning of objects lies in the object itself. Although some aspects may be essentially connotative and dependent on cultural associations, the research sets itself up to investigate these associations bearing in mind that there is something in objects that escapes objective explanations.

The first objective parameters were given by a duality in the senses which are based on the important relationship: experience-meaning. Therefore, the first step is to investigate the experimental aspect of things. The contexts referred to must be understood as universal characteristics inherent in every interaction with objects such as the activity of touching, seeing or perceiving through senses. Although this refers to objective aspects of meaning, we soon realise that they instantly develop into subjective, emotive responses. This led me to believe in the importance of the processes involved in the development of the most elementary structures of mind and how they can be used to create more meaningful objects. In addition, how the relationship between the tangible and the intangible aspects of meaning could be shown with a survey of contexts of meaning. Finally, I demonstrated that all the perceptual aspect of the object is a natural embodiment of the intangible, spiritual aspect of the world. So, the intangible aspect of the object raises from formal actions by material attributes.

These researches are crucial to understanding what is normally conceived as the unexplainable in objects. The assimilation of these issues should be an essential part of the designer's expertise in dealing with the perceptions of the user about attributes. How these contexts influence our conception about creativity and how can benefit from this is something we will see in short.

Notes on chapter one:

1. According to Berkeley, *God guarantees the continuous existence of the world...because God perceives everything all the time, we are not facing the alarming prospect of the world popping in and out of our existence every time we shut our eyes.* George Berkeley paraphrased by Janet Daley, Design creativity and the understanding of objects in Design Theory & Practice, Conference in the Royal College of Art, London, July 1984, page.7. Also Berkeley, Reason and experience, The Open University Press, London 1882, unit 17-20 block 4.

2. A popular epigram called *Idealism*² shows this philosophical dilemma:

*There once was a man who said God
Must think it is exceedingly odd
If he finds that this tree
Continues to be
When there's no one about in the Quad (signed Ronald Knox)*

A reply

*Dear Sir,
Your astonishment's odd:
I am always about in the Quad
And that is why the tree
Will continue to be,
Since observed by
Yours faithfully, (signed God)*

3. Stanley Kubrick, 2001: An Odyssey in space, MGM, 1968

4. Man in relation to the objects he constructs and is surrounded by them. Similarly, man in relation to war could be also named *Homo Militiae*.

5. In the climax of the ideology of modernism, when the School of Ulm led the Bauhaus believers, the aesthetics of 1968-69 revolved around Gestalt theories and the laws of geometrical purity, the importance of the golden section, etc.

6. P. Sparke, F. Hodges, E. Dent Coad, Design Source, QED Publications, London 1989, Chapter 1, page 21.

7. *Against positivism the spiritual revolution reacts.* Wasilii Kandinsky, Concerning the Spirituality of Art, translated by M.T.H. Sadler, Dover Publications Inc., New York 1977, pp. 10-18

8. Kenji Ekuan, The aesthetics of simplicity, at Design: Pleasure or Responsibility, Cycle of conferences at the UIAH, June '94. Also, *Tokyo reminds us that the rational is merely one system among others*, Roland Barthes, The Empire of the Signs, Jonathan Cape Ltd., London 1983, page 33. They both speak of how much Zen culture is concerned with finding the spirituality in things.

9. The machine aesthetic is a concept developed during the 1900-1930 period in which Bauhaus and Russian constructivism celebrated the application of new technologies in architecture and industrial design. The machine aesthetic experienced much more the technology of materials than their capacity to formally express other meanings.

10. Epistemology is *the human capacity to construct (cognitively) a perceptual universe of continuous objects in a three dimensional space.* In other words, how we understand our relationships with objects and how we manipulate them to make innovations. Janet Daley, Design creativity and the understanding of objects in Design Theory & Practice, Conference in the Royal College of Art, London, July 1984, page 8. According to Necdet

Teymur, Epistemology is *the study of the process of knowledge production* which should be distinguished from the one which is concerned with the study of acquisition of knowledge *which involves the study of an object to be known and a subject who knows it*. Necdet Teymur, The environmental discourse, ?uestion Press, page 15.

11. Immanuel Kant, Prolegomena, Manchester University Press, 1953.

12. *There are certain universal innate schemata which provide the essential structure by which all grammars are generated and it is the possession of those structures which makes possible infinite innovation within the acquired specific language*. Chomsky, paraphrased by Janet Daley, Design creativity and the understanding of objects in Design Theory & Practice, Conference in the Royal College of Art, London, July 1984, page 8. Also *the transformations which relate various sentences and constructions are invariably structure-dependent in the sense that they apply to a string of words by virtue of the organisation of these words into phrases*. Chomsky, Language and Mind, Hartcourt, Brace and World, New York 1968, page 51. Also, John Lyons, Chomsky, Fontana and Collins, London 1970

13. *Product Semantics seeks to understand users' understanding of their practices of interfacing with designed things*. Klaus Krippendorf, Product semantics, in Product Semantics' Conference in Helsinki edited by Våkevå, Seppo, Publications of the University of Industrial Arts of Helsinki, 1989, section a, page 5.

14. Apple Macintosh 1992 Classic designed by R. Deluillis.

15. Ralph William Pickford says that Lowenfeld's idea is that perception in infancy is at first haptic and visual perception becomes superimposed on it, gradually taking a dominant position. Ralph William Pickford, Psychology & visual aesthetics, page 49.

16. Ralph William Pickford, Psychology & visual aesthetics, page 48.

17. The emperor of Japan, HiroHito gave up his divinity to allow doctors to cure him.

18. Ralph William Pickford, Psychology and visual aesthetics, Hutchinson Educational, London 1972, page 50.

19. A trouser crease, the definition of technology to arrive at the perfect edge, etc.

20. The five basic principles of Gestalt: figure & ground; differentiation and aggregation; closure; simplicity and isomorphism are directly extracted from the laws of visual organisation.

21. Leonard Zusne, Visual Perception of Form, Academic Press, New York 1970, page 109, chapter IV: The Gestalt viewpoint.

22. Although the principle of simplicity is a concept developed in Rudolf Arnheim, Art & Visual Perception, Alianza Editorial, Barcelona 1991, page 70, we could argue that it is based on the gestalt aspects of gravity, similarity, proximity, good continuation, etc.

23. According to Zusne, to arrive at the good Gestalt *one must study the laws of visual organisation* 1. *Form is the most important property a configuration may have;* 2. *Visual forms are either dynamic or the outcome of dynamic processes which underlie them;* 3. *All visual forms possess at least two distinguishable aspects, a figure portion, called figure and a background, called background;* 4. *Form is organised by its several centres of gravity;* 5. *Forms are transposable, without loss of gravity;* 6. *Visual forms tend to rest changes;* 7. *Form will be as good as the prevailing conditions allow;* 8. *Visual forms may fuse to produce new ones;* 9. *Law of compensation: the alteration of one part of a visual form alters the*

whole; 10. *Visual forms tend to appear and disappear as wholes*; 11. *Laws of reproduction and 12. Phenomenal space is anisotropic*. Leonard Zusne, Visual perception of form, Academic Press, New York 1970, pp. 110-134.

24. P. Pearce and S. Pearce, Experiments in form. A foundation course in three dimension, Van Nostrand Reinhold, New York, 1980

25. Rudolf Arnheim speaks of inner skeletons in the work of art created from a number of points of reference, Rudolf Arnheim, Art & visual perception, Alianza Editorial, Barcelona 1991, page 27

26. Luigi Colani is well known for designs which have a strong organic appearance. Luigi Colani's catalogue of the Design-show in Switzerland, 1993

27. With the check-list type device called *the communication matrix* G. Merkert demonstrated that design actually pays more attention in the aspect rather than the experience of the other remaining senses. Harmutt Ginnow-Merkert, Beyond the visual at Design: Pleasure or Responsibility, Cycle of conferences at the UIAH, June '94.

28. H. Ginnow-Merkert said that: *the acoustic, tactile, olfactory and gustatory qualities of our products happen by chance, usually as an accidental, unreflected consequence of our visual-aesthetic decisions*. Harmutt Ginnow-Merkert, Beyond the visual, at Design: Pleasure or Responsibility, Cycle of conferences at the UIAH, June '94.

29. Richard Buchanan, Declaration by Design, in Design Discourse, edited by Victor Margolin, Oxford University Press, London 1970, page 91-109.

30. *It is clear that what has become possible during the century has awakened the design industry to investigate what might become possible as well as having provided greater freedom of choice in form and, thus, a more extensive formal language than hitherto experienced*. Susan Lambert, Form follows function?, Victoria & Albert Museum Publications, London 1994, page 43.

31. Popular belief

32. The Classic's form has been frequently associated to the form of a sphinx or a bust.

33. Manfredo Tafuri, Architecture and Utopia, Massachusetts Institute of Technology Press, 1976.

34. *Time can reopen meanings; the class of impossible features thus forms a...reservoir of history*. Roland Barthes, The Fashion System, Jonathan Cape Ltd., London 1985, page 179.

35. Klaus Krippendorf, Product Semantics, in Product Semantics' Conference in Helsinki edited by Våkevå, Seppo, University of Industrial Arts of Helsinki 1989, section a, page 7.

36. *The year of the big brother*. Howard Oakley, The world according to Macintosh, The Mac magazine, January '94.

37. They also said that *the Mac has its own personality, one derived from a design that emphasises not programmers' needs but human expectations*. Jim Heird and Galen Gruman, ...ten years on, Mac World magazine, February '94.

38. Chris Espinosa paraphrased by Jim Heird and Galen Gruman, ...ten years on, Mac World magazine, February '94.

39. Steven Ley, Did Macintosh change the world?, Mac World magazine, February '94.

40. Mac adverts: *the rest of us* -1984-; *all of us* -1986-; *the Power to be your best*

—the Powerbook—; *the people who changed the world* —commemorating the fall of the Berlin wall—; *what's on your Powerbook?*

41. Richard Buchanan, Declaration by design in Design Discourse, edited by Victor Margolin, London: Oxford University Press, 1970, page 103.

42. William Hogarth, The Analysis of Beauty, Oxford Clarendon Press 1955, Chapter ten, page 678.

43. S.Connor, Value of pleasure. pleasure of value in Theory and cultural value by S. Connor, Oxford, Blackwell, 1992, pp.4-44.

44. S.Connor, Value of pleasure. pleasure of value in Theory and cultural value by S. Connor, Oxford, Blackwell, 1992, p. 40.

45. Their positivist thinking led them to consider mathematically the notion of beauty

46. In 1940 Barnhart established a low correlation between M and the preference of forms of researched rankings from students. Birkhoff paraphrased by Leonard Zusne, Visual perception of form. Academic Press, New York 1970, page 402.

47. *We feel into represented objects the movement or the pressure of weight (or other qualities) which they must exert.* Ralph William Pickford, Psychology and visual aesthetics, Hutchinson Educational, London 1972, page 31

48. Ralph William Pickford, Psychology and visual aesthetics, Hutchinson Educational, London 1972, page 153.

49. *McElroy found preferences for rounded shapes and girls for angular. An unconsciously determined sex difference in preference for simple forms was at work, especially in view of the change reported at the age of puberty (male preferences for rounded forms implies that those shapes are feminine and viceversa) The older they grow, girls tend to move towards boys' preferences: there is a repressed tendency to choose female symbolic shapes by boys, and male symbolic shapes by girls, which is identified by the increasing repression required to counteract the growing sexuality of adolescents.* Ralph William Pickford, Psychology and visual aesthetics, Hutchinson Educational, London 1972, page 160.

List of photographs and diagrams:

Fig. 1: Images of Stanley Kubrick's 2001: an Odissey in space

Fig. 2: Images of Stanley Kubrick's 2001: an Odissey in space

Fig. 3: Mahogany chair designed by A.H. Mackmurdo for the Century Guild in 1882. Sparke, Penny; Hodges, Felicity & Dent Coad, Emma. Design Source Book. London: QED Publications, page 27,1989.

Fig. 4: Diagram

Fig. 5: Own slide collection

Fig. 6: IDEO Product development, London consultancy catalogue.

Fig. 7: K. B. Hiesinger & H. Marcus, Landmarks of the XXth Century, Abbeville Press Publishers, London, page 295, 1993

Fig. 8: Design report magazine number 3, page 31,1994

Fig. 9: Ralph William Pickford, Psychology and visual aesthetics, Hutchinson Educational, London 1972, page 32.

Fig. 10: ditto., page 33.

CHAPTER TWO: THE COMMUNICATION SIGN

The role of Language. Visual recognition

In the creation and understanding of objects I observed that the intangible aspect of meaning is very dependent on Language. To what extent? The fact of naming all the perceptual and non-perceptual facts and descriptions leads to the realm of language and the phenomenon of *categorisation*. According to Dilnot the noun category is the real determinant of a form¹. To elaborate on this, Binder developed in the Gestalt School a theory of visual recognition² whereby an attribute assigned to a category is recognisable by a viewer. According to this, a form is learned through a spatial ordering of class forms. Gibson corroborated that theory with his theory of visual apprehension of attributes stating that *a form is a projected form*³ and can only be studied through a list of definitions. We understand the intelligibility of the experienced by the non-random use of language. All these experiences are complemented by language which quickly appeared when haptic perception demanded the activity of categorisation. The haptic experience and the subsequent visual perception are secondary activities supplanted by the naming, categorising and symbolisation of Language.

Lundholm⁴ in 1921 tried to describe lines using a list of adjectives such as sad, lazy, gentle, etc. He first discovered that the perception of slow and weak movement was suggested by lines with long and shallow waves while rapid and intense movement was suggested by be small and acute waves. He concluded that it was feasible to identify these movements with human emotions. So he related some of the adjectives such as *lazy* or *sad* to the first kind of movement and line, and adjectives such as *angry* or *anxious* with the second. Perception is developed experience by experience and it is symbolised first haptically, visually and finally by assigning a recognisable and not confusable class name. The intuitive has become intelligible thanks to the innate use of language.

The association of attributes is, then, a matter of categorisation and, according to Nelson Goodman⁵, labels conceptualise everything. More accurately, one could affirm that labels conceptualise reality to the extent that Dilnot asserts that if the label describes the object, *the label therefore is the object*⁶. But how can a word such as *love* be conceptualised? In contrast, is it true that an image represent one thousand words? How extensive is the supremacy of the tangible over the intangible and viceversa?

A number of studies have been undertaken in the past twenty years to answer these and other questions investigating the correlation between language and visual responses. One interesting investigation was undertaken by Norbert Hammer⁷ based on a scientific method whereby a test was devised to determine the user's visual fixation⁸ on products. It was called the "Ocu-test" and it explained the visual fixation of our eyes on a certain attribute of a product (fig. 1 & 2). The user is asked to stare at some part of a product after being advised to identify the qualities of it by naming adjectives such as *quality, beautiful* or *functional*. This was possible by using an electrical beam that could be tracked down in a *map of vision* of the product which showed comparable

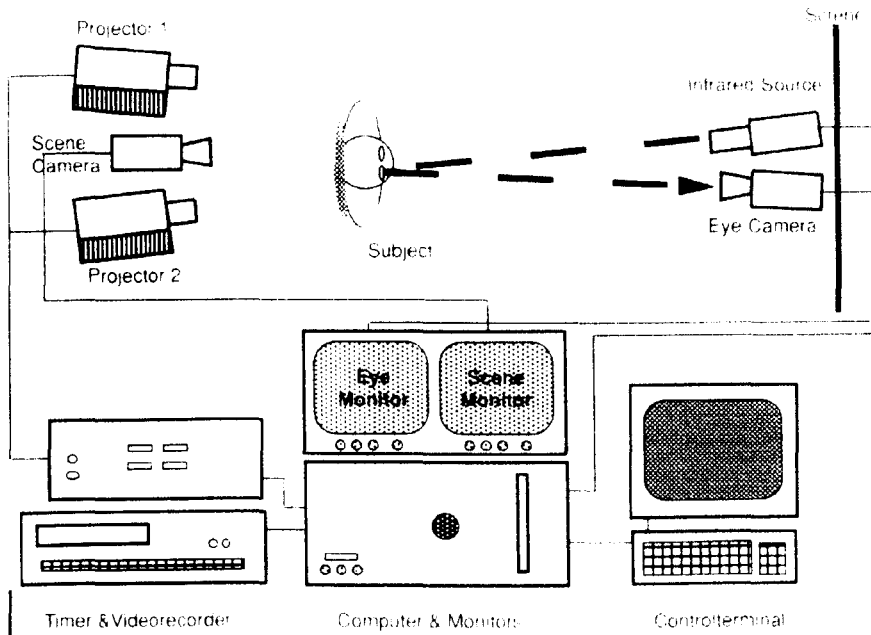


Fig. 1

The Ocu-test assigned a visual importance on certain parts of an object according to the adjective proposed to describe it

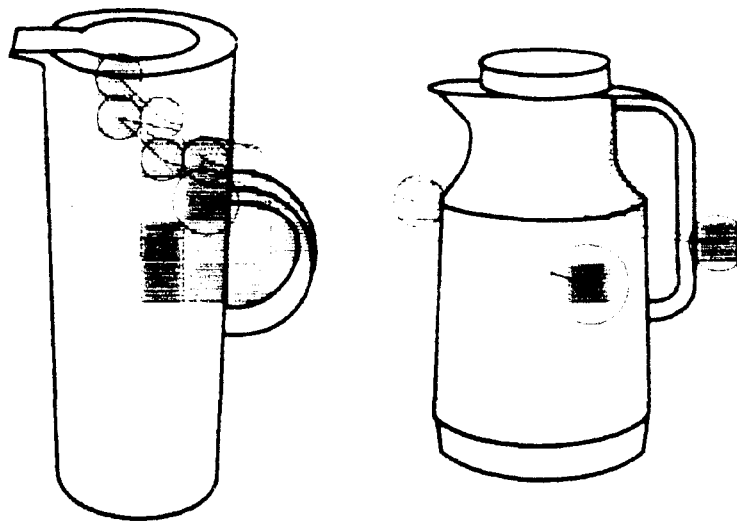


Fig. 2

OCUTEST. STELTON/KRUPS:
"MOST EXPENSIVE"

Oculab Essen

predisposition from the user to one part or another of the object.

This project provided evidence of how preconceptions about subjects such as taste or value completely affected the visual perception of a part of the product. It also showed that some segments allocate features that could be epitomised through the verbal naming of qualities. Another reading could be made although not observed by the authors: a confirmation that a product, although expressed in its entirety, is really formed and composed of an infinite number of parts, joined with or camouflaged by others. A myriad of meaningful segments amenable to the phenomenon of categorisation.

Categories: bridging both material and immaterial

Let us consider categorising a function that will lead to the activity of labelling not only the object by itself but different parts of it. Language not only helps in communication and in social context but also enables us to build up an intelligible three dimensional concept of the world.

The activity of language has been treated in various and complex ways but in dealing with words or categories or labels we deal with signs. These labels belong to Semiotics, the science that rules the meaning and life of signs. Such entities belong to an infinite system of symbols that can explain every aspect of our world. Other semiotic systems include music, dance, mathematics, body language, hand vocabulary and many others.

Here we may ask again whether our computer signifies what it is because many of its parts can be named: screen, slot, feet, cover, button, edge. We can name simple categories. Those categories are universally meaningful, but we could still characterise them further with adjectives: black screen, deep slot, bumpy surface, angular cover. We could even frame them within historic, aesthetic or other patterns: a minimalist button, a biomorphical foot, a cheap cable: but we still cannot explain with words alone the infinite variety of appealing characteristics it may possess.

To what extent does language determine the form and character of the object? Some features will transcend this verbalisation. Is language still considered as the most perfect semiotic system? The interaction of language in patterning the three dimensional world is a further step towards introducing the role of semiotics in design. Having started with the phenomenon of categorisation, we have reached a more complex situation for definition.

The communication sign

Was it a presumption or a very brave movement to send Leonardo's vision of man beyond the boundaries of our closest constellation of galaxies? Does this presume that and his measurements and partitions will be recognised by another culture? How sure are we that signs depicted in Voyager⁹ will be enough to contact another galaxy? Was it more effective to symbolise the allocation of our planet visually instead of by means of coordinates or mathematically? If so, that would imply the supremacy of visual systems over linguistic or numerical ones. My basic assumption is that the visual systems have a degree of excellence whereas the use of language is somewhat limited.

We realise this when we attempt to verbalise mental ideas and words alone cannot help to communicate their meanings. The wealth of visual systems goes beyond mere words. The use of the sign regardless of size or projection aims to reach higher peaks of communication when applied to objects.

Signs are communicative *per se*. Many other writers point in that direction including the French writer Jean Baudrillard. He asserted that: *all material goods are endowed by social significance*¹⁰. Baudrillard is one of the writers who gave the object a fundamental social aspect not only in economy but in the capacity to unveil certain social factors within a consumerist society such as manufacture or sale. Maurizio Vitta regarded Design as a mirror of these socially apparent aspects: *...if the object is [considered] a sign of social identification, design cannot help but... [be] an instrument of social analysis, a language, a theory of form, fetishism*¹¹. All seems to be compressed in the designed object. Finally, Douglass & Isherwood summarised the social aspect of the designed object with this assertion: *[goods] are communication signs, as much as the invisible part of the iceberg which is the global social progress*¹².

The object is considered as a sign and thus, we can enable objects to be communicative for communities or other cultures, especially when we export them. The role of semiotics applied to design is two-fold:

a) to determine intelligibility with the help of language by categorising the object's features

b) to enhance social relationships by constructing signs; at the same time, society predicts the possible effects that signs will have and imposes their meanings.

At this stage, it is important to bring some attention over the social aspect of the sign. Meanings are meaningful because they are constituted by social references which, ultimately, are constituted by words, categories or social values. These are subjected to geographical context and are complete semiotic systems. It is feasible, therefore, to establish a connection between the object and its meaning with the sign and its signification. It becomes a matter of social signification and, in doing this, a matter of semiotic theory.

Umberto Eco's Theory of Semiotics

Semiotics applied to Design needs more scientific demonstration. To follow the directions that people like Baudrillard indicated in naming the object as a communicative sign is not satisfactory. In the most recondite texts of theorists we find broader implications in considering Design as a semiotic system. Texts like Umberto Eco's *Semiotics and the Philosophy of Language*¹³ provide a substantial basis to vindicate the semiotic aspect of Design. Some empirical facts must be established to accomplish this. There are four main schools of thought that aim to encompass the role and field of Semiotics. The first, led by Locke and Peirce, is called Philosophical Semiotics and the second was founded in Greek medicine, followed by von Üexkull and named Empirical semiotics¹⁴. The third is the School of Linguistic Semiotics of Saussure and Greimas and The Semiotics of culture by Lotman¹⁵. This theoretical variety means that each scholar represents an independent school. Generally, the sign

in design has been approached from a linguistic semiotics perspective as, for example, of Barthes¹⁶. My first approach is based on a duality that serves as a foundation for a design system and owes more to the Linguistic School than the Semiotics of culture.

General and specific semiotic systems

Within different schools of semiotic there are some differences. It is important at this stage to state the differences between specific and general semiotics researched by Eco. For Eco, specific semiotics is a logic *grammatically* understood¹⁷. The specific sign is studied through the logics of syntax, semantics and pragmatics. Analogous to a grammar of material elements a pen, for instance, is constructed through the intercession of a syntax that allows the ink refill to be introduced into a sort of vein which prevents the former to escape with screw-cap in the top of the latter. The pen is also semantic in the sense that, once the elements are joined together, we make sense of the whole: it's a pen! Pragmatically, the pen has innumerable uses and has ergonomical concerns. But the connotations that may arise from, for instance, the first pen we had, the pen in relation to its surrounding environment, the associations it triggers in respect to its form, all belong to a general system. They belong to a general semiotic system not yet discovered but suggested. Barthes¹⁸ certainly proposed a general semiotic system and in his writing I observed the foundations of a possible realm of object-signs. The general semiotic system starts from the specificity of the linguistic sign (fig. 3). If generality is richer than specificity in semiotics, the foundations are the syntagmatic relationship (syntax) and its paradigmatic relationship (semantics and interpretation). If we aim towards a philosophical or more discursive semiotic system without belonging to any semiotic school except, perhaps to Lotman's school, the boundaries are more blurred and differences separating specificity and generality are not apparent.

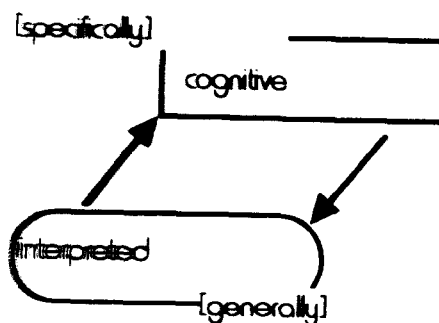


Fig. 3. Specifically, the system is like a grammar, it denotes. Generally it embodies the world of connotations

These obstacles may be overcome by various factors. A specific semiotic system such as attributes in design¹⁹, can be expressed through its linkage of signifiers (syntax), its meaning (semantics) and its use or experience (pragmatics). I anticipate that the design system must lead to a generality that other systems cannot achieve. If design started as a specific semiotic system or grammar—as Eco foresaw—it has now

become more arbitrary²⁰. Notwithstanding this, to accentuate the leap from specific to general semiotic system applied to design its specificity must be demonstrated, then its generality. The specificity of the sign has been more deeply appraised by Saussure's sign.

Ferdinand de Saussure's sign

For Saussure²¹, the sign is the entity which is a direct reference to a concept. He started from a basis of linguistics to characterise two aspects of the sign. In this sense, I make another connection to the duality of the three dimensional world. The signifier is the tangible aspect of the sign or: the entity which simply does not signify unless the signified or meaning is associated with it. The signifier is generally considered to be the element of the sign that can be transformed or reshaped. That presumes that it is material, whereas the signified is more concerned with the ideological aspect of the sign (fig. 4). In a way, the signifier acts upon the ethereal concepts and materialises them. In our specific semiotic system; which aims to be general, the signifier is ruled by Syntax. Derrida and Post-structuralist theory asserts that one can dissolve the entire sign system into a net of structures²².

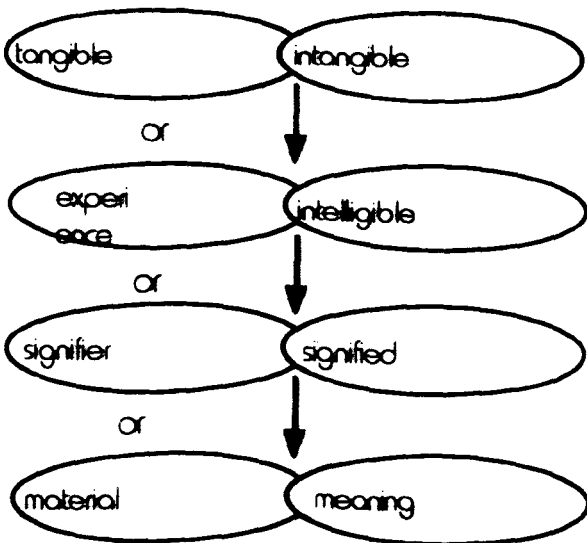


Fig.4: The concepts of material and meaning have been approached in this research in various ways. The last one is the semiotic sign

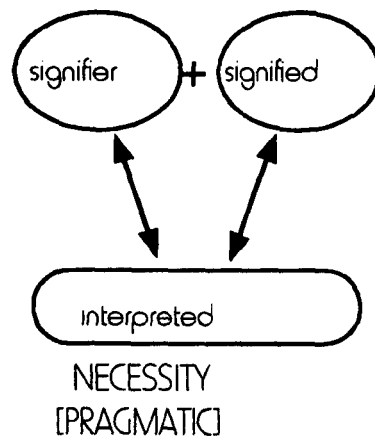


Fig.5: Peirce's sign incorporates the third element: the interpreter which leads to include pragmatics

Eco interprets this semiotic chain (of structures) as appearing to be just a chain of signifiers. In the same way we can interpret a *net* of materials in our case study, functionally arranged and incorporating elements such as a screen and a cover with buttons and so on. Similarly, if the chain of signifiers constitute a whole material entity, it would be feasible to imagine a chain of signifieds, a chain of meanings that are somehow unleashed.

Peirce's sign

We cannot content ourselves with the basic notion of Saussure's sign. Peirce²³ transformed the duality of the sign into a triad relationship incorporating object (signifier), its interpretation (signified) but also the interpreter. In this field, some work has been done in recent years by Susann Vihma²⁴ and Hanno Heshe²⁵ in adapting Peirce's research. The sign, however, is always related to Saussure's structure, but giving it a more social and interactive aspect. What is implied, indirectly, is the awakening of the logic of pragmatics in semiotics (fig. 5). Likewise, this late development of the sign is the origin of the semiotic process. In Peirce's investigation two new concepts occur which he called expression-plane and content-plane. These concepts also refer to the duality of the sign and ultimately to the experienced and the intelligible. What does this add to the knowledge of the sign? In Peirce's terms the expression-plane is a plane or level of cognition that can be perceptually analysed while the content-plane is subjectively interpreted by the reader or society. Later on and with the help of Heljmslev²⁶ I believe that the renamed expression-plane and content-plane adopted from Peirce can be applied to the design system.

Peirce and Morris were among the few semioticians who did not wish to follow the late formalist and structuralist attitude in Art. Under formalism, artistic creation is considered as a semiotic device which could be analysed as a set of rules and inventions *of prefixed codes and conscious modifications of socialised codes*²⁷. That would be similar to thinking of art as a *painting by numbers* activity. I would accept part of the formalist attitude in considering that the laws of visual perception or the technological reasoning of a production process may be amenable to scientific and/or grammatical explanation. While acknowledging that there are some aspects that escape such analysis I am more inclined towards non-formalism and post-structuralist attitudes.

The specificity of the design system, that is, the technological explanation of the nature of the materials and their manipulation or the perception of the visual world may well be prefixed by sciences or grammars. But our subjective interpretation of these codes cannot be specified. Understanding design as a specific semiotic system allows us to understand the sign in design as that chain of signifiers, materially connected, joined through technology. It engages with the intangible chain of signifieds. It also coincides with Lacan's thoughts²⁸: *the imaginary and the symbolic relationship is flattened through the equivalence or levelling of the expression and content planes by considering only the internal chain of signifiers*. The basic linkage of attributes is in a lower level than the level of the intangible aspects. It also means that the basic chain of attributes is a fundamental step towards intelligibility. The definitions concerning the expression and content-plane match perfectly the notion of a describable surface which establishes communication. Finally, if the discourse is aimed towards a semiotic generality then the system becomes less and less scientific. If we achieve that degree of general system in design, it will become a crucial element in a sort of *semiosphere*. A clue to providing this may be found by understanding design as a discourse based entirely upon the communication and recognition of messages through attributes.

Pragmatics

The inclusion of a third element in the sign leads to the investigation of the logic of pragmatics in design. Eco defines the task of general semiotic systems as *tracing the formal structure which underlies all phenomena of necessity of a sign*²⁹, whereas the specific system establishes the rules of greater or lesser semiotic necessity. The specificity of the system is observed when a set of rules (or grammar) tries to correspond to a certain social need. The need to refer to a single interpretation of sign (not just recognition) happens through perception. Perception, therefore, is a great potential source of semiosis. Stoics already spoke of *commemorative* because signs refer to past experiences. When Victor Margolin explains his experience of his grandmother's crockery³⁰ what he is pointing to is the type of crockery which describes the contexts in which a term can be expected to occur. So it describes past experiences or learned experiences. So, a specific system establishes the necessity of a framework in which the experience of an object exists. Pragmatics in semiotics applied to design is associated with these experiences. My intention at this stage is to transfer this logic to design in order to apply the notions of necessity and experience —of use or function— to the designed object but the extend this specificity to a generality including other notions.

We have examined the meaning of a sign belonging to semantics but what is the role of pragmatics? To name a sign is to name its manner of use or its relationship with the user, —hermeneutics—. Eco bridges the problem and explains that sign is *gesture produced with the intention of communicating*. Eco calls this *transmission successful*³¹ (fig. 6). The notion of gesture in design is usually confused with that of function since everything is meant to be used, even if it is just used for decorative purposes.

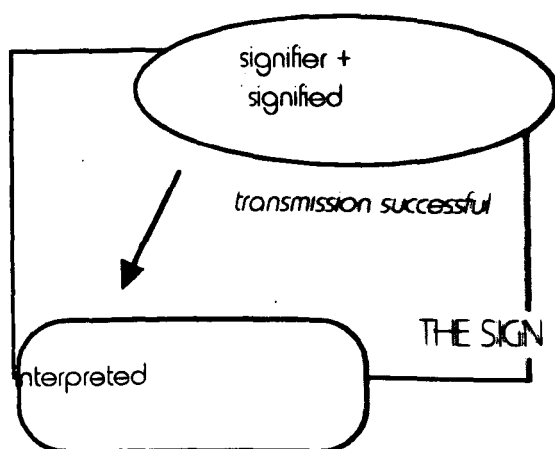


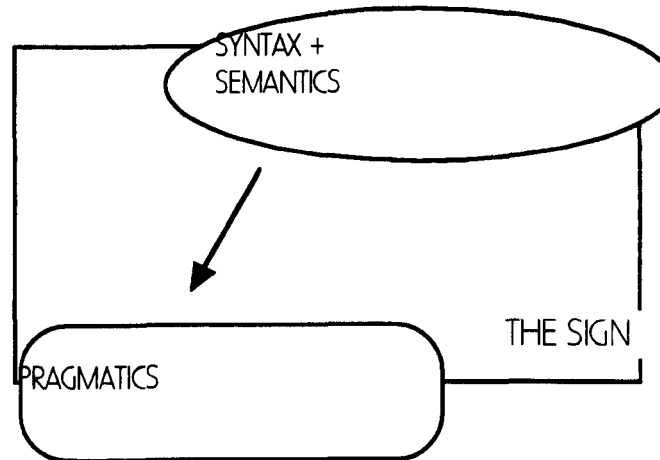
Fig.6:
Interpretation is essential in the context of the sign

A general semiotic system is complemented by incorporating pragmatics in design. Design is hugely involved in experiences of all kinds, manners of use and ultimately, gesture. Experience is the basis for intelligibility.

Moreover, this pragmatism which the object embodies, affects so deeply the meaning of the object that it has been asserted by many that to give the meaning of an attribute is to name its manner of its use³². I conclude, therefore, that it is valid to join pragmatics to semantics so that in order to ascertain the meaning of a designed object one needs to verify its contexts of meanings in combination with its context of use. The context of use would be, finally, another context to research, one that is disguised as the

logic of pragmatics (fig. 7). Although I have included a third element in previous sections, demonstrating the triad relationship of the sign, it is still possible to separate the perceptual aspect from the intelligible. In doing this, the syntax of design remains opposed to semantics and pragmatics. The designed object is a sign, that is, a complete ensemble of specific materiality with a general nebula of meaning and experience of use.

Fig.7:
The Semiotic sign applied to Design should also resemble the triad relationship



Product Semantics' methodology

At this stage, I want to show the work of Product Semantics to introduce a possible application of semiotic theory into design. The work of Klaus Krippendorf, Reinhart Butter, Michael McCoy and other theorists of the School of Product Semantics has resulted in the birth of a new school of design. In my opinion, Product Semantics aims to achieve specific purposes to design, specially those related to pragmatics. They put an strong emphasis on the experience of things as the only source for signification in products. Their contribution is basic to this chapter and bring some arguments in favour of pairing up semantics with pragmatics.

After a very interesting Conference in Helsinki³³ in 1989, they set up a theoretical and practical basis for a future design methodology. Its main purpose was to overcome a lack of understanding and consideration of the users in the process of design which has been the subject of criticism. What was designed to look good should also be well *interacted*. Under this simple but often disregarded axiom, Krippendorf asserted that old paradigms concerning the functionality of things should move to a whole set of new paradigms. According to this, Krippendorf proposed a motto for Product Semantics: *design is to make sense of things*.

The most important outcome of this research is that, for the first time, design is understood from the other side of the equation: the user. Now, design is directed to the real user of the object. Krippendorf's conception of four main scenarios for a theory starts from the users themselves and their understanding and experience of things. Krippendorf intended to understand the concept of *use* as a base for the following theories: *language*, *genesis* and *ecology of mind* from our experience of things³⁴. The first theory is named *use* and it refers to sheer pragmatism. Our experience about the interaction of things is determined in a subsequent stage by language. By using language, the world of experiences is verbally made sensible and can be shared by using speech. In one way, my own investigation has followed a similar development in stating a similar

hierarchy of events culminating in the phenomenon of categorisation. Product Semantics seeks the appearance of *genesis* to materialise the previous two theories through industry. This results in overshadowing the previous *use* and *language*, while in my research, syntax, which generates materially and industrially the meanings of things is allied to semantics. It does not absorb the meaning of things, but it serves as a basis of a broader project. In a way, by having *genesis* over *use* —pragmatics— and *language* what Krippendorf is actually doing is to convert a general semiotic system into a specific one. That would lead to a possible grammar, to a science of arts, to the engineering of meanings. I believe that this approach should be made in reverse, that is, from a specific system to a general one. That is, from syntax to semantics and pragmatics which also refers to the duality observed in chapter one and in semiotics. These attempts to methodologise design do not make this basic assumption. Under the commands of cartesian rationalism or other empiricist approaches, design and, by implication, arts, can only be positively explained. They refer again to the notion of a grammar of design that some writers intended to arrive at. By understanding design as a non-determinist general system I challenge this positivist and formalist attitude and I raise the question of understanding design as another art. Krippendorf tried to solve this problem by introducing the *ecology of mind*. The ecology of mind focuses on the importance of the object and the designer's responsibilities as regards society. Unwittingly, its method attempted to make sense of use —i.e. function— and, although the project was much more ambitious, it relied on the same methodologies observable in every movement in art and design. *Making sense of things* is a motto that could be applied to many movements. Nevertheless it is a unique attitude, a flag of a new design activity; a new discipline in design which really strives to understand users' understanding of things.

My criticism of this theory is also based on the fact that every single movement in Art has included the semantics of attributes³⁵. Semantics is basic for the understanding of the meanings in things in the world. It is one of the basic element in Semiotics. But we have also seen that the meaning of use is just one of the many components of the product. In realising this fact, Product Semantics also proposed the use of metaphor to evoke other more intangible meanings. Whether it was planned or not, it pointed to the concept of rhetoric, because metaphor is one of the rhetoric tropes used to convey meaning in a way that few linguistic functions can do.

Is Design a semiotic system?

Emile Benveniste questions whether design is a semiotic system and, using linguistic parameters, he asserts that it is not³⁶. Language is considered the most perfect because is the only one that is used to reinterpret the others³⁷. I question myself whether this linguistic approach is sufficient to embrace the scope of the design discourse. I believe that design should not be judged by a linguistic perspective alone. It may be better to start questioning whether design and, by implication, the visual arts, are the most perfect semiotic systems, since some of their features or attributes transcend language, appealing to the subconscious, inscrutable aspects of our mental activity.

In this respect, Susanne K. Langer said that visual forms *are capable of articulation only through language*³⁸. In my opinion, the objects which designers cause to be produced can also cross the boundaries of verbal discourse. The symbolism of forms is a non discursive symbolism. Perhaps, the subjectivity and individuality of a semiotic system is more firmly based upon a visual discourse than on an organised grammar. Simply to propose a new reading of the designed object throughout the history of art and applied arts raises issues: The designed object has been seen as a sign of status; it can become a sign of function or a sign of ecological obsession. It is indeed a sign of fashion current or past. However, we do not know for sure how objects become signs in the first place. This can be interpreted as a higher degree of intelligibility given through the manipulation of its meaning for political purposes or the granting or banning of certain signs in respect to others. It is certainly a social mechanism that is articulated through political, economic and social events rather than verbal discourses and represented by contemporary objects. It is worth considering what an object-sign would be without one of its constituents or composing signs? What would our case study be without the multicoloured bitten Apple logo on the front of the cover? Would it be a true or false sign? Above all, would it be a sign? Society acts here, in every semiotic system, as the element that assigns a meaning to a sign, symbol or icon. What is a sign in one society is not in another. In fashion, what is fashionable one year will not necessarily be fashionable the following year. It is the society or a group of individuals within it that assign a role for a sign as well as preventing others from acting as they would in different situations.

I can also advance that this generality must not only be ascertained in products alone. Not all works of art are physical objects. Although this research takes as a basic assumption the semiotic and rhetoric aspect of designed objects, we can imagine that every work of art could be equally significant. But, perhaps, in another field. This was suggested in some writing. The first view was introduced with Barthes' shifters of production in Fashion. A very complex system of production and cycles of developments is also given by John Walker³⁹ (fig.8). In his diagram we see a very interesting flux of the economic, technological and sociological devices implied in a consumerism society. The semiotic role in applied arts was also proposed by Schaer⁴⁰ (fig.9). ICSID's diagram⁴¹ (fig.10) interprets the industrial design process. In it, *form*, *decor* and other subjects seem misplaced of their natural dimension.

The concepts of Barthes are similar to those of Birgit Kuntschinki-Schuster's *reality*⁴² (fig.11). The more we go inwards, the more we arrive at Syntax and *reality*. On the contrary, the more we aim to arrive outwards, the more we reach the boundaries of *theory* or connotation. The basic level is learned throughout years of intensive learning about technology, material knowledge and perceptivity of attributes. The more we learn, the more we are able to master a syntax of materials. This constitutes the knowledge of technology and is focused on industrial parameters. The pseudo-syntax of meanings is never mastered but enabled to suggest through the subjective play of meanings. In comparison, it refers to the culture or to the specific culture in which industry survives.

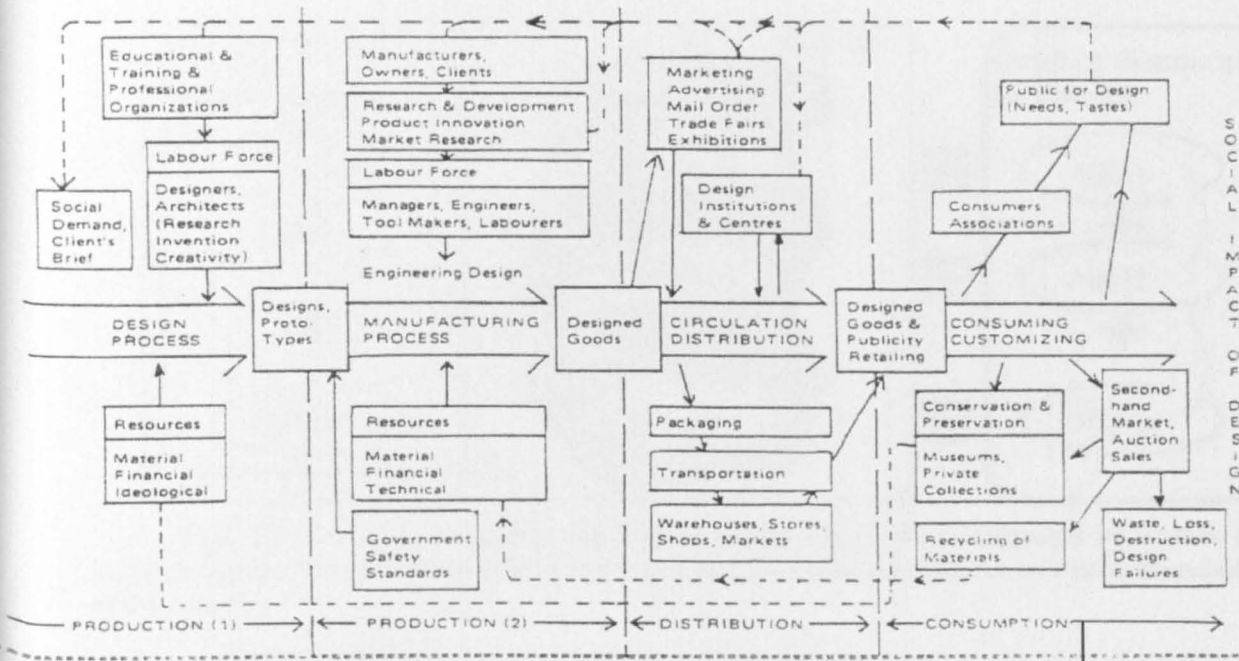


Fig. 8

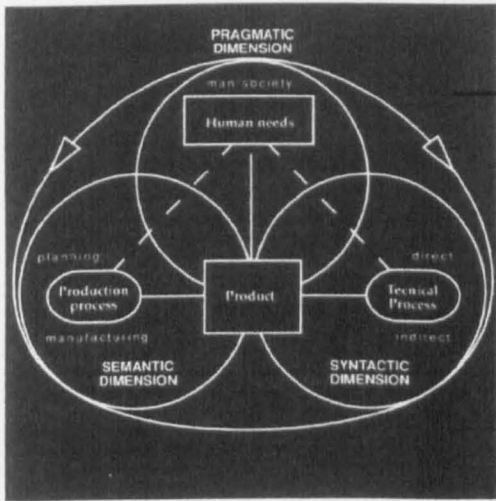


Fig. 9

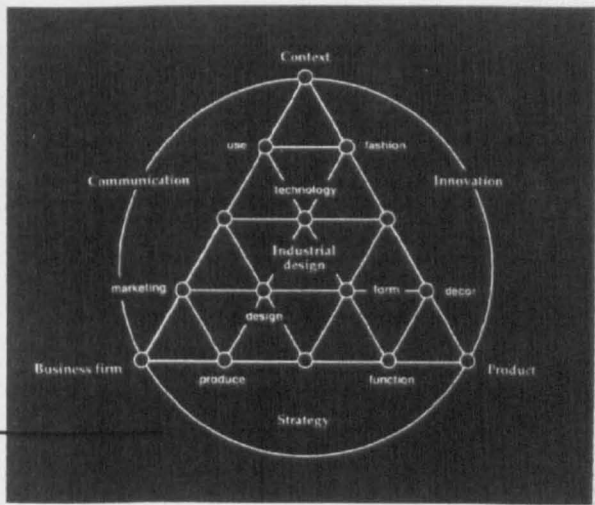


Fig. 10

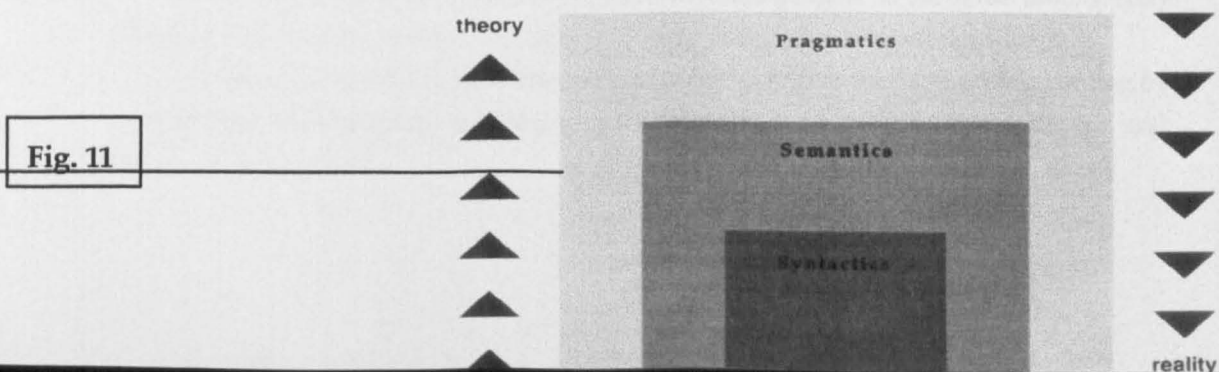


Fig. 11

This is another fact that helps us to understand the sign as something eminently social with its dimension completely developed through communities, societies and countries (fig. 12).

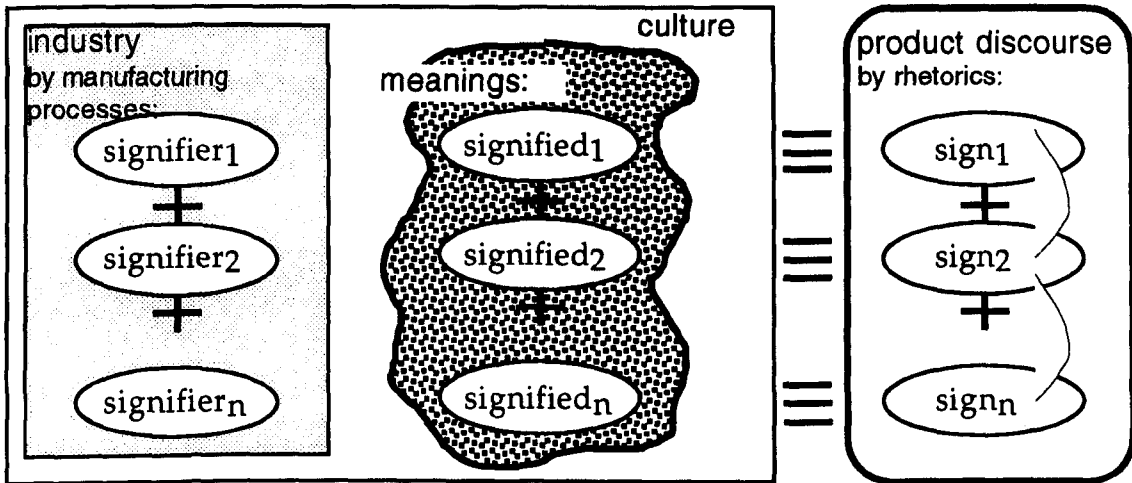


Fig. 12: The diagram shows the duality of the sign being constituted by Syntax and Semantic agents. This duality will lead to the product discourse which links two basic foundations of the society

Summary

Chapter two recaptures the initial duality in senses and is now developed through a more complex context of meaning: Language. Through a number of sources that have tried to establish a direct correlation between words and attributes, the use of language brings out concepts such as categorisation, labelling and more important, the use of signs. The duality in the experience of the world becomes a matter of semiotics because this science rules the meaning and life of signs. Why are signs so important to understand this correlation between the material attributes and their meaning? The first implication of this is that meaning become a matter of signification.

Every single element can signify. This is constituted by two elements which embody the duality material-tangible and the immaterial-intangible. Signs also encapsulate an essentially communicative aspect which belongs to cultural and geographical contexts. In addition, the use of the sign in modern semiotics directly implies the incorporation of a third element which is associated to the concept of experience through users. Similarly, the application of the three logics of semiotics are parallel to this triad in the reality of designed objects.

Signs have been traditionally regarded as direct references to concepts, ideas and, with the help of a number of theoretical investigations, I determined that the roles of semiotics applied to design are three:

- a) To determine intelligibility with the help of language by categorising the object's attributes.
- b) To enhance social relationships by constructing signs; at the same time, society predicts the possible effects that signs will have and imposes their significations.
- c) Design may be a system that aims to arrive at higher peaks of understanding by considering this discipline something more than the mere gathering of materials and attributes in an object.

To exemplify this, I included the work of Product Semantics to show that we must understand design as a discipline that, more than to deal with aesthetics, deals with communication. Although Product Semantics had the intention of doing this, their system arrived only to terms of correct human interaction with objects.

In order to move onwards we must consider the material attribute as a sign. Understanding the object as a sign presupposes a theoretical direct correlation between the application of technology and manufacturing processes which correspond to a syntax. More important, the semantics of forms and attributes matches completely the designer's activity of conceptualising meanings in an object. Furthermore, the pragmatism of the sign has an important place in evaluating the functional, experienced aspect of the sign. Designers understand the designed object as a sign because they can produce connections with cultures and societies. This is a much more ambitious project. Designers can even experiment with these meanings observing how they can be changed or perverted. After developing the notion of the designed object as a communication sign, the question at this point of the argument is: can we consciously apply these semiotic constituents in the object and, therefore, envisage the possible reactions to designer's intentions? This will be examined in the third chapter.

Notes on chapter two:

1. *Category is the real determinant of form. It is not how the thing functions that determines its form but the category we put it in.* Clive Dilnot, Theatrical design and the experience of objects, ID magazine, March-April, 1993, page 38.

2. *Recognition is a function of the strength of verbal associations.* Binder paraphrased by Leonard Zusne, Visual perception of form, Academic Press, New York 1970, page 302, chapter IV.

3. Form is studied by its characters of: solid, surface, outline, plan, nonsensical form, plane geometric and solid geometric. Leonard Zusne, Visual perception of form, Academic Press, New York 1970, page 315.

4. Lundholm, H. The affective tone of lines: experimental researches, Psychological Review, London 1921, number 28, pages 43-60.

5. *Representations are pictures that function in somewhat the same way as descriptions. Just as objects are classified by means of, or under, various verbal labels, so are also objects classified by under various pictorial labels. And the labels themselves, verbal or pictorial, are in turn classified under labels, verbal or non-verbal. What a picture represents (describes) and the sort of representation (description) it is.* Labels are inventive, too because they are *tools of organisation*. Nelson Goodman, Languages of Art, Oxford University Press, London 1969, pages 31-2.

6. Clive Dilnot, Consider what the child-proof aspirin bottle "knows" about the human world, ID magazine, March-April, 1992, page 30.

7. Norbert Hammer and Stefan Lengyel, Do we perceive what design expresses? in Susann Vihma, Semantic visions of Design, University of Industrial Arts Helsinki, 1989, section m, pages 1-7.

8. *The typical fixation scan path is recorded and gives an average of the fixation times [of the viewer].* Norbert Hammer and Stefan Lengyel, *ibid*.

9. The Voyager I was sent out of the bounds of our galaxy to send a terrestrial message by the NASA Agency. Robin Kerrod, NASA. Visions of space, Multimedia Books Ltd., 1990, page 146.

10. Jean Baudrillard, For a critique of the political economy of the sign, Telos Press, St. Louis 1981. Also J. Baudrillard, Le Systeme des objets, Gallimard, Paris 1966.

11. Maurizio Vitta, The meaning of design, in The design discourse, edited by Victor Margolin, Oxford University Press, London 1970, page 35.

12. *The most general objective of the consumer can only be to construct an intelligible universe with the goods he chooses.* Mary Douglass and Baron Isherwood, The world of goods, Ed. Harmondsworth, Middlesex 1980, page 65.

13. Umberto Eco, Semiotics and the Philosophy of Language, Macmillan, London 1977.

14. Seppo Vääkevää, What do we need semiotics for?, in Susann Vihma, Semantic visions of Design, University of Industrial Arts Helsinki, 1989.

15. Yuri Lotman, The universe of mind, I.B. Tauris & Co., London 1990.

16. Barthes' Fashion System starts from Saussure's duality of the sign and bases the entire connotation of the clothe in the phraseology —alas rhetoric— of the fashion critic.

17. *Specific semiotics can arrive at "science"*

18. The concept of a general system can be associated with a semiosphere, a sphere of objects understood semiotically that constructs an environment of visually meaningful messages. For Barthes, the elements of a general system in fashion are four (from the lowest to the highest): the real vestimentary code; the written vestimentary code; the connotation of fashion and the rhetorical system. Roland Barthes, The Fashion System, Jonathan Cape Ltd., London 1985, page 33.

19. A grammar of *markers of use* would be specific; a system of traffic signals has narrow and specific interpretation. They both refer to the notion of a grammar of attributes and the concept of code

20. J. Culler, Ferdinand de Saussure. Collins, Glasgow 1970. Also, Lotman confronts the positivism of Saussure with the arbitrariness of Jakobson. Yuri Lotman, The Universe of mind, I.B. Tauris & Co., London 1990, page 17.

21. Emile Benveniste, Saussure after half a century in Problems in general linguistics edited by M. E. Meek, Coral Gables, 1971.

22. Madan Sanip, An introductory guide to post-structuralism and post-modernism, Harvester Wheatsheaf, London 1993.

23. Charles S. Peirce, Collected Papers, vol II, page 247. Also: *The sign is in turn a triadic relationship: 1) sets off the process of linkage; 2) its object; 3) the effect that produces (the interpretant)*, Oswald Ducrot and Tzvetan Todorov, The Encyclopaedia of languages, Blackwell Reference, Oxford 1981, page 84.

24. Susann Vihma, Product Form - A semiotic approach, in Semantic visions in design, edited by Susann Vihma, University of Industrial Arts Helsinki, 1989, section f, page 1-7

25. Hanno H. J. Ehses, Representing Macbeth: a case study in visual rhetoric, in Design Discourse, edited by Victor Margolin, Oxford University Press, London 1970, page 187-197.

26. According to Heljmslev, graphic forms correspond to a level of expression while the design discourse would belong to the level of content. This duality is repeatedly associated with Kant's duality in human cognition and Saussure's semiotics. Heljmslev quoted in Umberto Eco, Theory of Semiotics, Macmillan, London 1970, page 51-57. Also Eco, Umberto. Semiotics and the Philosophy of Language, Macmillan, London 1977, page 43.

27. Lotman, Yuri. Universe of mind, I.B. Tauris & Co., London 1990, page viii.

28. Lacan, paraphrased by Lotman, Yuri. Universe of mind, I.B. Tauris & Co., London 1990, page viii.

29. Umberto Eco, Semiotics and the Philosophy of Language, Mac Millan, London 1977, page 38.

30 Victor Margolin, Products and experience at Design: Pleasure or Responsibility, Cycle of conferences at the UIAH, June '94.

31. Umberto Eco, Semiotics and the Philosophy of Language, Mac Millan, London 1977, page 14.

32. Use is not just concerned with operation or ergonomics or anthropometry. It has a much broader scope when it relates to sociology and human behaviour. *Meaning is Use. The meaning of a word is to give its manner of use.* Tzvetan Todorov & Oswald Ducrot, The Encyclopaedic Dictionary of Sciences of Language, Blackwell Reference, Oxford 1981, page 99.

33. Various authors, Product Semantics, edited by Susann Vihma, Publications of the University of Industrial Arts of Helsinki, 1989.

34. Klaus Krippendorf, Product Semantics, in Product Semantics' Conference in Helsinki, edited by Seppo Väkevää, Publications of the University of Industrial Arts of Helsinki, 1989, section a.

35. We may say that since semantics refers to the meaning of things, every single current, aesthetics, methodology or epoch in history has pursued the quest for meaning.

36. Emile Benveniste, The Semiology of Language, in Semiotics: an introductory reader, edited by Robert Innis, London & Dover N.H: Frances Pinter publishers, vol.II, 1986, page 234.

37. *Language is the only semiotic system by means of which we can speak of others including language itself. No semiology of sound, colour or image will be formulated in sounds, colours or images...but borrowing the device of language.* Tzvetan Todorov & Oswald Ducrot, The Encyclopaedic Dictionary of Sciences of Language, Blackwell Reference, Oxford 1981, page 96

38. Susanne K. Langer, Discursive and Presentational forms, in Semiotics: an introductory reader, edited by Robert Innis, London & Dover N.H: Frances Pinter publishers, vol.II, 1986, page 99.

39. John A. Walker, Design History and the History of Design, Pluto, London 1989, page 70. (fig. 8).

40. Moreover, I would partially disagree in placing production process and manufacture in semantics rather than in syntax. W. Schaer, Design Interaction Research, Design Congress, Helsinki 1981. (fig. 9)

42. The schema entitled Industrial Design Research 1980-1990 is quoted by Roch Landry, Product Semantics. Convergence of Design Research and Design Discipline in Susann Vihma, Semantic Visions in Design, Publications of the UIAH, Helsinki 1989, section k., page 3. (fig. 10)

43. Birgit Kutschinki-Schuster, Product Semantics in the context of corporate identity, in Susann Vihma, Semantic Visions in Design, Publications of the UIAH, Helsinki 1989, section j., page 2. (fig. 11).

List of photographs and diagrams:

Fig. 1 & 2: Norbert Hammer and Stefan Lengyel, Do we perceive what design expresses? in Susann Vihma, Semantic visions of Design, Publications of the University of Industrial Arts of Helsinki, 1989, section m, pages 1-7.

Fig. 3: Diagram

Fig. 4: Diagram

Fig. 5: Diagram

Fig. 6: Diagram

Fig. 7: Diagram

Fig. 8-11: See notes 39-43

Fig 12: Diagram

CHAPTER THREE: THE PRODUCT SYSTEM (I)

Introduction

How can we convey signification efficiently in a product? In this section we start from a theoretical basis that puts the research in a number of predefined axioms:

a) The object is a semiotic entity constituted by a number of meanings which become significant.

b) The object is also constituted by a number of elements responsible of representing these previous contexts. They are susceptible of being ruled by semiotic theory.

c) Semiotics applied to design combines specificity and generality so the three logics can be applied.

The aim in this chapter is to observe how isolated designed elements contribute to the overall signification of an object and how can designers benefit from this.

Roland Barthes' The Fashion System

A chapter dedicated to the adaptation of a singular linguistic semiotic system to the visual world requires reference to past works of theorists especially the work of the prolific French philosopher Roland Barthes. I have chosen the structure of his *Fashion System* as the starting point of this chapter¹. The title of the book does not sufficiently express the vast quantity of subjects he treated. He used the world of Fashion to set up a method based on the duality of Saussure's sign. My investigation departs from the steps that Barthes proposed for his methodology. He proposed an equivalence between the garments described by a fashion critic and the garment itself. In addition, he based criticism of the design of fashion clothes on the conscious and complex use of language and text. Although I have sought to adapt many of the subjects he proposed in his text, the intention is to extend a future general semiotic design system further than Barthes. I have considered it important to address other issues in a product such as economy, technology or the development of visual perception that he did not emphasise². Therefore, the inclusion of the concepts of syntax, semantics and pragmatics will lead to a much more ambitious project.

Some implications arise from this adaptation. Barthes' way to achieve this is to start with the translation of visual attributes into words —and viceversa—. Although we have seen that meanings transcend their verbalisation, Barthes proposed a deliberate correlation between word and signification and this is based on two fundamental levels of cognition. There is a layering of knowledge that also encounters the duality of Saussure's sign, i.e., the dichotomy between signifier plus signified and the difference between the experienced and the intelligible. Barthes himself recognises this in interpreting those layers with the names of denotation and connotation (fig. 1). Although his layering of knowledge soon becomes highly complex³ this duality is the very foundation of the subsequent levels. His intention is to follow an ascending meaningful path starting from the material signifier. His use of the sign is equally considered as the one of the examples of why visual arts may be understood as semiotic systems. Potential signs in Fashion do nothing but denote and suggest notions,

conventions and concepts that only signs can convey.

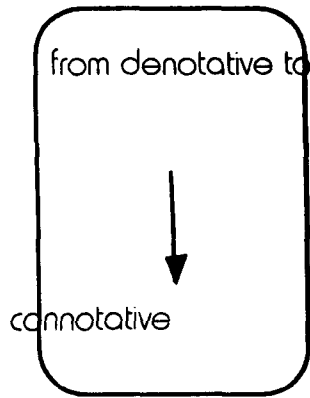
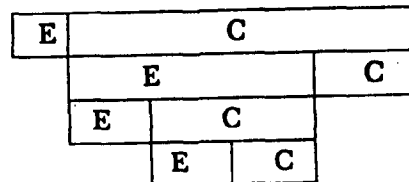


Fig.1:The levels of cognition also resemble a duality and imply a hierarchy

This happens through an organised hierarchy of levels of cognition. Thus, the signifier and signified are abstracted in an imaginary inverse pyramid of significations in which the lower level constitutes the basic denotation of an upper degree of connotation. In Barthes' terms, the signifier generally *denotes* while the signified *connotes*. The combination of both elements constitutes a level of cognition. The originality of *The Fashion System* lies in understanding this combination as a basis for another subsequent level of cognition. The system is comprised of four main levels in which the first one denotes (fig. 2). To denote is analogous to a basic, elementary level that is tangible, material and represented by real objects. The last is essentially the *phraseological*, belonging to the writer, to the style of the writer and the underlying rhetoric used to communicate. In this sense, The aim of my extended system is for designers to enable objects to be capable of supporting *written* rhetoric but this time not by using linguistics but semiotic elements, by the use of visual attributes, not by words. It would be feasible to imagine that there could be a fifth level that belong to the former fashion critic but now applied the visual discourse. This should not be considered as a level that superimposes itself over the discursive object⁴ but goes alongside it.

4. The analyst's metalanguage •
3. Rhetorical system
2. Terminological system
1. Vestimentary code



Again, it is important to state that denotation becomes connotative because society has assigned it a significant role⁵. The object would be seen as something communicative and socially understood. Secondly, I wish to address the description of the attributes. Even the most accurate technological or scientific description of attributes can only reach the level of denotation. This is the level in which science plays an essential role

in defining the terms *tangible* and *material*, a level in which everything can be positively explained and specified within a grammar.

That aspect of a basic level really expresses the notion of a *written* grammar that is ruled by syntax. But the visual object transcends and crosses this boundary, becoming connotative and subjective. At this point it becomes metaphysical and only explainable, as Barthes asserts, through a meta-language⁶ or a meta-meta-meta-language according to a similar layering of cognition by John Walker⁷. The effect of these approaches is repeatedly seen as a difference between the physical and the metaphysical, the knowable and the unknowable. This will be observed throughout the research.

Signifier + Variation = Signified?

How can we attain this connotative character of the signifier? Barthes proposed to follow a method by which every transformed attribute could be given a verbal translation. If the raw material was prepared to signify, that should only happen because the designer enabled a system of cognition to do so, hence providing a subsequent subjective explanation; a pseudo-parallel thinking function to design

He thought that by verbalising the transformations of the signifier these became entirely meaningful. It is logical to see that the end result of his system is the verbalisation and the constructed phraseology of the writer. Although Barthes suggested a similar transfer to a creative method, he constrained the last level of cognition to the written discourse⁸. By implication, I have reinterpreted his method in inverse order. By observing the application of those linguistic and semiotic elements that can transform the signifier I have reversed the system. My intention is to transfer these elements to a possible design method. In fact, the application of his system was in danger of being understood as a pattern for semiotic design criticism. Thus, in reversing the process I intend to use those transformations in the design process. I insist that we do not interpret and frame the visual world through words alone. I believe that what we can do is to mimic this visual world from a similar pattern to that of Barthes which stems from Linguistics to Rhetorics.

In *The Fashion System*, the equivalence between the linguistic and the visual seemed possible. This will become clear as soon as we include the concept of *gesture*. For Barthes, the simple gesture of opening the neck of a blouse is enough to support signification. This gestural aspect of the semiotic element certainly improved those aspects that he suggested as being enough to explain the material world⁹. Gesture in semiotics is directly compared to the notion of experience and, because the latter is individual, subjective and less universal or conventional, Barthes' set of variations of the signifier lacks pragmatic concerns.

Once variations are applied to signifiers and signifieds a meaning is provoked, evoked or suggested. Pragmatism is not completely considered in his investigation. Although gesture is the element that is similar to the pragmatic aspect of the sign. In this sense, it is not only the transformed signifier that shifts meaning. Gesture and use can determine meaning thoroughly.

The Product System¹⁰ may be inspired by the *Fashion System* of Roland Barthes,

and although the arguments previously set out contribute partly to new readings of his discoveries in applying his system, his contribution is fundamental to verifying the semiotic aspect of the designed object.

The Product System: The signifier-the material

It is rare to find a text that compares the use of the linguistic signifier with the epistemological one. In a way, the theory of semiotics that studies the use of the signifier and the signified usually comes from Saussure and the School of Linguistic Semiotics. This is relevant to assess the validity of the correlation between the designed elements of an object and their verbalisation. In the first chapter I challenged this equivalence but still there are few texts that supports this. In this sense, I may be pioneering in this field. The notion of the material represented by the signifier is constantly used in this research. It served as a basis for the creation of objects and it is the starting point for the designer to shift meanings. Metaphorically speaking, the signifier is the *stone* in which we can *sculpt* a shape or in which we embody our most profound intentions. Michelangelo said that his duty when sculpting a form in stone was simply to get rid of the material that actually covered that inherent shape¹¹. The plastic quality of materials like plastics, metal or concrete do not allow us to extrapolate from this creative process since they only allow for casting a form, not for uncovering it. The point of this example is to encourage designers to find expression in materials, to give them a more foreseeable role beyond the material and, at a late stage, to understand those materials as recordable surfaces for visual statements. The medium chosen for that purpose is the material signifier. The signifier is the element that simply does not signify unless the signified or meaning is attached to it.

At this stage, I wish to develop the concept of syntax, the first system of the semiotic process. The chain of words —as if we were speaking or writing— is understood as a chain of various signifiers. In a different way, the syntax of the designed object is interpreted as an infinite linkage of material elements, constrained by the laws of physics, statics and chemistry, all of which belong to the scientific world. As a piece of plastic can be bonded or attached to another material through ultrasonic waves, we can identify *bonding* as a technological activity. This is an activity that is linear, hierarchical¹², that is constrained but at the same time, unlimited, because advancing scientific discovery brings additional technology applied to the development of new materials. A technological activity is demonstrated by the ingenious arrangement of signifiers with a vast variety of representations through material plasticism. The syntax of designed objects is closer to a *pseudo-grammar*, similar to a set of rules commanded by engineering knowledge and the *Product System* is, in this respect, essentially specific. Is a signifier recognisable because of its size¹³, shape or colour? It is recognisable by its *importance* within that chain of signifiers. For some and from a Linguistic perspective, the search for the signifier is a search for anything capable of supporting meaning¹⁴. Similarly, the search for the signifier is a search for important units capable of being shaped or transformed to direct meaning to the viewer.

I wish to change the term *signifier* for another more appropriate. The signifier, because of its nature, is associated with a corpus, a body, an entity which is ready to be

varied (fig.3). The *corpus*, when transformed, leads to the interaction of certain meanings. This meaning or signified is so strong that we soon lose sight of the original non-transformed element and experience only the varied entity. I understand this signifier as a *corpus of meaning*, since it is the real support of the meaning, the only subject we can transform. The corpus of meaning is the basis for every attribute to signify.

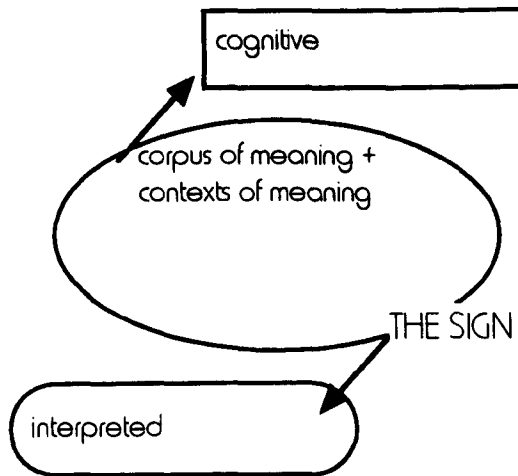


Fig.3: The sign in Design incorporates the corpus, the material and the meanings. Which are escrutable and interpreted in situ

A syntax of *corpora* in our case study will be investigated when the notion of variation is introduced alongside a range of possible identified *corpora*. Again it is very revealing that *corpora* are inevitably named or identified through a recognisable label or category. In this way, the system is related to a grammar, through language. Dealing with variations, meanings are efficiently attainable. But dealing with visual attributes there is less linguistic definition, stating the success of introducing the concept of a general semiotic system in design.

Types of signifiers: Krippendorf's signifiers and Lannoch's dimensions

The identification of signifiers in product design is approached from Klaus Krippendorf's research into types of signifiers¹⁵. Klaus Krippendorf distinguished several kinds of signifiers that can be identified in the form of *conceptual models*.

The first group is named *character traits*. Under this category, products belong to aesthetics, currents or adjectives of subjective origin including *fast, powerful, modern expensive, feminine*. One could understand that every single attribute in an object could be considered as a characteristic trait without making any significant relationship to a defined context of meaning.

In the other group we find elements such as the *intrinsic motivator*. This *motivator* invites users to observe, play or touch: *it can be a funny shape*. *Identifiers* suggest ideal or structural types —Gestalt forms—. *Distinguishers* help to delimit areas of function, while *expressivers* tell about their own qualities through *pointers* that direct attention. The *corpus of meaning* is certainly similar to this marker. The *expressivers*

are, nevertheless, very similar, if not equal, to the group of *characteristic traits*. Finally, the group of the *instructions* are represented by pictorial, verbal information.

Lannoch proposed a more specific study¹⁶ concerning the construction of three dimensional space. He asserted that the *semantic dimension* that surrounds us may be determined by a number of *experiential qualities*. According to Lannoch, the three dimensional world is ruled by the following dimensions: *orientation* —in front, beside—; *state* —closed, standing—; *comparative judgments* —narrow, heavy—; *affordances* —flexible, portable— and *values and conventions* —kitschy, practical—. By using these conventions, Lannoch intended to arrive at the *Semantic Transfer* or, in other words, the transfer of these dimensions to the design process. My intention is to propose another set of qualities that are based on two important studies without the pretension of encompassing the entire three dimensional world but to suggest some important clues in order to experience it self-consciously.

I believe that this system, which will eventually lead to a complete *Product System à la Barthes*, will be significantly more complete than the two previous ones.

The system of variations

The next step is to explore the application of the variations to a *corpus of meaning* practically rather than argumentatively. These variations are mainly concerned with Roland Barthes' assertion of species. For Barthes, to name a variation is to name an epitome of the corpus of meaning; to undertake a process of signification: *to add a variant to a species is to depart from the literal, already to interpret the literal and to initiate a process of connotation which will naturally develop into rhetoric*¹⁷. To apply a variation is, likewise, to transform a category and to invest it with the *aura* of signification. In the nineteenth century William Hogarth attempted to analyse the value of the artistic creation through a set of elements that should be highlighted over the others. In the The Analysis of Beauty¹⁸, he identified a number of elements: *fitness* of the theme —very similar to the phenomenon of appropriateness—; *variety* of elements; *uniformity, regularity* or *symmetry* in the composition; *simplicity* or *distinctiveness*; *intricacy*; *quality*, the value of *lines*; *pleasing forms*; the use of the *waving line*; the use of the *serpentine line*; *proportion*; the incidence of *light* and *shade*; *composition*; *colouring*; the *face* and finally the *attitude* of the elements. In this century, Rudolf Arnheim undertook a similar study very much concerned with rules of perception¹⁹. He suggested nine main sections —*balance*; *shape*; *form*; *development*; *light*; *colour*; *movement*; *dynamism* and *expression*— issues such as decorativism, the intricacy of certain combinations of shapes resolved by the rules of simplicity and visual perception, the importance of symmetry and perceptual balance²⁰; the use of the line to produce perspective and tension; the importance of light and colour, etc. Rudolf Arnheim's Art and Visual Perception²¹ is linked to Barthes' list of variations, because the former sought to develop some characteristics which guided the perception and correct evaluation of an artistic creation. Arnheim's aim was ultimately to support the idea of a more understandable art, a more interactive situation, even discursive, as happens in conceptual art, so that the reader or viewer could understand visually the

aims of the artist²². That was attainable through the conscious play of visual perception issues, basically extracted from Gestalt theories applied and developed to artistic creation.

In coupling these studies I intended to *marry* the conscious, linguistic and semiotic approach of Barthes in the prearranged transformation of the corpora, with the rules of visual perception of attributes. Thus, by joining the semiotic aspect of clothes with the perceptual character of art creation, I anticipated a complete design methodology based on the same polarity of Kant's senses. If this is considered rather adventurous, I would note that I observed that the similarities between subjects such as the rules of closure and closeness or others such as mark or simply colour were far from being anecdotal or random. In fact, they both speak about the same thing but in different codes.

Inventory of variations

Barthes found 30 variants grouped under eight headings, which belong to two main variations. The extent of the variation is polar: from the highest degree to the lowest. Passing through intermediate stages, we find the same character of Deictics²³:

Barthes	Arnheim
Variants of existence	
Identity	
(with or without) existence	
(opposes natural & artificial) artifice	subordinated form (decorativism)
(stress, colour, indication) mark	mark (neutral, positive, gender...)
(inclusion of graphics) mythography	
configuration	
(straight against curved) form	shape (biomorphic or mechanic)
(form adhered skin-tight or loose) fit	structure (maximum envelope)
(ascending, descending) movement	movement
substance	
(heavy or light) weight	gravity (physical and semantic)
(holds shape supply) suppleness	
(from protruding to bumping) relief	textured (haptic)
(opaque or transparent) transparency	transparence (exposure)
measurement	
(long-short) length	
proportion	gradation (stroboscopy)
(wide-narrow) width	depth
(bulky-narrow) volume	volume
(monumental or tiny) size	size
continuity	
(split or unsplit) division	subdivision
(fixed or movable) mobility	
(open, closed, wrapped) closure	closure
attachment	closeness
(folded, rolled up, straight) flexion	deformation (by plasticism)
constancy	

Variants of relation	
position	
orientation	
obliquity (tension)	
distribution	
addition	
(one, many, several) multiplication	balance (perceptual and physical)
(implies symmetry) balance	
connection	
connection	
(over, under, flush with) emergence	overlap
(to match) association	harmony
(increased by, softened) regulation	deviation (perversion)
(isomorphism) empathy	

Is it heretical to attempt to specify the signification of signs? Since we, as designers, feel that the three-dimensional world cannot be explained totally methodically, to recognise this would be the same as to recognise the existence of the *philosopher's stone*. Designers resist believing that a list of names of procedures or tools can be enough to produce the entire signification of *the world*. I acknowledged this problem and therefore I interpreted these two systems as a highly developed list of intervening clues to shift meaning. They suffice for a complete creative system which produced signification. For example in the design which is the subject of our case study. I wish to apply them to the Apple Classic to see how the list can actually provide an explanation of the features of a product. In addition, I will examine them in order to understand the system of variations as a criticism of a possible underlying rationale by the designer. They also imply the use of a methodology for creation since they suggest changes in the use of determined variation. As usually happens in language, to apply a variation implies its transformation. They will be also demonstrated as the development of a particular language in the latest generation of products of Apple Macintosh²⁴.

With the application of the list of variations to the Classic, my intention is also to reaffirm the notion of the stylistic²⁵ or, in my own words, *the preference of certain variations applied to a corpus of meaning*. The use of a transformation become a habit in the design of a product, a shape that always appears in the *language* of a designer. It becomes a matter of style. According to this, one could recognise this style in other *relatives* of the Classic, such as the Quadra, or LaserWriter. The repeated use of certain variation will also help us identify the effects of the transformations in the signifier so that a similar shift of meaning may be always deduced from it. The use of certain variations such as deformation or closure leads to a familiar or even monotonous characteristic of the designer's manner of expressing a meaning. This can be observed when, for instance, these stylistic traits are repeated in the whole range of Apple products.

Identifying the phenomenon of *style* through the list of transformations aims to raise consciousness in the process of design. Consciousness appears when the designer

seeks a more efficient way of sending meanings through attributes. The *Product System* aims to *cast* these intentions effectively. Consciousness is a tribute to those who willingly interact with objects in a search for statements which, as a consequence, establish an often disregarded two-way communication.

Checklist: a particular language in Apple

To exemplify the system, I produced a check-list in which every potentially meaningful corpus was included. Then I identified several corpora of meaning, the variation was interpreted and a meaning or explanation expressed. This is a first step not just for raising consciousness in applying variations but for showing how to deal with visual statements through attributes. This may happen because a rationale underlies our autonomous and subjective system of thought when we communicate notions, ideas and statements through designs. A set of interpretations is given subjectively very much in relation to Chap. I contexts of meaning. This does not presuppose that some fundamental conventions played an essential role in order to objectify signification. These conventions apply to every single human cognition since they became universal from early child development. Some researches have stated that these universal conventions are strongly affected by micro-cultures, geographic contexts and nationality. My assessment of the shifting of meanings will be based on generic conventions rather than on subjective ones. Similarly, both researchers' lists of variations are based upon universal conventions rather than subjective interpretations. The same checklist also has space to register the variations of relationship between corpora.

My intention is also to see how the most characteristic traits of the object can give it a possible overall meaning always in relation to those explained in the first chapter. I also considered those characteristic traits as determinants for developing that particular visual language that Apple has expressed with the so-called *espresso* generation²⁶.

The method

Perceptually, corpora alone combine themselves using variations of relation. Therefore, the relationship that they establish in combining themselves can be equally varied. In this sense, pairing up corpora can be considered as another source of expression. Thus, the list of variations of signifiers is increased by stating not just the variations and resulting meanings but also the meaning of relating one attribute to another. The checklist works as follows: the characteristic trait of the computer is identified under a class name, for instance a *hole* or a *led* and both *hole-led*. There are two types of lists: in the first type of list, the corpus is presented alone, with no relationship to others whatsoever. Once the corpus is identified, a list of variations extracted from Barthes' and Arnheim's lists shows the principal transformations developed from the corpus. For instance, the *hole* has *mark* because it can be either positive or negative; it could be coloured differently from other attributes or could simply be differentiated from others by *playing* with issues such as gender²⁷ in design. The variations are numbered 1 to 10 in the first type of list to 6 in the second. There are

two reasons why I have limited the number of variations. First, I recognised that every object has a transformation that affects, for example, its size, volume or colour. But to make something remarkably meaningful from these transformations is more complex. Thus, the list only highlights the most remarkable traits of the object

The numbers also guide the interpretation recorded afterwards. These have been shown in the most subjective way and they have as a main challenge to trigger as many other interpretations as possible from the reader. They also *infect* the reader with the same *microscopic* ability to list as many variations and subsequent meanings as possible in our case study and in other products. At the end of the first list a general meaning is given, leaving the latter predisposed to act in a much more complex discourse.

In the second list we start to identify the nearest relationships that corpora may have with signifying *neighbours*. But they can only reach the explanation of the physical arrangement or visual distribution of elements when they *denote*, preparing both meaning alone and plain material relationships to engage in a broader role: the visual discourse with the rhetoric bond, so these elements are finally and coherently gathered together.

Corpus of meaning 1: Micro (fig. 4 , rectangle over plain surface)

Variations	Meaning
1.mark -negative-	Everything that raises or goes up is commonly considered as +
2.shape -parabolic-	The form is perfect, as mathematical black-holes
3.deformation	Although it is perfect, it is deformed from the surface
4.movement -outside / inside-	There is an empathic movement towards the centre
5.texture -matt-	Pleasing touch, friendly as in fabrics or skin - is warm-
6.gradation-exponential-	Emphasises empathy, balance and movement
7.depth-hollow-	Gives the degree of form that is conical
8.constancy	Is constant, there are no gaps or interruption of shape
9.closure	Although we do not see it, we imagine the end of the cone
10.relief	It is a depression from the surface

General Signified: A perfect form, a parabolic cone points to the inside of the computer and it resembles some sort of natural depression that comes from outside. It provokes a strong degree of empathy²⁸ and the shape, though perfect, can be related to Nature or emotion.

Corpus+Corpus: Hole and micro (fig. 5)

Variation of relation:

1.orientation -concentrically- According to Gestalt, we could say that there is

- an end and they are centred
- 2.balance Mental balance²⁹ tells us that this is true.
- 3.connection -different - Contrast of shapes with an unexpected end
- 4.connection -different- Contrast of textures, they are different in nature
- Comments:** There is certain feeling of contrast between shapes that results from a gradated path to an unexpected formal and functional end.

Corpus+Corpus: Hole and cover (fig. 6)

Variation of relation:

- 1.orientation -concentrical- Culturally, associated with a single-eyed object
- 2.balance It helps to avoid tension³⁰
- 3.connection -similar- Because the hole comes from the cover itself
- 4.connection -similar colour- In fact, the hole is a depression of the cover
- Comments:** There is a relationship of connection between the hole and cover

Corpus of meaning 2: Screen (fig. 7)

Variations

- 1.mark -coloured- An interesting approach to screens is that they tend to be always switched on because then computers seem alive. Screen savers were first developed to save screen burn-in. Perhaps it also became a matter of decorativism
- 2.existence It is given, it is a technological constraint³¹.
- 3.form -rectangular- The size is determined by the concept of a self-contained computer³², transportable and not very big. The size of the screen, sadly, has recently turned out to be the main reason for discontinuing them
4. texture Very shiny, which cannot be touched

General Signified: Implicitly has no meaning at all; but rectangular invites relating things to it as well as surrounding it with a cover, for instance. Screen can be associated with a cinema screen or as a window to the world. We will see that these are strong reasons to consider this as something gestural³³.

Corpus+Corpus: Screen and cover (fig. 7)

Variation:

- 1.balance -placed centrally- It is placed so the tension is created by our perception about the weight. It provokes certain tension because the heaviest part of the computer is placed in the top. Perception is counter-balanced by widening the immediate zone underneath.
- 2.emergence It is in another plane under the cover.

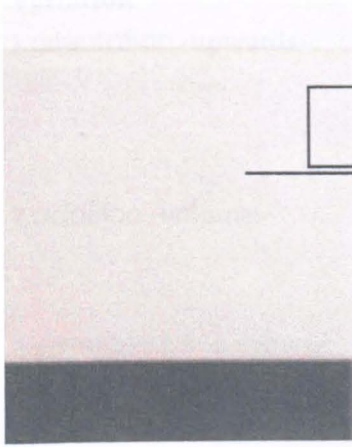


Fig. 4



Fig. 5

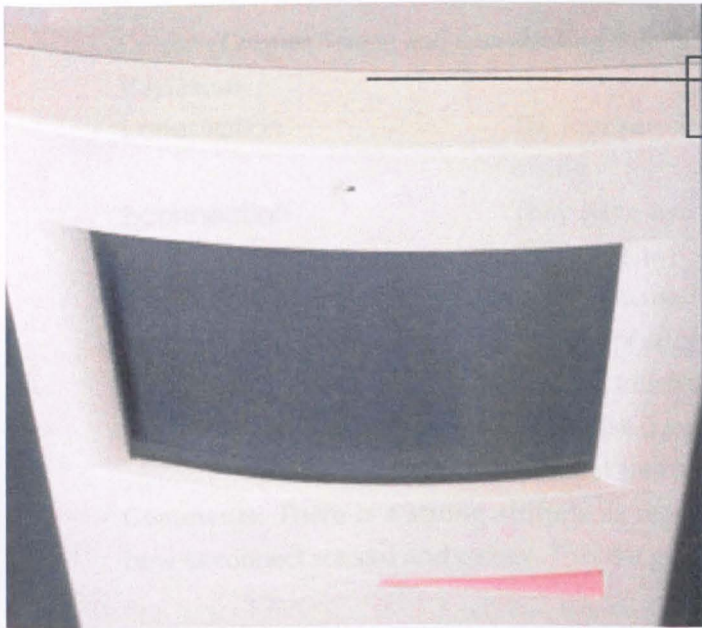


Fig. 7, 8

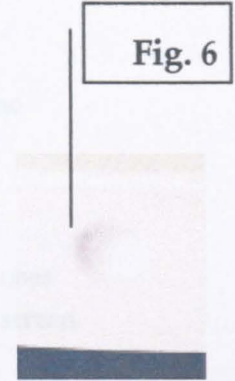


Fig. 6



Fig. 9

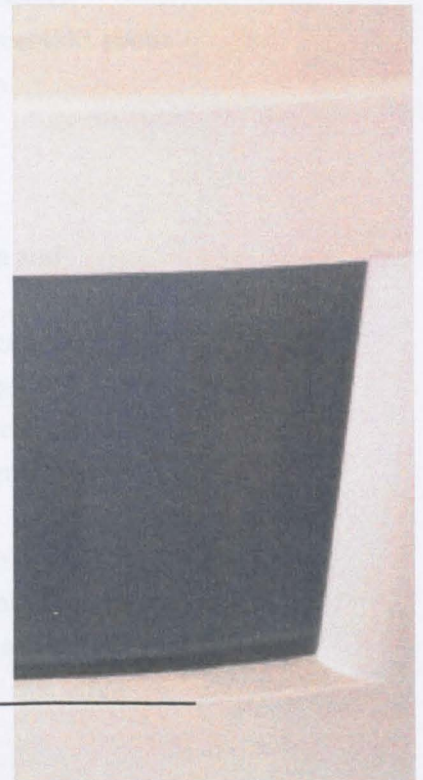


Fig. 10

Corpus+Corpus: Screen and side form (fig. 8)**Variation**

- | | |
|----------------------------|--|
| 1.orientation -upwards- | The front of the computer, the part in which we operate with it seems detached and moved significantly upwards in comparison with former Classics |
| 2.addition -volumes- | The distribution of volumes makes the computer seem bigger and taller than ever |
| 3.emergence -a sphere- | The screen is pushed upwards and that forces a shape to emerge from inside the main box which, metaphorically speaking, by the rule of closure ³⁴ we can understand a complete sphere |
| 4. connection -difference- | Difference of geometry in volumes helps us to separate parts |

Corpus+Corpus: Screen and surrounding edges (fig. 9, 10)**Variation**

- | | |
|---------------------------------------|--|
| 1.orientation | The four surrounding edges point towards the inside |
| 2.connection | They have two different shapes and are opposite |
| 3.association -realism / abstraction- | Acute, square edges versus rounded ones |
| 4.association | Texture of edges is warm in contrast to the screen. You can touch the edges but not the screen, otherwise it gets dirty! The colour is chosen to contrast thoroughly with the black screen |

Comments: There is a strong attitude as regards changing our perception about how to connect screens and covers. This is a great source of expression

Corpus of meaning 3: Lower edge of slot for diskette (fig. 11)**Variations**

- | | |
|-------------------------------|---|
| 1.deformation | The edge is bent towards the outside and downwards randomly |
| 2.form | The shape has been formed organically |
| 3.mark | Is acute if compared with other edges |
| 4.movement -to the left- | While the shape goes towards the right and outside, there is an empathic movement towards the left and inside |
| 5.texture -matt- | Pleasing as in cover. But, reflects more light |
| 6.gradation -non exponential- | Emphasises empathy and movement |
| 7.depth -until ?- | We cannot see the end because it is inside the unit |
| 8.weight | Gravity has definitively deformed this edge |

General Signified: An unconscious, capricious form that, because the slot for a diskette is always open, invites filling in. The shape can only be explained through the effects of the hand of the designer or gravity. In both cases, they appeal to the subconscious, to nature as well as codifying certain movements.

Corpus+Corpus: Lower edge and side edge (fig. 12)

Variation

- | | |
|-------------------------|---|
| 1.connection -similar - | They both seem shaped by the same hand or gravity |
| 2.deviation | The edge of the side seems as though it has been affected by the deformation of the lower edge. So it carries a similar deformation. Thus we understand that the lower edge has deviated the one on its side. |

Corpus+Corpus: Lower edge and upper edge (fig. 13)

Variation

- | | |
|---------------------------|--|
| 1.connection -difference- | There is an important difference between the upper edge, the lower and the side one. One is more natural than the other. The upper edge belongs to the slot for the diskette. But the lower belongs more to the cover. |
| 2.regulation | But both are constrained to the length and depth of a longer one |
| 3.obliquity | There is tension at the end of the edges |

Corpus of signifier 5: Slot for air intake (fig. 14)

Variations

- | | |
|------------------------------|--|
| 1.form-structural | It is a structurally perfect shape |
| 2.mark | Shows the <i>black</i> inside |
| 3.shape | Form abstracted from nature —fish— or car grills |
| 4.weight | It is not affected by gravity |
| 5.movement -inside / outside | It suggests movement inside/outside |
| 4.texture | Texture is the same but it reflects the light more |
| 5.flexion | Deformation of the edge is symmetric, neutral |
| 6.size | Considerable |
| 7.transparence | It exposes what is inside or that is hollow |
| 8. width | Quite wide |
| 9.movement | The movement points to the back |

General Signified: It has been interpreted as fish gills, because of its shape and function: they allow the computer to breathe. But because of the number it can be related to car grilles, and this is supported by the fact that it is structurally perfect and not a random shape. In any case, the deformation is used again to suggest not just movement but a deviation or perversion in the edges of the slots.

Fig. 11, 12



Fig. 13

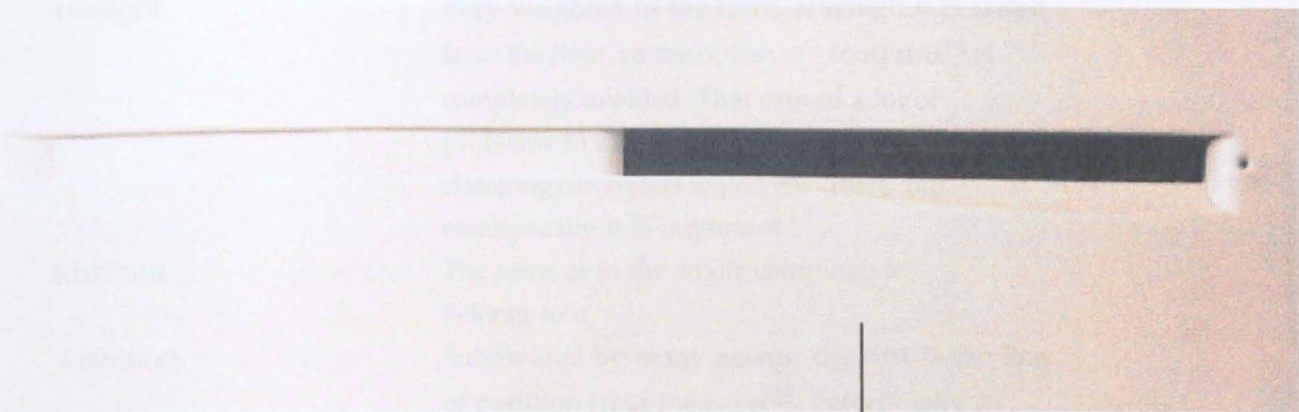


Fig. 14



Corpus+Corpus: More than one slot (fig. 15)**Variation**

- | | |
|-------------------|--|
| 1. orientation | They stand up as in former Macs and they are in relation to the bottom |
| 2. multiplication | There is a repetition of slots, therefore, meanings |
| 3. harmony | And they are exactly the same. There is no sequence at all |
| 4. balance | Placed in the bottom; the chips are there, too |
| 5. empathy | A whole sense of breath-in/-out |

Comments: They are essentially functional but they became very expressive with a visually elaborated idea of allowing the computer to *breathe* as a living entity. They also give the side a visual balance.

Corpus of meaning6: Front foot (fig. 16)**Variations**

- | | |
|----------------|--|
| 1. form | It is possibly a perfect shape |
| 2. shape | Round, not very mechanical, organic. |
| 3. movement | From front to rear and a second ring raises the feet |
| 4. weight | Very weighted in the front, although it is raised from the floor, so the notion of footprint ³⁵ is completely avoided. That caused a lot of problems to the people involved in the concept of clamping computers to prevent theft. But conceptually it is important |
| 5. texture | The same as in the whole computer: it belongs to it |
| 6. division | Subdivided by many agents: the first is the line of partition from the cover ³⁶ . Perceptually it allows us to understand a starting line from the back part of the computer, the technological to exert a certain influence on meaning. Others will be that decomposition of form by the influence of others such as the main rectangle. |
| 7. closure | We tend to see an inner circle and a prism |
| 8. deformation | It is not just a circle deformed as an imperfect egg-shaped form but is deformed or deviated when it is linked with the front curved and holed shape |
| 9. volume | Voluminous |
| 10. attachment | It is related to four different shapes |

General Signified: I interpreted this foot as a rather imperfect form therefore, not mechanical with an increasing weight importance in the front and losing it to the back. It raises the mass as if somebody is literally sweeping the floor from its feet and perceptually it supports the weight of the rectangular face. It comes from the cover and this is emphasised not just by the materials but by the line of

partition. They certainly work as two feet and this impression is more intense when we imagine it in two rather than three dimensions.

Corpus of meaning 7: Front form (fig. 17)

Variations

- | | |
|----------------------|--|
| 1. shape | A very organic form, not structural or pure geometrical |
| 2. mark | Has it got gender? According to Pickford it would be feminine. According to Hogarth it corresponds to a possible line of beauty |
| 3. subordinated form | It looks as if it does not belong to the whole front |
| 4. movement | It is a very complicated combination of movements towards outside/inside with a for that also provokes movement upwards and downwards |
| 6. gravity/weight | Very affected by gravity, as a drop of a fluid |
| 7. gradation | The movement increases gradually |
| 8. transparence | Perforated to enhance breathe in/out?
the holes are gradually defined so it focus on the centre in comparison with the sides. The holes look like a porous skin |
| 9. relief | It is protruding |
| 10. size | It is importantly sized. |

General Signified: A very biomorphic shape, emphasised by porous skin-like. It is deformed as a soft material and frozen afterwards.

Corpus+Corpus: Front feet & form (fig. 18)

Variation

- | | |
|---------------|--|
| 1. obliquity | Two movements are opposed and collide |
| 2. addition | They both fuse |
| 3. deviation | It seems like the main foot has moved the form upwards |
| 4. connection | Because they belong to the same surface |
| 5. empathy | We can feel the movement |
| 6. balance | There is an important axis of symmetry |

Corpus of meaning 8: Rear feet (fig. 19)

Variations

- | | |
|----------------------|--|
| 1. subordinated form | It is definitively an added form that is related to those feet found in former Quadras ³⁷ . |
| 2. weight | A second ring underneath prevents the feet from touching the floor as if they were floating in the air |

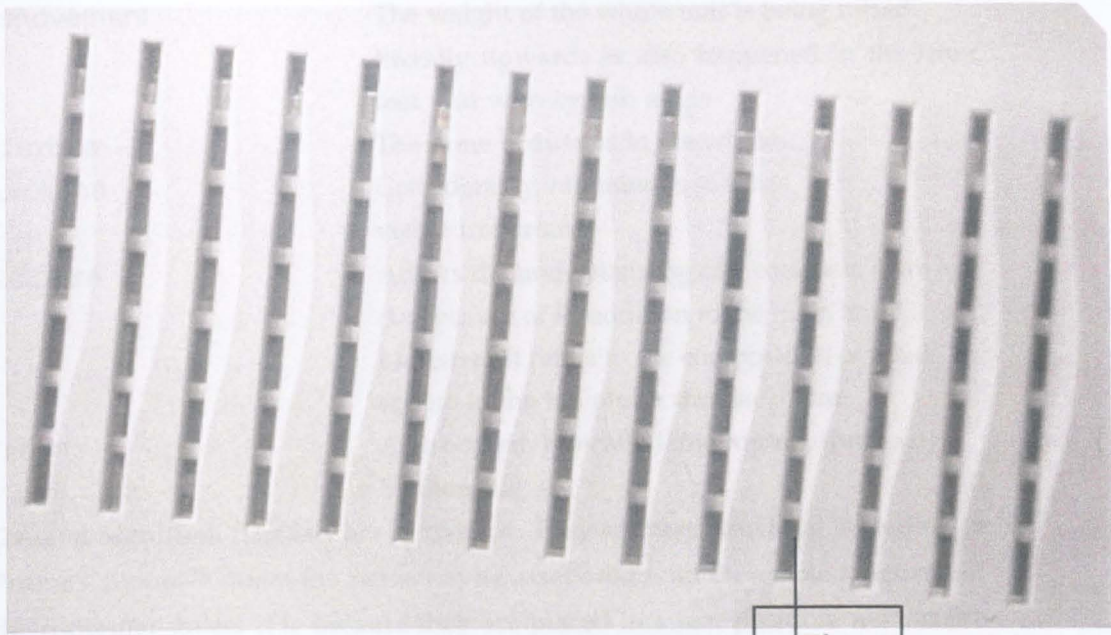


Fig. 15



Fig. 16

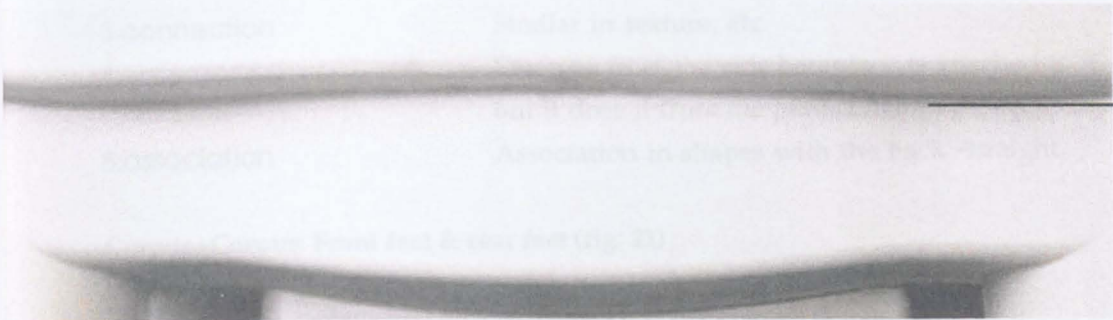


Fig. 17

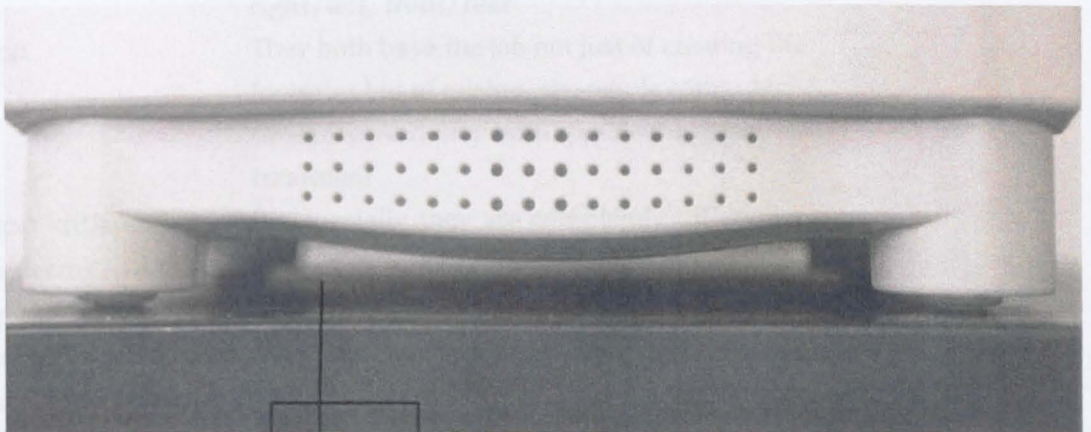


Fig. 18

- | | |
|------------|--|
| 3.movement | The weight of the whole unit is being raised literally upwards as also happened in the front feet. But with certain angle |
| 4.texture | The same texture as in the whole |
| 5.volume | Considerably voluminous so it has visual importance |
| 6.closure | Allows the understanding of a complete form just cut because of its addition to the main body. Moreover it refers to the composition of a half sphere in the top plus a circular prism |
| 7.form | A structural, typically lathe turned, form, not biomorphic |

General Signified: The feet are symmetric. They are very structural according to Pearce's shapes³⁸. Seem too perfect to be associated with the whole language of the computer unless it is because they are placed in a rear position, next to the mains, the chips and the hardware. The ring helps us to understand that the feet are raised and contact the floor with a point.

Corpus+Corpus: Rear feet and side (fig. 20)

Variation

- | | |
|---------------|--|
| 1.obliquity | Perpendicular to the floor, upwards, creating tension with the slight degree of inclination of the whole |
| 2.addition | Could be separated as in former Quadras without affecting the overall shape |
| 3.connection | Similar in texture, etc. |
| 4.emergence | Emerges from the side because it is attached to it but it does it from the perfect half of the feet |
| 5.association | Association in shapes with the back -straight. |

Corpus+Corpus: Front feet & rear feet (fig. 21)

Variation

- | | |
|---------------------------|---|
| 1.balance | Perceptually, the weight is heavier in the front but, the function is perfectly balanced right/left, front/rear |
| 2.association | They both have the job not just of creating the footprint but of raising the whole computer upwards. And they both receive the same treatment |
| 3.connection -difference- | But formally they are completely different |

Comments: Seems like that every pair of feet has its own relation with the part of the computer it supports. One pair is very organically shaped while the other is more geometrical. This emphasises the different languages of the front and the back as a face, front and a back.

Fig. 20

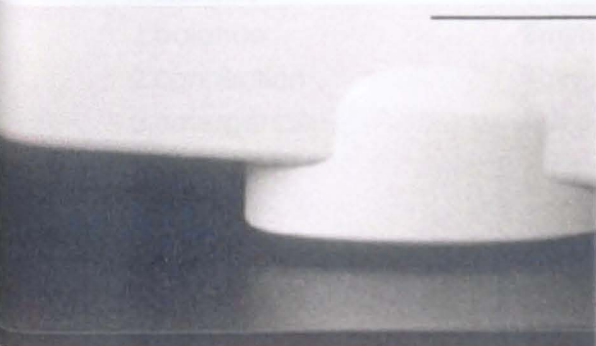


Fig. 19

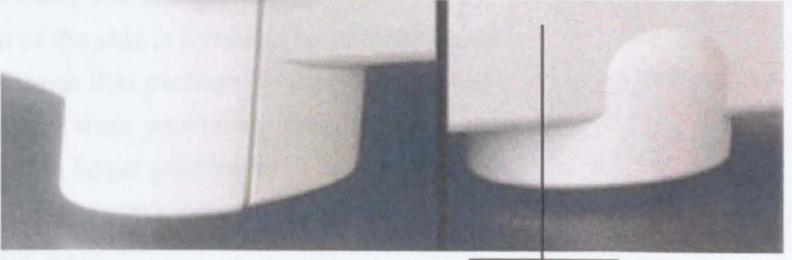
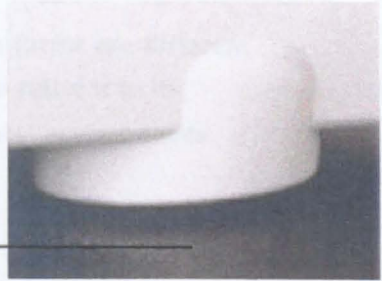


Fig. 21

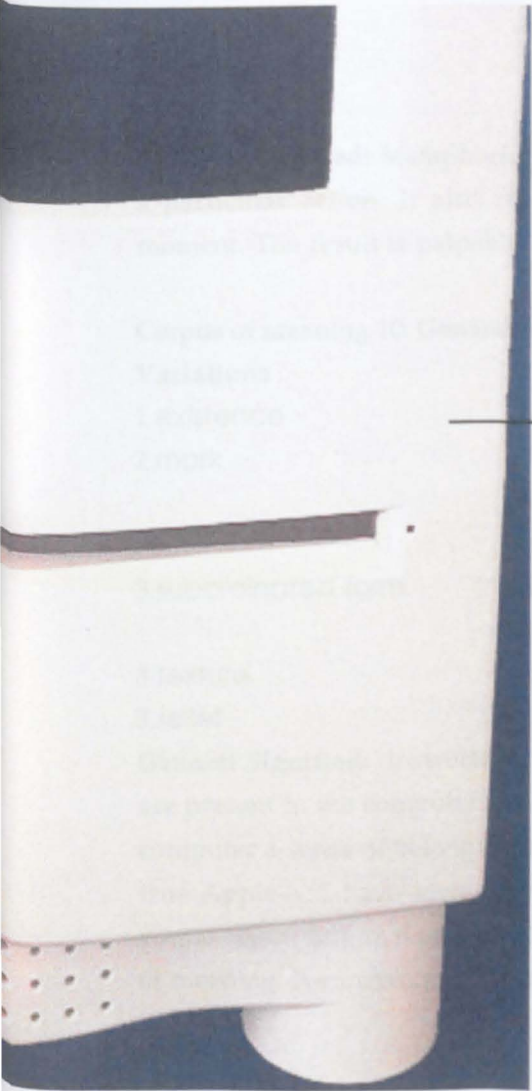


Fig. 22



Fig. 23

Corpus+Corpus: Front feet & cover (fig. 22)**Variation**

- | | |
|--------------|--|
| 1.balance | Emphasises symmetry |
| 2.connection | They are relatives, although forms are different |
| 3.emergence | It is pushed back, perhaps to relate it to its predecessors ³⁹ and to separate environments |

Corpus of meaning 9: Button**Variations**

- | | |
|-------------|---|
| 1.mark | It is positive and feminine |
| 2.shape | Very organic, biomorphic and less structural. It is the only touchable element |
| 3.fit | Fit to certain protuberance underneath |
| 4.movement | Towards the centre and the sides because the depression indicates that |
| 5.texture | It is smoother and less grainy |
| 6.gradation | The end of the side is followed by another curve |
| 7.volume | Two volumes that perhaps by the plasticism of the material were previously one, shaped by the action of the finger pushing in |
| 8.movement | It certainly indicates right and left, or by coding it+/- |
| 9.mobility | It has therefore mobility, it moves |
| 10.relief | Is very protruding |

General Signified: Metaphorically it resembles a shape that has become two by a particular action. It also resembles two bulbs of a fluid frozen in certain moment. The result is palpable: empathy

Corpus of meaning 10: General mythography (fig. 23)**Variations**

- | | |
|---------------------|---|
| 1.existence | We have mythography in the cover, a logo, etc. |
| 2.mark | It is coloured because it can contrast perfectly with the general treatment, unitary that the plastic receive |
| 3.subordinated form | Graphics can become decorative rather than functional |
| 3.texture | We can touch the texture of the logo |
| 5.relief | In this case is negative |

General Signified: Instructions as product semantics proposed or mythography are present in the computer. Since they help to identify functions and to give the computer a sense of belonging and validity —without the logo it would not be a true Apple—. I have included in this list because it is a general aspect of the whole object. But, in fact, it would be more correct to have it specified in a corpus of meaning. For instance, if the buttons had a icon stamped on their surface, then,

we could have had mythography listed as a variation.

Review of variations

This research has indicated that, to develop a particular language in the Classic, the designer has repeatedly used the following:

Variations of existence of first order (four times or more):

artifice-subordinated form

mark —coloured, positive, gender, or simply unmarked—

form-shape —everything has a form, but the designer can abstract shapes from different sources and relate all the others to one predominant one. This is observable with the slots for air intake—

movement —movement can be associated with empathy, since we can isomorphically feel it- .Its use allows us to emphasise dynamism-

weight —If an element is affected by weight, the empathy can also be felt.

dynamism can also result from applying weight. Weight is also associated by gravity, but gravity indicates only one possible direction—

relief —generally, protruding—

texture —everything has physically texture. Dealing with materials such as plastic one can play with different finishings and therefore find another source of expression—

gradation —it gives emphasis and it provokes certain feeling of growth, cadence—

deformation —it creates tension and, for Arnheim is the great source of expression after perspective—

of second order (up to three):

closure

volume —everything has volume, but to make an statement from its use can be very expressive—

size —the same for all the variations of measurement—

of third order (one or two):

existence —when we see something completely new in the overall form we could say that exists indifferently from the other corpora

fit —to imply that a shape is fit to another acknowledges that there is another underneath—

gravity

transparence —it allows you to show what it is directly underneath—

width

depth —sometimes depth is used to provoke the sense of having no end as it happened with the hole for the diskette—

division —to divide something with a partition line, for instance, is to interrupt somehow a form and therefore a statement; it also helps to distribute spaces and to differentiate them—

mobility

attachment —something is attached to another or gives you the feeling of not belonging—

flection —as paper is folded, flection plays with the relation of planes—
 constancy —opposed to division—

Variations of relation of first order:

orientation —every element has certain orientation in respect to another but to create tension or opposition with this orientation is expressive—
 balance —is perceptual, giving physical balance to a distribution of elements or mental, playing with visual perception issues—
 connection —can be connected or unconnected to a certain degree—
 emergence
 association —physically added or formally similar—

of second order:

obliquity —a degree of orientation at its most expressive order—
 addition

of third order:

multiplication
 harmony —no surprises!—
 regulation —one element is somehow related to another, indicating certain preponderance of one over the other. We may say that one is regulated by other—
 deviation —one element is not only regulated but deviated by another—
 empathy —one element gives a degree of empathy by the action of another—

The system of variations point in the direction of a personal stylistic approach and are carried throughout the whole new *restyling* policy of the new Macintosh products. Dealing with attributes, we do not just put forward our inner feelings, our own way of expressing artistic interest in the creation of products. We are actually raising consciousness in choosing among useful transformations assisting the materialisation of concepts. In doing so, we predispose meanings to be consciously interpreted.

Summary

In section two, the basic parameter to start with is that the designed object is composed by an unlimited number of significant designed elements which somehow contribute to the overall general signification of the designed object.

How this contribution happens or how can we control the suggested signification of attributes alone? In addition, how do these elements unite in a coherent role? In relation to the first question, Chapter III borrows from Roland Barthes and Rudolf Arnheim some important considerations from two different perspectives (the former from a semiotic perspective and the latter from a perceptual one):

a) Barthes bases his system in the duality of senses and on the constitution of Saussure's sign (Chap. II).

b) Barthes speaks about a layering of knowledge resembling again the duality common to Peirce's planes (Chap. II). This layering develops into a discourse perpetrated in the phraseology of a fashion critic.

c) Barthes and Arnheim provided a number of mechanisms to suggest changes in universal attributes capable of supporting signification.

d) Arnheim provides almost identical mechanisms from an essentially perceptual aspect of Art.

These mechanisms show the development of a possible methodology through a checklist-matrix that enumerates the effects of the both researchers' variations. They suggest the application of the three logics of semiotics and they also refer to a possible methodology for scrupulous design criticism. They provide some clues to understanding the phenomenon of *style* or the stylistic of a designer and this is put in evidence after recognising the most relevant characteristic traits of our case study.

Reversing the system in a way that the variations become the real transforming agents of the attributes, what we propose is a complete design system. That is, while the order of events passes through writing about existing features in a product from a semiotic process, what I aim is to materialise elements. In doing this, anyone could speculate what would happen if we changed the existing variations in the case study and what the signification would be.

In relation to the reunion of signification, the variations of relationship advanced a more complex system. The variations of relation prepare the consciously constructed significations to interact among themselves in a coherent way as regards the whole. How do they combine among themselves to a significant whole? The product itself prepares the third section and the awakening of rhetorics. Before that, there are some direct implications over the signification of the designed elements.

Notes on chapter three:

1. Roland Barthes, The Fashion System, Jonathan Cape Ltd., London 1985.
2. One of the few comments on the technological and productive process of the garment is quoted here. Barthes recognised in the very beginning of his book that there existed some *shifters of production* that ensured the correct materialisation of the meanings in a garment: *The real garment can only be transformed into representation by means of shifters: the real into image, from real to language and from image to language...first, by a sewing pattern/design; second, a sewing programme and finally a description* [their equivalents in fashion production terms]. This was, in fact, the only reference to the manufacture of the garment. Roland Barthes, The Fashion System, Jonathan Cape Ltd., London 1985, pp. 6-7.
3. *The written garment is constructed like an inverted pyramid of meaning*, Roland Barthes The Fashion System, Jonathan Cape Ltd., London 1985, page 82
4. *The object of a discourse is a discursive object*. Necdet Teymur, The Environmental discourse, Question Press, London 1982, page 28
5. See *The communication sign* in the Chapter II of this dissertation.
6. *System one denotes, system two connotes...system one is the object of the language, system two is the meta language*. Roland Barthes, The Fashion System, Jonathan Cape Ltd., London 1985, page 27.
7. John A. Walker, Design History and the History of Design, Pluto, London 1989, page 15.
8. Henri Pierre Jeudy, Beyond a semiology of objects, in Industrial Design: reflections of a century, by Jocelyn de Noblet, Ed. Flammarion, Paris 1993.
9. *Matter into function, motivation into gesture, nature into culture: the threshold of the intelligible*. Roland Barthes, The Fashion System, Jonathan Cape Ltd., London 1985, page 99.
10. My investigation is similar to that of Barthes with the focus on everyday life products. Although the foundations of both investigations share the same concerns for semiotic theory, the outcomes are substantially different.
11. Popular belief.
12. Since we can interpret the relationship of an attribute linked through another thanks to the intercession of another; to achieve that we must follow a multilineal hierarchical procedure. That is, a mental or spatial ordering of attributes that have been joined together creating a complex mesh of significations.
13. The 8D Finnish nail may be the smallest signifying unit and was awarded best designed under \$5 product in the World Design Competition 1988 because: *its form communicates an unmistakable clarity of function, it performs its primary function easily and directly, it expresses concern for minimalist use of materials and it provides lasting value, because \$5 worth of 8D Finnish nails can perform all its primary and alternative functions (too many to list here) on at least 500 occasions*. Design World, number 16, 1989, page 139.
14. *The only linguistic reality is the one that serves the communication of thought in discourse*. Martinet, paraphrased by Tzvetan Todorov & Oswald Ducrot, The Encyclopaedic Dictionary of Sciences of Language, Blackwell Reference, Oxford 1981, page 108.
15. Klaus Krippendorf, A discourse on meaning, Seminar at the Philadelphia University of Arts, 1994.
16. Hans-Jürgen Lannoeh, The semantic transfer, in Product Semantics edited by Susann Vihma, Publications of the University of Industrial Arts of Helsinki, 1989, section c, pp. 1-11.

17. Roland Barthes, The Fashion System, Jonathan Cape Ltd., London 1985, page 97.

18. William Hogarth, The Analysis of Beauty, Clarendon Press, Oxford 1955, Chapter ten, page 678.

19. Rudolf Arnheim, Art and Visual Perception, (Arte y Perception Visual), Alianza Editorial, Barcelona, 1991, page 97.

20. *The visual experience is a reciprocal play of guided tensions. Because they possess magnitude and direction we shall call them psychological forces.* Rudolf Arnheim, Art and visual perception, Alianza Editorial, Barcelona 1991, page 25

21. Rudolf Arnheim, Art and Visual Perception, (Arte y Perception Visual), Alianza Editorial, Barcelona, 1991.

22. *We have disregarded the gift of seeing things through our senses. The concept appears divorced from perception.* Rudolf Arnheim, Art and Visual Perception, Alianza Editorial, Barcelona 1991, page 13. To know more about conceptual art look at Baldessari's artistic creations.

23. Deictics represent the dichotomy: here/there; in/out. They are essentially polar oppositions in language at their utmost definition. Tzvetan Todorov & Oswald Ducrot, The Encyclopaedic Dictionary of Sciences of Language, Blackwell Reference, Oxford 1981, page 209.

24. After Harmutt Hesslinger and frogdesign's collaboration with Apple, Robert Brunner introduced the *espresso* generation.

25. According to Chamber's XX Century Dictionary of the English Language, *style* is defined as: *a distinctive manner peculiar to an author; characteristic or peculiar mode of expression and execution [in arts]*, page 961. In functionalist linguistics, the stylistic variation *does not introduce differences in meanings*. Tzvetan Todorov & Oswald Ducrot, The Encyclopaedic Dictionary of Sciences of Language, Blackwell Reference, Oxford 1981, page 24. But it also expresses *the conception of the author expressing himself in his work...It's mode of existence strikes the reader because it is too frequent or it is unjustified in its context.* *ibid.*, page 75. Style certainly becomes a matter of habit.

26. The fact of changing the colour from grey to ochre made Macintosh specialists in changing the previous names of *Snow white* to the *espresso generation*.

27. The issue of gender is a matter of preference of shapes depending on the sex of the viewer. It is asserted that certain shapes appeal more to men than to women and viceversa. This is elaborated in the *Emotion or pathos* section of the first chapter of this thesis.

28. Empathy affects thoroughly our perception and the capacity to provoke emotion from attributes. This is also elaborated in chapter one of section one in this thesis.

29. Balance is either perceptual or psychological. We learnt from Gestalt theory that certain distribution of attributes and geometry can lead to a mental relaxation of senses. We achieve mental balance when we feel that a form has no tension or that this tension is counterbalanced by other perceptual forces. Also, see Rudolf Arnheim, Art and Visual Perception, (Arte y Perception Visual), Alianza Editorial, Barcelona, 1991, page 209: *The angle of 90° degrees is the basement of verticality and horizontality . There are more cells in our eyes in charge of controlling up/downwardness & right/leftness than of their respective diagonals. If there happens the same (Isomorphism) in the brain, it would mean that, because of gravity, the evolution has established in the neuronal human system a predominance of the two fundamental directions.*

30. Tension and balance are naturally opposed as day to night

31. Constraints, whether technological, economical or subjective, force us to choose among the

vast amount of problem-solving mechanisms. The duty of the designer is to deal with these constraints and to use the variations to help the materialisation of them. This is called *neutralisation*.

32. This is a direct reference to its predecessors.

33. As it helps us to know whether it is switched on or off, or other unlimited possibilities such as real-time video images, etc.

34. Closure is another variation based on Gestalt principles.

35. The notion of footprint started with the problem of placing a computer on a table. Apple Macintosh computers attempted to reduce this space with the conception of the self-contained computer of the Classic. They also developed the anti-theft systems based on the clamping of the footprint's perimeter to a desk. Since it does not work perfectly, we can assume that footprint is understood in our case study as the real footprints of the design's four feet.

36. Partition lines in products are essentially functional to allow easy assembly and disassembly. But they can also be very expressive. Apple has traditionally made use of this in the design of its computers and they developed the concept of *fake-partition line* in order to enhance visual expression.

37. In former Quadras, small cylindrical feet were detachable.

38. According to Pearce's research we can state a direct correlation between the underlying structure of the shape and the shape itself, without using the concept of *maximum envelope*. P.Pearce & S. Pearce. Experiments in form. London: Van Nostrand Reinhold, 1980.

39. The *chin* has been a characteristic trait of the Classic. In this 1992 version, this remains untouched. The comments about the 1992 ID Annual Design Review of the Macintosh Colour Classic designed by R. Brunner, D. Deluilis and L. Barbera include statements like these: *a built-in microphone in its "forehead" or Here is a product with character...it has legs, not just feet, but legs!* M. Harden, ID magazine, New York, June 1992, page 52.

List of photographs and diagrams:

Fig. 1: Diagram

Fig. 2: Barthes layering of cognition. Roland Barthes, The Fashion System, Jonathan Cape Ltd., London 1985, page 33.

Fig. 3: Diagram

Fig. 4-23: Computer retouched images of a series of studio photographs of the original

CHAPTER FOUR: THE PRODUCT SYSTEM (II)

The unapproachability of the signified-meaning

Bearing in mind that in the third chapter I indicated that there is a more complex functionality in gathering designed elements in a complete designed object in a way that the group is coherently significant, I want to introduce some clues to elaborate this. In this way, I shift the focus of previous chapters to other areas of concern. To put all my interest in experiencing how signs gather under a much broader objective means passing through another threshold and to reflect on previous concepts. The most important shift is to give a minor importance to the semantic aspect of the sign.

To control the meaning of an object by the conscious plan of transformations would be pretentious. As I have stated before, my intention is not to *design* meanings but to use a more reliable system of variations, either semiotic or perceptual, in order to assist that subjective, individual way of expressing ideas visually.

Meaning is subjective and emphasised

The conclusion of the previous practical experience was first, that to make sense of things is very subjective. Secondly, it is not easy to control how we make sense of things. Thirdly, that meaning only refers to semantics while signification refers to the object as a significant entity. Meaning is individual, dependent on culture, idiosyncrasy and geographic location. It appeals to the subconscious, to the learning experience we, as individuals, have had during the development of our skills. Every human being has had different experiences about the same perception of an attribute and it is difficult to extract a rule from them.

Following a logical progression of this research, the semantics of the designed element is never separable from the other two. The fact that an object can make complete sense of syntax and/or pragmatic experience is basic to confirming that the signification of things belongs to many and diverse contexts. We have seen some important contexts highlighted in the initial case study. The intention of my research into intervening contexts of meaning is to show the underlying nature of the semantics of a product. We cannot completely account for the number of intervening contexts. Semantic is not separable in theory but it can be presented in practice, so that a demonstration is possible. A corpus of meaning can be transformed differently. Thus, the duty of the designer is to place an increasing emphasis on certain aspects of the object with the help of the visual mastery of attributes and knowledge of the context. Meaning is, therefore, suggested or evoked and the phenomenon of neutralisation¹ or deliberation is basic to the design process. It is an activity that forces us to emphasise that specific aspect of the object which most suits us. Two questions arise when we attempt to make sense of everything: will I be correctly understood and will I express what I intended?

Is meaning attainable?

Some answers to these everlasting questions have been given in different

aesthetics. Starting from the rationalist-functionalist school of the Bauhaus, passing through Ulm, and arriving at Post-modernism we see *two sides of the coin*. The aim of modernist designers was to design products that were so closely tied to their function and the newly discovered play of materials and finishes that they reduced the project to identifying the aspect of the signifier in the sign, a category and its technological syntax (fig. 1). But they squeezed the signification of attributes so tightly that a contrary movement—for some, a natural progression—arose from the same cultural foundations of the modernist movement. As far as the signified was concerned, the post-modern attitude was to reduce the project to its semantic aspect failing, perhaps too often, in inappropriateness (fig. 2). Thus, post-modernist designers were less worried about the syntax to which every material thing must comply to some degree. Similar ideals underpinned different discourses. On the one hand, modernist designers tried to pay homage to current technological developments. On the other hand, the post-modernists became much more fantasist, less impressed by the achievements of technology (*they* had already landed a man on the moon) and were far less influenced by academics with their golden sections and golden rules.

Product Semantics asserted that meaning is a matter of endless connotations in the user's mind. If meaning does not lie in the object and in any case it is not supportive of meaning, the meaning of an object cannot be understood through its shape or the actions that the designer may have produced in designing it but because of the reflection of its external attributes which are interpreted in the user's mind. It is as if attributes absorbed the other possible meanings except the one that is meaningful to us. If this is correct, we would be able to design or, more correctly, to devise a plain surface with, in the case of a computer, just a screen, a keyboard and a slot for a diskette and then wait for the infinite varied interpretations the user may devise. Janet Wolff² asserts that for sociological reductionists the text (or a painting or a cultural work) has no fixed meaning, but that meaning is produced by the viewer/reader with every act of reception. According to Wolff³, viewing or reading is always (*re-*) *interpretation*. Nevertheless, I believe that there is still room enough for us to invoke and send messages. It is the purpose of this research to elucidate the potential method of producing those connotations. If an object acts as a surface which absorbs meanings as the example quoted above then we can control the aspects of this recordable surface to absorb one or the whole range of meanings except one. The colour blue is seen as such because the object has absorbed all the other colours but blue! Is this the clue to the design of so-called classic or timeless design? Design could be so arbitrary that our task is less specific and more and more general having no other duty but the performance of a universe of reflections of meaning.

Meaning has had and still has different degrees of emphasis. We could assume that these *isms* refer to different approaches to diverse contexts of meanings. There have been minimalist, brutalist, sculptural, semantic and linguistic approaches, historicism, and some other *isms* subsumed in a very interesting tree of contemporary aesthetics these help me confirm again the subjectivity of the discourses⁴.

The multiplicity of meaning

At this stage I wish to refer back to the issue concerning the degree of freedom available in exploring the topography of the site. The modernist project was to collapse the meaning of the object to its signifier. They become highlighted not just for their form, but for their function, or character, to mention a few. The post-modern project was to collapse the character of the object to its signified, meaning.

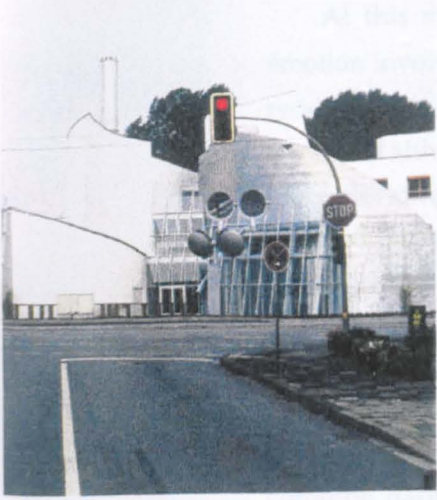


Fig. 3

Deconstructivism has been specially significant in Architecture as means of a new artistic expression

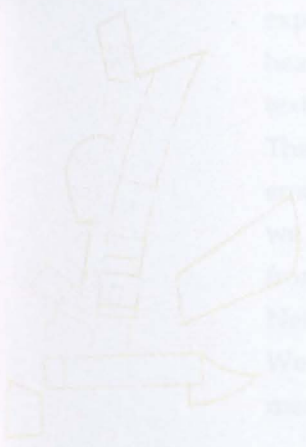


Fig. 1

The modernist project was to collapse the meaning of the object to its signifier

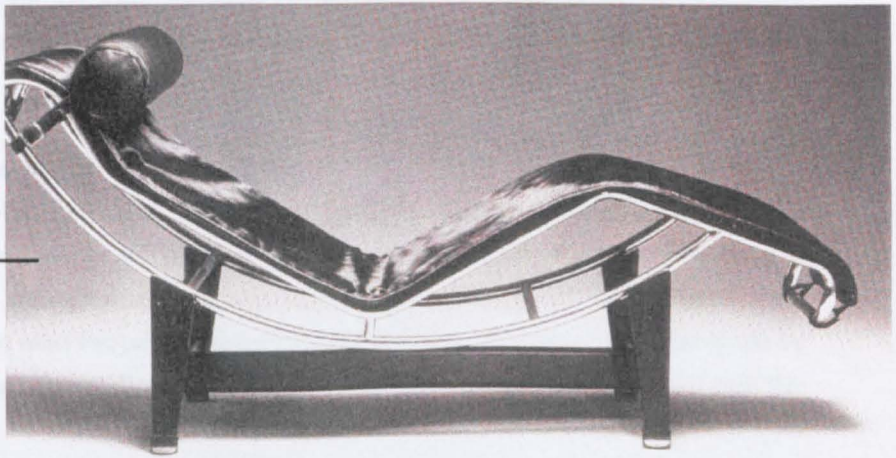
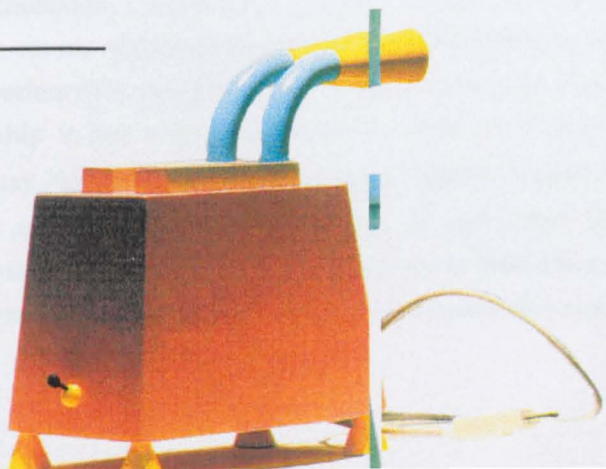


Fig. 2

On the contrary, the post-modern project was to collapse the character of the object to its signified, meaning



The multiplicity of meaning

At this stage I wish to refer back to the haptic experience and the degree of emotion involved in exploring the topography of objects. The mother⁵ is subconsciously recalled to communicate multiple values and we are impressed or moved by certain attributes although we do not know why. I interpret this richness of the attributes in a more elevating perspective by recognising the talent of those who, consciously or not, enabled this relationship (whether historical, technological, functional or aesthetical) to develop in the person who interacts with them. The experience of using a computer mouse is offered semantically in a shape that could be linked to a real mouse which conforms to the hand. Therefore, it also becomes ergonomically sound. The object has a tail that *runs* inside the screen of the computer as a mouse looking for cheese. The first time we may be amused and surprised at the ability of the device to combine hardware and software so easily. The intangible aspect summons up the experiences that we find in the LED blinking when we start the computer, when we hear sounds or a noise when some action is not correctly performed. The curvaceous and textured form of one of the computer's sides, the holes of the cover: what are they for? They become intelligible not just through use but by experience, history, technology, emotion, or character, to mention a few of the active contexts of meaning. That is why we cannot separate a single characteristic of the meaning that can be evoked, provoked from the infinite composition and connotations or associations the object may embody. Neither can we separate the interpretation of them and the subjectivity we represent. We experience them and in milliseconds we visually perceive all these isolated meanings.

Foucault, Derrida and Post-structuralism

Thus objects are multivalent. They never entirely surrender their signification: they can be appropriated in an infinite variety of ways and can be reinflected in different historic or geographic contexts. This fragmentation of signification was advocated by Foucault who introduced the notion of having our knowledge disrupted by its previous formation. Foucault was concerned with *discontinuities* of thought and the delimitation of truth in evaluating whether a discourse is true or false. He has been called *historian of discontinuity*⁶. In dealing with history he affirms that general history is concerned with⁷: *series, segmentations, limits, time lags...* The task proposed for the general historian is, finally, to determine: what forms of relationship may legitimately be made between various forms of social categorisation without looking for any theory of causation. Causation is a word I do not wish to use. I am no longer concerned with the causes of the appearance of a certain attribute, although it has been very helpful to experience its transformation, to know its nature. I am mainly concerned with the relationship it has with another of its kind or of another nature. Omar Calabrese in his essay Neo-Baroque: a sign of times⁸ speaks of parts and elements, of an *etymology of detail as a kind of lexical memory to the path taken by meaning* and the structuring of meaning through thresholds. The whole is determined by fragments that allow us to interpret the former. He says that structuralism, for example, in Linguistic,

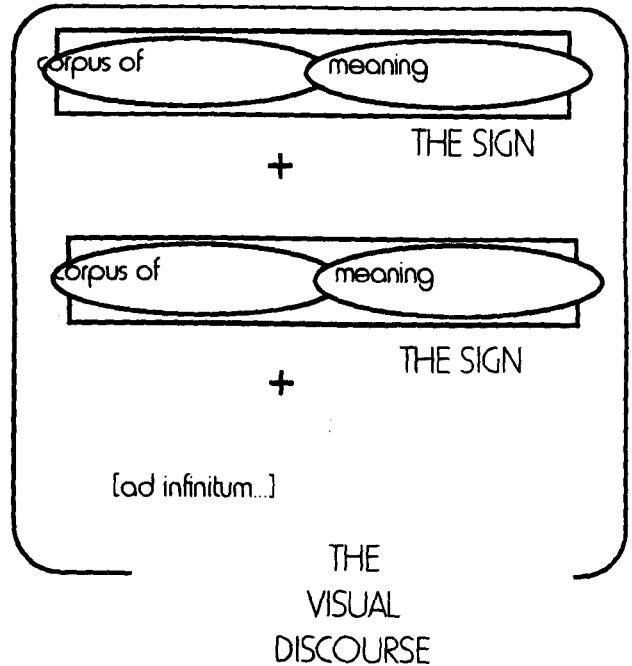
Semiotics and Anthropology is based on the concept of a *phenomenon as a detail of a structured system*. I shall refer to his work later, how he approaches the reunion of fragments in a whole piece of design (as a car can be understood as an aggregation of thousands of little designed pieces).

The latest discontinuity of thought comes from Derrida. He said that there is no final resolution of signification but endless deferral⁹. Significations are deferred as if they were meanders of a river which, after being tracked down, end in the earth and disappear. His theory about fragmentation in discourses has been broadly followed by deconstructivists in architecture¹⁰ (fig. 3). They strictly deconstruct a traditional unit such as a wall or a staircase into small significative, not necessarily fundamental, components as a means of sculptural expression. Again, the relationships among them are, at the core of the creation, a matter of a fragmented discourse which, according to my research, will be ruled by rhetorical functionality. Finally, we return to Foucault¹¹: *the world is knowable but it can be interpreted differently; behind it lies no meaning but rather countless meanings*. He introduced the notion of *perspectivism* under which there is no single truth but different perspectives of it. He also introduced the idea of *subjectivism*. Most writing assumes that designers are fully centred subjects in possession of all possible meanings. But attempts to capture meaning invoke an endless list of requirements. To capture some of the psychological, sociological and associative, to name a few, is a subjective and perspectivist attitude which, unwittingly, affects our attitude as regards designing objects. This attitude will never be considered as true, because designers have acquired the stigma of being, by nature and by profession, highly unstable beings. As example of the complexity of signification, is the thoroughly symptomatic description of a wheel by Umberto Eco¹².

Relationships among signs

I shall move towards the broader implications that the application of semiotics can offer design. The preoccupation for making sense of things gave free reign to Rhetorics and the understanding of the relationships between possible significations as potentially discursive in a visual discourse. The importance of reading in arts moves towards a possible reunion of fragmented significant elements. This fragmentation has been observed in various ways in this research and my interest is to extract from this a complete methodology for the creation of visual discourses. This post-modern structuralist attitude is borrowed from theorists such as Eco and Derrida and they strongly influence an investigation of those relationships which meanings have had in art history (Mc Keon¹³). In this regard, I must remark how important is for this investigation to follow the natural development from a structuralist point of view to a post-structuralist one¹⁴. Those relationships can be effectively explained through the use of Rhetoric, the ancient art of discourse and interpretation that the Greeks mastered. Although to date it has been associated only with texts and literature I will attempt in the third section to apply it to visual discourse (fig.4).

Fig.7: The role of rhetorics is not only to provide a function to fragmented, isolated statements in a designed object but to explore and develop the idea of a true visual discourse



Summary

The description of the Product System in this section has been given as if a design process has been triggered. Step by step, I attempted to build a design discourse from the foundations of the smallest signifying unit to the culmination of a visual statement. Although we have undertaken a process of disintegration of elements, relevant traits, characteristics, they engage in relationships with their immediate *neighbours*. What we see with the human eye is not detail alone but the whole group of those small meanings gathered in an homogeneous form. It will be a matter of habit for those who believed in the fragmentation of discourses and the importance of the detail, because details are marginal statements within a coherent total discourse.

The relationships that rule those engagements are the cause of the rhetoric bond, a discursive attitude that plays with the parts in relation to the whole. We are not concerned to find the answers for the explanation of signification. The idea is not to experience the use of a metaphor, for instance, but accompanied with many other rhetoric figures in a visual discourse.

This overall rhetorical interpretation of significations has two main important tasks. The first is the homogeneous, conscious and individual interpretation of the whole. It also has a free understanding, of those heterogeneous small statements, more concerned with the already investigated contexts listed in Chap. I. In this case, the rhetoric *struggle* is the last clue to an analytical methodology for design; a methodology based on analysis of detail, a compendium of variability of corpora of meaning. It is also a pattern for ultimate design criticism.

In this chapter, my intention is to prepare the reader to the third and last section which is the conclusion of the two previous ones. Here, I wanted to bring some attention to the impossibility of the designer to control the signified because we have already seen in Chap. II that signification is completely linked to cultures. Notwithstanding this, one must take into account some important issues as a basis for the last section:

a) Objects are significant and their nature of being and functioning are due to rules of a material syntax and belong to contexts of meaning which, in addition, refer to major contexts of semantics and pragmatics.

c) These conscious arrangements of signs are always done in accordance with a general signification of a product. Whether this is planned in advance or it is developed through design processes, this general signification becomes the overall visual discourse.

In practice, one must take into account that all this theory cannot be disconnected from its historical implications or contemporary or philosophical developments. It is here where we place the research in front of aesthetic dilemmas and we situate it within most recent tendencies in theories of knowledge and creativity. It is here where we are more concerned with how signs function in a global visual discourse.

Notes on chapter four:

1. *The semantic yield of oppositions constitutes...the reservoir of meaning or memory...Neutralisation occurs to the benefit of a generic term...once the opposition is neutralised.* Roland Barthes, The Fashion System, Jonathan Cape Ltd., London 1985, pp. 161-169. Also, parallel thinking allows us to make all the suitable mental connections to choose and neutralise the non-useful utterances. James Burke, The real thing: life sentence, series of TV documentaries.

2. Janet Wolff, Aesthetics and the Sociology of Art, Macmillan, London 1993, page 33.

3. *ibid.*, pages 33-34.

4. Charles Jencks, Meaning in Architecture, The Crescent Press, London 1969.

5. We can imply that the first haptic contact that the baby has in the early months of development is basically the mother's body, especially the breasts.

6. *Foucault is concerned...with discontinuities in thought and with the impact these ruptures have had on the delimitation of truth. Not surprisingly, he has been called a historian of discontinuity.* Jeffrey Weeks, Foucault for Historians, History Workshop Journal, Autumn 1982, page 109.

7. *ibid.*, page 110.

8. Omar Calabrese, Neo-Baroque. A sign of the times, Princeton University Press, New Jersey 1992. Chapter 4, page 74.

9. Translated from the French word "différance". Derrida, Deconstruction and Philosophy, edited by J. Sallis, University of Chicago Press, 1987.

10. Deconstructivism is the latest *manner* for architects to express meaning in architecture. It is similarly followed by graphic design and publicity in the latest attempt to print visual discourses. In this case, the emphasis of graphic deconstructivist designers is on the writing rather than on the meaning of the written word. They both are based on the fragmentation and detail rather than on the whole.

11. Michel Foucault, The Archeology of Knowledge, Tavistock Publications, London 1970, page 145. Foucault uses the French word "différance" translated here as "deferral".

12. Umberto Eco, Semiotics and the Philosophy of Language, Macmillan, London 1984, page 163.

13. Richard McKeon, The uses of rhetoric in a technological age: architectonic productive arts in Rhetoric: essays in invention and discovery edited by Mark Backman, Ox Bow Press, Woodbridge, 1987.

14. Eco explains that: *Structuralism is a method...but not all semioticians used that method (Peirce and Morris). Lotman is a critic that started from a structuralist approach to the phenomena of signification and communication...but who does not remain bound to it.* Prologue by Umberto Eco, in Universe of Mind by Yuri Lotman. I.B. Tauris & Co., London 1990, page ix, prologue.

List of photographs and diagrams:

Fig. 1: 1928 Chaise longue by Le Corbusier, P. Jeanneret and C. Perriand in Sparke, Penny; Hodges, Felicity & Dent Coad, Emma. Design Source Book. London: QED Publications, page 93, 1989.

Fig. 2: Prototype toaster by Michele de Lucchi in Design Source Book, page 207

Fig. 3: Frank O'Gherly in Design Report magazine, number 11, page 64, 1995.

Fig. 4: Diagram

CHAPTER FIVE: THE RHETORIC STRUGGLE

The rhetoric struggle

The notion of signification has been presented in this investigation as a complex struggle in combining concepts visually presented in a discourse. Somehow they seem marginally related to other more conclusive meanings. These marginal concepts are gathered in an aggregate of discontinuous relationships. We saw that the meaning of an object is related to countless contexts and overlaps enrich our subjective interpretation about them. Functional, technological and economical constrains help to define other contexts of meaning. The *quest* for signification in an object presupposes understanding design as a new creative attitude that manifests itself when the designed elements of an object are combined through the axioms of the rhetoric struggle. Thus, designers' duty is to fight ambiguity to enhance a more feasible two-way communication between objects and users.

Some writers defend the use of rhetoric to exhibit these relationships between statements. The function of this chapter is to recapture a platform laid out in the first two chapters to prepare the *revival* of rhetoric and to apply it to the design process. The *rhetoric struggle* strives to give a discursive function to these isolated statements, assigning to them a reason for functioning in the overall visual discourse. In a first stage, they reached a level of consciousness and purpose when designed elements were consciously transformed by the system of variations. Interpretations from their variations also determined relationships that could only be reasonably explained from a rhetoric perspective. These conflicts are poised for further investigation with a number of case studies.

The purpose of the rhetoric function is to give coherence function to those relationships between those marginal statements. Specifically, to gather unconnected concepts within the whole discourse and to struggle for preponderance and persuasion. It is, therefore, that the analogy of a struggle was chosen to communicate a conflict between the creation of visual statements and a rhetoric relationship established either physically and semantically in a designed object.

Ingo Maurer's Bulb

Consider Ingo Maurer's *Bulb*¹ (fig. 1) an object in a fundamental level of visual discourse. The conscious transformation of the corpora of meaning reveal the application of one basic rhetoric function. Analytically, meaning is because we can understand that a bulb is inside a *bulb*. With the use of a metaphor we experience the cover of a real electrical tungsten bulb in terms of an electrical tungsten bulb. The use of the metaphor influences the application of the variations of the corpora mainly cover and base. Moreover, the fact of exposing the real bulb becomes an statement by itself².

In doing this, we use the abstracted form of a real tungsten bulb covering a real one. The metaphor gives us the fundamental meaning and the function of both design elements —cover and bulb, form and function— of that singular statement. This also

becomes discursive in the sense that it is a deliberate, humorous repetition, a redundancy.

Robert Venturi's extension of the National Gallery

Looking at Venturi's extension of the National Gallery of London³ (fig. 2) the words of visual discourse, architect's statement and some other synonyms echoes strongly in the north-west corner of London's Trafalgar Square. Some criticism also claimed the anti-academicism of the building when Venturi proposed the evident but no less rich, complex play of history of architecture. In my opinion, understanding the classic orders of columns and balustrades of the National Gallery that turns into an unmistakable contemporary language is essentially rhetoric.

This extension is constructed as a metamorphosis. The dialect between vernacular architecture and post-modernism is solved wisely through the use of rhetorics. Venturi perhaps never intended to use rhetoric figures purposefully. But many of the apparent features of its façade could only be explained efficiently under the rhetoric struggle. The relationship of the National Gallery's front façade triggers an argument that can only be unravelled using rhetoric functions. The elemental discourse is based on a recreation of the old order that gradually loses its influence and arrives at an eminently modern facade. Some elements help the understanding of this, specially the gradual loss of the columns' perimeter and function or the use of windows to emphasise this metamorphosis. The window's sill is only retained, kept in an anecdotal way as if the passage of time eroded the rest. To emphasise this, he ended up *saying* that what he was expressing in a first instance was not completely true. In order to support this historical development a classic Corinthian column is placed in the middle of the modern facade as a reminder of the historical past of architecture. Very much in connection with the role of a museum. The modern is not modern without having the old to refer to.

These visual statements have a rhetoric function as regards the whole. The rhetoric figures give the overall discourse a determined function so an interpretation can be issued the play with the balustrade, the play of the columns, the metaphor of the window eroded. They are sheer statements on their own. It is now when we start recognising functions in the discourse. These functions have a clear name in rhetorics.

Theory of Rhetorics. Rhetoric functions.

Some rhetoric functions have been identified in Ingo Maurer's *Bulb* as Metaphor and Redundancy; in Venturi's extension of the National Gallery they were Gradation and Antanacclasis. Where does this nomenclature come from? Some writers have approached the function of meanings in the discourse⁴ and a variety of phenomena has been studied. The starting point of the rhetoric struggle in the Product System stems from the research of meaning to the use of the rhetoric figures. The list of phenomena is understood from a linguistic point of view, giving controversy again to the transfer of the linguistic to the epistemological.



Fig. 2

Different views of the National Gallery's extension in Trafalgar square in London

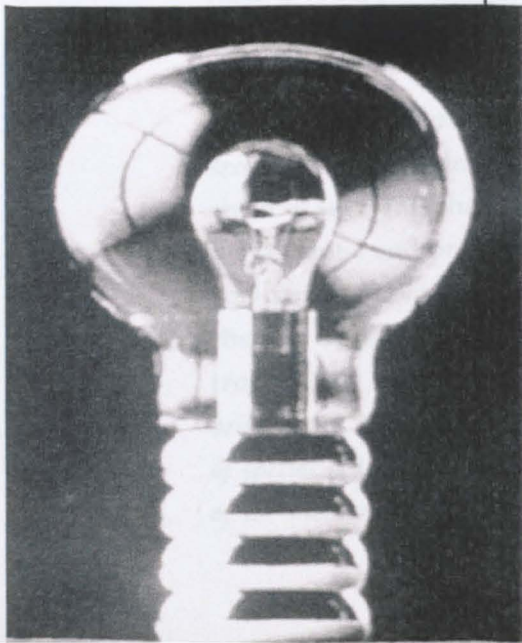


Fig. 1

Ingo Maurer's lamp is a clear example of the use of rhetoric figures

Only few rhetoric functions such as Metaphor or Metonymy have been granted the transfer from linguistic theory to epistemology⁵. The classification of rhetoric functions applicable to design aims to incorporate linguistic rhetoric figures. The research of rhetoric theory is basically centred in two writers: Umberto Eco and Yuri Lotman. They both contributed to a great extent to raising a number of useful rhetoric functions. The first theorist supported the idea of using the trope to convey meaning in a discourse. The second analysed its entity and experienced its use in the arts. They both pointed to the function of rhetoric in a visual discourse. Umberto Eco first identified in his Semiotics and the Philosophy of Language⁶ the symbol as a trope which had a diversity of composition. In other words, the trope had different functions according to a degree or ratio of expression. Therefore, the expression of conventional visual attributes are, for Eco, expressed into two ratios: *ratio facilis* and *ratio difficilis* (page 136), i.e. of easy and difficult ratios.

In the first instance, the attribute is referred to the concept it designates by virtue of law (that is, imposed). It becomes a mere sign such as, for instance, the white hexa-pointed star appearing in every cap of a pen referring to the Montblanc brand. Similarly, the bitten, coloured apple stamped in the cover of our case study refers exclusively to the Apple Macintosh computer.

In the second instance, attributes act as visual *diagrams*. Their transformation gives way to the *oneiric* symbol (page 139). But the rationale of the oneiric symbol is uncertain because it is based on dream distortion and the dream, after Freud, is a disguised fulfilment of repressed wishes⁷. Eco asserts that since dreams work through condensation and displacement of concepts and, in addition, since they do not have a logic nor feasible explanation, they have a rhetoric (pp. 139-140). In this case, the underlying rationale of the oneiric symbols is that they can be expressed, by *ratio difficilis*, through the trope and, by extension, rhetoric, that is, very discursively. The trope is the function that allows the designer to be highly connotative and expressive through attributes.

Yuri Lotman in his Universe of the mind⁸ extended the notions of the rhetoric figure and the trope. He also affirmed my expectations about rhetoric functions: *rhetoric is a mechanism for meaning generation* (page 36). His writing also supports my findings in the first and second chapter: *within consciousness there are as it were two consciousness...: a) one that operate as a discrete system of coding and form texts...in which the basic bearer of meaning is the segment (or sign), while the chain of them is secondary and its meaning derived from the meaning of signs [alone] (pp. 36-37)*. The chain of segments that form the text are syntactically bonded and they pave the way to the semantic and pragmatic interaction. The second part is more revealing: *b) the text is now primary and bearer of meaning [as a whole] (page 37)*, as I foresaw with the rhetoric struggle. *Adequacy relations* for these segments to relate each other form a trope. They constitute the essence of creative thinkings, and their function extends beyond Art. They are inherent in all creativity (page 37). Moreover, tropes are a means of special ordering of consciousness eventually becoming for Tezauro the very foundation of the mechanism of thought (page 42). So, the trope is a foundational mechanism of

thinking

These tropes are for Lotman of three types: Metaphor, Metonymy and Synecdoche. He continued by explaining that the trope has a verbal aspect and another visual one *however masked the latter may be* (page 37). The transfer of the theory of linguistic signs into epistemology has also been suggested by Lotman through the use of the sign. Its ultimate function is to gather these signs into a rhetoric discourse and, according to Lotman, this is conducted by the above mentioned three main tropes.

Lotman experienced the use of the trope: *in traditional rhetorics, devices for changing the basic meaning of a word are termed tropes.* (page 39). With this affirmation, what he asserts is that the meaning of a word can be transformed using tropes. This is because the rhetoric of tropes belongs to a higher level of cognition as Barthes suggested. That implies that this level is distinguished from the level of primary signs or, for Eco, *expressions by ratio facilis*. In consequence, a sign can be used rhetorically and then lose its signification in favour of a broader or controversial one when functioning as an element of the overall discourse. The rhetoric struggle has, thus, the danger of perverting the basic, fundamental *by virtue of law* meaning of an attribute and to give it an extended or different role. This reveals only a wealth that few systems have. The meaning of a single attribute offers an infinite variety of readings once devised in a visual discourse.

Lotman also reinterpreted the History of Art through rhetorics. He said that there are some epochs oriented towards the saturation of tropes: Middle ages, Baroque (fig. 3), Romanticism and Avant-garde. Similarly, I question whether we may be foreseeing a new epoch in aesthetics yet to come. Lotman interpreted and considered the opposition between rhetoricism and anti rhetoricism is one of the universal dilemmas of human culture⁹: *Baroque normalised the rhetoric in a way that when classicism took over, rhetoric was vulgar and the absence of it highly significant* (page 45).

Fig. 3



Rhetoric has been adopted as a source for richness and complexity in a variety of epochs, including Baroque

Necdet Teymur's Environmental Discourse¹⁰

Another clue to proposing a shift of understanding the designed object as discursive through the help of certain mechanisms including rhetoric is found in Necdet Teymur's research. His investigation is mainly concerned with the discourse as a whole that may involve verbal or graphical representations. Some of these mechanisms have a strong influence on society in general and may be extrapolated very easily to the realm of the designed object. We must clearly differentiate the use of the word *object* in Teymur's discourse and object as such. The object of the *Environmental Discourse* is not entirely the discursive object as I proposed in chapter two. The object is enabled to identify the field and its conditions that enable a discourse to form and to function and this is through a hypothetical *discursive field*. In this sense, the designed object evidences itself only materially although it has the same vocation and ability when sending messages.

The formation of the objects are comprised by several *mechanisms, processes and stages*. These are¹¹:

- a) Adopting ordinary words or terms (for instance, scientific concepts such as *crowding, territoriality* are derived from other common ones)
- b) By reference to same empirically given real objects.
- c) Constituted by arbitrarily determined points of view (...*just as social sciences view man as 'nodes' from inside*¹²).
- d) By generalisations (by the same token, environment is described as *everything external to man*¹³).
- e) By reductions and simplifications (for instance, problems in using products could be reduced to a matter of user interfaces or human interaction).
- f) Reference to ideal and original objects (for instance, a urbanism which is compared to an utopian one).
- g) Variations of the basic epistemological structure (the concept 'object' is replaced by 'product', 'commodity' or 'discursive object').
- h) By analogies and metaphors (the object as a discourse, as an open book)
- g) By shifts of domain, amphibologies and borrowings¹⁴
- h) By graphical representations (for instance, simple diagrams)
- i) By non-discursive interventions, ideological promotions and under institutional historical determinations¹⁵

Umberto Eco's list of rhetoric¹⁶.

Umberto Eco approached the variability of the phenomena of meaning with a list of textual effects. Eco assumed that the relationship of at least two linguistic utterances establishes a rhetoric effect. For instance, to mention the meaning of a word unwittingly triggers the mentioning of its antonym. Barthes himself recognised the phenomenon of Neutralisation¹⁷ when we face the task of choosing among the amount of linguistic utterances. Similarly our task when designing is to neutralise the infinite number of meaningful attributes to evoke or suggest a concept or meaning. In fact, this task is eased with the use of the variations. Their relationships are organised and

approached by Eco as follows¹⁸:

- | | |
|--------------------------------------|----------------------------|
| a) Synonymy & Paraphrase | b) Similarity & Difference |
| c) Antonymy | d) Hyperonymy & Hyponymy |
| e) Semantic anomaly | f) Semantic ambiguity |
| g) Redundancy | i) Analytic truth |
| j) Syntheticity | k) Inconsistency |
| l) Containment & Semantic entailment | |

O' Toole's models¹⁹

According to L. M. O' Toole, there are certain mechanisms that aim to transmit a given amount of information in an artistic, narrative structure. These are responsible *not merely to transmit information but to infect the reader with it* ²⁰.

These mechanisms are similar to those I listed as rhetoric functions. The elements theme, mechanisms and text, form the Environmental Discourse. It is important to state that these mechanisms can establish a direct correspondence between the text and the visual objects. In O' Toole's words, they *preserve meaning and heighten the artistic expressiveness*²¹. O' Toole's mechanisms are:

- a) Concretisation: a more concrete word replaces an ambiguous one —for instance, 'entrance' for 'door'—.
- b) Magnification: to exaggerate —in a product, a 'keyboard' for 'buttons'—.
- c) Repetition: to repeat.
- d) Multiple realisation: one utterance summarises several —'computer electronics' instead of 'calculator'—.
- e) Contrast: one element is replaced by itself and its antonym.
- f) Antecedence: the same element its replaced by itself and its precedent —it implies a *'prophecy, a tragic irony'*²².
- g) Combination: two elements are replaced by one.
- h) Agreement: Metaphor.
- i) Abbreviation: Metonymy and Synecdoche.

Under these mechanisms, O' Toole was able to brake up the artistic narrative text into small elements and show the relationships that utterances had among themselves. The basic equation of theme and text expressed by these mechanisms is emulated by the Product System. In this sense, the object actually is enabled to establish the interaction between theme and text through variations.

Ducrot & Todorov's list of rhetoric figures²³.

The use of the rhetoric figures from now onwards is somewhat new as a discipline that cannot be understood completely as it is newly applied visually. Several unconscious attempts have been envisaged in some works from Venturi, Maurer and others.

My intention at this stage is to show the reader the mechanisms that the rhetoric struggle offers design and to reach consciously the materialisation of visual statements in design. By showing a number of rhetoric figures applied to real products, objects or

buildings, my intention is to give way to new possible patterns of interpretation. Interpretation is the clue for the true transfer of the sign in text to the sign in design. Interpretation is a subjective, socially oriented activity that allows us to receive the information we select independently of the medium chosen. The aids to do so are, nevertheless, ruled by rhetorics.

I will also demonstrate the associations that signs engage in. Subsequently I will prepare the reader for the future main body of application. This body will be the reinterpretation of the case study of the first chapter, the Apple Macintosh Classic designed under the Product System.

The list of rhetoric figures is mainly extracted from Ducrot and Todorov's *Encyclopaedia of Languages*²⁴ and is confronted with others' researches such as O'Toole's or Eco's. Some writers have narrowed the list of rhetoric devices to a maximum of one, two or three: Lotman²⁵ explains that during the history of rhetoric investigation several writers have agreed on the main three tropes; Eco understands the Metonymy as basic²⁶; Todorov connects the Metaphor with the doubling of a Synecdoche²⁷; Group μ treated Synecdoche as primary²⁸ and Schofer and Rice attempted to include Irony²⁹. Finally, Jakobson³⁰ distinguished and associated Metaphor with a paradigmatic activity in the discourse while Metonymy was associated with syntagmatic ones.

At this stage, I want to call attention to the paradigm and the syntagm in rhetorics. When Jakobson pairs Metaphor and Metonymy with paradigmatic and syntagmatic roles respectively, he distinguishes between two main extents and uses of rhetoric figures.

Some rhetoric figures are somehow more amenable to function as enhancers of meanings. They will be named schemes. In the first instance, schemes work like syntagm, whereas tropes are more oriented to meaning generation, to paradigmatic activity. A list of rhetoric figures is, therefore, separated in two main groups:

(schemes) Syntagmatic rhetoric

Paradigmatic rhetoric (tropes)

(repetition of sounds) ALLITERATION

ANTANACLASIS (repetition with semantic features)

ANTITHESIS (comparison of two antonyms)

(repetition and simultaneous inversion of the relationship of two attributes) CHIASMUS

(suppression of one of the elements necessary to complete syntactical construction) ELLIPSIS

(succession of at least 3 syntactically equivalent term that possess one or several semantic features in common and among which at least one is repeated with quantitative changes) GRADATION

(permutate elements of a syntax) INVERSION

IRONY (the use of an attribute to express the meaning of its antonym)

LITOTES (a quantitative diminishing of one of the properties in favour of another)

METAPHOR (to experience one thing in terms of another)

METONYMY (to experience the particular for the general)

(syntactic relationship between two antonyms) OXYMORON

(a reuse of the same argument)	REPETITION	PARALLIPSIS (one declares that one is not saying what is saying in the argument itself) PARANOMASIA (juxtaposition of elements that have the same aspect but different meanings)
		SIMILE (establish comparisons between meanings) SYLLEPSIS (a single attribute has more than one meaning and participates in more than one syntactic construction) SYNECDOCHE (an attribute in a broadened sense that includes the ordinary meaning as one aspect)

In the history of the design of objects I observe certain preference in dealing with certain rhetoric figures that have the ability to displace meanings from one realm to another (METAPHOR) or pervert them (IRONY). Others are more concerned with emphasising tropes repeating them (ALLITERATION) or reversing their order of appearance (INVERSION). In consequence, there is a relationship between both groups analogous to an osmotic relationship by which meanings are filtered according to their role in respect to the overall discourse. Sometimes, the production of meaning is based on schematical rhetoric. On many occasions, the trope performs the main function and other schemes are filtered through the use of this trope to accompany and emphasise its overall meaning.

Since deconstructivism has inherited the maxims of post-structuralism thinking³¹ especially in linguistics, architecture or graphic design much attention has been given to experimenting not with what is written but rather with how it is written. That is, to experience the form rather than its meaning. The text itself becomes aesthetically attractive perhaps to the detriment of the message. This post-structuralist attitude was partially borrowed as well in the second chapter implying that we are no longer insisting in the causation of meanings but in their relationships. In this sense, by introducing rhetorics, I strive to focus on the *writing* of the visual discourse. In this writing the syntax of signs are essentially re-mastered by schemes such as ALLITERATION, REPETITION, ANTITHESIS or others.

This is substantially extended when I aim to gather speech and writing into one complete visual discourse by introducing the special functionality of tropes. The relationship among statements are now concealed under a basic analogy: a visual *text*. The paradigmatic trope is now predominant and, therefore, a possible hierarchy is implied.

Frogdesign's cooking pot confronts the system

Frogdesign's cooking pot³² (fig. 4) will be shown to exemplify practically the Product System. It represents the first instance of a pattern for methodological criticism of design. According to the second chapter, a corpus of meaning is identified in a product, for example, the edge of a lid. It has some variations applied bearing in mind that an edge in stainless steel is not the same as an edge in plastic. The technological reasoning starts to appear as we have certain constraints: this material cannot be cast as aluminium, the finishing it receives is different and the plasticity of the material belongs to another production process. Economical factors could be added although they belong more to other kinds of investigation. Pragmatically, it has a clear function, that

is to allow the pouring of liquid. The edge is varied as we saw in the second chapter and, using a similar checklist, some interpretations are given:

Signifier: edge (fig. 5)

Variations	Signified
1.mark	It is positive since goes upwards
2.shape	Resembles the deformation we see in clay
3.movement	The movement is smooth, upwards, downwards, as a wave
4.weight	Weightless to be steel
5.relief	Form relieved
6.volume	Considerable voluminous
7.constancy	Parabolic
8.closure	We can match the form of the tool that formed
9.deformation	The edge is deformed from it

General Signified: The shape has been deformed as if it was clay or paper, organically not mechanically. At the core of that variation there exists the use of rhetorics as a means of providing signification to the deformation as well as the function. We see that rhetoric figures such as Metaphor have been used to experience steel in terms of clay, for instance. Moreover, there is Irony in the fact that we have expressed this in terms of one of the possible antonyms of steel: clay. So, to express steel with the plasticity of clay is very ironical. Rhetoric is revealed when we relate signifiers one with the other. We would say that the curved edge with others of its kind establish another relationship.

Signifier + Signifier: curved edge & others of its kind (fig. 6)

Variation of relationship:

1.orientation	They point towards the centre
2.multiplication	There are three
3.balance	They are at the same distance, the same size.
4.connection	They are exactly the same, therefore
5.association	There is harmony in their relationship

General signified: We saw in chapter two that these signifiers, once varied, perceptually relate to each other and are prepared to receive a function within the overall discourse. This happens almost spontaneously when those secondary statements engage in a much broader discourse. Rhetorics will help us to do so again.

Rhetorics:

ANTANACLASIS (trope)

General Discourse: The rhetoric bond in this case is used merely to emphasise the meaning of metaphor and irony we referred to earlier. It has a schematic role, a function that helps to accompany the strongest symbol, which has been given by metaphor and irony. Sometimes the rhetoric scheme can be so strong that it can easily override the meaning of the marginal variation and therefore, the elementary statement. Other secondary statements can be seen in the cooking pot when we see different attributes confronting themselves in different parts of the object

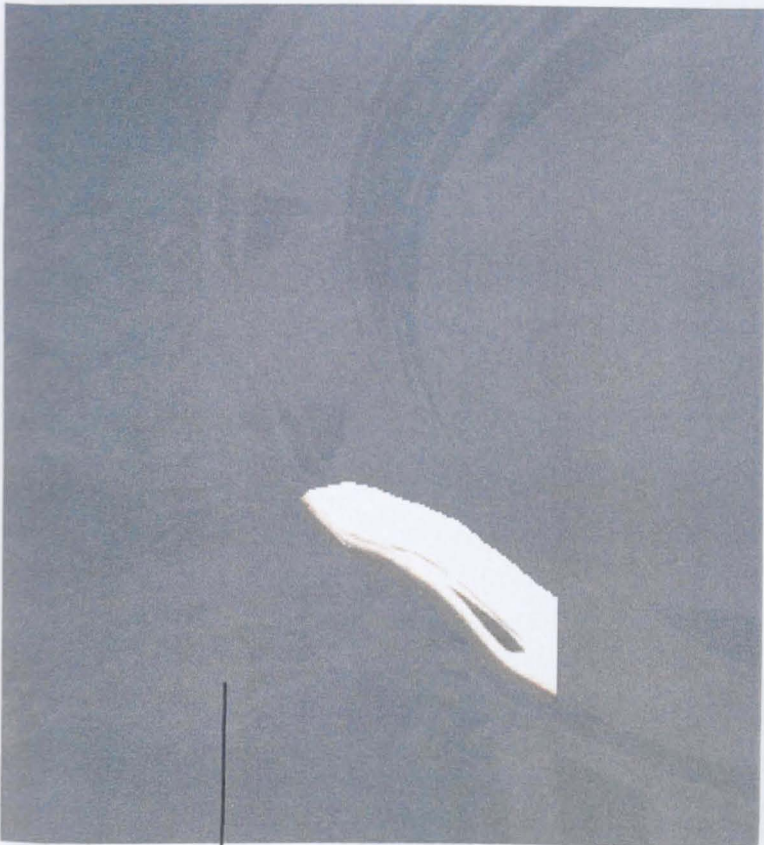
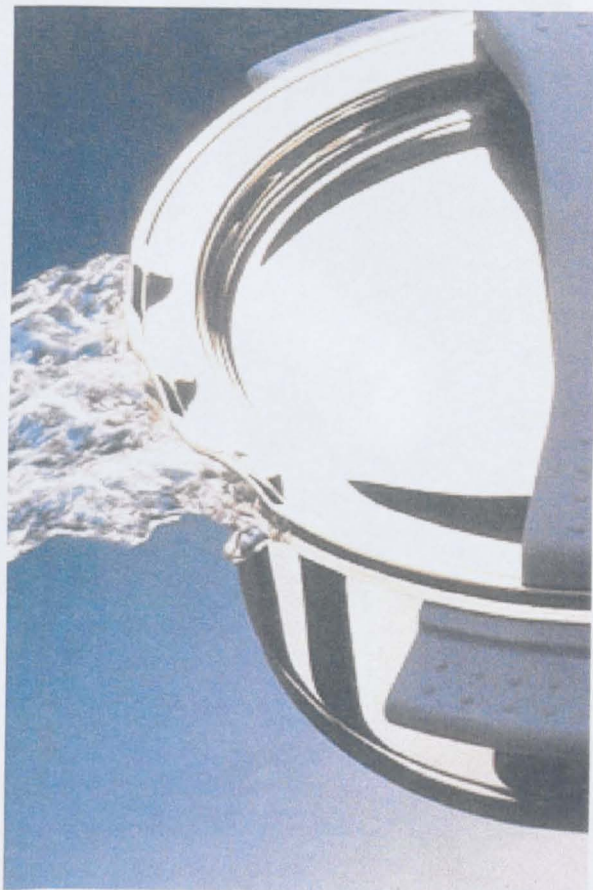


Fig. 5

Fig. 4

Frogdesign's design for Fissler



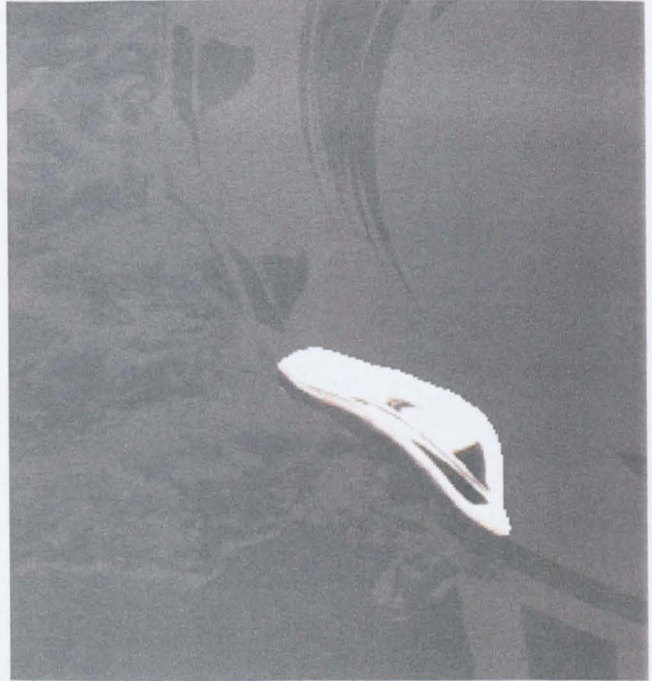


Fig. 6

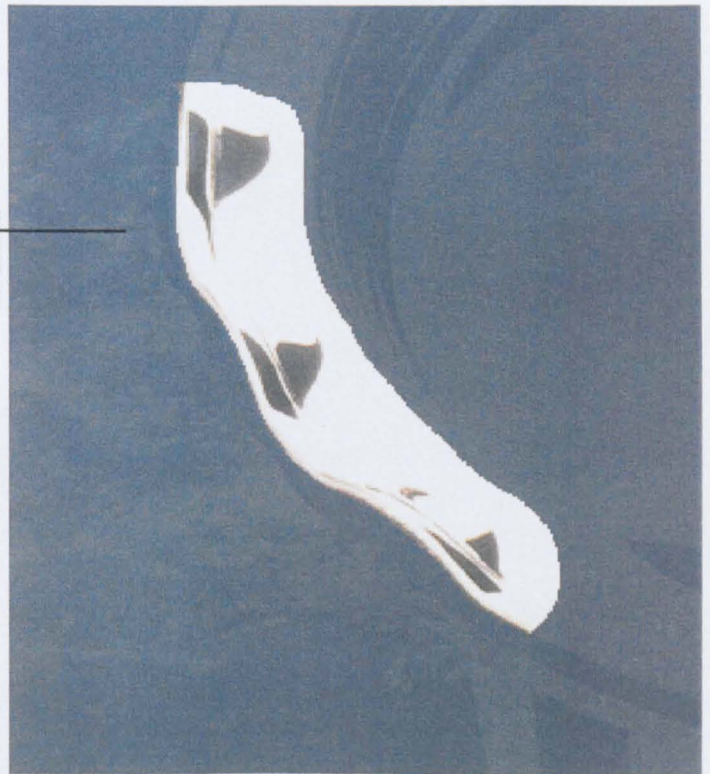
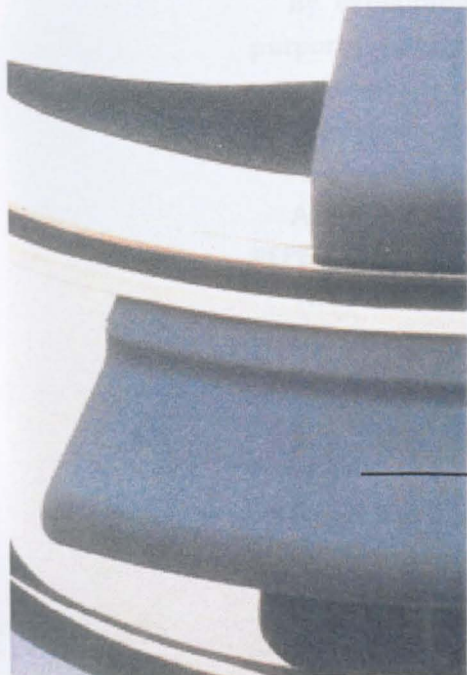


Fig. 7



Signifier + Signifier: texture (steel) & texture (plastic) (fig. 7)

Rhetorics:

ANTITHESIS (trope)

REPETITION (scheme)

General Discourse: In the first use of rhetoric the function of the relationship between the texture of the steel and the texture of the plastic is essentially rhetorical. Because the variations that the steel received emphasised the very smooth, polished, almost untouchable texture contrasting with the coloured, very grainy, less conductive of heat and more ergonomic for the better grip of its handles. The repetition arises when the same treatment is repeated in the handles either of the lid or the main body, always confront by stainless steel. Though obvious, the repetition must be understood not as another alliteration but as a repetition of the same statement in another place of the object. To put it this way, you can repeat alliterations but you cannot make alliteration of repetitions.

More statements are carried throughout the whole product such as the play with the shapes of the handles, the orientation of the points to provide extra grip in the handles. Moreover, they refer to a possible general discourse which I will attempt to interpret:

We saw that the forms resembled those from a material having a plasticity that steel cannot actually achieve or traditionally has never been required. The irony was so strong that the function of all the other statements was very much based on that idea. Thus, the choosing of alliteration emphasised this for three times, plus the irony; the antithesis was chosen to contrast very strongly, the difference of texture and visual language that both production technologies may offer: plastic moulding versus stamped stainless steel and this was repeated to make the point more clearly.

The intention of the designer was to play with the traditional concept of users as regards cooking pots and bakelite handles. To challenge us about seeing stainless steel as something more transformable, more expressive than before; even to see colour in frequently aseptic look-alike kitchenware in the house.

The rhetoric figures

By explaining them the reader is made familiar with the functions that they purport proposing a new vision and a new perspective of Design as a profession and a new attitude as regards consumer societies. These are written in a different indentation to differentiate them from the list of variations more clearly, specially in chapter six.

ALLITERATION, ANTANACLASIS, CHIASMUS, GRADATION, INVERSION AND REPETITION.

The most obvious representation of ALLITERATION can be seen in architecture or interior design since the repetition of orders and elements have been always an interesting source for expression. The deliberate repetition of certain elements such as a simple window in a building gives not only functionality but can result in a repetitive emphasis.

Repetition is a source of expression. Its use can even be irritating in some cases. In music, for instance, the so-called minimalist music or contemporary dance are very much affected by constant repetitions of musical modes where cadence and rhythm are more important than melody —by implication, form instead of meaning—. To repeat also

usually means to emphasise. That is what ALLITERATION does: to emphasise, to mark something from another. It represents a perseverance in one direction. Eventually it helps visually to give perceptual balance to a visual composition. This scheme becomes an ANTANACLASIS when we include semantic features. It becomes a trope. The difference between both seems to be established by a degree of semantic importance. Although I defended the idea of understanding each attribute as a sign, that is, composed of an accumulation of syntax, semantic and pragmatic characteristics, some attributes may have a stronger influence on our cognition. The difference between schemes and tropes is that the scheme supports the trope and the trope regulates by itself the association with schemes. The use of tropes can be emphasised more independently using schemes without affecting the paradigmatic aspect of the trope. In frogdesign's cooking pot we observed ANTANACLASIS in the repetition of deformations which were highly metaphorical. In another segment of the same product, in one of its handles more specifically, ALLITERATION plays an essential role in arranging a group of small spherical forms in order to provide more grip. The shape that results does not show any apparent meaning at all except, the one that geometry could suggest, that is, another pragmatic function that results from this pattern—to provide more grip—or an elementary relationship among textures and/or colours. In the latter case, a degree of semantic interpretation leads us to suggest that the figure used is simply an ALLITERATION. To repeat this pattern in another part of the handle or in another part of the cooker belongs to another figure: REPETITION. As the name itself suggests, REPETITION is simply the reuse of the same composed sign in another segment of the discourse. No differences can be observed at first glance when we compare its function with ALLITERATION or ANTANACLASIS. Except, again, for the amplitude of its function. We can observe a REPETITION of ANTANACLASIS or other rhetoric combinations but not an ALLITERATION of METAPHOR, for instance.

Another scheme which is related to the above is GRADATION. This is because it establishes an ALLITERATION that includes semantic features but is a REPETITION that implies a growth, a succession, a play of sizes or values, a function in the discourse that allows the designer to establish, for instance, an increase of size or importance. GRADATION is observed either as a progression or as a regression. The rules that commands this scheme are simple: *...equivalent terms that possess semantic features and at least one has quantitative changes*. I include qualitative changes too, although the difficulty is to establish the value of these qualitative changes since the notions of quality, fashion or taste and value are referred completely to the subjectivity of the designer.

GRADATION is a very complex source of expression that is based on the rules of visual perception and Gestalt in order to provoke the sense of stroboscopy, depth and perspective, or to indicate a hierarchy of attributes or a succession of statements in a discourse. Its use implies a certain order, because it gradually organises the function of an entity to a desired end.

CHIASMUS combines REPETITION and GRADATION with a permutation of signs. The function proposed here is to combine the relationship of two utterances, two attributes that oppose their growth or decrease at the same time. Venturi's extension of the

National Gallery in London is a clear exponent of this inversion. To use CHIASMUS implicitly describes a dynamism of two concepts, two ideas. This is something that does not control the ANTITHESIS, for instance, because a contrast is made with two opposed ideas or antonyms.

With INVERSION, this permutation happens in a more elemental way, without indicating any gradation whatsoever. INVERSION can conduct our ideas to an unconnected displacement of meanings. Is like receiving an antagonical element in your design and to make of this a statement. This permutation of elements is basically referred to as a permutation of elements within a logical syntax configuration. For example, if a screw is placed in an object to support physically a piece of material but, in fact, this piece of material—a cover, for instance—is supported by another different element and is placed in another part of the object, the inversion has occurred and this screw loses its functional identity, becoming an aesthetic statement.

Thus, at this point, we must clearly understand the difference between schemes and tropes. The schemes are frequently more related to functionality within a discourse. While syntagmatic and paradigmatic functions are not mutually exclusive, tropes are more dedicated to conceptualise, to generate the ideas and the meanings of the discourse. They are determined to make visual sense and to give coherence to the *mare magnum* of those statements. The reverse does not happen. Tropes do not usually provide functionality to a scheme. The power of the trope, in a sense, is higher, because it can ironise, can metaphorically displace notions that no scheme can and, at the end, can even contradict them. The schemes powerfully emphasise the tropes, repeat them, give them a grade of influence or invert them.

ELLIPSIS

This rhetoric figure is presented alone since it has no counterpart in the realm of rhetorics. It represents the smart use of the blank spaces, interruptions and/or gaps to provoke another kind of emphasis. It is another scheme that provides an empty relationship between signs, that is, a relationship zero. To give space to breathe is fundamental in design. To evaluate scale, proportion and measurement is crucial in order to design. As a result, to provide space for this to happen is something that ELLIPSIS, within a rhetorical discourse, can assist very effectively. Something that is never considered by the designers is the movement of air. The space given to an object of determined dimensions displaces a certain amount of air. If this air is considered when we design, leaving for instance, functional or expressive space to walk in a corridor, we create the sense of atmosphere.

If Zen culture revolves around emptiness and finding this zero relationship physically and mentally in life, ELLIPSIS plays a predominant role in achieving thus. The space that follows a gap helps you to clearly differentiate this space from others and not to confuse it. ELLIPSIS allows you to disconnect utterances from others and to organise visual messages. Gaps are also considered rhetorically with the use of ELLIPSIS. Slots, air intakes in car grilles and other examples are expressively treated in transportation design. Finally, it is not the shape that gives meaning to the object but the air that is displaced and the movement of air through or around the shape (this is

specially important in hydro and aerodynamics). What is essentially rhetorical is to allow this emptiness to be expressed and to establish a relationship with other physical elements. It is a relationship that is established by association rather than by appearance. It depends on the other element rather than itself.

ANTITHESIS, IRONY AND LITOTES

In a field that belongs more to tropes, ANTITHESIS is essentially an opposition of meanings. It is an anti-thesis, an antagonism devised in an object to communicate an opposition. In this sense we may say that ANTITHESIS is a SIMILE because it is a no-comparison. We saw that the interpretation of meanings is subjective. To confer a certain meaning to a certain attribute is subjective and I supported the idea that this is uncontrollable and only evocative. To use ANTITHESIS does not presuppose any control but the relationship between two antonyms. For however subjective the interpretation of meanings may be, an antonymic relationship is always at stake. Neutralisation tells us, for instance, that the opposed to the colour black is white and viceversa. What we imply is the expression of a possible contrast. The same happens in design: it does not affect substantially the fact that a circle is contrasted to a square or viceversa. What we want to say, rhetorically, is that they can be antonyms.

To use ANTITHESIS is to counterpoise meanings and to reaffirm one in favour of another. If we combine these oppositions with schemes, the balance is put in favour of another. That is when LITOTES appears. The most expressive way of using LITOTES is when an exaggeration of size or proportion is applied to an object. The work of Jonathan De Pas, D'Urbino and Lomazzi is a clear exponent of this monumentality of small things. Litotes emphasises quantitatively inherent properties of an utterance (fig. 8). In comparison with ALLITERATION, the latter's emphasis does not affect the components of the object. ALLITERATION duplicates, triplicates or multiplies the object in a sequence, without affecting the dimension of it. LITOTES works at its best in oversizing a property or to exponentially increase its size or other characteristics. Yet again, there is an implicit comparison between two subjects: before and after, real and unreal. Therefore, there is certain contrast, a certain antonymical relationship.

A much more important trope is IRONY, frequently used in verbal speech and difficult to understand in design. The ironical action of expressing an idea through its antonym is difficult to apply visually because, in comparison with speech, this rhetoric figure does not have the same aids as facial expression, intonation or body language. IRONY seems like the highest degree of ANTITHESIS deliberately expressed through an affirmation. It must be understood always in context, never alone and, therefore, we would say that it is a conditioned trope. In our case study, to counterpoise organic forms with mechanical shapes is an ANTITHESIS but also an IRONY because a machine could with difficulty be organic.

I say that the matrix of an IRONY is a contrast and not viceversa. The IRONY takes a step further because it has forced the reader to take part in the discourse. It makes you decide which side is correct for you. Hence, it makes you choose between good and bad. To affirm the good through the bad is normally considered humorous and IRONY provokes a certain degree of humour in objects. Humour is strongly provoked with the

use of the METAPHOR too, because this trope has a certain facility to make unusual and impossible displacements of meanings. Finally, IRONY is a trope whose use may be sometimes understood as cynical.

METAPHOR AND METONYMY

The most traditional, humorous, often unrealistic³³ and exhausted use of a rhetoric figure as such is the METAPHOR. A lot of literature has been dedicated to the profusion of the METAPHOR in arts³⁴. Theoretically, many writers have paid less attention to some of its direct relatives: the SIMILE, the METONYMY or the SYNECDOCHE. The SIMILE is the *younger brother* of the METAPHOR. To compare is the latter's shyest version. To compare is difficult to assimilate in design since a comparison can be extrapolated to its extreme: to contrast (by ANTITHESIS) or to its identification (the METAPHOR).

A compromise between both is difficult to achieve because a SIMILE can be understood as LITOTES or GRADATION (a compromise). To use a SIMILE is generally to establish comparisons between meanings. Colours, textures and materials can be rhetorically compared in an object and this comparison is much more defined than shapes. Forms tend to be more restrictive to SIMILE. In any case, the maximum comparison is the identification itself. The METAPHOR embodies this identification. Lakoff and Johnson³⁵ affirmed that the METAPHOR is: *to experience one thing in terms of another*. That is, this general definition is enough to understand the METAPHOR as a metamorphosed meaning that has been absorbed or encapsulated in another. The basic notion of both SIMILE and METAPHOR is the analogy.

The sometimes superfluous use of meaning in post-modern arts has been blamed mainly for overshadowing or disregarding functionality, productivity or the efficiency of the product³⁶. METAPHOR has been blamed in parallel for helping this semantic euphoria to happen. The reasons for this must be found in the roots of the trope's ability to displace meanings quicker than others. METAPHOR portrays much more effectively Barthes' realm of connotation³⁷, representing with its use the differences between the tangible and the intangible. Nelson Goodman³⁸ stated very poetically the use of the METAPHOR: *Metaphorical force requires a combination of novelty with fitness, of the odd with the obvious. The good Metaphor satisfies while it startles. Metaphor is most potent when the transferred schema affects a new and notable organisation rather than a mere relabelling of an old one*.

My opinion is that metaphor has always existed as a means of evoking meanings. Adrian Forty³⁹ has suggested that Greek architecture and its orders were based on the motifs of Greek pottery which was developed significantly earlier than great buildings. The use of metaphor has often been discussed by theorists⁴⁰ and artists to produce meaning in design. The rhetorical figure does not belong exclusively to Product Semantics. Horst Hoecle acknowledged this in the 1989 Helsinki conference⁴¹ and demonstrated some problems that those of us who collaborated in the latest edition of Product Semantics in 1994 in Helsinki⁴², also felt after an important pause for self-criticism and after some loss of confidence and support from people like Robert

Blaich⁴³.

Metaphor & Appropriateness of meaning. Product Semantics: three case studies

To develop my line of criticism as regards the use of metaphor in the Product Semantics theory I wish to refer to the work I undertook in the Product Semantic workshops⁴⁴ at Helsinki, 1994. Eco expressed the phenomenon of appropriateness and impossibility⁴⁵ in using Metaphors. To exemplify appropriateness as well as the *Product Semantic Interface* I will explain the work that some of the Product Semantic disciples as well as investigators from other areas of concern undertook in the *Semantic Interface Workshop* in Savitaipale, Finland⁴⁶ In this workshop we were asked to enhance that semantic interface that Krippendorf and Reinhart envisioned in future design. Four main companies attended this workshop proposing four main themes to explore: IDO (bath equipment), Datex (medical equipment), Kone (elevators) and Fiskars (knife sharpeners). I am mainly concerned with the last three cases. With real clients and real projects we felt that the students would be more motivated in trying to make sense of the atmosphere of travelling in an elevator, or in the rituals of sharpening a knife or in the functional efficiency of the future bathroom and the appearance of computer equipment in medicine.

My criticism does not take into account the use of the so-called *semantic markers* because I realise that these elements can be helpful to accommodate functional concerns. They can enhance the interaction of attributes and, in fact, as the term indicates they help to mark, remark or delimit meaningful segments of use. In the same way that a button to record sound can be socially codified in red, semantic markers of use help the interaction between user and functions playing with universal concepts. They can be explained by the system of variations because, in fact, the *semantic markers* are variations from signifiers. They may also be extracted from Krippendorf's system of signifiers, specially *distinguishers*. But they only form a small percentage of the visual capability of the attributable aspect of an object.

When Eco speaks of impossibilities in the use of the metaphor he implies misleading information, misconceptions or misunderstandings in the discourse whether textual or visual. In this regard, Necdet Teymur established an epistemological fallacy in the use of the analogies and metaphors which could result in a weak and fashionable discourse: *appeal to analogy cannot function as a principle of explanation in the absence of a theory justifying the analogy by reference to similarity of internal coherence*⁴⁷. This was demonstrated when the projects were presented to the audience of students and professionals during the workshop.

Kone's elevator

The experience of travelling in an elevator could certainly receive very poetic and/or historical treatments as well as including new concepts but, in my opinion, these concepts were poorly related to climbing buildings or avoiding obstacles with a limited mode of transportation. To experience the challenge of gravity in order to climb floors in a skyscraper or to climb a wall without effort are concepts that can be the very

foundation of a project like this one. The project was metaphorically associated with the biblical claustrophobic experience of *Jonah in the whale*. Therefore, the whole elevator had a whale-like skeleton, especially ribs, painted predominantly black. The control panel of the elevator resembled the helm of an old ship swallowed by the whale and other factors led us to believe that we were going to spend a lot of time inside the animal rather than easing the feeling of claustrophobia. Following product semantic guidelines, the concept made complete sense through the clever use of metaphor and the appropriate functional markers. The user had an exceptionally meaningful experience in travelling upwards or downwards. One question haunted us during the whole presentation: do whales climb buildings? What is the formal relation between concept and object? That question referred to the concept of appropriateness in using the metaphor and the impossibilities of the visual discourse.

Datex anaesthetist-aid system

The same problem was identified in Datex's project. In designing an anaesthetists computerised aid system, the designers of a one-piece cupboard thought about the warm, friendly and relaxing forms and attributes of a nurse dressed in an old-fashioned manner. It seemed that the use of past or historical shapes was more appreciated than any futuristic ideas the project could propose. The project was conceived more to improve the computer interface of a highly complicated system of parameters and the effectiveness of graphics was very well resolved. In addition, ergonomic constraints such as the placement of the whole unit in the operation theatre as well as its overall shape were also improved. The appropriateness of using the metaphor of the nurse was cast into doubt when we acknowledged that the nurse was taking care of the anaesthetist rather than the patient. That did not fit very well with people's conceptions about doctors on duty. But it was arguably more valid than the elevator's metaphor.

Fiskars' knife sharpener

The last project was conducted by Lucy Niemeyer and myself. The first stage was very constrained by the company and very down-to-earth. We managed to escape from this and proposed various ideas which, inevitably, confirmed many of the subjects that I believed crucial to the creation of products. Some were more related to function, to ritual, to perceptivity and to metaphor. With the basic and obvious constraint of security in dealing with a stone that could *cut* the edge of the knife, we decided to propose a shape which the user could rely on because of previous training, visual evidence and a simple association of shapes (fig. 9). One of the projects was literally to design a carrot⁴⁸. A carrot is meant to be cut into slices, though sometimes it is grated, and we are naturally trained to cut it safely. We also know how to handle the carrot so that it does not slip from our fingers. The appropriateness of the metaphor was far from unrelated except for the fact that, this time, the carrot could not be cut. On the contrary, the milling stones allocated inside the form *cut* the edge of the knife. Similarly, some interesting ideas arose from the mechanism of the sharpener: the tiny milling stones. As the name indicates they were considered as the grain milling stones that eroded that edge of the knives.

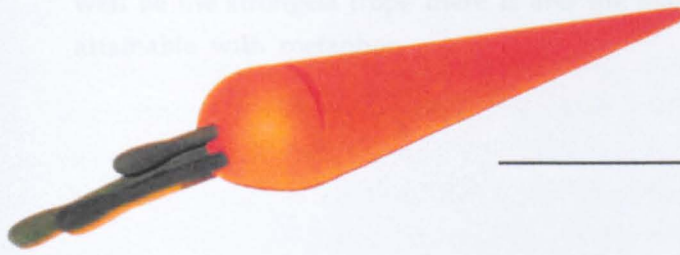


Fig. 9

The use of Metaphor is clearly appropriate in this project

The resulting displacements of meanings must be assessed in terms of appropriateness. One could foresee that the correctness of the use of the METAPHOR and, by extension, all the other rhetorical figures, is to relate formally and illustratively the concepts or ideas that we want to displace in a visual discourse.

METAPHOR delimits sharply the boundaries between the trope and the scheme. When we use the metaphor, an intention or aim of the designer is demonstrated. To illustrate this, if we experience a table in terms of marble, covering its surface with a melamine surface that resembles marble, what is the intention of the designer in doing this? Moreover, what could we interpret from this action? Firstly, to experience wood in terms of marble is obvious. If we go beyond this, what we suggest is to understand that marble is weightless. On the other hand, can we say that wood looks stronger? If we experience a chair in terms of an animal, what is the designer's intention? Is it to give life to an inanimate object? Or, if we experience a building in terms of an Egyptian temple (fig.10), what is the aim that we can extract from this? To experience an office building or a dwelling as a religious temple? In addition to this, can we summarise this displacement into a single word? For instance, in the first case, strength; in the second, animation; or in the third, religion. This is the way in which metaphorical displacements and association of ideas work.

This complex use of the METAPHOR transports us to the very first activities I proposed when I started this investigation. The transfer from Language to the Epistemology that I pursued with a possible methodology that aimed to translate the concepts expressed in words to formal attributes was closer to its use⁴⁹. In our case these words can be others as valid as the ones we proposed in the first instance: fake marble, fashion; fun; and ancient history.

Roland Barthes based all his Fashion Discourse on the direct correlation of attributes and adjectives. Arnheim pretended to do the same by determining a group of characteristics that could evaluate the value of an artistic creation. Barthes and Arnheim's processes⁵⁰ are, therefore, from the other way round: from the existing design to a linguistic relationship. More importantly, they demonstrate that the techniques of brainstorming and mind mapping that are broadly used in creative

consultancies are more than legitimate.

The use of METAPHOR results in a quicker interaction of the user although this research encourages designers to experience the use of other figures. METAPHOR may well be the strongest trope there is and the materialisation of concepts seems more attainable with metaphor.



This sofa is a clear example of the use of Litotes as a source for rhetoric expression

Fig. 8

Robert Graves has always been an historicist in Architecture that has frequently used a number of Metaphors

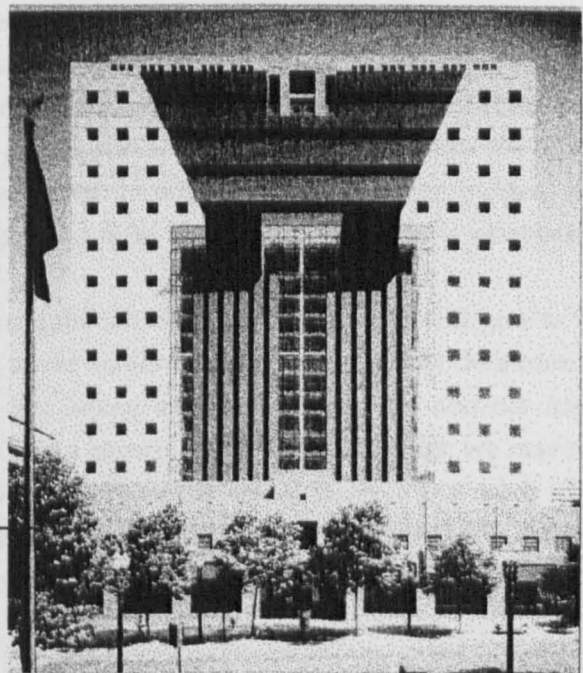


Fig. 10

METONYMY demands as much attention as METAPHOR. With this rhetoric figure we have the ability to experience the particular for the general. In a way its function is comparable to experiencing one object through one of its parts. Language allow this disfunction: I bought a Picasso! One did not buy Picasso himself but one of his masterpieces. We tend to interpret a sort of restricted METAPHOR. It is restricted because, instead of experiencing one thing in terms of another, what we do is to experience it in terms of one of its own parts. There is a displacement of meanings that it is constrained to a segment of itself. Therefore, we are led to believe that there is no displacement at all. It is a controlled METAPHOR, as well. The use of METONYMY is not inappropriate. Besides, it explores the expressive potential that one of the attributes may have. METONYMY extrapolates one of these attributes and bases the discourse completely in this isolated element that is now exaggerated or emphasised over the others. METONYMY is a rhetoric trope that excludes the ordinary meanings and highlights others. It is a trope that balances the relationship among ordinary and non ordinary meanings.

PARALLIPSIS

It is common to find in a rhetoric discourse that the speaker affirms a thesis by denying its veracity in the discourse itself. This is even more effective when this negation is placed at the beginning of the discourse. In mathematics, the principle of induction is a method that allows us to verify mathematically the truth of a premise by putting it into question in the axiom itself⁵¹. The use of PARALLIPSIS transports us to the realm of the IRONY because it expresses the antonym of the axiom. Where IRONY can result in an offensive or humorous nuance of meaning, PARALLIPSIS becomes more neutral and general.

Another factor that differentiates this figure from IRONY or ANTITHESIS is that it is commonly used as a conclusion⁵². It is a figure that gives a general coherent role to all the other visual statements. It is, indeed, a trope that gives the overall meaning to our discourse by summarising and giving a broader function to all the rhetoric struggle devised in the discourse. We can mentally imagine the complexity of how statements are related to each other, trying to attract some visual importance from the whole formal discourse, with attributes overlapped by others, sometimes even hidden, and statements contradicted or metamorphosed until a unity, a coherence is established through rhetoric functions.

Re-understanding the object as a compilation of infinite statements will give to the designed object an unusual richness never achieved before. The formal definition of PARALLIPSIS is: *one declares that is not saying what is saying in the sentence itself*. PARALLIPSIS implies a generic IRONY and a generic ANTITHESIS. Although we may say that it is based on these two primary rhetoric functions PARALLIPSIS is a much more complex rhetoric function that combines ANTITHESIS, IRONY, GRADATION and INVERSION, suggesting a higher degree of rhetoric functionality, a complexity and intricacy worth studying.

PARANOMASIA AND SYNECDOCHE

Contextual comparison is inevitable in the first figure. Two attributes, for instance, a small sphere or a texture, may be exactly similar in terms of shape, treatment or colour. But depending on where they are placed and the role they may have been assigned, they support a different meaning or a different rhetoric function. When two elements are similar in aspect, they are placed in a different segment of the object but they support substantial differences in signification, then it is a PARANOMASIA. If there is a juxtaposition, a overlap in their relationship, then it becomes a SYLLEPSIS. The use of PARANOMASIA introduces another complex rhetoric figure that shows the versatility of certain attributes depending on their situation.

A juxtaposition of utterances exposes this comparison closely in an object. Opposed to the PARANOMASIA, the SYNECDOCHE expresses the relationship of two utterances, one having its meaning extended over the other. Therefore, the former becomes more meaningful than the latter. Their function within the discourse is then, richer, more flexible and resourceful.

Using the SYNECDOCHE, the designer uses the same attribute to communicate more meanings. The attribute is given an extended role by rhetorics. The extended utterance becomes related to the former one. It has had an increase of importance and quality. The former becomes anecdotal in the sense that it has been overtaken by the other but it is always a reference for the designer to future re-use. Using the SYNECDOCHE implies a certain redundancy in dealing with signs. Since we repeat and extend the character of the entity, there is a sense of redundancy. This time the redundancy is broadened. It goes beyond re-use in order to provide more emphasis. It is not a repetition of an apparently similar utterance as happened in PARANOMASIA. The idea is to explore the different potential of the utterances to convey a diversity of meaning and messages. This trope is, in fact, more effective when displayed in the immediate relationship that is established in a direct comparison between both (see Ingo Maurer's Bulb).

SYLLEPSIS

SYLLEPSIS implies that the utterance does not have any feature broadened but, by the nature itself of the semantic aspect of the attribute, we can interpret many meanings at the same time. Thanks to the talented activity of the designer, the utterance finds itself utilised in an object in different and diverse occasions to represent different roles. In a way, these meanings become associated by syntax linked with other segments and the sign is different on every occasion. SYLLEPSIS represents this versatility in the physical, denotative attributes that are devised to connote, a concept that I have alluded to repeatedly in this investigation.

An attribute that has different semantic interpretations is in this case perceptually, subjectively and contextually interpreted in its highest degree. No trope can convey so many meanings under the control of a rhetoric figure than with SYLLEPSIS. Because, if we need paranomasia or synecdoche to communicate the potential use of a attribute, this is normally expressed by the relationship that we established between two utterances, one of which is considerably determined through a single utterance and its nebula of connotations in relation to the overall form. The last trope of our list gives,

therefore, a freedom that perhaps other tropes do not allow. It is significant, equally, that the last trope is represented by a function in visual discourses of a complexity only observed in PARALLIPSIS but in which the capability to communicate messages from the designer is more obscure than with ANTANACLASIS, for instance.

SYLLEPSIS can be misunderstood as a non-trope because the functionality of shifting meanings could be considered more a schematical function, commanding the arrangement of meanings rather than their shifting. That would represent a denial of the same ability to conduct meanings in a visual composition, function that tropes perform at their best. Ironically, this confirms that post-structuralist attitude, anti-Product Semantic, characterised in not caring about the meaning of things but only their relations in an object.

SYLLEPSIS does not do anything but provide more arguments in favour of the use of attributes as an excuse for accumulating as many meaningful segments as possible to create a visual discourse, to demonstrate the complexity of the rhetoric discourse and in addition, to understand the object as a fragmented communion of concepts.

Summary

The third and final section includes a number of arguments in favour of understanding design and, by extension applied arts, as a rhetoric, persuasive and interpretatively discipline. Three real visual discourses from different epochs (1960, 1980 and 1990) served as examples. In this chapter, the initial checklist-matrix from chapter III is improved by including the rhetoric functions right after the variations of relation. The general explanation is also broadened and exemplifies better first, the intention of the designer and secondly, how designed objects have a discursive role.

Some writers have defended this idea. Especially Yuri Lotman⁵³. For these writers the trope is the main responsible tool for creators to convey signification visually. N. Teymur, U. Eco and O'Toole gave another dimension to the use of tropes suggesting that there may be a levelling in the importance and function of the trope. I concluded that there are two types of rhetoric agents: the trope and the scheme, the latter frequently used to support the former. Their different types and combinations between them constitute the true activity of the formation of visual discourses.

Rhetoric has always been regarded as the ancient art of persuasion through complex argumentation. While persuasion and discourse comes mainly from language, the fact of interpretation escapes from this fact. Then, it is more feasible to believe in the basic transfer from language to arts frequently exposed in this research. Similarly, the source from rhetoric mechanisms comes from Ducrot and Todorov's list of rhetoric figures⁵⁴. Arguments could now be efficiently built not just from words but from forms. They become formal arguments. How they are interpreted is, again, a matter of individuals. A matter of semantics. But how are organised to have a deliberate purpose is, definitively, a matter of rhetorics. Whether these arguments were initially planned or develop during the design process is regardless of the functions of rhetoric.

By explaining each of the rhetoric functions, what I propose is to discover the new application of rhetoric functions to visual arts as well as to set up a solid methodological basis to the design of a number of products shown in the last chapter.

Notes on chapter five:

1. Ingo Maurer, *Domus* magazine number 755, Dec. '93, page 66.
2. In terms of the system of variations, transparency.
3. Robert Venturi's commission for the extension of the National Gallery of London, 1997
4. *Typology of the phenomena of meaning. The meaning of a word can be broken down into meaning, and reference into semantic features; or into explicit and presupposed content; or we can follow the various routes opened by a polysemic term.* These routes include rhetoric functions such as alliteration, comparison or metaphor. Tzvetan Todorov & Oswald Ducrot, The Encyclopaedic Dictionary of Sciences of Language, Blackwell Reference, Oxford 1981, page 253.
5. See page 7 of this chapter for a relation of investigations.
6. *The symbol is referred to the object by virtue of law. There are symbols conveying direct meanings (iconic signs) and indirect.* Umberto Eco. Semiotics and the Philosophy of Language, Macmillan, London 1984, pp. 136. *Icon, Index and Symbol are three degrees of Sign: 1)the symbol refers to something by force of law; 2)index is a sign placed in contiguity to an object it designates; 3)icon exhibits the same quality that the denoted object (images/diagrams/metaphor).* Tzvetan Todorov & Oswald Ducrot, The Encyclopaedic Dictionary of Sciences of Language, Blackwell Reference, Oxford 1981, page 85.
7. *For Freud identifies pleasure not with stimulation but with the lessening or controlling of stimulation to achieve equilibrium.* S.Connor, Value of pleasure, pleasure of value in Theory and cultural value by S. Connor, Oxford, Blackwell, 1992, pp. 38
8. Yuri Lotman. Universe of the Mind, I. B. Tauris & Co., London 1990.
9. In this respect, N. Teymur indicates the possible agents that rule the formation of the discourses: *a) particular social formations and particular economic, technical, ideological) practices which involve a discursive appropriation; b) how the dominant institutional structure produces, promotes, influences, prohibits...and how they establish official discourses; c) how some objects appear and disappear under certain historical conditions; d) how some objects are granted importance while others are ignored or undermined and e) how is it that some real or theoretical objects become discursive objects.* Necdet Teymur, Environmental Discourse, Question Press, London 1982, pp. 39-40.
10. Necdet Teymur, Environmental Discourse, Question Press, London 1982.
11. *ibid.*, page 34.
12. *ibid.*, page 35.
13. *ibid.*, page 35.
14. These operations or mechanisms form objects by: *bracketing; shifting; confusing; conflating; substituting or displacing; borrowing; transposing (amphibologies)*, *ibid.* page 38.
15. Societies incorporate, produces, prohibits, transform, ignore or undermine discursive objects for their own benefit. *ibid.*, page40.
16. Umberto Eco. Semiotics and the Philosophy of Language, Macmillan, London 1984, pages 48-49.
17. Involves *phonemic oppositions*. Tzvetan Todorov & Oswald Ducrot, The Encyclopaedic Dictionary of Sciences of Language, Blackwell Reference, Oxford 1981, page 117.
18. Umberto Eco. Semiotics and the Philosophy of Language, Macmillan, London 1984, page 48.
19. L. M. O' Toole, Two models of narrative structures in The semiotics of culture and language,

vol II of Language and other semiotic systems of culture, edited by Robin P. Fawcett, M.D.K. Hallidaas, Sidney M. Land and Adam Makkai, London & Dover N.H., Frances Pinter, 1984.

20. *ibid.*, page 34.

21. *The Expression Devices* quoted here are used by O' Toole to form the Environmental Discourse and belong to Zholkovsky and Scheglov. *ibid.*, page 35.

22. *ibid.*, page 35.

23. Tzvetan Todorov & Oswald Ducrot, The Encyclopaedic Dictionary of Sciences of Language, Blackwell Reference, Oxford 1981.

24. Tzvetan Todorov & Oswald Ducrot, The Encyclopaedic Dictionary of Sciences of Language, Blackwell Reference, Oxford 1981, page 277.

25. Yuri Lotman. Universe of the mind, I.B. Tauris & Co., London 1990, page 37.

26. *The metaphor itself often elicits references to visual, aural, tactile and olfactory experiences. We are interested in the metaphor as an additive instrument of knowledge.* Umberto Eco, Semiotics and the Philosophy of Language, Macmillan, London 1984, page 89.

27. Tzvetan Todorov, paraphrased by Yuri Lotman, Universe of the mind, I.B. Tauris & Co., London 1990, page 39

28. *ibid.*, page 39

29. *ibid.*, page 39

30. Jakobson, paraphrased by Yuri Lotman, Universe of the mind, I.B. Tauris & Co., London 1990, page 39

31. Christopher Tilley. Reading material culture, structuralism, hermeneutics and post-structuralism, Basil Blackwell, Oxford 1990.

32. Frogdesign designed a range of kitchenware for Fissler.

33. *Both analogy and metaphor...become dubious and dangerous discursive mechanisms when their nominal, partial and provisional natures are transformed...To appeal to analogy cannot function as a principle of explanation in the absence of a theory justifying the analogy by reference.* Necdet Teymur, The environmental discourse, ?uestion Press, London 1982, page 141-3

34. *Meaning is generated in two ways: I, Type forms to purposes [function] and II, Metaphor.* Adrian Forty, Of cars, clothes, and carpets: Design through metaphors in architectural thought, Journal of Design History, London 1989, page 3. See also Richard Coyne, Designing Information Technology in the postmodern age: from method to metaphor, M.I.T. Press, 1995.

35. G. Lakoff & P. Johnson. The Metaphors we live by. Chicago: University of Chicago Press, 1980, introduction.

36. In chapter two we affirmed that this period of time collapsed the semiotic sign to its signified, meaning, avoiding any relationship of this to the syntax and pragmatism of the signifier.

37. Roland Barthes, The Fashion System, Jonathan Cape Ltd., London 1985, page 244.

38. Nelson Goodman, Languages of Art, Bobbs & Merrill, London 1966, pp.68-87

39. *Ziegler's suggestion was that, in order to have a conception of architecture, one must have an appreciation of abstract form, and this, he suggested, the Greeks acquired through their pottery industry, which was historically earlier than architecture*, page 4. Forty added that *the legitimacy of modern architecture as a genuine style depended on its identity with modern products.* Adrian Forty, Of cars, clothes, and carpets: Design through metaphors in architectural thought, Journal of Design History, London 1989, page 9.

40. Necdet Teymur investigated the use of the analogies and the metaphor to associate

discursive properties. Necdet Teymur, The environmental discourse, Question Press, London 1982, page 143. Peter Collins determined four main analogies in order to ensure the provision of meanings in architecture: gastronomical —how to *taste* a building—; linguistical —lexicography applied to architecture—; biological —the building as a living organism— and mechanical —the building as a machine—. Peter Collins, Changing ideals in architecture, Faber & Faber, London 1971, page 149. Also Nelson Goodman extensively applied metaphor to artistic creation: *metaphor permeates all discourse*. Nelson Goodman, Languages of Art, Bobbs & Merrill, London 1966, pp.68-87. Schon in The displacement of concepts already considered the use of the metaphor *to generate new work*, London 1963. Howard Martin even considered the primacy of the metaphor in both philosophy *as the way out of the problems that arise in any consideration of the interaction between epistemology, morality and aesthetics* and architecture *as the crucial element that gives value and meaning as well as being a fundamental part of the design process*

41. *By manners of design oriented towards metaphoric means...giving expressive appearances to technical or operational functions without significant or evident structures.* Horst Oehlke, In search of the semantics of design objects, in Semantic visions in design, edited by Susann Vihma, Publications of the University of Industrial Arts of Helsinki, 1989 section e, pages 1-11.

42. Design, Pleasure or Responsibility, Cycle of Conferences in the University of Industrial Arts of Helsinki, June 1994.

43. Robert Blaich supported strongly the application of Product Semantics as a CEO of Phillips until he was replaced by Stefano Marzano with a more actual aesthetic approach. Evamy, Michael. Blaich's progress. Design magazine, pp.13-16, September 1991.

44. Pre-conference workshop The semantic interface in Savitaipale under the Design, Pleasure or Responsibility, Cycle of Conferences in the University of Industrial Arts of Helsinki, June 1994.

45. Umberto Eco, Semiotics and the philosophy of language, Macmillan, London 1984, page 98

46. The semantic Interface, Pre-conference workshop in the University of Industrial Arts of Helsinki, Savitaipale, June 1994.

47. Necdet Teymur, The environmental discourse, Question Press, London 1982, page 142.

48. 1996 International Design Yearbook. My acknowledgement to the dedication of Jordi Milà in the design of this project.

49. There is no single concept that bears a direct translation into a word, Subjective interpretations are involved in this. Moreover, a single concept has different associations depending on the country. A concept may be represented by several words.

50. See Section 2, chapter 3 in this investigation.

51. Induction is to state the premise as an hypothesis which can be verified by experiments which show that the conclusion actually holds. J.H. Johnson, The Open University, Design Theory & Practice, Conference Proceedings at the Royal College of Art, London, July 1984, page

52. In Venturi's National Gallery's extension, only the modern façade gives coherence to the whole

53. *The text functioning as a poetry depends on its orientation towards a primary linguistic message.* Lotman, Yuri. Universe of the mind, I.B. Tauris & Co., London 1990, page 29.

54. See Section 3, chapter 5 in this investigation.

List of photographs and diagrams:

Fig. 1: Ingo Maurer's lamp. Domus magazine number 755, Dec. '93, page 66. Own slide collection.

Fig. 2: Robert Venturi's Sainsbury's Wing. Diseño Interior magazine, number 8, October 1991, page 74

Fig. 3: Henry Eyles of Bath, in Sparke, Penny; Hodges, Felicity & Dent Coad, Emma. Design Source Book. London: QED Publications, page 23, 1989.

Fig. 4: Frogdesign's range of kitchenware for Fissler. Own slide collection

Figs. 5-7: Retouched images by computer of the original fig. 4

Fig. 8: 'Joe' Sofa by Poltronova in Sparke, Penny; Hodges, Felicity & Dent Coad, Emma. Design Source Book. London: QED Publications, page 179, 1989.

Fig. 9: Public Services Building in Oregon by Michael Graves, Sparke, Penny; Hodges, Felicity & Dent Coad, Emma. Design Source Book. London: QED Publications, page 197, 1989.

CHAPTER SIX: THE DESIGN OF PRODUCTS BASED ON THE PRODUCT SYSTEM

Introduction

The creation of products is a combined process of materialising mental concepts. But this is not instructional or hierarchical, that is, in order. It happens at will, simultaneously commanded by the subjective mechanisms of neutralisation of meanings.

My intention with the description of the following designs is to exemplify the different combinations of every element of the system of variations and rhetoric figures in order to produce visual statements. The sections dedicated to this chapter and the variations are predisposed to show an ideal process of creation of the visual and rhetoric discourse. This description must not be an obstacle to the true role of the rhetoric discourse: to shift meanings visually, semiotically and deliberately, without words.

This will be physically exemplified in the process of the design of a number of computers based on the 1992 Classic. To show this more graphically, the description dedicated to the list of main variations is done in another typography and the whole paragraph is placed slightly at the left hand side of the page. When the rhetoric struggle appears, the typography of the rhetoric figure is another and in capital letters. The paragraph will be displaced to the right in relation to the main text to emphasise the difference. In addition, some drawings accompany visually the description of the rhetoric struggle. They are placed over the photographs to separate the design actions from the image of the model. These drawings are listed by alphabetical order and placed in the text adequately.

Model one: Topology and Development

It is unusual to start the description of a computer by dealing with its back face. Design must not only take into account the visible parts of objects but all its multiple *faces*. The starting point of the system of variations of the computer's elements is the use of the cable for main power as a generative visual form. From this form an essentially geometric shape—a sphere—fuses into a cylindrical cone. They are both geometrically pure. The axis of symmetry resulting from this attachment is central. The situation of the shapes as regards the whole indicates a certain ascendant path, so we are led to believe that it ends somewhere in the front, because we already know that the back ends in a cable. The system of variations already started by giving a form which will be characteristic of the overall form and with certain degree of empathic movement. That leads to a possible comparison, a SIMILE. It also can lead to a GRADATION and a SYNECDOCHE. The forms are comparatively big, they look voluminous and they are not affected in any sense by gravity or by their own weight. The cone gives the feeling of being impassive to natural effects. It has texture and we may say that is transparent because it has gaps that allow us to understand that it is hollow and whose function is to provide the circulation of air. These gaps are supple to

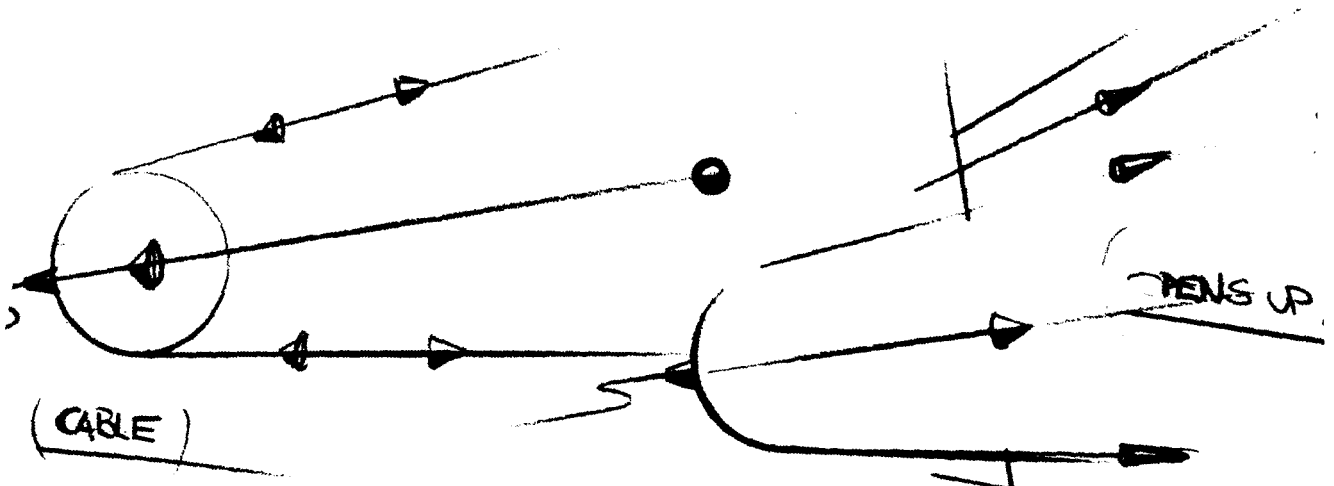
the shape of the cone and this becomes more evident when the gaps are adapted to the following form, the rectangular box (drawing a). Suppleness often leads to a METAPHOR, because it makes natural something artificially constructed.

The feeling of volume increases as soon as we reach the rectangular box (drawing b). This is slightly narrower at the sides than its top and bottom. This is geometrically and structurally fit, so we can imagine the inner structure that generated the shape, or fit to the screen inside. It also carries the whole movement inherited from the start of the sphere. This box should be textured differently, smoother than other textures so there could be a direct connection and association to the shiny surface of the screen. Similarly to the cone, the box is not affected by gravity although it rests on the floor. But the phenomenon of closure is important in both elements, cone and box. The sphere, cone and box received a formal treatment that reminds us of the Gestalt laws of similarity, simplicity, closure, background and others. There is a strong feeling of attachment when cone and box are joined and this is also supported by the slots for air (drawing c). Somehow there is a dramatic division in the top and bottom while in the sides the division is more gradual. Altogether, closure leads to a potential METONYMY because it makes references to the incomplete form. In addition, division makes a strong emphasis on voids that certainly could lead to an initial ANTITHESIS. Providing a flat space in the back of the box, in its top and bottom has also certain functional concerns. First, it provides some space to allocate the holes for a possible attachment of the cover to the main body. Second, in an attempt to leave the back of the computer free from cabling, there is room enough for the main cables of the computer (considering that peripherals can be connected by laser beam, using the latest technologies and the mains has already been placed). There is also a need to provide as many flat surfaces as possible in order to ease the access to the chip boards, although we can argue that miniaturisation is easing this problem.

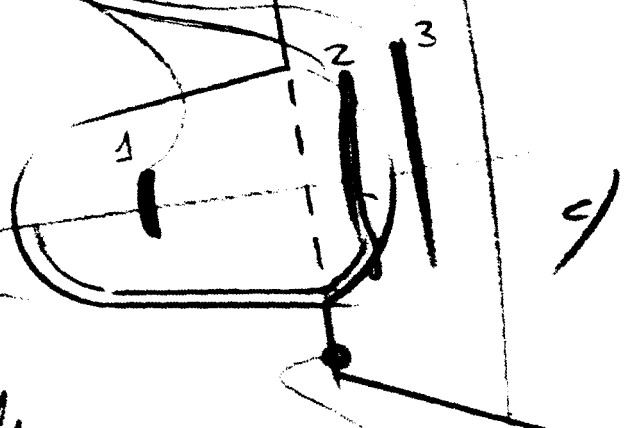
There is a strong balance between all these elements, allowing no chance for any kind of obliquity in the displacement of volumes. The variations of association can be explained through Gestalt laws and we cannot identify any deviation or regulation except the one that the axis of symmetry generated from the very beginning or the width of the volumes ruled by the diameter of the sphere.

The back form is a very complex shape since it helps us to note the difference between box and front forms. The rhetoric struggle has already been applied. All this previous description supports the idea of understanding the overall shape as one unitary complex form. The SIMILE with the implicit GRADATION supported by movement and the initial formal metamorphosis of the cable. All this is stopped by the front group of forms. This implies a difference and to understand that the front is detached if not formally, in discourse. This is an abstract from that of a screen. In fact, the basic purpose of conferring this shape to the back formal element was to exemplify the use of METONYMY. The generation of meaning of this computer

a/

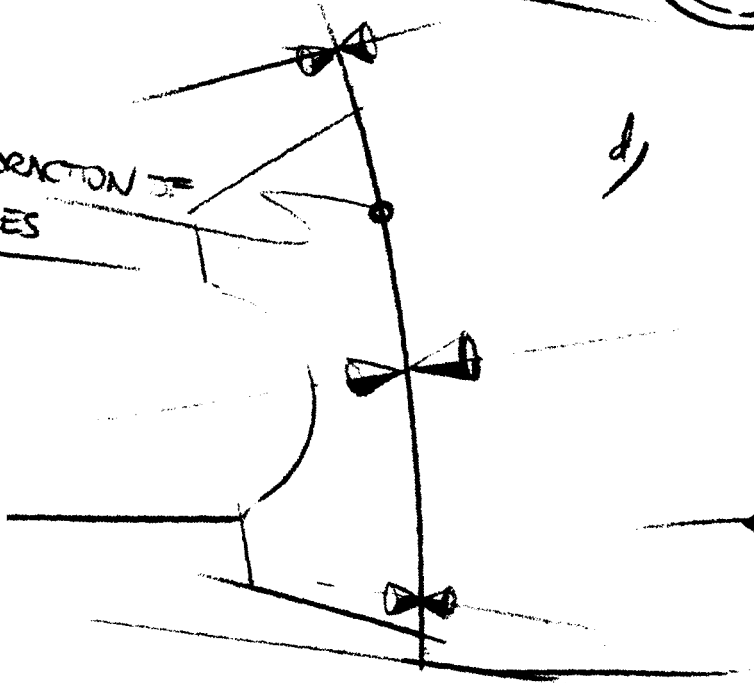


(2) PROVIDES THE LINK BETWEEN (1) & (3)



REACTION OF
ES

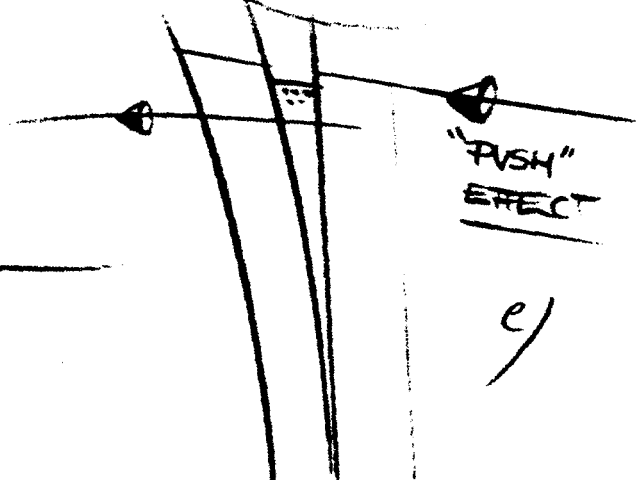
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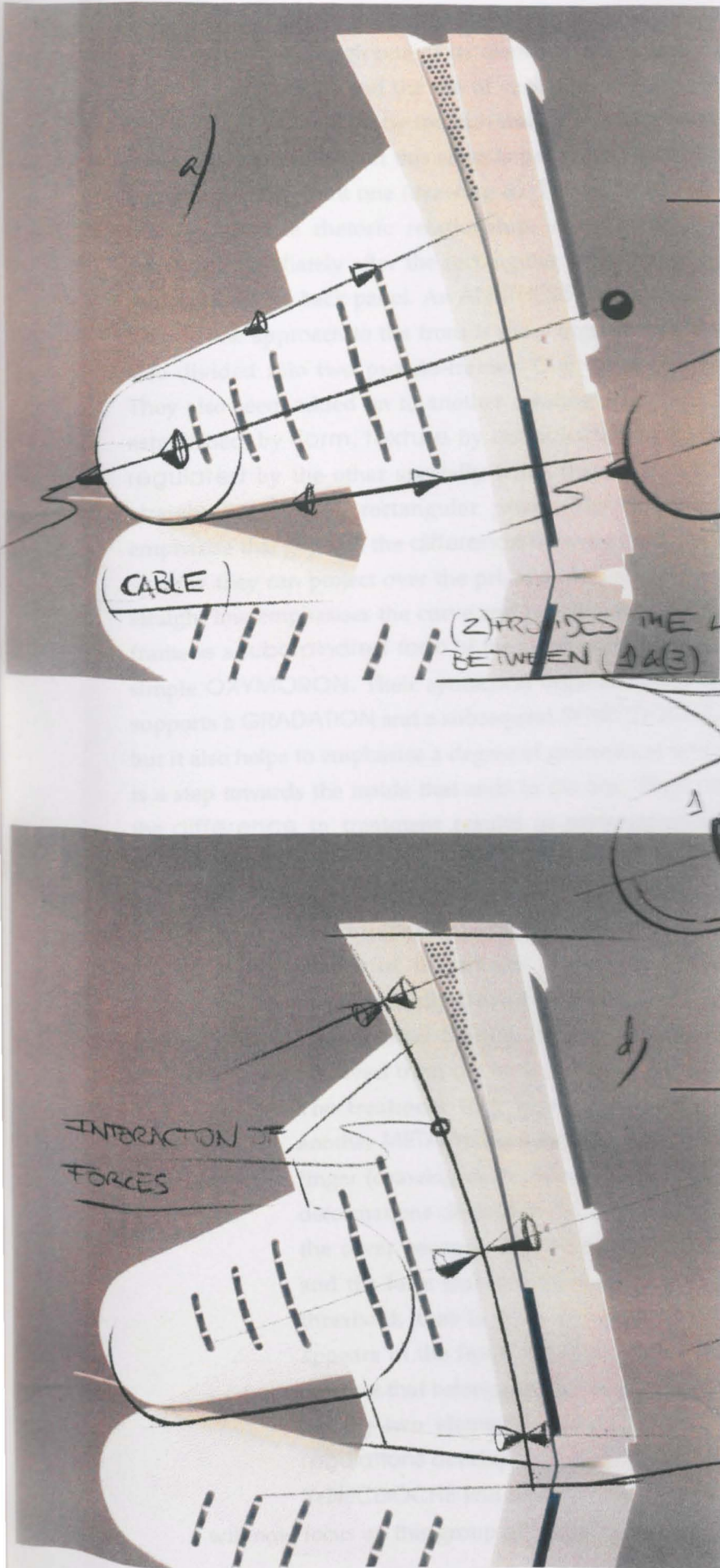


CLOSURE +
ATTACHMENT
EFFECTS

"PUSH"
EFFECT

e/





Topology and Development

TENS UP!

(2) PROVIDES THE LINK BETWEEN (1) & (3)

Topology and Development

ATTACHMENT EFFECTS

INTERACTION OF FORCES

"PUSH" EFFECT

Topology and
Development

Topology and
Development

is the conception of a trope that experiences the whole form of the object through one of its elements: the screen. The rhetoric struggle started with a trope and the use of variations assisted this.

Empathy is assured by the movements resulting from the relationships with volumes. The emphasis at this stage is put on the distribution between the back segment and the front one (drawing d). The variations of relation pave the way for the effective rhetoric relationship. A division in the back of the panel attached immediately after the rectangular prism leaves a gap between the back segment and the back panel. An ANTITHESIS will become a PARALLIPSIS. That is because the approach to the front is more organic than in the back. The panel is also divided into two pseudo-frames. One emerges in relation to the other. They also seem added on to another creating a stepping. Their connection is established by form, texture by association of lines and shape. One is regulated by the other specially when they both are associated with the straight lines of the rectangular prism. The deviation of their lines also emphasise this gap and the difference between both elements of the object. The shadow they can project over the prism also is considered. We may say that the straight line emphasises the curve and not viceversa. I also understand the inner frame as a subordinated form of the surrounding frame. Initially, it could be a simple OXYMORON. Their syntactical organisation is evident but regulation supports a GRADATION and a subsequent SYNECDOCHE. It becomes decorative but it also helps to emphasise a degree of geometrical empathy inside-outside. It is a step towards the inside that ends in the box. Their connection to the box, the difference in treatment results in understanding both elements quite unconnected.

Apart from the basic METONYMY, other figures are accompanying and nurturing the overall visual discourse with more complex readings. The shapes of the frames surrounding the back elements of the form are metaphorically treated. Moreover, the treatment it receives is based on a fundamental SIMILE. A fundamental METAPHOR is used to experience, observed from the back, a cover as a frame, very similar to picture frames. The treatment they receive, bendable as if they were flexible, leads to another METAPHOR; it looks as if a book was opened and a corner bent by a finger (drawing e). A plain, flat surface is bent towards the back and all the deformations devised to do that certainly points in that direction. In a way, the cover becomes like an element artificially attached to the main screen and the form that surrounds it. Also the screen happens to pass through a threshold, that is why we understand the back shape as a frame, that appears in the front of the computer (drawing f). It is certainly a group of surfaces that belongs to the front because there is a strong sense of regulation among two elements. Somehow the combination of associations and regulations develop a group of forms essentially METAPHORIC and a final SYNECDOCHE will arise.

I will now focus on this group of frontal surfaces, starting from the framing

immediate after the prism. The form of the top curve is essentially geometrical, coming from a large radius. The movement devised in the top is essentially concentric and we are led to believe that it coincides with the main axis of symmetry. But the side curves are out of bounds. They are generated from the corner that results from the end of the first curve. This curve never ends since there is nothing that helps us to believe that there is a perceptual end when it reaches the surface where it rests (drawing g). It did not happen with the box because there already existed an axis of symmetry. The second frame also accompanies this effect.

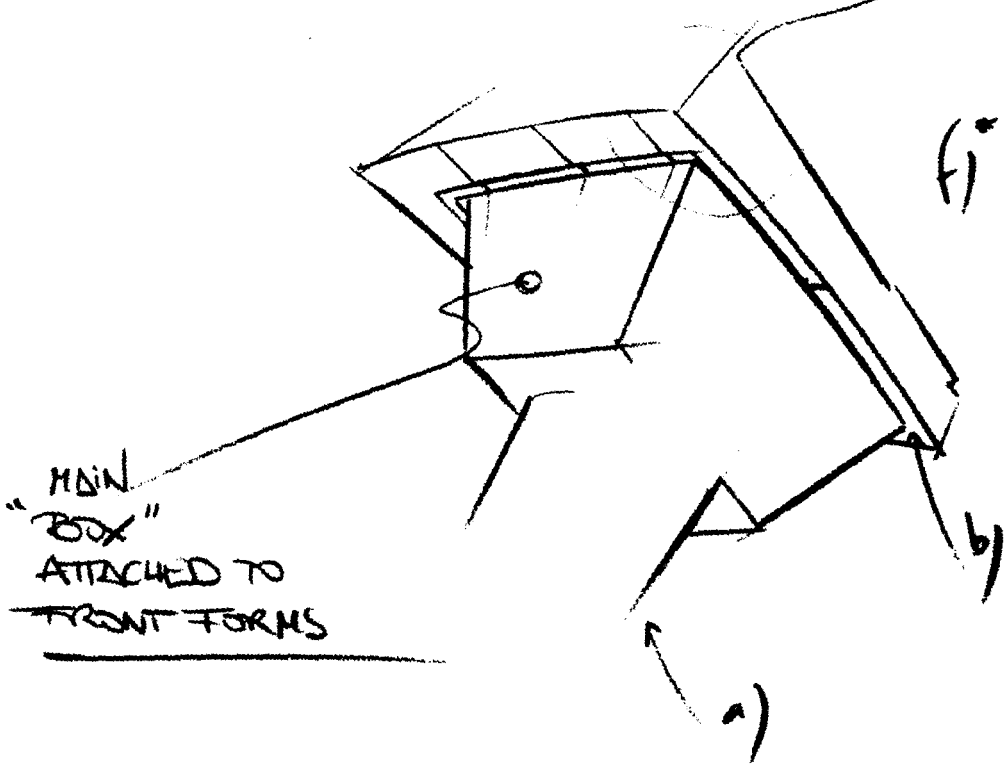
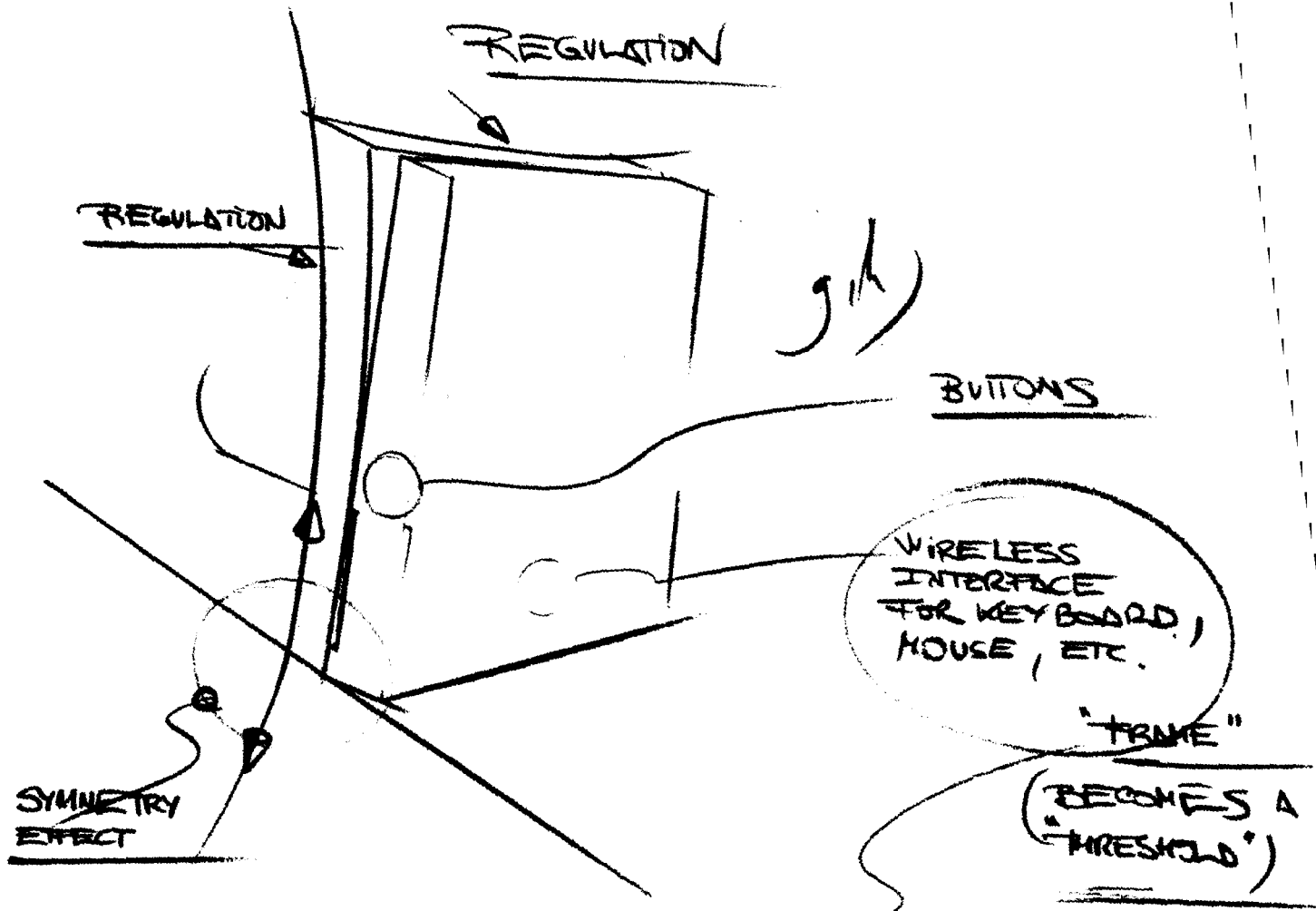
We could say that the movement never ends and is from top to bottom. It has measurement and proportion in relation to the top. Mainly the lines are deformed not just from top to bottom but while in the top this plane points towards the axis of symmetry and the front, the plane of the frame is deformed gradually towards a pure plane, flat, structural and square in the bottom, perpendicular to the surface of the rest. The same happens in the front of the top which, in the very centre of symmetry also becomes perpendicular to it. There are some strong GRADATIONS and this provokes empathy. There is, therefore, a number of combinations of closure that lead to understanding that there might be another axis of symmetry in the bottom of the computer.

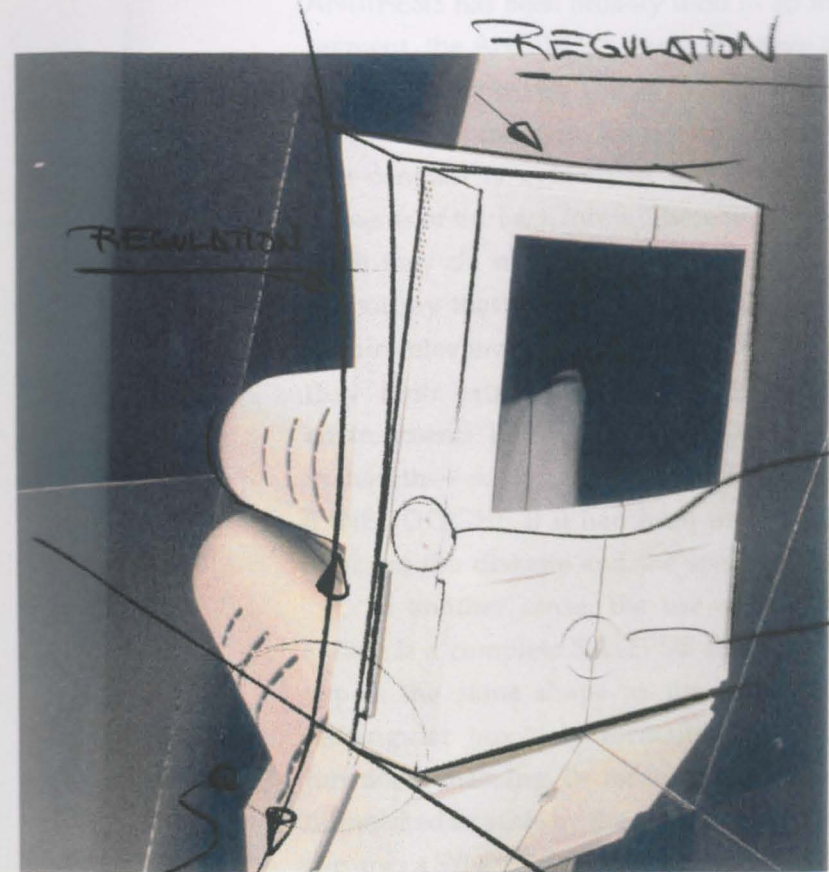
The edges are flexioned in the corner and bottom and all the intermediate stages are deformed by this flexion. The corner is very much influenced by the effects of something that pushes the corner down or is perhaps, affected by gravity. This flexion is also constant. We may say equally that one shape is somehow regulated by the other (drawing h) because if one does not carry the same empathic effect we may never have been led to believe this formal deformation as unitary from the very corner of the frame.

The same treatment receives the form just behind the two previous explained roles. Since it is subdivided by a very strong gap, we understand that it belongs to the same group of deformed forms. It certainly constitutes a frame with a certain proportion in relation to the previously explained forms and since this is not a sheet of paper, we can associate it with a frame.

The front forms regulate the back ones. I must remind the reader that this description starts from the back. So the hierarchy has been reversed to express the first movement, from the back to the front.

A very strong play with movement and shape leads us to believe that the rhetoric struggle is very much dependent on the use of ANTITHESIS and GRADATION to experience the relationship of almost every characteristic trait of the object. The GRADATION is evident in increasing the deformation from the front row of lines (drawing i). This GRADATION is not only in the top but in the sides. Moreover, the GRADATION affects the movement, from a boundary that delimits strongly the influence of the screen to a bend in the frame that is very similar to a picture frame. So, a metaphorical sense is supported by these flexions. They suggest that a material is being bent, playing, perhaps, with the plasticity of the material.





g/h)

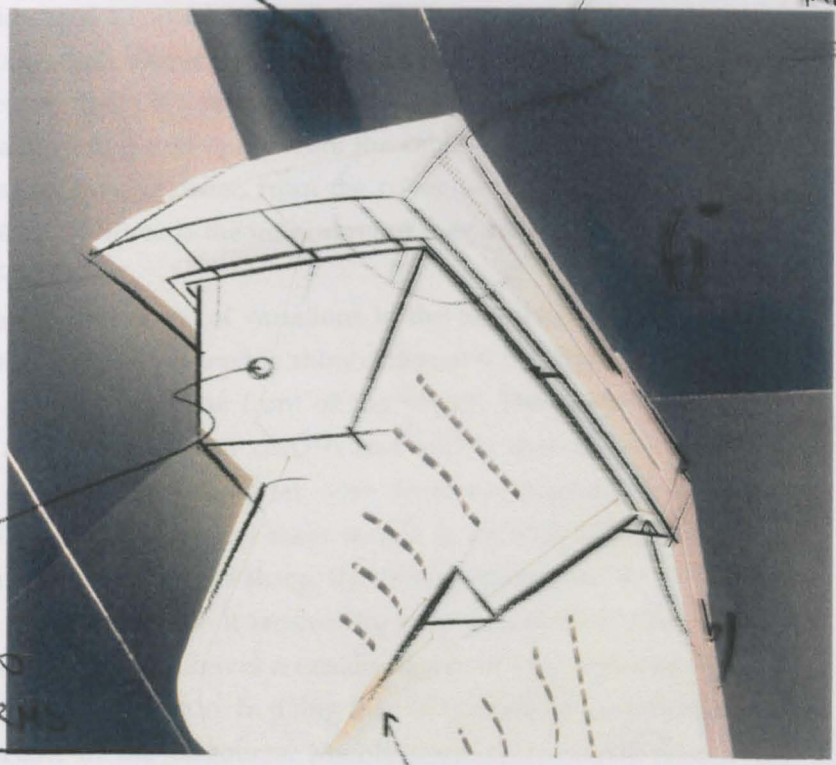
BUTTONS

WIRELESS
INTERFACE
FOR KEYBOARD,
MOUSE, ETC.

"TRIME"

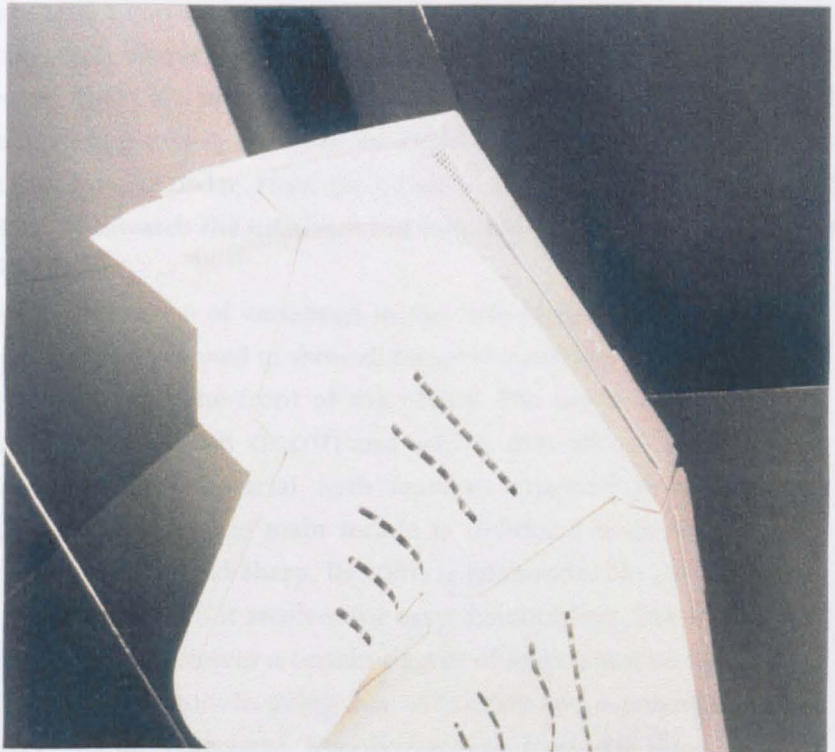
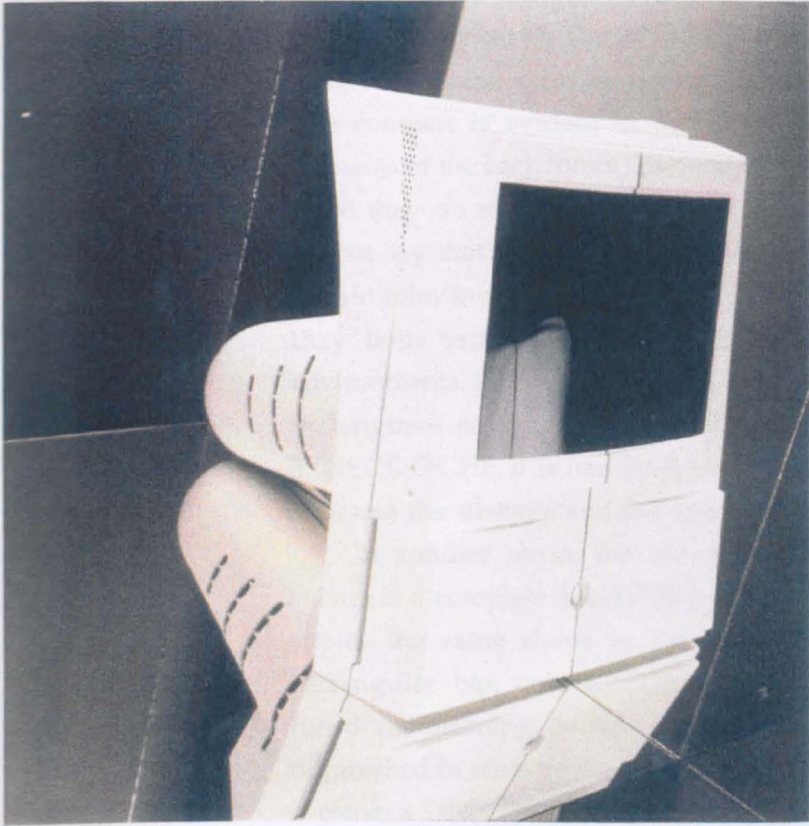
(BECOMES A
"THRESHOLD")

SYMMETRY
EFFECT



MAIN
"BOX"
ATTACHED TO
FRONT FORMS

a)

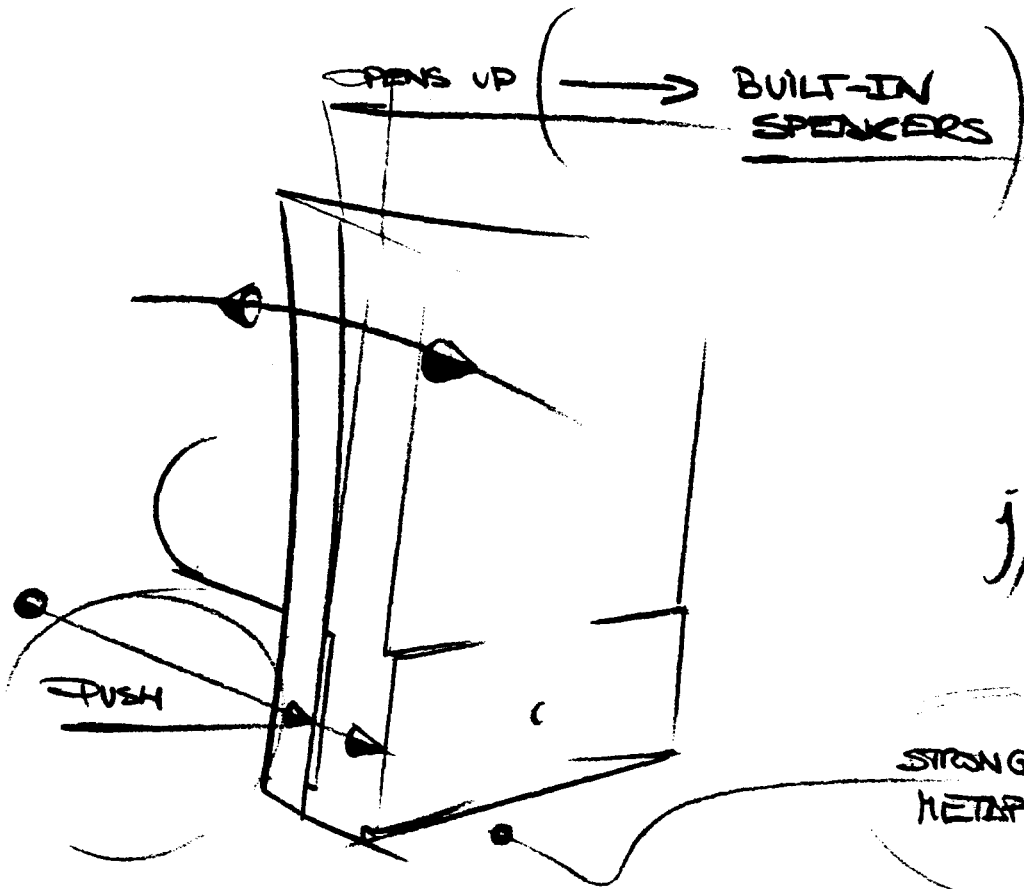


The contrast is evident between the front lines and the bottom ones. The ANTITHESIS has been broadly used in all the elements of the computer. In this segment, the ANTITHESIS starts when we associate the curvilinear screen and the face of the cover. The ANTITHESIS was also important in differentiating substantially the cylindrical cone from the rectangular box attached to it. The contrast is evident in the visual play of slots that belong to both elements of the back forms. These were originally generated by ALLITERATION since they do not portray any special meaning except their function. We cannot say that there is ANTANACLASIS. This segment of the object has a certain relevance because we can see the use of SYLLEPSIS. The relationship they both establish sees the use of the same utterance in different environments. It is a SYLLEPSIS but it is not broadened in its meaning—except in length—so it cannot be a SYNECDOCHE. It could have been a SYNECDOCHE if it had been used to conform the shape of the gap that allocates the diskette and the speakers.

In another sense, the use of the cable and its attachment with the sphere is a complete SYLLEPSIS and a SYNECDOCHE. It is an utterance that copies the same shape as the cone. While the cone is attached to the rectangular box only formally, the small link of the cable has a very functional meaning. Its meaning is certainly broadened although it has been diminished in scale by the conscious, perhaps obvious use of LITOTES. Then it becomes a SYNECDOCHE.

GRADATION is also important to identify not only movement seen from the side as if a concertina opens to the front, an opening emphasised by the gaps and each element of the form, but also the outlines of the front conical face cover. There is a strong opposition between movements of the outline of the back section that opens from the cable to the end of the rectangular box and as its inverse order, from the cover to the wall. They both open their movement towards the infinitum but they are ANTITHESIS in direction with INVERSION.

All this is supported by the use of variations in the following manner: the variation of movement has been planned to show different movement from the front to the bottom, starting from the front of the object. The main cover is completely straight and has a certain depth and width that allows us to understand a block of particular material with features attached to it as subordinated forms. In the front, the main facade is marked because is significantly rectangular, masculine and sharp. Its form is geometric. No curves are prominent except the general radii it receives for easy dismoulding. Texture is also present. The whole surface receives a certain degree of angulation so that there is some movement and tension. In doing this, empathy and a potential dynamism is important in the discourse. Mainly because from the simple GRADATION we move towards a more complex METAPHOR. The angle coincides with the optimum incidence of vision. But the angulation is related only to the side not to the top and is never parabolic, but always linear.



j)

STRONG METAPHOR

DISTRIBUTION
DYNAMISM

STRONG ANTI-THESIS
+ GRADATION

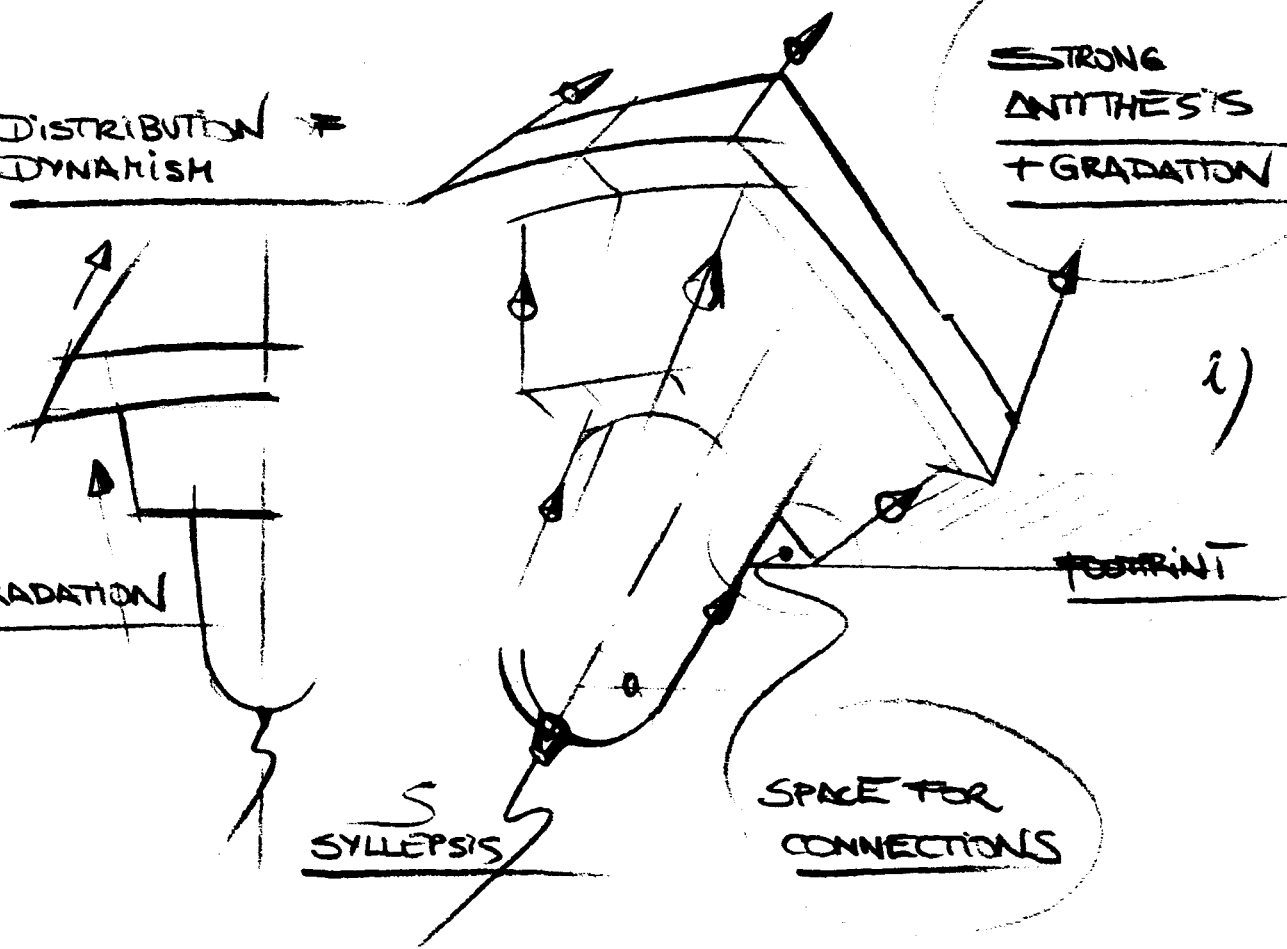
i)

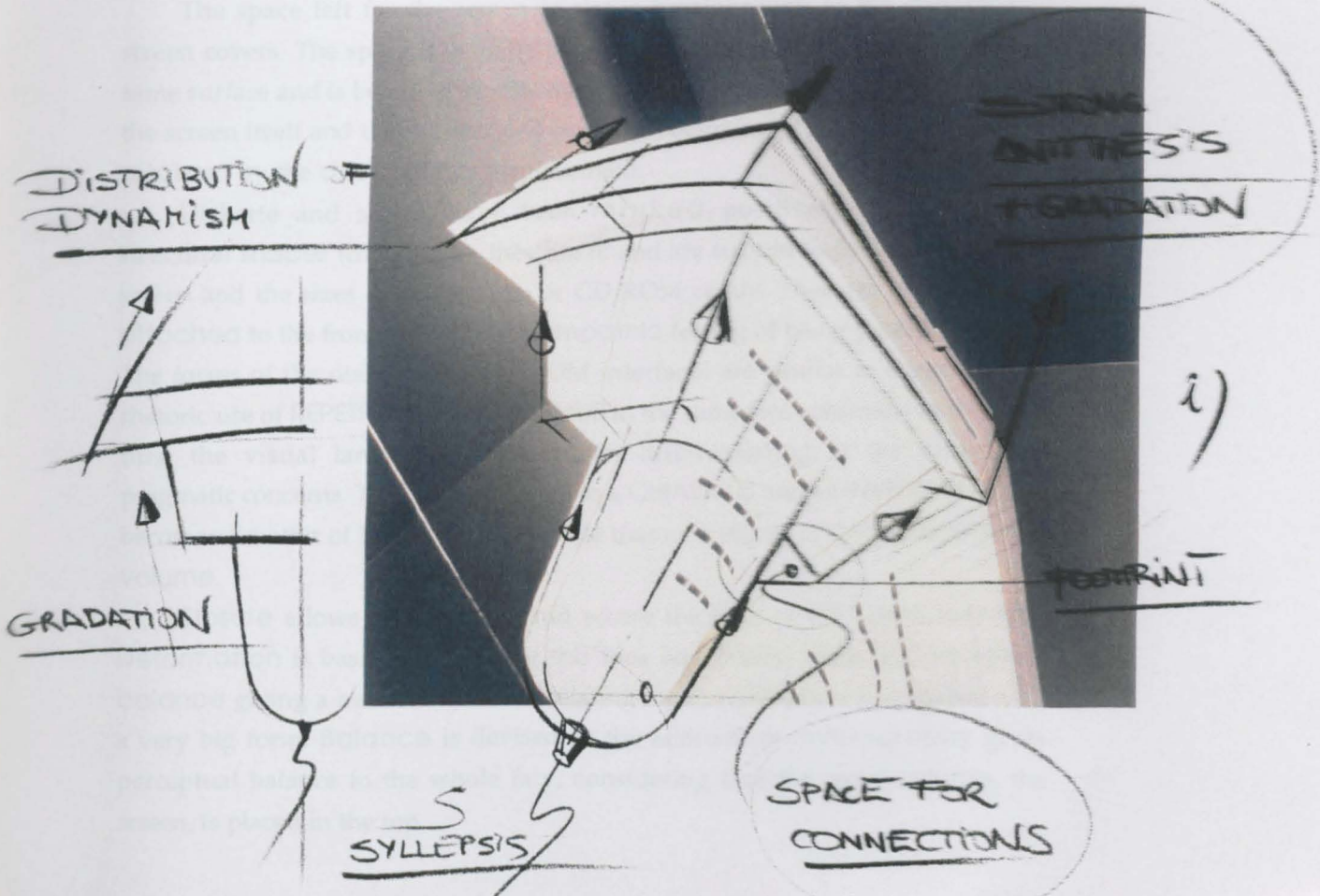
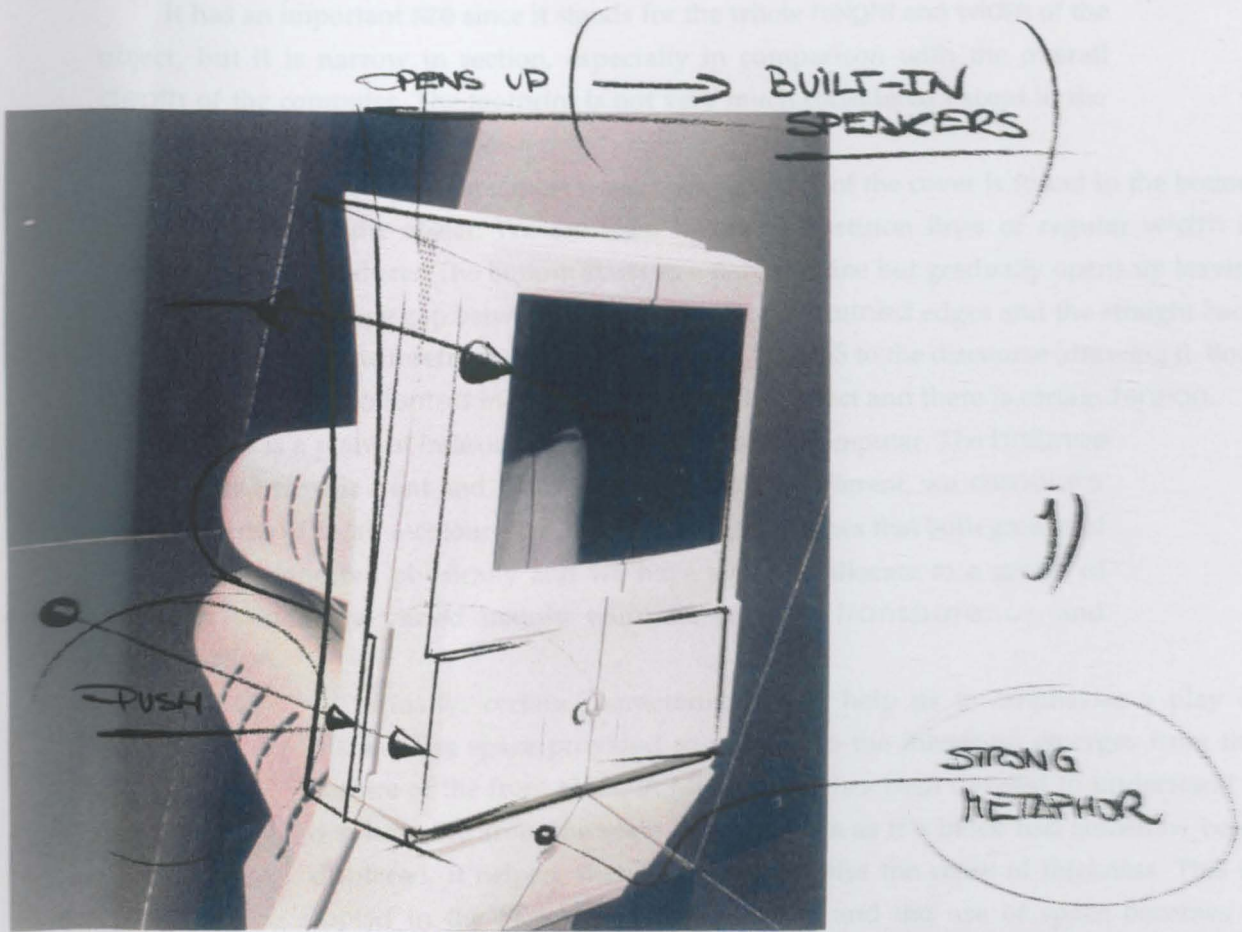
GRADATION

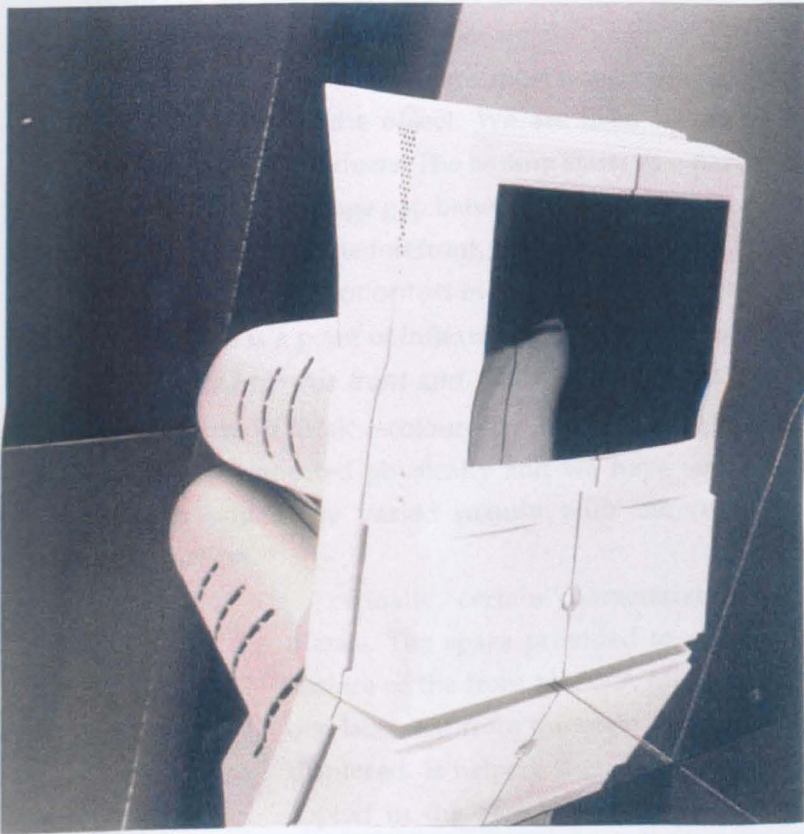
RESTRAINT

SYLLEPSIS

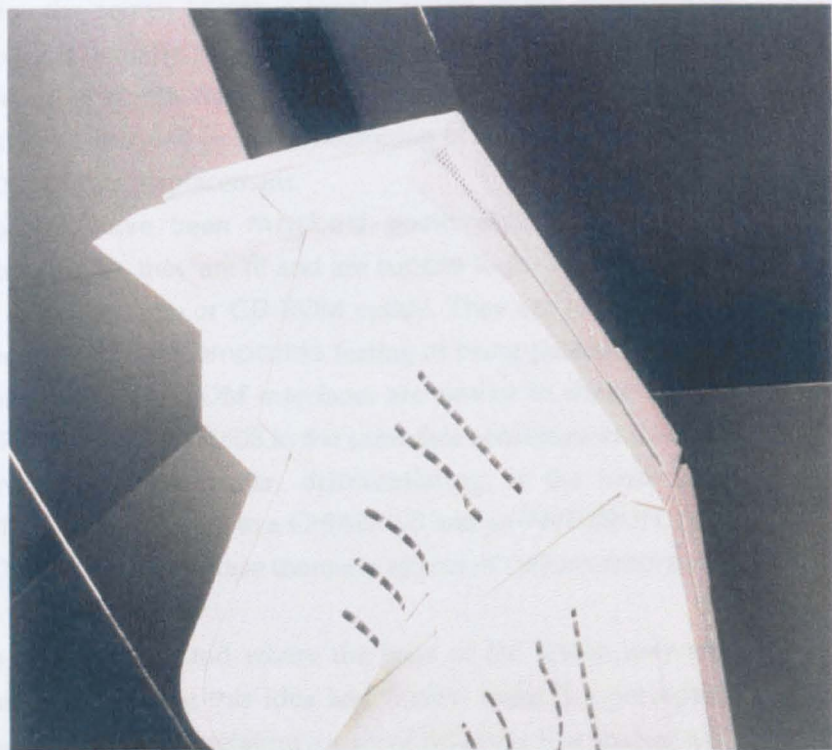
SPACE FOR CONNECTIONS







Functional rhetoric marker.



It has an important size since it stands for the whole height and width of the object, but it is narrow in section, especially in comparison with the overall depth of the computer. The footprint is not very much considered except in the part next to the rectangular box.

One of the most remarkable epitome of the cover is found in the bottom of the object. We are used to seeing partition lines of regular width in products. The bottom starts as a partition line but gradually opens up leaving a huge gap between the first group of deformed edges and the straight back of the forefront, hence providing an ELLIPSIS to the discourse (drawing j). Both are oriented in respect to symmetrical effect and there is certain tension.

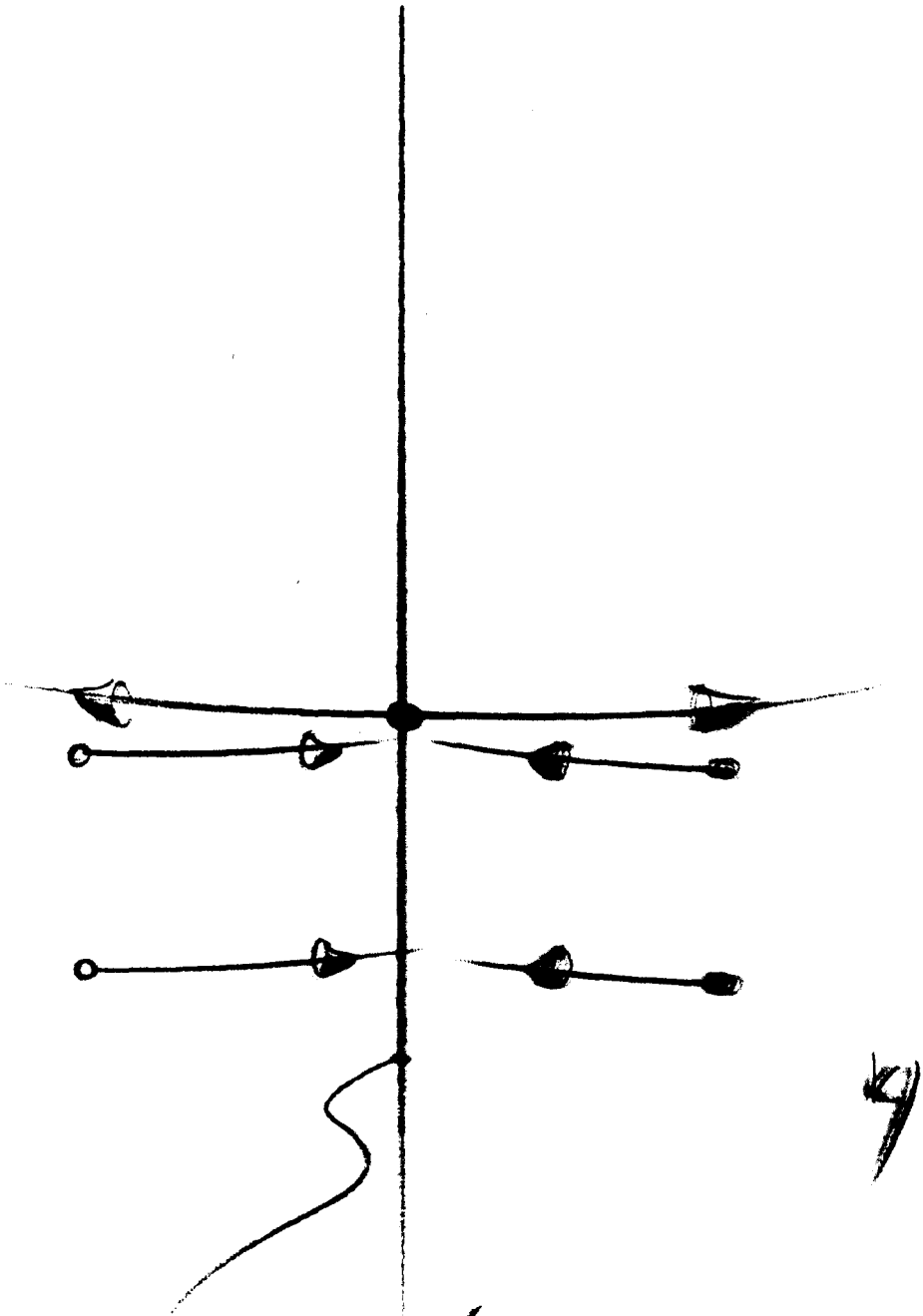
If there is a point of inflexion it is in the front of the computer. The balance is supported by this front and, although the forms are different, we associate them in terms of mark—colour—and texture. The gap shows that both groups of frames are connected physically and we have space to allocate to a group of speakers which are varied mainly with the rules of transparency and deformation.

Finally, certain characteristic traits help us to emphasise a play of planes. The space provided to allocate to the interfaces emerges from the surface of the front block. A METAPHOR has been devised to understand a displacement from the main frontal facade as if a block had somehow been displaced. It helped, therefore, to emphasise the sense of thickness. This is copied in the back edge of this facade and the use of space becomes a functional semantic marker.

The space left for the screen is also a breakthrough in the definition of screen covers. The space is actually pushed forward, as well. It comes from the same surface and is bent to resemble the curve of the screen. In fact, it comes from the screen itself and the movement from the beginning of the back. The edge is regulated by the depth of this displacement.

Diskette and screen have been marked positively, have elliptical structural shapes (drawing k), they are fit and are supple to the surfaces of the screen and the sizes of the diskette or CD ROM caddy. They are relieved and attached to the front giving us the empathic feeling of being pushed forward. The forms of the diskette and CD ROM interfaces are similar in shape but the rhetoric use of REPETITION and CHIASMUS in the same face constrains at the same time the visual language of the cover, differentiating at the same time pragmatic concerns. This is the first step to a CHIASMUS and an INVERSION. Soon becomes a matter of METAPHOR because there are effects of deformations and volume.

Closure allows us to understand where the lines of the screen may end. Deformation is basic to provoking this idea and finally, there is a perceptual balance giving a mental balance in relating a pair of diskettes like shapes with a very big form. Balance is devised so the addition of mythography gives perceptual balance to the whole face, considering that the main volume, the screen, is placed in the top.



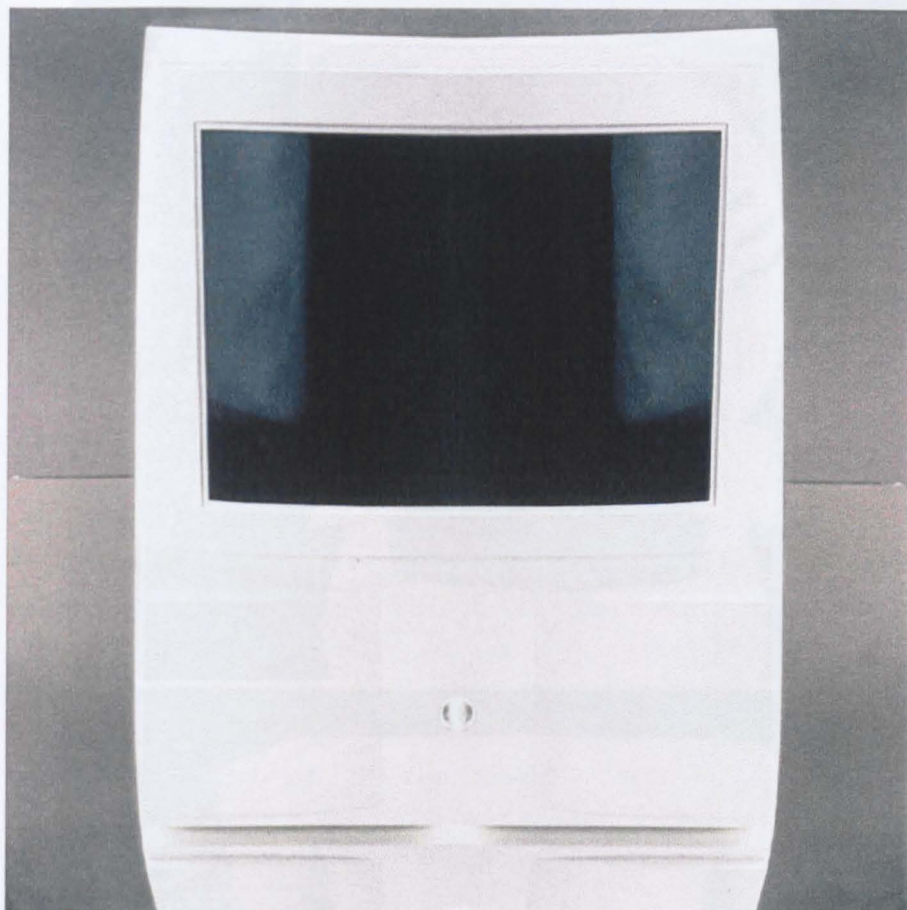
CHIRALITY + INVERSION
(LEADS TO A POTENTIAL ~~ERROR~~)

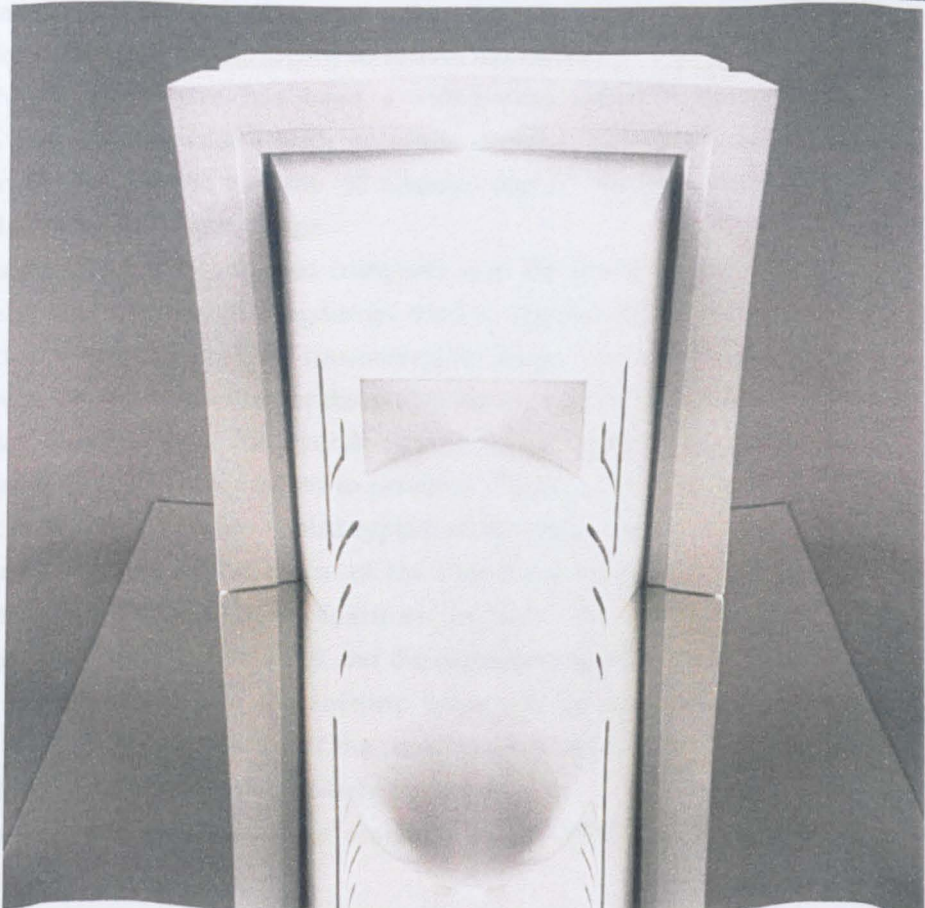
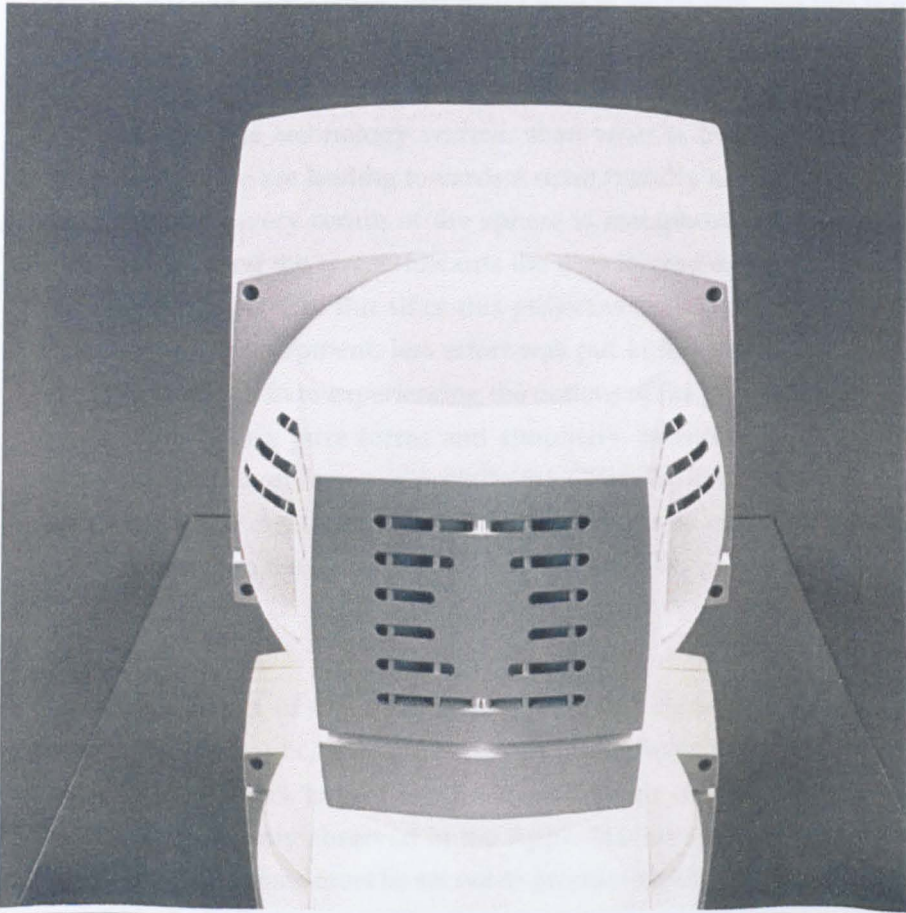


K/

CHIASMUS + INVERSION

(LEADS TO A POTENTIAL IRONY)





At another level, the discourse uses PARALLIPSIS in observing the controversy in the way that technology is presented. While the technological aspect of the object is frequently treated with curvaceous shapes, the face cover is flat and rectangular. This could lead to an IRONY. But this is not true when we approach the problem in the central box where it is more likely to find the screen itself. It suggests a certain empathic sense in finding the extremities of the technology warmer than what is inside. It is logical in a sense because we are leading towards a more friendly atmosphere. The use of the cable in the very centre of the sphere is metaphorically associated with a tail and pushing the screen towards the user instead of hiding it with edges certainly supports this. But since this project was very much concerned with topology and development, less effort was put in to making this a statement. The effort was put in to experiencing the notions of the phenomenon of closure, haptic experiences, pure forms and simplicity, textures and possible haptic paths, association of forms, especially the CHIASMUS of the front forms, the use of gaps, the creation of visual deformations to create dynamism and others rather than the use of IRONY and METAPHOR.

Model two: History

While the perceptual aspect of the first design provoked meanings that could be granted to gestalt and haptic, in the next design I will demonstrate that meanings can be entirely traced back to past and previous editions of the Classic range and to characteristic traits only observed in the Apple Macintosh family of products. Hence, most of the variations must be set out to produce visual references that will lead to a rhetorical discourse rather than the pure experience of a shape transformed to provoke empathy as seen in model one.

To achieve this, there has been a substantial research based upon observation and familiarisation with previous designs. References are taken mainly from the '84 Classic and the '92 Classic, that is, the first and the last design, produced for the Classic range.

The concept of a self-contained computer was the first basic idea for the design development. Although Frogdesign tried to suggest this in the range of LC's, the fact of using a 14" monitor constrained its design very much. The lack of screen size was one of the reasons for discontinuing the Classic range, so I felt the need to solve this problem. The overall size of the computer was, therefore, substantially increased in comparison to previous Classics. The allocation of the disk interfaces under the screen is also typical of the range. In my design these interfaces are displaced to the centre of the object especially to emphasise a characteristic symmetry. Other features include the famous chin, a differentiated distribution of volumes and the expressive use of partition lines.

In this design the use of the rhetoric trope will be of minor relevance, allowing for a better understanding of the rhetoric relationship between elements where the rhetoric struggle is particularly proficient.

Many of the cultural meanings assigned to the 1992 Classic belong to

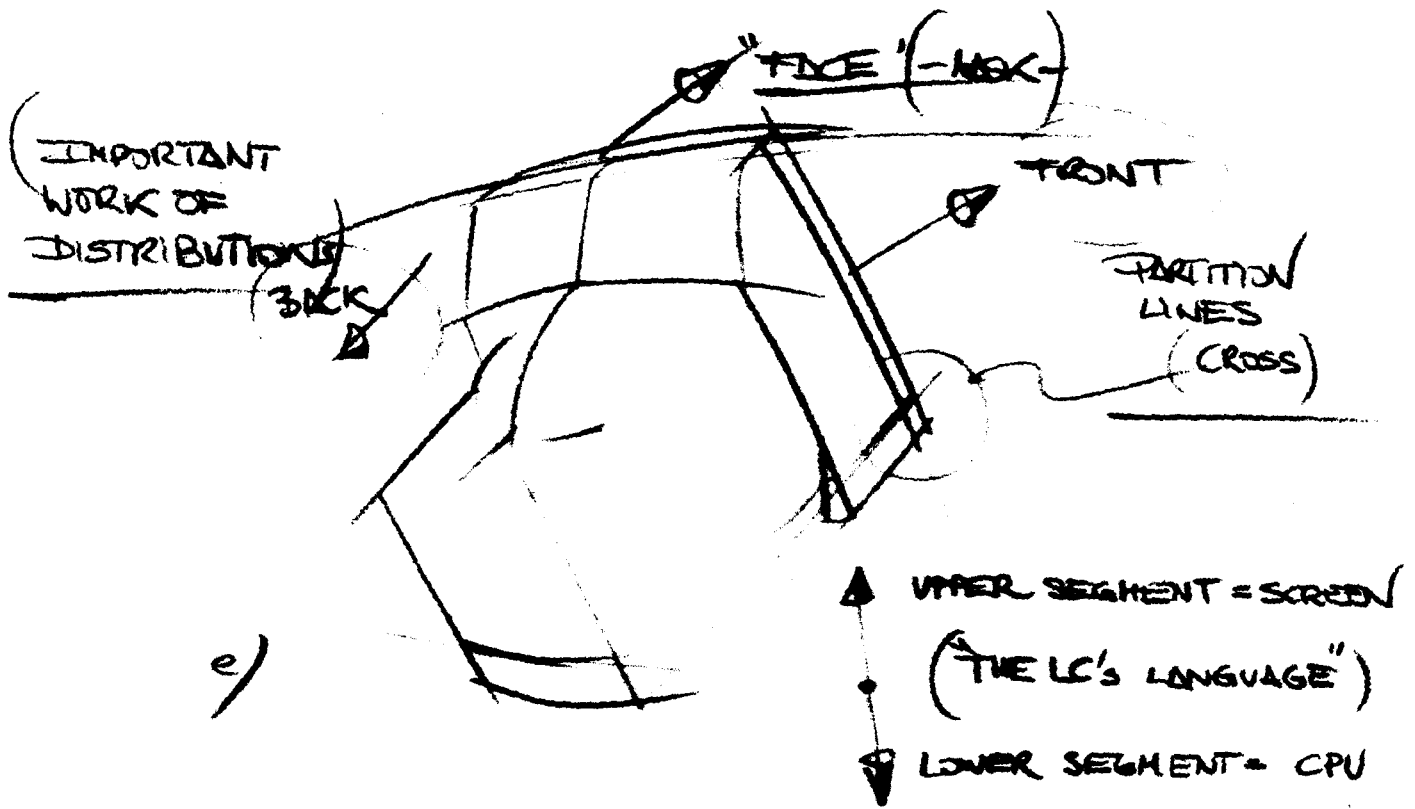
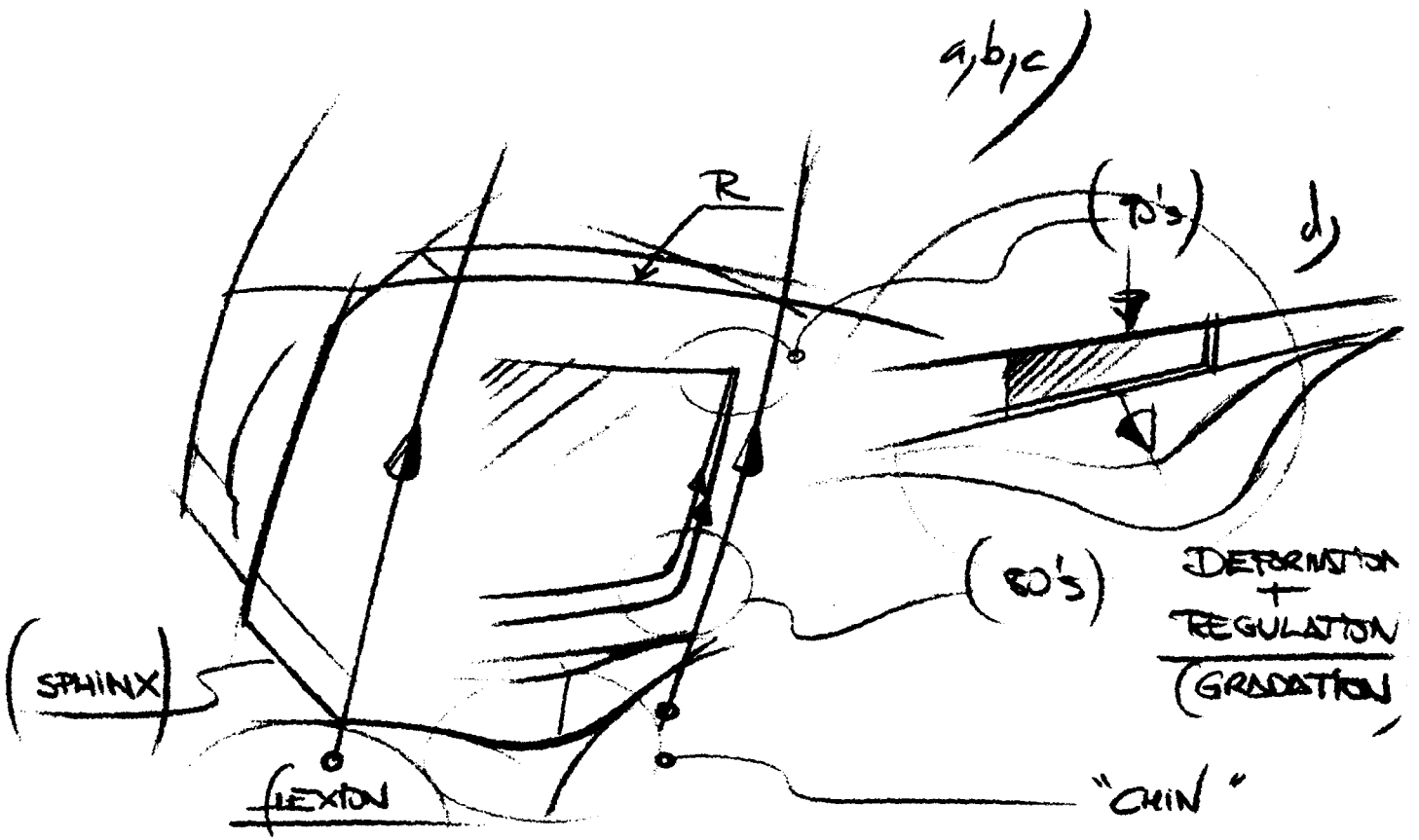
previous designs. To evaluate the historical character of the design one should only look at the cultural associations and connotations of previous Classics (drawing a). The examination of the analogies which have traditionally been made to these designs led me to discover a number of METAPHORS. The METAPHORS of the computer as a human face or a bust, the transformation of an object into an animal or a pseudo-animal such as an Egyptian sphinx (drawing b), the associations of the machine with an animated object whether animal or human, the form of a brain inside a box, a world opened to the human being through a screen are some of them.

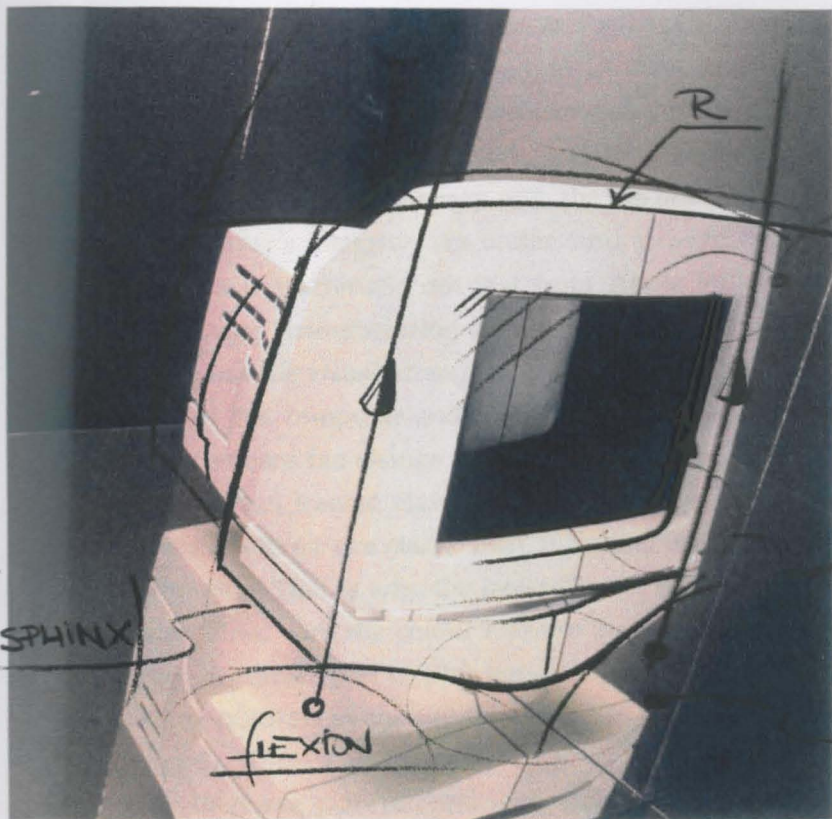
Starting from the screen itself, the use of METAPHOR to shape the cover's outline is based on the metaphor of the face and structure of the sphinx. The screen is placed high and in doing this, some space behind is displaced. With the use of such variations these concepts are constructed and establish relationship with others such as the familiar chin. The latter is based on another METAPHOR. The shape of the main body of the computer is certainly another analogy which is very much connected a world of possibilities which opens itself up through the screen. Many analogies are inherent in the design based entirely on history. But the use of the trope to generate those meanings is a legacy for others designers. The assessment of the rhetoric function will be more concerned with the analysis of the relationships between these past attributes and other analogies.

A series of homages to these past designs have been conceived and materialised with the Product System. The first homage is paid to the edges of the screen. Since the screen is one of the given constraints of the computer I will determine the immediate variations that resulted from including it. The way in which covers are attached to the screen are a very common source of expression in domestic appliances such as televisions. The screen has to give the sensation of being protected from touch so screens are never flush with the plastic covers. Levelling the surfaces is an issue that is important because if the difference is significant shadows or undesirable reflexions could appear.

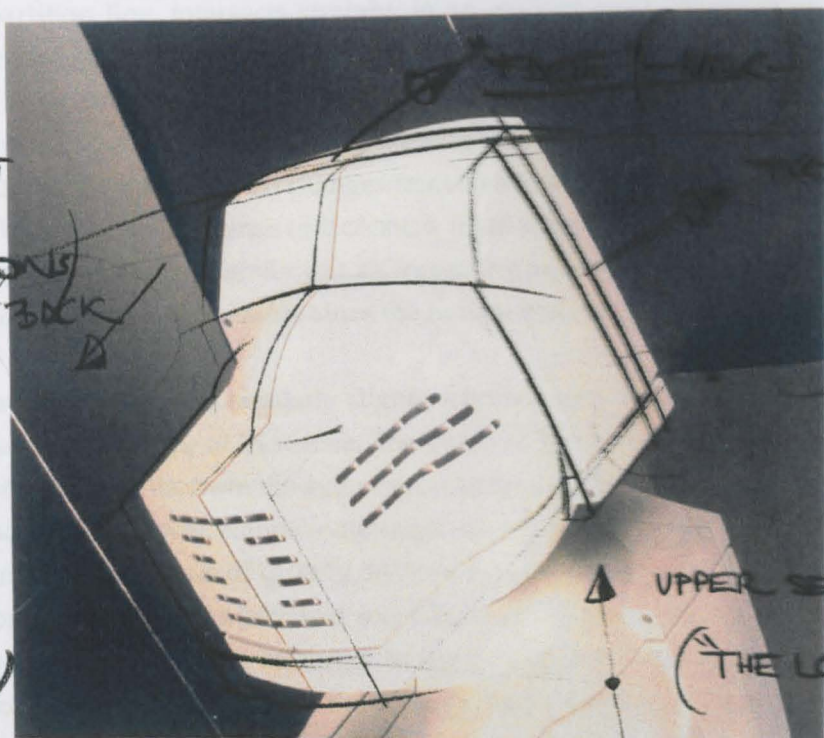
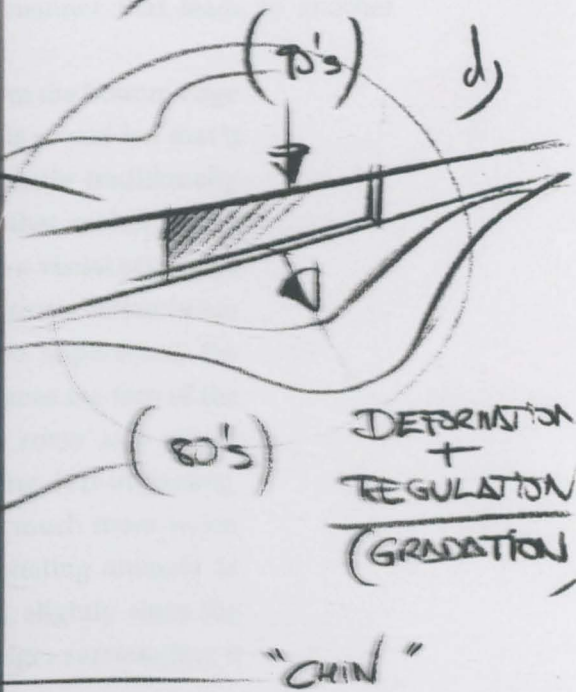
Disassemblage must not damage the screen so a small gap is also provided. The way in which this transition is treated pays direct homage to the first and last Classic. The first edge belongs to 1980's aesthetics and the other to 1990's (drawing c). The bottom edges are shaped as in the first Classic, thick, angled, with big rounded corners, specially deformed by the use of rudimentary plastic injection technology. Therefore, the top edge is perpendicular to the screen making a transition from top to bottom. Flexion really determines how the transition to the top edge is carried throughout the sides of the screen. This transition is gradual and constant. This flexion also gives the empathic feeling of going upwards. One group of edges seems added to the other ones rather than being all of one frame. A anecdotal but important play of connections and differences grabs all the attention at this point. A mixture of GRADATION and OXYMORON will lead to a potential ANTITHESIS.

The main rhetoric relationship established is the use of ANTITHESIS, especially by counterpoising the corners of the rectangle that frames the





a, b, c)



IMPORTANT WORK OF DISTRIBUTION

BACK

FRONT

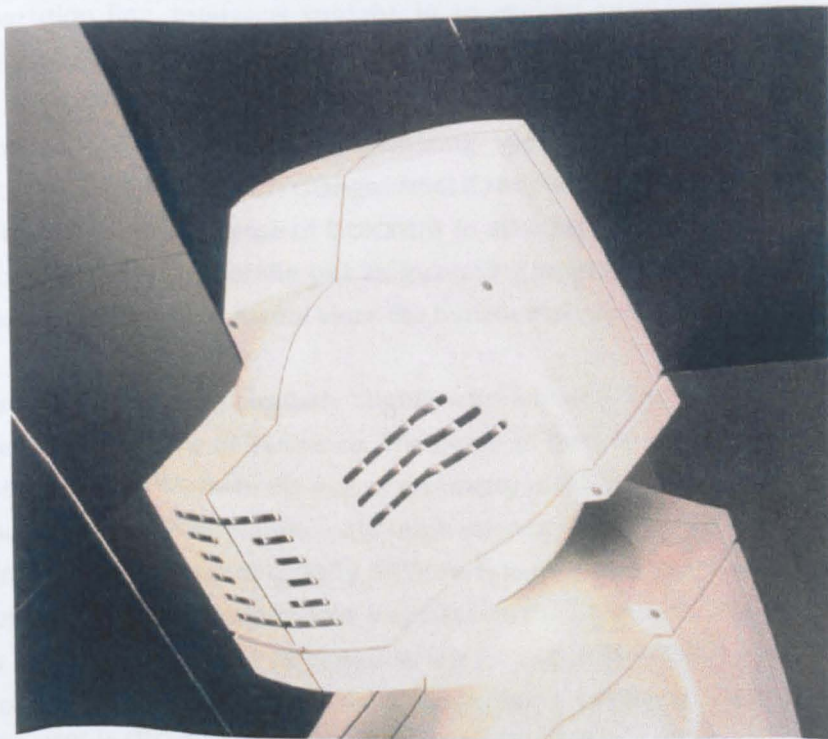
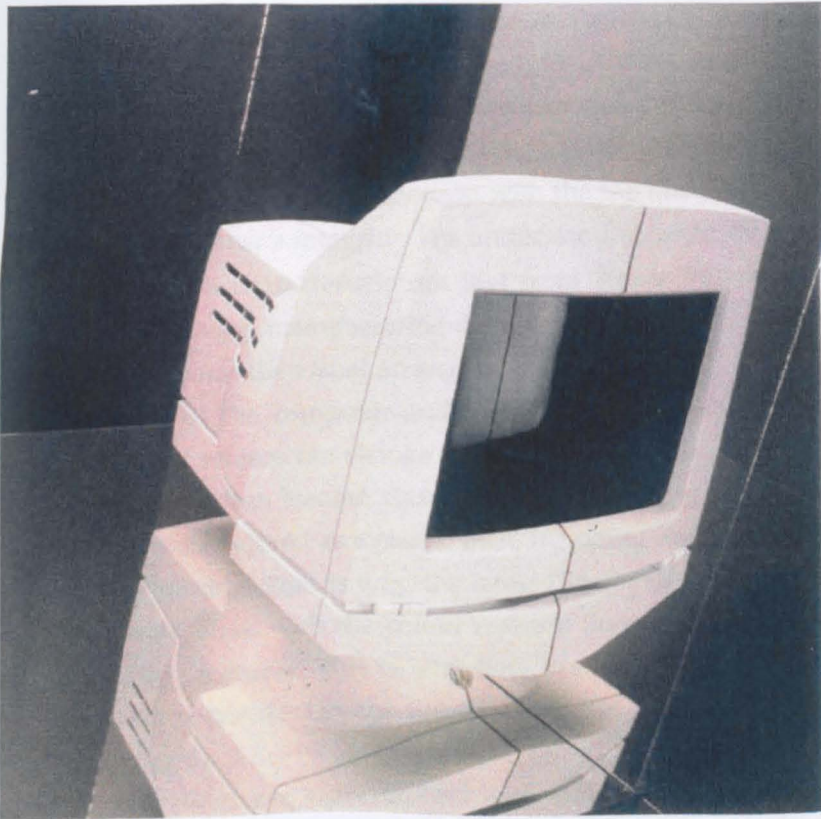
PARTITION LINES (CROSS)

e)

UPPER SEGMENT = SCREEN

(THE LC'S LANGUAGE)

LOWER SEGMENT = CPU



screen. One is curved, the other straight. The contrast they have established helps us to understand that this is not done randomly but deliberately. The use of LITOTES is also implied since the bottom corners are slightly oversized. A PARALLIPSIS is also determinant since we start experiencing the edges of the corner in a manner that leads to another substantially different mode of expression.

The top edge stops the increasing movement coming from the bottom edge which is very wide in comparison with the top one. This stop is so sudden that it affects the cover's integrity. We understand a cover first, because traditionally covers are a characteristic not just from Apple but from other makes which considered easy manufacturing disassembly. Macintosh made a visual statement about this and the visual arrangement of the partition lines. Covers certainly are the *mask* of the computer and if this may be considered too impersonal, the creation of screens can change this face. This also happens because the face of the Classic has been treated classically. By this I mean that the cover as a whole has been considered as a classic bust, including chin and ribbing. It is impassive, cold as marble. That is why the latest Classic incorporated a much more warm approach. First, with the colour *espresso* Second, by impersonating animals or animating features. This is why lines are naturally bent very slightly since the lines are regulated by the squareness of the screen and the edges surrounding it (drawing d).

The lines are connected with each other always in curve and only the line of separation that distributes the lower segment with the upper segment through the partition line, intersects straight, in an evident cross (drawing e). The line of the top is bent —flexioned— parabolically and the line of the side is also similarly shaped. We could say that they have similar curves although the one in the top is symmetrical, emphasising symmetry. The group of regulation, connection and flexion changes from a simple SIMILE to a complete METAPHOR. There is a strong sense of balance in all computers since the last development of the Macintosh family put an increasing emphasis on symmetry: another connection to the user's nature since the human body is externally highly symmetrical.

The surface of the cover is similarly slightly curved, allowing the screen to have the predetermined angle of incidence. The group of lines of the cover has a combination of movements: from the axis of symmetry to the sides and from the sides to the end of the line which ends —although interrupted— in the bottom of the curved chin. There is a sense of gravity, texture is evident, forms are divided, slightly deformed and very regulated and associated one with the other. The cover has the strongest effect of curves in the computer since they are also deformed towards the front and to the back giving a spherical effect. The approach to the user is gradual and transitional rather than dramatic.

Then, GRADATION provokes more empathic feelings than those stroboscopic or rhythmical. The emphasis on gravity can suggest the use of ELLIPSIS (drawing f). Thus we are led to believe that the METAPHOR is basic

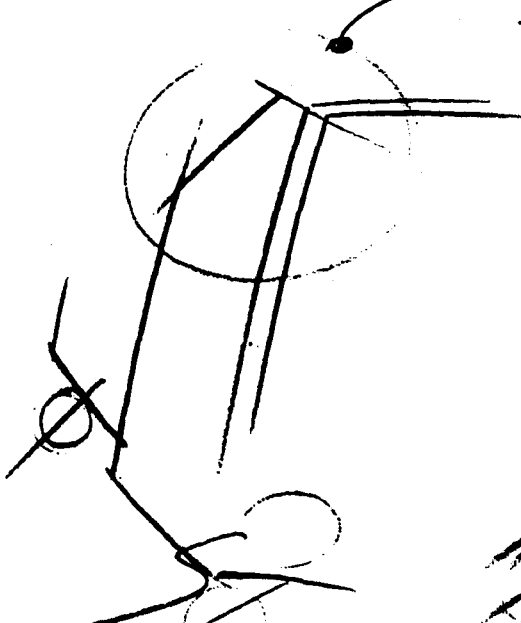
to shape this segment of the computer. It determined the overall shape of the cover, but it also affected the treatment its outline received. The *chin* mainly becomes an abstraction of a real human chin. It also prepares the front elements to include another rhetoric figure. In the '92 Classic, the place in which the disk interface was placed, the treatment it received was essentially metaphorical. In my design that lip has become one of the most important features of the design.

Another fundamental use of the rhetoric figure shows the potential use of schemes, even when they only accompany the trope. The next rhetoric combination is represented by the ELLIPSIS. ELLIPSIS results basically in producing gaps in the visual discourse to enhance expression. The same use was somehow observed when we related the rectangular box of the first design with the frames surrounding it. The gap is also extracted from previous designs but this time is increased. It cuts the computer dramatically in two. It allows the visual perception to stop and *breathe*. It establishes a relationship between two parts which have been cut by a gap that can only be explained through the use of ellipsis. But if the gap was relevant in the front, now it becomes decorative in the whole perimeter of the computer. The gap constrains the frontal interfaces such as buttons, but in the sides and back it only outlines its form. It also relates to the LC's designs which had the screen separated from the computer unit, leaving an important gap between them. This is a gap of the same dimensions as the split configurations. It is a reminder of the dilemmas between the validity of the self-contained or split computers, which are now solved formally. Closure is, nevertheless, important to achieve this. Curiously, the use of the scheme in this case shows that it can be as strong as a trope. In this case, closure can refer to a METONYMY, because it helped to establish clear and direct references to known visual typologies. The more geometrically pure are the more evident become. The use of the ellipsis is not only observed in this segment of the design but in other parts which I will elaborate later.

With the system of variations, this gap is regulated by the width of the gap of the frontal interfaces. The gap is narrow, deep and deeper in the disk. It is a subordinated form, it is square and structural, without any significant movement or empathic feature, except for the lip.

The lower edge of this gap in the front only is especially expressive. It is artificial, biomorphically shaped and less parabolic or structural. But it has essentially a strong sense of movement that points towards the gap or diskette. It is very similar to the latest Classic's gap which is deformed in the disk. There has been always been a special treatment to this casing for extraction and positioning of the diskette in the computer, because the fingers must not clash in the cover. This has been treated in squares, rectangles, circles or pseudo-lips metaphorically shaped. Again, this gap is symmetric. We may say that it is deformed, oriented towards the centre of the gap and balanced.

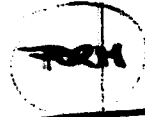
RESOLUTION



γ



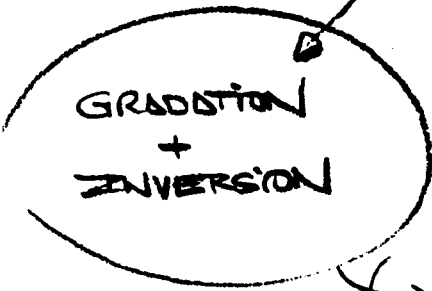
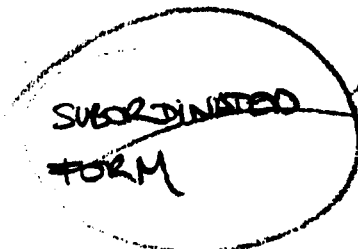
ELLIPSIS



(POSITIONAL LINE)

"LINE FORM"

BUTTONS
(DEVELOPED FROM
CLASSICS)

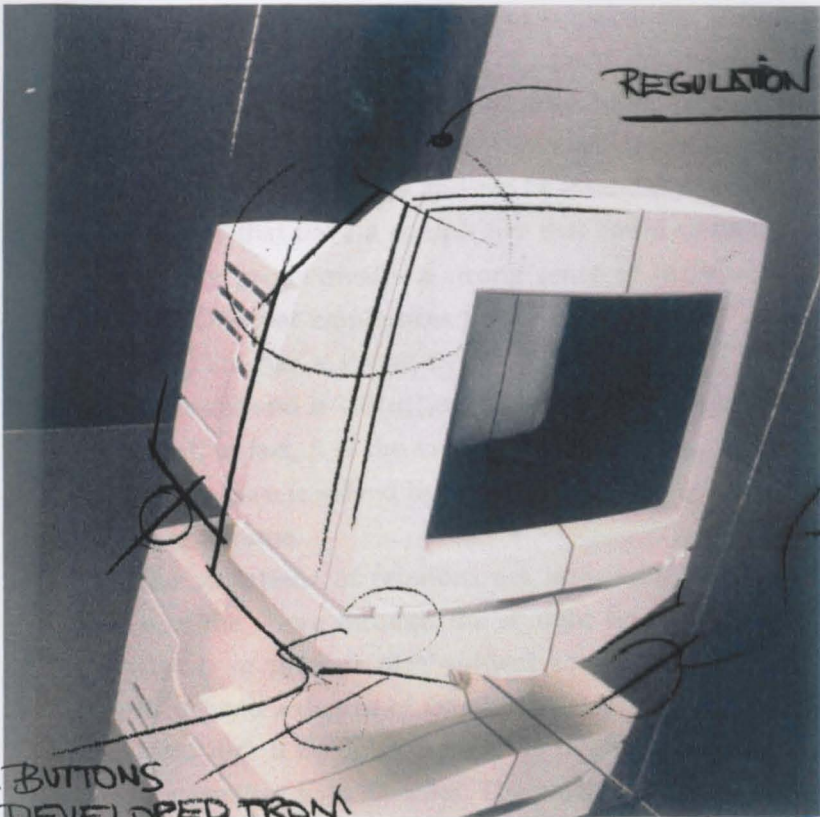


SYNECDOCHE

STRONG
EFFECT
OF
CLOSURE



ε



REGULATION

2)



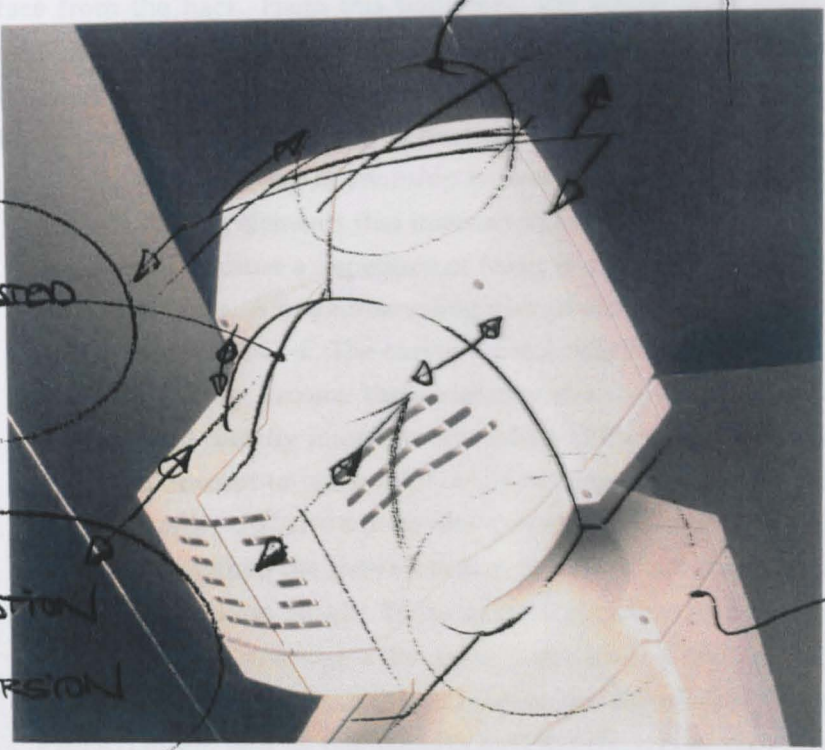
ELLIPSIS



FORM

(PARTITION LINE)

BUTTONS DEVELOPED FROM CLASSICS



SUBORDINATED FORM

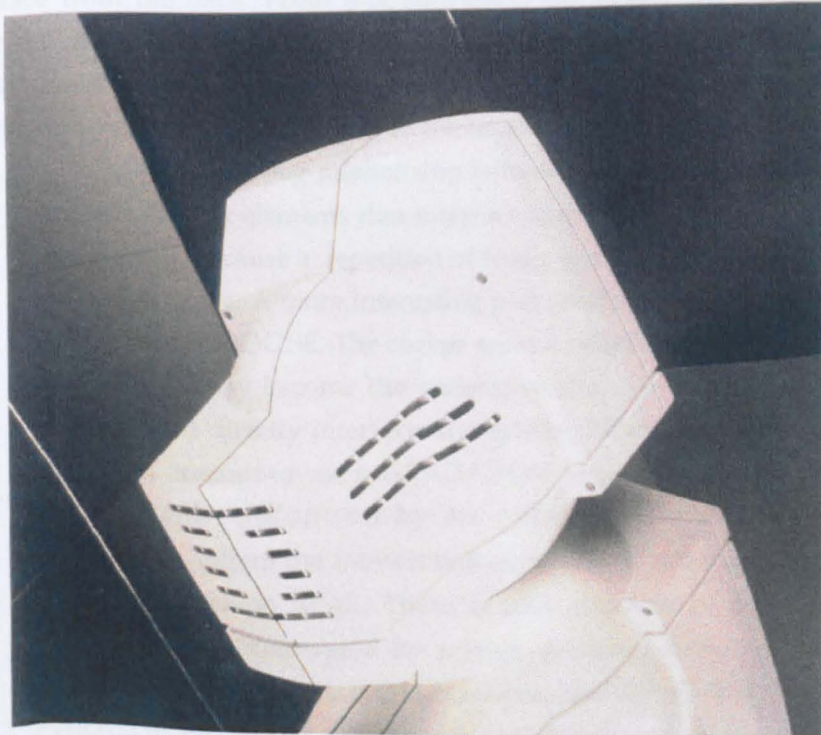
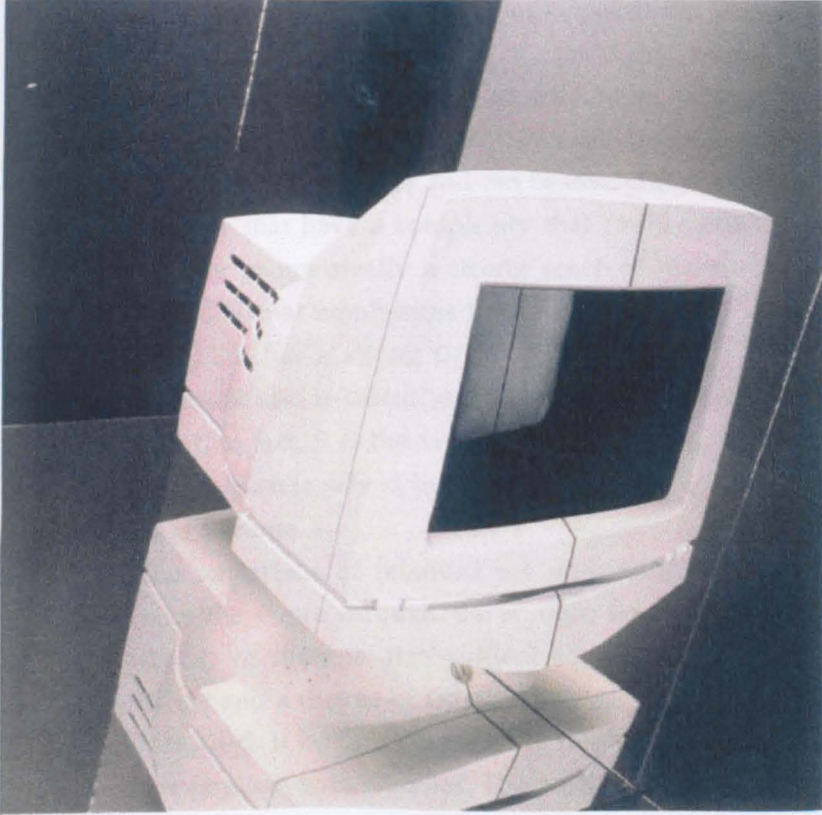
GRADATION + INVERSION

SYNECDOCHE

"ANTI-FORM"

f)

STRONG EFFECT OF CLOSURE



It is associated with the cover's texture and colour so we are led to believe that it is a flexion of the edge of the cover's gap, so it is regulated by this straight and sharp edge providing a sense of empathy by being pushed downwards (drawing g). But the traditional design of the chin is fundamental. It exists as usual in the Macintoshes we could say that the latest classic introduced another organic shape, pointed or with holes underneath. This time the chin resembles a real chin. It has a mark because it goes to the bottom, it is affected by a strong weight and gravity and can be essentially feminine. It is a composition of three curves that have a complexity that could resemble biomorphically rather than purely geometrically a strong sense of movement. There is a sense of GRADATION that emphasises this.

The chin has a strong proportional relationship with the width of the screen's frame and is attached to this frame considering the distribution of the cover. But, in fact, it is the same cover! So the play of elements which belong to the same surface is solved by the appropriate proportioning, sizing and visually separated volume.

The variations of relations are important because regulation gives the degree of the curve through the straight lines of the gap. It is gradual. The deviation of lines is also evident so we could say that straight lines are perverted and a degree of empathy is assured. The whole cover is deviated and flexioned. It becomes organically treated especially with the use of texture which is familiar with Classics. The partition line in this design is more than a source of expression since it crosses the perimeter gap. It is a boundary that delimits the face from the back. From this boundary, the whole body starts. There is a repetition of shape and movement. They are exactly the same but the movement and the direction points towards the back. We see in other Classics that there is a strong slope that goes to the back of the computer.

There is a strong relationship between the front group of forms and the immediate back elements that intersect in the sphere. There is an INVERSION in direction. Because a repetition of forms is also determinant to the design of the back shapes. A more interesting play of rhetoric figures involves the use of the SYNECDOCHE. The curves are not only REPEATED and subsequently INVERTED. They become the generative shape of the subsequent group of surfaces that directly intersects the sphere. Where the main group of forms makes an attempt to use a GRADATION because we see that these surfaces are gradually deformed by the conscious play of variations, when it reaches the sphere the intersection occurs drastically, in a straight manner, with no transition at all. There is also a matter of PARALLIPSIS. This relationship is interrupted by a huge spherical volume. It leaves a gap which is a matter of ELLIPSIS. It emphasises GRADATION and a possible PARALLIPSIS. If it is not interrupted, the discourse may become vulgar, repetitive.

This pyramidal prism is very sloppy in the top and less angled in the sides. The top of the element starts from the anti-form that resulted from the

by the anti-form and by the dramatic movement towards the back which again, is based on previous designs. It is a complex shape since it finishes in a strong curve, developed from the original ones. In addition, its surface is not very structural. So the movement starts from the axis of symmetry in the top of the symmetrical anti-form and end in the corner of this deformed group of surfaces. A diagonal movement is confined within these surfaces somehow affected by gravity and weight which supports this idea of deformation.

Although ANTITHESIS is the important rhetoric figure, INVERSION can support the idea of a subsequent PARANOMASIA because there is certain familiarity, if not in shape in the function and treatment it receives. This is observed in the side forms.

The side forms are associated and connected. They do not become anti-forms but they copy the shape, the texture, the ending, the movement, etc. From them, the movement turns also to the back and its form is slightly bent in the top corner to meet the formal necessities of the top deformation. The relationship between both is basically of regulation, association—at least of purpose since they combine to intersect with the sphere—, connection, deviation and empathy.

In the latest Classic, there was a similar development of this slope. The distribution of volume resulted in raising the face of the Classic, differentiating very much the face from the body which was emerging as if it pulled something inside, which resulted in a spherical shape with a handle. In other monitors, this curve was also observed.

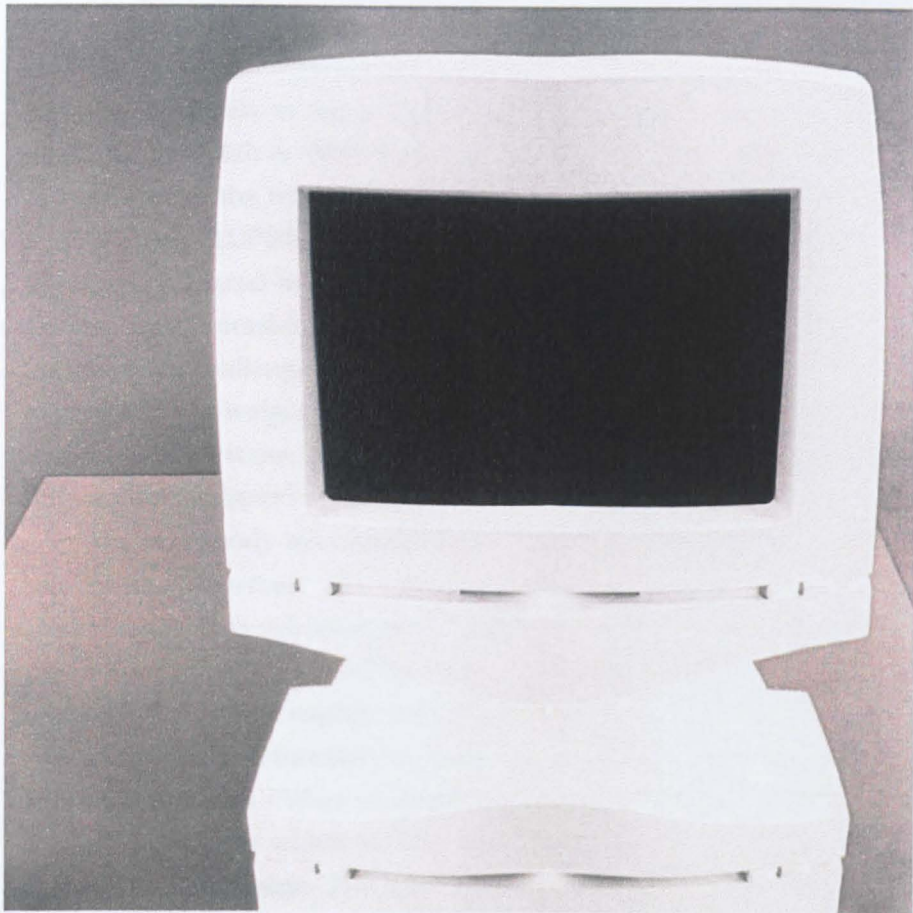
I wanted to repeat the same development and to bring it further. The former curve is now a complete sphere to which all the elements of the computer are attached. It includes the support of the whole computer so the feet are eliminated. First of all, there is a relationship that is extracted directly from the 14" monitors. The relationship between cover and main body was solved by Frogdesign in a sort of prism that provided the logical transition between volumes of different size and nature. There is an obvious economic reason as well as aesthetic. In my computer, this relationship resulted regulated by the size of the sphere. The bigger the sphere the less sloped and dramatic this transition becomes. The bigger the sphere, the bigger the space occupied on the desk and the footprint. A compromise was achieved.

The main shape becomes the main focus of attraction. As I said before, it is the main body of the computer. It is so strong that I claim that all the other forms become subordinated to it. It is textured as we noticed in other features and, therefore, we may say that it generates all the other textures. Is a perfect sphere, mechanically lathed and the movement it describes is generically in all directions, making connections in terms of coincidences with any kind of movement, but especially symmetry. The fact of designing a complete sphere let us imagine a centre of gravity possibly placed in the very centre from which all movements radiate towards the outside. It helps to mark the relationship between front and body. It both has weight and looks heavy.

To allow a sphere to stand up, either the centre of gravity is located in the bottom half, or a section of the sphere is cut out. The bigger this section, the better. The object stands up.

The sphere is cut to have space underneath a cable or speakers. Moreover, it is cut to have a irregular shape. It is a truncated sphere. It is not affected by gravity in any sense. It is not regulated by anybody.

The main body has a rectangular shape. It has a very thin neck attached to it. This neck has a curved bottom. The neck is



neck element is completely white. In the work, the design is a relationship between the square the circle and the neck. The neck is the help of the design of the visual design. The neck is alone.

Model does identity and relation.

The most characteristic work of the

To allow a sphere to stand up safely normally two actions may be taken. Either the centre of gravity is located in the bottom so it only wobbles but never falls, or a section of the sphere is cut and the object rests on this section. The bigger this section, the better. The object stands as a column on the desk.

The sphere is cut to leave space underneath to allocate to features such as cables or speakers. Moreover, it is cut to provide an important sense of being weightless. It is a transparent sphere, that is hollow, not a block. It is not affected by gravity in any sense. It is pure, not deformed nor deviated or regulated by anybody.

The main body becomes the focus of the principal use of the rhetoric figures. It has a very strong sense of volume and all the other volumes are attached to it. This is done in such a way that the gaps that the sphere leaves supporting the front face and the back forms are so voluminous that these two subordinated forms of the sphere seem to float. In perspective, ELLIPSIS is the real determinant of this relationship between surface of rest and shapes. While in the overall outline of the back box the relationship they also establish is SIMILE associated to a future PARANOMASIA, the relationship of the front forms are more of an ANTITHESIS, but mainly an ELLIPSIS. This ELLIPSIS leads to a potential IRONY because the main volume, the screen is placed in the top (drawing h). The sense of unbalance is also assured by diminishing as much as possible the area of the footprint and therefore we challenge the laws of visual balance. The IRONY results from experiencing a weight visually by its antonym, which is weightless. It is humorous since it can be perceived as dangerous. But this is the sort of visual humour that designers can provoke.

The main body also establishes a very strong ANTITHESIS. A contrast is established between the more rectangular shape and the sphere. Nevertheless, it is not intended to create a strong Gestalt relationship as in the first design. We have already seen the curves of either the front and back elements deformed slightly to become more warm. The ANTITHESIS is more related to situation, function, centrality as opposed to extremity and purity of form. Other issues makes us understand that ANTITHESIS is strong between forms. The way in which we transform the gaps for air intake is similar to that of the first design. The way in which the sphere is connected to the back element is completely different to that of the front which is drastic, while in the back, the transition is more gradual. The ANTITHESIS is evident. A relationship between both elements is based on the mediaeval attempt to square the circle and to circle the square. The play of the rhetoric struggle with the help of variations can trigger even more connotations but the wealth of the visual discourse cannot be completely attained with the use of words alone.

Model three: Identity and emotion

The most characteristic trait of this computer is found in the overall

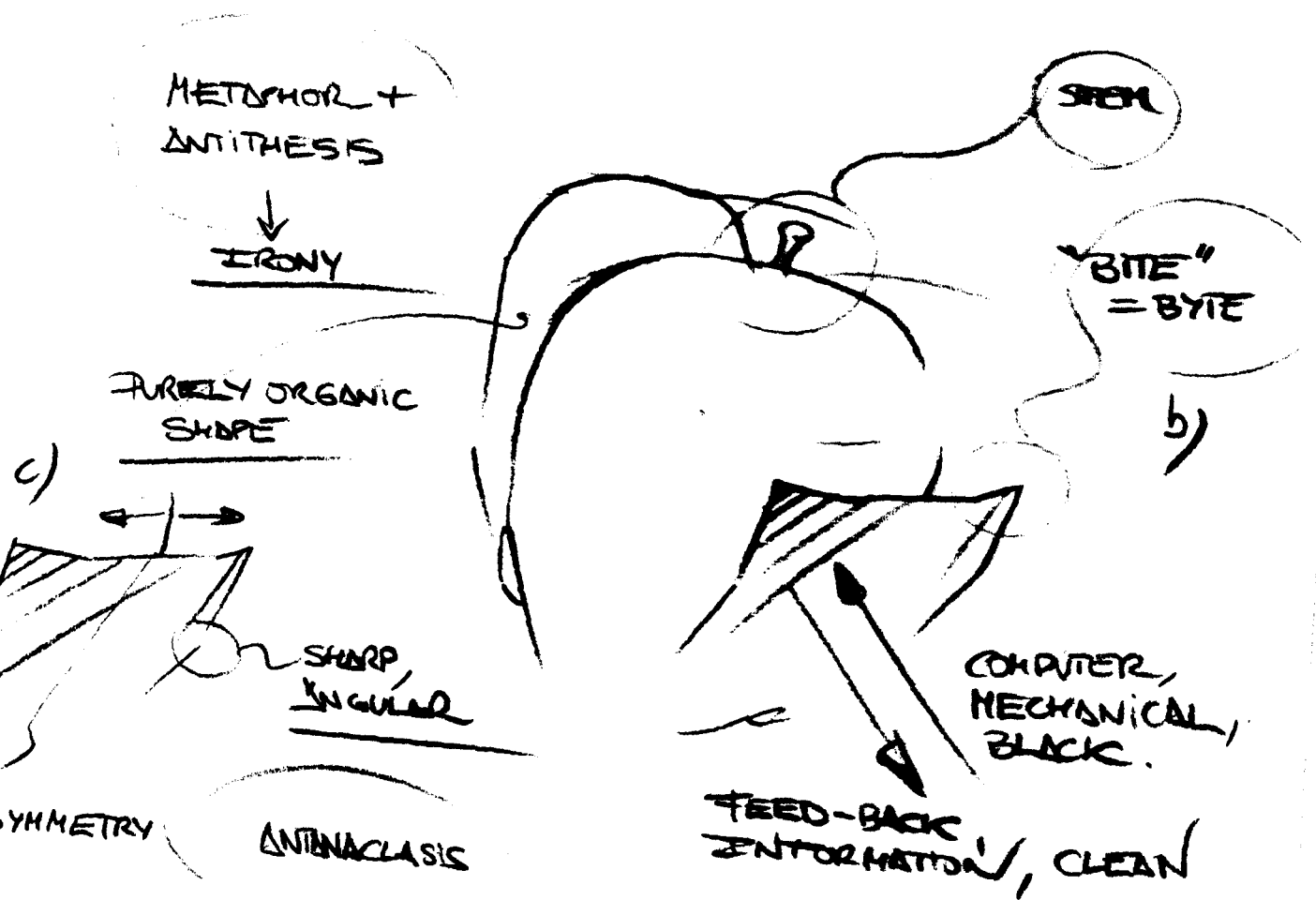
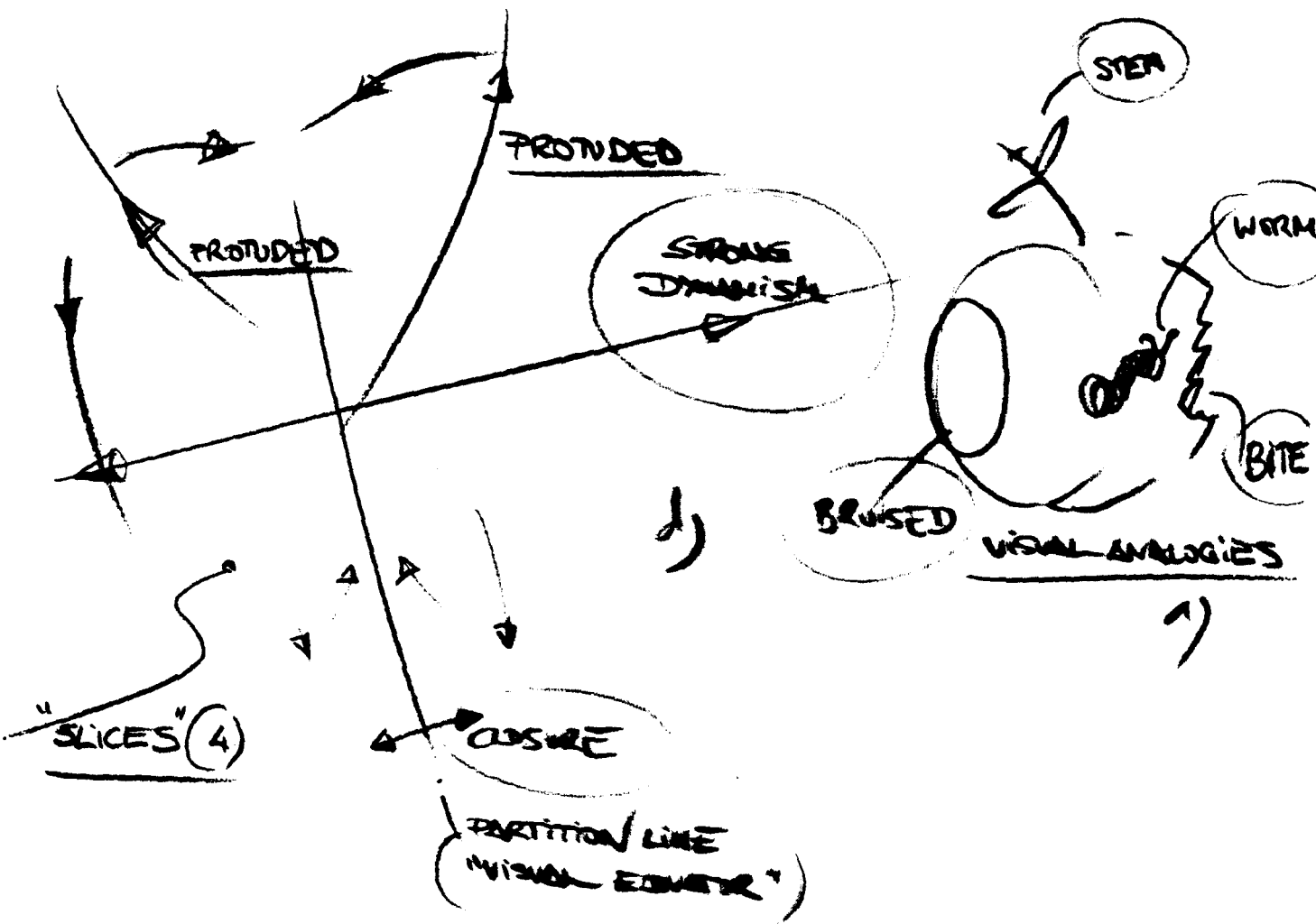
treatment that the elements of the computer receive. They are all constituted at random with little artificial or mechanical characteristics. The purpose of this design is basically to represent the identity of the company the object represents and to provoke the concept of emotion in design. This will be assisted mainly by the use of METAPHOR and the systems of variations to provoke empathy.

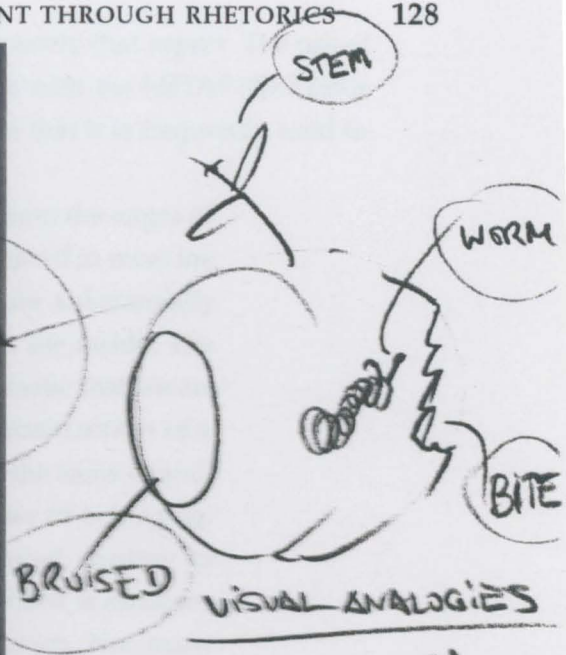
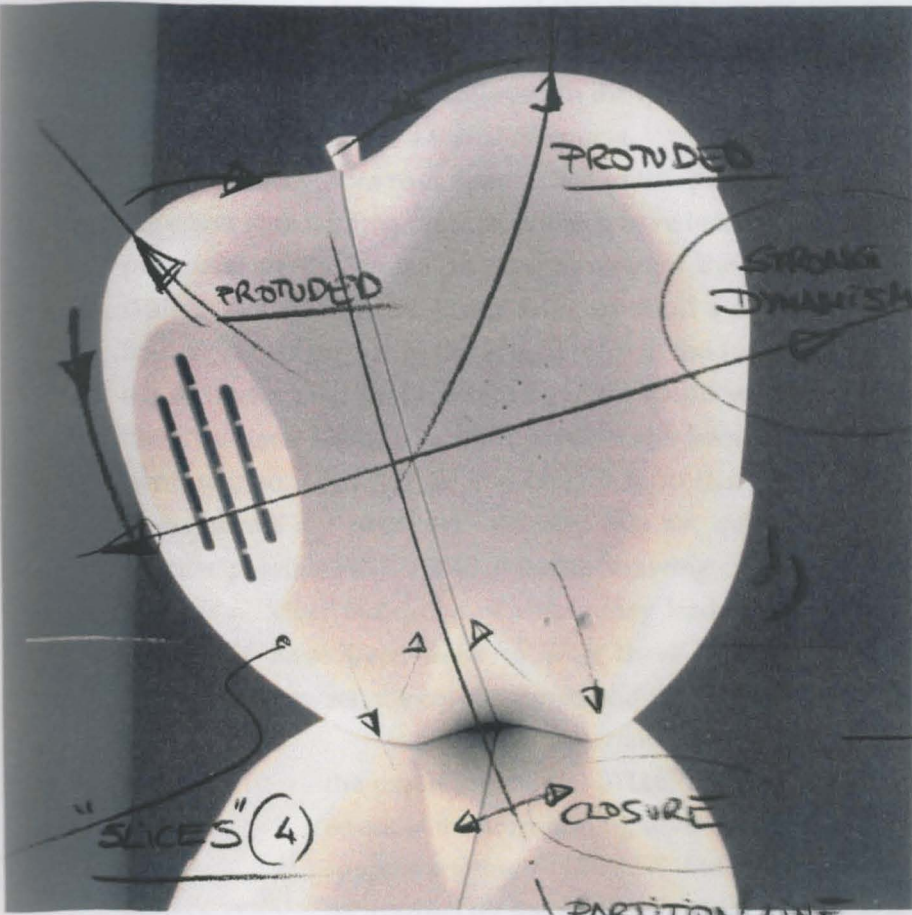
The mechanisms of the rhetoric function in the visual discourse commenced by generating a fundamental meaning through the use of METAPHOR. Illustrating the context of identity supposed a research of familiar components not only in the range of Classic —as happened in the context of history— but about the whole company. Hence, the most direct, obvious, familiar and perhaps fetishist concept to develop was the formal identification of the object with the company as represented by logo. This was not only achieved by the design of another self-contained computer —the first product of the company— but by identifying its logo directly with its external appearance (drawing a). Some criticism of post-modern architecture and design reject this kind of obviousness. But the issue of appropriateness in the metaphoric displacement of meanings cannot be so easily rejected in this particular instance. Other marginal METAPHORS accompanied the issue of appropriateness by understanding the elements of the computer as belonging to the object itself. This sense of belonging transformed the original mouse interface into a worm, bruises in the sides, switches as stems, etcetera.

The METAPHOR of experiencing a computer in terms of the apple is also supported by its characteristic bite that reveals the screen in the front. The same relationship it can establish with the byte that is the fundamental mathematical element of the software. The inclusion of a 14" colour monitor also establishes a relationship with the colours that the logo itself indicates. Moreover, it gives a degree of realism and of still nature in a machine.

The trope is specially proficient in dealing with these displacements of meanings. It has the danger, depending on the strength of the trope, of distracting the attention of every other rhetoric relationship appearing in the discourse. Nevertheless, it is also very revealing that much has been written to elevate the METAPHOR as the most reliable aid for designers to materialise concepts. In this design, the use of the trope is used only to shift one basic meaning. The trope ends here where the context of identity and organic animation are saturated by the use of that trope and nothing else. Other rhetoric figures can act so strongly that the viewer should not be distracted by the conscious and, in my opinion, appropriate use of the METAPHOR.

The METAPHOR is observed in the treatment of the surrounding edges of the screen. Breaking boundaries again of what is normally seen in the language of electronic appliances. The discourse also shifts another extended meaning which is also, a subtle, not so evident ANTITHESIS between the machine and the organic (drawing b). The squared, the strong and perfect is opposed to the perverted, deformed, organic and empathic aspect of the object. While the latter tends to be superficial, the former is usually hidden





Identity and Emotion

"SLICES" (4)

PARTITION LINE
"VISUAL EQUATOR"

METAPHOR +
ANTITHESIS

↓
IRONY

PURELY ORGANIC
SHAPE

SHARP,
ANGULAR

SYMMETRY

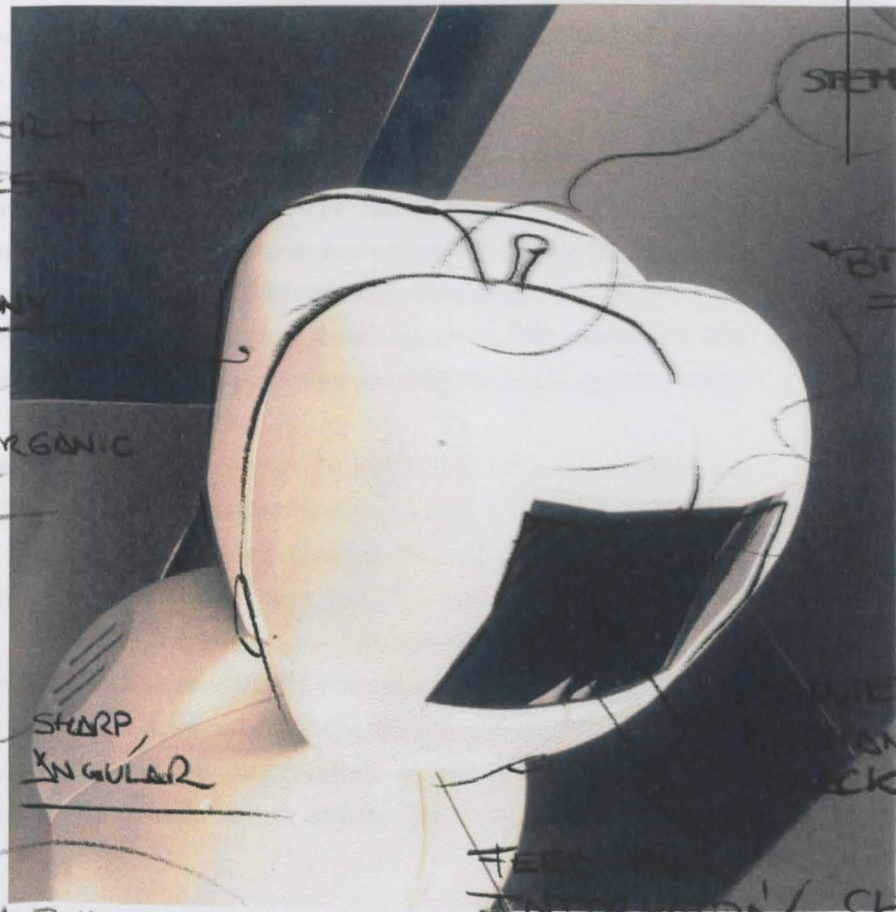
ANTINACLASIS

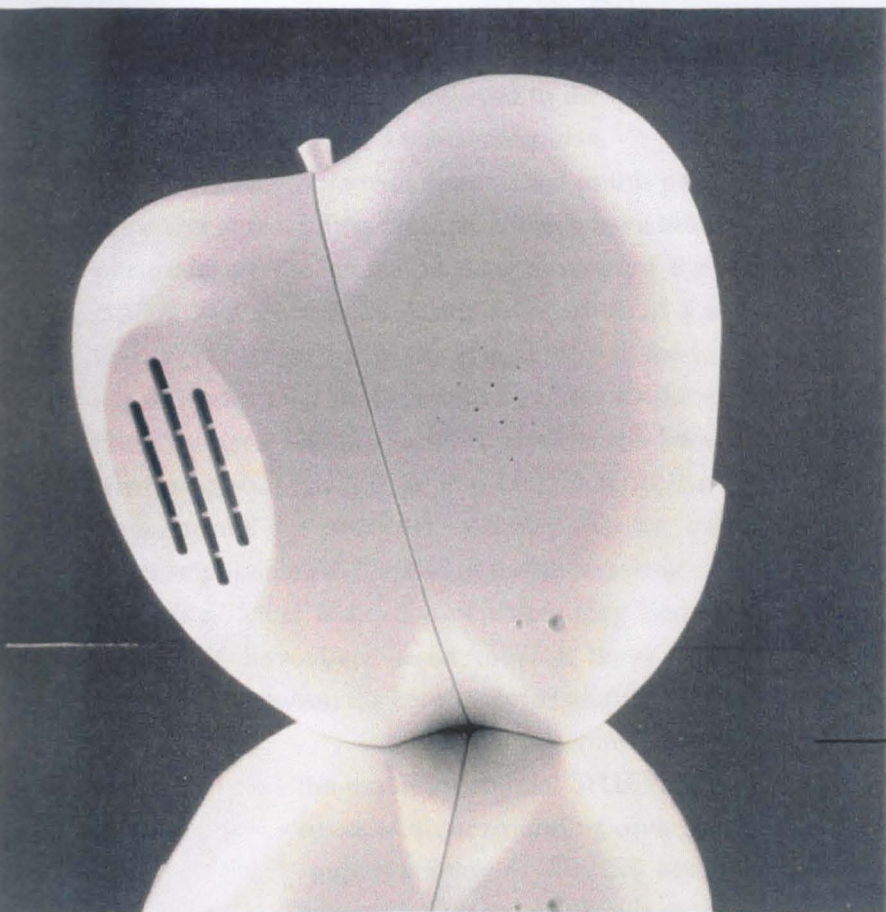
MINIMAL, CLEAN

STEM

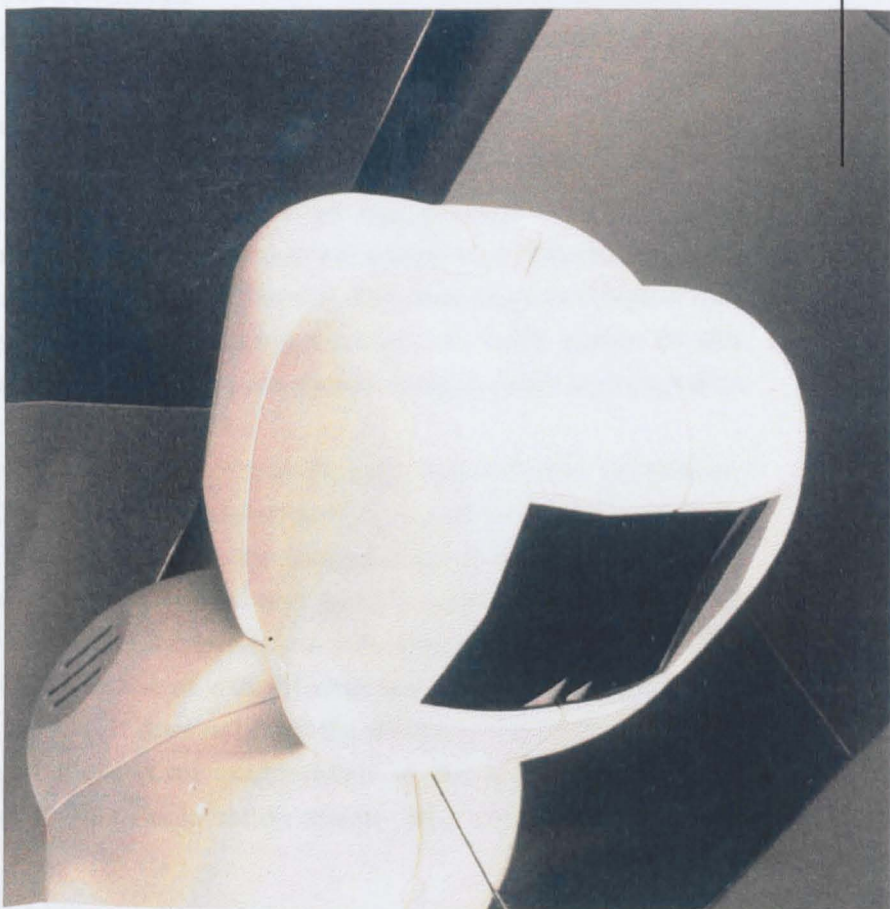
"BITE" = BYTE

b)





Identity and
Emotion



from the external skin. Only a bite reveals completely that aspect. The use of the ANTITHESIS establishes a certain competition with the METAPHOR since we have observed in the first and second models that it is frequently used to create a visual discourse.

Several corpora have been varied to this purpose. Starting from the edges of the cover surrounding the screen which have been randomly shaped to meet the perimeter of the screen and the surface of the cover. They are substantially deformed towards the inside as a flexion of a surface towards the inside. The flexion in comparison to the overall form of the surface is so dramatic that we are led to understand that it might be associated with a cut, an abstraction of a bite. It is not a subordinated form the cover because it receives the same overall treatment so it has a degree of association that give us a sense of belonging. These forms are marked in a way that are quite sharp, pointed, leading to another possible ANTITHESIS of forms (drawing c). Their movement is random, there is no clear indication of where they lead except to the screen. Not many variations have been used to shift these meanings allowing for a direct correlation between the corpus varied and the meaning it represents.

While there is certain harmony in the edges of the screen itself with the use of a potential SYLLEPSIS, a very strong, chaotic relationship with the edges of the surrounding cover have used some variations of relationship that support another ANTITHESIS. But this arbitrary formalisation of curves become regulated by the perimeter of this screen and become harmonised by this. Therefore, the ANTITHESIS establishes the framework for a SIMILE and a METAPHOR. The forms are multiplied and the balance is symmetrical. This is a ANTANACLASIS.

The cover embraces functionally and formally more than the face of the computer. It ends in the equator of both sides. The usual partition line of other computers' covers develops to the partition line that subdivides this design in two. The partition line of the centre of the computer also subdivides the object in two so the computer is cut into four *slices* that propose a new form of manufacturing assembly (drawing d). These are paired in a way that closure connects them although they are very different. The stem plays an essential role in locking the segments of the form, hiding therefore, all visible screws for this function. The two frontal slices support a number of interfaces such as the speaker, buttons, etc.

The forms in the front are different from the back. The forms are voluptuous, curved, protruding. They are organically shaped in accordance with the overall shape of the apple that is assured by the phenomenon of closure. We cannot discern any structure behind its shape and there is a strong movement that points towards the back. The variations of substance are important in this segment. There is an evident use of weight with few spaces left to allow us to understand that it is hollow. It does not copy the shape of the screen so it does not hold it. Somehow, there is an exaggeration of this effect. Then, it is a LITOTES. Specially when this exaggeration affects other segments such as the

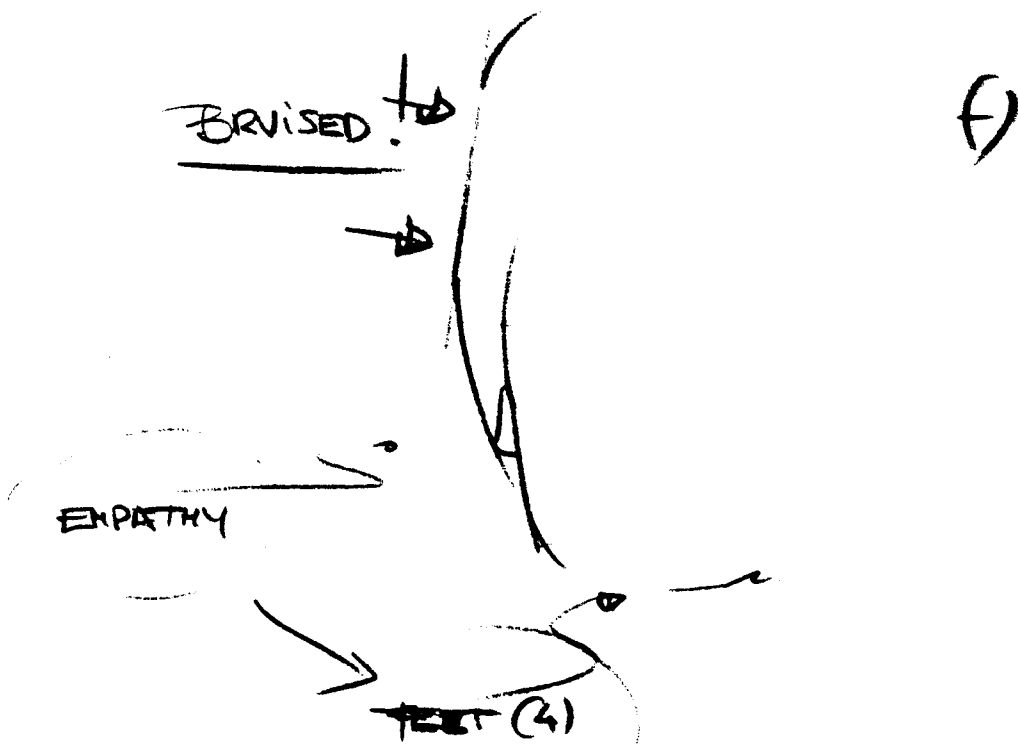
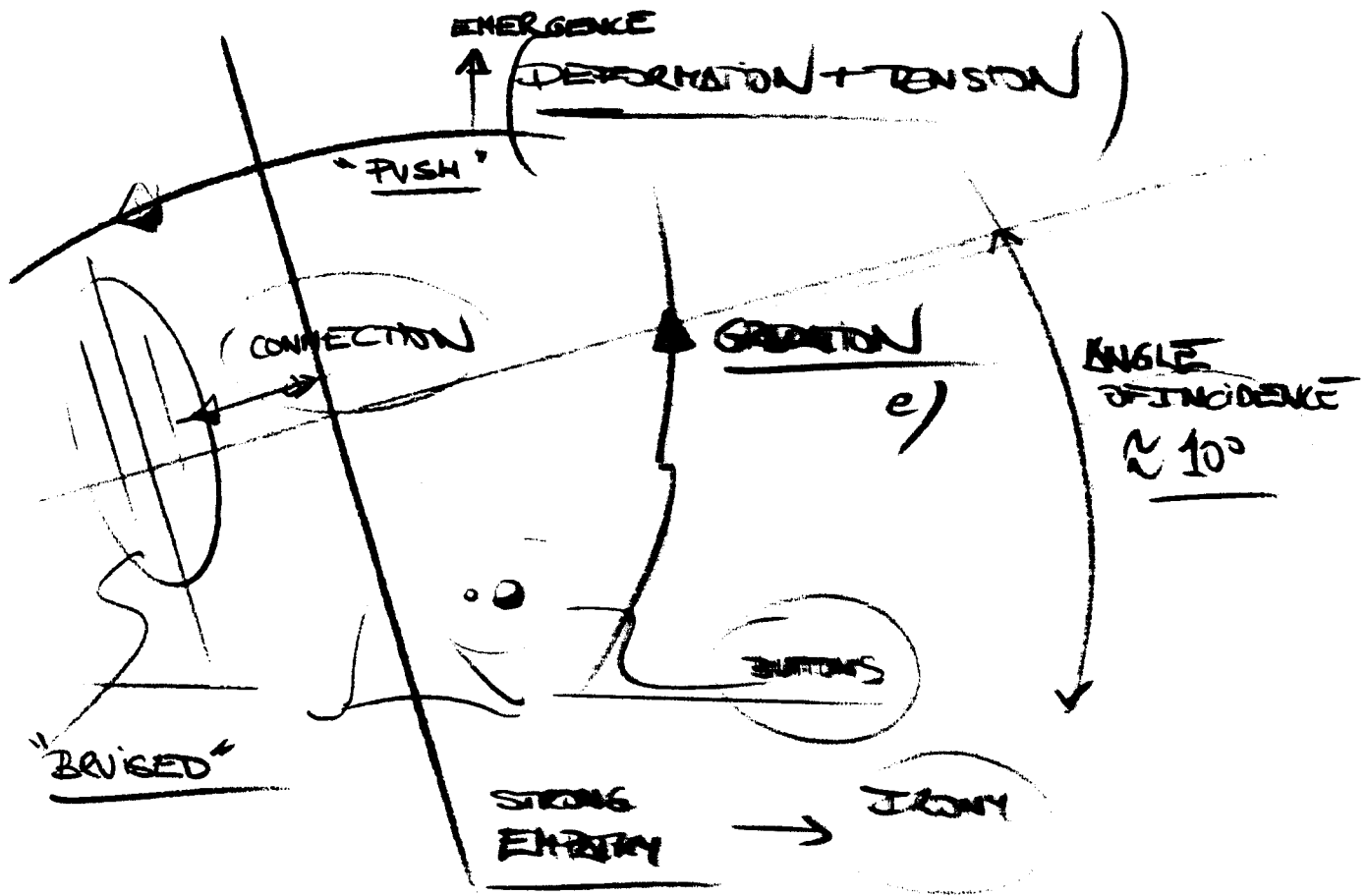
following. On the contrary, they look very independent from each other. Specific parts of the cover protrude which resulted in four corners in the top and four forms in the bottom which became the footprint of the computer. Texture is also vital to produce a less artificial, plastic texture. Many of these protuberances can be better discerned by touch. This fact made me suggest a warmer response from the user, usually more used to-see-and-not-touch configurations.

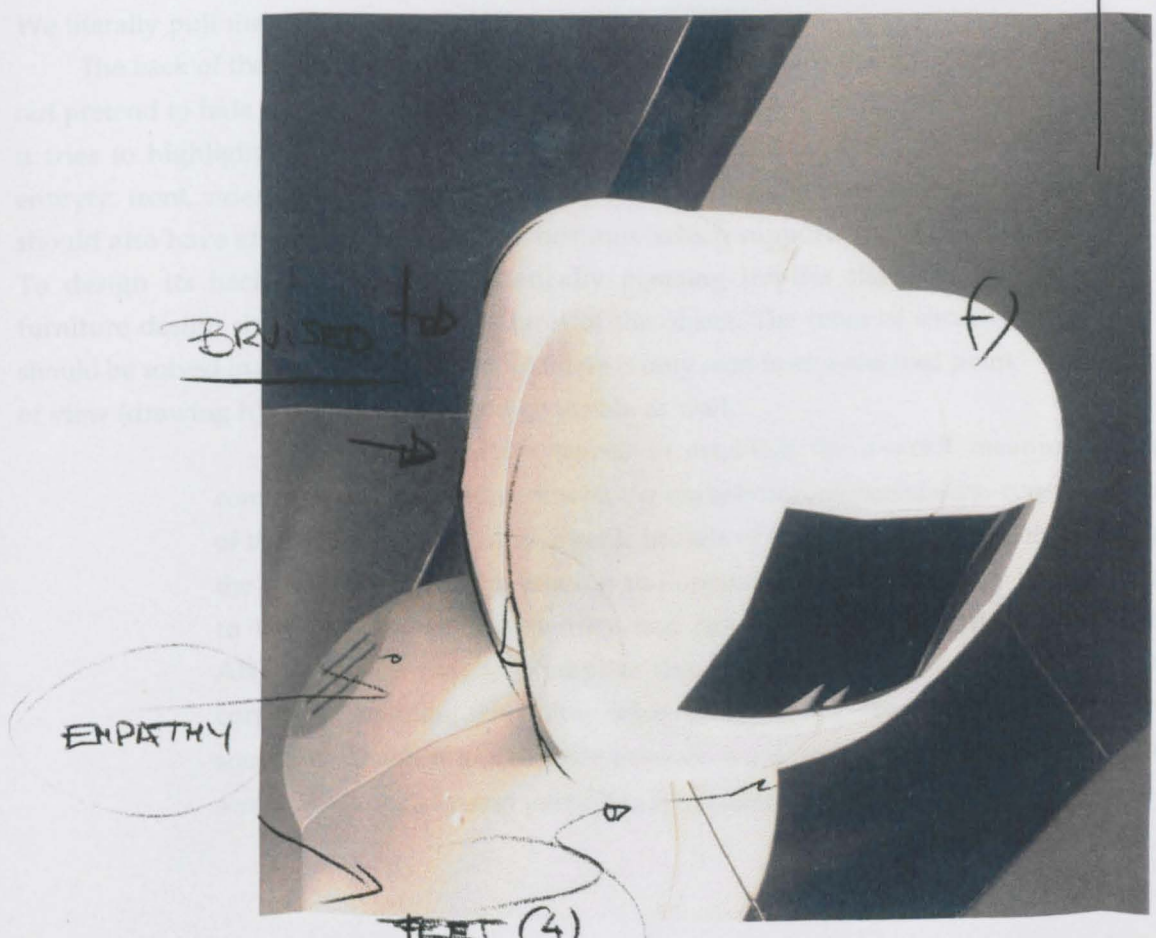
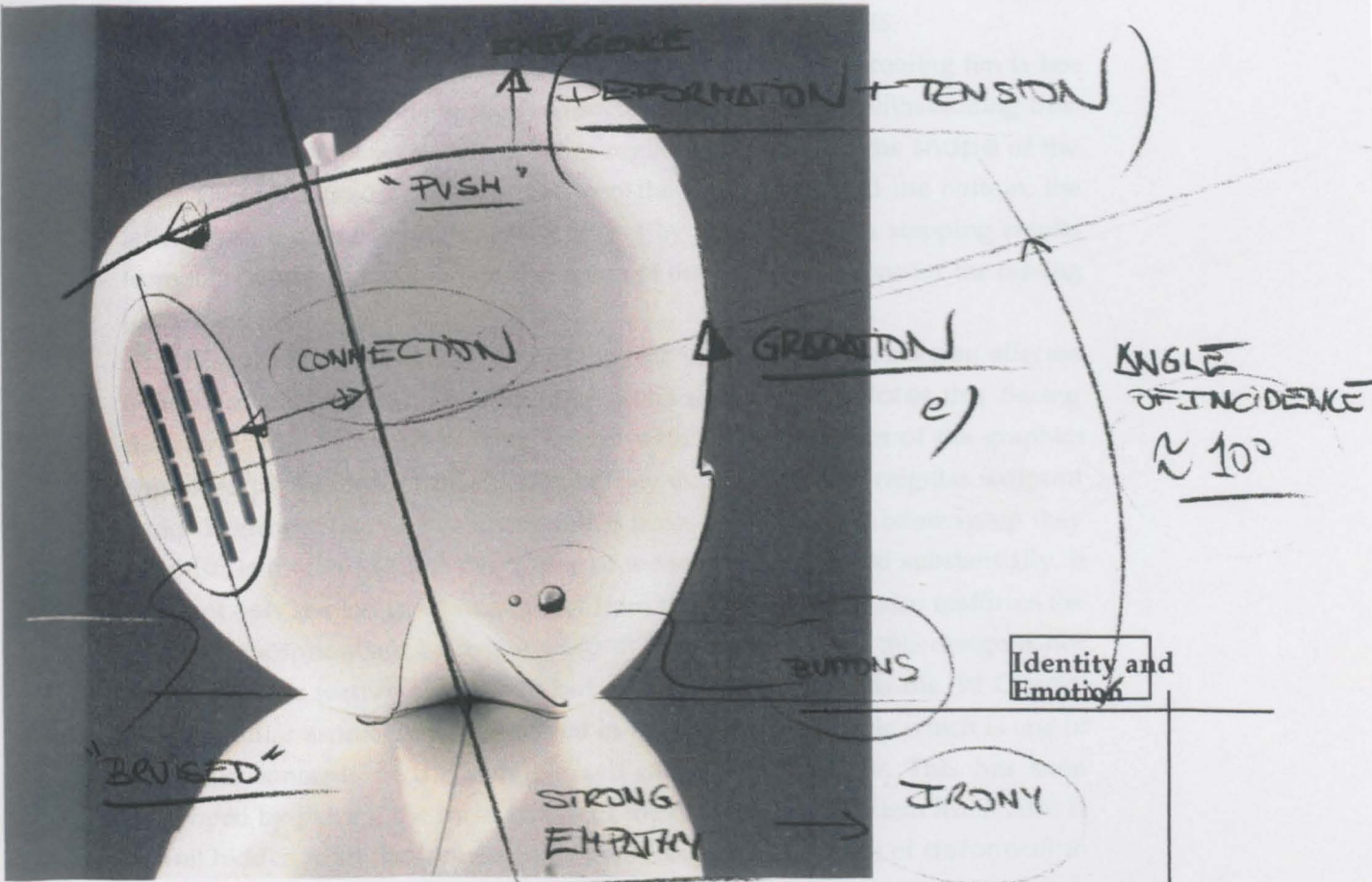
An important empathic movement has been devised to experience the sense of push (drawing e), not only from the front to the back but from top to bottom. The diagonal that results from joining the top of the four corners of the protuberances of the apple forms an angle with the surface of rest that coincides with the ideal angle of visual incidence. The partition line and the slots for air intake also copy this angle so there is a gradation towards the front of the computer that witnesses this angle. The partition line marks a latitude line in the shape because it is perfectly perpendicular to this angle. In consequence, the shape of the back is substantially regulated by this angle. But it portrays much better the sense of empathy. The angle emphasises the obliqueness and provokes tension and is highly dynamic. This is where we understand better the notion of still nature. The partition line also regulates this push and we may say that the back is perverted because it is a varied form of the front. As a whole it becomes the other naturally shaped segment of the back of the apple. Individually, it is degraded in comparison to the front.

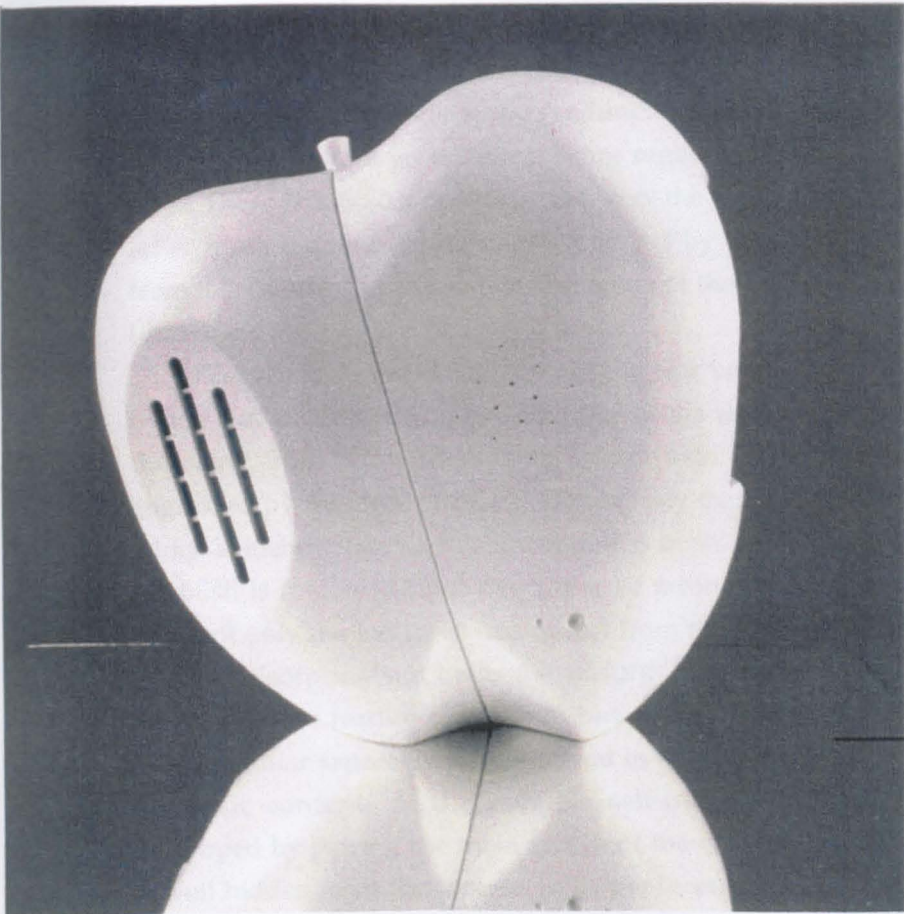
Emergence is relative to two ideal outlines of the overall perimeter of the computer. These are represented by the partition lines of the sides and centre. They regulate the extent of the protuberances in the top. They state an ideal line of beauty based on Hogarth's and, in general, give the degree of depression of the forms of the top and sides. So the partition lines not only become functional but a very important pattern for empathic movement, for empathic emergence, for METAPHORIC struggle and an ANTITHETICAL function when we experience the relationship between front and back.

All these effects may lead to a IRONY which masks a humorous approach to the visual discourse. Degradation, deformation, perversion provokes tension, empathy and dynamism. In discourse, it can support harsh criticism.

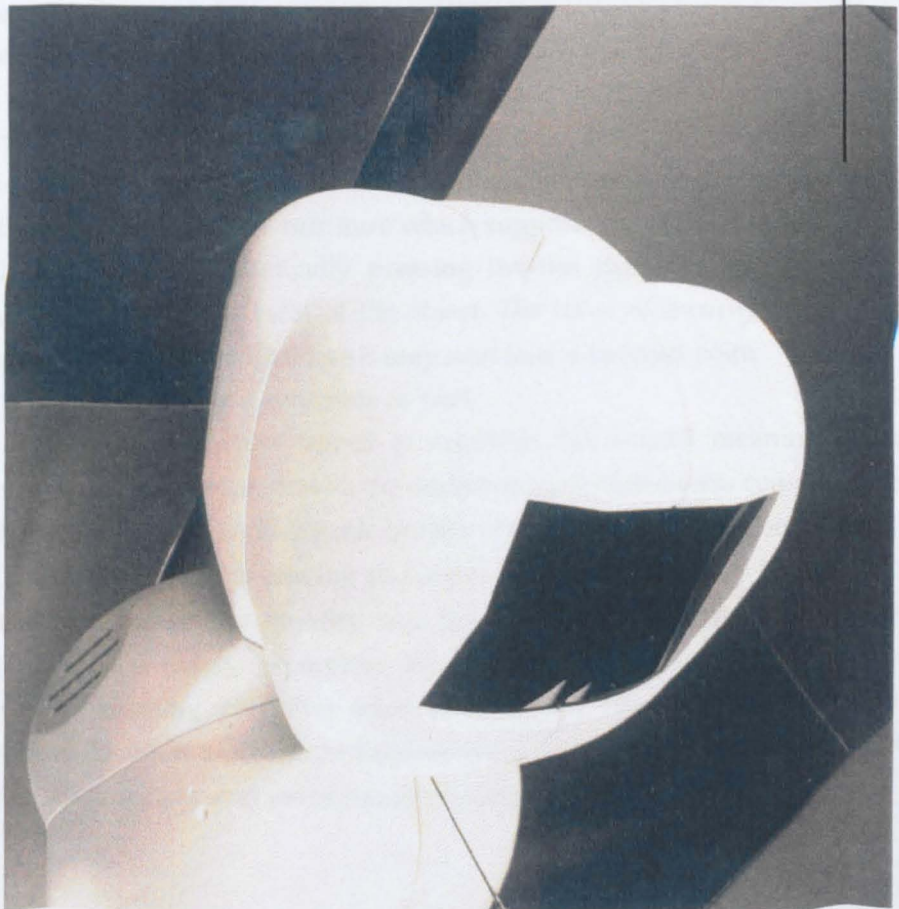
The sense of perspective is strong and this also leads to an implicit dynamism. While in the first design the lines of the frames end under the desk, in this design, the lines of the angle result in literally squeezing the object between two main planes. The segments of the back hold the elliptical, geometrically pure forms similar to natural bruises that define the slots for air intake. These bruises are treated differently from the depressions of the buttons of the front. While the latter are more treated organically, the elliptical forms are flat and the edges sharp. Their orientation, ellipsis and slots, also coincide with the angle of the partition line (drawing f). The elliptical form is also proportioned in relation to the space it occupies.







**Identity and
Emotion**



But another purpose is to accompany the sense of perspective and to support another complex play of ANTITHESIS and a subsequent PARALLIPSIS.

The form of the back that also allocates the slots for the cooling fan is less perfect, trying to provide space for functional concerns. Notwithstanding this, the forms are quite geometrical, being regulated mainly by the shape of the slots. There is a disassociation between the upper form and the bottom, the latter more flat and the former regulated by the latter. So, a stepping results from this difference and defines the zones of the fan and the zone for the cabling (drawing g).

Feet are also contradictory since the rear ones of the back are also affected by the deformation. The partition line of the sides also regulates this. Seeing the object from below there is an x form with the bottom part of the graphics engrossed by the deformation. We may say that we have an irregular footprint which somehow freezes this uncontrolled push. Moreover, the relationship they establish is rhetorical since the corpus of meaning is broadened substantially. It does not only remind us of similar feet from past computers. It also reaffirms the notion of footprint, and holds the weight. To provide feet for this design is not only a realistic feature of the fruit but creates similarities with the '92 Classic. Other familiar aspects can be observed in the design of a handle which is one of the basic concepts of the portable self-contained computer. This has been developed by placing the main switch of the computer in the stem itself. Also it is well hidden from the front as in its predecessors. The degree of deformation also assisted this. Formally the stem goes to the main core of the object. To switch the computer on and off has also affected the way in which we interact with the machine, affecting, therefore, the pragmatic action of switching on a computer. We literally pull the core off to switch it on another IRONY.

The back of the computer is especially considered in the third design. It does not pretend to hide any of the electric elements of the computer. On the contrary, it tries to highlight this in a discursive manner. The object is designed in its entirety: front, sides, back, top and bottom. To consider the object in its entirety should also have effects on the design of furniture which supports the machine. To design its back, to make it aesthetically pleasing implies that modern furniture design should not mask this facet of the object. The issue of security should be solved in other ways and the discourse is only seen from a reduced point of view (drawing h). The bottom should be visible as well.

I have used certain tropes to establish the overall meaning of the computer and to compare it with the underlying but nonetheless conscious, use of the SIMILE with the non-organic bruises of the external skin. I demonstrated the use of ANTITHESIS in relating and opposing features that may belong more to the organic, to the identity and the emotion about attributes. These ANTITHESES strongly exemplify the rhetoric functionality of the varied corpora of meaning when they relate to each other. From these ANTITHESES I sought to establish a difference between the organic and the mechanical. The screen was formally and perceptually separated from the cover.

b)

WIRELESS INTERFACE
OR KEYBOARD + MOUSE

HANDLE +
SWITCH

IRONY

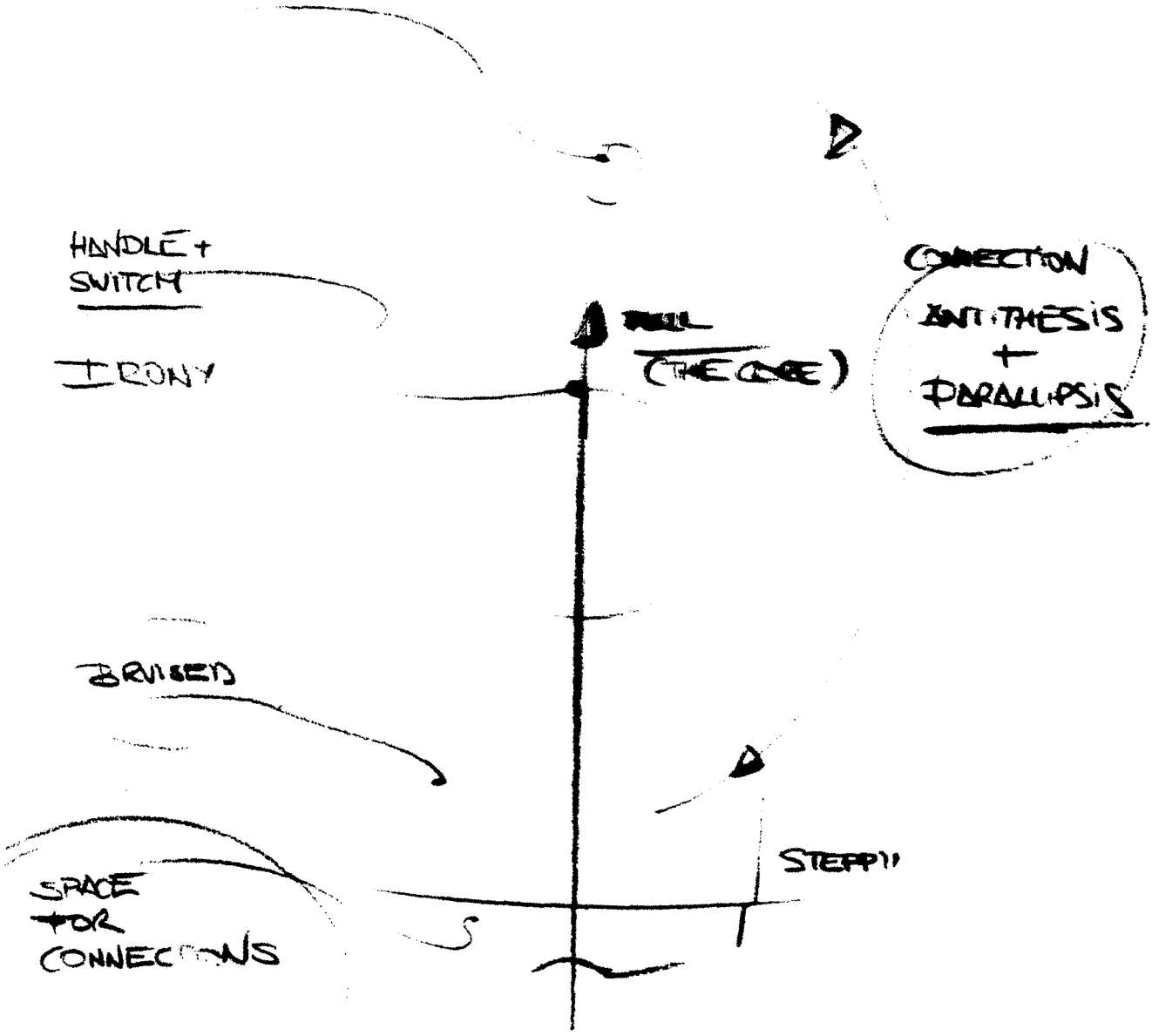
WALL
(THE ONE)

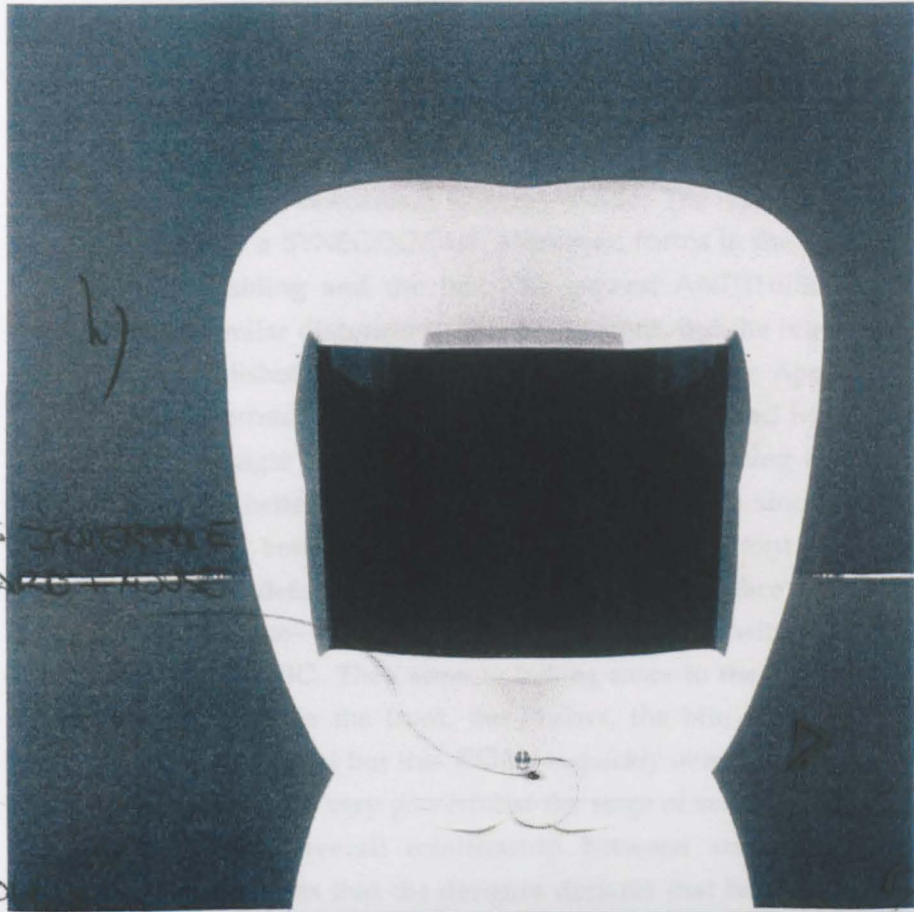
CONNECTION
ANTITHESIS
+ PARALLIPSIS

BRUISED

SPACE
FOR
CONNECTIONS

STEPPING

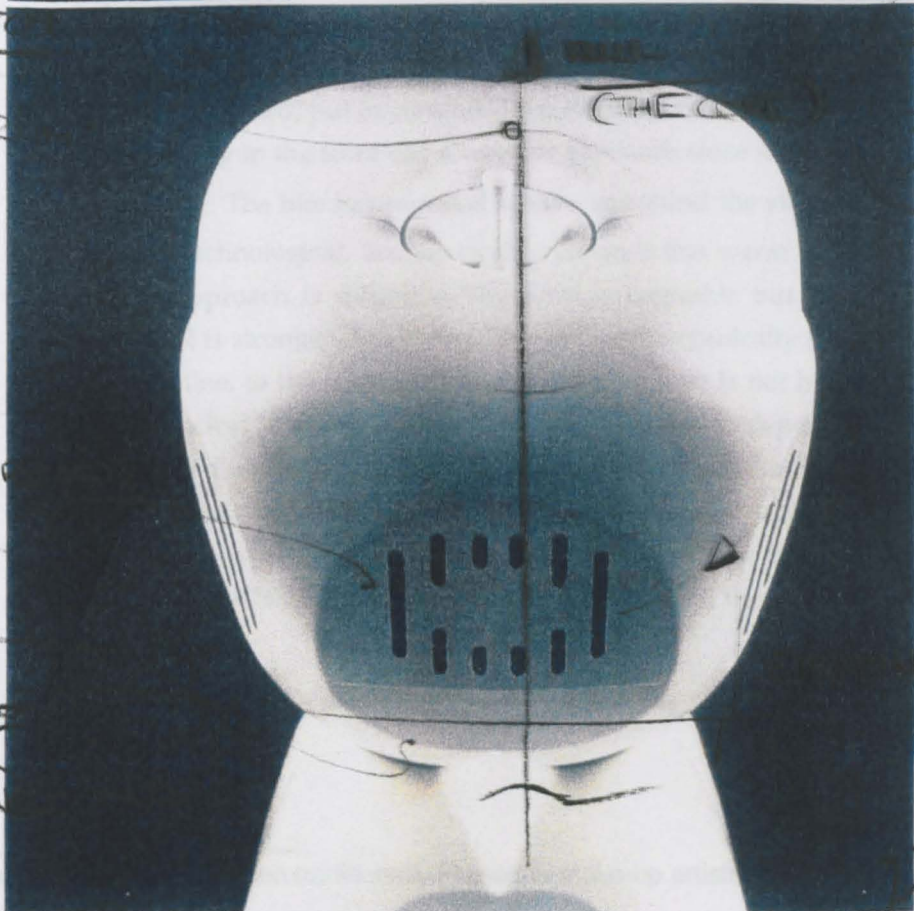




WIRELESS INTERFACE
FOR KEYBOARD + MOUSE

HAND
SWITCH

CONNECTION



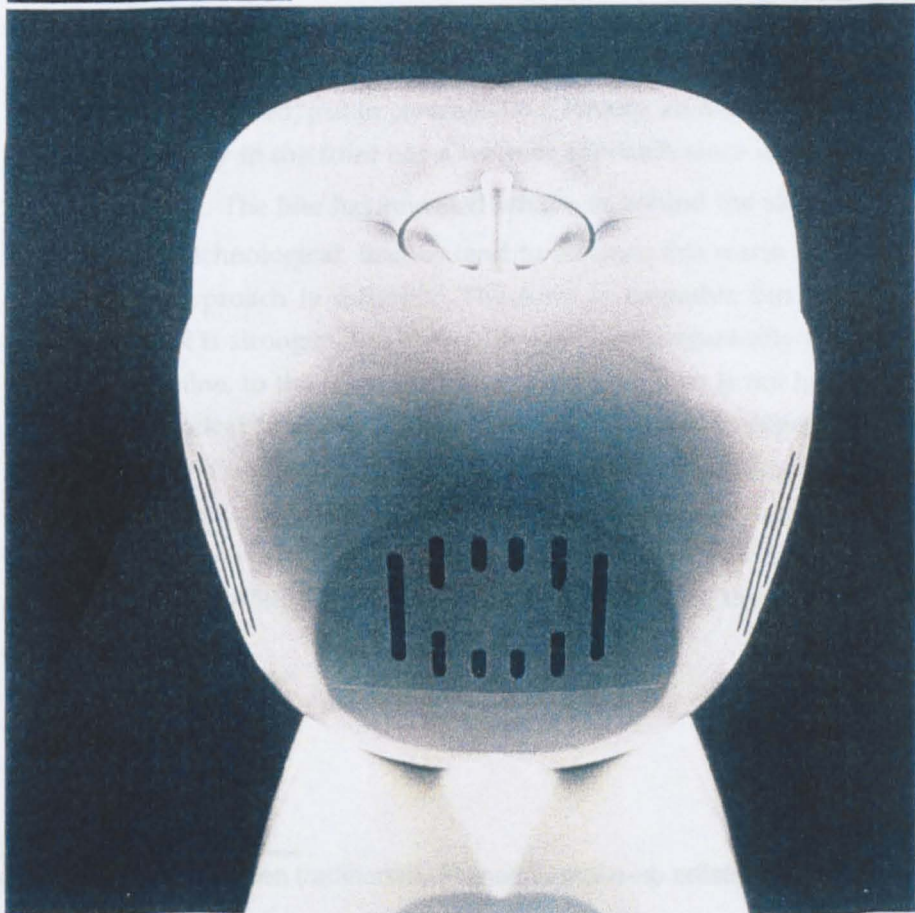
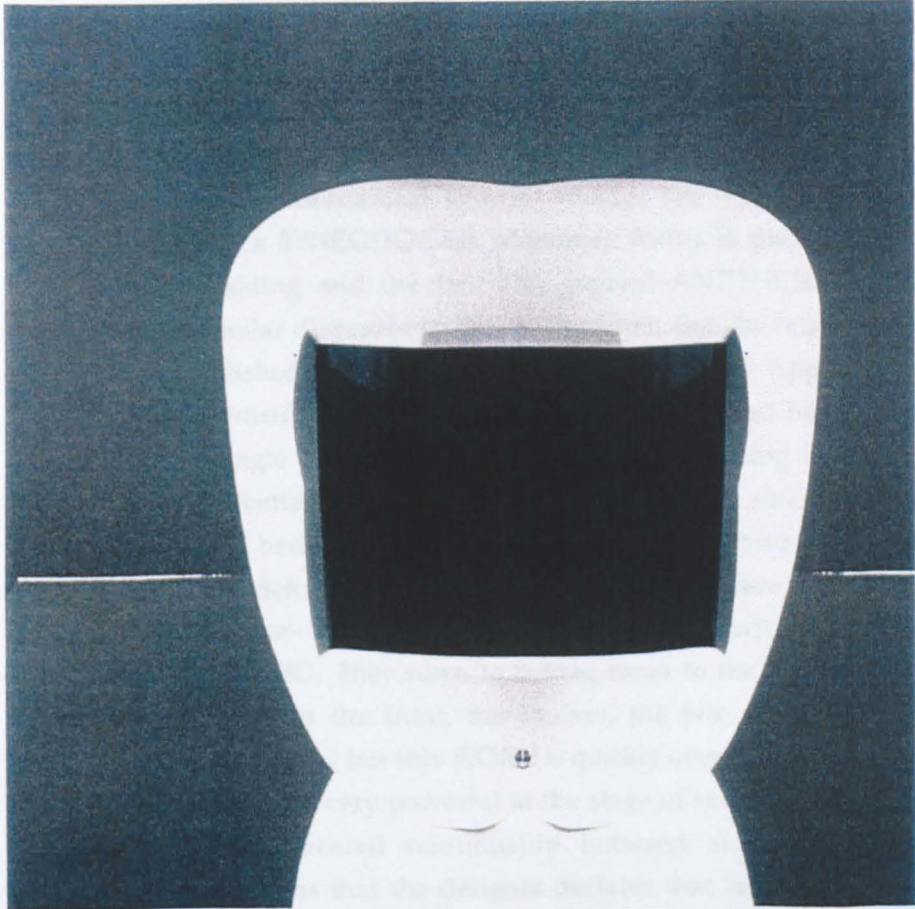
IDE

(THE CLIP)

ANTITHESIS
+
PARALLIPSIS

SPACE
FOR
CONN

G



Bruises in the front were grouped through the conscious use of schemes such as ALLITERATION that became ANTANACLASIS since they semantically communicated the idea of realistic bruises and, subsequently, were designed to establish a GRADATION among them. But, while the bruises in the front were realistic, their treatment in the back was expressed more artificially. The latter had their surfaces flattened, the edges sharpened and their intersections narrowed. They made it clear that they had functional purposes and they exposed mechanical features inside. The visual play with the bruises becomes a SYNECDOCHE. Moreover, forms in the back supported visually the cabling and the fan. The general ANTITHESIS in the back resembled a similar discourse to that of the front. But the relationship front and back established is first, IRONICAL. The back of the Apple is, perhaps, the most deformed, the most empathic and perverted by certain forces including the angle of incidence which pushed everything backwards. We may say that it better portrayed the context of emotion since its empathy was deliberately better conducted by variations. The front was purer, less affected by this deformation, more hermetic and its face quite uncorrupt—except for the bite—. But in the back, the relationship with forms and cover are more ANTITHETIC. They seem to belong more to the mechanical, to the machine aesthetic. In the front, the bruises, the bite, everything is more organic. That is ironical but this IRONY is quickly overcome by the use of the PARALLIPSIS which is very powerful at the stage of summarising and giving coherence to the overall relationship between statements. Basically, PARALLIPSIS explains that the designer declares that he is not saying what the discourse itself says. It is an implicit IRONY which broadens its horizons. The discourse establishes a discursive relationship in which two elements are confronted, opposed, put in contradiction. Finally, an overall discourse results. The technology in the front has a warmer approach since it is more in contact with the user. The bite has revealed what was behind the skin¹ and that was essentially technological. Bruises tend to enhance this warm approach. In the back, the approach is different, The form is empathic but the mechanical METAPHOR is stronger. The back, although more organically treated, belongs to the machine, to the electronic. The visual discourse is not hierarchical. The use of rhetorical functions allowed the discourse not to depend on linearity, nor to depend on the causation of meanings, but only in the relationship they may have and the potential of using the rhetorical struggle. The rhetoric function focuses on this relationship. Experienced from the back to the front or viceversa, the ANTITHESIS, the subsequent IRONY and the final PARALLIPSIS is made clear.

¹ Designers of computers have been traditionally likened to make-up artists, makers of cases.

Towards a methodology to design

My intention at the end of the research is to propose certain direct relationship between the initial stage of the design of isolated elements of the fragmented discourse and the resulting discourse as a whole, consciously arranged by the use of the rhetoric *bond*.

My intention is to propose an open methodology in the sense that these relationships are valid in the design of the three models but can be different in the design of other products or can be applied differently by other designers. This becomes a matter of style. However, the design of the three models are based on three major contexts of signification where a product may be frequently found: the organic perspective, the historic observation or reedition and the essentially perceptual one. The validity of the method must be assessed in global, not only from the perspective of the visual aids explained in the different chapters of the thesis but in the scope of the project. The interest of the methodology lies in the capacity to construct organised, deliberate and persuasive visual arguments in a group of designed elements so we receive understandable concepts, ideas or intentions from designers.

In the design of the three models I observed a strong relationship between certain variations and their subsequent organisation in the discourse by the rhetoric figures. A variation can propose different rhetoric figures. This is because we are designing from a basic elementary level of meaning. From this level, it is feasible to understand that your discourse can shift to certain argument or other in a undetermined way. Whether this is planned or not, the relationship they establish with other elements and the subsequent function as regards the whole can change completely the initial stages of the design process. Some rhetoric figures are specially efficient in doing this such as IRONY or PARANOMASIA. Some variations remark strongly the potential use of a rhetoric figure. This happens in, for instance, with the use of flexion because it inevitably leads to a GRADATION and/or a METAPHOR. Others are more flexible and are very dependent on the relationship they establish with others. This could be the case of movement because it can trigger effects of ANTITHESIS, REPETITION or INVERSION. A list of relationships observed to the design of products is shown in two main columns:

Variations	Rhetoric figures			
form	METAPHOR	METONYMY	IRONY	
fit	METAPHOR	ELLIPSIS		
movement	ALLITERATION	GRADATION	ANTITHESIS	ANTANACLASIS
	ELLIPSIS		INVERSION	CHIASMUS
empathy	METAPHOR	GRADATION	LITOTES	REPETITION
ANTANACLASIS				
	ELLIPSIS			
weight	LITOTES		SIMILE	
gravity	GRADATION	ELLIPSIS		ANTITHESIS

textured	REPETITION METAPHOR	ANTITHESIS SYLLEPSIS	INVERSION	IRONY
transparency	ELLIPSIS			
length				
proportion	ELLIPSIS	GRADATION		
width				
depth				
volume	IRONY	ELLIPSIS	LITOTES	
size	LITOTES	ELLIPSIS	METONYMY	
division	ELLIPSIS	PARALLIPSIS	SYLLEPSIS	
mobility	INVERSION	CHIASMUS	PARALLIPSIS	SYLLEPSIS
closure	METONYMY	SYLLEPSIS		
attachment	SIMILE	ALLITERATION	ANTANACLASIS	
flexion	METAPHOR	GRADATION	INVERSION	CHIASMUS
deformation	METAPHOR SYNECDOCHE	METONYMY	PARALLIPSIS	LITOTES
constancy	REPETITION	ANTANACLASIS		
Variations of relation	Rhetoric figures			
orientation	CHIASMUS PARALLIPSIS	SYLLEPSIS INVERSION	SYNECDOCHE GRADATION	
obliquity	ANTITHESIS INVERSION	CHIASMUS OXYMORON	IRONY PARALLIPSIS	LITOTES PARANOMASIA
addition	REPETITION	SYNECDOCHE	PARANOMASIA	
multiplication	ALLITERATION	SYLLEPSIS	REPETITION	ANTANACLASIS
balance	ELLIPSIS PARANOMASIA	SIMILE	SYLLEPSIS	REPETITION
connection	SIMILE	ANTANACLASIS		
emergence				
overlap	CHIASMUS	GRADATION	LITOTES	
association	SYLLEPSIS	SIMILE	METONYMY	ANTANACLASIS
harmony	SYLLEPSIS	SIMILE	ALLITERATION	ANTANACLASIS
regulation	OXYMORON GRADATION	PARALLIPSIS SYNECDOCHE	ANTITHESIS PARANOMASIA	IRONY
deviation	METAPHOR	ANTITHESIS	SIMILE	CHIASMUS
empathy	METAPHOR SYNECDOCHE	GRADATION REPETITION	LITOTES	ANTANACLASIS

After experiencing the meaningful and rhetoric capability of the designed object I am inclined to believe that with the Product System the designed object has embodied more than mere functional or ergonomical concerns. Let me elaborate this.

In the first chapter, the designed object represented a duality that was entirely based on our fundamental mechanisms of perception and the ensuing intelligibility of them. This duality is represented and studied in different ways and approached from different sources, but mainly from Kant and Saussure. This placed the research clearly in the field of hermeneutics and semiotics.

Understanding the object as a material unity that embodies signification in itself completely affected the research of meanings. Thus we understood the designed object as something material and non-material; a product of combining experience and intelligence and, in semiotic terms, a signifier or *corpus of meaning* with its signified. This duality resulted in a survey of meanings, organising a number of contexts of meaning in two main general groups establishing common aspects between those contexts and the tangible and intangible aspects of meaning. It is, perhaps, the first attempt to gather all the general possible meanings of an object together in one study.

In short, the research of meanings proposed to bridge a duality between both realms through the use of one theoretical domain: semiotics. This presupposed that there was a *gap* often pursued in diverse theories of knowledge between the perceptual and the linguistic that had to be covered. With the first chapter I demonstrated that the designed object is a communicative entity that, apart that from being completely meaningful, is semiotic since it embodies all the three main semiotic logics. In addition, it is essentially a matter of social interchange of *messages* because it engages in multiple geographic and social contexts.

From this approach I concluded that the Product System aimed not only to demonstrate the application of semiotic theory to design but to understand it as a new social attitude towards our environment. As an immediate consequence we should assign a more general, less specific role to the serially produced object.

The idea of semiotic generality in the system is carried throughout the whole research with special impact in the third chapter. In the second chapter the interdependence between the linguistic and the epistemological resulted in applying the investigations of Roland Barthes and Rudolf Arnheim. The former's dependence of the realm of linguistics and, ultimately semiotics and rhetoric, claimed to find a direct correlation between words and the designed elements of the garment. This had some important implications in this research. On the one hand, he assumed that the object was comprised of small meaningful elements which, in theory, would comply with semiotic theory. So, the elements were constructed as complete signs. On the other hand, the description of the garments could only reach a verbal explanation. The Fashion System turned out to be another specific semiotic system *in praxis*. But his research was specially useful to raise consciousness about the processes involved in the creation of objects.

The fact of allying the work of Barthes with that of Arnheim also had some important functions. Firstly, while Barthes's system strived to go beyond experiencing

the relationships between semiotics and the designed elements, Arnheim's research was dedicated to assessing works of art through their perceptual character. By adjoining both I am simply relating their investigations to the duality observed in the first chapter. Emphasising that the duality of human cognition is also resembled with semiotics. Secondly, both researches coincided in assigning the same words to the same perceptual-semiotic design actions either in the cloth or in the work of art. More importantly, I proposed focussing on a set of aids to assist efficiently the shift of meanings in Design and, by extension, designer's aims. Finally, both researches were directly transferred to the creation of a new methodology for design criticism and the demonstration of the validity of combining linguistics with epistemology through semiotics.

In chapter I, I also exemplified with a case study the outcomes of the theoretical domain set out in the first two chapters. The detailed description of the case study strived to experience a number of designed elements in a real product. It also suggested the application of the semiotic logics of syntax: semantics. In addition, the incorporation of modern studies about semiotics led me to include the logic of pragmatics or the study of the use of the sign. Since use determines very much the realm of meaning, I preserved the duality by adjoining pragmatics and semantics into one big group.

Pragmatics also established the diversity of the interpretation of meanings which, after a practical and theoretical approach the investigator succumbs in front of the evidence of the subjectivity of meaning in design. This is another fact that gave more relevance to the designed object as a physical entity with social responsibility. The deconstructivist attitude in understanding the object as a conundrum of signs that are somehow related one to each other was borrowed from a new post-structuralist attitude as regards the meaning of designed objects. Formalist techniques of textual analysis have been important, as have developments in semiotics and structuralism which enable us to comprehend texts as complex and signifying systems and codes. But I am not entirely following the previous formalist, structuralist attitude in worrying about the causation of meanings but their infinite variety of relationships, their forms and rationale of gathering in a unity.

More implications spring out from this. I established that only a number of characteristic traits can be determinant to exemplify the efficient shifting of meanings through the system of variations. Also, that the system of variations described by Barthes included a parallel system of variations of relationships that suggested a more important research. The rationale of the design of elements is amply related to our mental structuring activity. This relationship among designed elements must be resolved from similar theoretical domains. From linguistics I found out that our speech is very much dependent on the use of rhetorics and this is put in evidence occasionally in the history of architecture and design. It is feasible to imagine that a direct correspondence in the activity of creation is dependent on linguistic theories, semiology and, ultimately, the mechanisms of the discourse, now transferred to the three-dimensional world.

In the third chapter, rhetoric enters the research at its utmost importance. The

linguistic analogy of understanding the designed element as a visual discourse seems now even closer. The research of theoretical approaches mainly borrowed from Lotman¹, Eco² and O' Toole³ exposed a list of possible functions that could be adopted to the creation of design discourses. Laclau⁴ and Wolff⁵ defines more socially the conception of the discourse. The creation of these discourses would be assisted by the system of variations and, through the variations of relationship, they could pave the way to a much more complex play of functions, this time performed by rhetoric figures.

The design of a number of products also exemplified this visually. The explanation of its method of design did not fail into subjective interpretations since it only reported about the methodology of the application of the system of variations and described the use of the rhetoric figures. The use of the initial checklist-matrix extended in order to include the rhetoric struggle, does not presuppose that the Product System is a method in the sense that one can control signification as if we were designing mathematically. Perhaps it will, but my intention is to propose new patterns for conscious design.

What does this imply? Designers can, if not control meanings, organise and experience the immense variability in structuring visual arguments in a recordable surface that is the product. It is here where I give more importance to the research of meanings, the list of variations and the methodology based on the design of three products. It is here where I move towards the importance of the visual discourse as a whole, the importance of understanding the product as a hugely significant element and the relevancy of a new attitude in creativity as regards society. Subjective interpretations are directed to the reader's owns always subjected to geographical and social contexts. The third chapter's description aims to experience the potential of the rhetoric struggle between designed elements. This will lead to understand the overall form as a coherent and conscious construction of visual statements. Moreover, the whole idea of the analogy of the visual discourse is to assign to the object a more communicative role. By arriving at the level of visual discourse, the object has a more extended role as regards society which demands the complicity of the designer.

Since the designed object gives up its specific semiotic aspect aiming to a more general system, we are facing a possible demonstration of the concepts of semiosphere. The influence of the designed object in this semiosphere is immensely valuable. It is not difficult to imagine ourselves surrounded by objects. If these are powerfully embedded by visual statements one could even argue about the contamination of visual messages.

But this generality also supports the idea of understanding design as a new social

¹ L. M. O' Toole, Two models of narrative structures in The semiotics of culture and language, vol II of Language and other semiotic systems of culture, edited by Robin P. Fawcett, M.D.K. Hallidaas, Sidney M. Land and Adai Makkai, London & Dover N.H., Frances Pinter, 1984.

² Eco, Umberto. Semiotics and the Philosophy of Language, Macmillan, London 1984

³ Lotman, Yuri. Universe of the mind, I.B. Tauris & Co., London 1990.

⁴ *The discursive is not being conceived as a level nor even as a dimension of the social but rather as being co-extensive with the social as such.* Laclau, paraphrased by Janet Wolff, Aesthetics and the Sociology of art, MacMillan, London 1993, page 91.

⁵ *Meaning, consciousness and even the objects of thought are perceived as constructed in discourse.* Janet Wolff, Aesthetics and the Sociology of art, MacMillan, London 1993, page 91.

activity. If the object is an accumulation of corpuses of meanings technologically linked by a pseudo-grammar and these meanings are deliberately devised in a product so their gathering is mastered by rhetoric functions, what we are doing is to combine two fundamental pillars of our consumerist society: culture and one of its basic components, industry. If a chain of signifiers, technologically linked unleash an infinite number of cultural connotations represented by the signifieds, we would be able to understand a succession of possible semiotic elements which, consciously gathered through rhetorics may have a feasible and immensely coherent textual interpretation.

This new attitude implies that the designer has become the intermediary between these social pillars. The designer of the society would stand in between the mechanistic and the organic man. This person would have a de-humanised aspect and a humanised one. In other words, he/she would have a mechanistic role with a social gratification provided by the fact that they enable the scientific control of man and environment. But in the organic mode, one would find him/herself as a biological counterpart of humanity and could have control of the laws of Nature. The universal man establishes formally the needs of the universe: *designers construe themselves as a self-designated agent immerse in a society of other selves.*

It also has an intermediary role between other agents such as the principal of a company or industry and the consumer. Very much in connection to the *trickster in the office* claimed by Isao Hosoe⁶ in the working environment. the independence of the designer becomes an interdependence between groups of consumers and entrepreneurs. While this dependence has been traditionally understood as a means to provide simply more wealth to companies, the new model of man should provide more knowledge through design actions. This independence will lead to introduce a more responsible role as regards society. This educative role is, nonetheless, crucial to understand designers' vocation. It is the very fact of understanding the object as a visual discourse that turns the object into something not only meaningful but an unwritten, unspoken discourse: as *pictograms* of uncanny ideas.

It is recognised the influence of the industrial designer in society. Early in the 50's. Raymond Loewy and Bel Geddes affected thoroughly aspects of American society and the American way of life in the age of streamlining. They introduced the notion for fashionable products by streamlining and chamfering edges. The same modes can be observed in everyday objects of our life specially in markets such as electronic appliances or transportation design.

Communication through shapes is possible⁷. The designer becomes the interpreter of people's perceptions and conceptions about the signs of society. It merges two different cultures in the industry and also becomes the new speaker of people's desires and anxieties. This is because of the important shifts in semiotics applied to

⁶ Hosoe, Isao. *The trickster in the office*. Conference in Elisava School of Barcelona, Barcelona 1992.

⁷ *By presenting an audience of potential users with a new product...designers have indirectly influenced the actions of individuals and communities, changed attitudes and values and shaped society in surprisingly fundamental ways. This is an avenue of persuasion not previously recognised, a mode that has existed but has never been entirely understood or treated from a perspective of human control such as rhetoric provides for communication in language.* Richard Buchanan, *Declaration by Design*, in *Design Discourse*, edited by Victor Margolin, Oxford University Press, London 1970, page 93.

design and to the conception of the product as a visual discourse. As I demonstrated theoretically and practically, this is based on two main original contributions to the knowledge of the design of objects: the integral application of semiotics and the essential use of rhetoric to embody visual discourses.

This research invites designers and other creators to persuade society of the wealth of using conscious design in fundamental ways, to educate communities of the importance of a semiosphere of objects not only ergonomically, economically or ecologically, but in terms of cultural dynamism, knowledge turnover, cultural exchange and social responsibility.

The Product System sets up an ideology for the design of objects and suggests the role of the new designer of the society.

Glossary of terms

ANTI-FORM.	I called anti-form a form that is symmetrical to another.
APPROPRIATENESS.	This is a characteristic inherent in every visual discourse but mainly referred to those created by the Metaphor. The immediacy of the displacements of meanings with this rhetoric figure makes the designer to misuse it in the sense that messages can seem to be unappropriate.
ATTRIBUTE.	A material attribute is a visible, physical entity that can support any design action.
BITE, BYTE.	The bitten parts of the design three in chapter six establishes a humoristic relationship between the bite of the apple, Apple and the byte of the software.
BUILT-IN-OBSOLESCENCE.	Consumerist societies move onwards because of free exchanging of goods. In order to create wealth, this exchange must be as frequent as possible within and outside their boundaries. According to this, objects must be reasonably durable and must be replaced by other new ones.
CATEGORISATION, LABELLING.	The act of assigning a category or label to a entity.
CATEGORY, LABEL.	The classification of an entity whether material or immaterial is embodied by a category which is mentally organised through our experience about things. This classification is done by Language.
CAUSATION.	The intention of finding the purpose of being of a form, argument, etc.
CHARACTERISTIC TRAIT.	The most relevant, formally significative, visually attractive or discursively important aspect of an object.
CLASS NAME.	A label, word that classifies an entity according to a group of others.
CLOSURE.	Law of Gestalt that plays with the visual connection of elements in space.
COMPUTER FOOTPRINT.	Surface/s of the computer which are in direct contact to the surface in which is placed, for instance, atable.
CONCEPT.	Mentally constructed intention, initiative or idea.
CONCEPTUAL MODEL.	Model that exemplifies or visualises this mental concept.
CONCEPTUALISATION.	The act of bringing out concepts. It is frequently done with techniques of brainstorming and visualised with sketches or other techniques such as trend-boards.
CONTENT-PLANE.	A level of cognition in which concepts or mental associations exist.
CONTEXT OF MEANING.	A diversity of <i>a priori</i> common aspects between meanings can be grouped in or associated to a number of major contexts. Although I initially sought to reduce them in my research to a limited number, the reader could find some other different ones.
CONTOUR.	The outline of a shape is a contour. It only refers to its most external attributes such as an edge.
COGNITION, COGNITIVE.	It refers to our basic mental activity. The act of understanding is a cognitive aspect that differentiates us from animals.
CONNOTATION.	A level of cognition in which mental associations can be traced back to past experiences. They become connotative.
CORPUS OF MEANING.	The most basic entity or attribute ready to be transformed in order to support meaning (or signifier).
CPU.	The <i>brains</i> of the computer.
DECORATIVISM.	In aesthetics, it's a form by the sake of form.
DENOTATION.	Connotative aspects are supported by an elementary level that denotes them and make them possible.
DESIGN DISCOURSE.	An elaborated visual argument that is understood as a text, a discourse.
DESIGNED OBJECT.	An object that has been enabled to support formal or functional concepts.
DISCOURSE, DISCURSIVE.	Somebody's statement of intentions. A message to a reader.
DISCURSIVE FUNCTION.	The role of the elements of the discourse in order to support these statements in a coherent manner.
ECOLOGY OF MIND.	The last environment in which a Product semantic designed object exists. In this environment one must understand the object as the result of culture in general.

EMOTION.	Irrational response to actions, feelings or attributes.
EMPATHY.	To experience human characteristics into objects.
ENVIRONMENTAL DISCOURSE.	A general discourse which embraces all the aspects of culture and represented and perpetrated differently in it.
EPISTEMOLOGY.	Epistemology tells us how we understand our relationships with objects and how we manipulate them to make innovations.
ETHOS.	The identity of a group of individuals, organisation or culture.
EXPERIENCE.	Facts in life that are mentally recorded and are a basis for intelligence.
EXPERIENCERS.	Individuals who suffer these experiences.
EXPERIENTIAL QUALITIES.	Experiences have qualities that help us to classify them through labels, class names or categories.
EXPRESSION-PLANE.	Another level of cognition that supports mental associations, connotations or past experiences. It is complemented by the content-plane.
FORM.	It is the group of formal attributes, shapes, etc. that are, at a first glance, observed in an object
FORMALISM.	The object is designed highlighting the effects of its forms without considering their signification or fragmented discourses.
FORMAL ARGUMENT.	A visually conceived message. A text embodied by attributes.
FRAGMENTATION.	To shatter into pieces an object with the intention of understanding the possible visual messages a form may support.
FUZZY TECHNOLOGY.	The application of <i>intelligent</i> technologies in a product that usually overrides the user's ability to interact with it.
GENERAL SEMIOTICS.	The objective of this research is to understand design as a discipline that is concerned with communication rather than the mere restyling of products.
GENESIS.	The context of the Product semantics' design in which the object is manufactured. Analogous to Syntax in th <u>Product System</u> .
GESTALT.	In German, form. In abstract art, form must be created by a spirit that has not received any influence from natural forms or from sensitivity in art.
GESTURE.	To experience and modify an attribute.
GRAMMAR.	A set of rules that controls the efficient gathering of materials.
HAPTIC PERCEPTION.	The basic activity of touching and comprehend material attributes.
HERMENEUTICS.	To name a sign is to name its manner of use or its relationship with the user
HOLISTIC.	The epitome of the unrealistic, fantasist and unconstrained.
ICON, IDOL.	Visual representations of metaphysic attributes.
IDENTITY.	The recognisable aspects of a individual or group of individuals.
IDIOSINCRASY.	The set of characters of a determined society and culture.
INFORMATION CHANNELS	Responsible entities or attributes through which our senses receive and send perceptual, experiential messages.
INTANGIBLE, IMMATERIAL, UNTOUCHABLE, OR NON PERCEPTUAL.	Different labels that name the mental associations or connotations we have as regards things. The non perceptual aspect of the world.
INTERACTION, INTERACTIVITY.	The act of experimenting and having feed-back from attributes.
INTERFACE.	The entity that enables this interaction visually, formally.
INTERPRETATION.	The activity of individual, subjective understanding of a given text.
ISOMORPHISM.	Visual forms are either dynamic or the outcome of dynamic processes which underly them. Thus, if physical phenomena show configuration, so should the brain.
LAYERING OF LEVELS OF COGNITION.	Mental organisation of degrees of cognition.
LOGOTYPE.	Visual representation of a company's name and identity.
MARGINAL CONCEPT.	A concept that is dependent on another which broadens the former signification.
MAXIMUM ENVELOPE.	Forms are the outcome of a <i>skin</i> that covers the gaps that a basic

MEANING.	geometric structure have conformed the shape. The outcome of a association is a meaning because it produces entailments in our cognition that become understandable, meaningful to us. It is differentiated to the signification of an entity because the signification has a much broader role and is more complex.
MECHANISTIC.	Attitude as regards arts that characterises the mechanical, the technological or syntax of products.
METAPHOR.	Rhetoric figure: to experience one thing in terms of another.
NECESSITY.	Semiotics establishes the necessity of a framework in which the experience of an object exists. The need for a sign to exist is ruled by society
NEUTRALISATION.	To choose from the infinite attributes and concepts of life, one.
ORGANIC MACHINES.	Designed objects which shapes appeal to living Nature and provoke strong empathic feelings and emotions.
ORGANIC MAN.	An individual in relation to Nature.
PARADIGM,	Tropes in rhetoric have a paradigmatic activity
PARADIGMATIC.	A gap that separates two artificially linked pieces of a product.
PARTITION LINE.	Emotion according to Richard Buchanan.
PATHOS.	The most elementary activity of our senses. It is a source of experience.
PERCEPTION.	To understand art through individual, subjective perspectives.
PERSPECTIVISM.	Referent to the subjective manner of expresion of an individual in a discourse.
PHRASEOLOGICAL.	Epitome of the scientific, escrutable and demonstrable.
POSITIVISM.	Late XXth century aesthetic developed from the Modernist aesthetic.
POST-MODERN.	Third logic of Semiotics referred to the experienced and the experiencer of the world. It is a source for meaning and is associated to Semantics.
PRAGMATICS.	Subjective and selective choice for certain attributes.
PREFERENCE.	School of design. Its motto is: <i>design is to make sense</i> (of use)
PRODUCT SEMANTICS.	Degrees of communication.
RATIO OF EXPRESSION.	Analogy used to exemplify the act of perceiving and understanding a designed object as an "open book".
READING.	The greek ancient art of persuasion through discourse.
RHETORIC.	A group of mechanisms that commands the efficient function of persuasion through complex and subjective interpretation.
RHETORIC FIGURE.	Analogy of the activity of fragmented small rhetoric discourses which interact among them and reunite to create a coherent overall discourse.
RHETORIC STRUGGLE.	The basic group of rhetoric figures which role is to create elementary discourse or to accompany more complex ones created by the trope.
SCHEME.	Computer configuration which groups all the elements of a computer in one single casing.
SELF-CONTAINED.	A designed element that has evident semantic characteristics.
SEMANTIC MARKER.	The logic of semiotics that rules the meaning of signs.
SEMANTICS.	Ideal state of societites in which everything is significant.
SEMIOSPHERE, SEMIOSIS.	The science that rules the life of signs.
SEMIOTICS, SEMIOLOGY.	Elementary sense in our cognition that allows us to experience events in our life and serve them as a basis for a subsequent understanding.
SENSE EXPERIENCE.	The sense that makes these previous experiences to be understood.
SENSE INTELLIGIBLE.	Opposed to the holistic, is the epitome of the ruled, organised and positivist.
SERIALISTIC.	While form is referred to the group of formal elements of an object, the shape would be one of this elements.
SHAPE.	The different steps of a manufacturing process are due to a series of agents which move the production onwards.
SHIFTERS OF PRODUCTION.	The sign is an essentially social and communicative referent to a concept. It is the entity which supports signification.
SIGN.	It means to us more than the basic meaning. It produces entailments that escape to simple meaningful associations. Theoretically, it is more complex. It is the outcome of interacting with the sign.
SIGNIFICATION.	

SIGNIFIED.	The entity of the sign which support the meaning of things.
SIGNIFIER.	The entity of the sign which supports the signified.
SIMPLICITY.	Law of Gestalt according to which all forms tend to be reduced to their most basic geometrical construction. Under this law, forms are better.
SOLIPSISM.	Hume and the theories of Solipsism asserted that the experience of things is directed to an absolute criterion of knowledge.
SPECIFIC SEMIOTICS.	Stage in Semiotics where the systems are more scientifically demonstrable, are less connotative and more grammatical and positivist.
SPLIT CONFIGURATION.	Computer configuration which ungroups the elements of a computer into a screen and a CPU (plus peripherals).
STREAMLINING.	Aesthetic in the period 1940-50. After succesful scientific discoveries about aerodynamics and hydrodynamics, transportation design affected very much other disciplines and products became streamlined by the effect of a modernity that became fashionable.
STRUCTURALISM.	Contemporary current in literature that understood the text as an organised, planned and serialistic narration with a planned objective.
STYLISTIC.	Preference or continuous application of determined variations or discursive mechanisms that can be observed in a product or, by implication, in the work of an artist-designer.
SUBJECTIVISM.	Tendency in arts to produce or criticise objects in a less universal manner.
SYMBOL, SYMBOLISATION.	The symbol is another visually represented sign.
SYNESTHESIA.	V. Kandinsky discovered that the associations that colours could trigger in a work of art could establish a direct correlation between them and musical instruments. Art became by synesthesia, a symphony.
SYNTAGMA, SYNTAGMATIC.	Schemes in rhetoric have a syntagmatic activity
SYNTAX.	The basic logic of Semiotics that rule the efficient gathering of signifiers.
TANGIBLE, MATERIAL, TOUCHABLE, PERCEPTUAL.	Different labels that name the perceptual aspect of the world. The really perceivable, physical aspect of the world.
TECHNOLOGICAL REASONING.	The understanding of the technological aspect of the world in a product. The understanding of the form according to the manufacturing process that has transformed it.
TOPOGRAPHY.	The surface of an object may be understood as a topographical map of experiences in which senses develop an intelligible connotation.
TROPE.	The group of rhetoric figures which role is to create discursive function.
USE, USER.	The experiencer of a product.
VARIATION.	The basic transformation of asignifier or corpus of meaning in order to prepare it to signify.
VERBALISATION.	The act of namig the categories using language.
VISUAL PERCEPTION.	The activity to perceive through vision the external attributes of an object.

List of rhetoric figures

ALLITERATION	Repetition of sounds
ANTANACLASIS	Repetition with semantic features
ANNTHESIS	Comparison of two antonyms
CHIASMUS	Repetition and simultaneous inversion of the relationship of two attributes
ELLIPSIS	Suppression of one of the elements necessary to complete syntactical construction
GRADATION	Succession of at least 3 syntactically equivalent term that possess one or several semantic features in common and among which at least one is repeated with quantitative changes
INVERSION	Permutate elements of a syntax
IRONY	The use of an attribute to express the meaning of its antonym
LITOTES	A quantitative diminishing of one of the properties in favour of another)

METAPHOR	To experience one thing in terms of another
METONYMY	To experience the particular for the general
OXYMORON	Syntactic relationship between two antonyms
PARALLIPSIS	One declares that one is not saying what is saying in the argument itself
PARANOMASIA	Juxtaposition of elements that have the same aspect but different meanings
REPETITION	A reuse of the same argument
SIMILE	Establish comparisons between meanings
SYLLEPSIS	A single attribute has more than one meaning and participates in more than one syntactic construction
SYNECDOCHE	An attribute in a broadened sense that includes the ordinary meaning as one aspect

Introduction

To design an Apple Macintosh computer demands a very thorough research into its past history, an exploration of the idiosyncrasy of the company and a 11 years visionary policy of design and technological implementation.

The use of rhetorics, though inherent in our highly rich system of language, will not be easily recognised as such since this research is an early attempt to apply it to Design. My expectations about these redesigns are first, to exemplify to a substantial degree the theories explained in the three main chapters, especially those related to the inscrutable but intensely rich ways of framing the immense variability of meaning. Second, to make a first attempt to apply rhetoric figures in all their extent to Product Design.

The object entails attention to many realms at the same time. An object must not only fulfil anthropometric and ergonomic requirements, that is: the relationship between human and the objects with which he/she interacts, security standards such as the BS 5750, or others such as DIN norms, or simply static requirements such as strength, durability in conformity with the methods of production. Whereas these may be regarded as constraints that belong to functionality or production, others such as economy of materials, cost-centred projects, or the inclusion of new production systems have more effects on the economy of the products. Other propositions may be related to managing activities which will result in different marketing strategies resulting furthermore in the cycling of products -life span of products- or the inclusion of new management knowledge to design practices.

Designers must not constrain themselves uniquely to the limited discipline of problem-solving in the definition of a product. Constraints must be a source of meaning and, by considering this as meaningful, we include it with many other meaningful realms such as visual perception, history, etc. Thus, to design to express functionality narrows profoundly the possibilities of establishing more associations hence denying the existence of a great part of the discourse.

The intention of this final part of the investigation is, through the design of several *real* projects, to embody some of the theoretical domain expressed in previous chapters. To do this I will apply a similar structure to that of the chapters of the dissertation. The first project, therefore, will be to choose among the possible contexts in which meaning can be found. The use of deliberate variations of apparent signifiers to shift meanings will follow. The second project will be more concerned with the design of signs, and how they function in a visual discourse through the premeditated use of schemes and tropes. In certain cases this use can be fundamental to the discourse.

Choosing three main contexts starts with the same order of things that the first chapter proposed: *Sense experience* becomes *intelligible*. Similarly, the first main context has its primary focus on haptic perception, visual perception issues, experiments in colour and shapes, the issues of psychology of aesthetics and so on. The second context will be more concerned with the history of the predecessors, the reasons that led to its discontinuing, the understanding the object as something familiar, a relative rather than another optional product, an object that can cross the boundaries of simple perceptivity of its attributes. This will be closely related to the following project which will be the identity of the company itself. This context has a lot of potential to include another meaningful context which is the emotion of things. The pleasurability of forms, the intentional use of empathy to provoke

emotions and other issues will be treated more comprehensively in this project.

Other contexts such as economy of materials, ergonomics, marketing approaches or standards have not been disregarded as they are implicit in every real project but if we were able to give them special emphasis, I consider them obvious and not rich enough to demonstrate a rhetorical bond.

A very interesting project could be dedicated to defining the pragmatic context of the computer. In this project, ergonomic constraints would have a much bigger influence. I would allocate to it in intermediate stage between the project on haptic and visual perception and the following ones, history, identity and emotion. The latest trend in ergonomic preoccupation, that is interactivity in use and function of commands, will be even more important and taken into account.

However, many other contexts could be considered in a complex product like our case study. The interpretations of the computer that I subjectively trigger in every reader's mind will allow them to transfer as many as possible to each separate one and, if possible, to create the perfect computer for each user.

To summarise I have developed in five key points designing the *semiotic and rhetoric* object:

- To design is to define which portion of meaning your object is determined to put emphasis on.
- The use of a certain set of rules help us to achieve that more efficiently and to raise consciousness over the mental processes underlying the creation of objects.
- Attributes must accomplish syntax, semantic and paradigmatic aspects so that they are given the degree of semiotic sign
- Finally, those signs engage in a much broader role when they are rearranged in a true visual discourse using rhetoric figures.

Generalities

To design an Apple Macintosh without considering its past history is to disregard completely its own personality since it will be, perhaps, the only computer in the market that has been invested with human characteristics as well as other personifications or organic, biomorphic features. Truly humorous and irrevocable personal approach is therefore essential.

The first approaches have the role of placing the object in a much more superficial manner in such a way that the first step can start triggering many other subjects and help to explore or research the implications that they may have. The shape of the first Classics are important to recall constantly as they serve to relate the object and to not lose the possible self-created brief of the project: to redesign one Apple Classic.

The following references are notes based on the development of the designs. On every sketch there is a letter followed by a number. The letter refers to the group of designs and the number, their order of appearance. For instance, [d7] means that the seventh design (approximately) of this group belongs to Topology and Development.

[a1][a2] Represents a lot of resourceful attributes and features: ribbing, a handle, slots for air intake, the configuration of a self-contained unit including keyboard -Lisa- or a case for it, conical and angular shape, resembling a *face* which constitute some of the signifiers of

the computer. The shape of the computer has survived for many years and the fact of being discontinued can only be attributed to mechanical or marketing reasons -we know that the self-contained computer is only successful in America after a research about customer's perception which would regard this configuration as cheap and lacking performance- or because the monitors displayed never reached the standard 14", but never because of its design, conception or lack of performance since they supported, for instance, Quick Time.

The notion of growth is important. [a3] A shape related to the LC 475 is considered, too. Because the notion of a slotted platform separated from the screen is very revealing as the relationship between monitor and CPU is a very interesting source of rhetoric expression. [a0] The fact of not having *ears* has also shown a preference for symmetry that has been followed ever since the design of the first Classic and still prevails with the latest designs from R. Brunner. This can lead as well to stereophony and other functions that can be repeated along a symmetrical axis. [a4] Expresses a theatrical METAPHOR, this time related to the *theatre of the world* or the cinema that can be seen in the latest Classic. [a10] [a11]. The cubic form of the stereophonic shape [a13] reminded me of the early 50's designs of radios and televisions and provides me the first chance to foresee a possible application of rhetoric figures: the ANTITHESIS between a circular or organic shape against the square box that encloses and traps it. The big square box has deliberately deformed and deviated slots for air that relate their shape to emotive or empathic contexts. [a5] Overlaps start to appear and a controversy among concepts and other secondary ones -emotion and theatre- is observed

Apple preferred the Gestaltist play of visual perception issues from Harmut Hesslinger and its consultancy Frogdesign. Thus, we can see a complex play of volumes worth reapplying. [a6] Thus, visual perception issues and haptic experience paves the way to a possible meaningful context on its own. Hence, overlaps are expected too, because visual perception is a context that is implicit in every form as they serve, as well, to bridge the experienced with the intelligible in the following projects. A challenge will be to try to express just haptic and visual perception issues in a single project, demonstrating that attracting meaning is a matter of emphasis. [a12] An emphasis on technology is seen when we project a hybrid of a portable and a Classic.

[a14] Other relatives must be considered such as Newton or peripherals such as the printers or workstations as they serve us to understand the idiosyncratic language of Apple's designers which was explained in chapter two. To design an object such as the computer means as well that some pragmatic questions must be put into crisis: does the computer need to be put flat on a given surface? Moreover, do it need a surface or can it include the surface as happened in former workstations? These questions should be answered by choosing another context which I pointed out in the beginning of this chapter related to pragmatic and ergonomic issues. However, the design of four Apple Classic computers must be retained as an unquestionable brief and they are utilised, however, to exemplify theoretical issues that can be applied to any technology, context or purpose. There must be constant reminders to prevent overlaps from appearing at maximum. [a15] Rhetoric starts to appear in accompanying or constituting the overall visual discourse. [a16][a17] In this case GRADATION accompanies and matures the meaning. [a19] The ANTITHESIS of volumes is resourceful, too. [a20] The first idea about symmetry underlies the concept of personification with a face with the diskette as a humorous tongue.

Topology And Development

To dedicate one whole project to haptic and visual perception is somewhat difficult as they are subjects inherent in every piece of artistic creation or product. The laws of haptic experience are empirical to every object as they show the first developing activity of the perception of attributes. The laws of simplicity, geometric forms, closure, tension, colour psychology and transparency from Gestalt School are universal, too. Finally, the theories of pleasurability of shapes or psychology of aesthetics lead to the notions of preference and the notions of beauty and empathy in shapes, although we reserve the two latter for another future project. All these issues and others may be recognised in future products but my intention is to dedicate a whole project to them without implying any other meaning but the play of human perceptivity of attributes, that is the topology of the form and the demonstration of the development of the human perception through objects. This involves isolating these meanings from others such as shapes related to past predecessors or the implementation of new technologies or materials. They will demonstrate, too, that meaning is a matter of focused emphasis or dedication to one context. The power of isolating meaning or a set of meanings or contexts from others will be challenging and fruitful as we perceive a unique methodology in creating and shifting meanings to users with a clarity not seen before. In doing this, the application of rhetorics will be freed from confusion and will explain directly the messages that result from a reunion of constructed signs.

To start with, we state that Gestalt issues such as closure have been exhaustingly used in the history of design. A play of what we see and what we want to express has a very straightforward interaction under visual perception theories. The four laws of haptic experience will be approached as first and generic. In this sense, the pleasure of the activity of touch discovering the notions of warmth and symbol of attributes will be suggested though very constrained to visual perception. The following step will be to apply the Gestalt laws - some have been already mentioned- and other issues. To provoke tension is essential according to Arnheim to communicate dynamism and ultimately, artistic expression. Other factors will be borne in mind such as the effects of gravity. In [d1] we can see how an angular, tight form can be translated to Hogarthian terms. In [d2] this line becomes rhetoric using schemes, but this is too obvious at this stage. In addition, how these can be treated to provoke closure [d4].

The footprint in [d5] recaptures the notion of proportion which is basic in the realm of perceptual and physical balance. Haptic and visual perception issues join to produce [d6] and are developed in [d7]. The results do not produce complex but instead easy gratifying and predictable readings. To react against this, I try to find tension in the monitor which has been traditionally treated under visual perception Gestalt laws [d9] is a more serious study of [d7] and proportion allows me to allocate a 14" monitor. This is important as it would mean the reedition of the Classic. In [d10] the shape must resemble more the former Classic than anything, since the façade is too detached from the body and it looks like more a *façade*.

The contrast among feet is essentially rhetoric. The massive front feet are treated by LITOTES. The slots are put in the top and in the edge to provoke transparency. In [d11] the contrast between pure shapes is stronger but empathic as well as we perceive closure at the same time. I must prevent empathy from appearing as I will reserve it for future projects. In [d12]

the shape is affected with gravity and a deviation is followed from the façade. The upper corner is designed to emphasise closure and transparency. [d14][d15] are studies of volume and [d16] leaps towards history conceiving a shape that belongs to the Powerbook. Its function is similar too, since it helps to achieve a certain degree of screen incidence. [d17] More unlikely, the shape can be related to the mouse. The results, again did not please me aesthetically, though theoretically they support a very complex dialogue of haptic, visual, pleasure, topology and development issues which paves the way to an equally complex and rich rhetoric struggle. The reasons for changing the route to another approach are based on my subjective feeling of having designed too frivolous a shape, or a shape related to an early development of attributive configuration. The feeling that the use of haptic perception has been gradually disregarded makes me go back to the first four generic principles from Pickford and reshape it. Curiously, the same approach of [d18] is related to a very early concept [a8]. The tube inside is always hidden and scarcely suggested. I tried to make it more evident as well as to follow the last step of the haptic experience which tries to symbolise the shape of attributes. Exposing this shape, I would allow the *blind artist* to understand the computer from the shape of a screen which is the main source of interaction to the user. Besides, from its very foundations, it allows me to apply a trope such as METONYMY, experiencing the whole through a part of it. To play with texture in order to emphasise Haptic experience would also be necessary.

[d19] Is the first idea and [d20] looks too much like a television. [d21] It is a first approach but it suggests from the preoccupation implementing the existing constraints such as mains, cabling and, the effects of gravity and balance. Ergonomical constraints should be added. The symmetry will give not only physical but perceptual balance [d22] expresses the relation of tube, openness and screen cover. The screen cover must be big enough to allocate everything, exposing everything too, and to support weight. The relation of space displaced had this first sketch. A sensible move would be to displace the weight to the bottom [d24], making in use of the holes for screws. [d25] By angling the tube I achieve angles of incidence and rest. [d26] we study the angle of incidence. In [d27] the proportion of the back should be more or less as shown but there is a difficulty allocating diskettes. [d28] recaptures the use of the handle, but that would belong to another project. However, it is difficult to imagine how are we going to use it. Pragmatic study is essential here. [d29] possesses a sufficient three point rest configuration. The shape of the cover can be graduated. [d30] This is elongated and smoothed. [d32] Shows a feasible allocation for the mains. There is however, a strong preoccupation for allocating chips, cabling and peripherals. The argument is that if it fits in a Powerbook it can fit as well in this space. There is another actual concern for miniaturising the technology but still some ergonomic constraints must be met, starting from the size of the screen itself. [d33] Is a study of angle vision. In [d34] it seems that we have bent it by deformation. [d35] A first idea including handles and diskette and CD ROM is visually very strong. The addition of textures to increase codification would add more complexity. A study of volumes would emphasise the closure and the dialogue among constructed signs.

[d36] Shows the allocation of the diskette in the top of the computer but, since the slot is hidden, it would necessary to provide a visual clue. A guidance must be understood, therefore, under a semantic marker which would be that of familiarity or connection for Barthes or more in relation with Product Semantics' postulates of making sense of things.

Matching similar shapes is another play from Gestalt. [d37] The same guidance should be provided for the CD ROM in the same side, for instance. Then, shapes must be differentiated and this provides another dialogue. The problem is more physical than aesthetic, here. [d38] The displacement of the visual clue is understood as a displacement from the front wall as if a brick had been removed from its place. Then space is given to allocate the diskette as well as to provide extra space for the inner mechanisms. [d39] Is a detail that expresses better the combination of bent edge -1-, displacement from façade -2- and other forms -3 & 4-. The bent edge towards the back provides extra space for the allocation of the diskette. A more profound intention is to produce transparency. Deformation reveals the inner edge that covers the screen. [d40] gives a perspective view of the group of signs. In [d41] gravity is challenged as well as giving dynamism and a logic direction of pragmatic use when using peripherals. The shape prepares the action of taking and putting the information. In [d42] I questioned the necessity of making the lower edge flat, because it gives me the opportunity to create feet and a symmetry is implied. Placing the diskette and CD ROM to each side in combination with contrast and balance buttons emphasises the symmetry. To place them in the parting line is equally useful and rhetoric. The façade and the screen are almost flush one with another. Difference is given by the degree of curve. The Apple goes to the centre. [d43] Is a much more complete sketch. Starting from the back, the mains copies the conic form of the tube -SYLLEPSIS-. The movement provides flexibility and angularity to the third resting point. The curve, the sphere of the tube, is the only spherical shape we have in the computer. This conic form increases towards the face and it relates dramatically to the shape of the tube. In doing so, I am provoking closure, too. The intention is to repeat the transparency to the very front of the computer. So the screen is seen from the back to front. The face then becomes added that functions to support the diskette. The face is deformed -plastically not biomorphically- as if paper were bent. The difference in thickness pushes the movement towards the front like a lever. There is a lot of tension, gravity, dynamism. [d44] Applies rhetoric and functionality to the slots. The provision of these lines possibly contradicts the flow of the electricity. [d45] The brick goes to the back. In consequence, the parting line is contradictory. [d46] Gives reason to the last action since it can give space to the handle -not very functional, though-. [d47] Studies the relationship among volumes with either GRADATION or ANTITHESIS. [d48] Perhaps this adds more visual complexity. The bend towards the rear is affected by this. [d49] Is a detail of the front emergence and the back depression. [d50] Makes it a rhetoric GRADATION, emphasised by a secondary button which function I cannot envisage (unless it is the button for taking the CD ROM caddy off). [d51] The use of the slots is enough to emphasise the rhetoric struggle of the main body: GRADATION + ANTITHESIS + INVERSION + REPETITION. [d52] is a study of the back form combining mains and angulation of the third point of rest related to Powerbooks.

The emphasis is put more on the screen. The aim is to experience the relationship between cover and screen in a different way. The way in which the edges surround the screen has been of great concern in this research. [d53] experiences this as a frame. [d54] tries to copy the shape of the screen and it looks too much like a TV. In [d55], the edges are deformed and emerge from the surface of the front. [d56] is a combination of frames and rectangular sections.

[d57] is a powerful combination of planes that includes a certain GRADATION as well

as to make the screen emergent and enclosed in a rectangle. This rectangle is also curved towards the outside making its approach to the user more welcoming. In [d58] the proportion is more correct and the fact that is placed in the top leaves enough space in the bottom for the drives and a strong unbalance. In [d59] I explore the angle of incidence, the relationship with the back forms and how it relates to the perpendicular frontal surfaces. The frontal surfaces may also follow the angle of incidence indicated by the back forms and the axis of symmetry. In [d60] the diameter of the cone also rules the size of the box which, by implication, rules the size of the rectangle of the screen and the space available underneath. There is a deformed secondary plane after the main front one which starts from a formal partition line.

[d61] The METONYMY is more evident now because the form of the back is big enough to make us understand that the front forms are only to frame the screen. In the back, in the sphere of the main cone there is a disc that becomes a foot. It also locates the main cable. [d62] is a complete sketch that includes all the designed elements, back forms, front planes, front forms for interfaces and the slots and partition lines. But the screen in angle is unrealistically presented with the cover. This is an important issue to investigate. [d63] imagines the relationships among elements in a deconstructivist manner. There is also a strong sense of SIMILE among shapes.

[d64] looks very correct and balanced. In [d65] the play of the angle of the screen with the possible perpendicularity of the front plane is interesting to develop. [d66] proposes a possible order of planes. The GRADATION of planes and a possible ANTANACLASIS between them is also outlined. [d68] [d69] are sketches of this hierarchy of planes which is highly complex in [d70]. In [d71] the difference between positive mark and [d72] negative mark results in a mix [d73]. The image is interesting and the border of the front screen has rhetorical capabilities. In [d74] there is strong sense of gravity and I returned to the idea of [d64] with [d75]. The problem of the size of the back forms must be resolved and [d76] is one idea. It is better to design a back form [d77]. Finally, [d78] establishes an ANTITHESIS.

History

One of the most challenging projects I embarked upon during this research was the opportunity to relate the redesign of the Apple Classic to its predecessors. This became a matter of familiarity, of generations. To design a great-great grandson of the first "Lisa" is to go beyond perceptivity and materiality. Beyond physical and technical constraints and even to portray singular meanings.

The male designer is denied the gift to give birth to a child. The creation of an object is always sentimentally approached for those who enjoy creating. For me, this project is even more fulfilling since I am not just designing another link in the productive chain but a *relative*. The last action would be to give it a name, as homage to the first impersonation, Lisa.

The latest trends in applying deformations and biomorphic deviations of edges and surfaces in other relatives from the Classic help me to support this action. Furthermore, the last Classic is seen as a sort of an animal and for some has some resemblance as a whole to the famous Egyptian sphinx. Between this animal and sphinx another factor is missing: the human, feminine form of the Egyptian woman from which the shape of a lion is adapted. The

result of the animal and the human is the sphinx and this will be one of the starting points of this project, among others.

In addition to this, the aim of the project is to include some of the most significant and characteristic traits of the succession of attributes repeated in the Macintosh family in order to evoke historical features. In this project one unavoidable visual language will appear since it is implied in every single product and it is one of the classical visual languages of the creation of the Apples for the past 10 years.

Some of these characteristic traits have been identified superficially: the *espresso* language: play with volumes, biomorphic attributes, texture, plasticity, theatre concepts, face/eyes, brains, gills, tongue, feet. Studies of volumes [a1] to [a16] followed a normal sketch progression.

The inclusion of a real head is seen in [b1] Rhetoric struggles appear in [b2]. But it is more important to understand something unconscious at the time of conceptualising: the sphinx. In [b2] and [b3] we see the bridge I mentioned earlier. The human bust is present, too. In [b3] "stereophony" is introduced and a big slot is curved as in the Classic. The first long slot [b4] refers to former LC's. The shape of the back is meant to be more historical than anything. The central slot for diskette becomes a real tongue. In [b5] the face is more important than the body and the apple is included. The slot is much more defined and helps to separate volumes adding distribution. The screen relationship its influence to the floor -gravity- and a curve is welcoming. The screen is seen completely separated from everything and it emphasises the chin. The curve of the chin gives space enough to play with the neck because it is a neck and supports the whole head body. Ribbing is treated rhetorically, [b6] is a leaner interpretation trying to include feet. The proportions and curves are becoming more important. The curve of the slot is less strong than the chin. So it is graduated. There is a nice game of stereophonic slots. The notion of footprint is considered for the first time. [b7] looks better in that the neck is curved differently, and gives an interesting study of the edge with the screen and cover. [b9] Narrow in the top, bold in the back, as in the SE/30. There are in this study four differently graduated curves for slot and chin. That leads to [b8], a true lip! The notions of marked gender should be considered. Is it chauvinist to have a feminine machine serving a man? [b10] The first confident study of the back incorporates the strong detachment of the screen from the body. The parting line is also expressively used. There are some problems in making the integral slot to separate volumes and finishing it in the back. The idea of the mirror appears already used. The mains are important to give the sense of tail. A curve that ends in the back box was suggested in the Classic. Transitions, to be pleasing, should be smoother. [b11] Notice the idea of the crossing partition lines observed in Quadras -can even be related to the religious experience-. A study of the slots for stereophony meeting and graduating the gills, provoking stroboscopy. The footprint strongly contrasts with the curve.

[b13] Shows explicitly the former edge and the new one. It is homage to both. The sides of each relates to each one gradually. The form of the former is essential in order to understand its past relation. The curve is much more real and proportioned. But the fact of making a real lip in the slot as in Classic changes the chin, becoming more a real chin. The slots of stereophony are first ideas of [a5]. [b14] Expresses the bridge between the animal/machine and man/woman. In [b15] I found it difficult to relate back and front. That points to a successful detachment of screen and body. The progression of the Classic looks

complete so far. Rhetoric must not be disregarded, either. We must take into account that only subconscious or conscious mechanisms of transformation have been considered to date. [b16] The first mirror. A box engages in a strong dialogue among volumes. Box and head are platformed as in LC's. It is conical, too. [b17] A quick sketch synthesises the future play of volumes: strong body under a square box. This body [b18] becomes an animal: everything rounded is certainly appealing. If it becomes emotion, then it should be transferred to the following project. It is not only an animal. The triangle is much more controversial [b19] but the study of the [b21] feet is richer and much more rhetorical. [b20] What is better, one transition or two? It looks too much like Porsche's TV.

Changing the line of the footprint, the angle of vision changes. The feet allow me to play with this without affecting the vision and shape. [b23] The head is very big and becomes a body. [b24] The handle is essential and provokes more overlaps with visual perception. Conic form is increasing. I like the way in which the dialogue disappears. The box is really conical and is less square. The chin makes an interesting profile. The ribbing is constrained to a base where the breath in-out rules. [b25] The junction of screen, platform and head is too difficult to produce and is functionally *dirty*. The transition must be different, a sphere enclosed in a prism. Only one foot? [b26] Sees too strong an emphasis on development. With [b27] I see the effects of the angulation given by the shape of the feet. And with [b28] the emphasis is on emotion because there are more shapes related to Hogarth and women. The Apple could be considered as a temptation! The curve of the chin addresses the slots. The feet are visually strong.

[b29] Is the shape I would like to see. The distortion of the view is very appealing. It goes upwards. The box of the back finally belongs to the base, and this is confirmed by the *gills*, GRADATED. There is a certain IRONY, too. [b32] is a study of proportions. But it is false unless platformed. It truly follows the first back shape of the SE/30 as well as noting a maturity from the last Classic. It would be placed in the middle of both like an evolution. One foot is remarkable. It could be moved forward or to the back. [b33] Relates to theatre. In fact, the face looks like a mask and it is a development.

[b34] Is more focused to LC's. It could be possible to develop this idea alone. [b35] Expresses some correct proportions. [b36] Elongates these too much. [b37] Is a different curve, not a sphere. The box almost disappears. [b38][b39] propose that sphere+prism that better addresses the technological reasoning. [b39] looks like a dome for a theatre or a church.

In [b40] I tried to solve the problem with all the developments. The main contribution is the slot at the side which verges dangerously with the development context but relates to the traditional deformation of slots. [b41] exaggerates the platform. [b42] pay more attention to the platform and the box [b43] These three drawings confirm the development of the shape: where do shapes come from? From closure?

[b44] By extending the curve the dialogue with the platform is perverted and becomes unbearable. [b45] Shows the effect with the front because [b46] shows the latest improvement. The Egyptian cape of the sphinx is retained with the face as it is a design apart -the mask-. The handle is still possible. The head becomes a body that includes everything. So the screen is much more the brains. The slot is long but stops at the far end, at 1" from the box. The box is conical, historical, perceptual and smoothly relating to the body without having problems with the sphere. [b47] But in this one, the box is the support of all the weight. The footprint

is the sphere cut. It raises the weight. In [b48] it is not as tall as in [b49] which is elongated and in [b50] it seems correct.

The relationship with the LC's platforms are less evident and the brains are now much more a body. The feet are lost but other issues are recovered such as the footprint and many other relationships. The sphere in [b51] seems too big, although it is very appealing. Notice the emphasis on development. In a way, the work of Frogdesign is too important to be avoided.

Identity and Emotion

It seemed obvious to me that, to demonstrate the contexts that the meaning of an Apple computer conveys, I should follow the ideas from chapter on concerning the *ethos* and the *pathos* of the objects. The character of the object and the capability to express emotion from its attributes was a challenge to the designer and another context that communicates that strongly expressed difference between the experienced and the intelligible, the material and the metaphysical, the tangible and the intangible. The obvious consideration was to refer the object to the identity, the personality of the company which had been traditionally impersonated in previous computers, especially in the Classic as a son of the first Lisa. The corporate identity of the company was an early and definitive start. The fact of impersonating a very challenging company in every sense was something difficult to overcome. It would be arguable that history is another context interrelated to identity as it happened with topology and development. Again, meaning will be a matter of emphasis and evocation and not science. Then, my first and intuitive approach to the design, perhaps instant and obvious at the same time but nonetheless enthusiastic, would be in the form of an apple. Since the apple had been chosen by Steve Jobs to identify his company, the homage to the creator was equally implied. recently, some problems surrounded the choice of the apple since another company belonging to The Beatles sue the former for inappropriate use of their name.

Another interesting issue arose in the choice of the apple and it will be recalled constantly: appropriateness in using METAPHOR. The first thing we must bear in mind is that the use of tropes has started defining the whole project. So, the use of rhetorics is basic in this context. The use of the trope in this case has made it clear that the trope has been used in a much important way than the scheme since it is the very foundation of the visual discourse. Finally, the appropriateness of METAPHOR is verified by using an apple to represent the Apple Classic computer. The word Classic could be applied too, but it seemed more feasible to apply rhetoric tropes with the use of the normal, historical and straightforward use of METAPHOR. Similarly it is arguable that the machine should never be associated with a machine. But apples are considered as a METAPHOR of knowledge in English culture and represent the company perfectly since its logo is recognised throughout the world as a bitten apple.

A dialogue among the two contexts will be devised in the project to a degree that, at this stage, I cannot foresee. The issue of emotion, pleasurability, empathy are concepts that can and must be disassociated from the context of identity, character or personality. But, since the company is constantly challenging our perceptions about the computer industry, not only formally but technologically, an interesting idea is to merge both through the direct reference

to an organic element such as an apple. However, in the latest range and generation of Apple computers and peripherals we have seen a sense of biomorphical expression and plasticity have been used to develop an individual, personal and idiosyncratic language that only a company such as Apple can match.

What follows is an elementary brainstorm of issues related to the two contexts: empathy, challenge, religion, dynamism, youth, compatibility, suitability. Overlaps are expected, but they must be controlled, too.

The project is clear: to design an Apple that embodies computer features. The apple includes these: [c1] a worm, a bitten apple (see logo), has a stem and is bruised. [c2] A first idea is enough to be followed in the whole project: the stem is the handle, the screen is placed in a side, and the bitten piece can be included. In [c3], the size allows me to include a 14" screen. The handle starts to be more defined. But the emphasis is the discovery of feet. It is related to the former Classic. The relationship with the former Classic must never be disregarded, since the brief of the project is the redesign of an Apple Classic. [c4] sees the preponderant role for the handle. A screen is added. In [c5] empathy is included and the apple is ageing. Is it a statement about the ageing of the company? Is it wrong, therefore, to apply bruises, too? Pushing back the apple gives the screen the desired angulation and provokes a lot of dynamism and tension. The handle is hollow. [c6] The shape could be conformed not just by wire framing but by two dimensional cardboard. [c7] makes the apple too soft, too static and without life or expired life; tension must be added. [c8] Dynamism is exaggerated and the base is not of an apple at all. [c9] represents a smoother back and, by making this push, the handle is placed on it as traditionally seen and not exposed unless desired. [c10] tries to retain the four feet plus empathy. [c11] looks too much like a helmet. The screen is not added; it is now becoming more important. The handle is hidden except from the cut part of it.

[c12] shows a very terminal shape and a confirmation of corpuses. There are few chances for rhetoric struggle, but plenty for variations, mainly deformation and deviation. The push back results in a deformation of the feet. [c13] detects another push but now down. [c14] gives the bitten part another role: to locate the screen. This has a lot of potential discourse: a façade in front of the mechanism; a skin over the complex external appearance belonging to organic. [c15] Is a first front view in perspective. [c16] Sees the handle very much to the back and a possible biting. Symmetry has the danger of spoiling the organic idea but it gives four feet. [c17] Without feet. [c18] Includes diskette and stereophony. [c19] Looks definitive to me: perhaps the dimension and the proportion are not perfect but a big forefront is important. The feet must be easily seen. The biting must be formally studied. The first bruise is applied in the form of speakers or breath in-out. A cut gives space to the computer interfaces. The most important feature is the bruises. It certainly provokes empathy if we play with textures and advanced technology for plastics. So, the bruises are meant to be real soft bruises. The led of ON/OFF will be seen under the plastic playing with difference of thickness, as a light under the skin. Buttons must be treated equally, soft, interactive. [c20] Sees the cut in the side, oblique, tensioned. The rear feet are empathically pushed down. Under a rhetoric view, they contrast with the first ones -ANTITHESIS-. Biting should be realistic but abstractly shaped. The handle is right under the surface except the "ball" of the end. [c21] Shows the interfaces either for floppy or CD ROM. They have rhetoric

potential. [c22] Expresses the abstraction of biting. The fact of symmetry must be considered thoroughly. [c23] The apple is too deformed now (see the tail). It does not relate at all to an apple, so it should be hidden. [c24] Gives a bad perspective. [c25] Half hollow handle. [c26] Is ergonomically sound and a hollow shape for the handle is provided. [c27] Is superficial. [c27bis] Is a study of the feet's empathy. The wrinkle is powerful, though. [c28] Shows as many bruised parts as buttons and functions. The CD ROM is placed, too. The handle is, again, unnoticeable. But the breath in-out provided by the slots is very powerful. The slots explain the extent of the bruise because the idea is not to delimit but to suggest. Transitions must be smooth. The bruises are unnoticeable because of the change of colour and softness.

[c29] Is a section of the soft latex applied. [c30] The idea that the worm is the mouse and incredibly appropriate. [c31] The connection with the plastic must be like a worm. Appropriateness is unquestionable. A worm inside an apple is better than a mouse inside a computer. [c32] The bitten piece can be a dust cover or a radiation protection. [c33] The worm is located in the feet. The shape is not very convincing. [c34] The deformation is strong, here. This must be studied because it gives the degree of angulation. [c35] A front view includes the CD ROM as an ear. [c36] The handle, though hidden, is very powerful in the back. The cable must be as hidden as possible and [c37] is the study of slots. Could it be moved as a real skin? Transitions must be smooth. Gradations are rhetoric. [c38] Is a very hidden handle. I must take into account the cabling and to see not just the METAPHOR applied but others.

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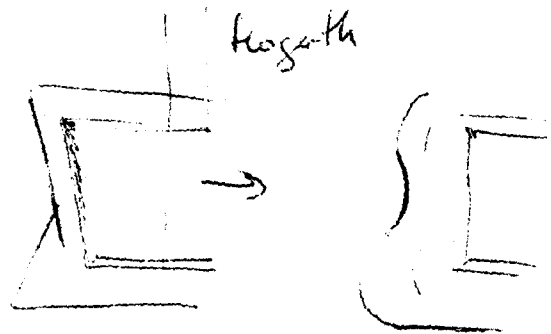
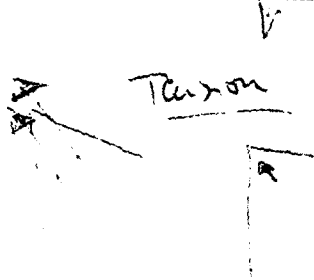
TOPOLOGY & DEVELOPMENT

Optic experience

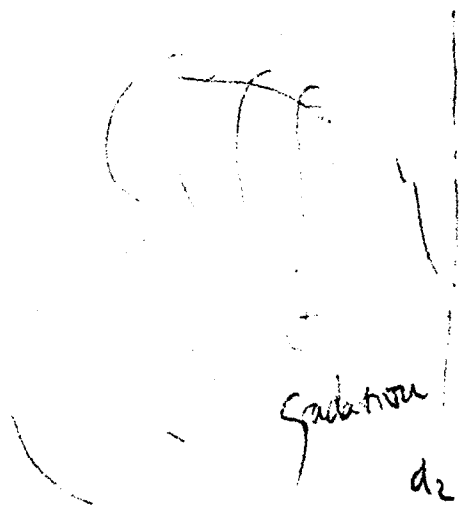
- Visual perception - simplicity
- pure forms
- closure
- tension → obliquity
- colour
- transparency

pleasure
pleasantness
gravity

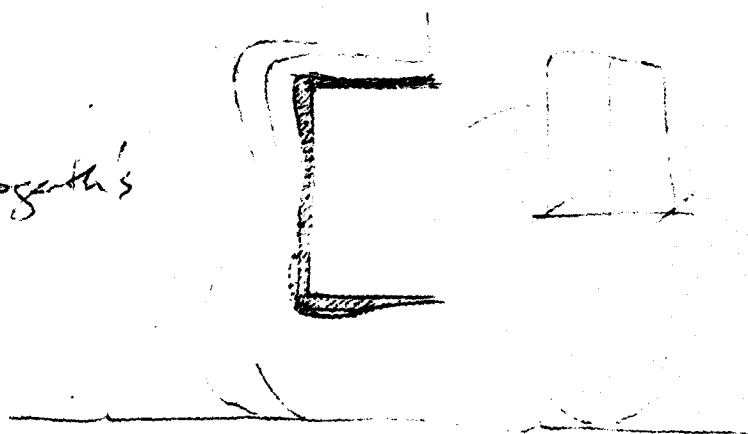
- rhythm
- slow, picked - check -



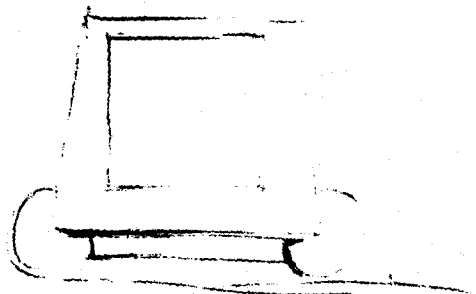
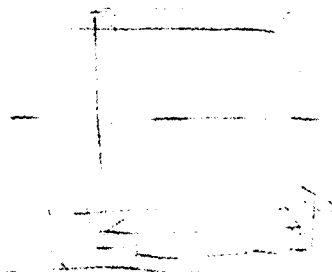
ZOCCAS: Cover for transportability - protection



Hogarth's

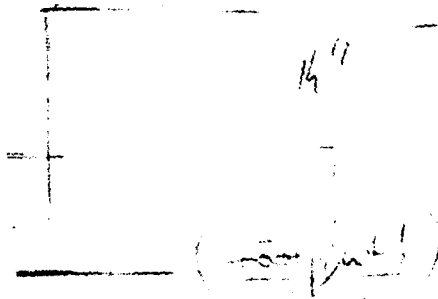


Abraham
Zeno's



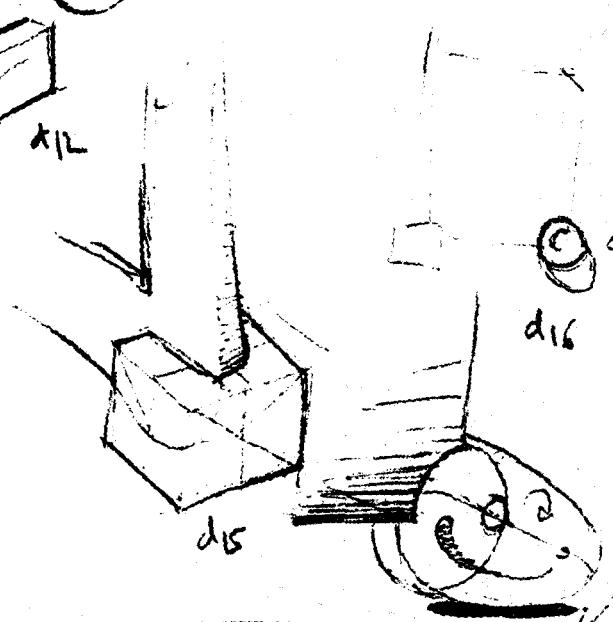
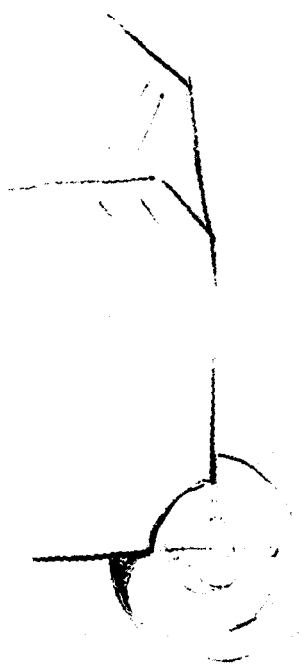
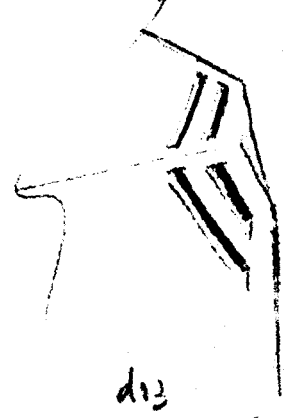
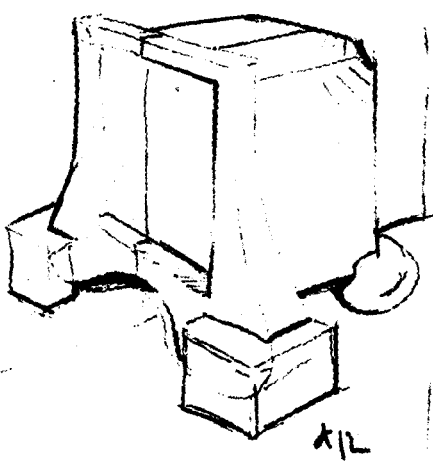
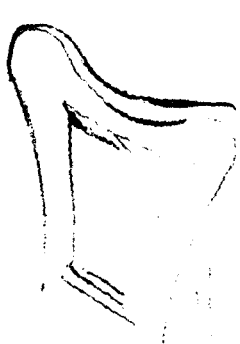
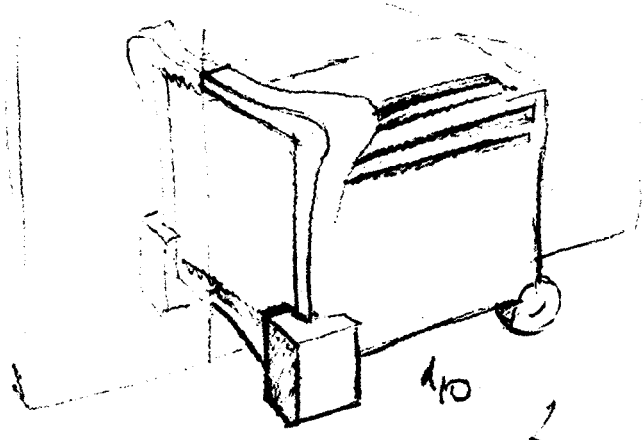
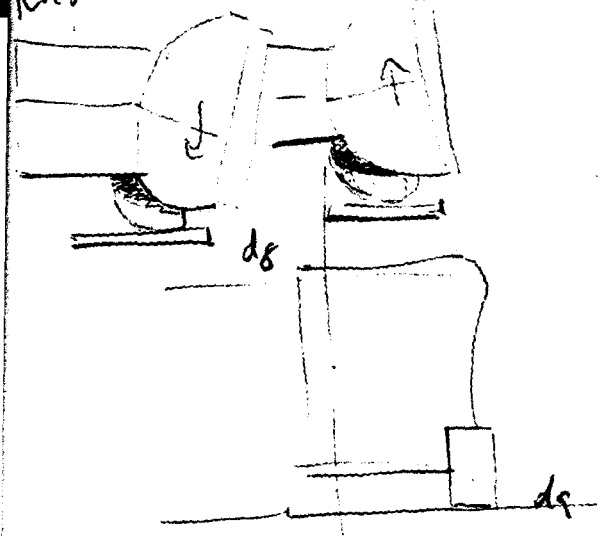
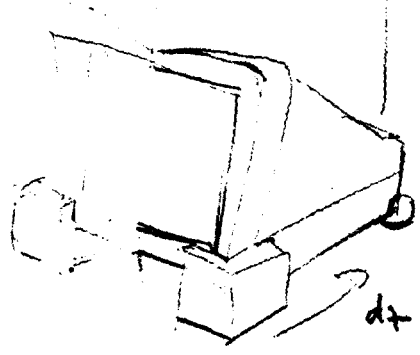
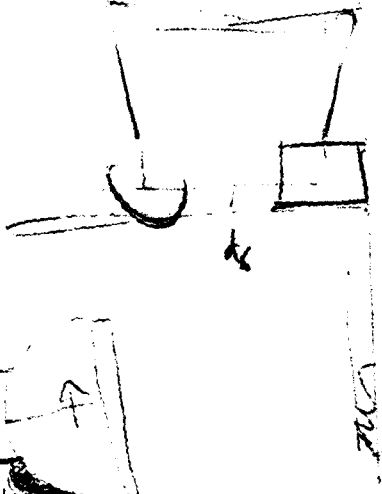
14"

d3



Chapter

Extension in LGS

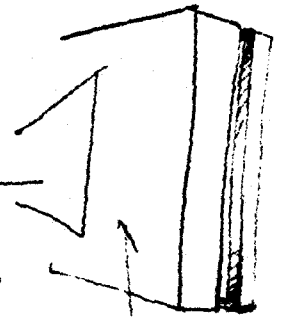
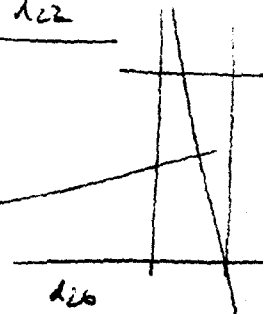
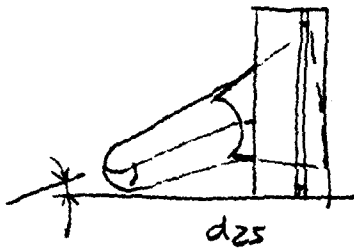
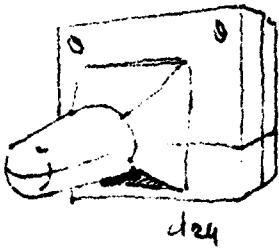
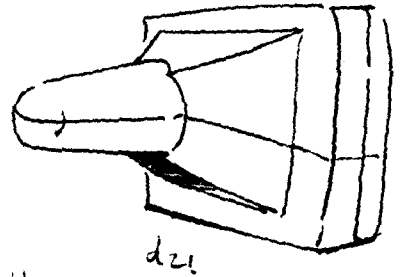
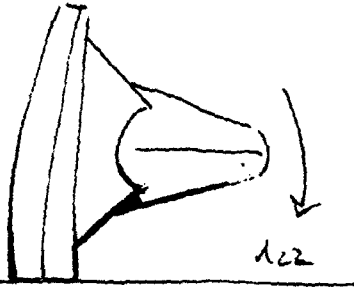
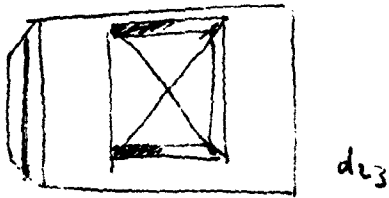
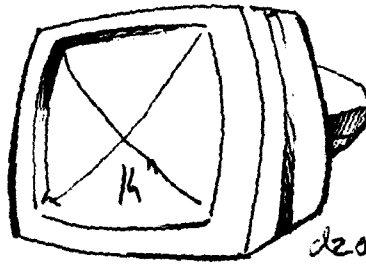
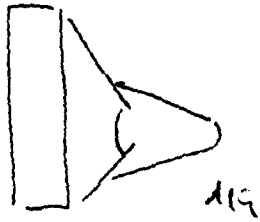
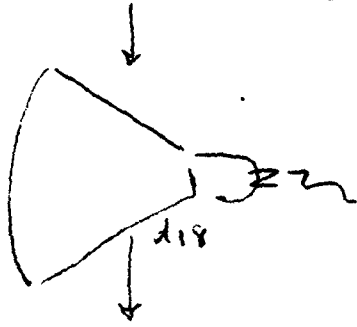


...no handle!

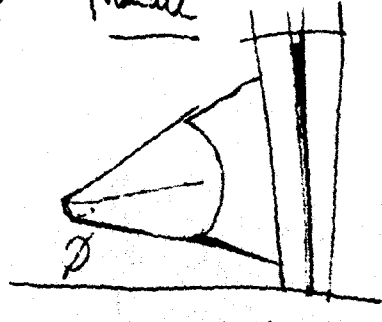
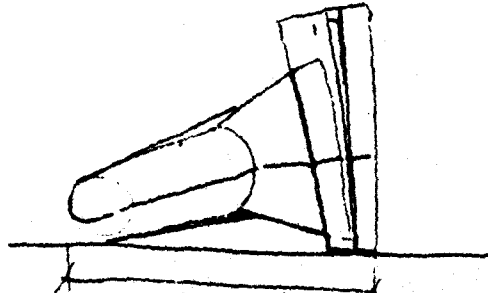
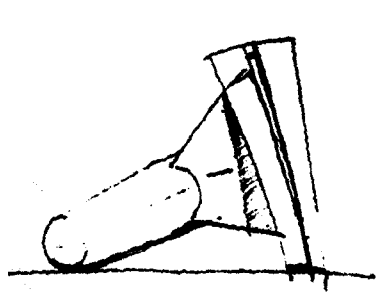
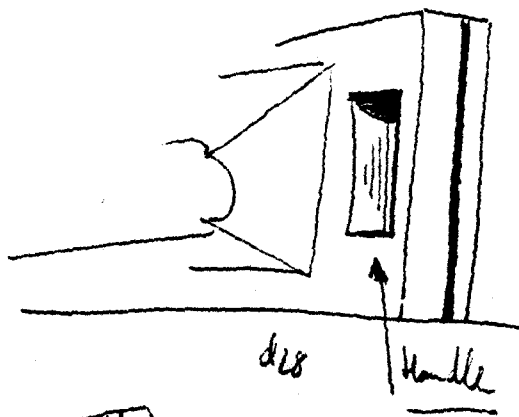
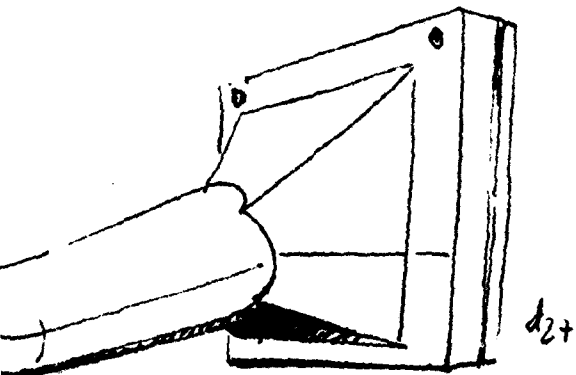
Kaytze symbolises the touched ...

for instance screen & tube (function)

CLOSURE
TOUCH — Texture —
SIGN
5 SENSES
Visual perception issues.

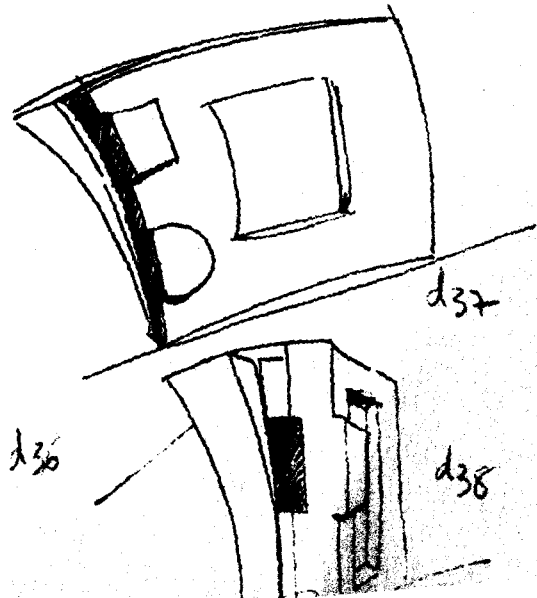
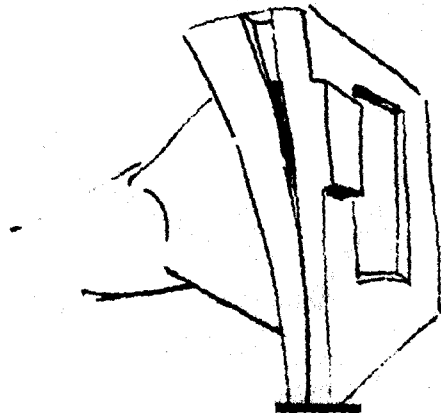
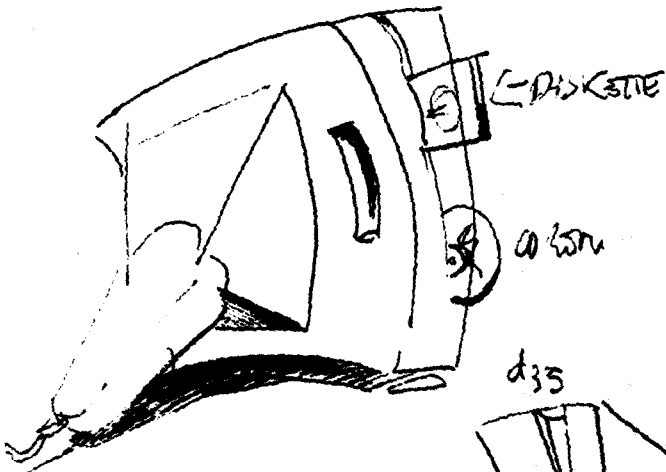
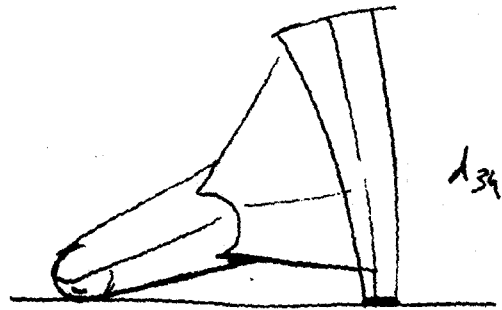
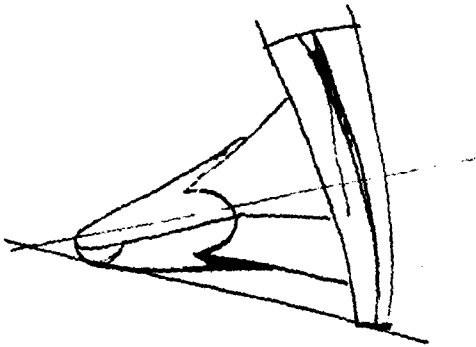
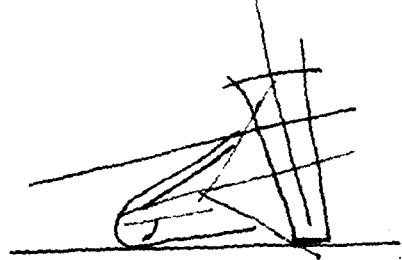
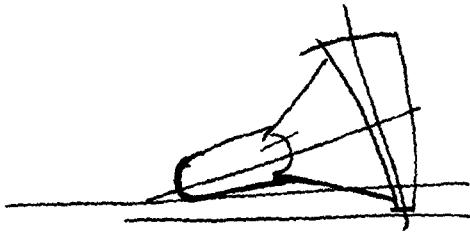
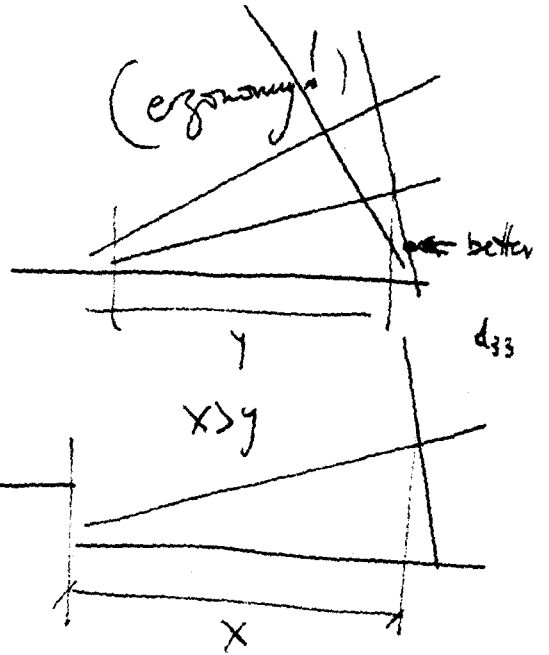
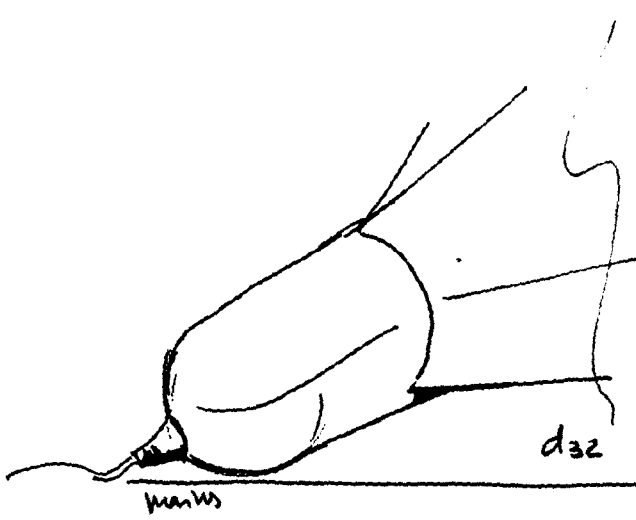


allocates
chips mem.
etc.

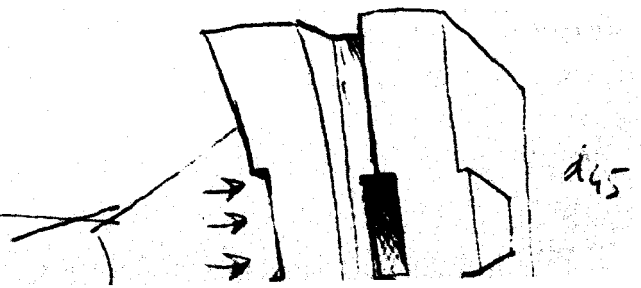
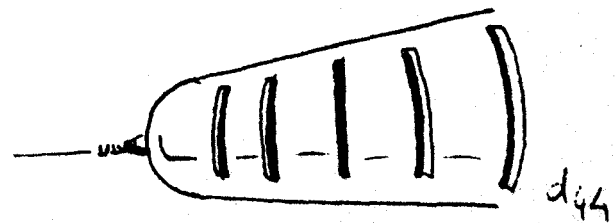
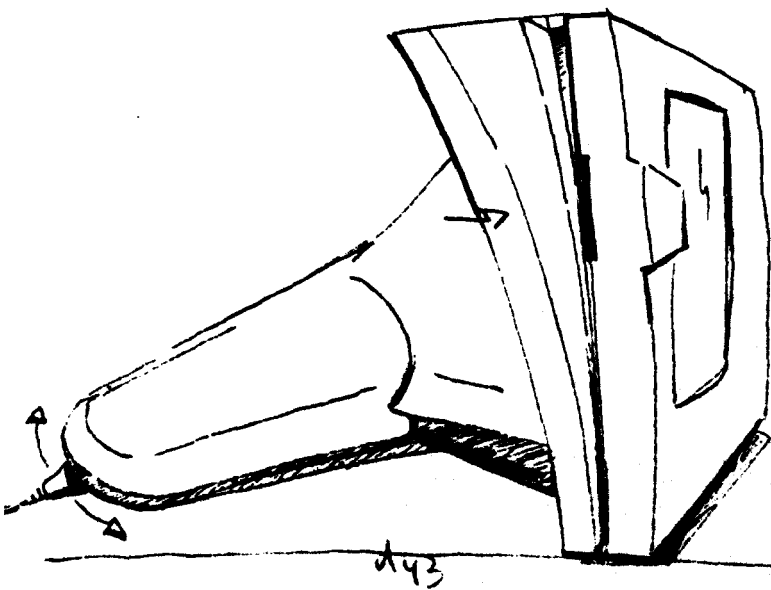
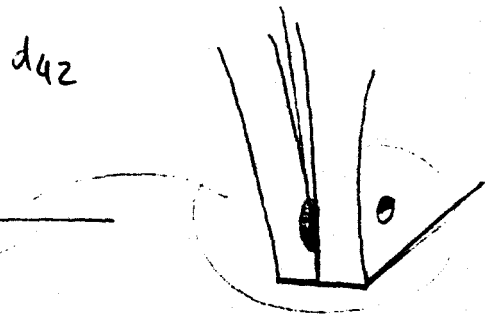
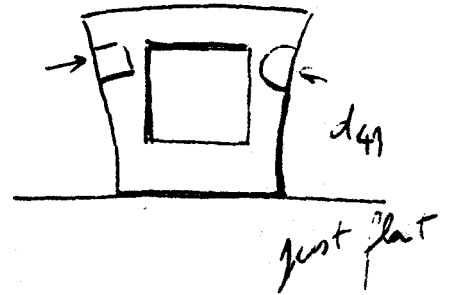
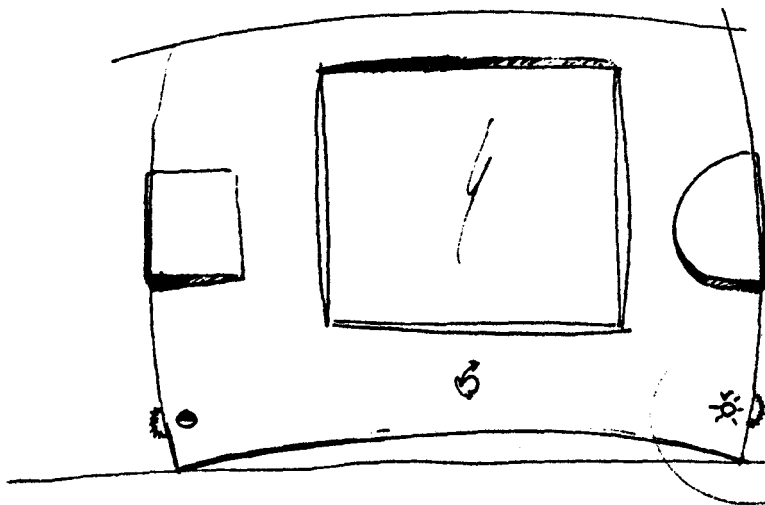
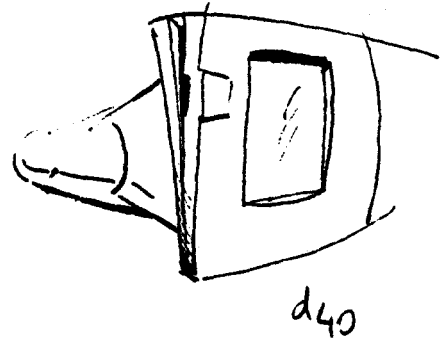
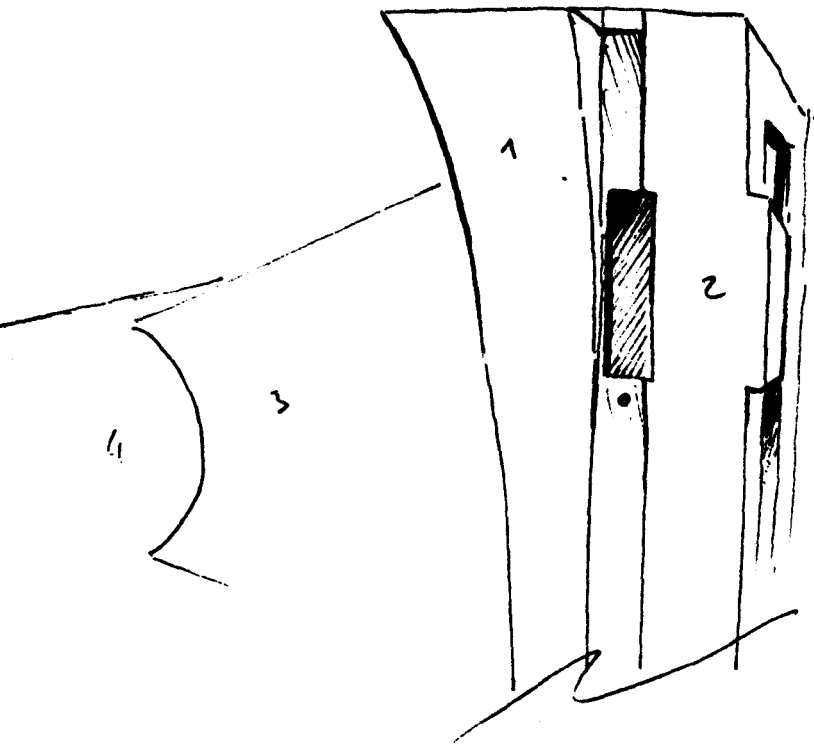


low mark - dia

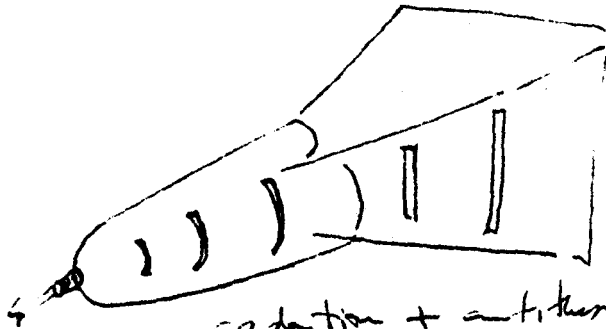
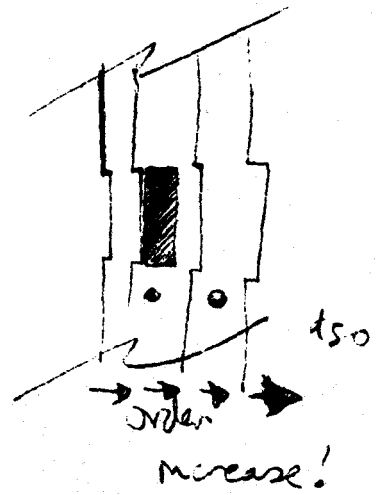
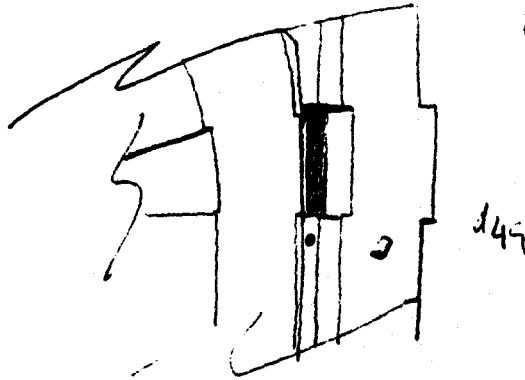
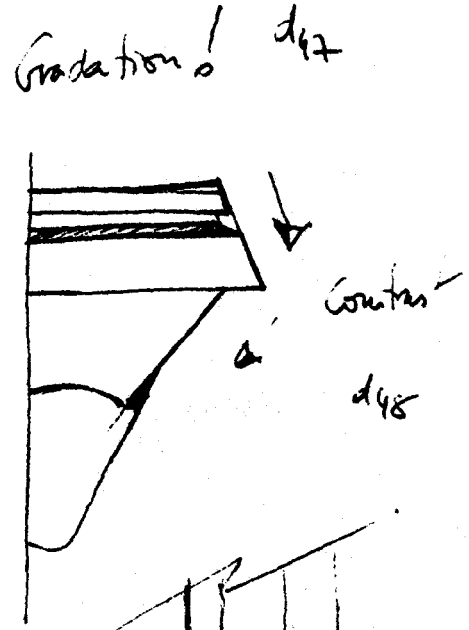
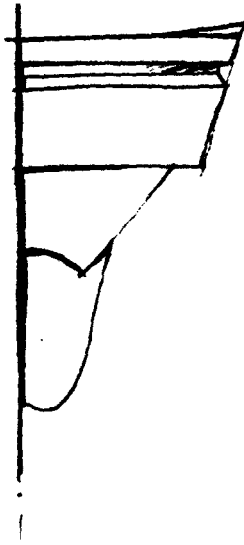
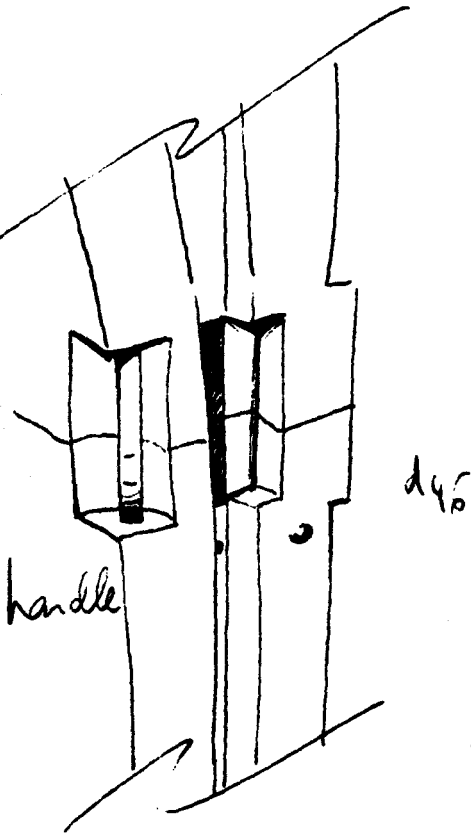
d31



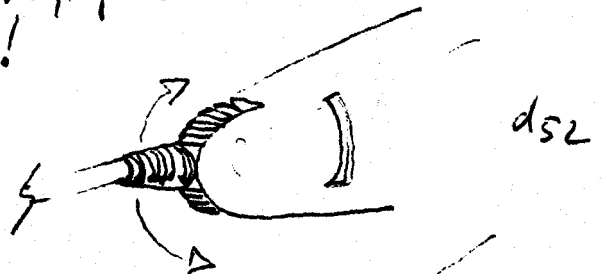
TOPOLOGY &
REFINEMENT.



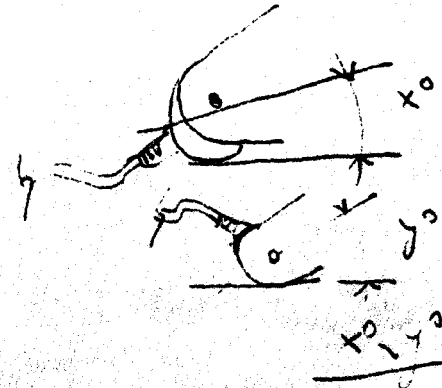
APPENDIX : THE DESIGN PROCESS

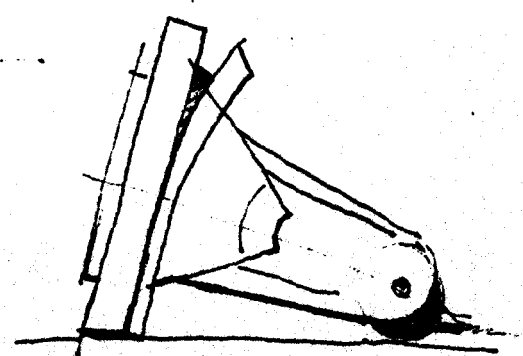
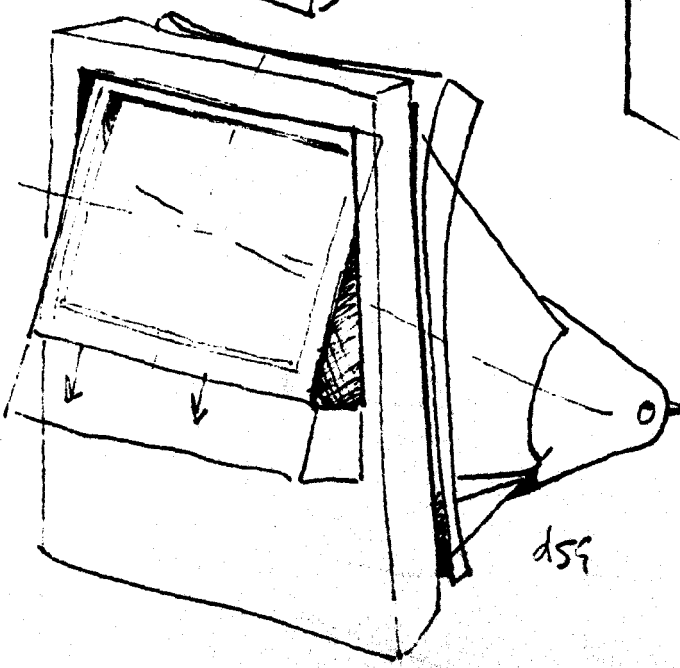
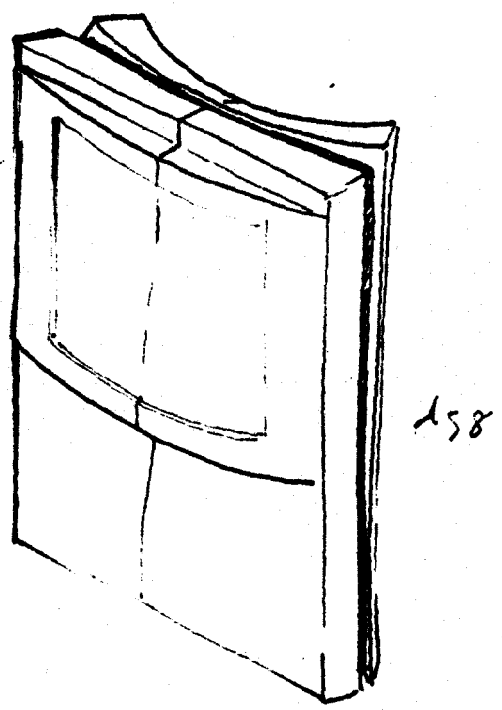
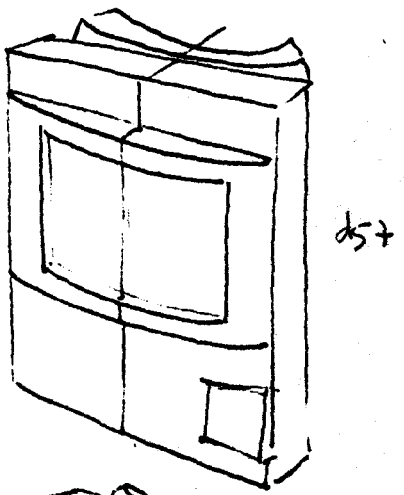
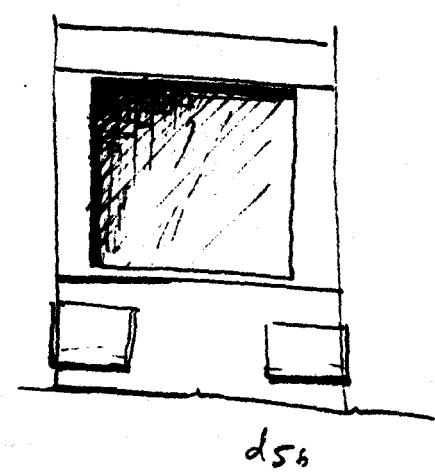
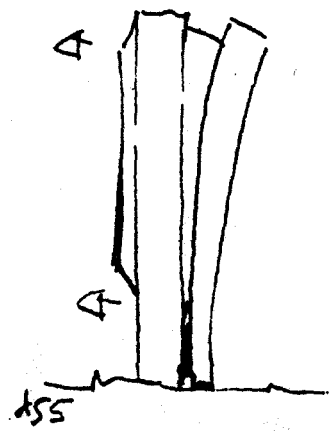
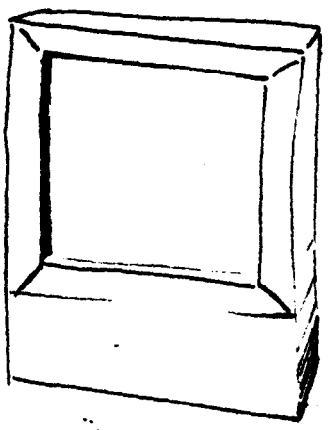
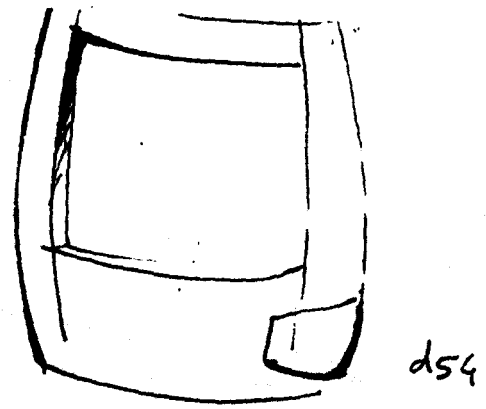
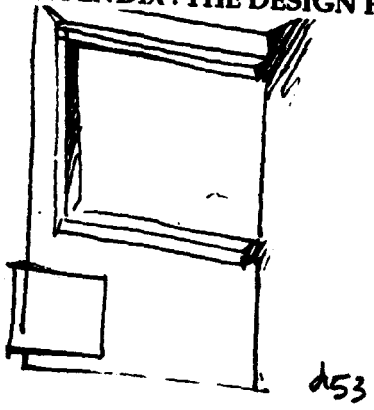


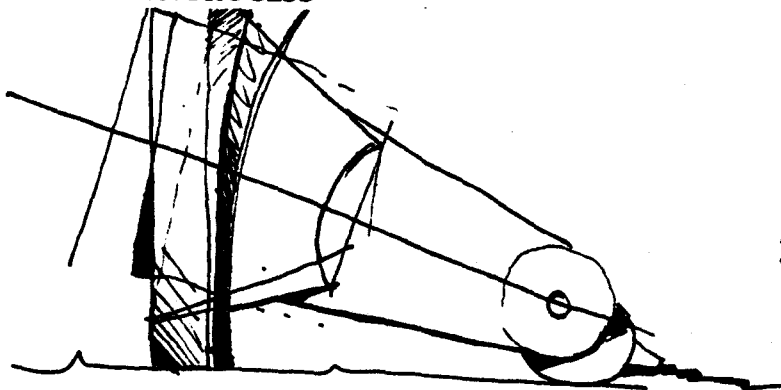
gradation + textures, mirror, repetition...
 increase, oxygen, everything is here!



To achieve degrees...





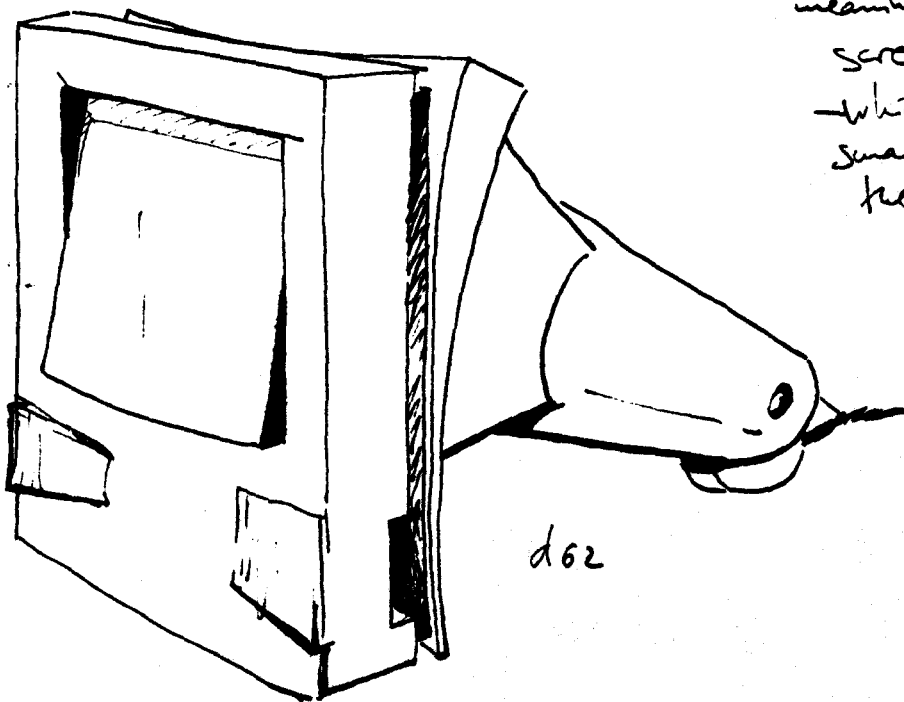


d61

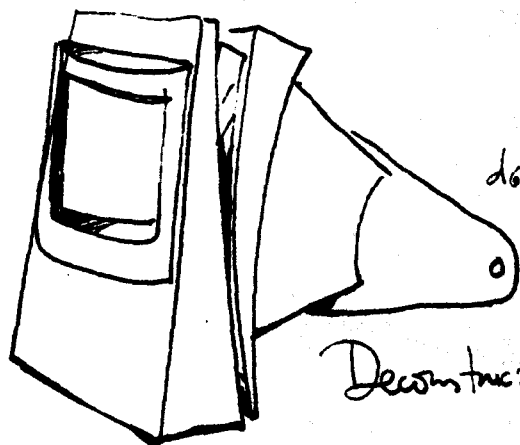
Metonymy:
To experience computer
through its screen.

The 95% of the
meaning is the
screen.

— which is perhaps the
small percentage of
the computer! —

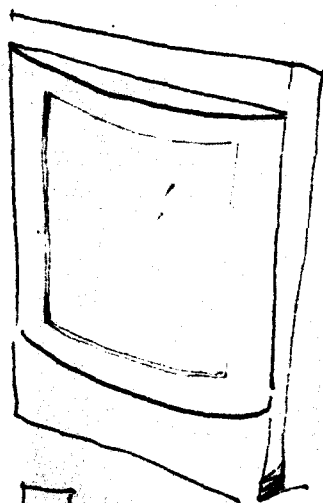


d62

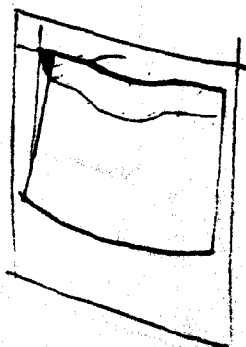


d63

Deconstructivist?



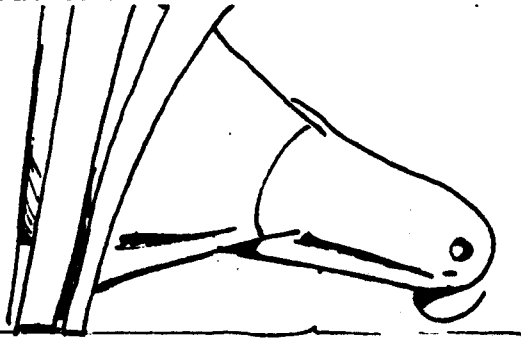
d64



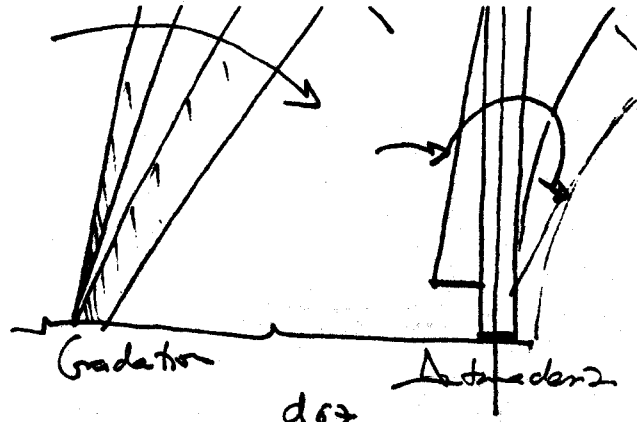
d65

APPENDIX: THE DESIGN PROCESS

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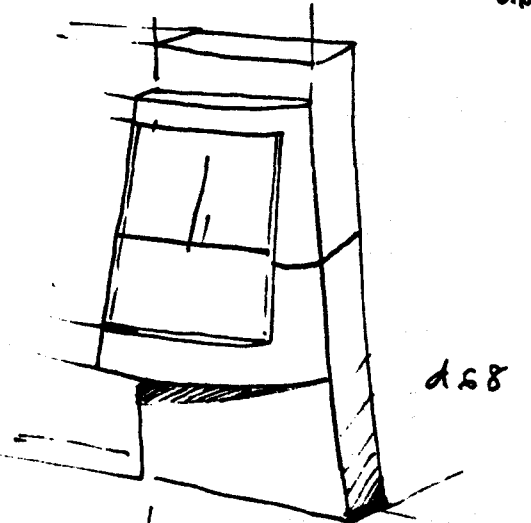
d66



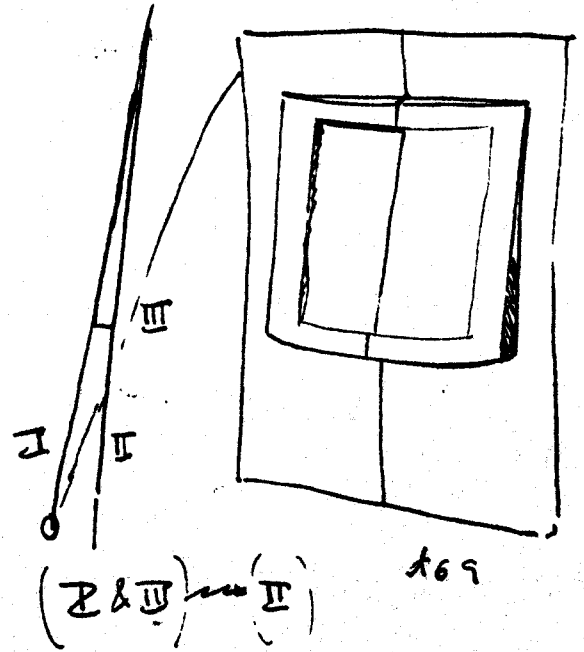
Gradation

d67

d67a

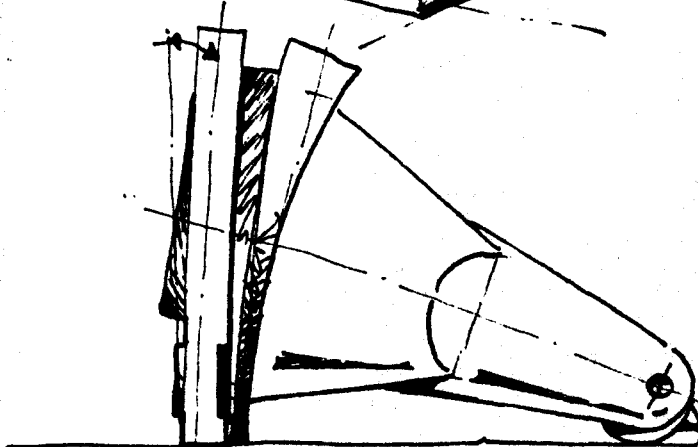


d68

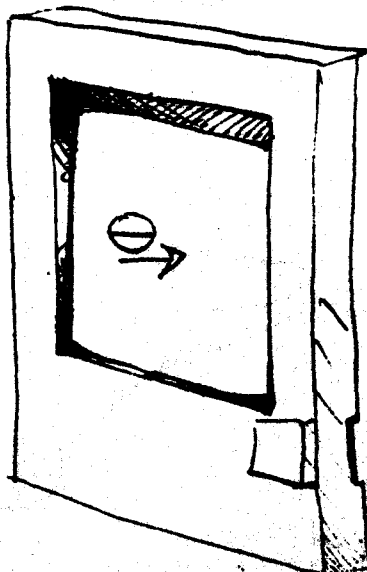


d69

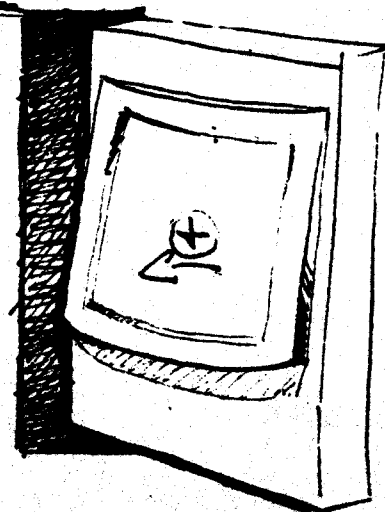
(I & IV) = II



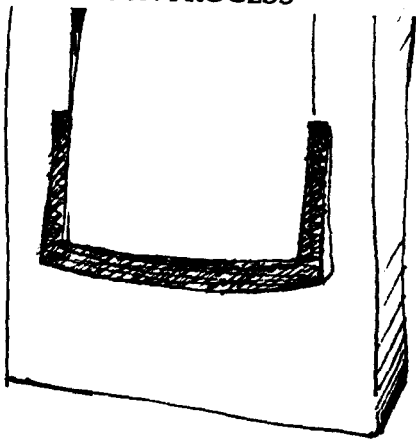
d70



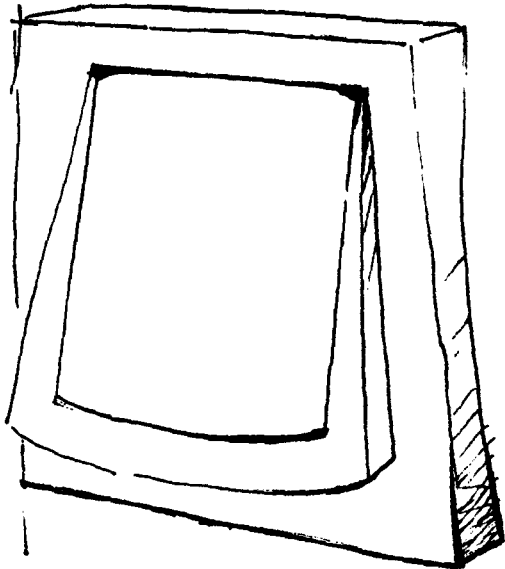
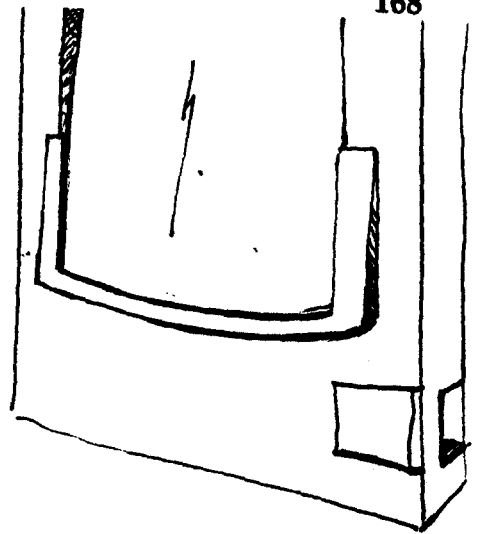
d71



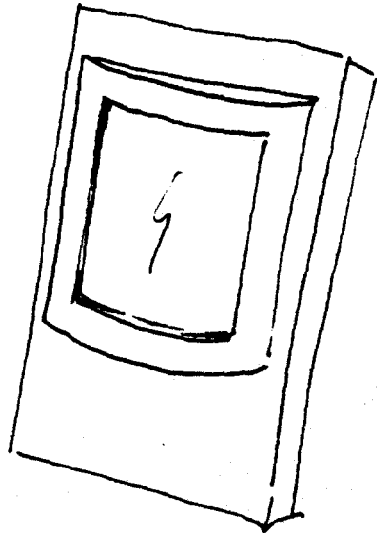
d72



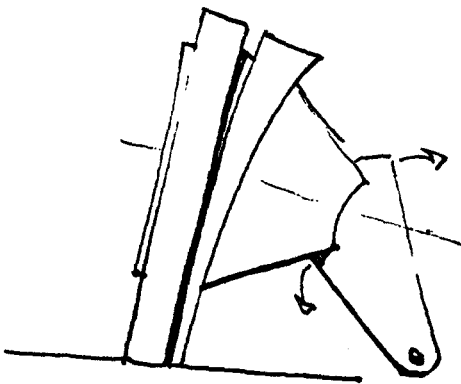
d73



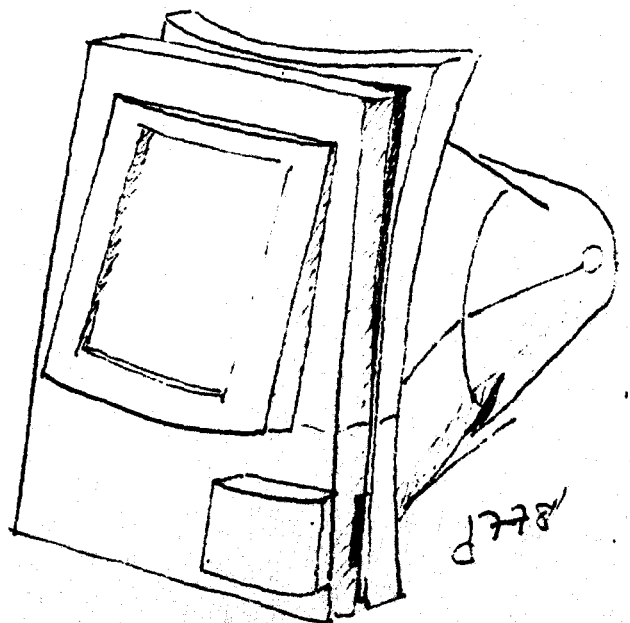
d74



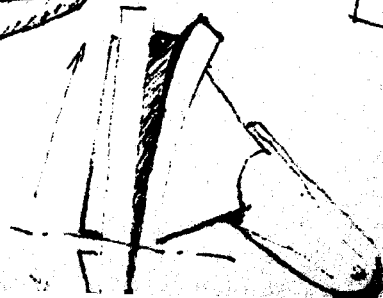
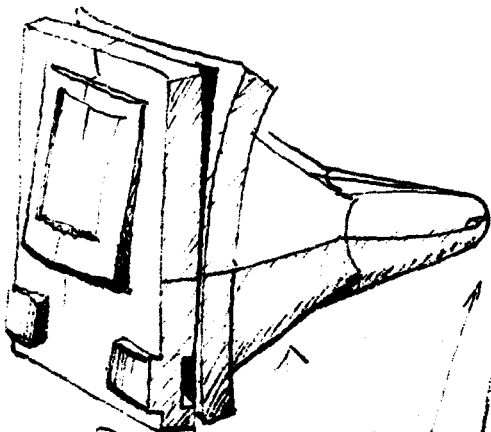
d75



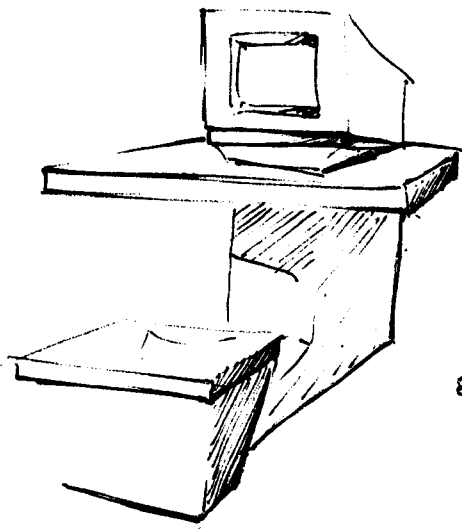
d76



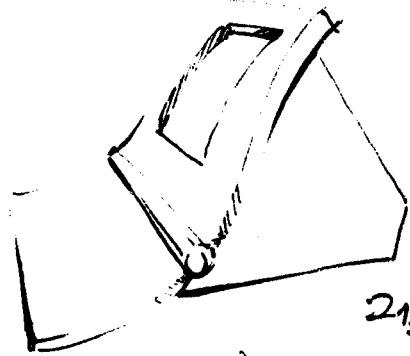
d77



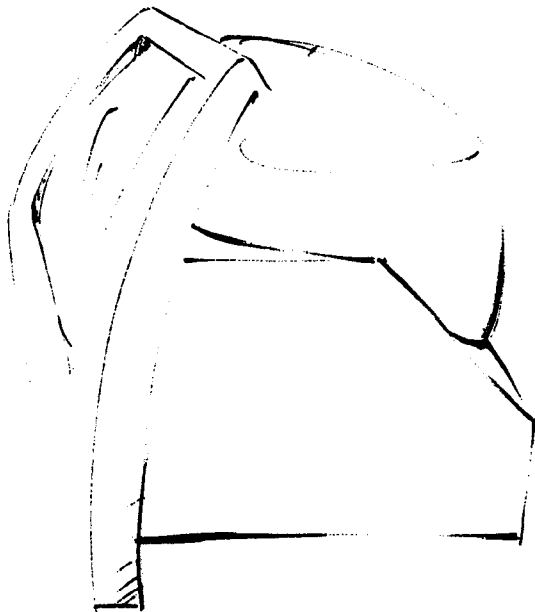
d78



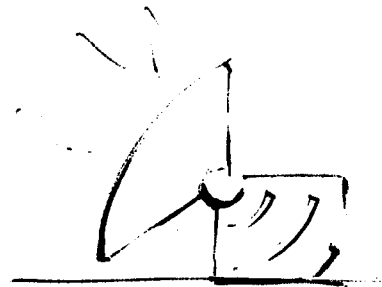
214



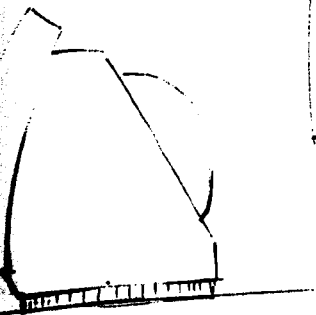
215



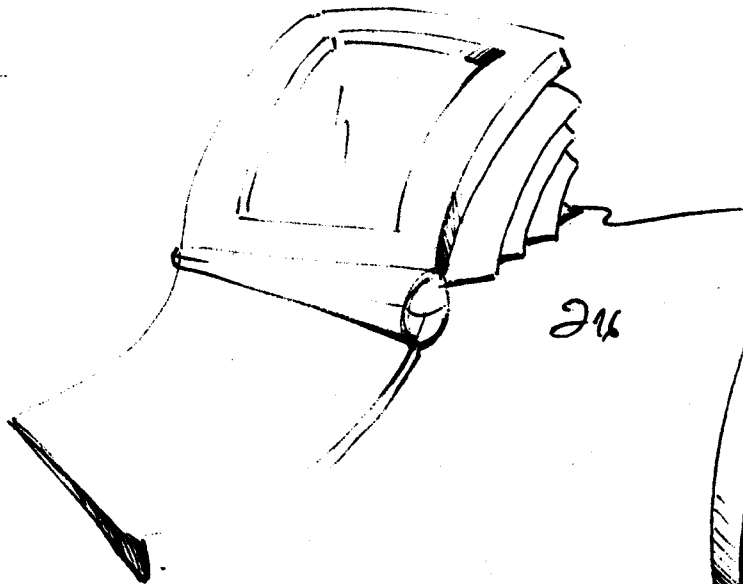
216



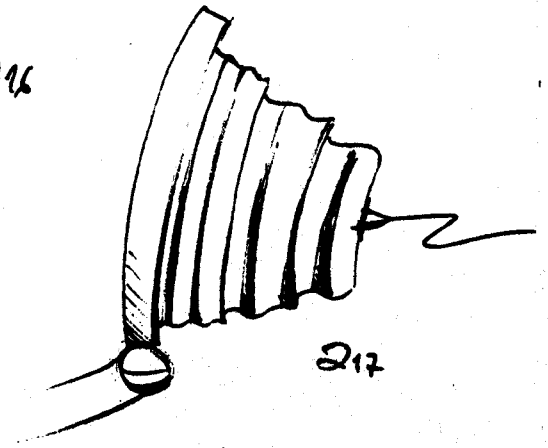
218



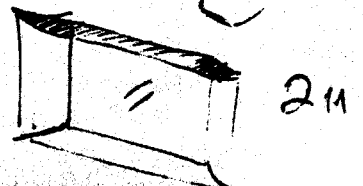
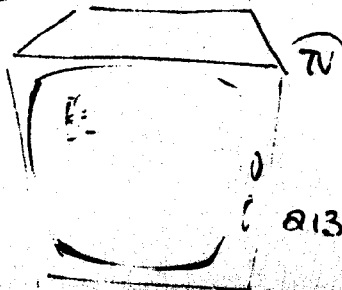
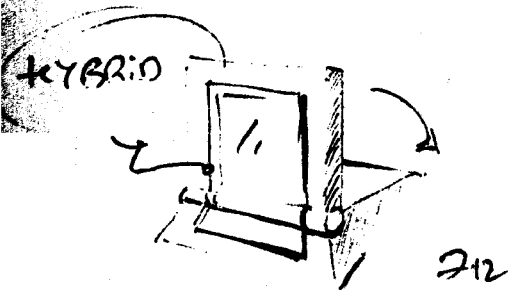
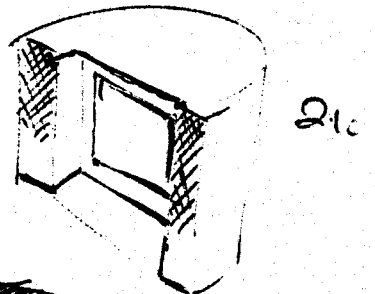
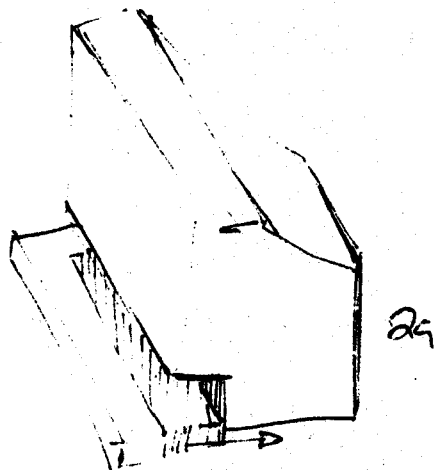
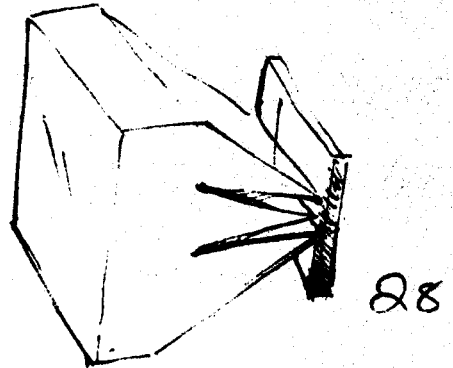
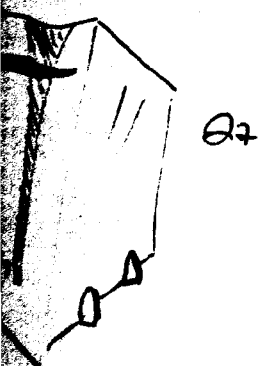
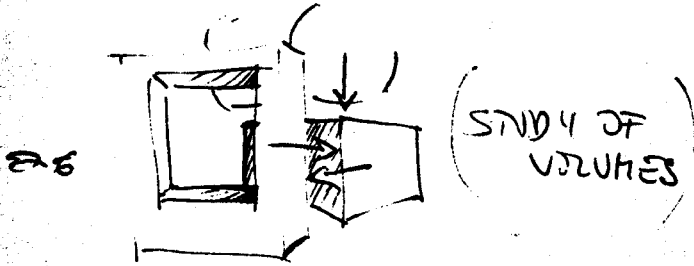
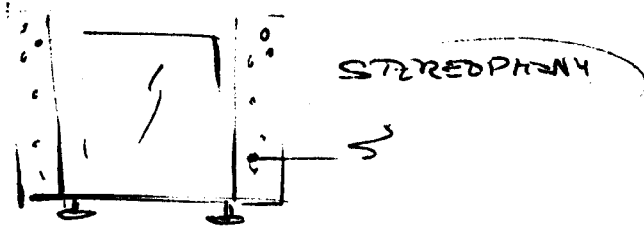
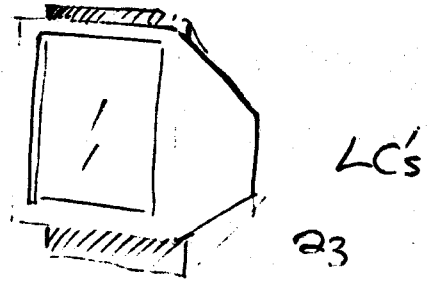
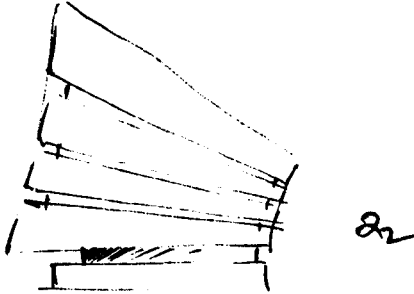
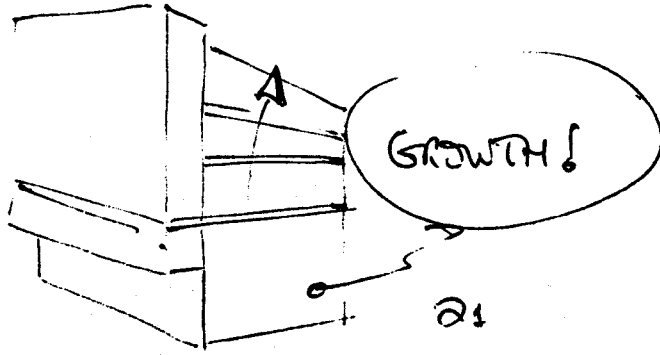
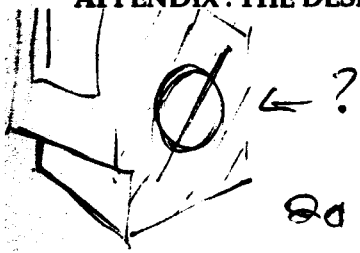
210



216



217



▶ RIBBING

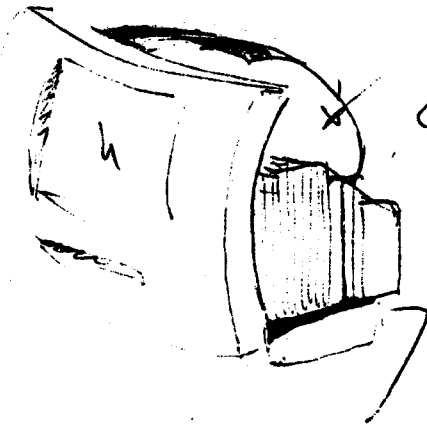
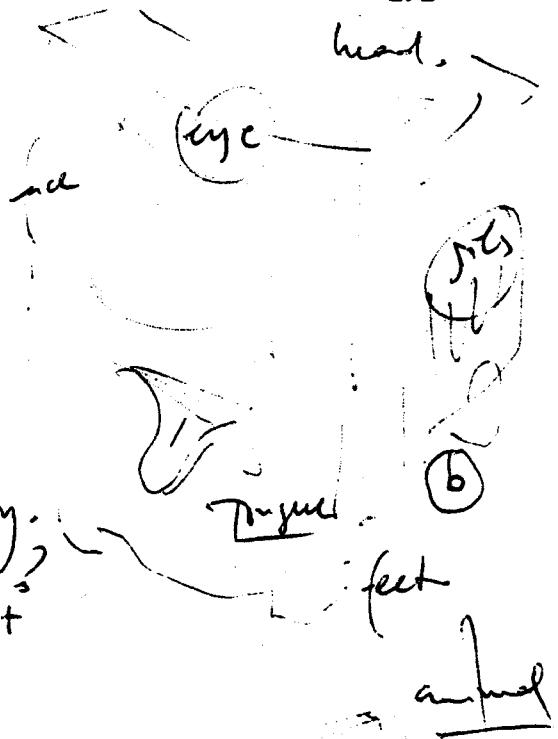
CHIN
HANDLE - SELF CONTAINED -
CONICAL
FACE - not ears -

▶ Greek orders?

former classes - LC 475, LC II, III, etc.

LAST CLASS 2 - espresso - D volumes

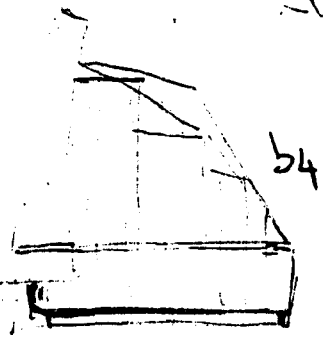
- Animal → texture
- plasticity.
- Theater?
- contrast



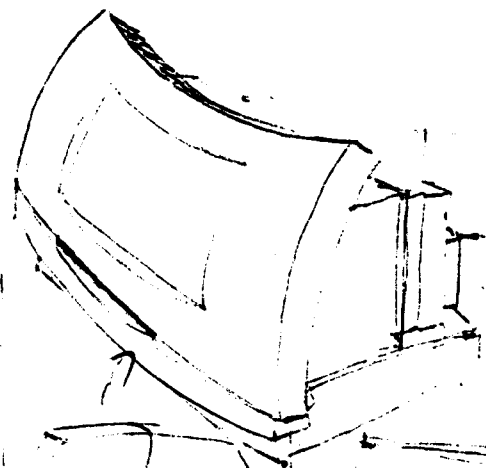
← NO -



Splint



b4

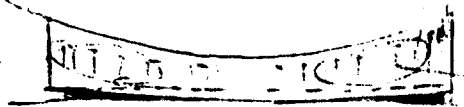


b3

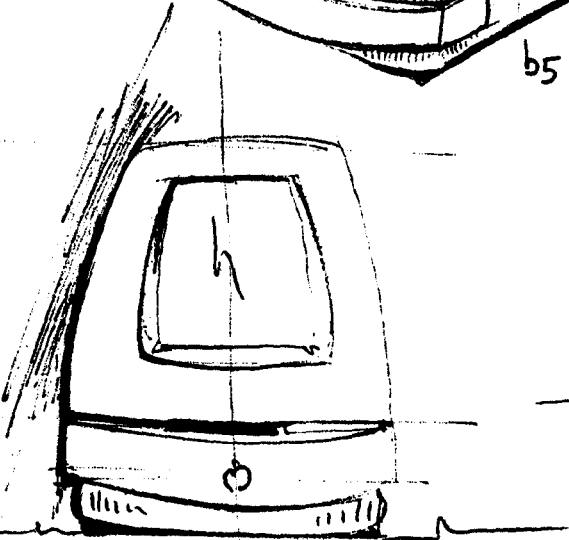
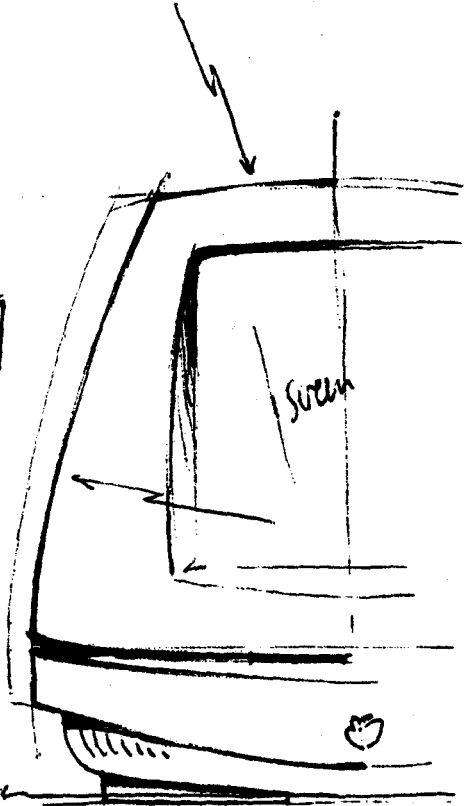
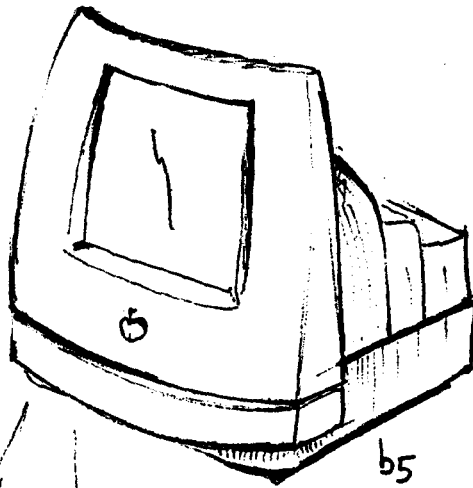
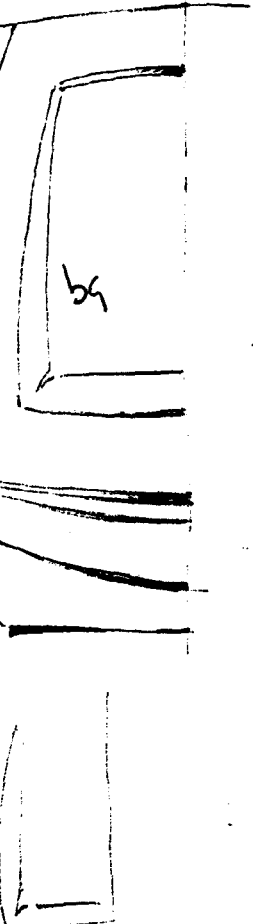
best
↓



b2



Stroop



b8

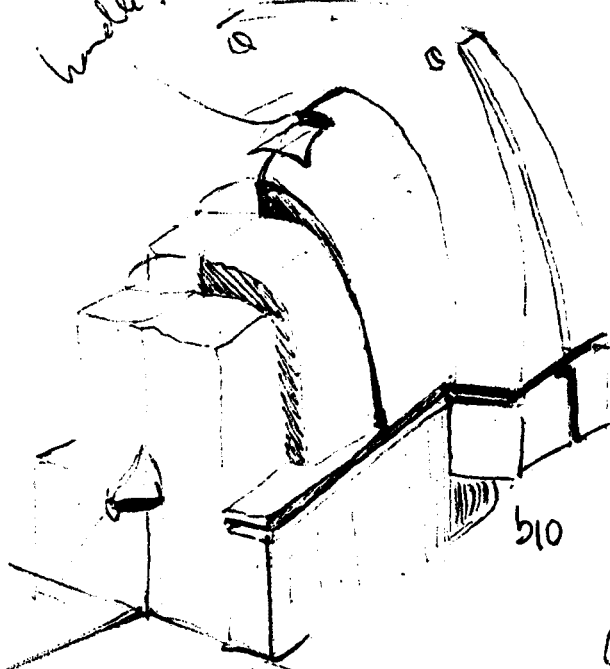
lips!

b7

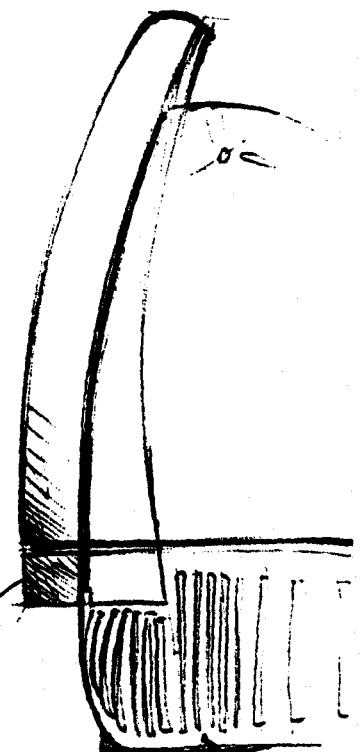
speakers

idea?
growth!

handle?



b10



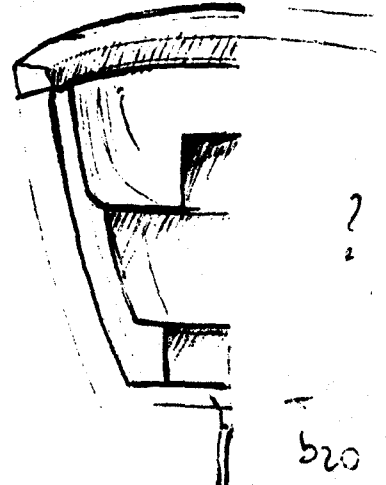
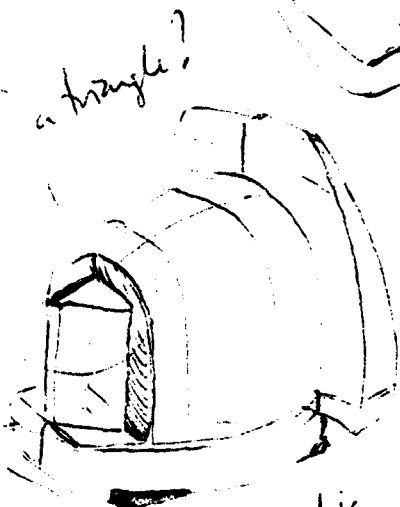
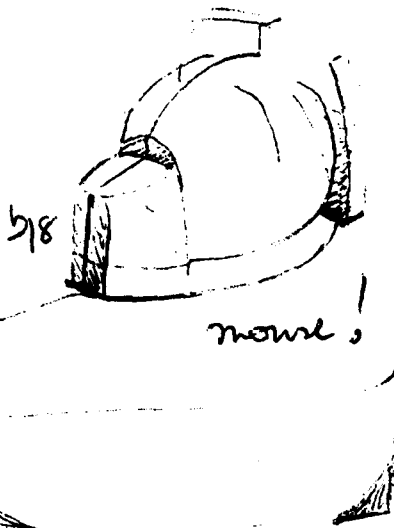
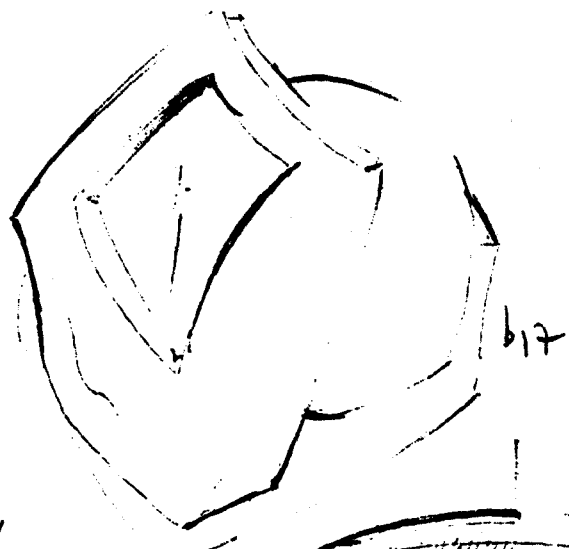
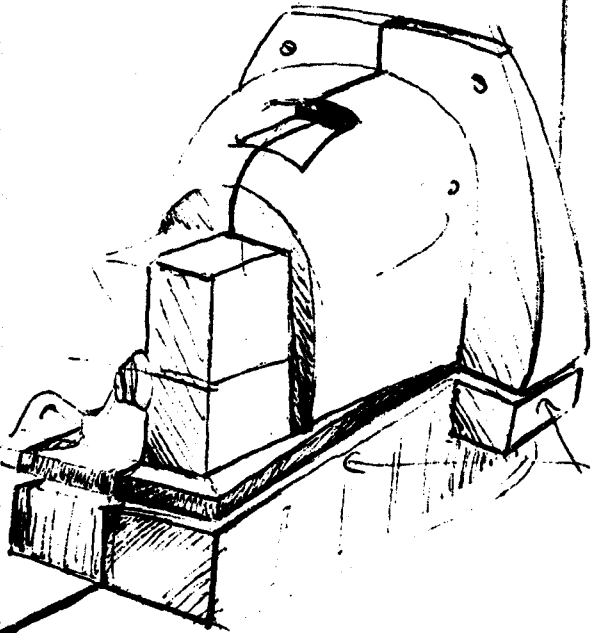
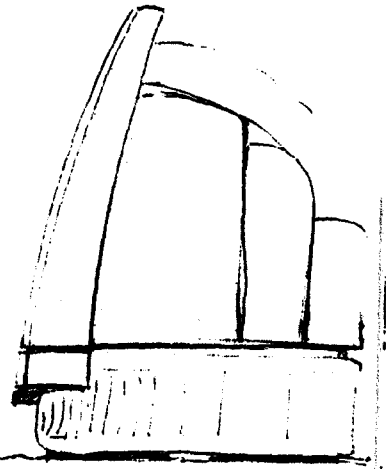
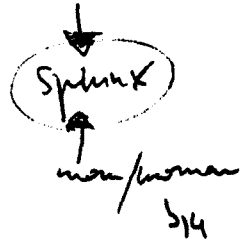
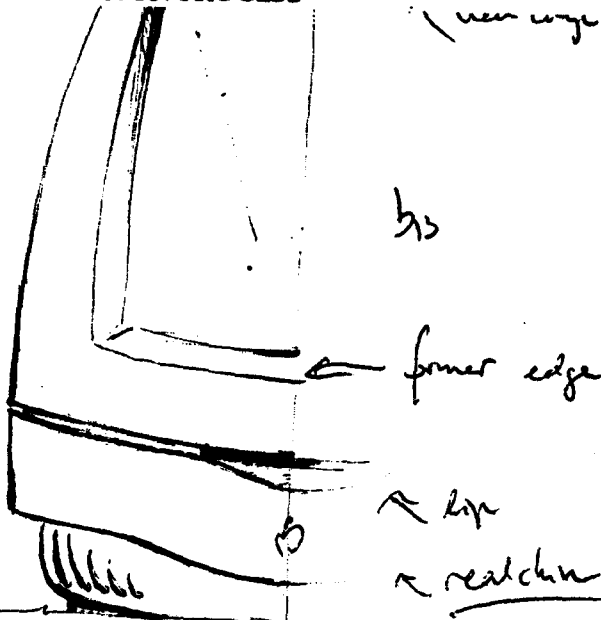
collapsion?

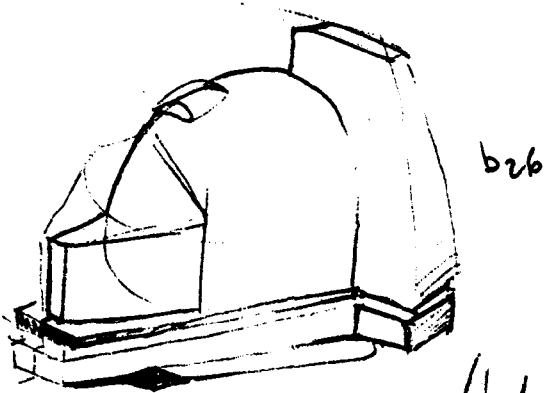
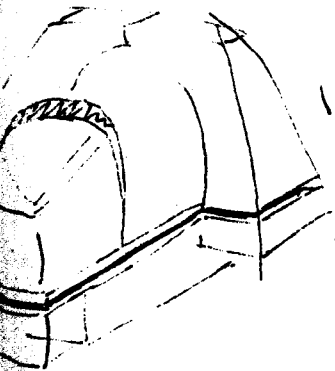
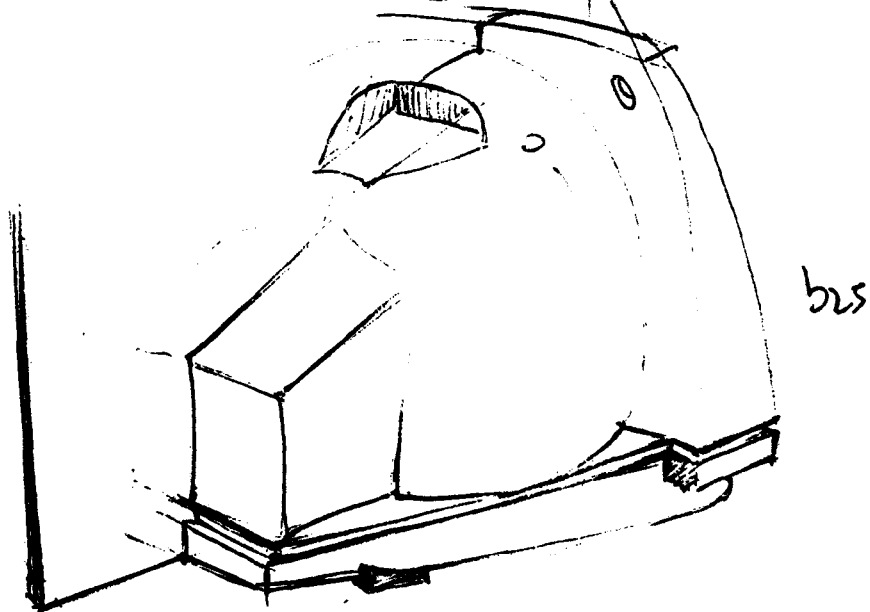
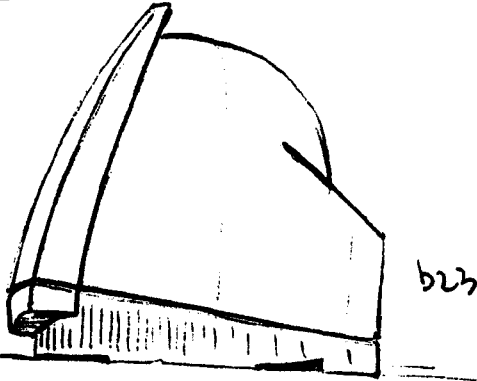
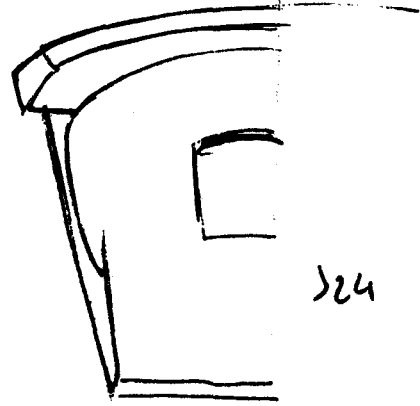
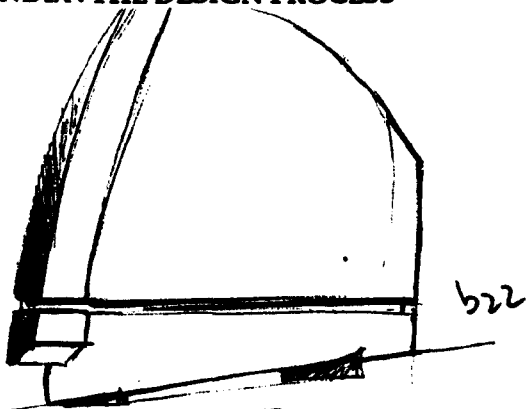
footprint gets
b11

marks

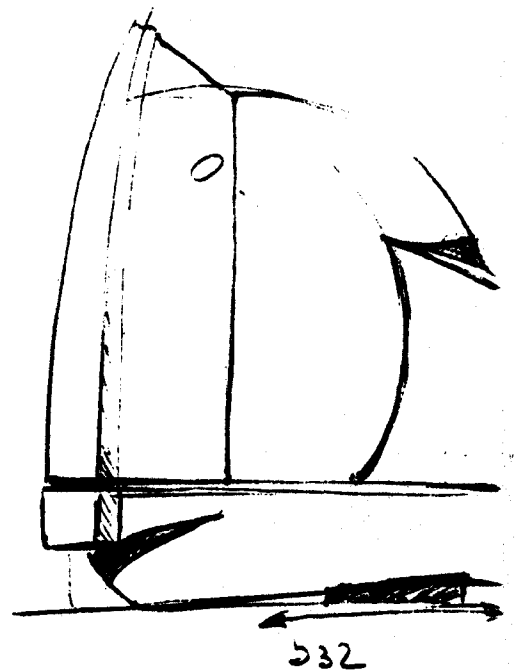
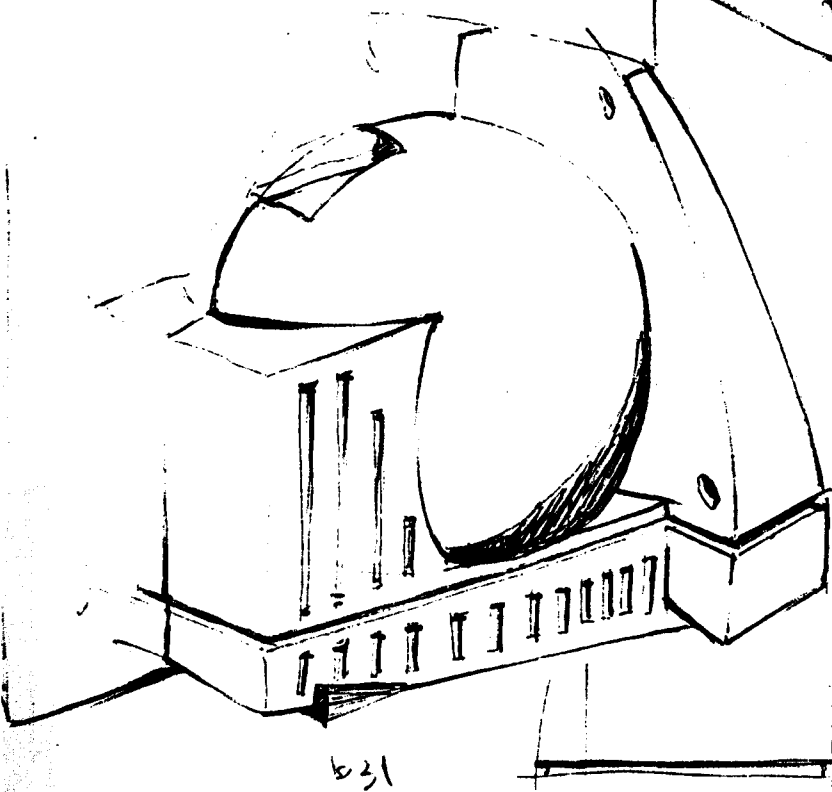
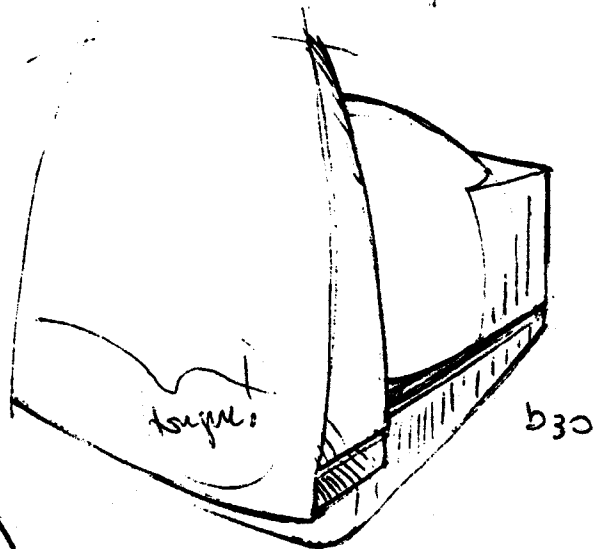
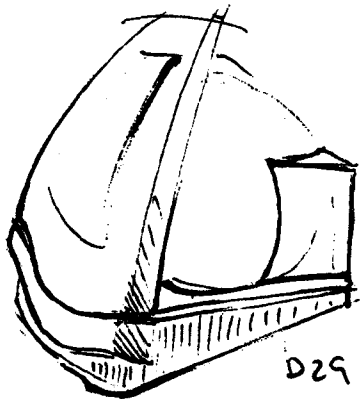
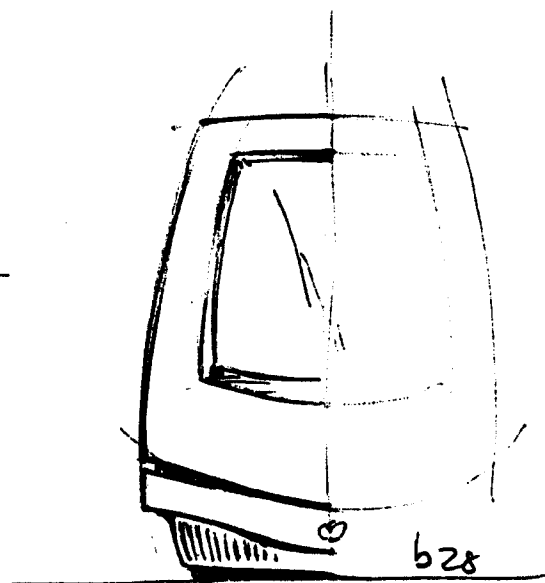
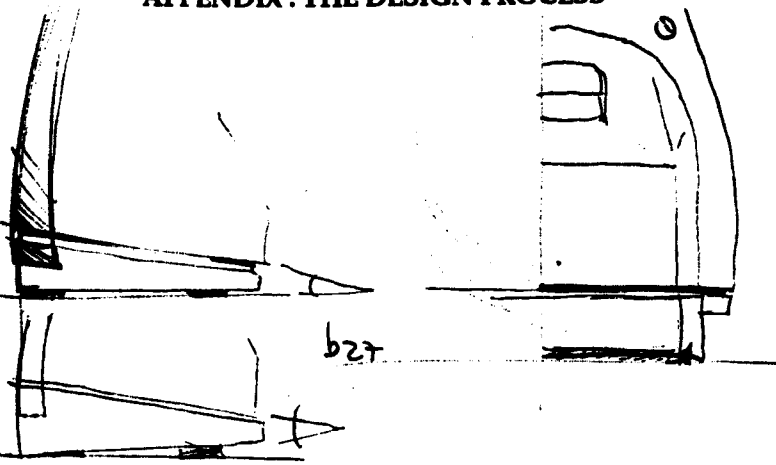
slides
• splunk
dbs
face
LCII/475
SE/70

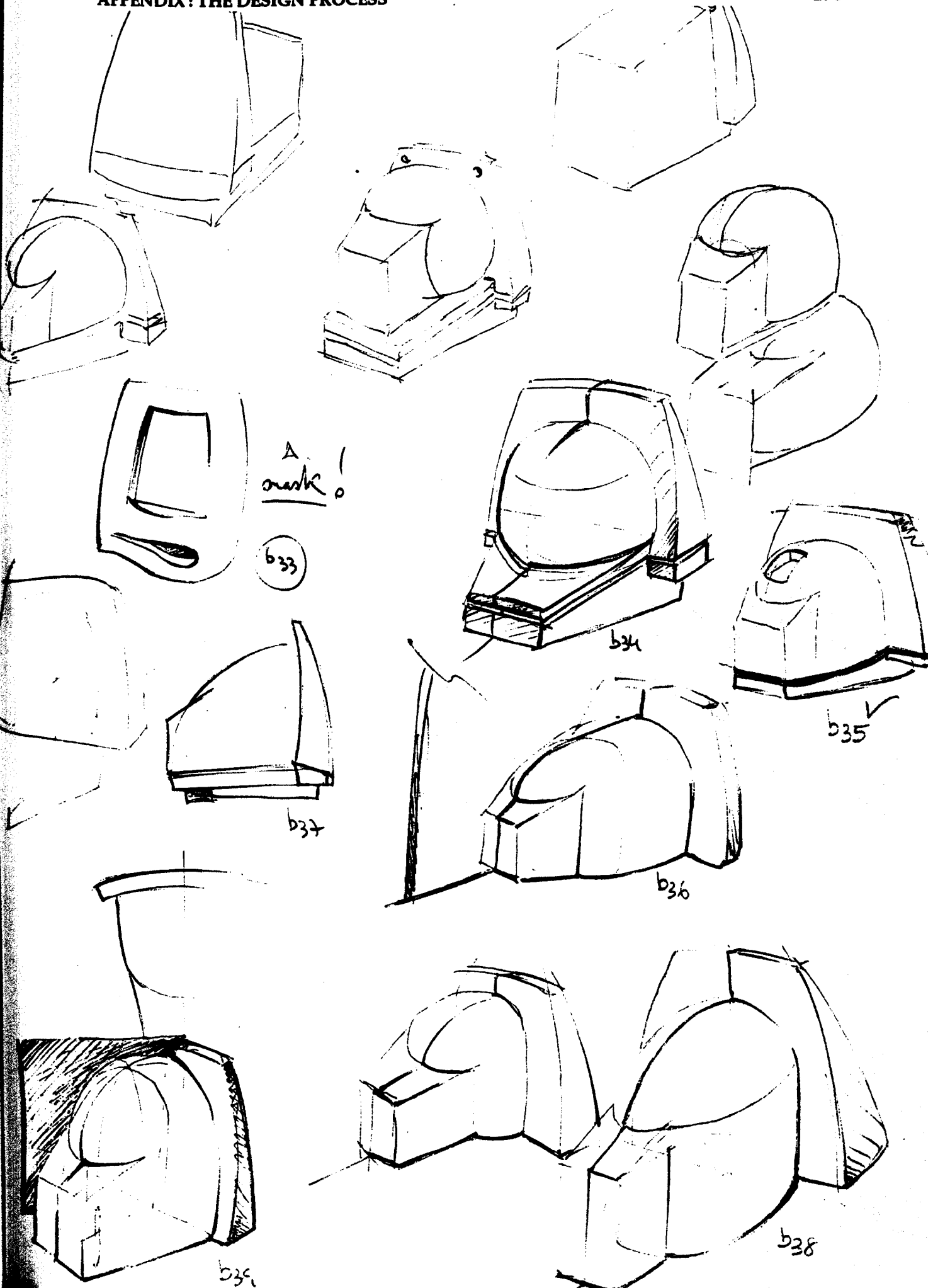
b12

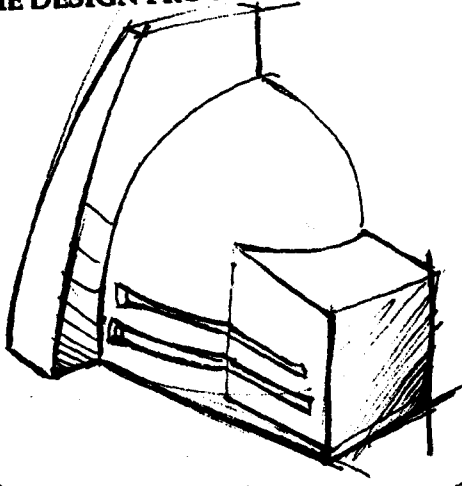
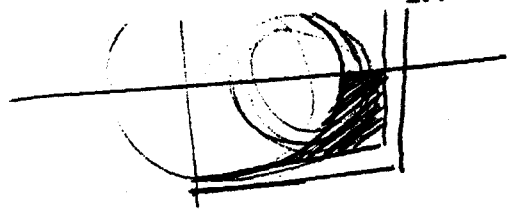




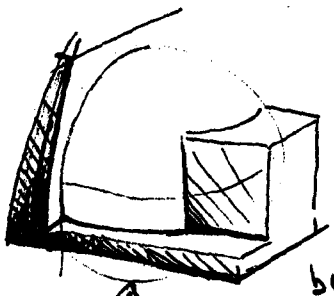
(belongs more to development!)





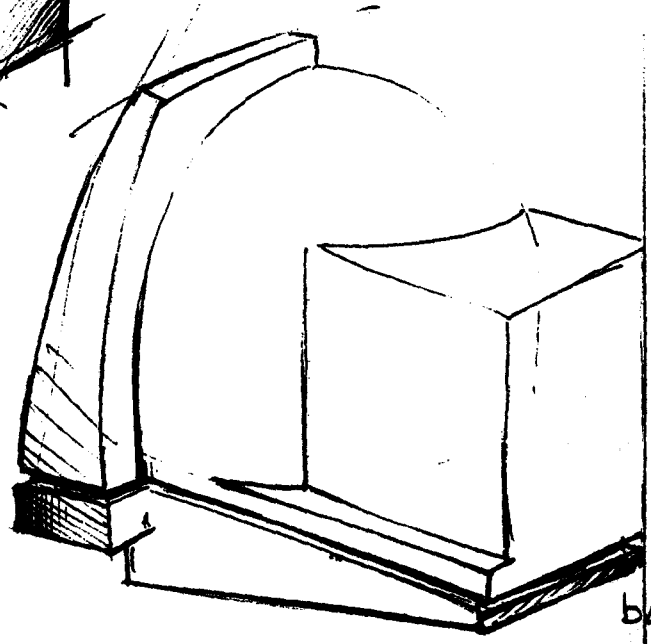


b40

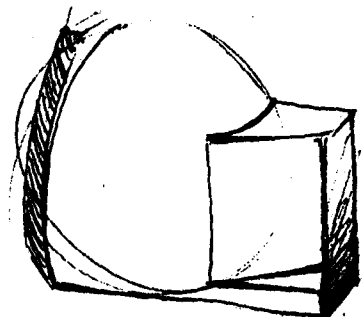
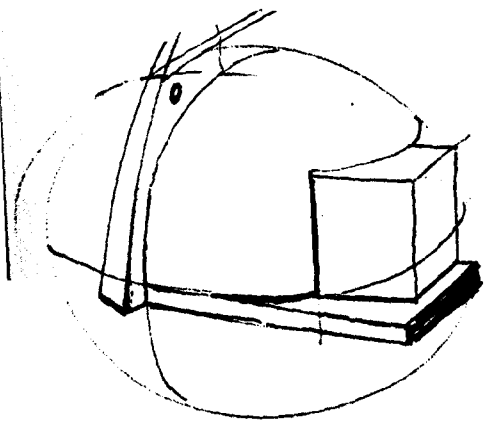
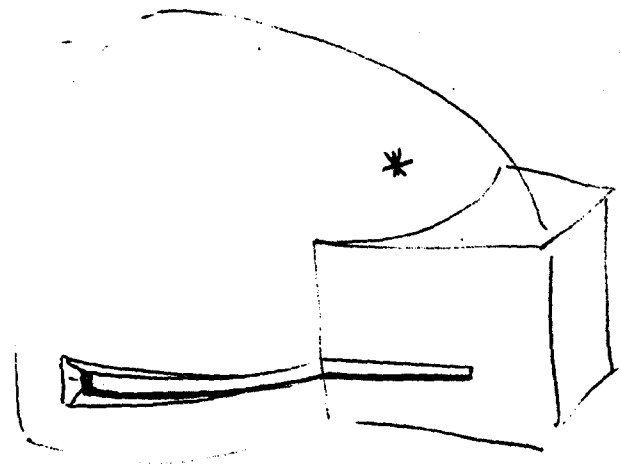
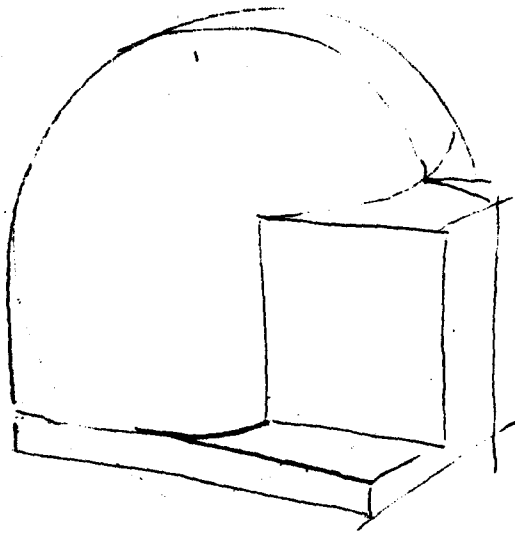


b41

↑ Platformed

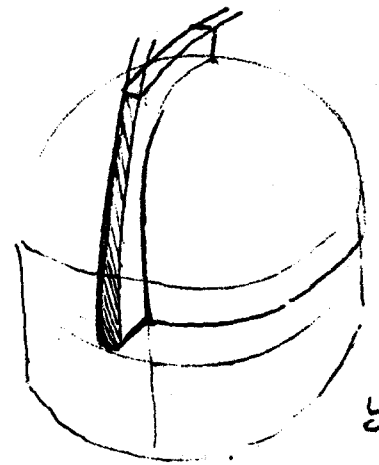


b42

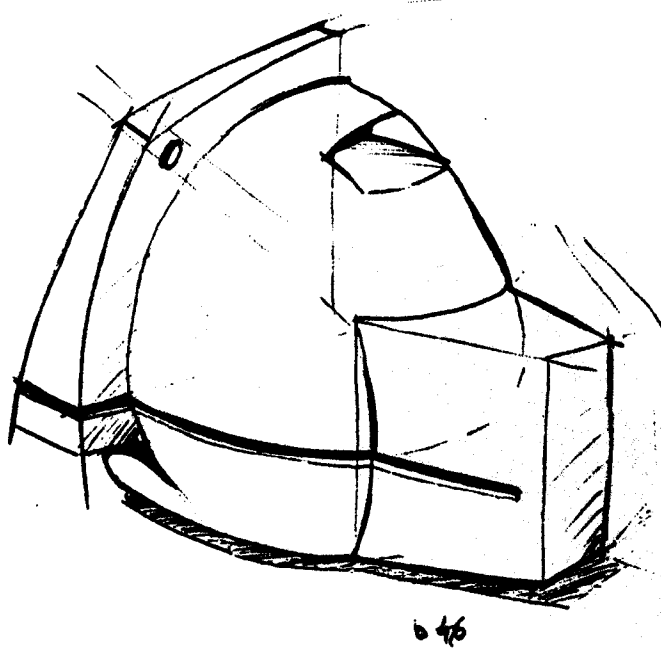
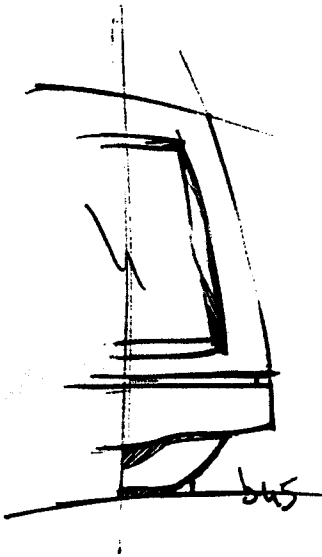
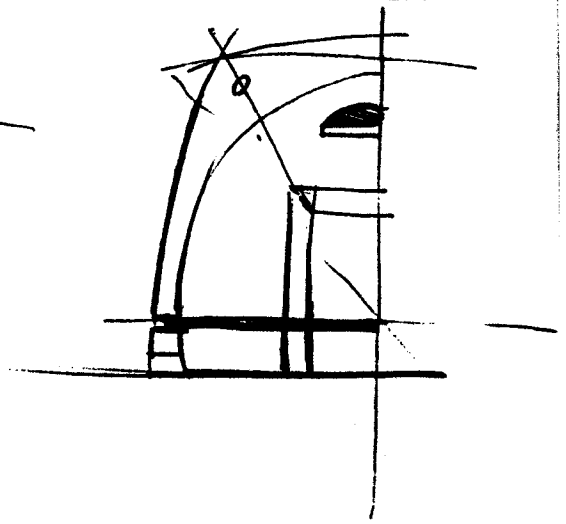
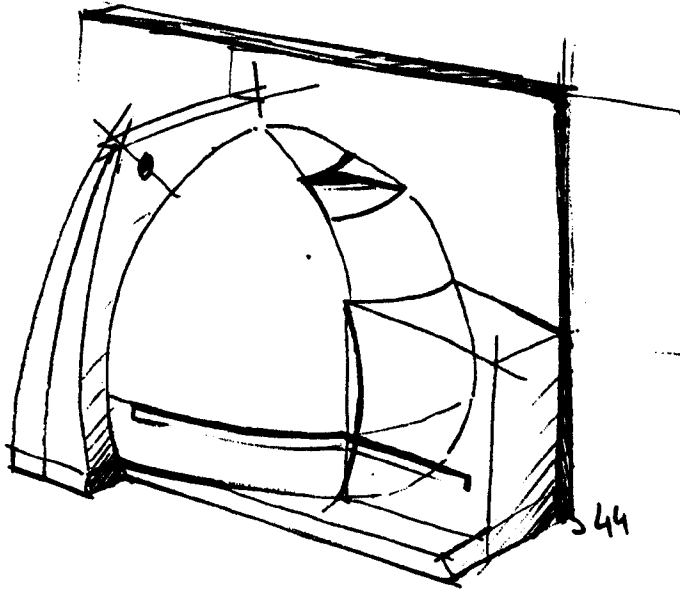


b43

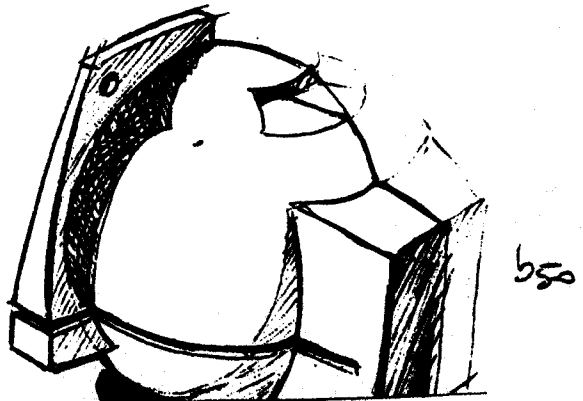
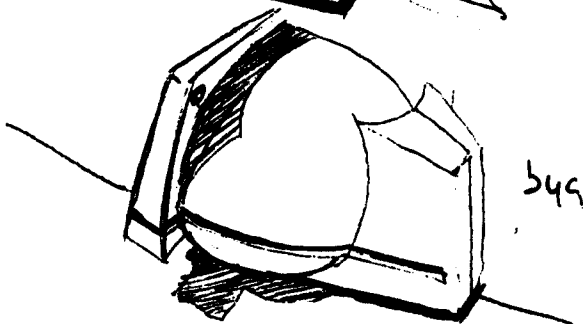
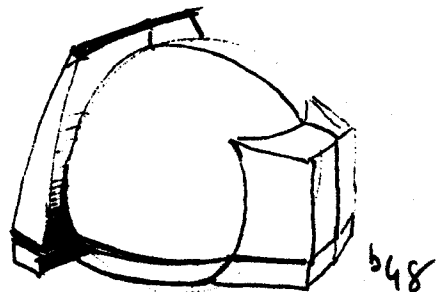
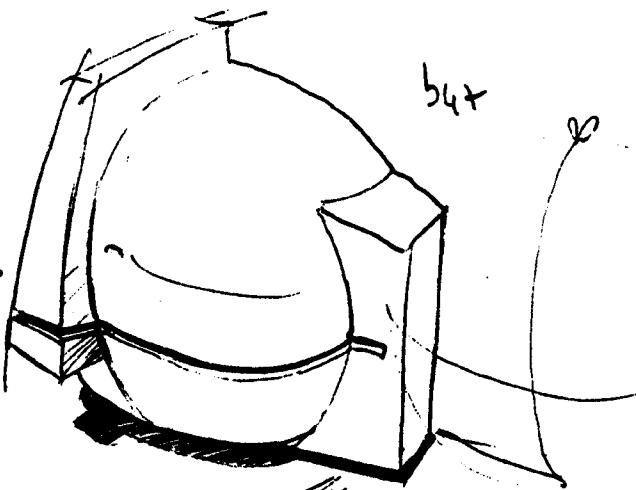
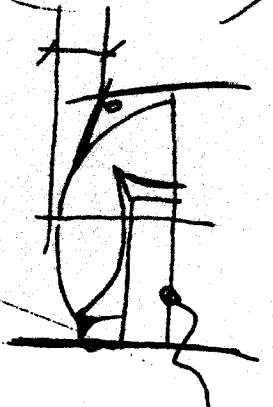
b43

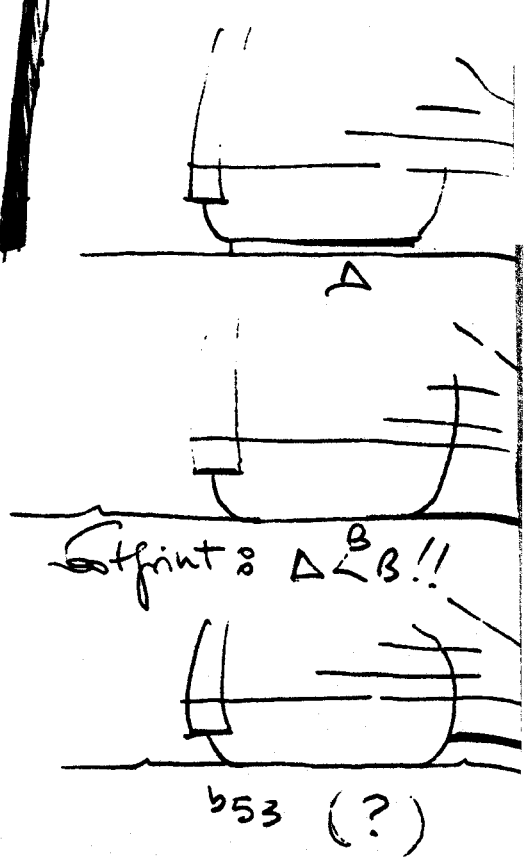
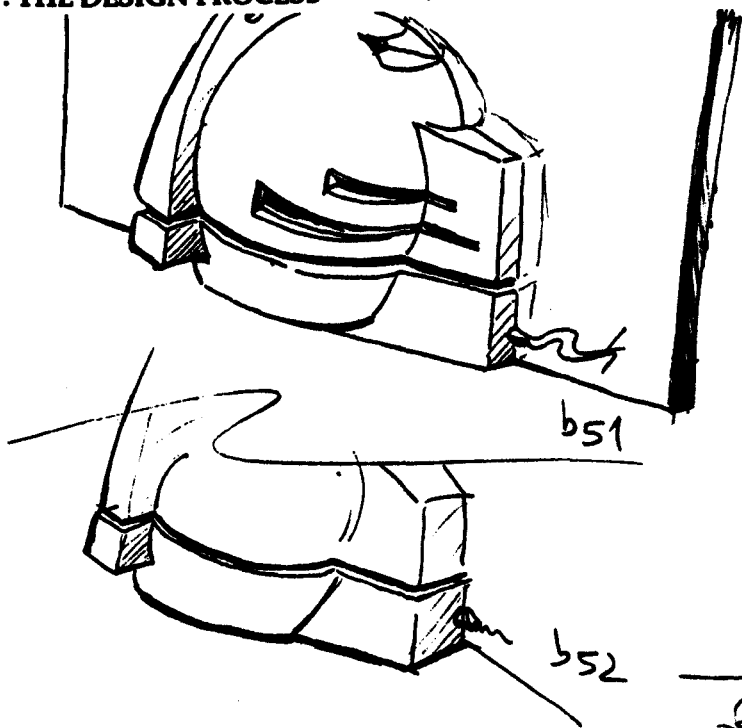


b43

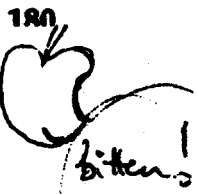


less & less horizontal ?

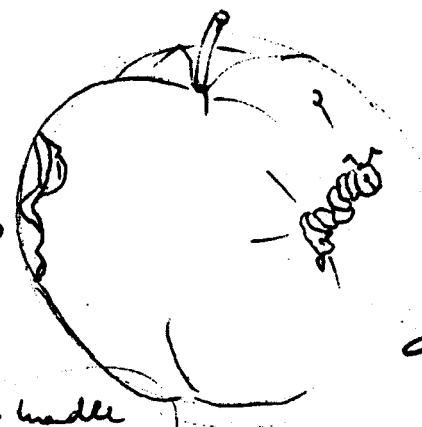




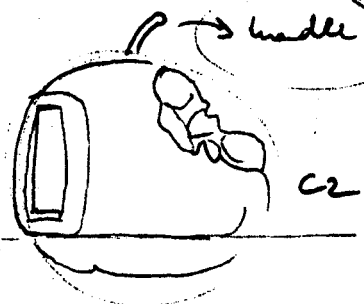
APPENDIX : THE DESIGN PROCESS



- empathy -
- Apple -
- challenge -
- religion -
- dynamism (Antenn?)
- young -
- compatibility -
- suitable -

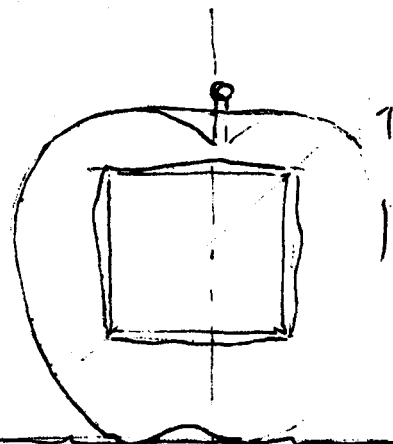


C1

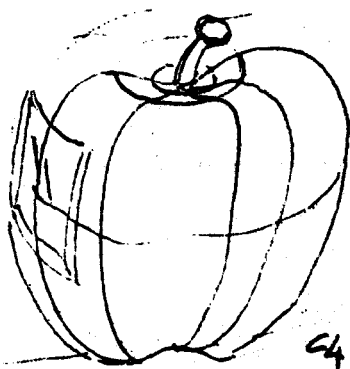
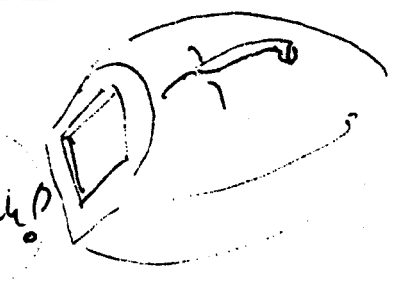


C2

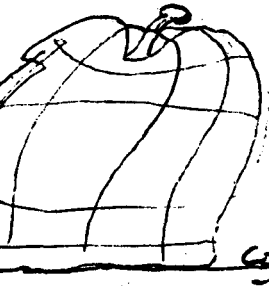
empathy!



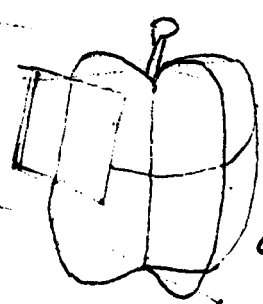
↑ 7/8 inch? C3



C4

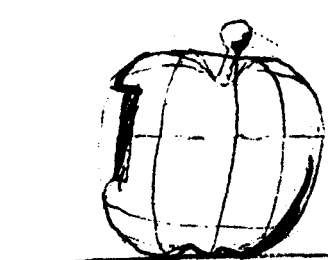


C5

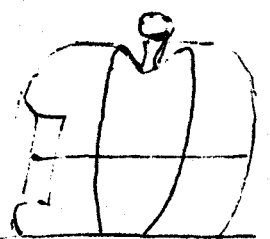


C6

4 feet!
or more



↑ soft!



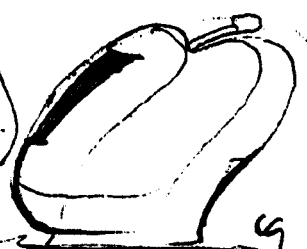
C7

out!

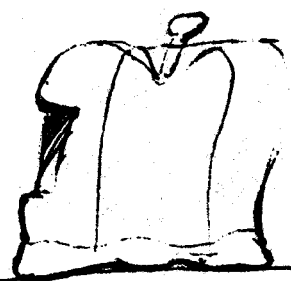


C8

(TENSION = EXPRESS.)

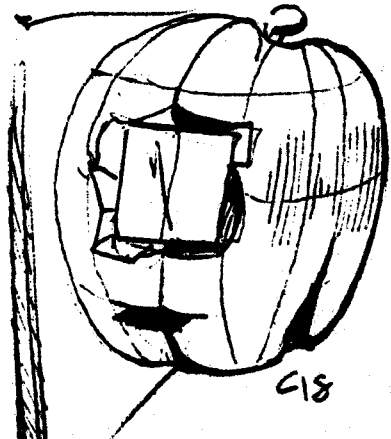
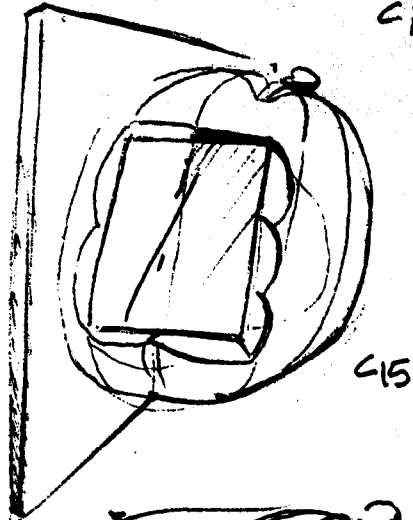
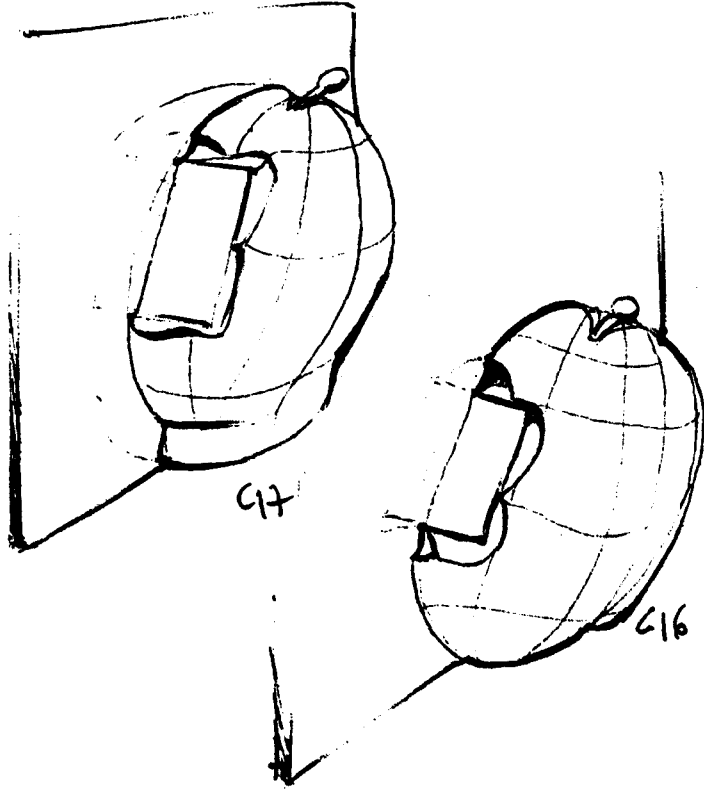
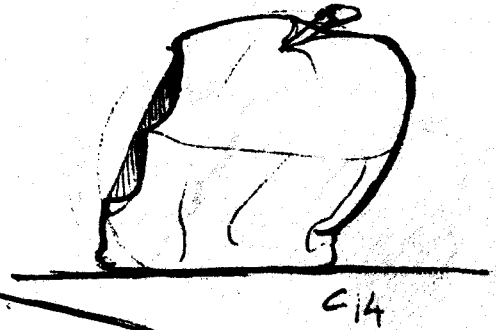
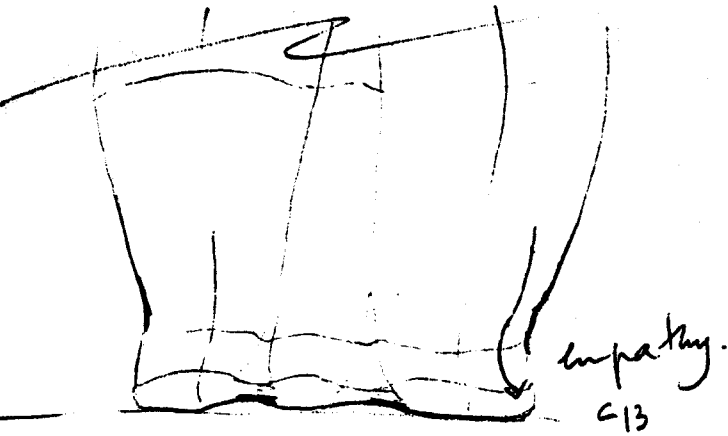
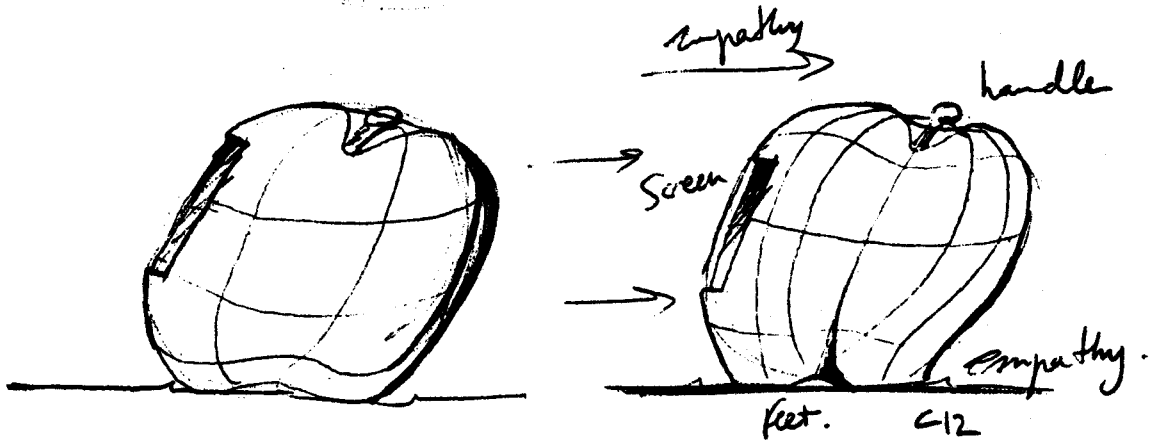
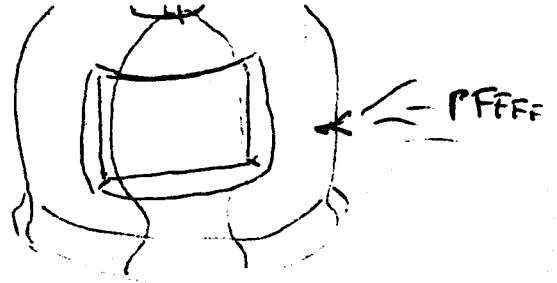
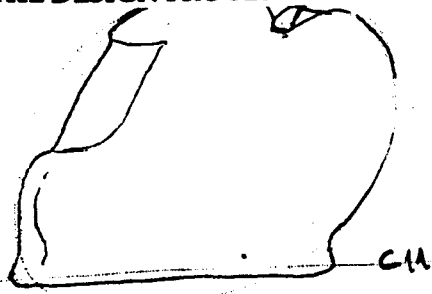


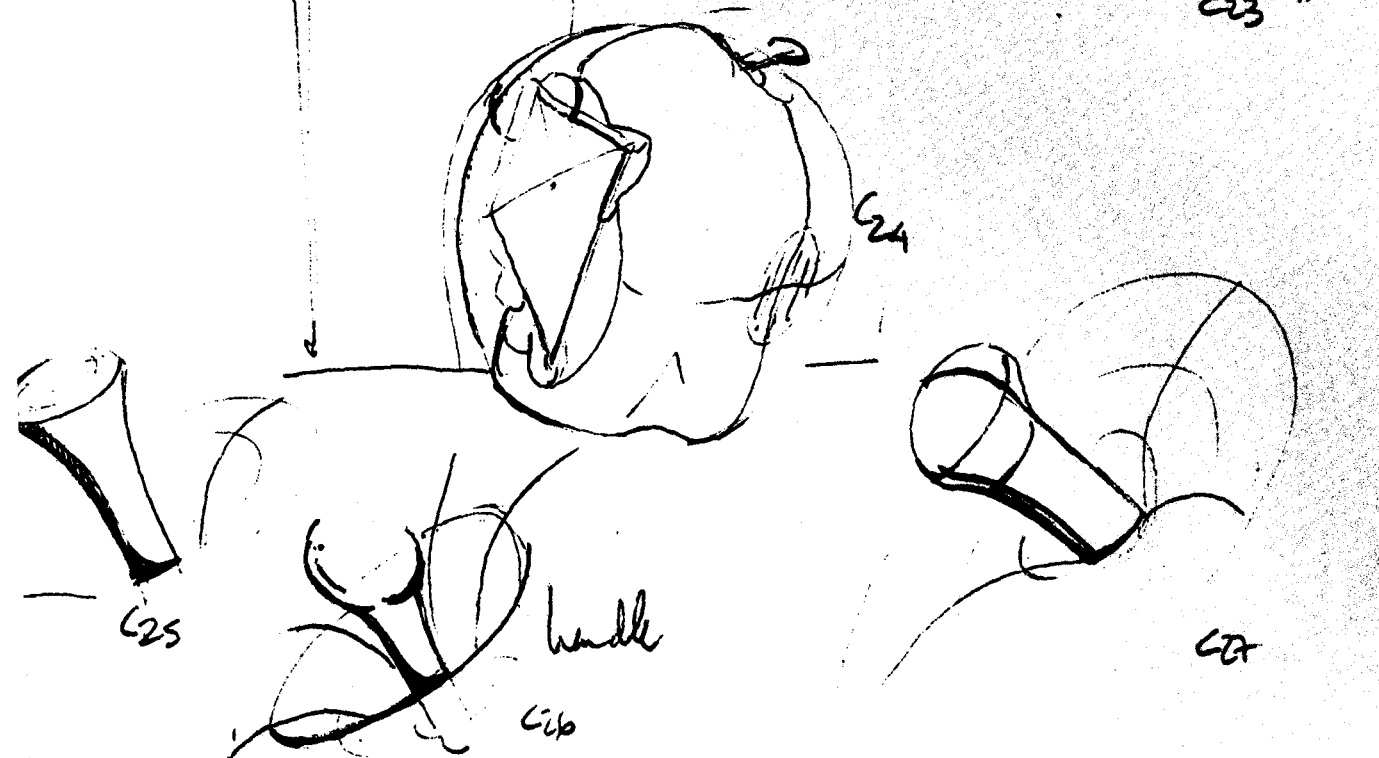
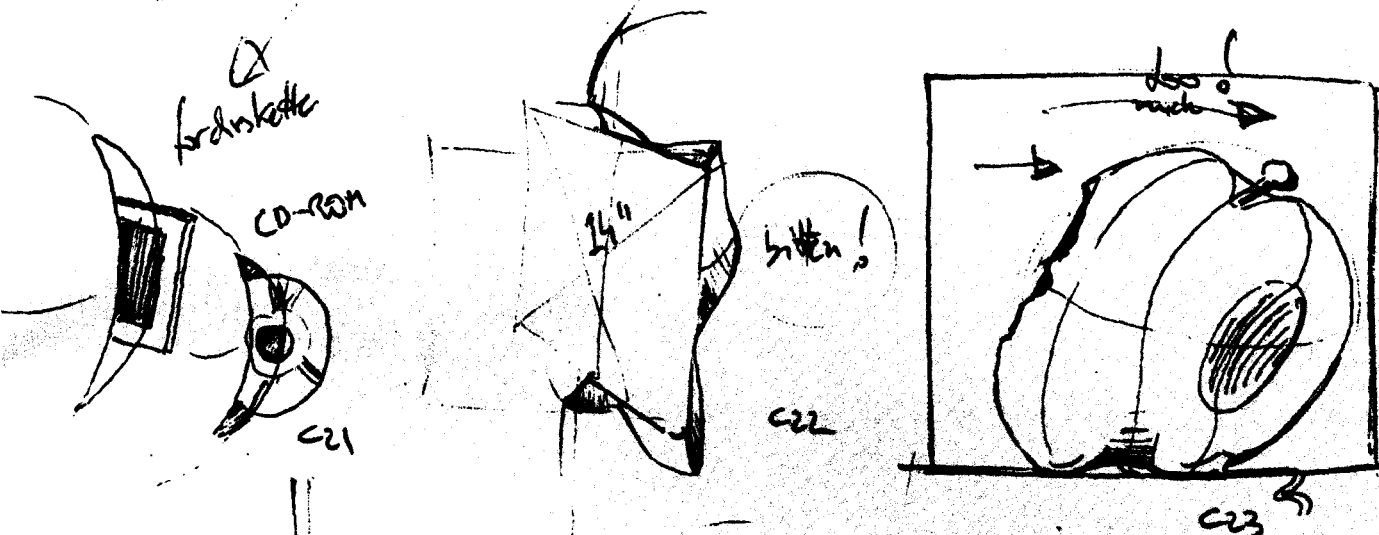
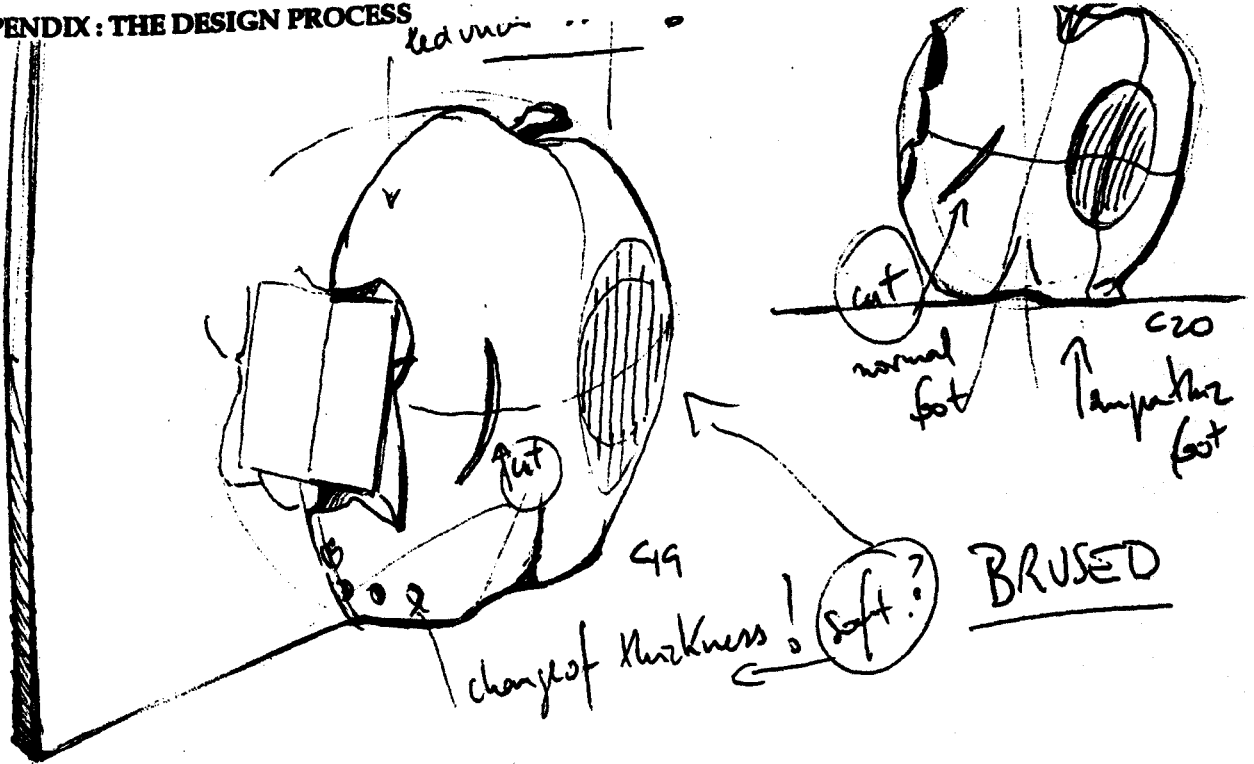
C9

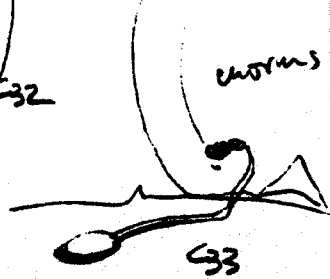
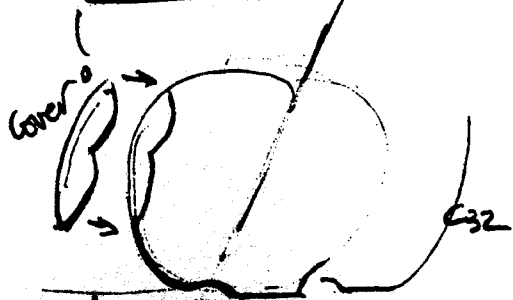
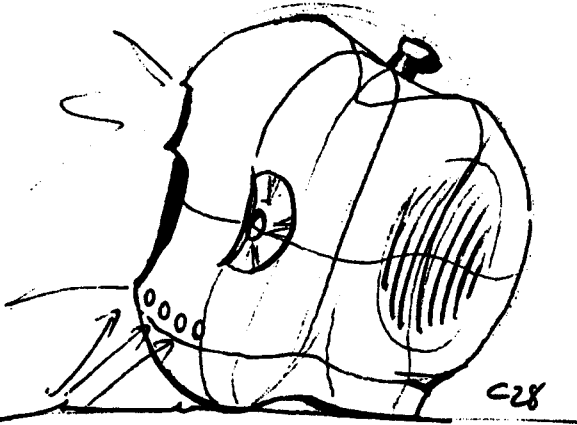
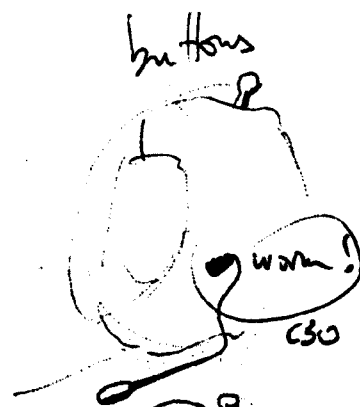
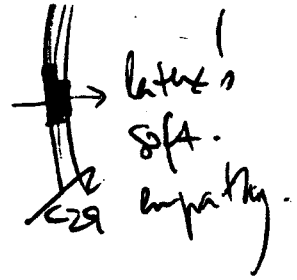
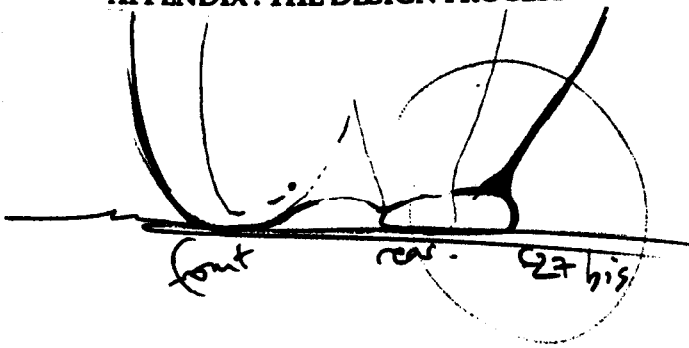


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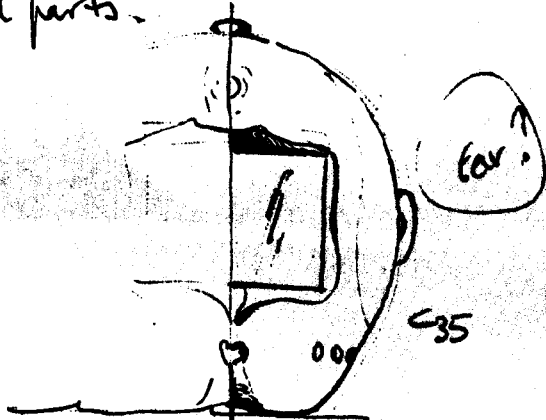
↑ tension!



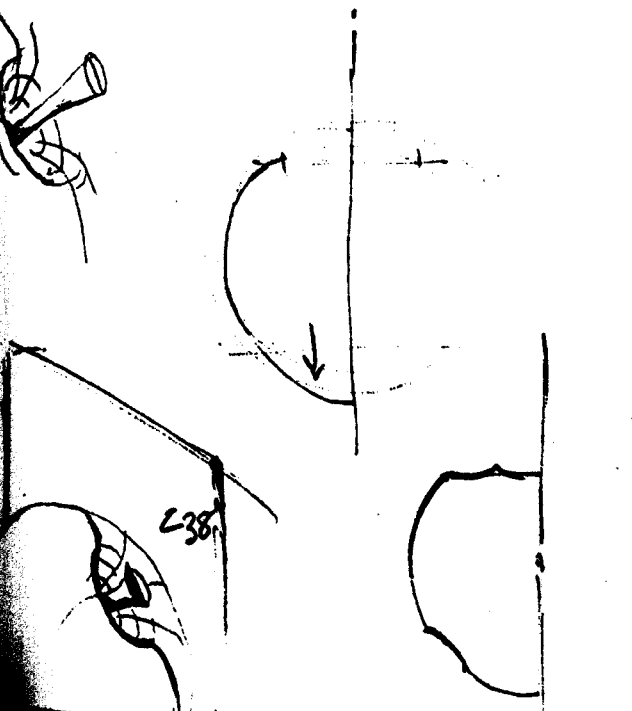
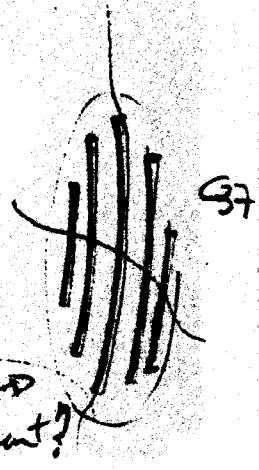
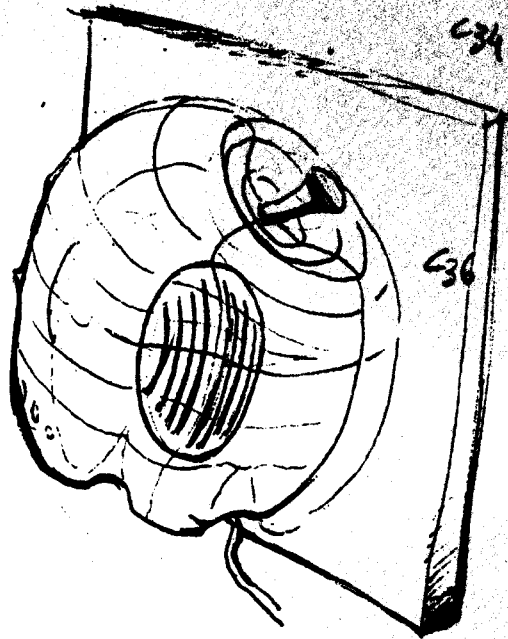
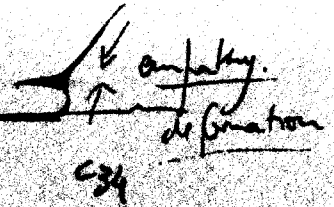


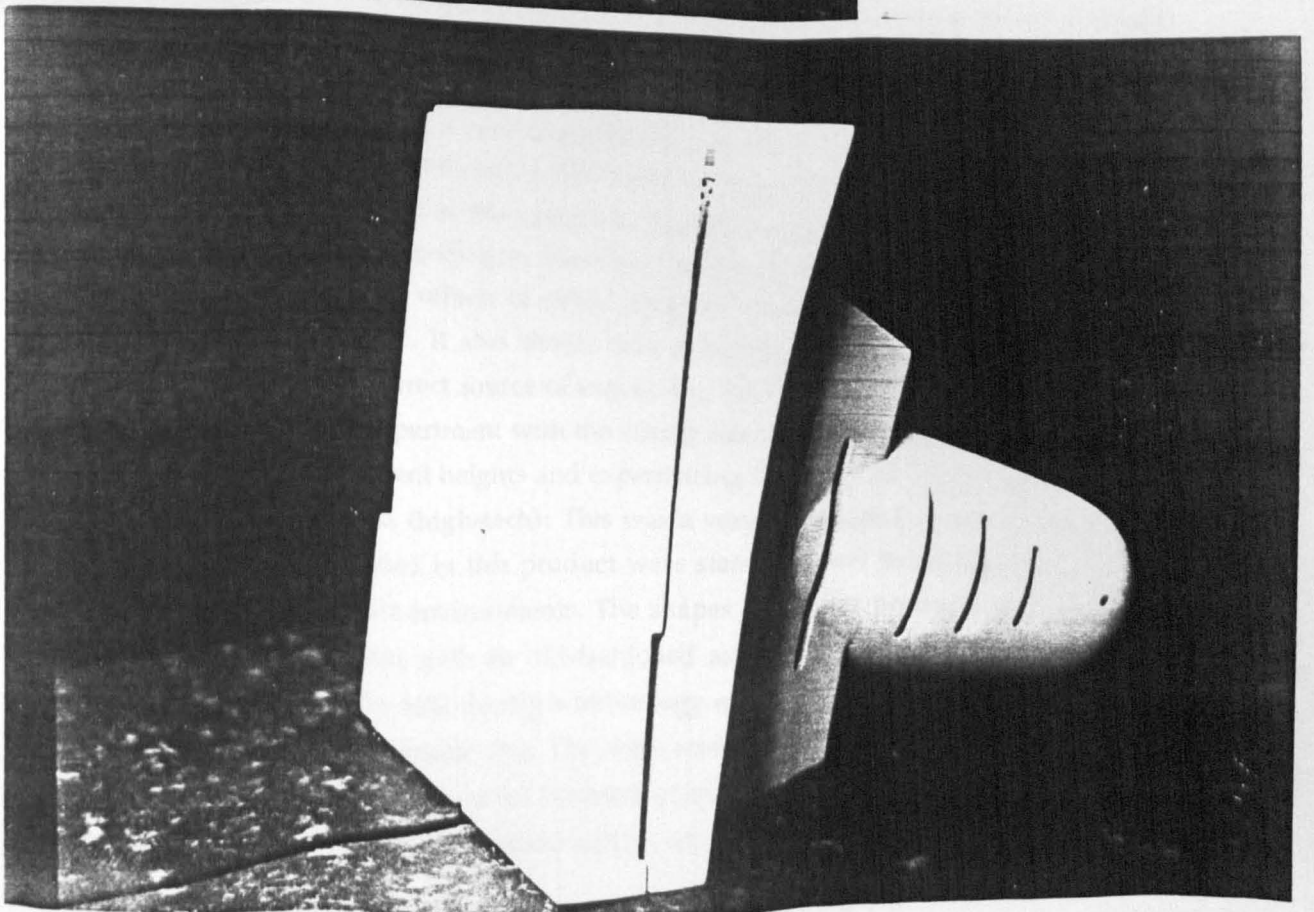
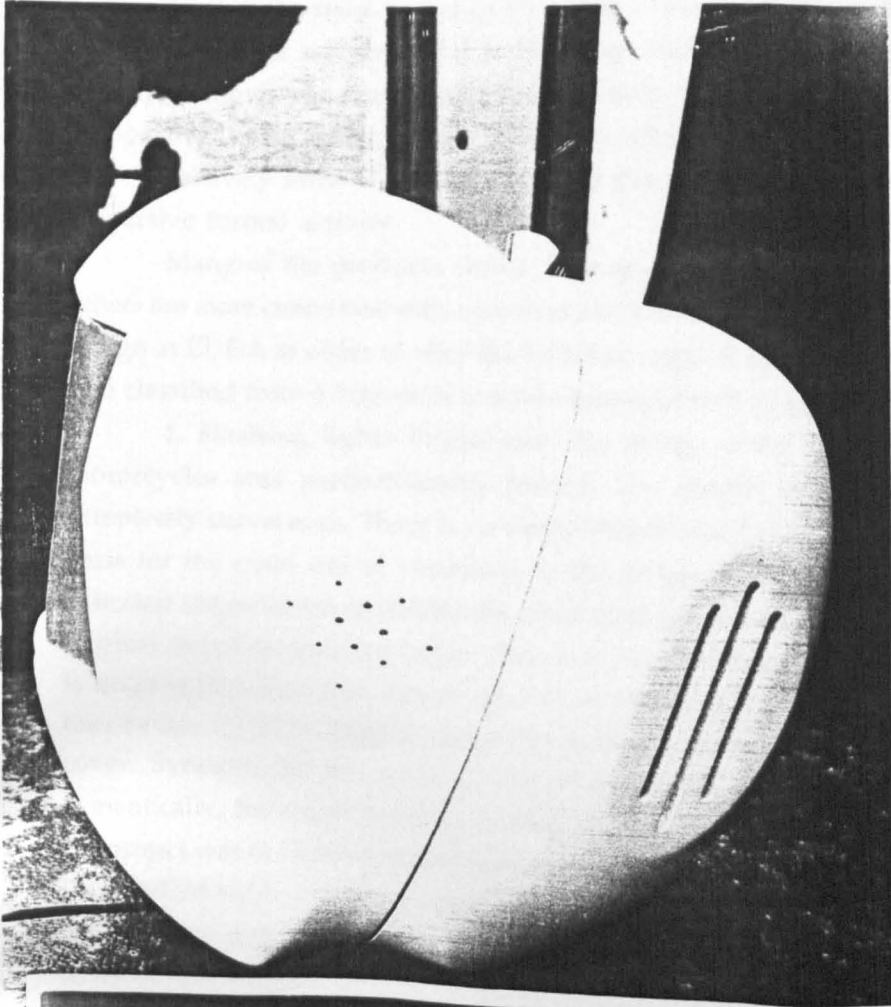


more brused parts.



bite = byte.





Introduction

During the short period of two years I have been able to design some products for a variety of market segments. For some design studios, this is a privilege in various aspects. Mainly, it allows you not to specialise too much in a niche market and to have a very broad perspective of the design process. It is now, after two years of practising that I can observe more objectively some of the real emergent theoretical aspects of the Product System and its discursive formal activity.

Many of the products shown here are more related to transportation design while others are more concerned with consumer electronics and furniture. I want to show 10 products design at EDDA in order to offer the broadest scope of application in real products. These are also classified from a high-tech to a low-tech approach to the design process:

1. Flashing lights (high-tech): The design of the group of four flashing lights for motorcycles was predominantly formal. The shapes are essentially organic, soft and completely curvaceous. There is no single straight line in this design and this, in fact, was the basis for the main use of variations in the project. The partition line is a cut in the main spherical shape which embodies the small bulb and the optics inside which provides a lot of implicit *movement* and *dynamism*. *Closure* is the main variation and this is because the object is divided in a way that *closure* also let us to emphasise not only functionally but formally the obvious *ANTITHESIS* between the *marked* main black body and the yellow *transparent* cover. Syntactically the work of allocating all the elements inside was a real problem. Semantically, the shape provoked some interesting emotive responses, bearing in mind that the project was to shape a simple protection for the bulb. The use of *closure* may also lead to a *PARANOMASIA* considering the important difference (only in functions) between the two main objects and a subsequent *SYLLEPSIS*. As a whole, this highly constrained project in terms of standards and product feasibility left us some space to produce some formal discourse (fig. 1).

2: Dashboard (high-tech): In this project we were able to produce more visual discourses although we also had a very constrained brief. The main work of variations was set to play again with the effects of *closure*, but this time leaving important gaps between the different groups of elements, that is, the upper box of indicators in respect to the speedometer, or the locking device in respect to the previous boxes and so on. So, from the external shape of the object the inner shapes are offsets of every group of the internal elements. It is a clear example of the variation of *fit*. It also shows how something that emerges (*relief*) from a shared surface can become a direct source of expression. This effect of *closure* generated by a formal *subdivision* led us to experiment with the strong effect of the *ELLIPSIS* by placing the elements of the object in different heights and experiencing the effect of empty spaces (fig. 2).

3. Smart Card System (high-tech): This was a very challenging product in different levels: the electronics embodied in this product were *state-of-the-art* technology that had to be tested in the most difficult environments. The shapes of similar products were box-like objects of difficult interaction with an old-fashioned aspect. The product challenged the pragmatic of consumerism by introducing a technology which pretended to eradicate the use of normal currency by a rechargeable chip. The *shape* was thought to be the most comfortable for a hand and very easy to carry on for different purposes such as quick transactions like buying *take-away* food, buying newspapers, in bars, etc. The *shape* was designed to provoke

as much *empathy* thanks to applying big radius in its external edges. Moreover, the inner elements were allocated not to spoil the purely geometric contour of the product, a task which was impossible until we had to produce some external *deformations* in the bottom in order to place normal AA batteries inside. We could say that the bottom of the product has another treatment and that could be explained in rhetoric terms since there is a strong *difference* and *fit* between both segments. While the half upper segment has no constraints but the obvious interface with the electronics, the lower segment has a lot of functional and problems as regards space available. But we did not seek for rhetoric discourses there. The design of interfaces such as the screen, keyboard and the slot for the card were designed differently, with more *geometrical* and *similar* shapes. The formal intersections between these elements and the main *shape* led to the use of *closure* as a means for formal bridges. This effect was also supported by assuring as maximum *constancy* in every attribute. This helped us to produce a strong *ANTITHESIS* between the two main environments: external shape and electronics.

In addition, we produced a false partition line in the surface of the main ellipse which became a *subordinated form* of the external *shape*. It was also designed to provoke a strong *ANTITHESIS* by polishing the surface surrounded by this partition line while the external was *textured* for better grip. The partition line is a very organic *shape* that seems to squeeze this electronic aspect of the product as if technology had to be limited in this product. The choice of colours was also thought to show this product as something more attractive, touchable and even fun. In general, it is a *METAPHOR* of a warm technology, similar to the design of the apple for Apple Macintosh (fig. 3).

4. Can holder for train/bus seating: The can holder is composed of a support that hangs on the back of the seating, a cover which becomes a surface of support and a cylindrical balcony to hold a can, a glass or a cup. The cover pops out from the chair and the balcony follows the inclination in order to hold the can. The system also included an anti-vandal system. The *shape* suffered a lot of formal modifications, not to mention the functional and engineering considerations. At the end, we were only able to experience the play of *ANTITHESIS* between the overall shape (generated by highly complex surfaces to avoid the shape of a rectangle) and the diversity of mechanical elements that allowed us to put the fingers (specially those of women with long nails), to support the bottom of the can, etc. The main contrast can be seen in the visual play of surfaces and edges of the cover which were designed to be chamfered instead of filleted. We also had the opportunity to experience the repetition of small design actions which can barely be seen but they give an overall treatment that usually changes radically the aspect of the whole. This is a matter of *ANTANACLASIS* and is normally supported by edges, radius, thin walls, holes, etc. Altogether was expressed in terms of high *dynamism*, *tension* but with a friendly interaction, warm touch and enhanced pragmatism (figs. 4 & 5).

5. Electronic regulator for motorcycle (medium-tech): The group of products (3) are distributors of electricity from the battery to other devices such as lights. One regulator functions to this purpose but, depending on the number of electronic devices in the motorcycle, the distributor must be bigger. Considering this, we were asked to create a family of three products that, although they were different in size, performance or shape, they could be recognised as a range of products. These elements are also hidden and rarely visible unless one has to do a major reparation. Notwithstanding this, the client asked us to apply as much

design as possible.

The two bigger products played with a number of rhetoric functions. The thin walls of the regulators are meant to disperse accumulation of heat when the electricity runs through it. These walls must have an important amount of surface so air can cool effectively a possible overheating. While this degree of surface is important, the shapes of these are not. Thinking on heat, overheating, air, flow of electricity and others we gave them the *shape* of a wave. The distribution of these walls are essentially a rhetoric struggle based on *METAPHOR*, *GRADATION*, *REPETITION* and a combination of *INVERSION*. The shapes of the three products follow always the same *METAPHOR* of the wave, the flow of electricity or the patterning of a fluid. In doing this, the third small product resembled the expansive effect of a focus of electricity or other which in its very centre had the inclusion of *mythography* with the logo of the company (fig. 6).

6. Dashboard (medium-tech): The use of *empathy* was determinant to give to the support of the speedometer and other indicators the main *shape*. The way in which the main six indicators were placed was purely *geometrical* but how we placed the whole group in the upper part of the dashboards was done in order to provoke a *deformation* that could trigger some emotive responses with a sense of *relief* and *empathy*. The product had not much rhetoric activity because it was simply reduced to contrast a bit the circular shapes of clocks, indicators and led but we also wanted an implicit movement with the curvaceous *constant* contour of its *shape*. There is, therefore, a subtle *ANTITHESIS*. In addition, the design of the speedometer and gauge we tried to use the effects of *transparency* by showing a sort of landscape behind the lettering (fig. 7).

7. Termination for a tubular structure (medium-tech): In the line of the production of formal *METAPHORS*, we designed the termination of a rectangular tube for a system of tables for schools. The design of the table bore in mind that the product had to support the most aggressive erosions and treatments from kids and adolescents. The termination also placed the product in the field of scholars so the main *shape* became the claw of, for instance, a lion. The *shape* has *weight*, it also has *volume* and as a whole becomes a *METAPHOR* that included *mythography* with the logo of the company. In addition, with the inclusion of *texture*, *colour*, *generous radius*, organic shapes this termination-claw became something more warm, touchable and less aggressive than a real claw. This initial *ANTITHESIS* led to a potential *IRONY* (fig.8).

8. School furniture (low-tech): For the same client we designed another complete system which exemplifies better our approach to school furniture. The complete project would take me a lot to explain but only to comment that there was a very innovative technological system for the finishing of the edges of the melamine surface and that this school furniture had to include sizes for up to four groups of ages. The *colours* were as soft as possible either in the tubular structure and the wood and this was to avoid visual stress after five-six hours studying at school.

The *shape* of the tubular structure of the chair and the table prepared the overall discourse to an obvious *ANTITHESIS* between the straight lines of the front curves and the back ones. This rhetoric effect is emphasised by the tendency of the curves to the variations of *flexion*, *gradation* and *movement*. The element of the corner is a clear example of the use of *closure* not only because it follows the radius of the edge but also the geometrical *contour* of

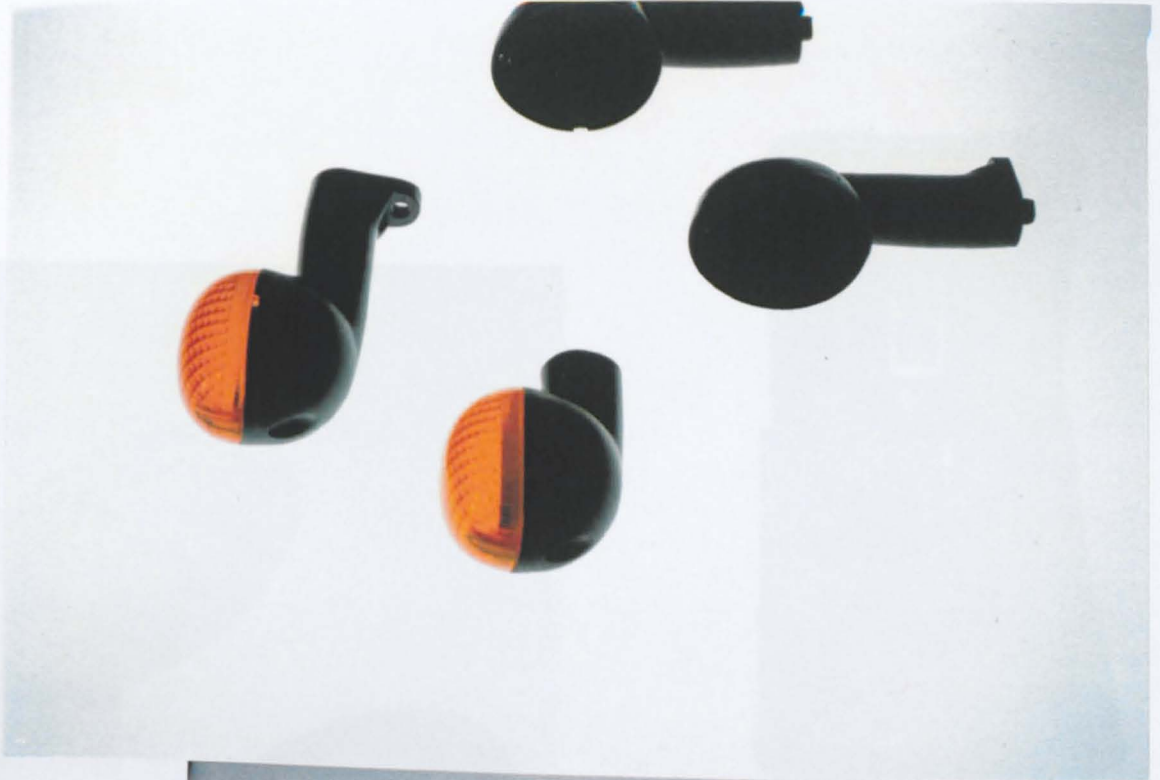
the table. These protections have become one of the most visible discursive facts of the discourse which encompasses the general subtle play with different finishings, colours, textures and materials (fig. 9).

9. Strap (low-tech): This strap was part of a more complete project which was the design of a high-chair for kids. This chair included belts, a table for eating, wheels, etc. These elements were all designed from a child's perspective rather than from the parent's one. So, all the objects were funny, with animal shapes, with saturated colours and warm materials.

This is a strap that prevents the kid from falling down and is placed in the front of the chair. It is tied up from the bottom of the chair to the top of the table for eating thanks to a slot that lets the head of the animal to show up. The kid has another funny element in the front. The head of the strap is designed so an adult's hand can pull it up comfortably, so pragmatism is assured. It is a clear *METAPHOR* of an animal that, in addition to the curvaceous *shapes* of the head, contour, colour, quality of material and *transparency* provokes important doses of *empathy* and *humour* (fig. 10).

10. Sideboard (low-tech): This hand-crafted product was designed to mark a contemporary tendency which seeks for funny shapes in furniture. The idea was to find soft, funny *shapes* to provoke as much *empathy* and possible. We used an important effect of *flexion* in the legs which also *deformed* the main shape of the sideboard, The organic shapes of the handles are also repeated in the bottom of the drawer and this drawer is cut so *closure* is also used. In this way, there is some movement and dynamism that is not normally observed in this kind of products. The sense of weight in the top also explains why there is a sense of deformation in the legs can be a *LITOTES*, so we create a clear effect of animation which leads to a potential *METAPHOR* and an *IRONY*. The effects of the *REPETITION* of the curves also becomes a matter of *SYLLEPSIS*. Moreover, the idea was to produce emotions and dynamism to a product. The *ANTITHESIS* between the metallic handle and the quality of the wood pretended only to give the product the highest quality of finishing (fig. 11).

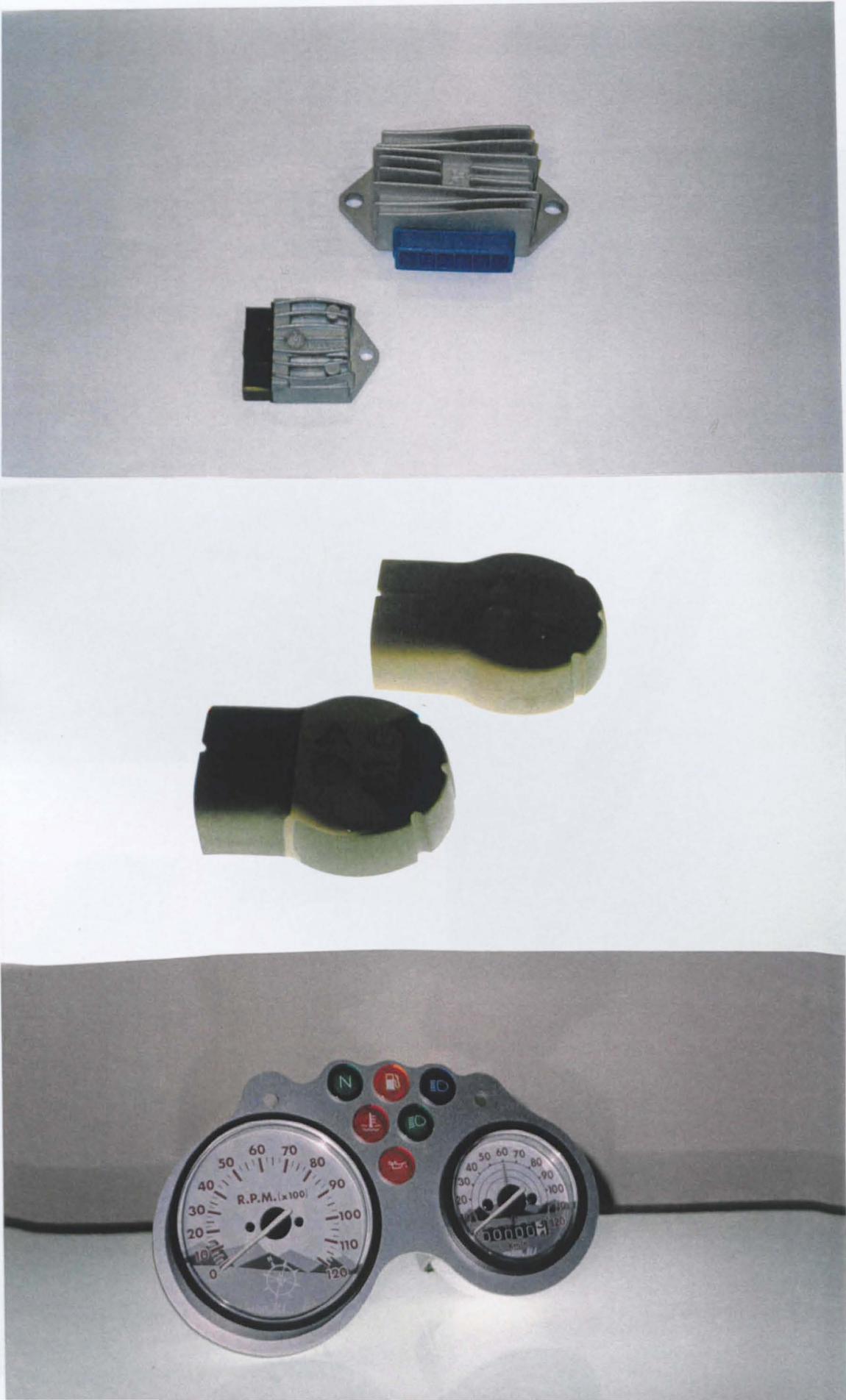
Figures 1 & 2



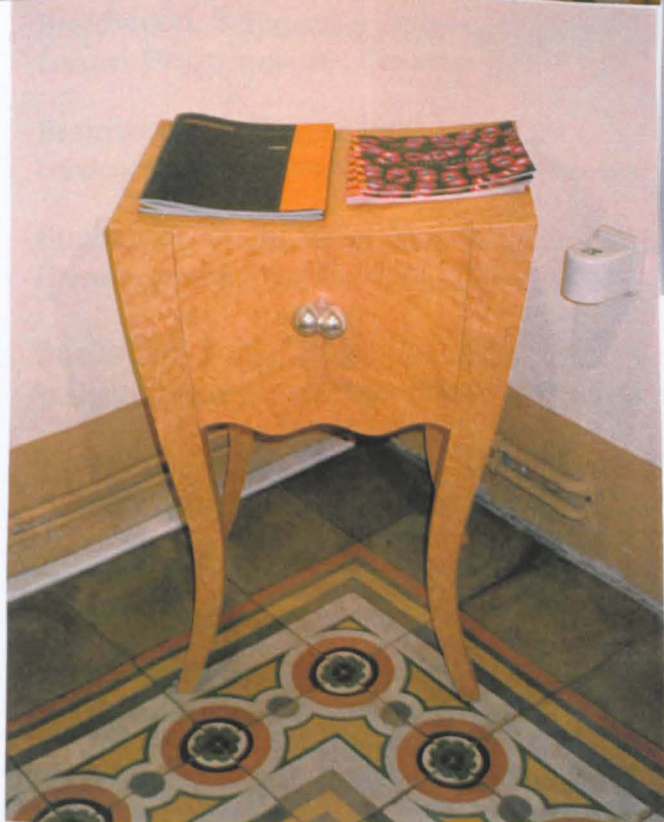
Figures 3,4 & 5



Figures 6,7 & 8



Figures 9,10 & 11



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