Contemporary Furniture Design: Exploring the Iconography of a Technological Aesthetic.

(Peter Radomir Joseph)

by Mr. Peter Prasil, BFA (Hons).

Submitted in fulfilment of the requirements for the Degree of Doctor of Philosophy.

University of Tasmania, October, 2000.

Declaration of Originality:

This Thesis contains no material which has been accepted for a degree or diploma by the University or any other institution, except by way of background information and duly acknowledged in the Exegesis, and to the best of my knowledge and belief no material previously published or written by another person except where due acknowledgment is made in the text of the Exegesis.

P. Prasil

Statement of Authority:

This Exegesis may be made available for loan and limited copying in accordance with the *Copyright Act 1968*.

P. Prasil

Abstract:

The project explores the implications of preceding and diverse new technologies, as applied to furniture and object design, and researches new and innovative applications to contemporary design.

The central theme of the study is to find a way to humanise our ever advancing technological age, to counterpoint the vast sweep of mass markets and mass production, through the rediscovery of craft in conceiving and making of the objects we use.

Coming to design from a technical-engineering background, my work is influenced by the morphological aspects of technology with an emphasis on techniques and workmanship. The work is related to the Machine Aesthetic and styles like Streamlining and Biodesign.

The forms, while attempting to express specific signs of the electronic age, recall the iconographies determined by preceding styles or movements.

However, the work, except for its execution is not serious. Rather the conceptual idea, being a parody or even a travesty of Ronald Reagan's 'Star Wars' "Strategic Defence Initiative".

It is an interpretation of the sociological, sociopolitical, symbolic and morphological aspects of technology, providing historical context by defining and detailing a body of work embedded in the machine aesthetic.

Acknowledgements: I would like to thank my supervisors; Mr. John Smith, and Mr. Kevin Perkins for their support and guidance; Associate Professor Jonathan Holmes, and Ms. Patricia Scott for editing assistance.

I would also like to thank; Mr. Philip Blacklow and Mr. Michael Knott for technical advice; my fellow candidates; Mr. Jirawat Vongphantuset, Mr. Steven Hudson for much appreciated computer help, and Mr. Anthony Sullivan for laying out this exegesis.

Table of Contents:

Introduction:

I came to design from a technical background. Before I commenced these studies, I had completed a four year toolmaking apprenticeship followed by ten years in the engineering industry. As a result, my work is strongly influenced by technology. The central theme of my research has been to find ways to humanise our ever advancing technological age, to counterpoint the vast sweep of mass markets and mass production, and also to rediscover craft in conceiving and making the objects we use.

The project has aimed to explore the implications of previous and diverse new technologies as applied to furniture and object design.The research project creates new and innovative applications in contemporary design. It is loosely centred around the morphological aspects of technology and engineering with emphasis on technique and workmanship.

We are living in a society where our immediate visual environment is dominated by the products of industrial methods of manufacture. In our homes and workplaces, in schools, factories, offices, shops, in public buildings, streets and transport systems, these products constitute the visible cultural landscape of everyday life, comprising in their totality a complex pattern of function and meaning in which our perceptions of the world, our attitudes and our sense of relationship with it, are closely interwoven.

Objects have become a channel by which we communicate to others information about our values, our status, and about our personality. The possession and use of those objects that surround us, carry cultural and social meanings. As Tony Fry has argued in Design History Australia.

> "Design, like the other material fabric of the social construction of meaning, operates with conventions, codes and signs at every moment of material existence. Thus, function, appearance, fiction/ideology are all constantly in play"[1]

Usually we proceed on the basis of the existence of an object as material essence, but as Tony Fry points out above, we can never know objects purely as material. Their meanings come as a multitude of forms, practices, processes and historical circumstances. As objects they exist in sign systems, in language, therefore, they are coded.

1. Fry, T., *Design History Australia*, Sydney, Hale and Iremonger, 1988, p.19

To know them they first must exist, in some form in our imagination before any material encounter. Only then can we decode their meaning by reading the clues provided by the wide range of forms of that we have some historical knowledge. Thus, we come to an object within a historical knowledge, which allows recognition, cultural placement and the comprehension of use.

Our imagination also plays a role, since imagination takes an object through a range of desired uses, projections or rejections in many environmental settings, social relations and different forms of aesthetic style or fashion. Objects also operate as instruments in the process of economic and social regeneration or degeneration, and at the basic level, they have uses in the sphere of utility and pleasure.[2]

My work draws on contemporary industrial design and some of the qualities found in the objects of today's mass production methods, but through the alternative of a craft approach. In Chapter One of the exegesis I discuss the transition of craft from pre-industrial times to the mass-production of the early 20th Century. The work is related to the history of a Machine Aesthetic

2. Fry, T., 1988, p.p. 55-56.

and the Machine Age that followed this industrial development which is the subject of Chapter Two. I approach my work through craft where the techniques used and a high standard of workmanship play central roles, these issues are discussed in Chapter Three. The visual forms of my work directly draw on the historical style of Streamlining, and in Chapter Four I describe this historical style.

The major part of the thesis, an installation entitled 'SDI' is a parody of Ronald Reagan's 'Star Wars' Strategic Defence Initiative, coupled at times with my obsessive attitude towards new technology and machine aesthetic is the subject of Chapter Five. It draws on the sinister aspects of military technology. The remainder of this last chapter is a description of individual objects within the whole body of work.

Chapter One: 'From Craft to Mass Production'.

Applying art to everyday objects is a very old theme. But since the Industrial Revolution it has become a topical theme, in particular during the second half of the nineteenth century after the polemics of William Morris and John Ruskin and the Arts and Crafts movement against the growth of mass production. Morris argued against the industry of his time that produced bad taste and bad quality products, in contrast with the craft production, which in his opinion was more spontaneous, of higher quality and more attuned to the artistic and cultural aspects.[1]

Although industrial design and production has its roots in the craft tradition, the pattern of its emergence has not been a linear evolution from handwork to mechanical production, and consequently design has become separated from the act of making. In craft production, conception and realisation are linked and coordinated by the interplay of eye, hand and

1. Adams, S., *The Arts and Crafts Movements,* New Jersey, Chartwell, 1987.

materials. The entire process can be accomplished by one person, disguising its complexity, giving it a human scale and apparent simplicity that allows it to be experienced by both practitioner and observer as a comprehensible unity. In mass production this coherence is fragmented, and the complexity of conception and making is subdivided into a series of specialised activities. The processes are interlinked, but the relationship is often perceived as remote and impersonal.

The separation of design from the processes of making emerged before the Industrial Revolution, in the late medieval period when early Capitalist forms of production began in Europe. The growth of trade in the medieval period was a crucial phase towards specialisation. In the cities of Western Europe, such as Florence, Venice and Nuremberg, large workshops were developed to cater for the sophisticated tastes of Courts, churches and rich merchants. Though traditional skills and techniques still predominated, they became more specialised. Many objects of the same type were made and the process of production was essentially the repetitive duplication of existing craft methods. Much of the work produced by these craftsmen was of a high level of skill and artistry, and the boundaries between artists and craftsmen were fluid, depending upon the degree of achievement

2 Hesket J., *Industrial Design*, London, Thames and Hudson, 1980, p. 11.

based on a common training and technique, rather than on differences in the nature and type of activity.[2] The continuing expansion of trade and commercial opportunities and the growth of production created competitive pressure, that, in turn, led to demand for innovation, and for some characteristic feature to distinguish a product and attract the interest of customers. In the sixteenth century, in Italy and Germany, the first designers began to cater for that need with pattern books. Those books were collections of engravings produced in quantity by the new mechanical printing methods, illustrating decorative forms, patterns and motifs, intended for textiles and cabinet making. The pattern books contained designs that could be applied repetitively in a variety of contexts. Their significance was that a designer, by publishing in this form, was divorced from any involvement in the means by which the patterns were applied and used.[3]

The delicate porcelain imported from China in the seventeenth century was superior to any ceramics produced in Europe at that time and had such appeal in court circles that it stimulated research to discover the secrets of its production. Porcelain production was initially intended for the courts, and the emphasis in design was on artistic quality and exquisite craftsmanship irrespective of cost. The subsidies required to support its production were a heavy financial burden, and

3. Hesket J., [1980], p. 11.

by the mid-eighteenth century new commercial markets were sought to offset the operating costs. The newly acquired tastes for tea, coffee and cocoa among the growing middle classes led to an extension of the use of porcelain and a change of emphasis in design from artistic exclusivity to commercial acceptability. Consequently the artistic quality of work deteriorated under the pressure of large scale production.[4]

In some respects, the factors influencing design in Britain in the eighteenth century were somewhat different from those prevailing in Europe. It was a rich period for pattern books and many leading artists provided designs for a variety of objects. The major difference was that many of the famous names closely identified with designs and products of this period were not artists or designers, but commercial entrepreneurs and innovators such as Chippendale, Wedgewood and Boulton.

Typical were the developments that took place in production of what was known as `toys', the staples of metal trade, such as buttons, buckles, mounts and clasps. In the mid-eighteenth century, manufacture was still based on traditional methods and a network of small workshops, although a high degree of specialisation

4. Hesket J., [1980], p. 12.

existed in the various stages of production. Matthew Boulton, who inherited his father's business in 1759, produced more cheaply than his rivals by introducing a large scale production based on mechanised means of manufacture. He purchased a site for a factory at Soho and erected large workshops adjacent to a stream for water-powered machinery. By the time the Soho Foundry was completed in 1766, more than six hundred men were employed.[5]

During this period although aesthetic values were important, they were subordinate to commercial viability. Designs were predominantly from outside, that is from artists and publications providing forms, patterns and motifs. Designs were applied to the process, not derived from them.

It was in the nineteenth century, as the Industrial Revolution gathered momentum, that the rift between design and production became most apparent, but the process of industrialisation did not always involve fundamental changes in production technology.

In some industries, such as textiles, mechanisation resulted bringing dramatic changes, in others large production was introduced, but techniques remained based on handwork. The furniture industry, for example, saw the development of many large firms,

5. Hesket J., [1980], p. 13.

but they did not introduce mechanisation on a large scale until the twentieth century.[6]

The Industrial Revolution not only transformed traditional crafts, but, as the speed of technical innovation increased, many new industries were

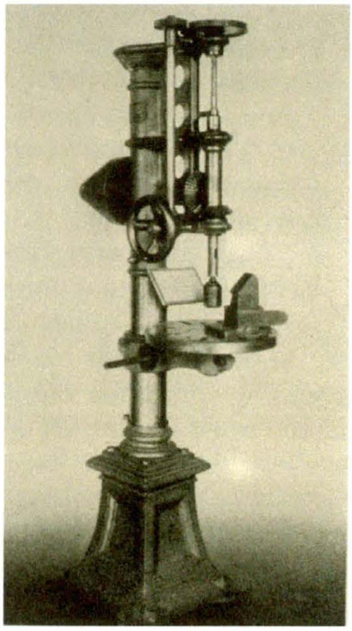
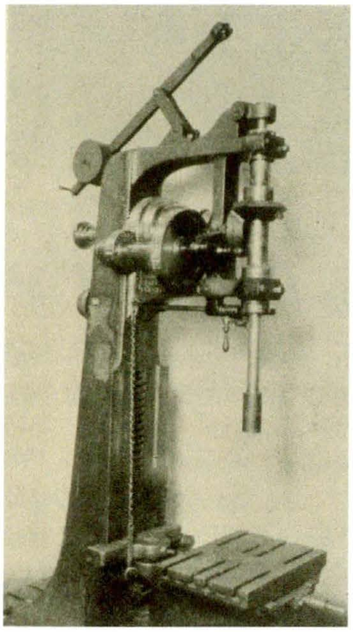



Fig 1.
(left) Drill press, Pre-American Civil War.

(right) Withworth Drill press, mid-Nineteenth Century

established that applied mechanised processes to the production of new forms. However, they were often so heavily decorated that one hesitates to refer to them as utilitarian. At first Gothic and Classical ornament, then Victorian rococo ornament was used whenever possible in designing products and machines. There were some exceptions, such as the designs by Sir Joseph Withworth, which were simple and functional. (see fig. 1.) He exhibited his machines in the London Exposition of 1851, at the Crystal Palace. They received no more approval from the designers of the day than the Crystal Palace did from the architects.[7]

6. Hesket J., [1980], p. 18.
7. *Machine Art: 60th. Anniversary Edition Catalogue* M.O.M.A.,(1994).

Although William Morris, the great reformer of (what was then called) the minor arts, hated the machine, it is said that it made him almost physically ill to look at the Crystal Palace, which he visited as a young man. His whole life was devoted to a crusade against the machine and for the ideals of art in everyday objects, and art created by the common man himself. Parodoxically it was Morris and other members of the Arts and Craft movement who set the scene for the emergence of the machine aesthetic in the aftermath of the First World War. The arts of Europe at that time had become sterile adaptations by indifferent craftsmen of Classical and Baroque forms. Morris and his followers turned design in the arts toward simplicity and originality, although Morris himself believed that he was reviving the Gothic style.[8]

The English Arts and Crafts movement reached its greatest heights in the 1890's in the work of Voysey, MacIntosh and Baillie Scott. But it was not acknowledged as a modern movement until it had been taken up on the continent in Vienna and Brussels under the leadership of Josef Hoffmann and Henry Van der Velde. One phase of the Arts and Crafts movement on the continent, characterised by curvilinear and naturalistic ornament, may even be called a style; the Art Nouveau.[9]

8. Machine Art (1994).
9. Machine Art. (1994)

As in architecture, it was only after World War One that designers realised the possibility of beauty in the construction of machine products

As so many commentators have observed, there is a direct link between the Arts and Craft movement in the late ninteenth century and the development after World War One of a new approach to the manufacture of utalitarian objects, as well as architectural spaces and environments. In Germany, particularly, the post-war generation prided itself on achieving a mechanistic age and on designing the proper utensils for living in it. This was clearly expressed in the Bauhaus School at Weimar under the leadership of Walter Gropius. In spite of a cubist aesthetic and left over craft spirit, the movement moved more and more toward a machine-like simplicity. It was there that Marcel Breuer developed the now famous tubular steel chair. The movement in Germany has been more and more against 'Kunstgewerbe' Arts and Crafts until the modern expositions of what we call industrial art, which is free from that tradition.

Chapter Two: 'The Machine Age'.

In the first three decades of the twentieth century, the atmosphere in America was completely different from the stagnation and disorder that existed in Europe at that time. European traditions appeared to be constraining and the destruction of World War One left many writers and philosophers predicting the end of western civilisation. To the younger Europeans committed to modernism, especially the artists, designers and architects, their hope was the new developments in Russia and America. Russia attracted some of them in the 1920's but subsequent communist rejection of modern design and repressive philosophy repelled most of them. On the other hand, in America a sense of purpose and confidence appeared, both before the War and in the 1920's, and the United States became the chosen land where these modernists congregated. Virtually all of the great German-based designers and architects of the first third of the twentieth century eventually found their way either to America or to more liberated countries in Western Europe.

To them, America offered a great promise. The French social scientist, Andre Siegfried, observed in his book

America Comes of Age:

> The American people are now creating on a vast scale, an entirely original social structure which bears only a superficial resemblance to the European. It may even be a new age.[1]

For Siegfried and the young European designers, America offered many possibilities. Siegfried claimed that:

> As a result of the use of machines, of standardisation, and the intensive division and organisation of labour, production methods have been renovated to a degree that few Europeans have ever dreamed of.[2]

The Russian constructivist El Lissitzky declared in 1925: "The word America conjures up ideas of something ultraperfect, rational, utilitarian, universal."[3]

In hundreds of newspapers and magazines around the world from 1910's to the 1930's, something only dreamed about in utopian fantasies seemed to be taking place in America. Hundreds of skyscrapers, built or under construction challenged old records of height. Suspension bridges of great span leaped across vast voids. Huge hydro-electric dams tamed great rivers

1. Siegfried A., *America Comes of Age* New York, 1927, cited by Wilson R.G., in *Raymond Loewy: Pioneer of American Industrial Design*, Munich, Prestel Verlag, 1990, p. 64.
2. Wilson, R. G. in Loewy R. (1990), p. 64.
3. Lissitzky, E. *Americanism in European Architecture*, cited in Lissitzky, E& Kuppers, S. in *Lissitzky: Life, letters, Text,*

and delivered water and power to millions of people in faraway cities. Great factories, giant grain elevators and industrial complexes sprouted across the country. Cars, no longer just the toys of the rich, but operating in their own environment of parkways and freeways, appeared everywhere. Elevators transported people up and down; express trains carried people from city to city and in the sky, could be seen entirely new forms that would rapidly generate a fundamentally different concept of time and space. Both before World War One, into the 1930's and the Great Depression, America appeared to be the land of the machine. As Willson observed:

> From the emergence of the machine on a vast personal scale in the United States beginning in the teens through its great period of hope in the 1920's and 1930's to its ultimate end as a symbol of power gone mad under mushroom clouds at Hiroshima and Nagasaki, the Machine Age was the new religion[4]

Despite the term being applied on a global scale, in the eyes of writers, editors, poets and designers of the time, America was the heartland of the machine. The Machine Age was not totally confined to America, as pointed out by Richard Guy Wilson:

Greenwich, Conn. 1968, p. 369.
4. Wilson, R. G. in Loewy, R. (1990), p. 64.

> Machine purity, or the simplification of design to few geometric elements, which was developed by the Dutch de Stijl group, the Bauhaus and the French purist Ozenfant and Le Corbusier, formed a great American following. The curvilinear form of "streamlining" that came to the fore in the 1930's had European roots, but in America were extended in application to all manner of design, from the pencil sharpeners to refrigerators. Finally biomorphism, which appeared in the 1930's and extended its greatest influence following World War Two, was particularly American response to the machine, a triumphant realisation on the part of American designers that the machine could be made to conform to the human or animal form, rather than vice versa.[5]

Americans did not so much invent the machine as take European inventions and alter, refine and place them in a system which reduced labour time and increased productivity, thus helping America to become a world class economic power which rapidly surpassed Europe. In the early years, these machines remained impersonal and were situated into separate environments, such as the rail line and the mill district.

5. Wilson, R. G. in Loewy, R. (1990), p. 64.

From the 1920's, and increasingly during the 1930's, machines invaded the personal life of the average American. The United States Bureau of the Census estimated that in 1912 only 15.9% of American dwellings had electrical service, by 1920 30.7% and by 1930 nearly 70% of dwellings had electricity. This initiated the introduction of a vast number of small individually controlled machines, from electric ranges and shavers to hair dryers and toasters. The home mechanical refrigerator was invented in 1920; by 1924 there were an estimated 65, 000 of them; ten years later there were over 7 million. In 1921 the Westinghouse-owned KDKA of Pittsburgh was the first commercial radio station to go on air. By 1925 there were 571 stations and over 2.75 million receivers. In 1900 the automobile was largely non-existent, by 1920 there were 10 million cars, trucks and buses on the road, and by 1930 this figure had risen to 26 million.[6]

Clearly a flood of machines came to dominate the interior of the American home, as well as the city and suburban landscape, with growing junkyards where they rusted away. The source of these machines was mass production, or 'Fordism' as it was then called. It was perceived as a new system although the origins of mass production go back to nineteenth century developments such as the idea of the moving assembly line and interchangeable parts.

6. Wilson R. G. in Loewy, R. (1990), p.64

These ideas were employed and systematised at Henry Ford's Michigan plant in 1913. For example, putting the assembly of magnetos onto a conveyor belt and moving them past workers whose tasks were simplified to the constant repetition of a single operation. Where it had previously taken twenty minutes to assemble a magneto, now, with tasks in sequence on a line, it took only five minutes. In 1914 300, 000 Model T's were produce; by 1923, the company had manufactured over two million. At the same time the price of the Model T dropped about 60%, even though the overall American price index moved upward. Quickly other businesses attempted to follow the concept of mass production. By the 1920's almost all of American car production was some variation of the Ford assembly line.[7]

Mass production, or 'Fordism', was much discussed throughout the 1920's and 30's. 'Fordism' was similar in some ways to the scientific management principles of Frederic Winslow Taylor, where workers were trained to perform their tasks more efficiently. Ford differed from Taylor,however, in that he simplified and reduced labour through the use of more efficient machinery. But both Ford and Taylor treated workers as inefficient machines. As a result, workers complained about the mind-

7. Wilson R.G., in Loewy, R. [1990], p.68

numbing repetition, while others deplored the mass standardisation and uniformity. Critics of the system were more explicit, Fritz Lang in his film *Metropolis* and Charlie Chaplin in *Modern Times,* both provided a devestating and quite frightening view of this emerging form of labour. Despite their critiques, mass production was generally praised.[8] .

Ford considered mass production to be not simply a technique, but an economic doctrine which lowered the cost of products and made them available to the masses. His idea was based on a standard product, the Model T, which would be subject to steady mechanical improvements, but would remain the same in appearance and colour. However, General Motors, under Alfred Sloan, came forth with the new idea of introducing increasingly expensive car lines, from the cheaper Chevrolet, to the Pontiac, Oldsmobile and Buick for the upwardly mobile and the Cadillac for the wealthy. General Motors also introduced the annual model change, which in effect created product obsolescence. To be up-to-date, one needed the latest model, which had been less frequently altered in its mechanical efficiency, than in its appearance or style

As Willson has argued, the success of General Motor's cars was the major factor in diminishing the lead of Ford, who disliked advertising and thought that the

8. Wilson R.G., in Loewy, R. [1990], p.70
9. Wilson R.G., in Loewy, R. [1990], p.71

product spoke for itself. He dismissed the notion that words and images can place new values on products.[9]

Advertising took on an important role in regard to business, including product advertising and public relations. In the 1930's, with the depression and a critical attitude toward big business, its image was altered to appear caring and dedicated to improving living standards. Advertising agencies not only created images that claimed the glory that would be bestowed on the purchaser of a product, but they also influenced the look of products and their design.

The industrial designer was a result of this new system, giving form, style and appeal to the products of the machine. According to R.G. Wilson:

> ...the industrial designer was the artist of capitalist consumption, cleaning up or hiding the oil and grime of the machine. With the onset of depression the day of the industrial designer truly arrived. The task was no less than the revitalisation of the companies and their products, the salvation of capitalism...

10. Wilson R.G., in Loewy, R. [1990], p.72

> ...[T]he term industrial designer was first used by Norman Bel Geddes in 1927, but it was by no means the only one. Used interchangeably were: packager, production designer, consumption engineer and advertising consultant.[10]

After World War Two, and over the following decades, industrial design came to dominate the look of products because new technologies were developed with increased speed and mass production and the spread of mass markets and consumerism.

In the seventies, for example, the technology necessary to make organic forms using computer-aided design, engineering and manufacture became available for the first time. Initially used in aerospace and later in the car industry, CAD and CAM (computer-aided design, computer-aided manufacture) were in the beginning hindersome and extremely expensive to use. By the early eighties, these programs were getting, not only more sophisticated and easier to use, but their cost was also greatly reduced. As a result, their use spread to industries where design and development served shorter product lifecycles, such as TV sets, hi-fis, cameras and white-goods.

The 1970's and 80's saw a second Arts and Crafts movement react against mass-production. In the 1990's, however, the crafts began to engage in a more nuanced way with mass production, while mass production moved towards limited, small scale production, selectively developed for individual consumers.

In many ways, my own approach to design is based on my reading of those 70's and 80's shifts- the shifts that saw, for instance, the development of new concepts of mass production. One such concept, for example, was exemplified by Volvo. Recognising the mind-numbing repetition of mass production, Volvo introduced the concept of makers grouping together in cells or work units. Rather that being required to stand for hours in the same spot, Volvo makers were given considerable autonomy in the structure of the unit's work and processes. It emphasised an old notion / skilled manufacture (making by hand).

My approach to design and the making of objects is somewhat unorthodox. I do not produce many preliminary drawings or work out a complete design before making an object. Rather, I begin with a generic idea and develop this idea through creative visualisation, letting the design evolve as I proceed. Working in this spontaneous way, allows me to retain a certain element of surprise upon completion.

Even though my work is strongly influenced by the visual aspects of industrial design, or, to be more precise, by the products of industrial design and manufacture, it is an illusory simulation of these object's production. Whereas industrial design and manufacture continues to be more and more obsessed with the precision of the computer, my work stubbonly asserts that this precision and craftsmanship is still obtainable in the hand-made.

One of the methodologies employed by industrial designers is computer-aided design followed by computer-aided manufacture. I do not dispute these time-saving processes. However, I find them impersonal, especially during the manufacture stage, since the dynamics of direct personal involvement are to a large degree lost.

Being a craftsman, the personal involvement during making of an object is of utmost importance.

Most of the output of today's mass production reaches a high standard of quality seldom equalled or surpassed by craft. My intention is to achieve this standard and quality through an alternative approach, that is through craftmanship.

Chapter Three: 'Returning to Craft.'

I approach my work through craft where the techniques used and high standard of workmanship are of the utmost importance. In our man-made environment there is a certain quality which owes far more to workmanship than we generally realise. This quality is often thought of in terms of materials. Usually we talk as if material on its own corresponded to quality. Only to utter the name of precious materials evokes a picture of treasure, but material in its rough state is nothing much; only worked material reveals its quality because workmanship had made it so.

The better sort of workmanship is sometimes called craftmanship, but it is difficult to say where ordinary manufacture ends and craftmanship begins. There are people who are convinced that craftmanship is backward-looking and opposed to new technology. For them, it remains the domain of hobbies in sheds and garages, just as art is the affair of art galleries and museums. On the other side, there are many people who see craftmanship as a valuable source of our civilisation and tend believe that it has a higher spiritual value.

Walter Gropius, writing in the Weimar Bauhaus manifesto proclaimed:

> There is no essential difference between the artist and the craftman of heightened awareness, but the basis of craftmanship is indispensable to all artists, it is the prime source of all creative work.[1]

The linguists tell us that the comparative use of the two words, art and craft, emerged around the time of the Norman conquests in 1066. The Norman-derived word art, was reserved for the higher priced objects intended for the conquerors, while the Anglo-Saxon derived word, craft, was reserved for the lower priced objects intended for the conquered. But after almost a millennium, this distinction is no longer relevant.[2]

David Pye in his book "The Nature and Art of Workmanship" said:

> If I must ascribe meaning to the word craftmanship, I shall say as first approximation that it means simply workmanship using any kind of technique or apparatus, in which the quality of the result is not predetermined, but depends on judgement, dexterity and care which the maker exercises as he works... and so I shall call this kind of workmanship the workmanship of risk.[3]

I agree with Pye's statement. His essential idea is that

1

2. Jacobsen, E., "*The Art of Turned-Wood Bowls*" New York, E.P. Dutton, 1985, p.2.

3. Pye, D., " *The Nature and Art of Workmanship*" Cambridge, Cambridge University Press, 1979, p.4.

the quality of the result is continually at risk during making and contrasts with what he calls the workmanship of certainty to be found in mass production or quantity production and in its pure form in full automation. In this sort of workmanship the quality of the result is predetermined before a single product is made and had been in occasional use in undeveloped forms since the Middle Ages.

The majority of craftsmen use the workmanship of risk (myself included), but I can limit this risk by using such devices as jigs or templates; for instance, drilling with the aid of a drilling jig. I often use such devices for the sake of accuracy and precision, not to save time or labour. Doing the work in this way, I may be working free-hand with a hand tool one minute and resort to a machine tool the next .

It is obvious that the workmanship of risk is not always valuable or necessary . It is often time consuming, expensive and can produce things of poor quality. However, nothing can be made economically in quantity unless machine tools, jigs and guiding devices have been made first by the workmanship of risk.

All products are normally made by a succession of different operations and there are alternative ways of carrying them out. If I want to saw a piece of wood, for example, I can do this using a hand saw, power driven table saw, bandsaw or in other ways. But to distinguish between different ways of carrying these operations out by classifying them hand work or machine work is meaningless. Hand-made or handicraft are not technical terms but rather social and historical ones. Today their usage refers to workmanship which could have been found before the Industrial Revolution.

The current idea of hand made and handicraft has been deeply affected by the Arts and Craft movement, which became a protest against the aesthetics and the workmanship of the Industrial Revolution. The idea that before the Industrial Revolution everything was made without machines is of course false. For most craftsmen of the Arts and Crafts movement, including William Morris, handicraft meant work without the division of labour. Morris said:

> During the medieval period there was little or no division of labour, and what machinery was used was simply of the nature of a multiplied tool, a help to the workman's hand labour and not a supplanter of it. The workman worked for himself and not for any capitalistic employer and was accordingly master of his work and time. This was the time of pure handicraft.[5]

Handicraft did not exclude the use of machines and had social and historical implications. It was not a word referring to any definable technique..

There is plenty of literature exclusively devoted to the knowledge of techniques, essentially describing methods of making or doing. Along with a knowledge of technical procedure, the knowledge of technique is one of the factors that is taken for granted as completely understood in any discussion of craftmanship. In reality, this knowledge of technique is the most difficult part of technical processes to define. If we consider the technical procedures to be instructions telling one what to do, then the knowledge of techniques tells one how to do it. As Pye said: "Technique is the knowledge of how to make devices and other things out of rough materials." [6]

But technique is more than just this knowledge, which can also be conceived as a set of rules. As Polanyi said:

> Rules of art can be useful, but they do not determine the practice of art; they are the maxims, which can serve as a guide to art only if they can be integrated into practical knowledge at art. They can not replace this knowledge.[7]

In analysing technical process, several features must be

5. "*The Revival of Handicraft*" Fortnightly Review, 1888, cited by Pye, D. [1979] p.12.
6. Pye, D., [1979], p.22.

mentioned, first the intention that motivates the project; next, the raw materials that are an essential part of the process; third, the numbered steps that compose the set of procedures to be followed in their proper sequence. This set of procedures is obviously indispensable, because one can not do the job without them. Then the 'how to', technique, is a key feature of each step in this procedure.

If one never performed similar technical procedures before, the instruction could be incomprehensible gibberish. Further, even if one does struggle through it, the end result will very probably be a sorry approximation of the intentional object. But why is this so? It is because the technique is not really an instruction that tells one how to do something. Rather, it is an instruction to perform a physical activity that is assumed to be part of the maker's repertoire of knowledge. It is a simple fact that if one does not possess this taken-for-granted knowledge, then one can not follow this particular technique or any similar one.

On the basis of this, one can see that knowledge of techniques is much more than what can be simply written down. Pye came close when he stated that: "Technique is the knowledge which informs the activity of workmanship."[8]

Thus technique is not simply theoretical knowledge which

7. Polanyi, M., "" Chicago, University of Chicago

informs one how to do something, but is a form of practical knowledge, since it involves practical know-how and not just abstract technical knowledge. It becomes a communication system wherein knowledge of techniques are expressed in physical activity and the result of this activity, along with the activity itself informs the maker of what he is doing, how well he is doing and most importantly of all, when to stop doing it. The exercise of a technique stimulates, indeed, forces the maker to decide what his/her next act will be. The next act, of course, is based on the knowledge of technique and so this becomes a continuous dynamic process.

It is highly unlikely, if not impossible, to even understand an instruction, much less learn the technique by reading or hearing about it. It is possible to understand and perform instructions only if one already knows some techniques. Pye says for instance:

> There is an old saying that when you have learned one trade, you have learned them all. There is truth in it. Beside the special forms of dexterity and judgement which belongs to one trade, something general is learned which makes it easier to learn others, though still not easy. This may merely be the matter of taking care but it seems to be more.[9]

In any case, the best and perhaps only way to learn is

Press, 1958, p 50.

by doing, simply because knowledge of techniques can be experienced only through physical behaviour. For example, Polanyi observes:

> Take the way we acquire the use of a tool or a probe. If, as seeing men, we are blindfolded, we can not find our way about with a stick as skilfully as a blind man does who has practised it for a long time. We can feel that the stick hits something from time to time, but can not correlate these events. We can learn to do this only by an intelligent effort at constructing a coherent perception of things hit by the stick. We then gradually cease to feel a series of jerks in our fingers as such, but experience them in the presence of obstacles of certain hardness and shape, placed at a certain distance at the point of our stick. When the new interpretation of the shocks in our fingers is achieved in terms of the objects touched by the stick, we may be said to carry out unconsciously the process of interpretation the shocks.[10]

Implicit in Polanyi's discussion is the knowledge of techniques expressed by behaviour such as sweeping the stick before one. The feel of an unknown object and the ultimate alteration in behaviour of the blindfolded man as he is forced to decide what to do next on the basis of this feel can be comprehended only by experiencing the feel one self.

8. Pye, D , [1979], p.22.

In the final analysis there is no substitute for attempting to perform the task oneself to learn what is really involved in terns of difficulty, 'doneness' and goodness.

At this point, it is essential to discuss standards of workmanship because a simple description of procedures and techniques is incapable of yielding an adequate analysis of technical process. How then is it possible for one person to perform the task and produce an excellent product, while another will produce unpalatable work? This occurs because each person has different standards against which they judge their performance, and these standards affect the end product.

Standards can be derived from the universal human tendency to criticise and evaluate the output of technical processes. People are always judging similar items to be good or bad with respect to each other. To a collector, some Japanese swords are good while others are poor. In all likelihood, one sword differs from another not so much in the performance or the set of procedures and techniques involved in their manufacture - both were made in roughly the same way - nor in the materials used, but in the workmanship that was exercised during their making.

People constantly make these sorts of judgements in all aspects of life, from the average person choosing the better of two apples to highly paid critics and appraisers choosing and evaluating the worth of art works, antiquities and the like. The solution to this problem lies in the standards themselves. As one lives and experiences the world, their standards change, develop and become more refined.

> To become an expert wine taster, to acquire a knowledge of innumerable blends of tea, or to be trained as a medical diagnostician, you must go through a long course of experience under the guidance of a master.[11]

As Polanyi suggests, the objective of this course of experience is to gain knowledge of a set of standards. The more one experiences, the more one assimilates the standards and the better he/she is able to judge excellence. Excellence can now be judged not only by association with a specific person who produced an object, but also in relation to a class of objects. In regard to technical process, there is always a difference to be judged as skilled or unskilled workmanship.[12]

As far as the connoisseur goes, skill is judged on the basis of the output of the project. As far as judgement of craftspeople or artists by their peers goes, each is judged as a member of a class. And as the judgement of craftspeople or artists by themselves goes, each is skilful to the degree to which they achieve their self imposed standards. Here the makers are their own critics.

The point of the foregoing argument is to attest that standards of workmanship exist and provide criteria for the judgement of an object. They operate in two ways, in that they enable an observer or critic to judge the degree of excellence of a finished product and, more importantly, they enable the makers themselves to evaluate their own performance while making and cause them to modify their behaviour on the basis of this evaluation.

12. Cont.

Personally I think that the concept of skill is not sufficiently defined; it can mean anything you want it to. Skill is said to be work-specific, but if this is so, we could say that a child's clay model of a person is as skilfully executed, as for example, Michelangelo's "David", which of course is not true, but in the process we have lost the criterion for judging similar things somewhere in the middle. Judging through my own work, I hope that you agree with me when I say that my work is skilfully executed But when it comes to soldering electrical-electronic components, the statement is far from truth, since I usually end up with a lump of hot metal in sometimes the most inappropriate place - such as my lap. This suggests to me that skill is not so much work-specific, but rather it is task specific.

Chapter Four: 'Streamlining'

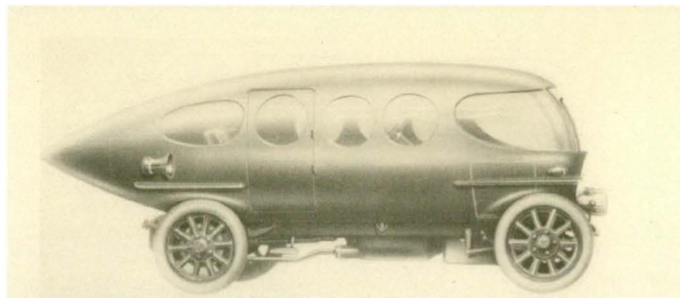
Since childhood, I have been captivated by aerodynamic and streamlined objects and gadgets. In this regard, it was interesting to note that the psychoanalyst, D.W. Winnicott, in his study on Transitional Phenomena, identified the area of human experience in a largely unknown zone situated between dreams and reality. Halfway between things `perceived' and things `conceived', neither inside, nor outside the individual. In his opinion, objects that populate this area are transitional; like children's toys, games, or even a child's security blanket - things which for the child, are a sort of magic representation of the happy sphere, in which the child was joined to his mother. Winnicott observes, for instance, that it is:

> ...to these objects the child attaches while sleeping, to find comfort, an image of her which he can keep by him all the time, evoking the reassuring unity with his mother, and in this way the transitional object produces the effect of obtaining precisely what it had set out to deny: it enables the mother to go out while the child keeps her close to him symbolically. [1]

1. Winnicott, D. W., *Play and Reality*, Rome, Armando, 1990, p.11

Winnicott refers to the area of play which begins from the child's first experience with the use of transitional objects and games, but later expands far beyond it and continues in the adult's entire creative and cultural

fig. 2.
A special Alfa Romeo
for Count Ricotti,
Carrozzeria Castagna, 1914.



90. Il Carrozzeria Castagna. A special *Alfa Romeo* for Count Ricotti. 1914. (Cour-

life. He thinks that the area of Transitional Phenomena continues in the intense experience we find in religion, in all forms of artistic creation and fruition, and also in the creative scientific work. The child's transitional objects thus yield their fruition as they dilate, divide and merge into the vast range of objects by which the human life is populated.

I agree with Winnicott. Reading his opinions on the subject brought forth the memories of my own childhood and the recollection of my first toy car, which was a model of a streamlined racing car. Since that time, without being fully aware of it, I have admired streamlined objects; they appeal to my aesthetic sensibility and perhaps that is why my work deals with the visual aspects of streamlining and aerodynamics.

The term Streamlining has its origins in science, and

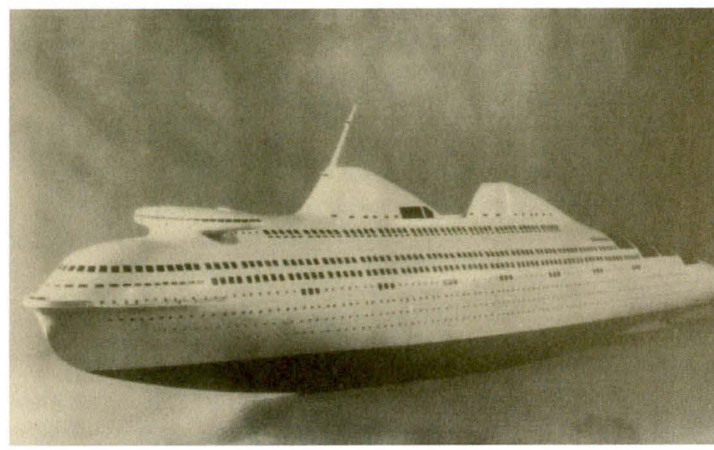
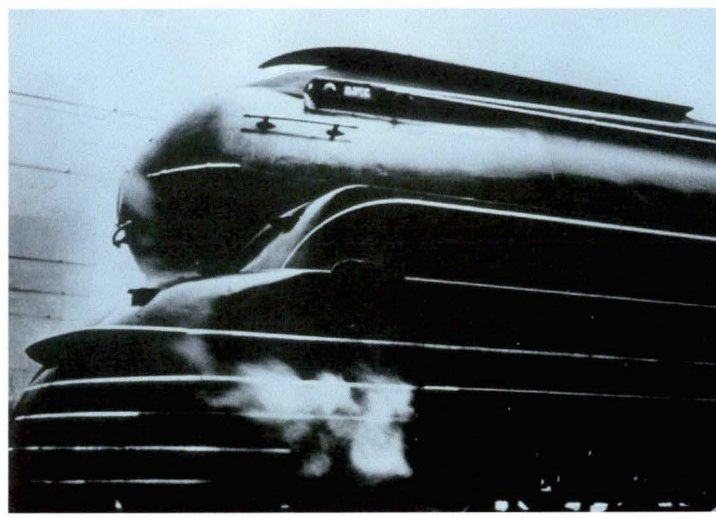


fig. 3.
'Ocean Liner',
Norman Bel Geddes, 1932.

in the history of hydrodynamics and aerodynamics. Streamlined forms are representative of efficiency and speed, usually characterised by round edges, smooth surfaces and low horizontal profiles. They are simplified by absorption, the merging of one form into another with transitional curves and reductions, the elimination of external details. The resulting forms are intended to penetrate water or air with minimal resistance. They resemble the organic forms in nature and contrast with angular geometric forms. In fact, the natural forms, like fish and birds, suggested low resistance to the scientist who pioneered aerodynamics and hydrodynamics. Daniel Bernoulli introduced the term hydrodynamics to encompass the sciences of hydrostatics and hydraulics in his first book on the subject, published in 1738.[2] At this time hull designs were still based on trial and error, or intuition. Unrefined experiments, providing some data were



...fig. 4.
Pennsylvania Railroad 'K4S.' steam locomotive, R. Loewy.

reported in England as early as 1765. In the following century, a proposal to tow Her Majesty's ships in sheltered waters in order to measure resistance and speed was rejected by the Admiralty. Instead they funded the experiments of Frederic Reech, who towed a variety of model hulls through a water-filled trench.[3]

It was determined that the motion of fluids around an immersed body takes place in two ways; laminar and turbulent. Laminar flow can be seen as a series of parallel layers in a moving fluid, each having its own velocity and direction without disturbances in its forward motion. Turbulent flow is characterised by eddy currents or vortices caused by the form. This turbulence produces a partial vacuum behind the form which reduces its forward motion.

Count Ferdinand von Zeppelin, an observer in the American Civil War, noted the use of tethered observer

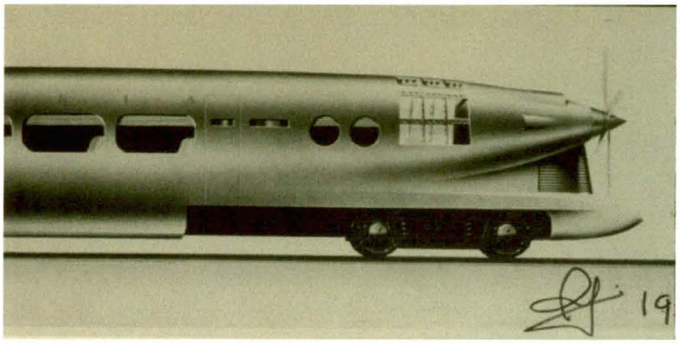


fig. 5.
Model for a railcar propelled by rear propeller, R. Loewy, 1932.

balloons and concluded that they ought to be made "dirigible", that is powered and steered craft.[4]

Early dirigibles were non-rigid and depended on internal pressure to maintain their form. The rigid frame airship was developed in Germany, and first tested there in 1897.[5] Over the next decade and a half Count Zeppelin improved the rigid frame type, so much so that his name became a synonym for airships, and the cigar-shaped dirigibles captured the popular imagination. However, this turned to fear when, in 1917, these Zeppelins grew to seven hundred and fifty feet in length and eighty feet in diameter, and were used in aerial attacks on London. Together with another similar form, the submarine, they became a vehicle for

2. Giacomelli, R. and Pistolesi, *E., Historical Sketch: Aerodynamic Theory,* cited by Bush, D.J. in *The Streamlined Decade*, New York, Braziller, 1975, p.4

terror in World War One. Both submarines and airships were tapered cylinders designed for easy penetration of water and air and minimal turbulence in their wake. Both had similar apparatuses for diving, climbing and stabilising against roll, and were totally immersed in their respective fluid environment.

The natural sciences often support the view that animal forms are directly altered by the forces upon them, or gradually by adaptation. Sir D'Arcy Wentworth Thompson in his treatise "On Growth and Form" used the term streamlined to describe organic structures that offer the least resistance while in motion. One example he used was the hen's egg:

> Its particular shape results from the deformation of an elastic spheroid in passing through a peristaltic tube, (one in which motion is induced by progressive waves of contraction and relaxation). While in the oviduct, the egg may be viewed as a stationary body round which waves are flowing, with the same result as when a body moves through a fluid at rest.[6]

Thompson treated the development of the egg as

3 Robb, A.M., *The Development of Applied Hydrodynamics,* cited by Bush J.D. [1975], p. 4.

a hydrodynamic problem simplified by the absence of turbulence, a streamlining structure of a simple kind. He supported his thesis with a description of the formation of the egg and mathematical analysis of its form, combining biology with physics and mathematics.

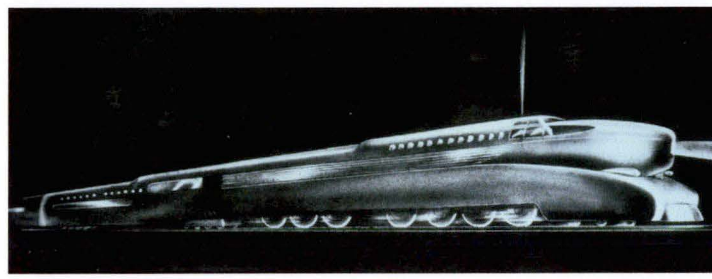


fig. 6.
'Blue Sky' rendering of an imaginary Locomotive, R. Loewy.

For him, organic design was the result of applying nature's principles for greatest mechanical efficiency. He wrote:

> ...the naval architect learns a great part of his lesson from the streamlining of fish; the yachtsman learns that his sails are nothing more than a great bird's wings, causing the slender hull to fly along; and the mathematical study of the streamlines of a bird, and the principles underlying the areas and curvatures of its wing and tail, has helped to lay the very foundations of the modern science of aeronautics.[7]

By moving freely from examples in nature to

4. Rosendahl C.E., *What About the Airship?* cited by Bush D.J [1975], p. 7

others in engineering, Thompson felt that man had discovered basic principles which had informed the natural process of adaptation.

> From hydrodynamics and aerodynamics, [he writes]

fig. 7.
Dymaxion Car No. 3,

> we learn the enormous, the paramount importance of streamlining. There would be no need for streamlining in a perfect fluid, but in water or air, the least imperfection in a streamlined body leads to pockets of dead water or dead air which spell high resistance and wasted energy.[8]

While scientists gathered data and developed formulae that would make aerodynamics a more sophisticated and complex science, the term streamlining itself gained its currency and became more than a technique, it became a viewpoint. The first three decades of the present century produced many streamlined ships, submarines, airships and airplanes, high speed trains and teardrop cars. However, in the long term, the scientists themselves

5. Brooks P.W., *Aeronautics: A History of Technology,* cited by Bush D.J. [1975], p.7

became the sceptics, and were able to demonstrate mathematically the limitations of streamlining.

Streamlining was, in fact, an historically specific style, even if its principles were derived from aerodynamics.

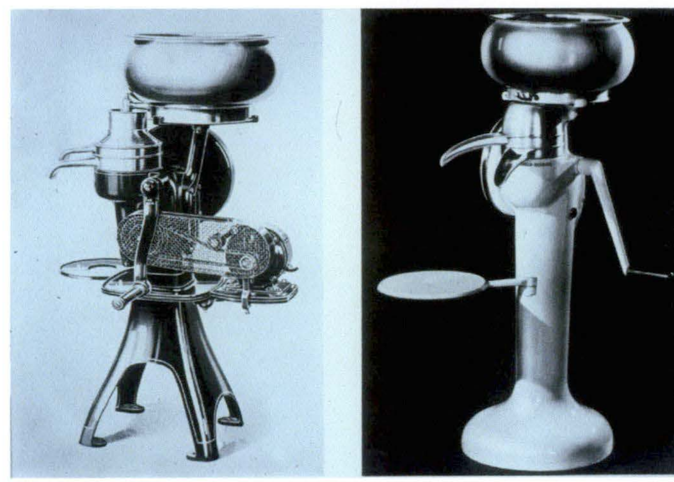


fig. 8.
Cream separator and redesign (right) for Mc Cormac-Deering R. Loewy, 1945.

Early streamlined objects took the form of projectiles and were associated with high speed and efficiency. They were memorable forms that came to denote progress and modernity with widespread applications and uniformity among many products.

In the 1930's designers began to provide consumers with a greater awareness of sculptural form, since streamlining removed the two-dimensional ornamental features and directed their attention to the plastic qualities of three-dimensionality. (see fig. 2. to 8.) Streamlined designs were abstractions and their organic qualities evoked an association with modern bio-morphic sculpture. They provided an emotional experience lacking in the geometric machine art of the previous two decades and as a result, many of these designs have a pleasing authenticity and a distinctive style derived from the conditions of that streamlined era.

In my work there is a sinister aspect to the streamlined forms and objects. They allude to the threatening intention of the Zeppelins, which came to be seen as terrifying. Such aspects are even more pronounced in current military technology, as for example, the highly aerodynamically streamlined aircraft cloaked in the dark mask of stealth technology.

Chapter Five:

'Sinister Science'

I wanted part of my work to look like nondescript scientific instruments to some degree threatening or sinister (see. fig. 9.). By nondescript, I mean objects that can not be readily identified (see. fig. 10. 11.) that is objects that are both visually and functionally indeterminate. Such objects have a certain mystique about them, to which the viewer is often drawn and perhaps is forced to some sort of assessment or analysis in order to work out what the object is and how it works. As a result the viewer becomes engaged not only on a visual but, also, on an analytical level.

The threatening or sinister aspects of my work are derived from military technology. The work, however, except in its execution, is not serious. It is a parody and a caricature of Ronald Reagan's "Star Wars" Strategic Defence initiative (SDI).

Military institutions have been continually revolutionising science and technology, solving complex and varied technical problems and producing sophisticated weapons associated with psychological mystification. To overcome the enemy the belief was held that the aim is not so much to capture but to captivate the opposition, to instil the fear of death before the enemy actually dies. Weapons are not just tools of destruction but also of perception. They are stimulants that make themselves felt through neurological processes and the nervous system, thus

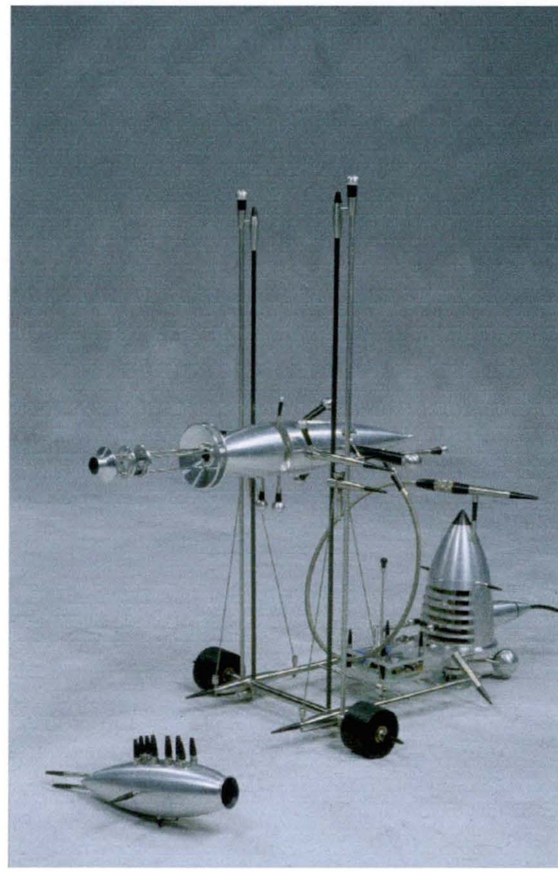


fig. 9.
Laser Housing and Video Infrared remote control (foreground), P. Prasil, 1998.

affecting human reactions and even the perceptual identification and differentiation of objects.

An example of this are the German dive-bombers of World War Two, that swept down on its targets with a piercing screech, intended to terrorise and paralyse their enemy. They were successful in this aim, until the forces on the ground grew used to it.

In this respect the first atomic bombs, dropped on Hiroshima and Nagasaki in 1945, presented the ideal conditions - high effectiveness, complete technical

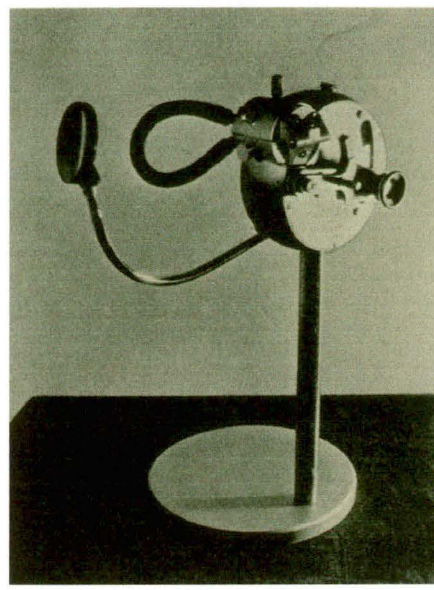


fig. 10.
Sugar and Oil Refactometer, Carl Zeiss, Inc.

surprise and a moral shock. The Americans, by demonstrating that they would not hold back from creating a civilian holocaust, triggered the principle of deterrence, which in turn led to massive nuclear arms build up.

Nuclear weapons tell us a great deal about the nature of the balance of terror. The idea of such a balance, originally hailed as a divine gift by the Americans, has much more to do with dogma than any strategic theory.

Even when weapons are not employed, they are active elements of ideological conquest. Ronald Reagan understood this when, in March of 1983,

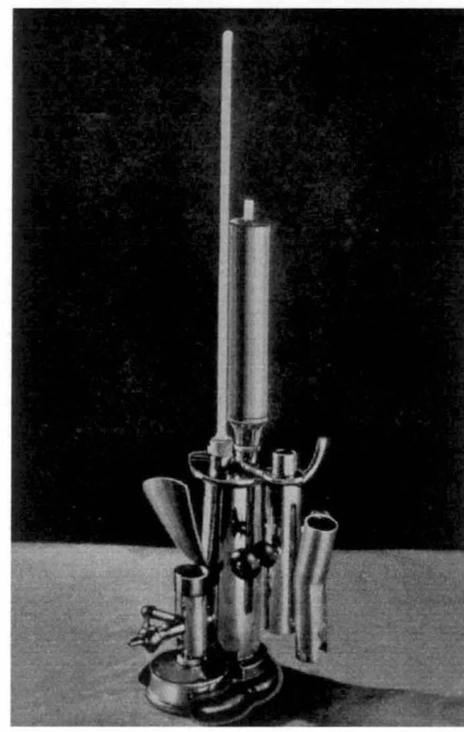


fig 11.
Jerust ebulliometer (for ascertaining the alcoholic content of beverages), Eimer & Amend.

he unveiled a plan to establish a space-based anti-ballistic missile system relying on lasers and mirrors. A budget of one billion dollars per year was proposed with the project to be completed by the year 2000.

Since the first missiles of World War Two and the lighting flash of Hiroshima, the element of surprise and terror is coming from technology itself, rather than from politicians, armies or general staff.

In 1940, reconnaissance aircraft had a constant short-wave radio link with the ground over a range of a few tens of kilometres; this increased to five hundred kilometres by the end of the war. In the same year, RAF night-fighters had on-board radar which enabled them to see, on a cockpit screen, German aircraft flying through the dark over five kilometres away.[1]

By 1942 ground based electronic devices were able to direct flying squadrons over long distances, helping them to drop their bombs by day or night under any weather conditions. This electronic network covering Western Europe was continually improved and in 1943 it could give pilots not just a radar signal but also a radar image, a luminous silhouette of the target over which they were flying. Their bombing apparatus was equipped with a transmitter that beamed centrimetric waves in a perpendicular line to ground level, the echoes then returning and forming on a cathode screen, an electronic image of fifteen square kilometres. The system was used for the first time in operation which destroyed Hamburg. Objects on the ground were no longer needed to be visible, giving the pilots total visibility, cutting through distance, natural obstacles and darkness.[2]

The development of such "secret" weapons, and others, such as the "flying bomb" and stratospheric rockets, led to

1. Virilio,P.,*War and Cinema: The Logistics of Perception*,London.Verso, 1989,p.76.
2. Virilio,P., [1989], p.77.

the development of "Cruise" and intercontinental missiles as well as the "invisible" weapons which use various rays.

After the first US Hydrogen bomb explosion in 1951, both new arms development and their build-up speeded up. The US Strategic Air Command bombers were in constant readiness and the Air Defence Command spread their protective umbrella for the eventuality of a Soviet long range attack. The danger increased in 1953, when the USSR exploded its first hydrogen bomb.

The Cuban crisis in the early 60's saw the threat of a third world war, when the U-2 spy plane equipped with newly developed high-resolution camera came back from a mission over Cuba with firm evidence of Soviet missile installations. This set off confrontation between Kruschev and Kennedy and led to a hot line link up between them and an instant interface between their operations rooms.

In 1962, at a time when there were already ten thousand American advisers in Vietnam, the first electronic war was devised. It began with parachute-drops of sensors along the Ho Chi Minh trail, and continued in 1966 with the development of the electronic “MacNamara line”, consisting of fields of acoustic and seismic detectors spread along the Laos access router, US army bases and the Khe Sanh stronghold. At that time, Harvard Professor Roger Fisher, developed the strategic concept of a "land-air dam", which relied on the latest technology to keep watch over enemy movements. It used infra-red devices and low lighting television, combined with advanced means of ariel destruction such as the F-105 fighter, the Phantom jet and the Huey-Cobra helicopter gunship. Transport aircraft were converted into flying batteries with the latest electronic equipment such as laser targeters, capable of guiding bombs with high precision, a night vision image enhancer system and the computer controlled multi-barrelled Minigun, capable of firing six thousand rounds a minute.[3]

The complexity of manoeuvres, the ever greater air speed, the assistance of satellites and the necessity for ground attack aircraft to fly supersonically at very low altitudes eventually led to automatic piloting itself. On the F-16 "AFTI," developed by Robert Snortzel, the pilot never touched the controls but navigated by voice. In return an on-screen display kept him informed of his flight plan and firing plan, anticipated acceleration and countdown time, as well as the kind of manoeuvres that he had to execute. For firing operations, the pilot had a special

3. Virilio,P.,[1989],p.82.

sighting helmet linked to laser and infrared targeting system. All the pilot had to do was to fix the target and give a verbal instruction for the weapons to be released. This revolutionary apparatus, designed in 1982 for the US Air Force, the Navy and NASA, combined a number of advanced technologies, particularly in the field of laser-targeting. The eye-tracked synchronisation system fixed the pilots gaze, however sudden the movement of his eyes, so that firing could proceed as soon as binocular accommodation was achieved.[4]

Ever since sighting devices were superimposed on gun-barrels, people continue to associate the use of projectiles and light. Recent inventions include the photon accelerator, the light intensifier, and now there are the laser weapons, directed beams and charged particle guns. Not content with barrel mounting, the scientists have inserted sighting devices into the inner tubes of artillery in order to improve performance. At ballistic and aerodynamic research laboratories in France and the US, "hyper-ballistic firing tunnels" can launch scale models of "re-entry bodies," (the projectiles being tested), at a speed of five thousand metres a second. Equipment with a capacity of 40 million images a second is then used, to visualise their path in the bore of the gun.[5]

4. Varilio,P.,[1989], p.88.
5. Vanlio,P.,[1989], p.83.

A major concern for all is the fact that these weapons are virtually undetectable. Stealth bombers, smart missiles and submerged submarines are designed to be invisible not just to the humans eye but, above all, to the piercing gaze of technology.

In the 1970's, the pile-up of weapons continued with increasing speed and the threat of an all-out nuclear war became even more real. Both in the US and Europe, people were building nuclear fall-out shelters and the outgoing US President Jimmy Carter, in his farewell address to the nation in 1981, declared:

> "It may only be a matter of time before madness, desperation, greed or miscalculation lets loose this terrible force. In an all-out nuclear war, more destructive power than in all of Word War Two would be unleashed every second during the long afternoon it would take for all the missiles and bombs to fall. A World War Two every second - more people killed in the first few hours than in all the wars of history put together."[6]

And so in 1982 the United States established a military high command for space and announced the impending launch of an early warning satellite. As previously noted, the following year, on the 23rd of March 1983, President Ronald Reagan created a

6. *Historic Documents of 1981, Washington D.C.*, 1982,p.34, cited by Virilio, P.,[1989],p.7.

picture of an anti-ballistic missile system employing nuclear energy, enhanced rays, directed beams and charged particles.

The project was controversial from its outset and its viability was questioned by many leading scientists, most of whom when asked about SDI immediately talked of it as "Star Wars" science fiction fantasy, since the technology to make the project workable was not yet invented.

It is relatively easy to intercept and destroy land-based stationary targets with the assistance of existing technology. However, when it comes to intercepting moving targets, such as missiles travelling over three thousand miles per hour, while relaying on satellite based lasers is another matter. Shortly before the research and development into SDI was abandoned, US scientists launched fourteen missles simultaneously, but were only able to intercept two. It was recently revealed, that even during the Persian Gulf War, in the early 1990's, the allied forces successfully intercepted and destroyed very few of Iraq's missiles when they were airborn.

Not content with such failures and setbacks, the program is presently being revived. This time it is not being referred to as the Strategic Defence Initiative, but the Missile Defence Shield, and it will rely on airborne, rather than satellite based lasers.

SDI:

Ronald Reagan's "Star Wars" Strategic Defense Initiative, became a costly debacle when the advanced technological fantasy proved to be ultimately unrealisable.

My work is likewise a fantasy and a comment on the technological folly which often blinds us from seeking more realistic solutions. The forms relate to Streamlining and Biodesign, they draw on a Machine Aesthetic and the short-comings of the actual "Strategic Defense Initiative" program.

In particular the work draws on several aspects of this military technology. It incorporates a laser, an infra-red beam, a laser line generator, optical laser mirrors, radio frequency and infra-red remote controls, photo-electric sensors, audio-visual equipment and other electronic components. It relates to the psychological warfare of such technology - that is, its threatening aspects - and alludes to the failures and short-falls of the actual Strategic Defence Initiative.

Coupled with this, the arrangement of the objects within

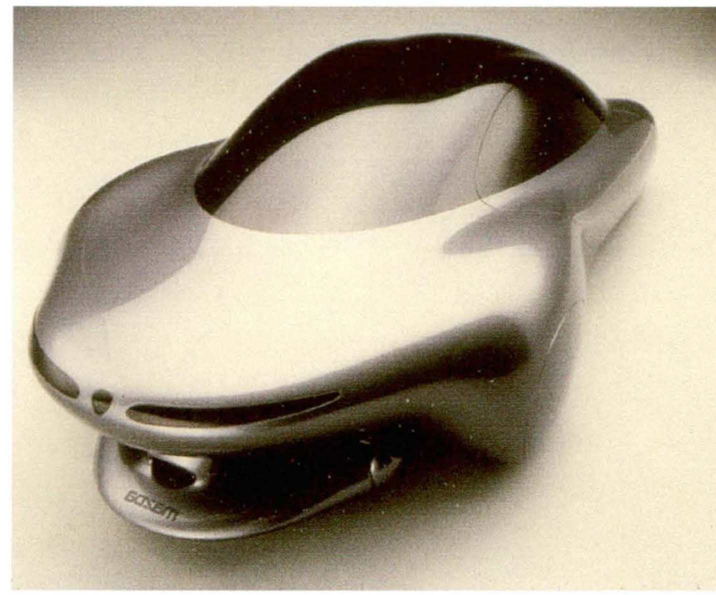


fig. 12.
Mazda design,
T. Matano , 1985.

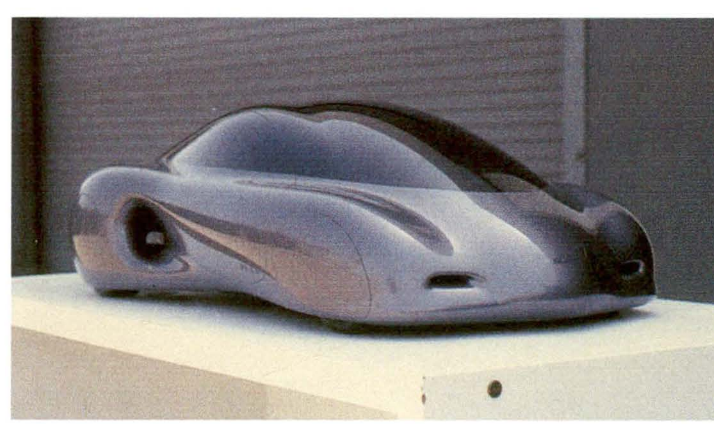


fig. 13.
RX-44 Advanced
Design Study,
T. Matano, 1985.

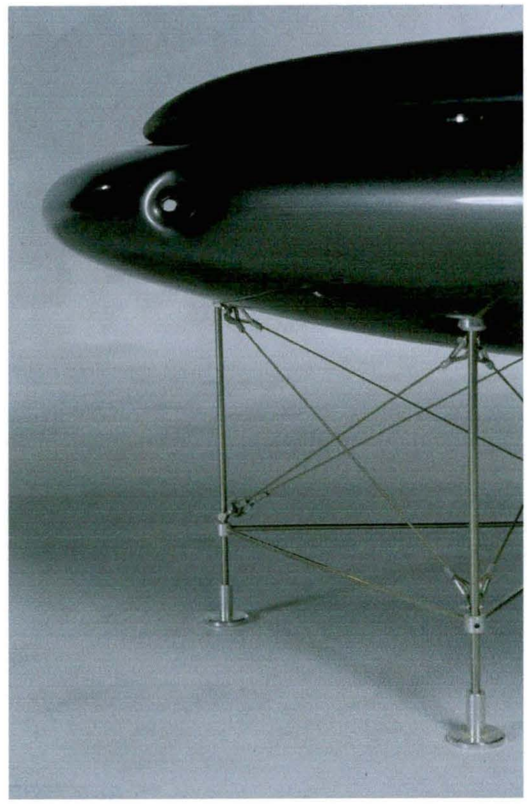


fig 14
Porthole Opening (detail)
P. Prasil 1999.

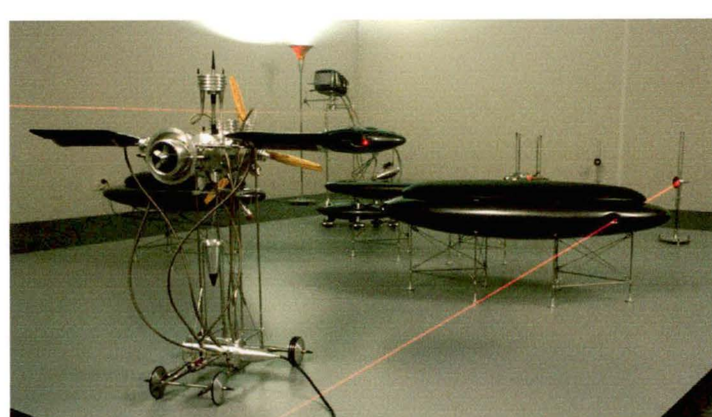


fig 15.
Installation Detail
P. Prasil.1999.

this body of work and their styling resembles the architectural models of "metabolic" housing schemes or "plug in cities" visualised during the 1960's by Guy Dessauges, Kisho Kurokawa, Paolo Soleri, and by the pop culture of space age lifestyle exposed in the TV cartoon series "The Jetsons" and extraterrestrial cities in movies

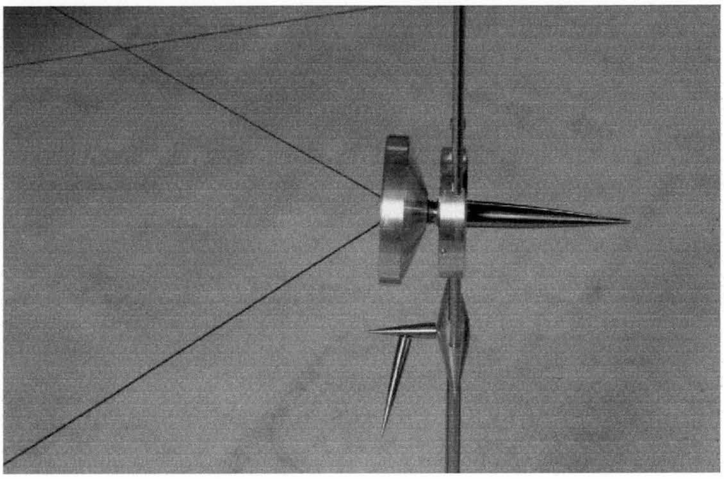


fig.. 16.
Laser beam reflector,
P. Prasil, 1998.

such as "Barbarella."

Those sources began to emerge as significant influences on the shape of my work later in the research project. Initially, however, the work was influenced by the automotive industry, in particular, by the design of Tom Matano (see fig .12.13.). My interest was in the area of visual effect and the interaction between solid 3D form and concentrated light beam, manifested in this instance the car body and headlight beam. It was my intention to place several furniture pieces within an asymmetrical zig-zag grid of laser light, with the beam penetrating and piercing through porthole openings in these furniture pieces (see fig. 14.) creating an illusion of

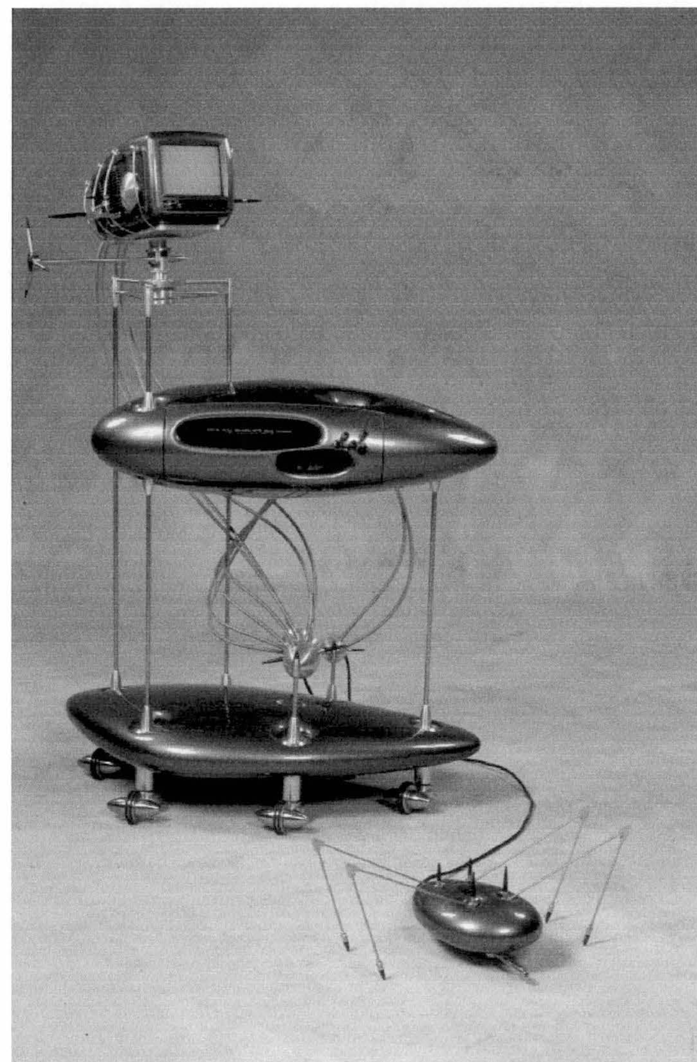


fig. 17.
Video-T.V. unit and monitor
transformer (foreground),
P. Prasil, 1998/99.

support and connectedness. (see fig. 15.).

The bench seats and table were shaped from polyurethane foam over which several layers of fibreglass and carbon fibre were laid and set in

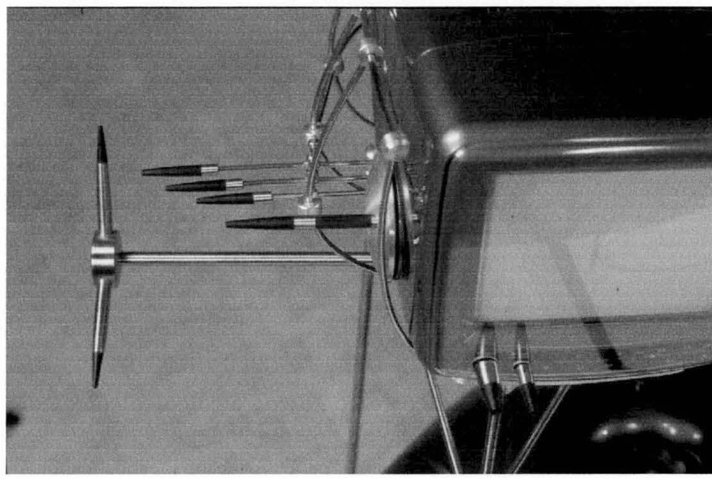


fig. 18.
Monitor (detail),
P. Prasil, 1999.

polyester resin, then sanded, spray-painted with primer-surfacer, metallic automotive paint. Pearl paint was added, than both bench seats were topped with leather upholstery. The laser gun housing was precision machined from solid aluminium and stainless steel, with ebony handles and details (see fig. 9.). For safety reasons I have used a low powered commercial laser pointer of the sort used for audio-visual presentations. Other higher powered lasers, such as Helium-Neon Argon-Ion or Ruby Lasers are quite dangerous, and since I did not want to maim anyone, were not suitable. The attenuated barrel and the profile of the laser housing recall the ray guns of Flash Gordon and Buck Roger - the laser pointer itself is loaded through a bolt action breech mechanism, similar to those used in some rifles.

Although, I have never owned or even fired a gun and, ideologically, I am opposed to firearms, nevertheless I am attracted to weapons and military technology due

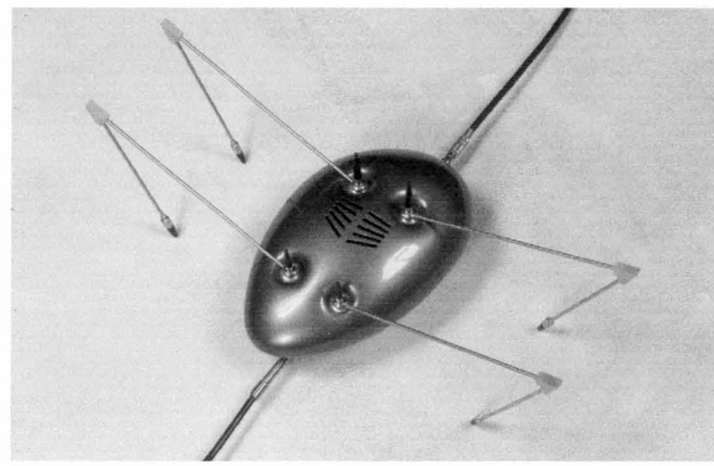


fig.. 19.
Monitor transformer housing,
P .Prasil, 1999.

to their threatening potential, and I wanted part of this work to look dangerous, threatening and sinister.

The laser housing is articulated manually: it slides up and down, swivels and is moved forward and back for easy alignment. Originally, the laser pointer was powered by batteries, but these lasted only six hours of continual use, therefore it was necessary to include an AC-DC transformer and a voltage regulator. The power is switched on-off by a radio frequency remote control (see fig. 20.).

When I tested the laser by projecting its beam through the seats and table, the work took on an entirely different dimension from that previously anticipated. It became reminiscent of an advanced security system gone haywire. It was at this stage that I began to think of the project in terms of Ronald Reagan's "Stars Wars" Strategic Defence Initiative and to develop this work further by

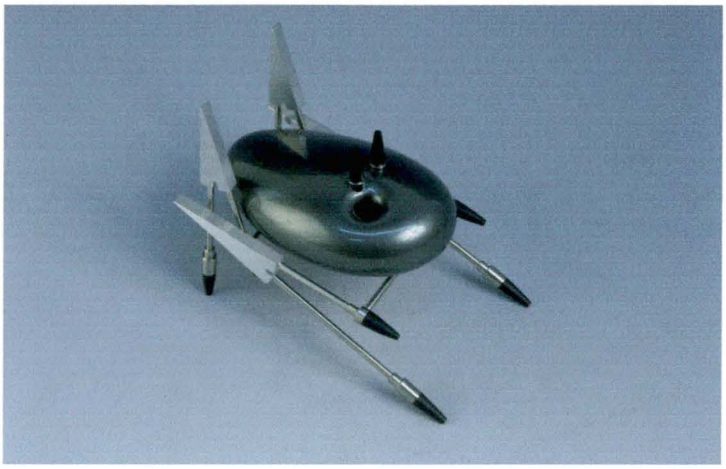


fig. 20.
Radio frequency remote control,
P. Prasil, 1999.

adding several related objects, such as video-TV unit, smoke machine and remote controls.

My intention was to include video-TV unit (sec fig. 17. & 18.) which would interact with the laser beam: that is, if the laser beam was momentarily interupted by someone walking through its path, it would turn on a video tape of Ronald Reagan delivering a speech about the Strategic Defence Initiative. I later abandoned this idea for several reasons. Firstly, the frequency of the laser was incompatible with the video machine and would have been too costly to alter. Secondly, there would be an additional problem during an exhibition, if several people were present at any one time, they would continually trip the video tape on-off, as they walk around the installation, crossing the path of the laser beam, which is bent and reflected around the work many times with the aid of mirrors. This would

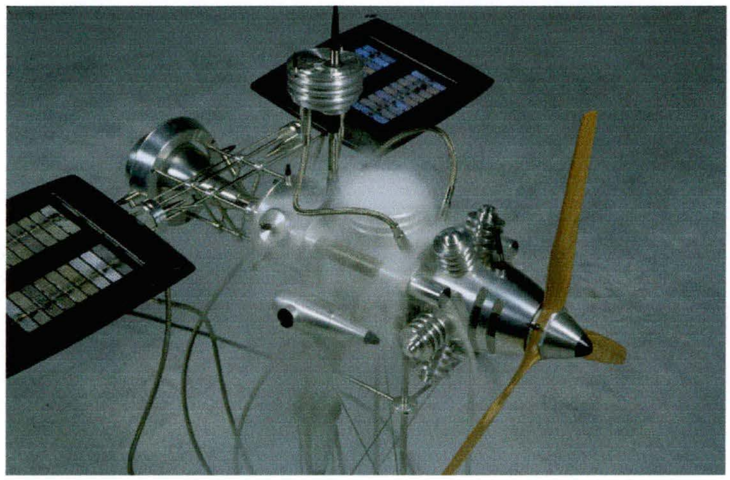


fig. 21.
Smoke machine,
P. Prasil, 1998.

undermine the point that I wanted to emphasise throughout my work - the short falls of the actual SDI program.

I decided to build a dry ice smoke machine as the light beam of a laser diode, such as a pointer, is not visible unless refracted by smoke, steam or some other medium denser than air. In a way, this machine traces the progress of technology and relates to the machine aesthetic. At one end, there is the industrial or mechanical technology, visually represented by the wooden propeller and a star-like arrangement of piston housing derived from the engine block of a 1930's fighter aircraft. On the other end of the machine, there is a jet-age turbine which sucks air into a dry ice chamber and forces the smoke through several outlets at the front. This is powered by two solar panels on flanking

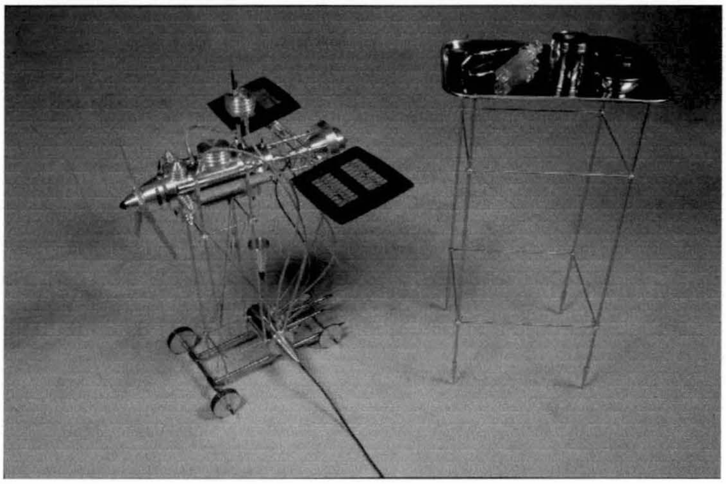


fig. 22.
Smoke machine and accesories
P. Prasil, 1998-9

wings, reminiscent of contemporary satellite or space station design and refers to electronic / post-industrial technology (see fig.21 and 22.).

The smoke machine is made from aluminium and stainless steel with ebony details and various electrical- electronic components. The propeller is powered by a six volt electrical motor and a miniature gearbox. I found it necessary to use a gearbox to slow down the speed of the propeller, which at high speed dispersed, rather than gently scrambling, the emerging smoke. The inner chamber for dry ice contains a heating element and a thermostat. I found that dry ice, inserted into the chamber filled with unheated water, did not produce an adequate amount of smoke, as the dry ice rapidly lowered the water temperature almost to freezing. The turbine fan on the rear is powered by another miniature six volt motor and a sealed lead battery

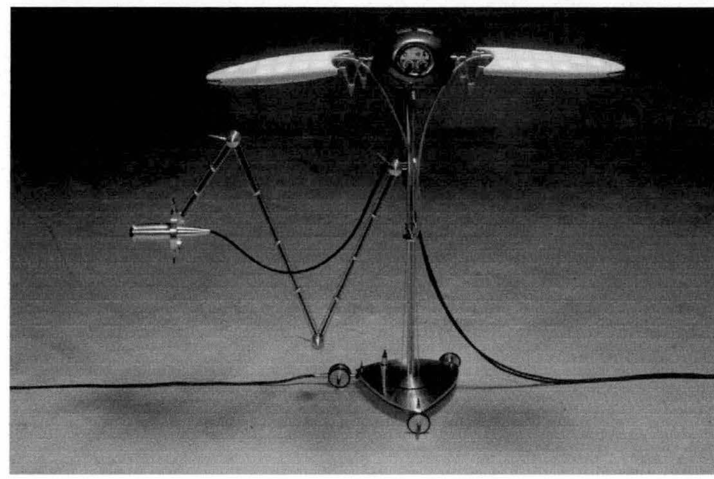


fig. 23.
Photoelectric switch amplifier,
P. Prasil, 1999.

which is continually recharged by solar panels. The speed of the turbine fan is adjusted by a voltage regulator. The internal chamber is emptied by removing a cork stopper and the water level is viewed through a external window. Any condensation the machine produces drips out into a container located underneath.

There is, of course, no real need for the complexity in the articulation and exposure of its components. The machine is in fact, less efficient than intended. Due to the size of the dry ice chamber, the volume of smoke it produces is insufficient and dissipates shortly after it emerges. Dispite this limitation, when combined with a small commercial fog machine, concealed within a plinth, and fuelled by non-toxic fog liquid, (as opposed to dry ice which is solidified carbon dioxide) it produces enough smoke and fog for the

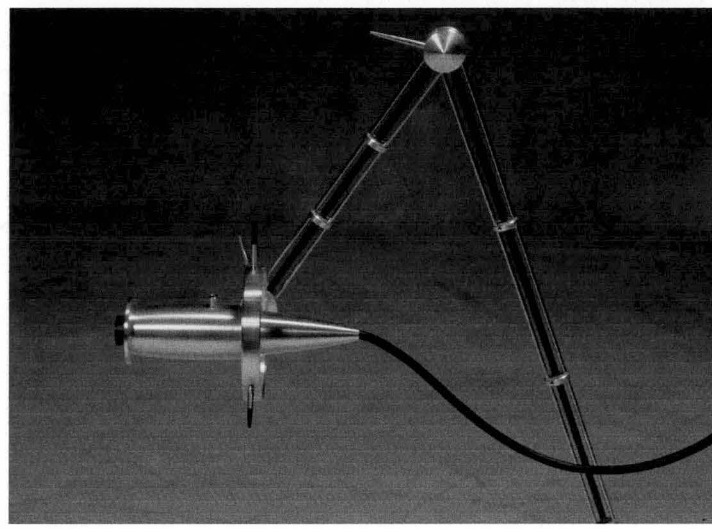


fig.. 24.
Infrared sensor (detail),
P. Prasil, 1999.

laser beam to become visible. Once again this relates to the shortfalls of the real SDI!

In the video-TV unit, I have used a 12 volt TV monitor, and included an AC-DC transformer. Its enclosure is made from fibreglass with overhead stainless steel legs (see fig. 19.). By mounting the fine stainless steel, aluminium and ebony legs overhead, the transfomer housing acquired an insect-like quality. Connected by electrical cable to the video TV unit, it appears as a giant bug eating its way through the work.

In a sense, this is referring to the saying "Every new system has its bugs."

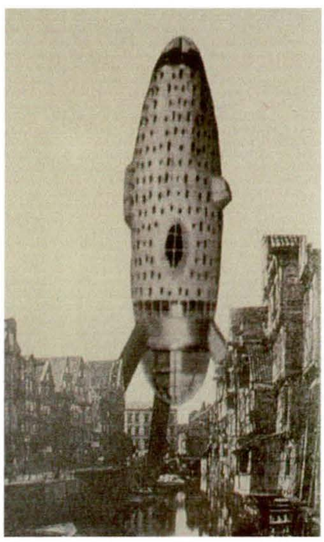
As well as this, the insect-like qualities of the following objects wings (see fig. 23.), relate to the grid pattern of the laser beam and the earlier plywood furniture which is discussed below.

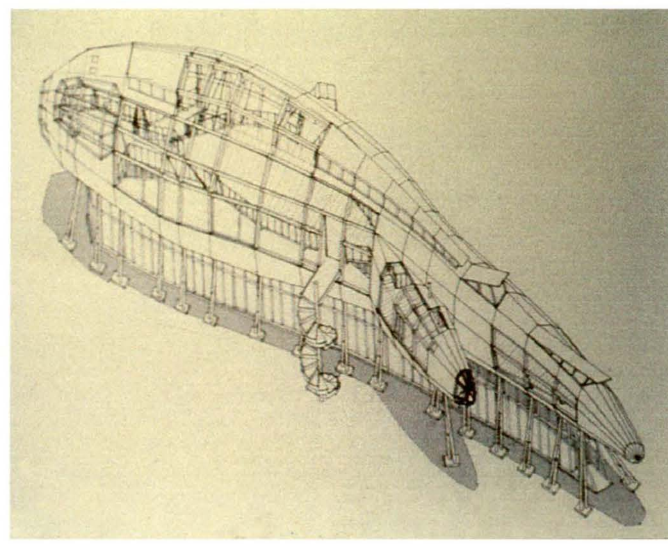
The final piece of work in this installation houses a photo-electric switch amplifier, with infrared sensors (see fig. 23. 24.). This apparatus is located at the entry point to the SDI installation. Anyone passing between these sensors (see fig. 24.) momentarily switches off the laser line generator which is connected to the photo-electric switch amplifier and mounted to the plinth above the small fog machine mentioned earlier. The laser line generator is automatically switched on again after few seconds. This object relates to the Strategic Defense Initiative's early warning satellites, it registers any person, observer or intruder alike, in close proximity to the installation.

Other Influences:

The work is also influenced by recent science fiction and cyberpunk movies, like the Matrix, or thrillers which revolve around computer surveillance and security systems such as The Net, Strange Days, or Enemy of the State.

In my earlier work, I attempted to restrain myself from obsessiveness, but in the latter pieces I wanted this





left fig.. 25
'Pickle' Hamburg,
M. Sorkin

right fig.. 26.
'Carp' Beached House,
M. Sorkin.

obsession to come through. Here I draw upon the B-grade science fiction attitude which often borders on bad taste. Take for example the Russian space station Mir, which in my opinion is not B-grade 'science fiction', but a corresponding grade of 'science reality'. It has been falling apart for years, and yet all breakdowns have been fixed and the Americans were lining up to get there. The Russians work differently, things always seem to be in a mess or falling apart and I can identify with that.

In contemporary terms there are also certain similarities between my work and the work of

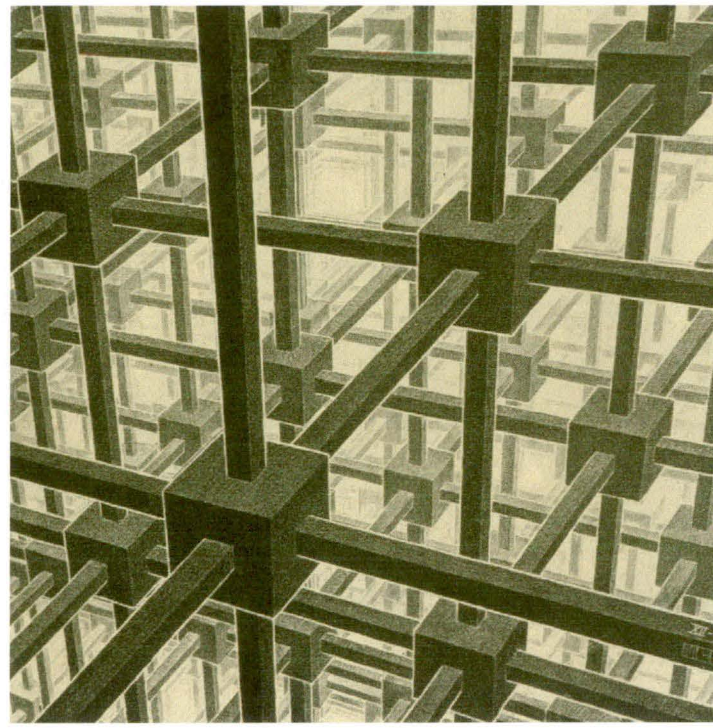


fig. 27.
'Cubic Space Division',
M.C. Escher, 1952.

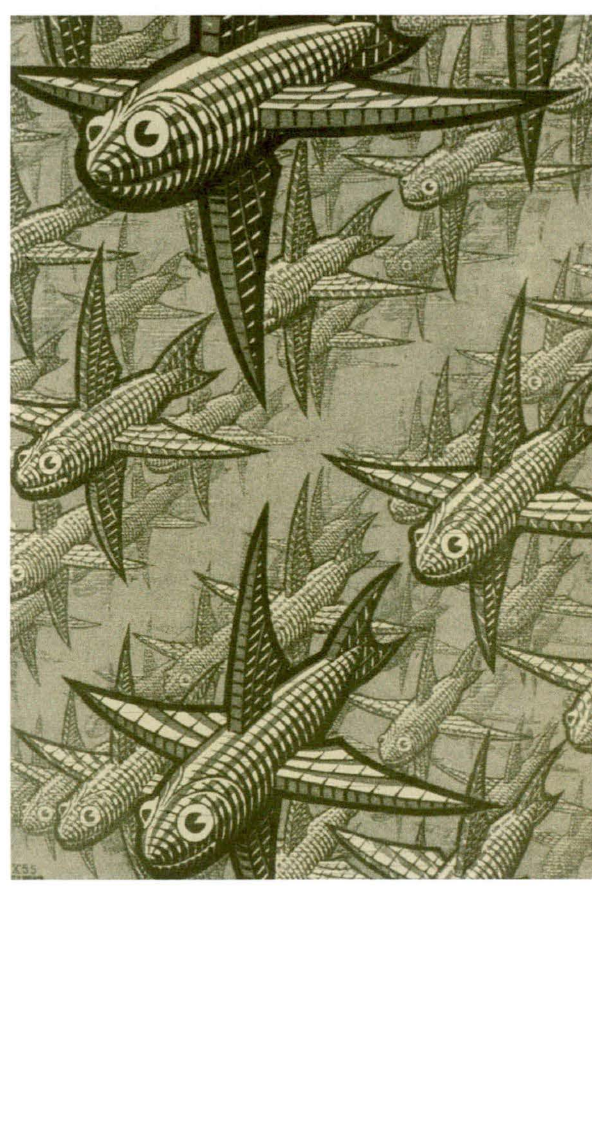


fig. 28.
'Depth',
M.C. Escher, 1955.

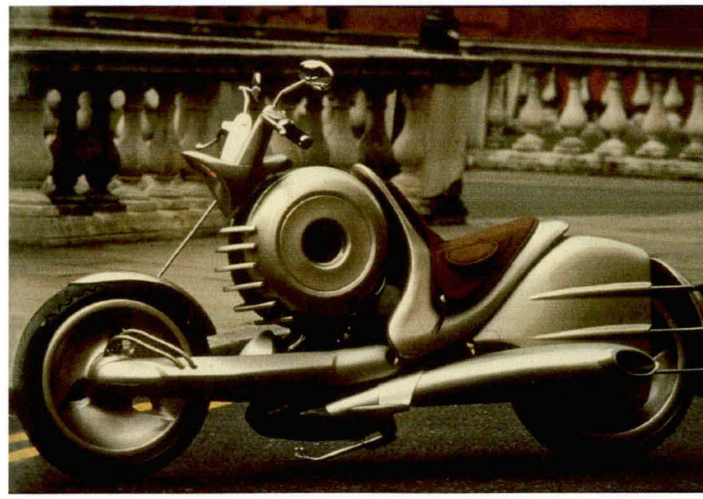


fig. 29.
'Showdown',
C. Muntanda

fig. 30.
Vacuum Cleaner,
E. Kaond and H. Hokazu.

Cesar Muntanda, a Master's graduate from the Royal College of Art in England, now working at the Peugeot Citroen Advanced Design Studios in Paris. His concept bike Showdown refers to cowboy culture, Native American culture and the Machine Age

fig. 31.
'Smooth-ness'
A. Ness.

(see fig. 29.). Similarities can be also seen in the work of Ehab Kandond and Kirouki Hokazu and their Vacuum Cleaner (see fig. 30.). Their work is organic and differs from mine, since it does not include any geometrical elements; likewise in the work of Arlen Ness, who is a motorcycle parts manufacturer. He occasionally designs and makes custom bikes such as Smooth-ness (see fig 31) with its Art Deco

fig. 32.
'Christy' conical multipurpose sugarbowl with feet,
M. Morozzi.

fig. 33.
'Firebird' P.C. electronic gas-lighter,
Guido Venturini.

references.

Through the insect qualities of my final pieces I wanted to create the experience which one might find in Guido Venturini's Firebird electronic gas lighters, (see fig. 33.) or Massimo Morozzi's conical bowl with

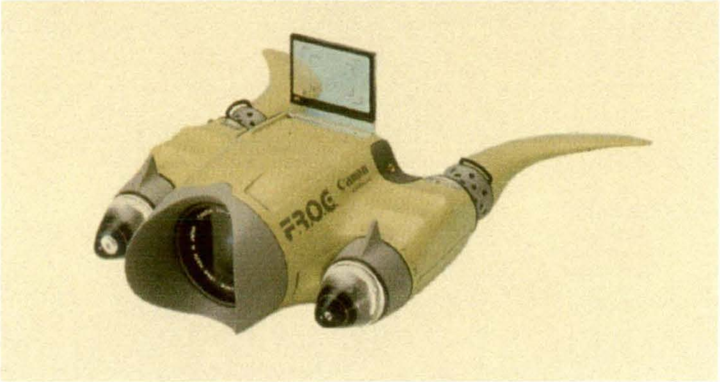


fig. 34.
Prototype of the Canon 'Frog' underwater camera, L. Colani, 1983.

feet, Christy (see fig. 32.) a thermoplastic resin redesign of Christopher Dressler's 1886 electroplated sugar bowl; or Luigi Colani's Frog - an underwater camera for Canon (see fig. 34.).

RECEPTION SUITE:

Before the early stages of my "SDI" development I had not worked with fibreglass on a large scale, and though I found this process to be a good way to achieve curvilinear forms, I did not enjoy working in this medium due to its toxic nature. This led to a brief departure from fibreglass to a different medium, one that was less itchy and scratchy when being worked, resulting in an another work, but one that is related to "SDI" through form and structural elements (see fig.35. 37.).

Originally these pieces were based on pre-World War Two airfoil construction, and I intended to stretch translucent canvas-like material over them. But after completing one, I decided not to cover them in a textile material, since this would partially obscure the

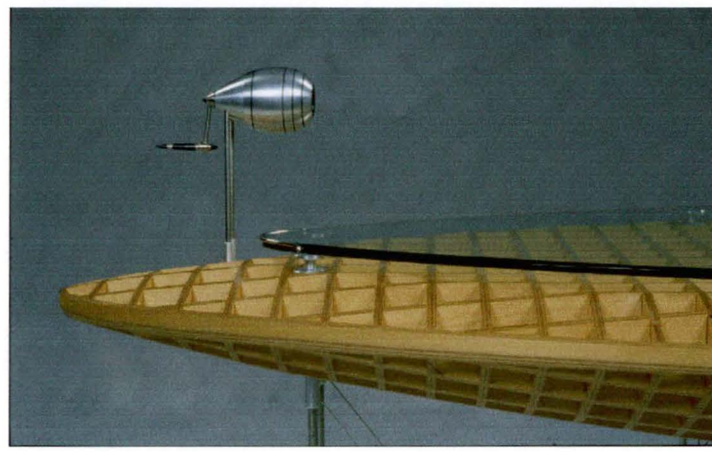


fig. 35.
Reception desk with pencil sharpener,
P. Prasil, 1998.

fig.36.
Pencil sharpener,
R. Loewy, 1934.

open grid pattern, which I found more effective aesthetically; it corresponded to the light grid made by the laser beam.

Through plywood torsion box construction, I was able to achieve precisely the effect I desired, giving these furniture pieces strength, lightness and depth coupled with a see-through quality.

In this work I drew on architecture and its grid-like matrix pattern, which can be noticed all around us, from urban design, where towns and settlements are built in a grid pattern, to buildings with their gridlike facades and scaffoldings which become permanent features in our cities.

fig. 37.
Reception desk, low seat, and stool-chair, P. Prasil, 1996.

I wanted to impart not only some architectural feeling to these furniture pieces in terms of the grid like matrix pattern but also certain engineering aspects in the construction of its skeletal support base. The minimal stainless steel legs visually refer to engineering. This work was inspired by the buildings of the architect Michael Sorkin, (see fig. 25. 26.) and by the drawings of M.C.Escher. (see fig. 27. 28.).

The desk has one drawer and a sliding tray, (provision for a laptop computer see fig. 38.) I have also included a pencil sharpener. (see fig. 35.) The tear drop pencil sharpener resembles Raymond Loewy's 1934 design. (see fig. 36.).

It was not my intention to appropriate specific designs, but to visually allude to past streamlined iconographies by placing them within a contemporary context, and thus there are obvious differences. Loewy's design is cast in metal alloy, mine is machined from solid

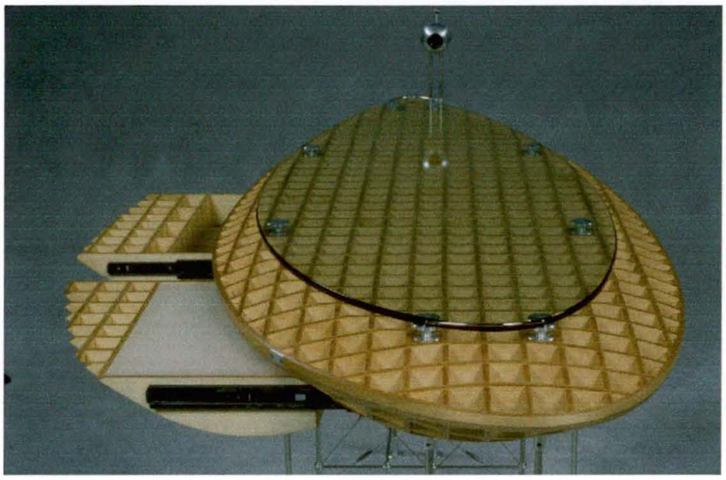


fig. 38.
Reception desk with drawer and sliding tray open,
P. Prasil, 1996.

aluminium with a different base attachment and variations of the tear drop form are reflected throughout the entire work.

Conclusion

The project aimed to explore previous and diverse new technologies as applied to furniture and object design, and to research new and innovative applications to contemporary design.

The central theme has been a search for a way to humanise our ever advancing technological age, to provide a counterpoint to the vast sweep of mass markets and mass production through the rediscovery of craft in conceiving and making the objects we use.

The work was influenced by the visual aspects of technology with an emphasis on technique and workmanship, it refers to a Machine Aesthetic and draws on past and contemporary styles, such as Streamlining and Biodesign. The forms express specific signs of the electronic age, while recalling the iconographies determined by preceding styles and movements.

The major part of my work, an installation entitled 'SDI', is a parody of Ronald Reagan's 'Star Wars' Stratergy Defence Initiative, which was conceived to eliminate the risk of nuclear attack, but became a costly debacle when the advanced technological fantasy proved to be ultimately unrealisable.

The work uses actual technologies, draws on science, science fiction, pseudo science, and the psychological or sinister aspects of military technology, coupled with my, at times, obsessive attitude towards machine aesthetics and new technologies.

At the same time, I have attempted to equal the high standard and quality of present day mass production through an alternative, that is, craft approach. The work revolves around industrially mass produced objects, such as TVs, video players, fog machines, laser guns and remote controls, a range of objects rarely explored by furniture designers/makers.

Also, the materials and techniques used in production of this work are not traditionally associated with craft. Such materials are usually seen in the sphere of 'avant-garde' design, seldom in craft, and my choice of techniques, such as precision machining for example, allude to this 'crafted technology'.

All individual objects have been designed and crafted for a single purpose and their dependancy on each other provides a ground for the whole body to be greater than the sum of it's individual parts.

This work is a humourous interpretation of the sociological sociopolitical and symbolic aspects of technology, and as such, I believe, they make an original contribution to the discipline of design.

It places an acute emphasis on the idea of furniture pieces grouped into a specific installation.

All furniture when placed in a room becomes in effect, an 'installation'. Whether the conventional 'installation'is consciously conceived around a specific social ritual, such as formal dining, or more ecclectically thrown together for a casual lifestyle of lounging in front of the T.V., the resultant installation nevertheless dictates how we interact with the furniture, either consciously, or more typically, subconsciously.

By adopting a non-conventional background theme, that of 'Star Wars', and an extremely specific installation (the laser-beam, furniture and mirror configuration necessitating precise placement for it to work), the whole notion of furniture installation is hightened to the point of the theatrical.

The relationship between the individual pieces; between the pieces and the walls of the room; and the importance of the actual spaces between pieces, that are delineating with the laser-matrix grid; all become 'hyper' sensitive. The whole installation becomes 'hyper-real', and the theatre of its use becomes almost 'surreal'. It re-focusses our attention upon what furniture can be, what an installation of furniture in a room can signify, and how we can interact with it in a new way.

Bibliography:

Adams, S.; *The Arts and Crafts Movement*; Secaucus, N.J.; Chartwell Books Inc.; 1987

Ashford, F.; *The Aesthetics of Engineering Design;* London; Business Books Ltd.; 1969.

Baldwin, J.; *Bucky Works: Buckminster Fuller's Ideas for Today*; New York; John Wiley and Sons, Inc.; 1996.

Bayley, S., Garner, P. & Sudjic, D.; *Twentieth-Century Style and Design*; London, Thames and Hudson Ltd., 1986.

Bickwell, J., McQuiston, L., (Ed.); *Design for Need: The Social Contribution of Design*, Oxford; Pergammon Press Ltd., 1977

Brooks, P.W.; "Aeronautics", *A History of Technology: the Late Nineteenth Century, Vol.V.*; in *The Streamlined Decade*by D.J Bush.

Bush, D.J.; *The Streamlined Decade*; New York; Braziller ,1975

Carrington, N.; *Industrial Design in Britain*; London; George Allen and Unwin, Ltd., 1976.

Cipolla, C. M., and Birdsall, D.; *The Technology of Man: A Visual History*; New York; Holt, Rinehart and Winston, 1986.

Clark, R. W.; *The Scientific Breakthrough: The Impact of Modern Invention*; New York; G. P. Putnam's Sons, 1974.

Cochrane, G.; *The Craft Movement in Australia: A History*; Kensington, N.S.W.; University of N.S.W. Press; 1992

Collins, M & Papadakis, A.; *Post-Modern Design*; London; Academy Editions, 1989.

de Noblet, J., (Ed). *Industrial Design: Reflection of a Century*; Paris; Flammarion/APCI, 1993.

Derry, T. K. & Williams, T. I.; *A Short History of Technology: From the Earliest Times to A.D. 1900*; Oxford University Press, 1970

Dormer, P.; *The Meaning of Modern Design: Towards the Twenty-First Century*; London; Thames and Hudson, Ltd., 1990.

Dormer, P.; *Design Since 1945*; London; Thames and Hudson, 1993.

Ellul, J.; *The Technological Society*; New York; Alfred A. Knopf Inc, 1973.

Escher, M. C.; *The Graphic work of M. C. Escher*; London; Pan, Ballantine, 1973.

Fry, T.; *Design History Australia;* Sydney; Hale and Iremonger;1988

Giacomelli, R. & Pistolesi, E.;"Historical Sketch" *Aerodynamic Theory: A General Review of Progress, Vol.I*; Durand, F. (Ed); New York, 1963.

Goodison, N.; *Ormolu: The Work of Matthew Boulton*; London, Phaidon Press Ltd., 1974.

Goslett, D.; *The Professional Practice of Design*; London; B. T. Batsford Ltd., 1971.

Greenhalgh, P., (Ed); *Modernity in Design*; London; Reaktion Books Ltd., 1990.

Heidegger, M., *The Question Concerning Technology and Other Essays*; New York; Harper and Row, 1977.

Heskett, J.; *Industrial Design*; London; Thames and Hudson Ltd, 1980.

Hodger, H.; *Technology in the Ancient World*; London; The Penguin Press, 1970.

Ioannou, N.; *Craft in Society: An Anthology of Perceptions*; Freemantle; Freemantle Arts Centre Press; 1992.

Klein, B.; *Design Matters*; London; Sacker and Warburg Ltd., 1976.

Lissitzky, E.; *Americanism in European Architecture*, Greenwich, Conn., 1968 in Wilson, R. G , Pilgrim, D. H. & Tashjian, D.; *The Machine Age in America 1918-1941*; New York; Harry N. Abrams Inc., 1986.

Loewy, R.; *Industrial Design*; London; Faber and Faber, 1979.

Lucie-Smith, E.; *A History of Industrial Design*; Oxford; Phaidon Press Ltd., 1983.

Lucie-Smith, E.; *The Story of Craft:The Craftsman Role in Society*; Oxford; Phaidon Press Ltd., 1981.

Lucie-Smith, E., *World of Makers: Today's Master Craftsmen and Craftswomen*; London; Paddington Press Ltd., 1975.

Manzini, E.; *The Material of Invention*; Milan; Arcadia, 1986.

Marks, R. & Fuller R. B.; *The Dymaxion World of Buckminster Fuller*; New York; Anchor Books, 1973.

Mayall, W. H.; *Industrial Design for Engineers*; London; Iliffe Books Ltd., 1967.

Mumford, L.; *Technics and Civilization*; New York; Harcourt, Brace and Co., 1934.

Papenak, V.; *Design for the Real World*; London; Thames and Hudson Ltd., 1984.

Periainen, T., *Soul in Design: Finland as an Example*; Helsinki; Kirayhtma, 1990.

Pevsner, N., *An Inquiry into Industrial Art in England*; London; Cambridge University Press, 1937.

Potter, N.; *What is a Designer: Education and Practice*; New York; Van Nostrand Reinhold Co., 1969.

Pye, D.; *The Nature of Art and Workmanship*; London; Cambridge University Press, 1968.

Pye, D.; *The Nature and Aesthetic of Design*; London; Barrie and Jenkins Ltd., 1978.

Robb, A.M.; *The Development of Applied Hydrodynamics: A History of Technology in the Late Nineteenth Century, Vol V.*;

Singer, C. (Ed); Oxford, The Clarendon Press, 1958.

Rosendahl, C.E.; *What about the Airship?*; New York; Chas. Scribner's Sons, 1938.

Schonberger, A., (Ed); *Raymond Loewy: Pioneer of American Industrial Design*; Munich, Prestel and Verlag, 1990.

Teague, W. D., *Design this Day: the Technique of Order in the Machine Age*; London, The Studio Publications 1946.

Thakara, J. (Ed); *Design after Moderism: Beyond the Object*; London; Thames and Hudson Ltd., 1988.

Virilio, P.; *War and Cinema: The Locistics of Perception*; London; Verso; 1989.

Walker, J. A.; *Design History and The History of Design*; London; Pluto Press; 1989.

Wentworth Thompson, D.; *On Growth and Form*; Cambridge; Cambridge University Press, 1917 (2nd edition 1963).

Willcox, D. J.; *Finnish Design: Facts and Fancy*; New York; Van Nostrand Reinhold Co., 1973.

Wilson, R. G , Pilgrim, D. H. & Tashjian, D.; *The Machine Age in America 1918-1941*; New York; Harry N. Abrams Inc., 1986.

Winnicott, D.W.; *Play and Reality*, Rome; Armando, 1990.

Woodham, J. M.; *Twentieth Century Design;* Oxford University Press, 1997.

Wood, C. (Ed.); "Auto Design: the Rain Man", "Architecture: Michael Sorkin", and "Italian Design Update"; *Design World: The International Journal of Design, No. 28.*; Ferny Creek, Vic.,Design Editiorial Pty. Ltd., 1994.

Wood, C. (Ed.); "Automotive Design: Show Down"*; Design World: The International Journal of Design, No. 30.*; Ferny Creek, Vic., Design Editiorial Pty. Ltd., 1995.