

**Presentation Rendering in  
Industrial Design  
A History and Appreciation**

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PRESENTATION RENDERING IN INDUSTRIAL DESIGN  
A HISTORY AND APPRECIATION

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## INTRODUCTION

To begin any written effort by defining the title of the piece is a common schoolboy cliché. However, it is of clear necessity in this case to define the precise meaning of the word 'rendering' in the industrial design context and establish the reason for its favoured choice in explaining the particular visual activity practised by the industrial designer.

'Rendering' is the word chosen clearly because the immediate alternatives; 'drawing' or 'illustration' represent two extremes neither of which embraces the exact level of 'detail' and type of approach typical of an industrial design presentation visual. An industrial design rendering should never be too illustrative as this too often suggests a precise realism (not super-realism or suggestive realism as is more 'appropriate' for the industrial designers intentions). Neither can a rendering be called a mere drawing, which is a word suggestive of a sketch with little colouring or treatment of surface qualities. The function of the typical rendering is to explain and enhance a design concept; by the nature of a concept it is 'incomplete' and 'flexible' to some degree. Rendering is a level of drawing which reflects this; too illustrative a technique would suggest a relatively complete or 'finished' concept; a less illustrative and more sketchy, or suggestive, technique will conversely tend to imply an incomplete and more speculative one.

Design visuals are so rarely fully illustrative that it would be an overqualification to describe them thus. At the same time it would not do justice to describe the 'genre' as mere drawing. The term 'visual' is rather loose and requires qualification, narrowing the final choice down to 'the rendering'. To render additionally means; 'to apply a surface finish', which is the aim of the renderer in transforming an otherwise plain line sketch.



The designer must render surface finish in terms of detail, texture, highlight and colour to fully explain a formal three-dimensional concept on the flat page. However it is always a rendition of surface finish in preference to a 'facsimilation', which can add the confusion of reality to what is essentially an isolated concept. Concepts are most effectively rendered in suggestive circumstances rather than in any precise location so that the widest band of 'viewers' can relate to the concept, without assuming that the particular circumstances suggested are anything but suggestive. Rendering technique itself is based on a whole plethora of stylizations (of reflections, highlights and surface finishes) which both speeds up drawing time and allows the concept, at whatever stage in development, to remain appropriately indefinite in time and place.

With this important distinction established, this written study will continue by tracing the conditions which gave rise to this distinction and will refer to the formation and development of the industrial design profession itself. The effects of new media will be noted and assessed and there will be opportune analysis of the varying philosophies of sketching and rendering within the industrial design confraternity.



## CHAPTER 1

### THE ROOTS OF DRAWING FOR PRESENTATION AND EXPLANATION

The roots of the explanatory drawing which visually presents an idea for others, is traceable to a time before the industrial manufacture of products, when artisans or artists were commissioned by a patron or colleague to create an artefact within a set of instructions or perhaps a theme; pieces of sculpture, buildings, items of furniture, works of art and so on. All were initially conceived 'on paper' for approval.

This overall system must date back thousands of years and certainly transcends cultures, but could not have been truly effective until the introduction of perspective drawing systems during the Renaissance period in Europe. For the first time patrons and artisans alike were given the opportunity to realistically define a three dimensional object or concept through graphic means.

Architecture must surely be considered one of the oldest of conscious design specialisations and it is in this discipline that explanatory drawings were of most clear benefit and were most extensively used. Pre-Renaissance sketches were tackled without the aid of perspective and could only be described as being stylized or pictorial. To define the large structures which were built (even without the aid of perspective drawing methods) technical style drawings - true views of plan and elevation - were used together with these unavoidably distorted pictorial sketches, (often reminiscent of isometric and axonometric drawings in common use today, which deliberately do not foreshorten true lengths). Perspectives have three properties missing in an axonometric type view; convergence, diminution and foreshortening. These properties make the perspective 'realistic' where the axonometric is stilted and artificial.



Understanding of perspective began with the notion of a window interposed between the artist and the subject "the subject was seen through the window". Indeed the very word 'perspective' derives from the Latin for "see through".

For centuries pictorial drawings remained simple linework affairs of pencil or crayon and only the new perspective techniques made any change. All evidence suggests that little attempt was made to use colour or excessive modelling in what were considered preliminary sketches, indeed they were almost certainly not considered valuable in their own right at all. It was the finished product to which all the attention was directed, this indeed holds true today for some branches of design work, particularly exclusive or one off projects such as are common in furniture design. Note how Memphis almost poke fun at the design community with their deliberate anti-rendering style.

The introduction of perspective, pioneered by Brunelleschi, however, was an obvious breakthrough in terms of the explanatory function of applied drawings, making complicated and abstract forms more easily visualised for the untrained client or patron. Perhaps this was even to the detriment of the more individualistic artisan whose drawings and intents were now more easily to be understood; the patron would now be much harder to please!

With perspective the inventive mind could conceive on paper complex three dimensional problems. What might not have occurred to an artisan until actual realisation of a piece, could now be more readily predicted and solved, before ever stepping into three dimensions.

No mention of inventiveness on paper could escape reference to the work of the master Leonardo da Vinci. His work is particularly interesting, from the design point of view, because it documents prolific three dimensional



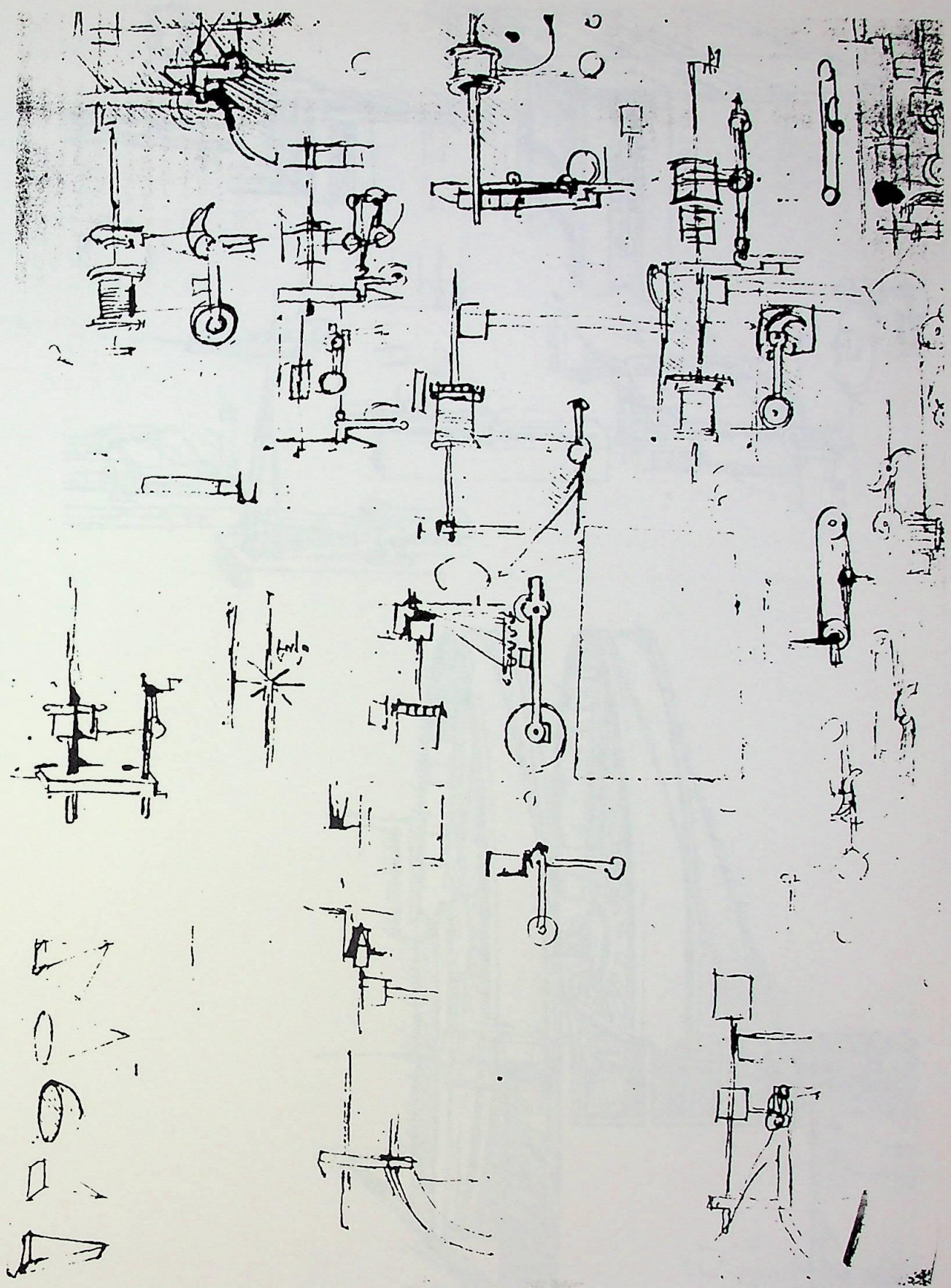


Fig. 1 Page of pencil sketches by Leonardo da Vinci.



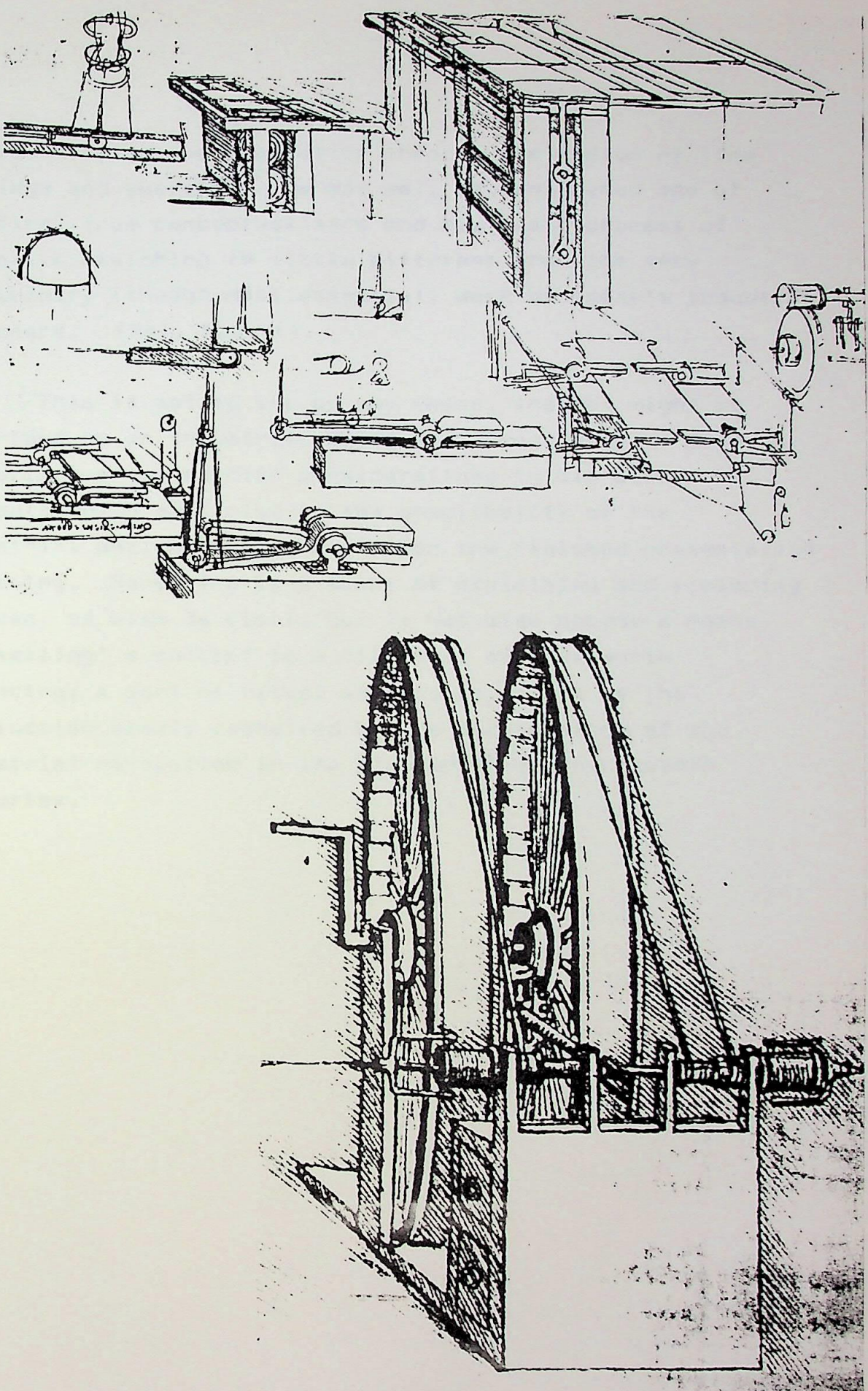


Fig. 2,3 Pencil sketches by 'da Vinci showing proposals for textile machinery designs.



problem solving and innovation through the medium of line drawings and sketches. He may well be considered one of the first true conceptualisers and his basic process of inventive sketching is little different from the very preliminary (though most essential) work of today's industrial designers. (Ref. Fig. 1).

This is not to say by any means, that he might be described as an industrial designer. There were no mass production or commercial considerations in his work; elements which gave rise to the practicality of the industrial design profession and for the finished presentation rendering. Rendering is a means of explaining and exploring an idea, as with da Vinci, but it has also become a means of 'selling' a concept to a client as an idea worth advancing; a sort of visual salespitch. This is the distinction slowly conceived by the machinations of the industrial revolution in the Eighteenth and Nineteenth centuries.



## CHAPTER 2

### THE NEW DESIGNER-IN-INDUSTRY

Industrialisation came hand in hand with increased mass production of goods and with this increase came the separation (or perhaps divorce, for it was a reluctant process) of design and 'creative' skills from the physical manufacturing process. No longer did the artisan design and make.

Palpable industrial expansion was first in real evidence in the England of the early Eighteenth Century. At centre stage were industrialists who organised the mass production of products to cater for the rapid growth and conglomeration of urban populations.

One leading figure in this process was the pottery manufacturer Josiah Wedgwood. He is accepted as a key figure in the development of the industrial design profession itself and is considered to have pioneered the employment of well known artists, who would be commissioned to provide designs in a manner foreshadowing today's consultants such as, in Wedgwood's case, John Flaxman or Christopher Dressers work for metal working companies.

Sometimes those responsible for designs were engineers, as in the manufacture of locomotives and industrial machinery, or modellers and pattern makers, for example in textiles and furniture production, in a manner anticipating modern in-house designers.

As this practice extended to other areas of industrial manufacture, so a growing appreciation was felt for the need (both creative and commercial) for specialist designers 'au fait' with a company's capabilities and talented enough to design suitable products. In this way many artists such as Christopher Dresser, William Blake and Henry Cole became the legitimate forerunners of the industrial designers of today.



The number of artists working as designers naturally had significant influences on drawing styles. The government established schools of design advocated traditional analytical drawing classes as a means of teaching design. The misdirected emphasis was on decorative flourishes rather than any inherent aesthetic, culminating in Owen Jones 'Grammar of Ornament'. The drawings were often as ornamental as the subject and were usually executed elaborately in pencil, pen and ink, or were softly tinted with watercolour washes.

In England, where the main early influences continued to be wrought, design was not yet clearly compartmentalised as it is today (between engineering, product, graphic, transport and furniture specialisations). Additionally individuals such as Ruskin and Morris were maintaining that 'every design' must be a moral design (though they happily profited from exclusivity and elitism). They advocated simplicity and simultaneously derided the Harry Cole school of profit and function, great antipathy being felt towards the insurgence of the machine and labour saving devices. 'Engineering design' in its infancy was of low status in favour of the craft design movements of the late Nineteenth Century. Consequently the most common items to be fully designed for industrial 'mass' production in the last century consisted largely of furniture and household wares such as pots, plates, cups, glasses, cutlery and so forth. Christopher Dresser's work is worthy of particular note in terms of innovative formal design. (Little applied decoration here).

In other areas, however, the definition of design at the time depended largely on the application of decorative features and details to ready engineered devices of all kinds. This was a symptom and result of muddled Nineteenth Century style and perceptions (or lack of perceptions) of 'beauty'. Consumer labour saving devices from office



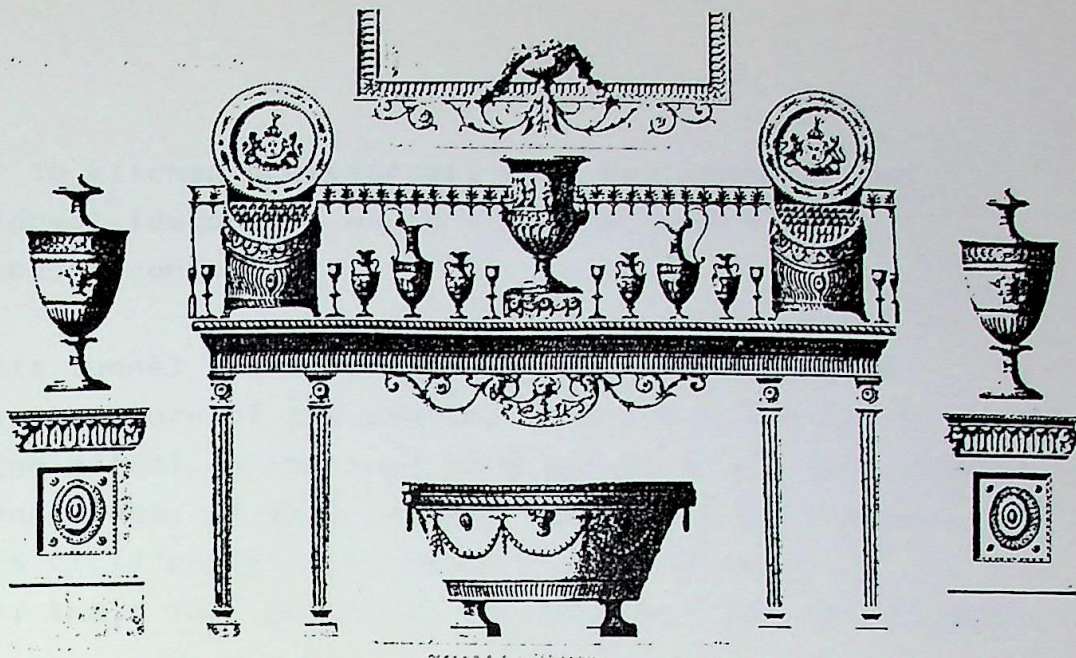


Fig. 4 Designs by Robert Adam, 1768, showing influences of architectural presentation.

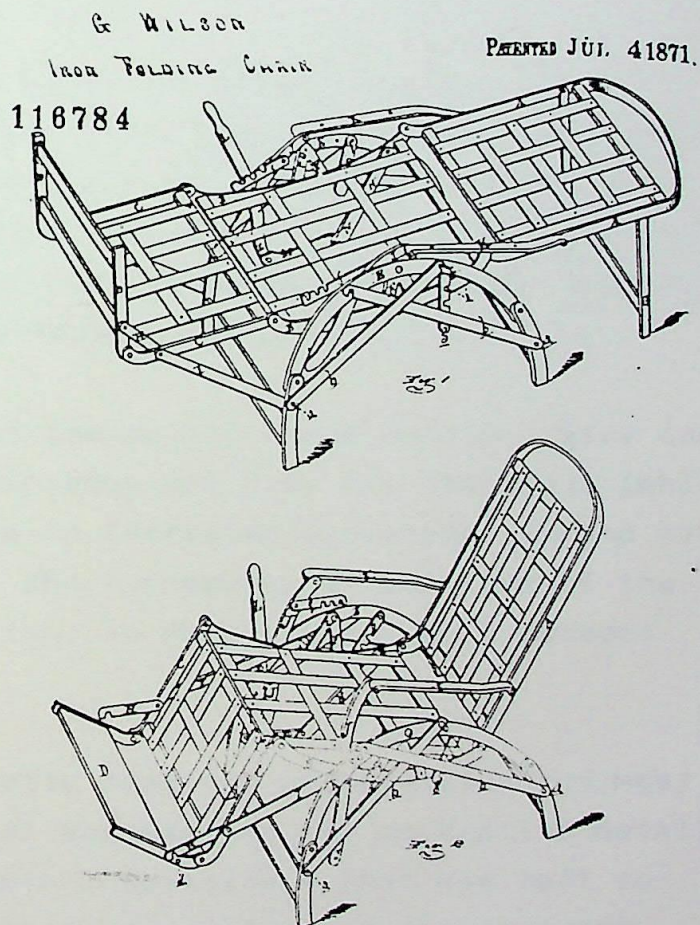


Fig. 5 Typical patent illustration showing an Iron folding chair mechanism, 1871.



equipment to kitchen accessories, were engineered first and 'designed' (decorated would often be a more apt description) second.

This tunnel vision of design thinking persisted through to the turn of the century in Britain and had a stultifying effect on the type of drawings which were used. Design renderings, if that is what they could be titled, remained stoically analytical, unemotional and bound by tradition; their full potential unrecognised and unrealised.

Architectural, as well as traditional Fine Art techniques were also a great influence in a way which can be justifiably compared to the influences of automotive rendering today.

Even into this century the most popular media remained the most basic; still beloved of architects; pencil, 'pen and ink' and wash. The aim remained predominantly to illustrate decorative features or designs in sufficient explanatory detail for the craftsman to produce duplicates or the engineers to produce moulds.

This paralleled completely conservative status quo in Art and Design philosophy and Fine Art technique (which were just getting used to increased expressionism and were blissfully unaware of the turnabout, in the form of the abstract experimentation, to come in the early decades of this century).

Sketches generally remained unexpressive and most often consisted only of suggestions for decorative detailing rather than any in depth innovation - that was left to engineers with their curious patent type drawings and incomprehensible technical elevations and plans. This division would persist as long as engineering and art remained for all intents and purposes - polarised.







The proliferation of inventions and new technical ideas took little heed of 'design' except in terms of applied ornament. Little thought was given to anything like ergonomics or even basic functionalism, anything new often remained as archaically designed as the inventor had first envisioned. In engineering terms rendering must have long seemed unnecessary beyond diagrams suitable for the patenting process. It was only after the physical process was complete that the artist was employed, presenting sketch proposals for decorative features for the legs or exoskeleton of the machine. This was ultimately the undoing of much of British design thinking when confronted, in the growing international market, with the more democratic and functional approach American industry was beginning to embrace.



## CHAPTER 3

### A NEW CENTURY OF NEW PHILOSOPHIES

Many ingredients mixed to complete the formulas which today's industrial design renderers follow and the greatest influences were those which formed the industrial design profession itself.

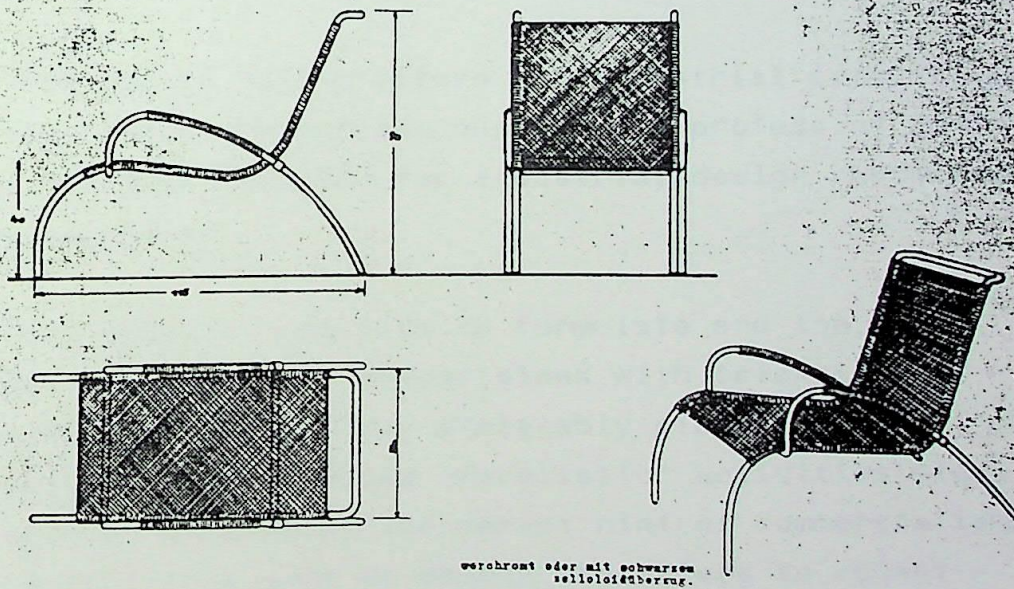
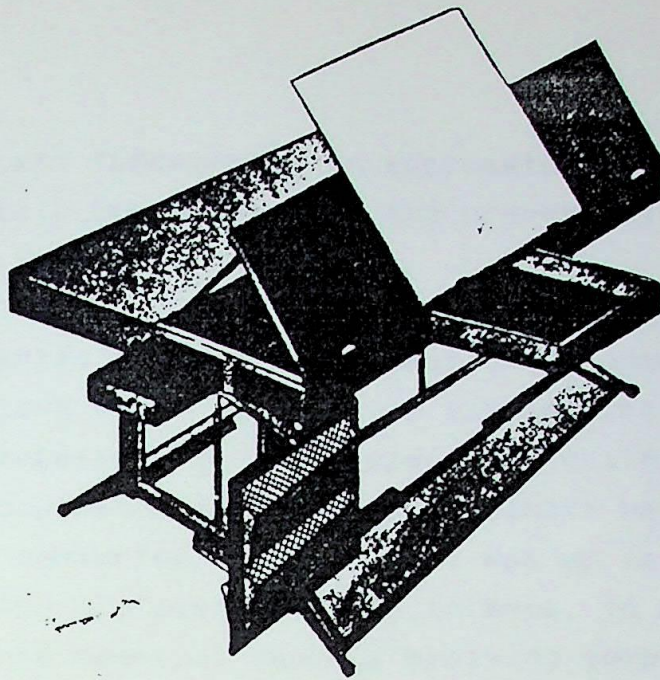
The realisation that new products needed other design inputs in addition to engineering input took practical hold only in this century, due in large part to the opening up of markets and the competitive element. Applied ornament, on its own, was no longer considered to constitute acceptable 'design input' in competition (from the consumer's/purchaser's point of view) with ease of use, efficiency and image. (Status symbols at last diverged away from 'high camp' decoration).

By the turn of the century huge changes were also afoot in Europe and America in terms of design philosophy and in terms of the relative invasion of 'technology' and industry into the home.

Both elements were crucial towards the formation of a climate in which industrial design could become a self-supporting profession separate from other disciplines; rather than distributed ineffectively throughout in ad-hoc fashion, as had been acceptable for so long. Though philosophies were radically changing towards modernism and an integrated inherent aesthetic, away from a fussy applied travesty, still drawing remained uninspiring and functional.

Influential movements, typified by the Bauhaus, concentrated more on three dimensional or formal problem solving and remained architectural schools of design at heart. Industrial design was still unborn, in its current sense, and design philosophies had not conceived of (or did not admit to) the critical commercial element which





Figs. 8,9 Bauhaus furniture design, contemporary drawings showing functional style of drawing as well as design, mid twenties.



is unavoidable and fundamental in successful industrial design simply as a consequence of the process by which products reach the user.

The benefits of functional design and inherent aesthetic had long since been proved (though more than occasionally forgotten) in the fields of architecture, furniture and houseware design through almost natural evolution over centuries. However, it was up to the industrial design profession in its infancy, to prove itself as the legitimate means of rapidly evolving completely new and alien technologies for human use; often without previous typeforms or references as guidance. Obvious examples of the industrial designers dilemma (and bread and butter) were such inventions as the telephone, automobile, bicycle and aeroplane to name but a conspicuous handful. In this role industrial design could finally prove itself as a necessity and commercial viability.

This had to happen before the industrial communities would reluctantly embrace and nurture the profession and, finally, the full equation for industrial design rendering could be completed.

This equation was slow to formulate and the commercial influence, or comparisons with trickster advertising, are to this day preferably played down; by and large by designers whose 'moralistic' activities might be degraded or debased by the merest hint of commercialism (to the extent that some movements can afford to reject the 'flashy' rendering in practice). Ultimately it has to be accepted that every design must have its market and there is little point in outwardly denying this - the client won't (unless he has money to burn).

To summarise then; rendering, until the formative thirties and the rise of the ugly face of commercialism, was a secondary aspect of the process-to-completion of



a 'work-of-design'. The rendering then, as now, was both a preliminary explanatory tool and a means of evaluating ideas. Rapidly, however, rendering assumed a major new function; a function which derived from the new commercial nature of design-applied-in-industry, the catalyst which finally placed the profession of industrial design squarely on the map.



## CHAPTER 4

### THE BIRTH OF INDUSTRIAL DESIGN AND THE 'FLASHY' RENDERING

The fresh challenges of product innovation and design and the retailing of these products to the masses were paving the way for a new brashness soon to be applied to the conceptualising, advertising and packaging of what were previously considered ordinary, everyday products. It was the lean years of the depression, of the late twenties and early thirties, which accelerated this process as market competition was more intense than ever before. It was to the new breed of advertisers and designers that industrialists turned to maintain profit margins and commercial success.

Raymond Loewy's landmark design work for the Gestetner Corporation was only the beginning, both in terms of industrial design and in terms of the graphic means with which designers literally sold themselves to their clients. For a whole generation and more, the slick transformation of Gestetner's old 'Ream' model to Loewy's '66' was a "seductive metaphor of the shamanistic skills of the U.S. industrial designer", Conran Foundation Booklet on 'Art & Industry'.

It was no mere coincidence that America's new breed of designers were fronted by former advertising draughtsmen, stage designers and fashion illustrators; veritable creative riff-raff! However, it was this breed of exuberant design 'talent' and the drawing style and skills that they possessed which dramatically changed the design rendering 'typeform' and 'raison d'etre'. Designers became aware of the concept rendering as a key tool for acquiring clients and persuading them to accept new ideas. The humble, neglected rendering was to enjoy a jump in status as a prime means of projecting and selling the future direction. It was a convenient inexpensive method and it began to mark the dividing line between engineer and designer in industry.

The change in design illustration at this time is marked. Whereas, as little as a decade earlier, the Bauhaus



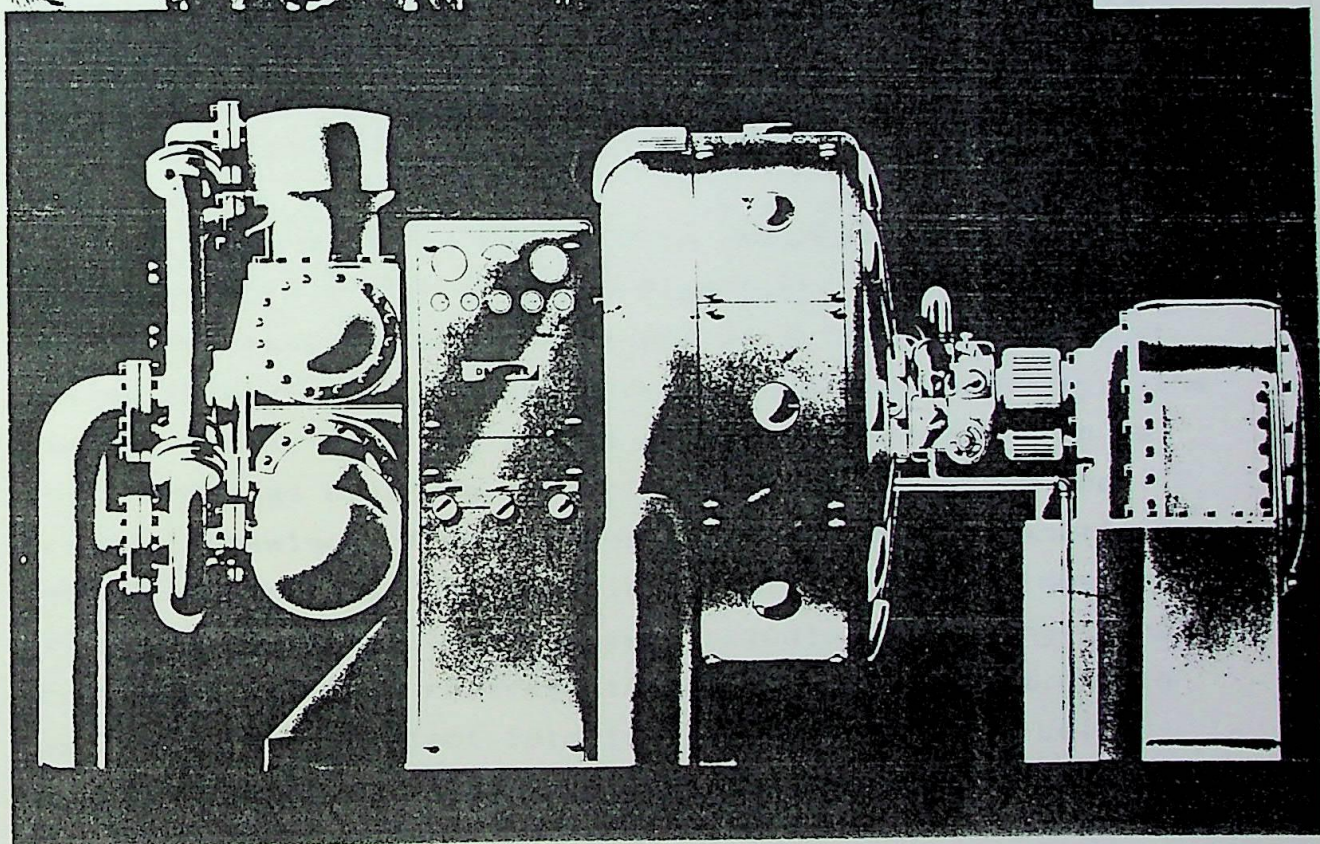
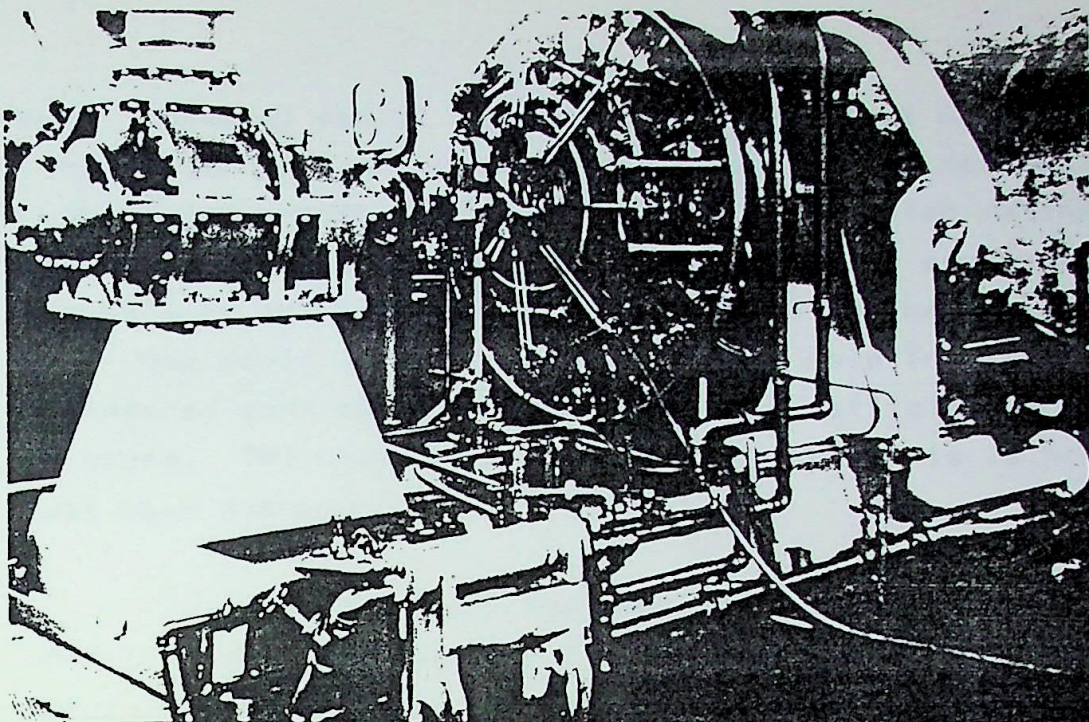


Fig. 10 The rendering was the means by which designers could show clients what could be done.



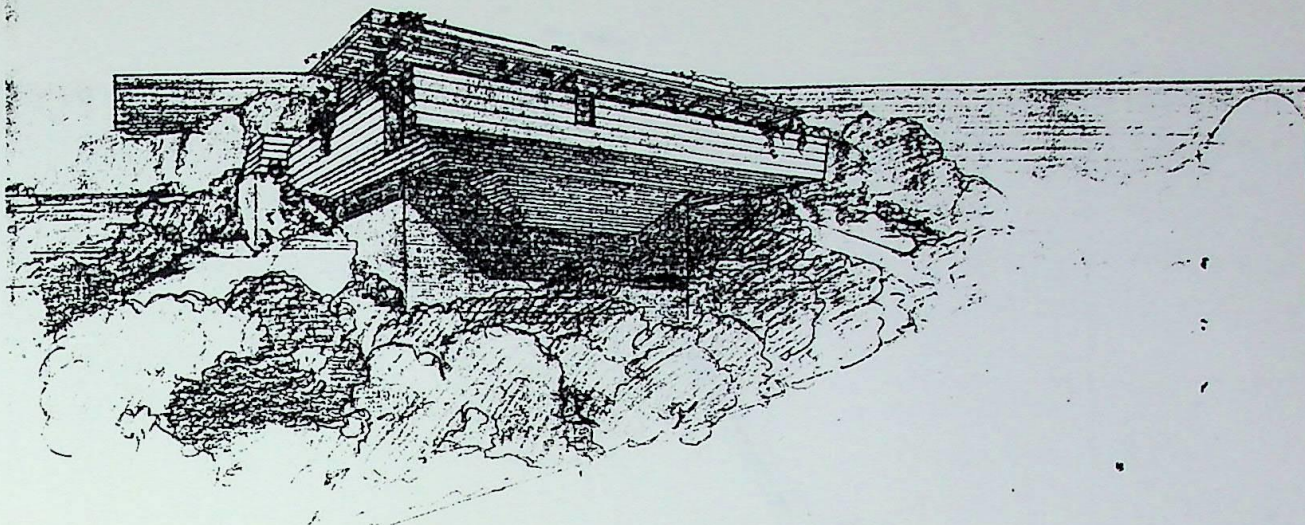
were producing staid, almost boring depictions of undeniably revolutionary modernist furniture and interior designs. Now Loewy's and others were producing drawings which matched in visual hyperbola, those typical of fashion or adventure book exhuberance and which did visual justice to the streamlined era. How novel it must have been to be able to transform engineered contraptions into streamlined, efficient wonder machines. The step taken was so great that this is how it must have seemed.

Studios produced drawings by the sheaf to dazzle potential clients with visualisations of what could be done. Loewy, in particular, was thoroughly astute in exploiting this magic trick effect and probably did more in a fair analysis to publicise the benefits of industrial design input than many of his more moralistic contemporaries.

Early studio drawings were remarkable for their quick development in originality and freshness. The products themselves were often original but it is the confidence of design technique and approach which shows most clearly. The aim was to maximise the impact of the new concept. To do this, drawings began to reflect the futurist, sleek and dramatic drawings of Bel Geddes and the equally dramatic and dynamically composed perspectives typified by drawings from Frank Lloyd Wright's architectural studios. Drawing techniques which were latterly reserved to enhance dull elevations in architecture or project futurist concepts were now being used to portray realisable concepts in the rapidly proliferating design studios. (Ref. Fig. 11).

The sudden impact of this style in the United States was unique and entirely consistent with that era and its new climate of change. The avant-garde work by these U.S.-based pioneers was to change, irreversibly, the way design was to be perceived by manufacturers and public alike.





HOUSE FOR MR. AND MRS. GEORGE D. STURGES  
LOS ANGELES CALIFORNIA  
FRANK LLOYD WRIGHT

Fig. 11 A dynamically composed perspective drawing by Frank Lloyd Wright (1939) paralleled developments in product renderings.

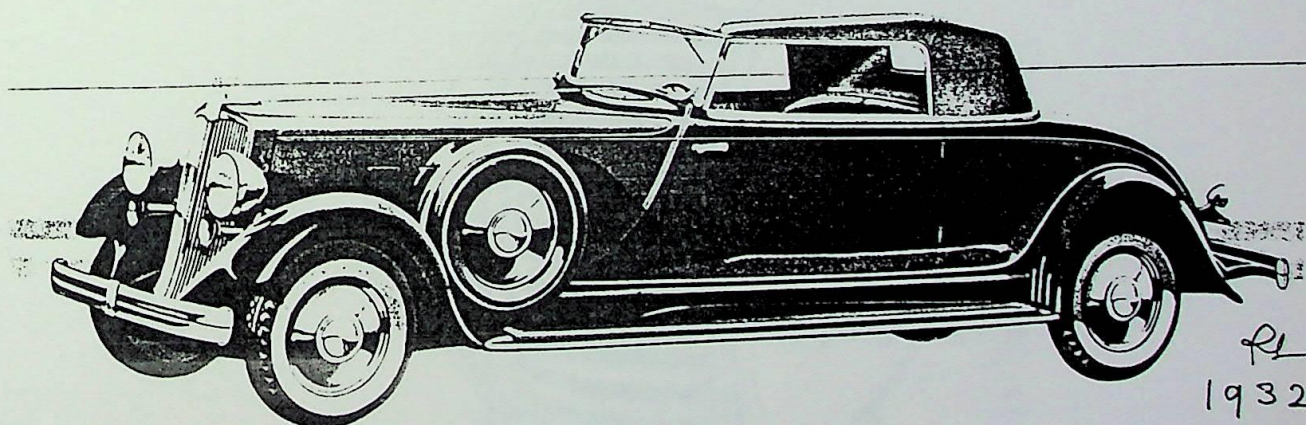
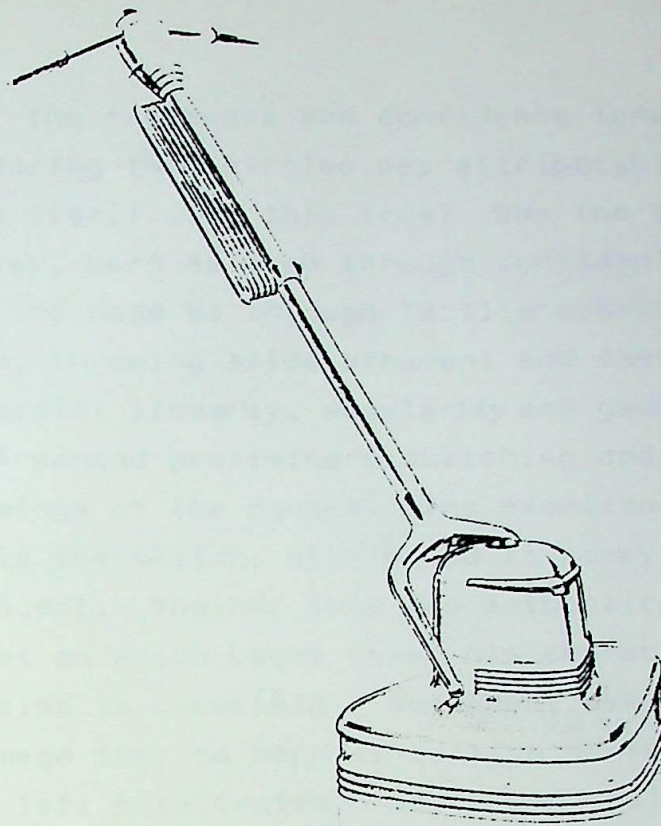
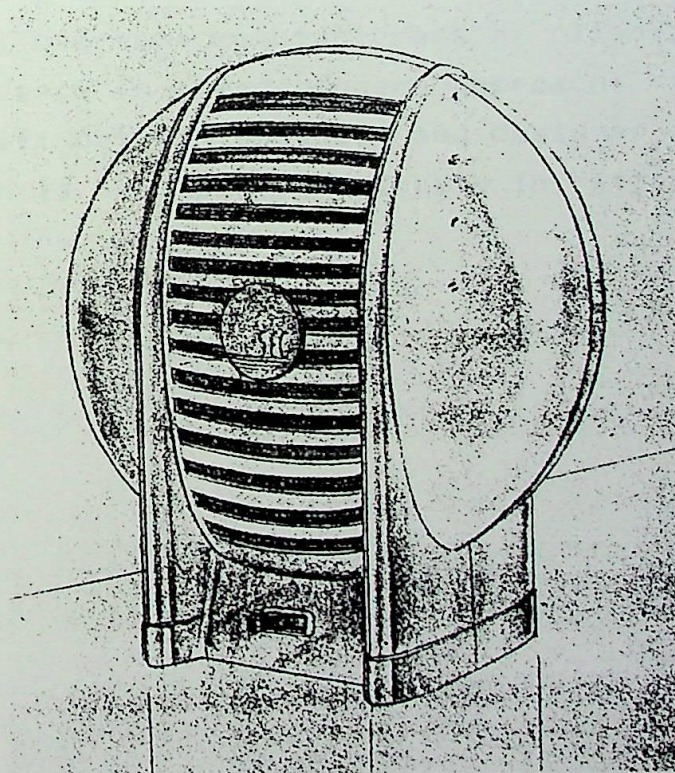


Fig. 12 A pre-airbrush car rendering, initialled by Loewy, 1932. Within five years Loewy was to show airbrushed proposals for all kinds of streamlined vehicles in a style more appropriate to the futuristic look.





Figs.13, 14 Designs by Loewy studios for a vacuum cleaner and fan heater; both shaded pencil sketches on tracing paper, mounted to board.





Part of the freshness and confidence inherent in drawing style during the thirties was attributable to the style of design itself...is this true? Was the streamlined style, so popular, born as much through confident curvaceous strokes across the page as through tactile modelling of sculptured form; throwing aside ornament and laboured detail along with modernist linearity, angularity and geometry. One can sense the freehand preliminary sketching and modelling behind the drawings of the decade. The excellent illustration of this point is the sketch, attributed to Loewy, of a high speed train concept. Whether this was authentically the original concept on which Loewy based his characteristic streamlined trains is uncertain. Not least due to the disliked megalomaniac image that he happily cultivated for himself, which left both contemporaries and design historians with perhaps a sour taste on their less egotistic palates and speculative of Loewy's full input into his studio's work.

The sketch however is indicative of a new approach to conceptualising and rendering which now encouraged and endorsed the slang qualities of 'pomp' and 'snap'; that renderings might over-awe manufacturers or clients and display a supreme confidence in the designers approach. (Certainly adding to the rift between engineer and designer, at the same time, which is the more unfortunate in retrospect). (Ref. Fig. 15).



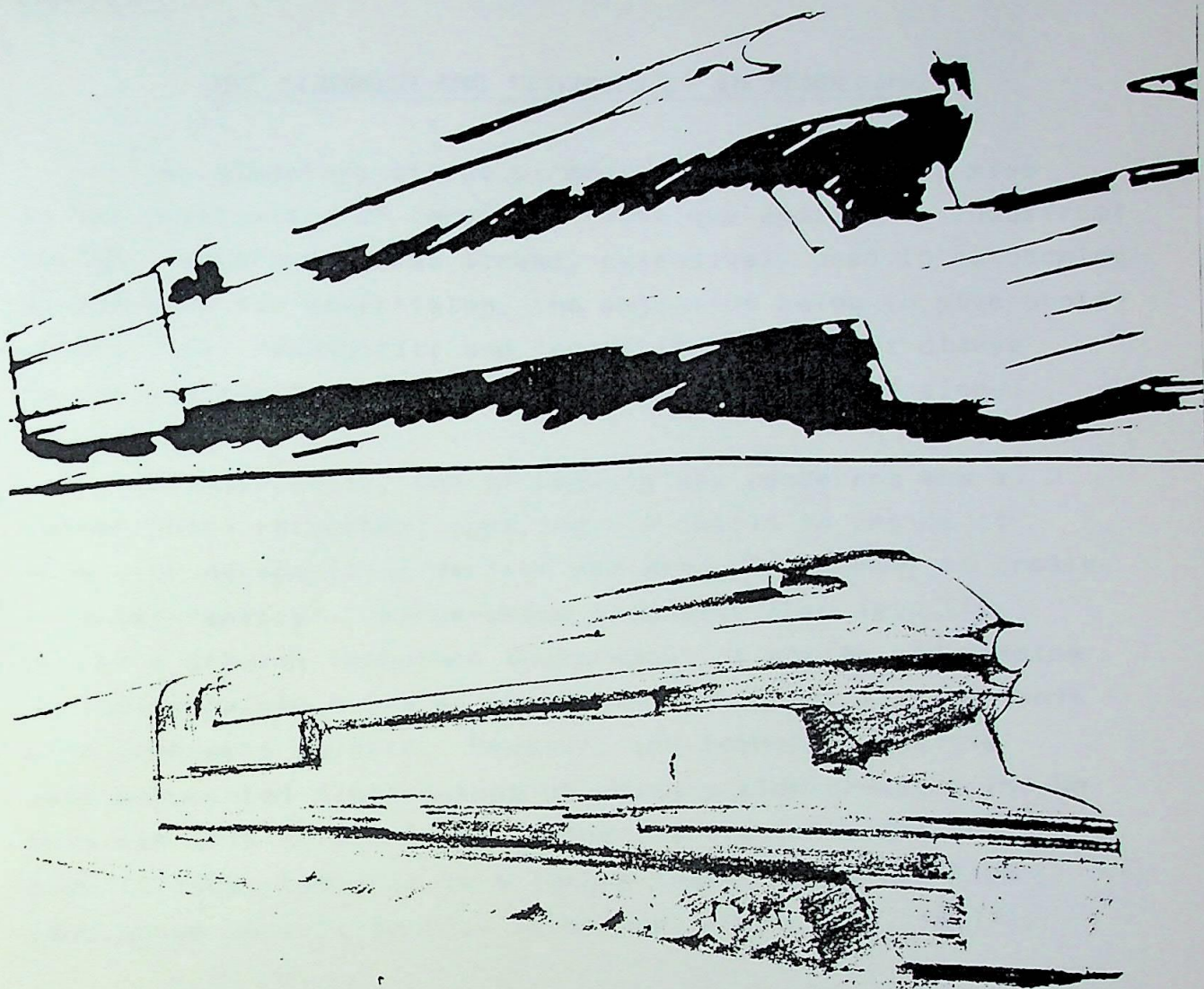


Fig. 15 Hi-speed train concept by Loewy, indicative of the new confidence in sketching style and presentation



## CHAPTER 5

### THE AIRBRUSH AND 'TECHNIQUE' IN RENDERING

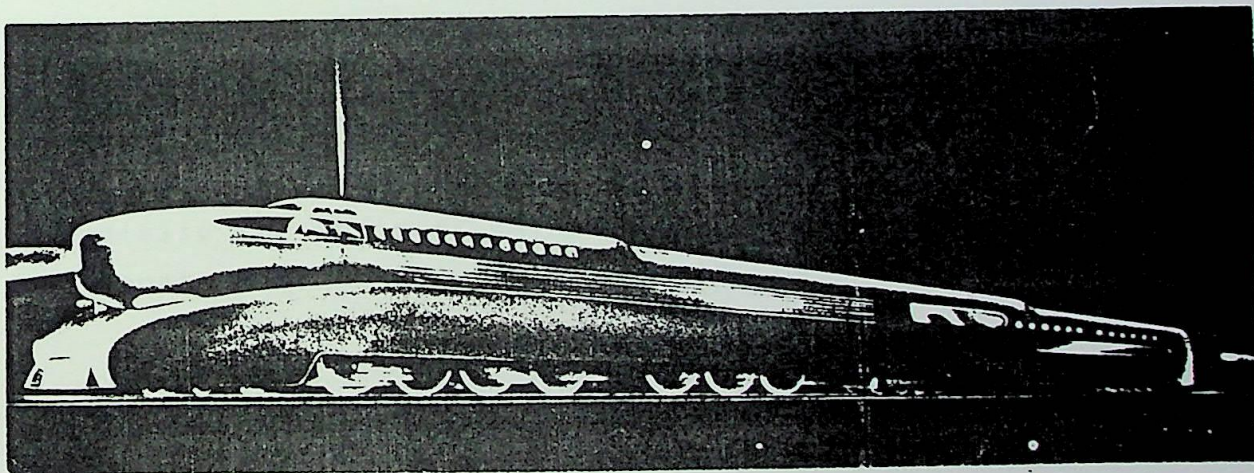
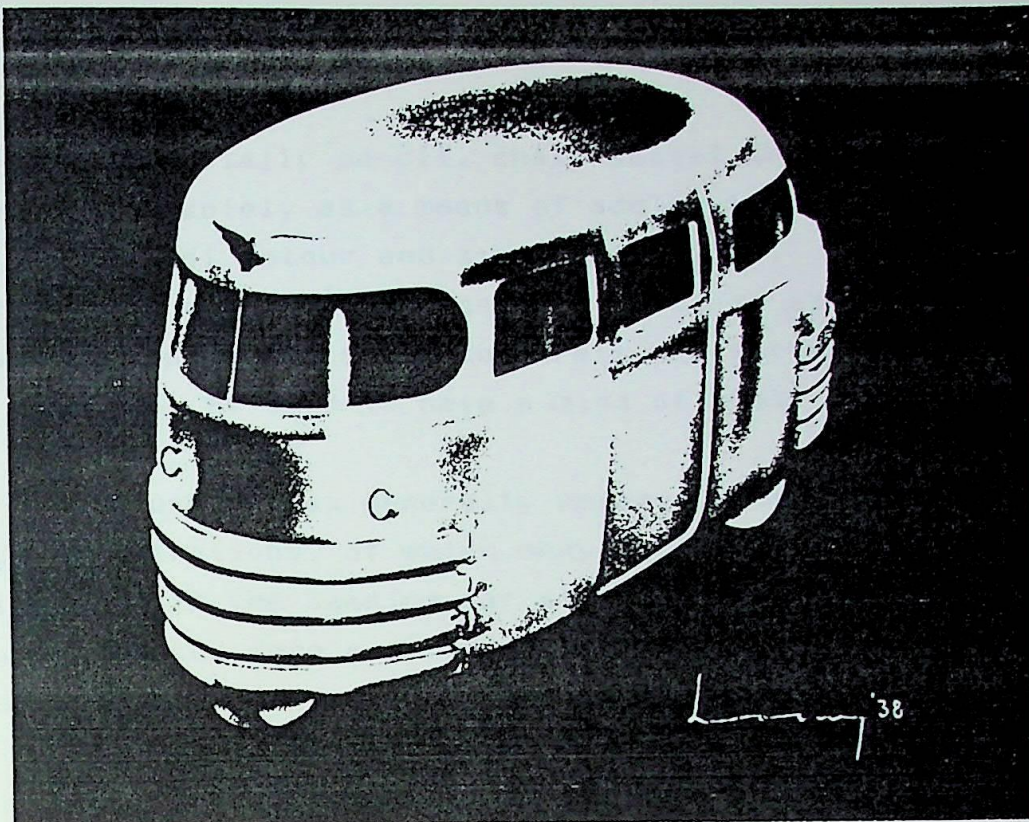
The discovery of the airbrush was an important step in the development of rendering technique applied to industrial design. Airbrushing was already extensively used in retouching photographs for advertising, the objective being to give photographs the readability and 'snap' that could not always be satisfactorily duplicated by photographic means alone.

Significantly, one of Loewy's key renderers was a former photo retoucher, applying his skills to photos of models or perspectives derived and drawn from them, to create a 'super-reality'. Airbrushing gradually came into its own as a drawing technique independent of photos and remains an indispensable means of toning and colouring illustrations with unequable results. However, the technique has the well documented disadvantage of being a slow process. Though this was less of a problem in the thirties, forties and even fifties, today it is a luxury indeed to afford time (and hence money!) to this technique. (Ref. Figs. 16,17).

Despite this, airbrushing is still used as a dramatic backup to other techniques if 'slick' results are the order of the day. Coloured pastel, used in powdered form can achieve airbrush-like effects if skillfully worked and has always been popular as a rapid means of toning and suggesting graduated colour. It is popular primarily because it is a versatile dry technique with no patience required, or time wasted in waiting for paints or inks to dry. Neither is there a major clean up operation required in its wake.

The use of paints, in waterbased and particularly oil based form, has always presented a particular quandary for the industrial designer. Early design renderers led the way by making use of dry techniques as extensively as





Figs.16,17 Airbrushed taxi-cab and train, concepts from Loewy studios. The kind of drawings which got clients used to advanced ideas.



possible - especially pencil, chalk pastel and charcoal - using paints solely as a means of adding the all important final touches of colour and strong highlight. Opaque water-colours; gouaches and temperas were favoured as they had contrastual impact and dried comparatively quickly (unlike oils which may be said to have a mind of their own).

Airbrushing was generally reserved for detailed design illustrations, of which many were produced, particularly in the dawning car styling industry where the effects produced were a perfect match for the new streamlined curvaceous forms.

Designers shied away from the commercial art technique of full opaque-watercolour illustrations on board (though they borrowed considerably from treatment and effects) considered too time consuming and, as a result, often laboured looking. There was no lack of experimentation, with renderers trying every permutation and combination of material and medium readily available to precisely or suggestively render products and backgrounds, with no loss to style and confidence. This showed, in practice, in increased use of paints with other media for fast results, especially for the ever more dynamic abstract backgrounds or vignettes which became popular in the fifties.



## CHAPTER 6

### RENDERING AS PERSUADERS

During these formative decades the technique input into design renderings which set them apart from all others was not the media used, for only the airbrush was new in real terms; nor was it even the design style. It was a symptom of commercial influence that many rendered designs now had to look literally wondrous; not only realistic; not merely accurate. What design drawings lacked before was the planning and extra 'touches' which transform the simple explanatory drawing into a true concept rendering.

How was it/is it done? This is a question many laymen, inexperienced designers, students and clients ask (intentionally so in many cases). That this is still the case is probably a testimony to the renderer's true skill and innovation and also perhaps to his harmless vanity in beholding the expressions of the 'great unwashed' on viewing the latest 'flashy' rendering. The means by which a simple picture-of-a-product, even an orthographic technical drawing, can be transformed into one of these dynamic flashy renderings - symbols of the designer's realm - are few but fundamental. Some might well consider them with suspicion as being somehow dishonest, preferring again to avoid possible comparisons with the gross and subversive advertising 'techniques' of the car salesmen or games show host.

It cannot be denied that rendering techniques can provide the opportunity for camouflage or distortion of 'the truth'; particularly in advanced-concept work which often conveniently omits the basic realities to allow free reign to innovative image. Note for example the 'wheels' on the vehicle concept (Fig.18). This type of visual juggling and assumption is often fully encouraged in situations where reality can occasionally be suspended in the interests of creative whim, ie. in colleges and advanced styling studies.



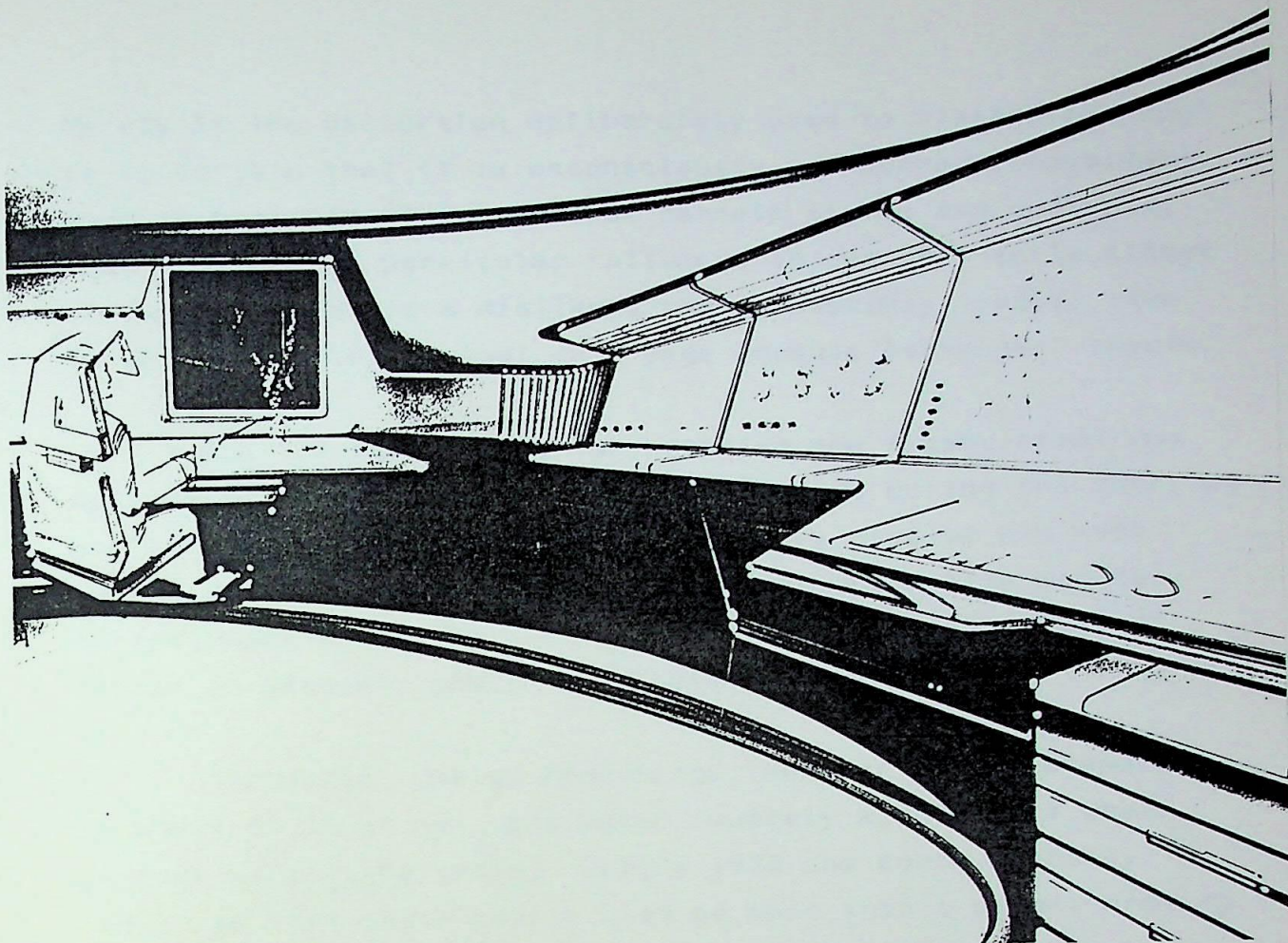
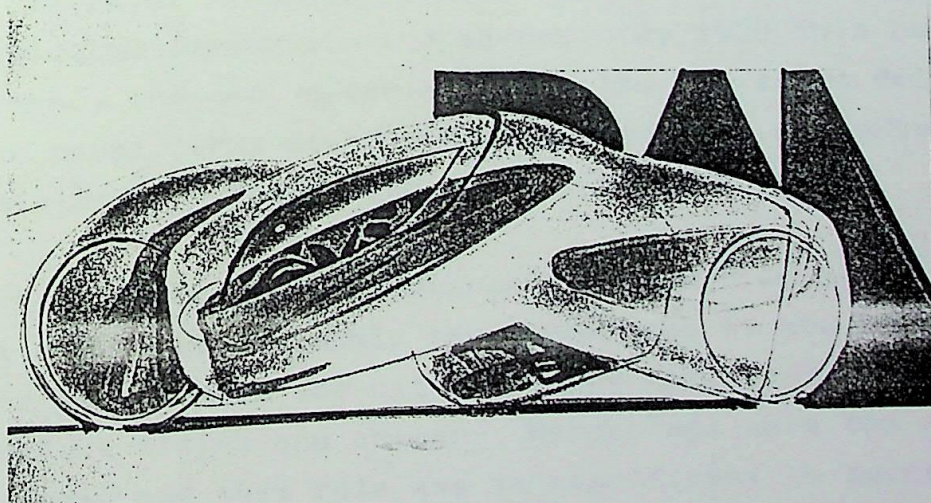


Fig. 17 A Josef Ungar 'persuader'!

Fig. 18 A concept which ignores such details as wheels which touch the ground!





Rarely is the distortion deliberately used to mislead although it is certain that it is unconsciously and perhaps unavoidably used to bias the viewer towards certain styles and concepts. This would be of particular influence in the very early stages of sketching, where a disliked, though possibly viable, idea is soon conveniently lost on a page amongst 'stronger' images.

All the basic rules for creating the flashy rendering were established in industrial design terms during the thirties and forties by such as Loewy and Dreyfuss studios and were undoubtedly taken to greatest lengths by automobile manufacturers, many of whom still rely heavily on the 'Gee Whizz!' factor to maintain public fascination and awe.

Industrial design renderings, whether one is prepared to admit to it or not, are based squarely within this whole concept of selling ideas. Before 1930 one could probably 'sell' an idea quite easily with no more than a patent drawing. As soon as manufacturers began to compete, within the same markets, with the same basic product, however, more than an innovative mechanism was required. Technical and patent drawings could portray these mechanisms sufficiently for the initiated but style and exterior detailing for covers, panels, material finishes, surface textures - all were forgotten and considered separately and ad-hoc. By 1930 this had irreversibly changed, exterior qualities had to be decided upon, on equal terms with mechanical details, mistakes had to be avoided for continuing commercial success.

The new breed of industrial designers were there to suggest and it was commonly the renderings of the ideas which ultimately persuaded the client. Clay models could rarely show surface finish and colour. Renderings were the real 'Persuaders' and this role was so significant to success that techniques were rapidly evolved; from the fields of advertising, architecture and commercial art; to show ideas in their best possible light.

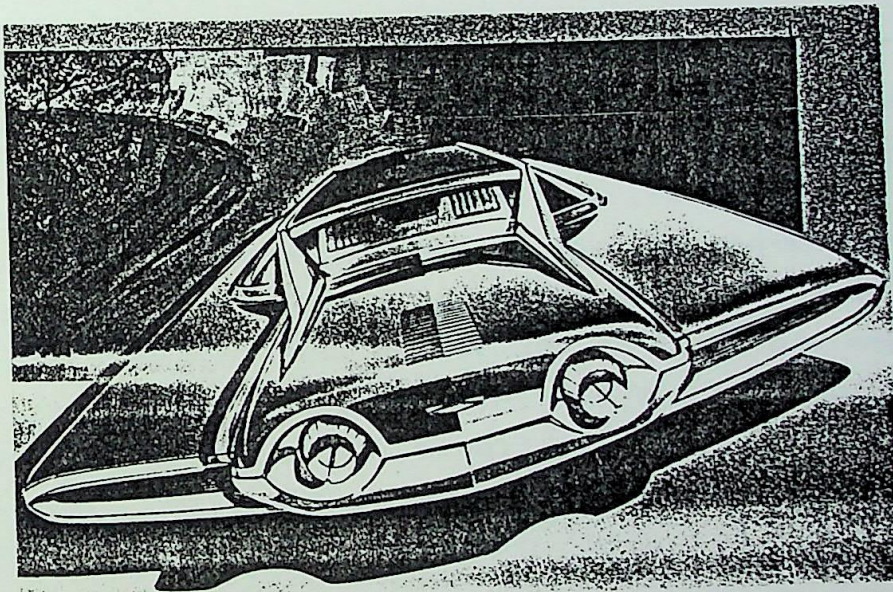
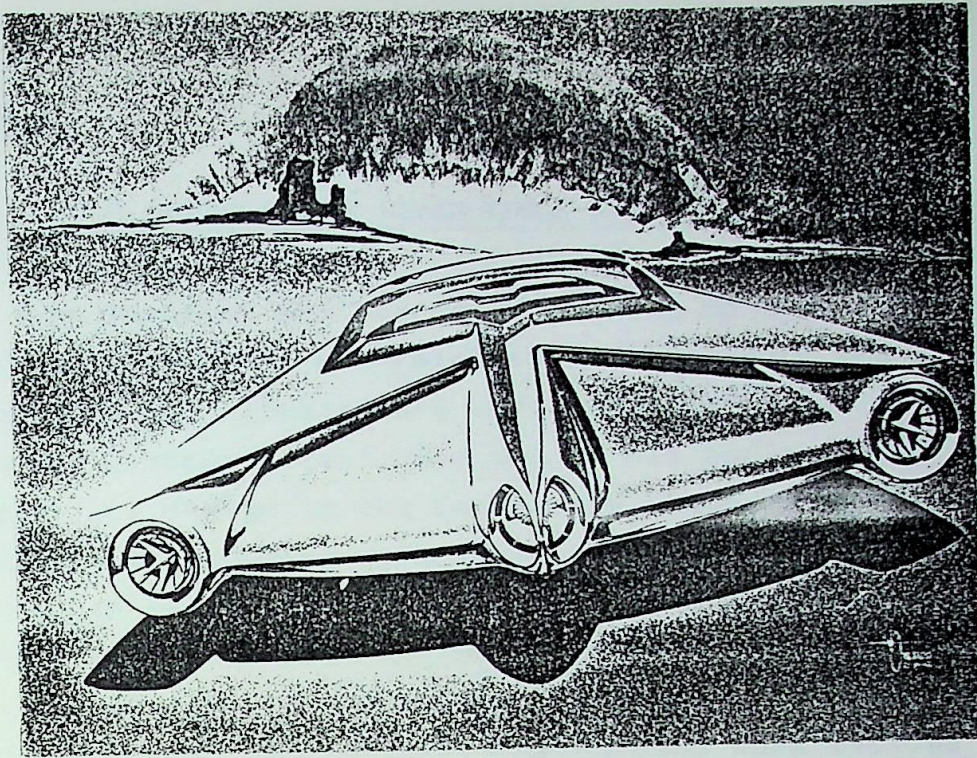


This was taken to extremes by the automobile styling studios, where the most was at stake and product designers adapted a similar approach as appropriate, borrowing considerably from automotive rendering experimentation.

The American influence embraced by European 'exiles' and natives alike is largely 'to blame' for the propagation of a 'flashy rendering' syndrome. Just as U.S. automobile design relied more and more on exaggeration and loudness of detailing so renderings cried out more and more for attention.

During the fifties the process became somehow irreversible - perspectives were distorted to the bounds of the imagination and compositions went to extremes of dynamism and imagery with colour at its most vivid. Unlike the Harley Earl dreamcars of the decade, however, this self indulgence has somehow lasted - if not thrived. Fledgling designers still strive to sell their ideas and showcase their skill through their drawings; encouraging constant originality and freshness of drawing quality for success.





Figs. 19, 20 U.S. automobile designs relied more and more on exaggeration and loudness of detailing.



## CHAPTER 7

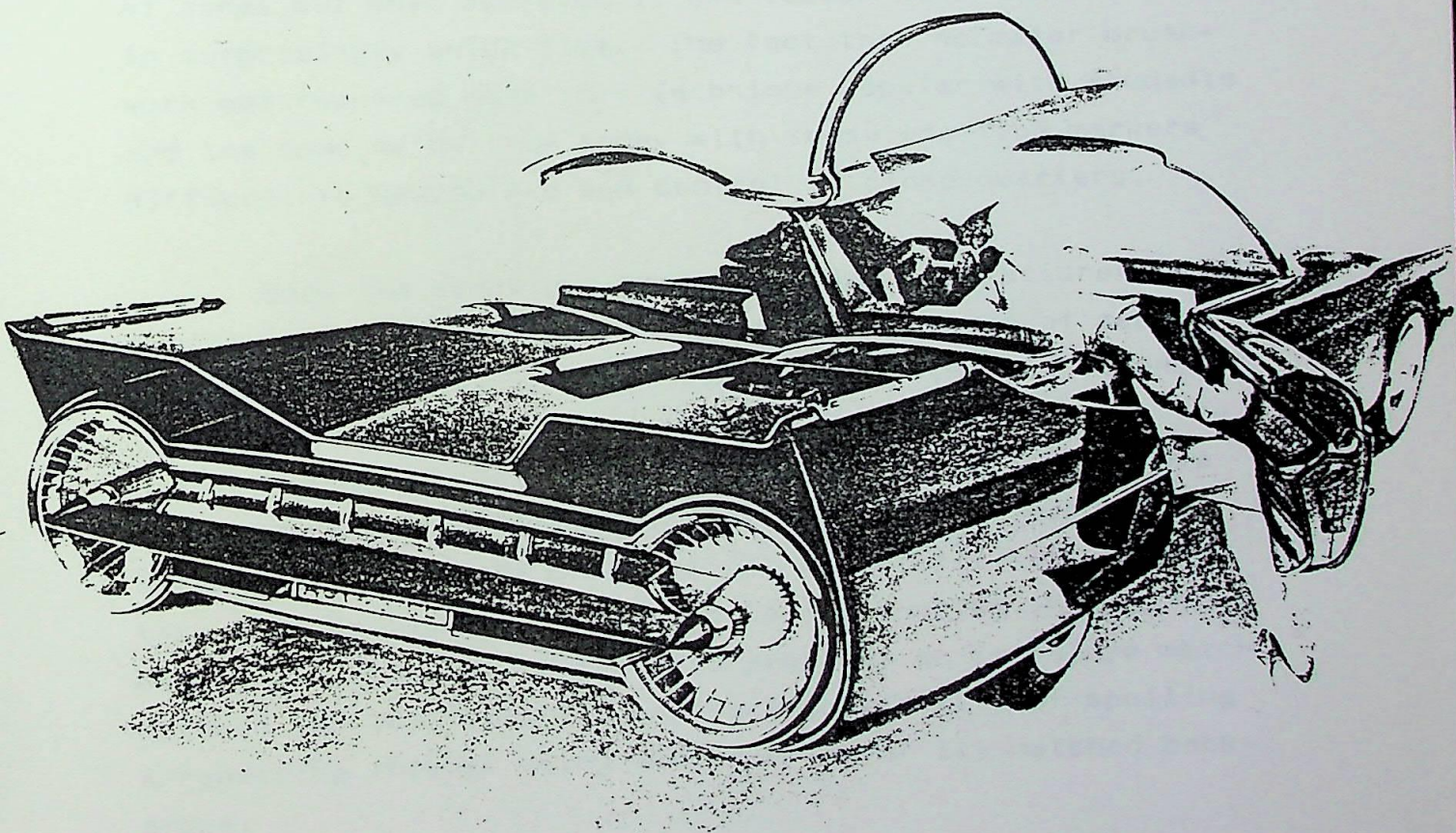
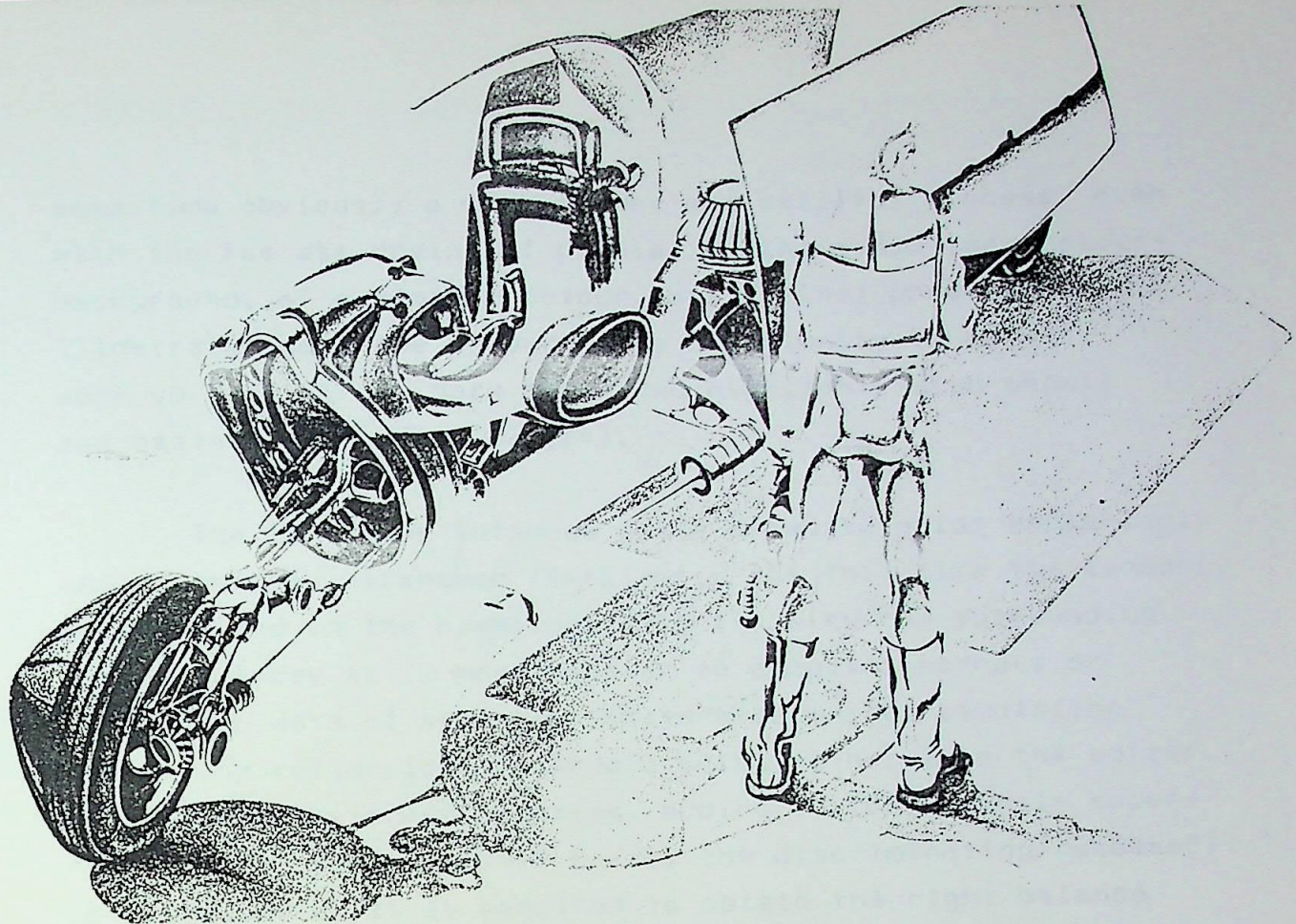
### COLOURED PAPER RENDERINGS AND OTHER MEDIA

One designer who learned his trade in the 'Fins and Chrome' years and who has retained his influence and impression on designers and illustrators alike to this day is the self professed 'Conceptualist', Syd Mead. His early training in industrial design in the Californian Pasadena Arts Center, from which he graduated with first class honours, led him into the car styling industry during the boom years of the late fifties. Thence to become a futurist illustrator of international reknown. (The term renderer could never cover the minute detail and intricate background work typical of his laborious, though always fresh, work).

In his student days, along with his contemporaries, he made extensive use of coloured pencil work on coloured papers with additions of highlight using bow-pen and ink or brushwork. This technique came into its own, as a rapid means of producing effective renderings, in pre-marker days (and remains popular as an alternative today) because most of the media required were either dry or quick dry media - chalk pastel, pencil and pen, with only scant use of guoache or ink for the all important highlights - allowing rapid sketching and increasingly essential savings in time and money. (Ref. Figs. 21,22).

The increased popularity in the use of coloured, rather than plain white backgrounds came about for other significant reasons besides. Highlighting on white paper is obviously difficult - highlights being an essential and indispensable final touch to any true blue rendering worth its salt - requiring much build up of tone to achieve the same tonal and contrastual range which is almost unavoidable with the use of a ready-coloured background. In these pre-marker days this would entail using quoaache, paint or similar, to layer on intense colour - which was more versatile in terms of the variety of colours intermixable but which was at the





Figs.21,22 Coloured pencil drawings by Syd Mead, from his college days, also showing dynamic angles of perspective and use of strong shadow and highlight.



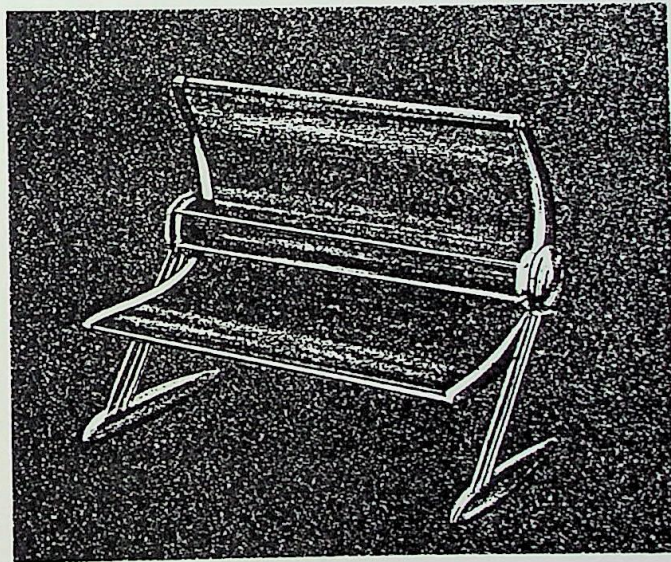
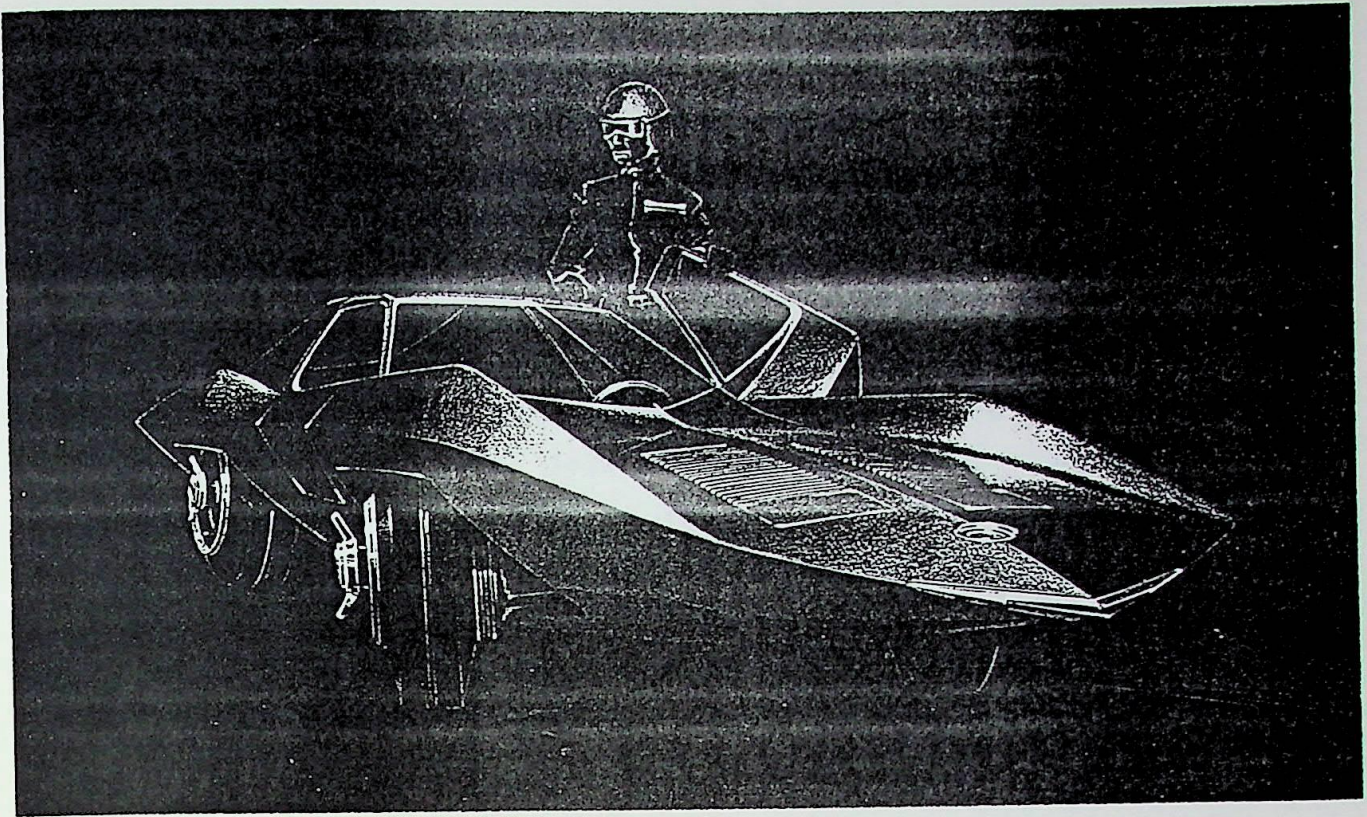
same time obviously a much slower and skillful process, even with the fastest drying of paints. Using a mid-tone colour-background, of a similar colour to the final product being illustrated gave the renderer the opportunity to quickly work up both strong dark tones and highlights with pencil and pastel. (Ref. Figs. 23,24).

The famous or infamous spots of white paint endearingly and annoyingly nicknamed 'farkles', (At this time the tendency was to blend in the highlight slightly with the surrounding colour. Today it is more popular to pinpoint corners or edges with dots of strong unadulterated white; simulating the strong reflections of studio bulbs rather than the softer contrasts of exterior lighting, adding to the slightly super-real quality often strived for by the discriminating renderer). Considerable skill is required to obtain the right balance of tones but when achieved it can foster remarkable results in surprisingly quick time. The fact that no major brush-work was required made this technique popular with students and the same holds true today with those who find markers difficult to manipulate and control in close quarters.

Once the technique became popular manufacturers added fuel to the fire by supplying ever wider ranges of paper colours and surface finishes to cater for the new demand, there has certainly been no wane in popularity since. The use of coloured paper allowed the renderer to concentrate on the line work and modelling without need of worrying extensively about the base colour; which will always shine through. Having the background colour running through the design illustration itself also provides an immediate match between the two, limiting any real possibility of spoiling a rendering through using overpowering or ill-matched back-drops.

This technique did not suddenly arrive with the fifties however, - artists had long used white and black charcoal or pastels together on off white surfaces for portrait and analytical work. These were obviously loosely done with





Figs.23,24 Two illustrations of the success and popularity of coloured paper technique; the heater is a Loewy design of 1939 and the Sports car is a 1962 concept from General Motors.



unwieldly sticks of artists charcoal; with the arrival of ever wider ranges of coloured pencils and then papers the techniques could be much more precise and considerably less untidy, making the eminently suitable for the design studio.

You can be certain that coloured pencils and papers were not developed, and ranges extended, exclusively for the fifties industrial designer and car stylist. Rather, as is strongly encouraged to this day, it was experimentation with media and techniques, by ever more demanding renderers which brought these useful items into the limelight and gave them a new function and a new market; manufacturers certainly didn't complain.



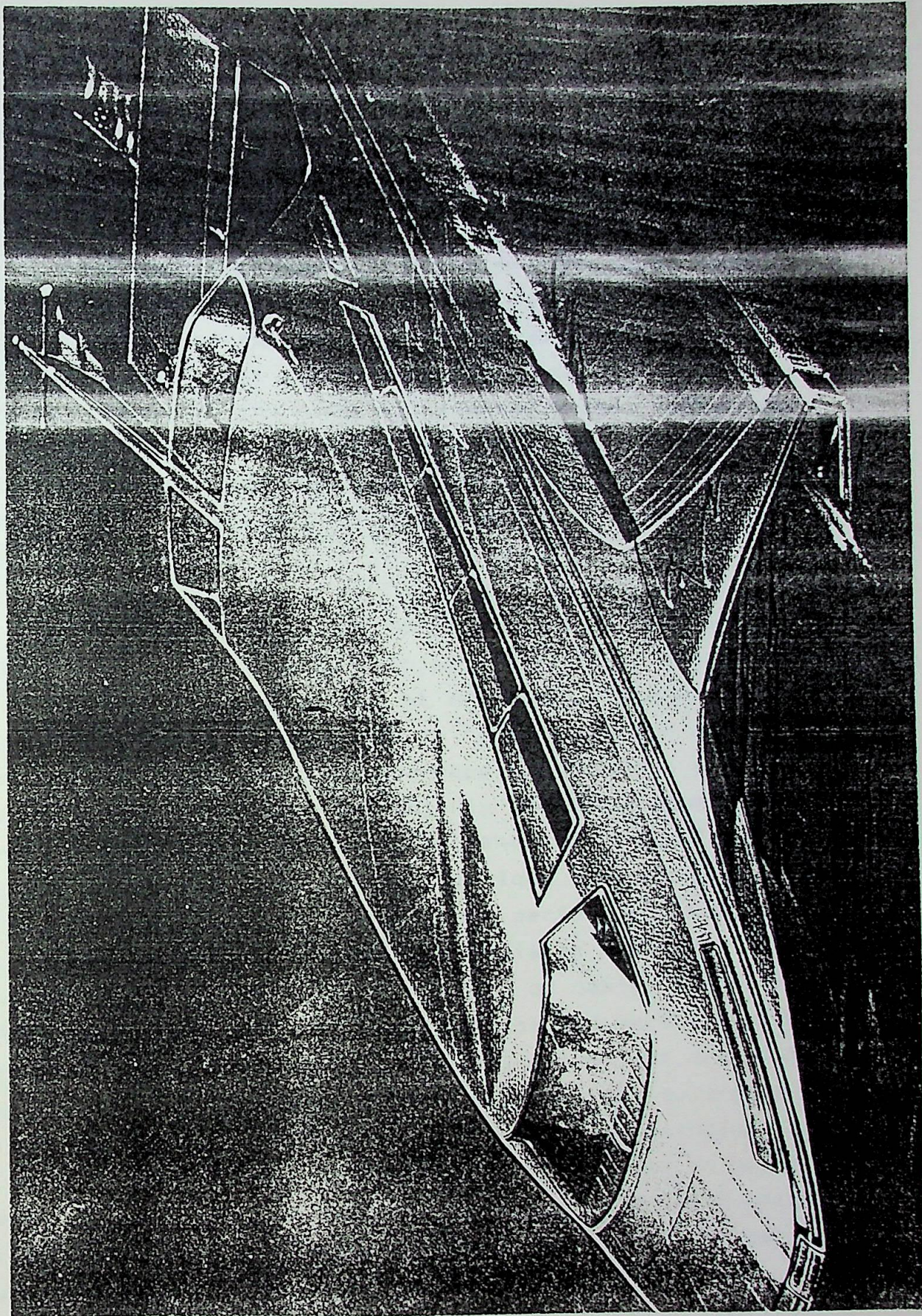


Fig. 25      A perfect example of the dynamic highlighting possible with coloured pencil/pastels and white line work on a contrasting background; from Loewy studios 1961.



## CHAPTER 8

### THE ARRIVAL OF THE MARKER

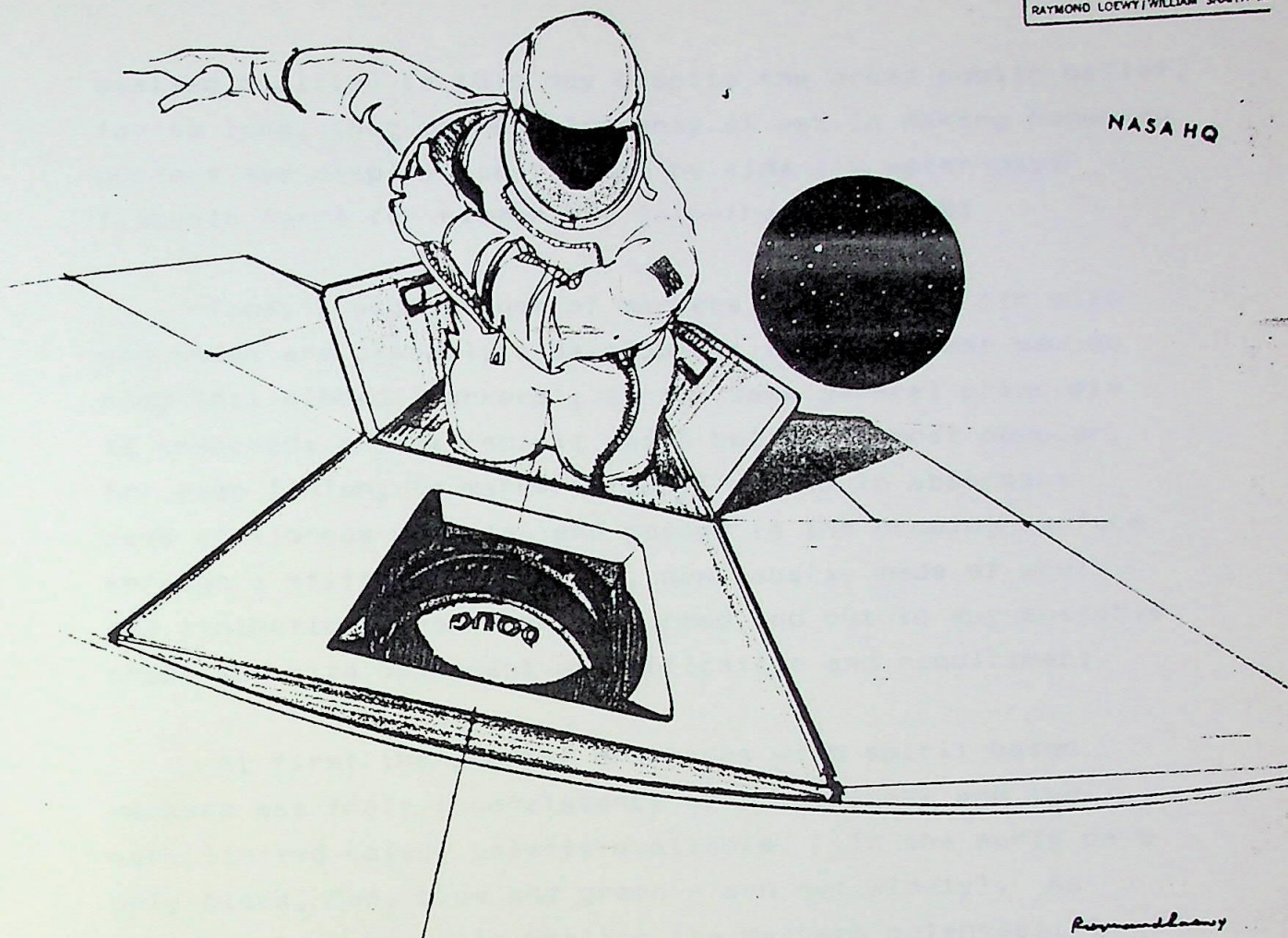
This same experimentation brought to the designer/illustrator's attention a rather unusual and unwieldy device capable of applying instantaneous-drying vivid colour to even the thinnest and most absorbant paper. Markers are a landmark in the renderers eternal quest; encouraged by ever shorter timescales and ever dissipating profits; to find the ultimate technique to produce the most exceptional results for the least amount of time, money and effort wasted.

The marker first came to genral notice during the mid-sixties as an unusually thick nibbed 'pen' capable of vividly marking a variety of surfaces. No one could know who precisely lays claim to first using the marker in industrial design terms, perhaps for giving a strong outline to a drawing or for quickly sketching some idea, when nothing else was available. Whoever it was it genuinely marked a new era in rendering technique - particularly for designers who were to find them perfect for simulating all kinds of product finishes, especially plastic. The marker has certainly had more impact on design rendering than even the airbrush. Why? Because the marker immediately proved itself as an almost magically convenient means of applying colour to renderings without thought to drying time (except perhaps that it is too fast for blending - you can't win them all). Neither did one need to bother with the entourage of messy clutter associated with painting technique; brushes, water, thinners, palettes and cleaning up time.

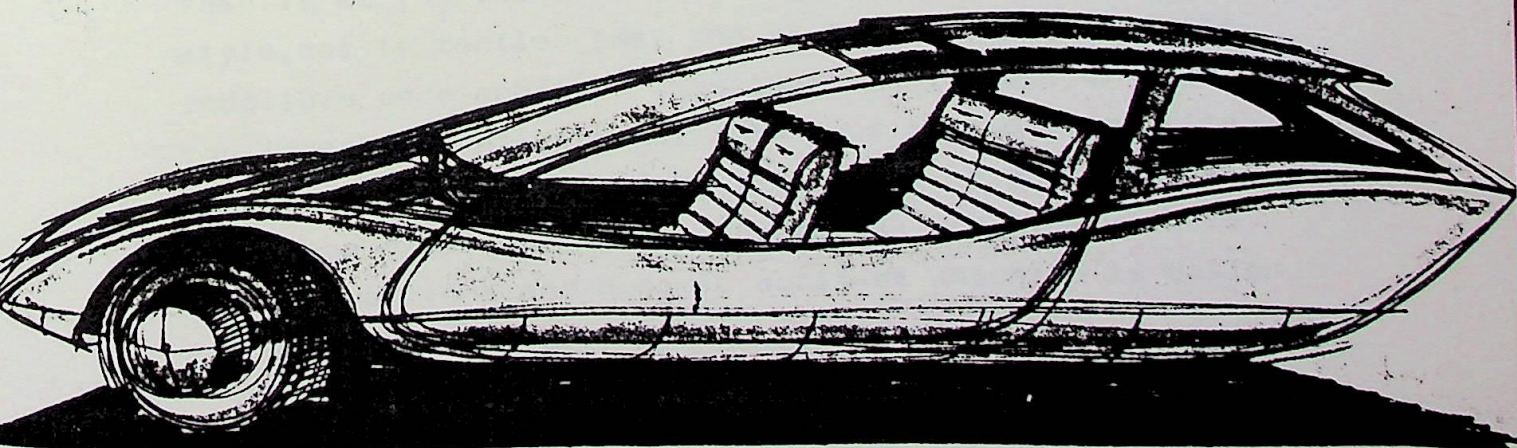
Time was the key factor in bringing markers to the very fore of design rendering technique, supplanting paints despite despite their 'infinite' colour versatility and long tradition. For industrial designs they retain their



NASA HQ



Figs.26,27 Examples of early dry marker sketch technique with pen line-work dating from the mid sixties.





exalted position to this day despite the broad public belief, for so long, that markers are only of use in making homemade posters and displays or for use by kids (in water-base fine-nib form) for elementary join-the-dots work!

Today's wide ranges of markers, in colour, nib size and shape are probably a development from Japanese bamboo reed felt nibbed 'markers'; as the same general principle is involved; an ink (spirit based being the most popular, for even finish, in markers today) soaked in absorbant pads of fibrous material and guided to the drawing surface through a stiff nib. The nib, now usually made of wool and synthetic fibres, can be formed and cut to any suitable shape and size dependant on application and requirement.

At first the premier drawbacks with spirit based markers was their inconsistency or blotchiness and the very limited colour palette available. (In the early days only black, red, blue and green - and not widely). As manufacturers began to realise the markers potential, in design rendering of all kinds, they wasted little time in introducing ever wider ranges of marker colours and tones.

By the end of the seventies the use of broad-nib markers had literally taken over from other techniques as the prime means of illustrating everything from concepts to finished designs. Nevertheless, markers have always required considerable dexterity of use for polished effective results as the instantaneous drying requires rapid working style, not to mention that the vivid marks produced are indelible once applied. Designers making use of them need considerable confidence of technique as a prerequisite to successful drawings. By their very nature markers encourage rapid application of colour and line work to obtain even tone and dynamic outlines which suits design concept work admirably.



To combat the problem of colour spread, to increase controllability and sharpness of line, specialised non-bleed papers were developed which allowed designers to work on layout-like paper (light and 'semi transparent') without fear of destroying underlying pages, or their own drawings, through excessive bleed of colour over sketch outlines. Transfer of drawing outlines from separately structured 'roughs', or underlay sketches, to the final rendering surface had always proved a difficult and time consuming business as paints will only apply effectively on thick board; with colour papers also being too opaque for trace-work. Layout marker paper now makes it possible to overlay and trace to one's hearts desire speeding up the drawing process and making it easier to correct mistakes in linework. Drawings could also be easily cut out and pasted down onto separate background work allowing greater experimentation without leaving visible traces, to the unsuspecting viewer, in the end result. The 'man-on-the-street' will nearly always assume that a rendering is executed in paintlike style and can even be disillusioned on finding out that the designer 'cheats' by using cutouts!

At this stage it seems appropriate to ask; why backgrounds at all? In the early days of industrial design rendering in the thirties rarely was there any dependance on, or time given, to the use of backgrounds except perhaps the simple use of a ground line.

It was the car styling 'industry', primarily in the U.S. (though let's not forget individuals such as Sason working for SAAB in Sweden, ref. Fig.28) which popularised the use of backgrounds even in concept work. The use of backgrounds gave scale to vehicles by the inclusion of human figures, which the onlooker might identify with and to suggest an environment which reflected the theme of the concept itself.



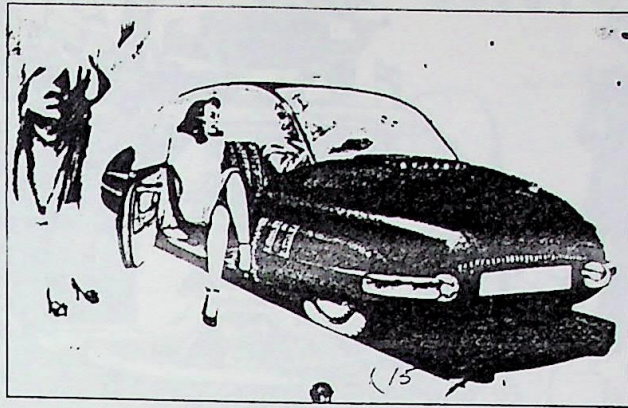


Fig. 28 A 1946 car concept rendering by Sixten Sason for SAAB using figures to give scale and interest.

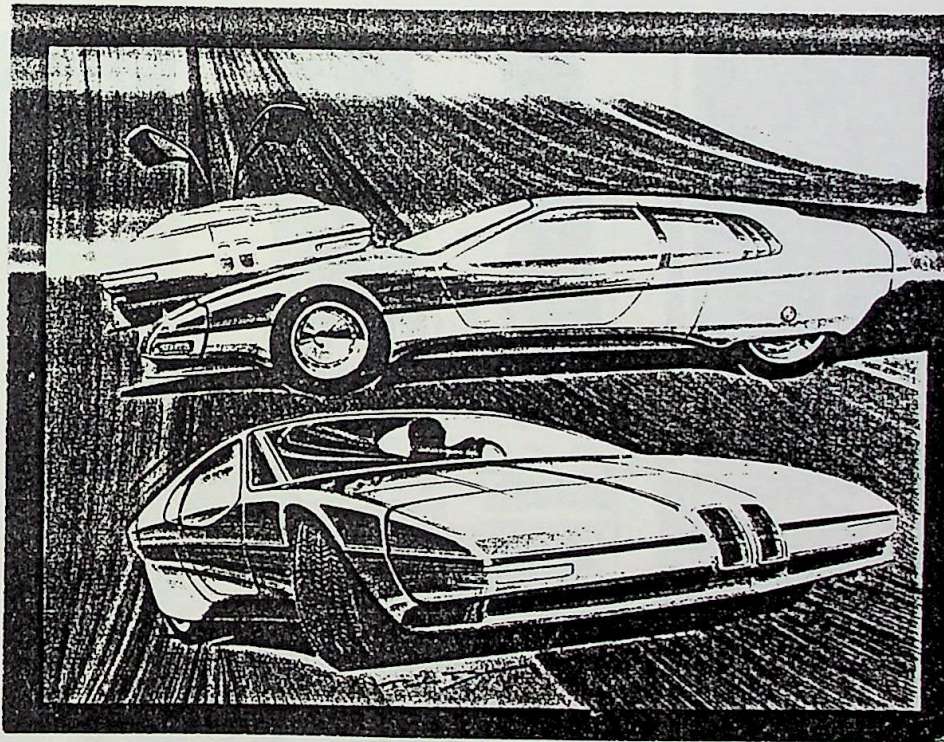


Fig. 29 Mid-sixties use of dynamic 'brushed' back-grounds and composition of illustrations.



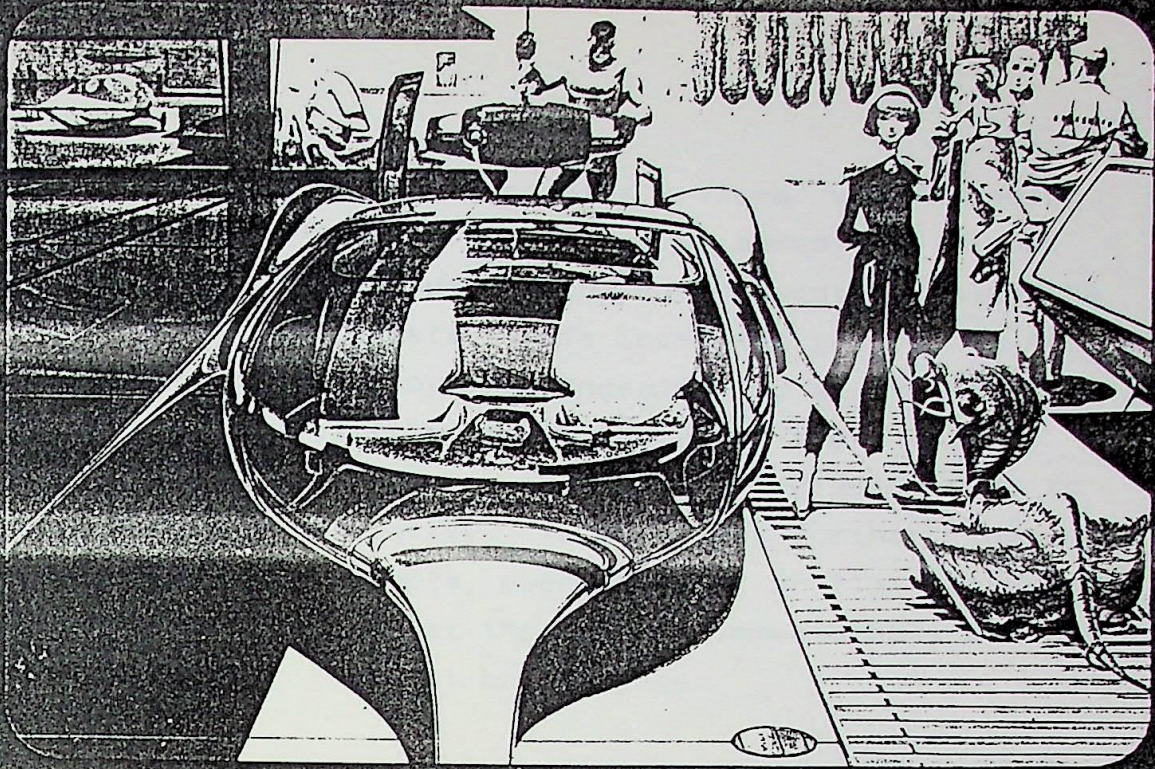
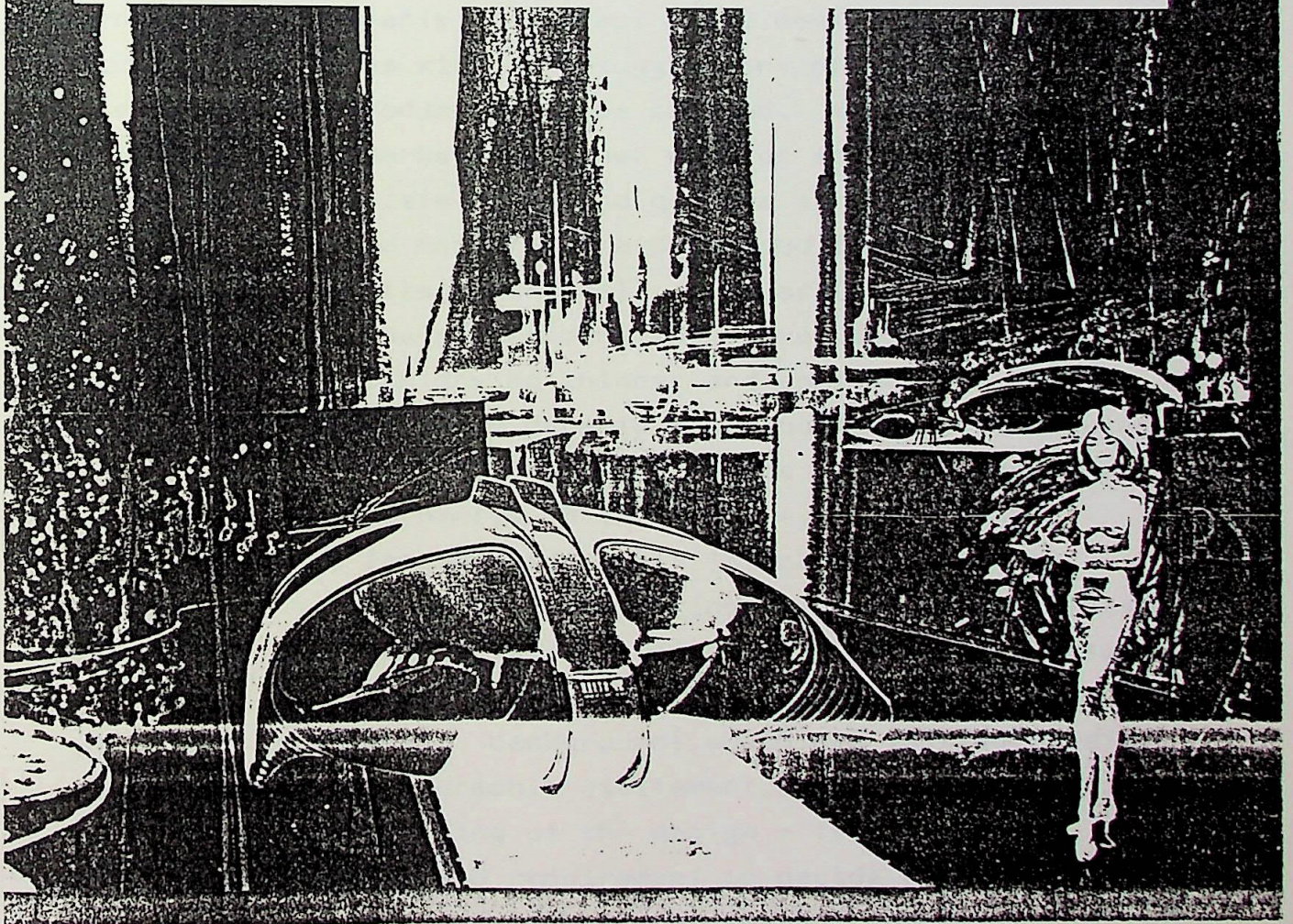


Fig. 30

Typical renderings from Syd Mead's sixties work clearly showing his developing penchant for detailed backgrounds with futuristic figures.





Rendering an object creates a visual understanding of that object. When a background is added this visual understanding is extended to the environment in which the object or concept exists. This increases the degree of information conveyed by the rendering and always provides a more visually exciting and stimulating final result. Modelling and highlighting a perspective drawing adds to three dimensional clarity. To go a step further, the use of an essentially simple, even abstract or flat backdrop to a drawing can project the drawing immeasurably and prevent it from seeming to float on the page.

For the fifties car-stylist backgrounds consisted popularly of vignettes - little desert scapes or more natural scenes for finished designs. By the early sixties, however, backgrounds were already tending to be more abstract and dynamic, particularly in concept work, consisting of broad strokes of quoades with some suggestions of ground line over which the product would be painted. With the introduction of markers came new ways of achieving similar results. To simulate the broad quoades strokes of previous years, extra broad markers were developed (or could be homemade from 'gutted' markers). Similar (and less expensive) results can also be achieved by the use of powdered pastel, wetted with a quick drying thinner and applied with cotton wool pads. These highly dynamic techniques are most popular in automotive rendering where the sweeps of colour conjure up speed and aerodynamism in the minds eye. Airbrushed backgrounds are favoured for their 'slickness' and their ability for giving a marker rendering an unparalleled finish. Renderers, particularly of more finalised designs or those which must appear to be so will often return to more pictorial or thematic backgrounds, which are less successful at inducing overall graphic excitement, but more so in enhancing understanding of the design - it is left to the renderers taste and requirement to decide what precise impression he ultimately wishes to convey.



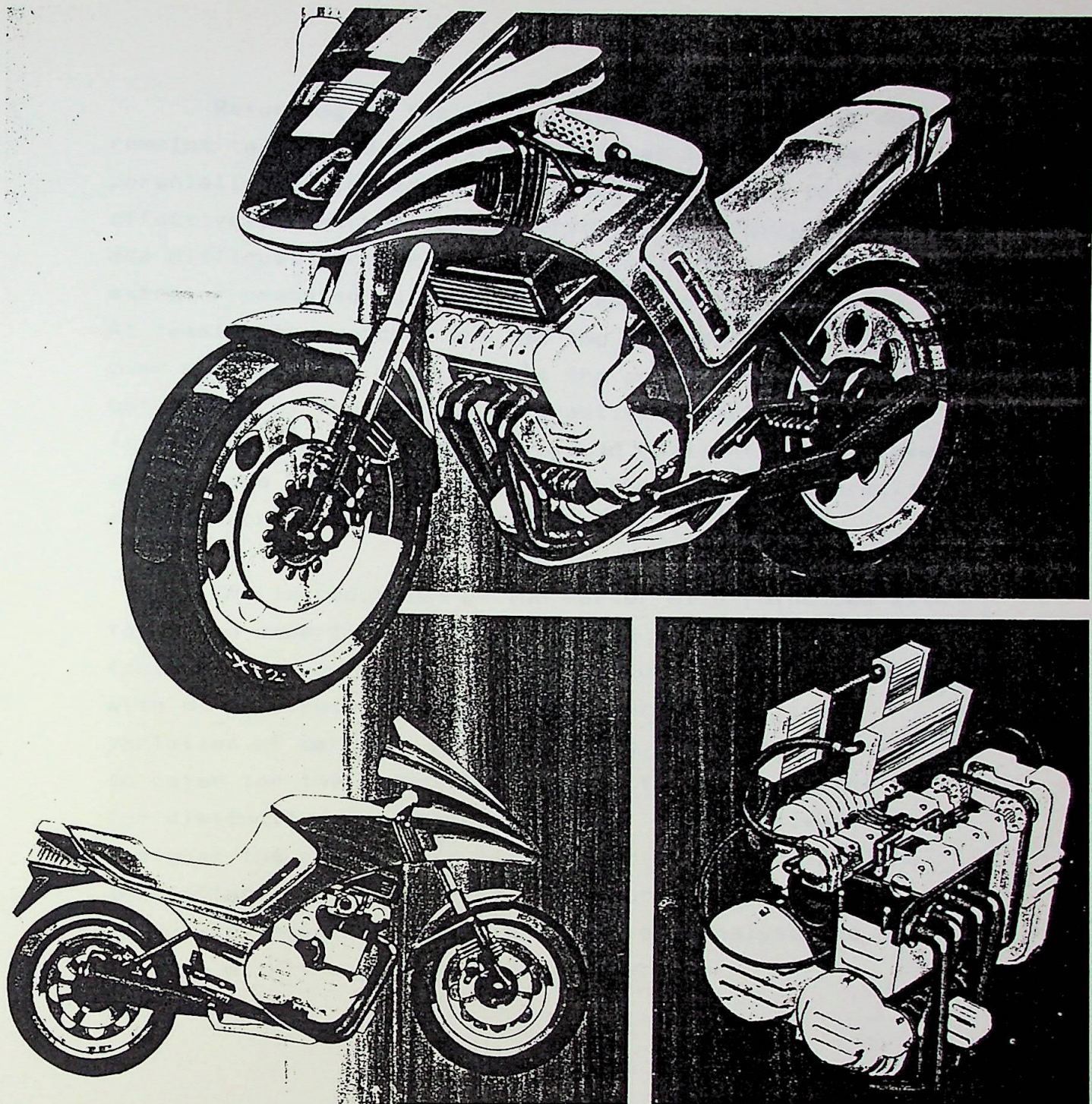


Fig. 31      Highly contrastual streaked backgrounds project these renderings immeasurably, note the way the main illustrations seems to be jumping out of the background.



Returning to the main subject of markers, it only remains to be said that the techniques involved are perennially considered to be the most difficult to acquire effectively - markers are notoriously unforgiving, mistakes are difficult to correct or camouflage often involving extra or unwanted cutting out or annoying false starts. At least with gouaches one had the opportunity to paint over mistakes and with pencils the opportunity to rub out. Lack of confidence and practise quickly erodes technique; a marker used slowly and hesitantly will never produce the kind of 'flash' renderings for which practised marker technique is famed.

The introduction of the marker also coincided with increased experimentation with mixed media as the marker could be used on a wide variety of surfaces in conjunction with other drawing tools. Today there are infinite varieties of markers, papers, boards, pencils and inks to cater for the diversification of technique in the quest for distinctive and imposing style. For the fledgling designer the choices are little short of confusing, the most effective remedy being to encourage experimentation as much as possible and to exhaustively analyse and keep in step with the visual work of others.



## CHAPTER 9

### THE FALL AND RISE OF THE 'FLASHY' RENDERING

Despite the renderings undeniable usefulness, during much of the sixties and seventies there was little emphasis placed on its practice. By this time of course the industrial design profession had been considerably respectabilised and had broadened its horizons to involve in depth appreciation of production restraints, engineering, markets, ergonomics and so on - all elements which would ease the 'selling' of ideas to discriminating clients. As Dick Powell puts it in the introduction of his relatively definitive techniques book (page 9); "...this new and wider role brought with it a much improved professional status, partly because the ability to rationalise and quantify is more tangible (and incidentally more bankable) than the ability to articulate and resolve aesthetic problems." This has resulted in many industrial designers becoming more or less design engineers with a consequent lapse in high quality drawing skills in favour of three-dimensional modelling which is always much preferable in explaining concepts - but is proportionally much more expensive and time consuming, often by a factor of ten at least. Over the last decade, and more, clients have been less and less able to afford endless models and so rendering skills have, once again, regained some importance. Dick Powell also enthusiastically predicts that "this trend will... continue because of the huge diversification of product lines to suit smaller and smaller market segments". He is obviously banking on this with the introduction of his books which are probably doing more than is admitted in influencing and enlightening students and professionals alike, at least on this side of the Atlantic. This predicted re-emphasis on product styling and visual impact will once again bring confident rendering skills to the fore and the increasing numbers of books and articles on the subject can only encourage more developed rendering skills and diversity of technique.

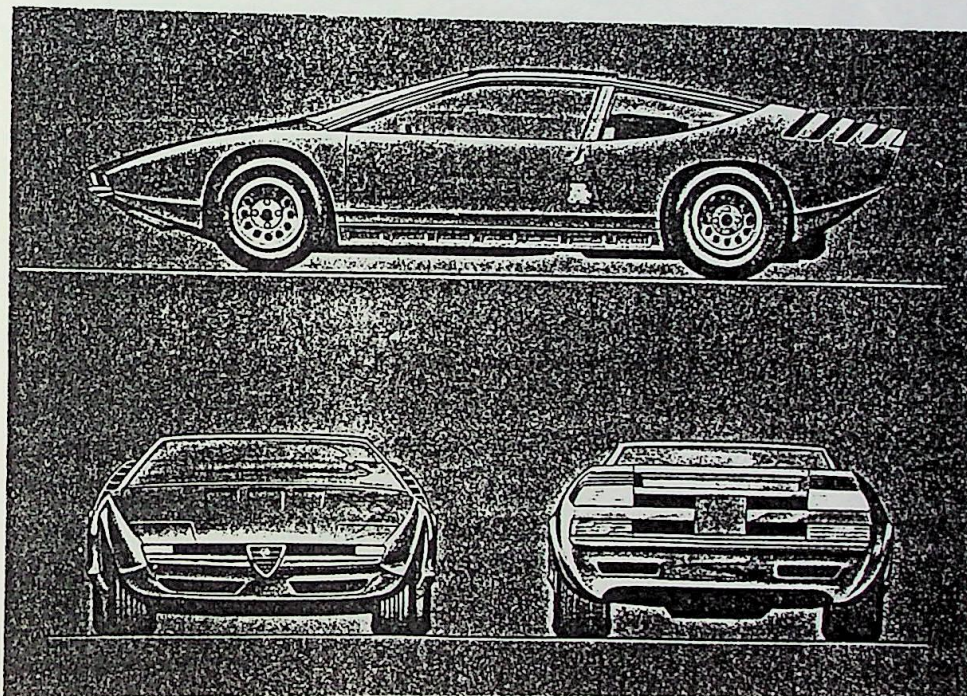
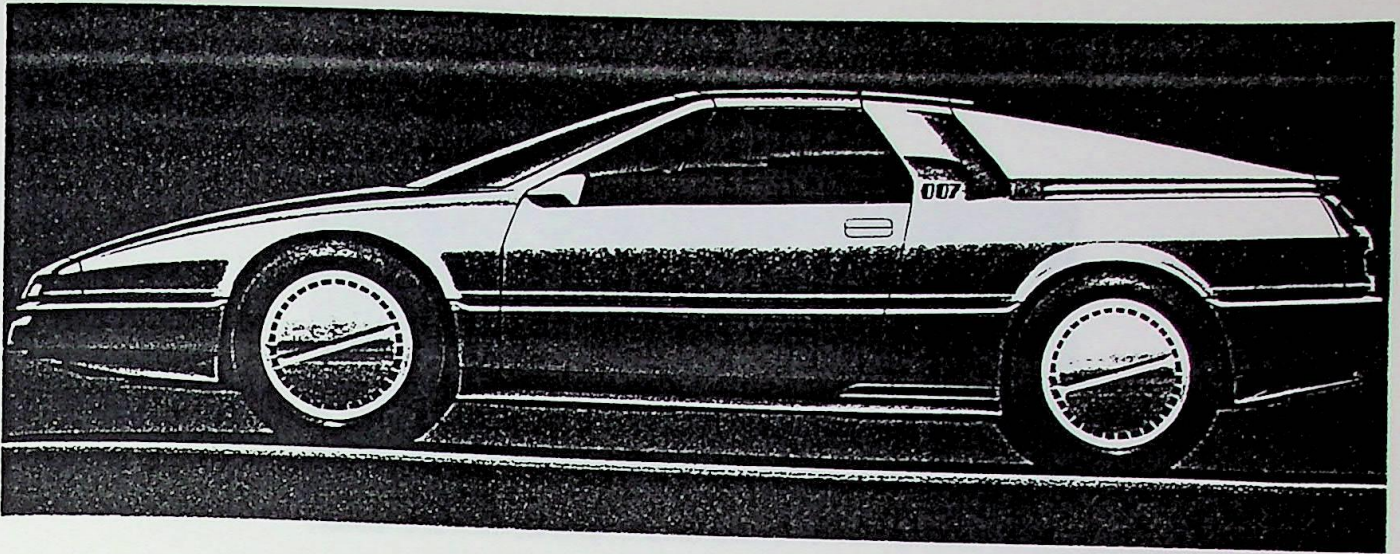


In the light of this perennial and hopefully increasing interest in design rendering technique it is appropriate to return to a question tentatively posed but largely unanswered earlier (in the interests of chronological order) - How is the common-or-garden drawing transformed into a 'flashy' rendering?

It is fair to say that there are two extremes of technique - and it is up to the renderer to decide where precisely he will fall between these extremes to take advantage of, or to suit, all circumstances. His choice will depend on the client requirement; does the rendering portray an unrealised concept or a developed idea? Is it to explain a mechanism or enhance an image? These kinds of questions must be answered, consciously or unconsciously, before any rendering is undertaken to establish philosophy. There are huge differences, for example, not just in style but in philosophy between the automotive renderings by such as Giorgio Guigaro and those typical of conceptualists like Luigi Colani or the reknowned work typical of Royal College of Art students. The difference being caused, I believe, by three main factors; the degree of 'persuading' which the rendering is required to do; the personal philosophy of the renderer and in terms of the design itself; the balance between in depth realistic design detailing and overall innovative styling (which is usually dependant on the stage to which the design work has been taken not to mention the design emphasis as dictated by the brief).

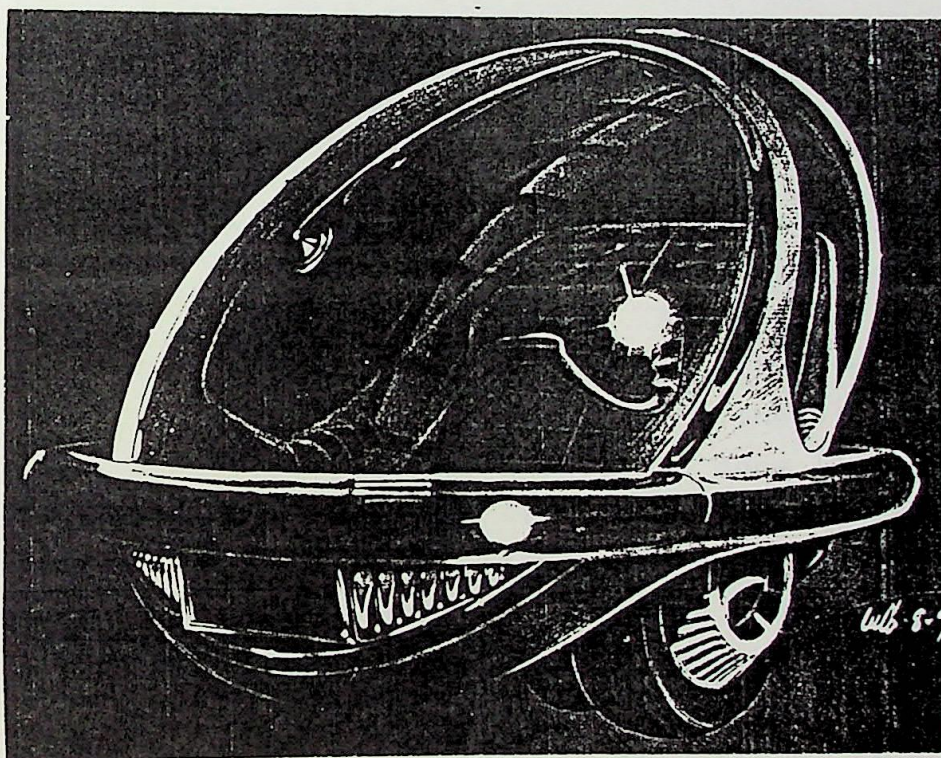
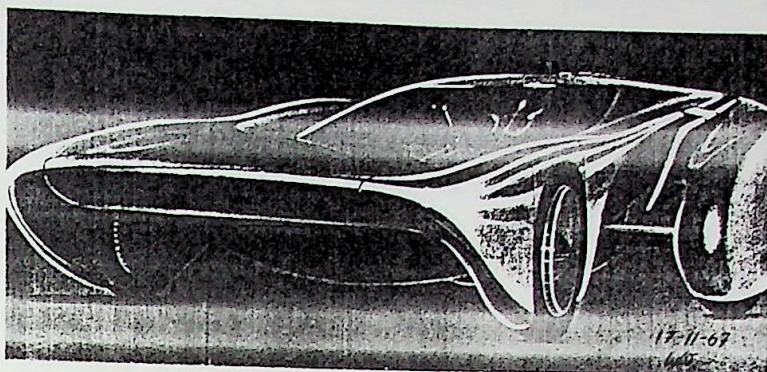
Take a look at the differences between the renderings in Figs. 32, 33 and Figs. 34, 35. What is it that makes them 'flashy' and persuasive or informative and explanatory? Firstly, the degree of persuasion - this was a key factor particularly in the earliest days when almost everything was new and designers were largely involved with extraneous styling details. If Loewy & Co. could see the present output of the R.C.A. transport faculty





Figs.32,33 Typical renderings on blue backgrounds from Guigaro's ITAL studio.





Figs.34,35 Colani concepts from the late sixties.



it would surely gladden their hearts! Loewy was himself the ultimate persuader or industrial design 'star' and the drawing output from his studios tended to mirror this. Whether he might like the modern design style is arguable, and academic, but there is no doubt of his affinity with the drawing style and its inherent charisma.

This style, in general, has four main features all based on exaggeration, super-reality and brashness -

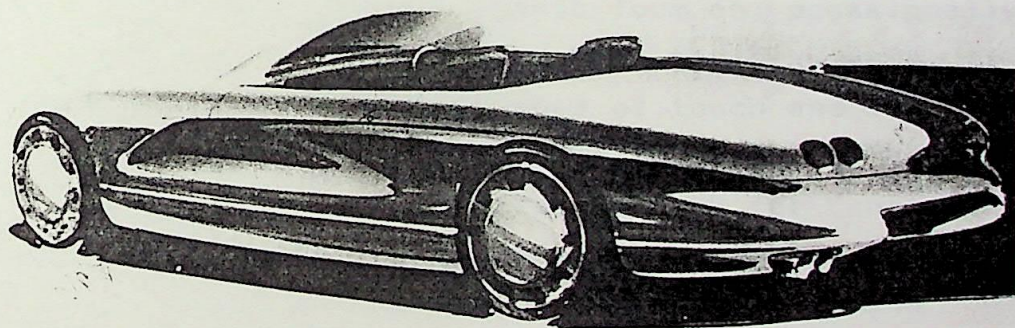
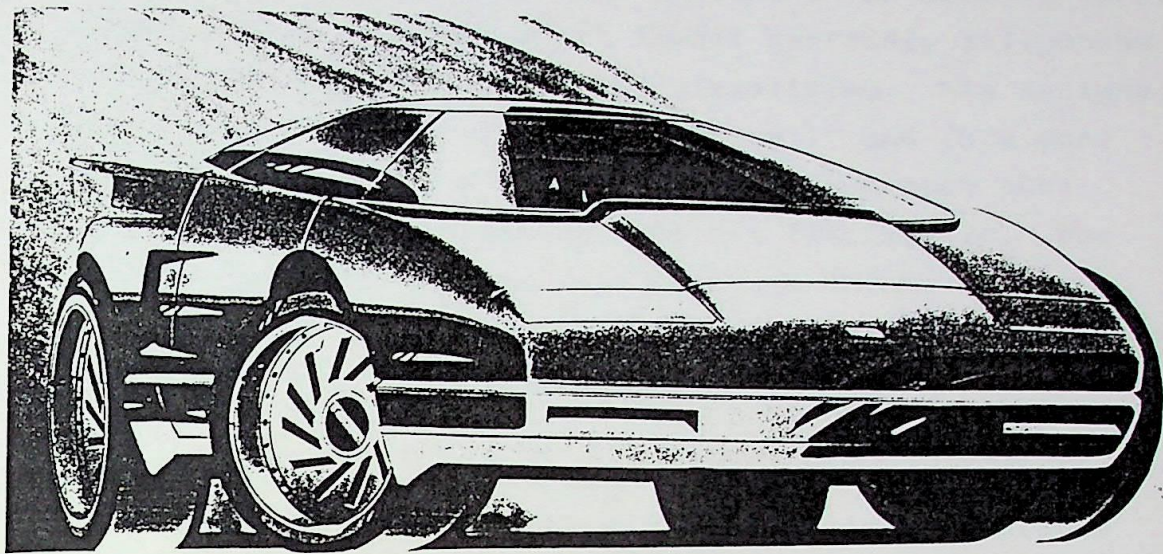
1. an exaggeration of tonal contrast and colour intensity,
2. a stylization of highlighting,
3. a use of unexpected or unusual perspective, and
4. a stylization of treatment of surface quality which is suggestive and essentially impressionistic;

all of which could be further enhanced by appropriate background.

These were, and still are; the key means of transforming a rendering from an 'ordinary existence' as just another explanation drawing. The degree to which these persuasive techniques are used can often influence the onlookers perception to a level where the view is overdistorted and almost telling a lie - here lies the 'dishonesty' (which has to be avoided by treading a fine line) which might otherwise catch a client unawares and possibly 'boomerang' back on the designer. However, that is not to say that these techniques if used in moderation and full awareness are to be steered clear of, for they are inherent in every rendering, by definition, to some degree.

Guigaro's car renderings generally show a relatively restrained and moralistic approach which is almost surprising for this industry (and refreshing if one eschews automotive hype). The perspective is always realistic, highlighting is extensive though restrained and there is little stylization. Perhaps this Italian has never needed to push the merits of his design work and abilities and therefore largely dispenses with much of the hype which





Figs.36,37 R.C.A. concepts making full use of suggestive sketching technique to give the illusion of detail, all enhanced by 'aerodynamic' backgrounds.



can surround concepts presentations. Giugaro as is common amongst Italian designers was trained in an architectural school and environment which almost certainly influenced his way of problem solving and visualising. His designs are rarely futuristic or 'off-the wall' and this more likely explains the staid and detailed approach that is most evident in drawings from his ITAL studio. The latter holds extra conviction when one thinks of his contemporaries - Colani, DeLucci and Sottsass - who rarely like to stand still in design terms.

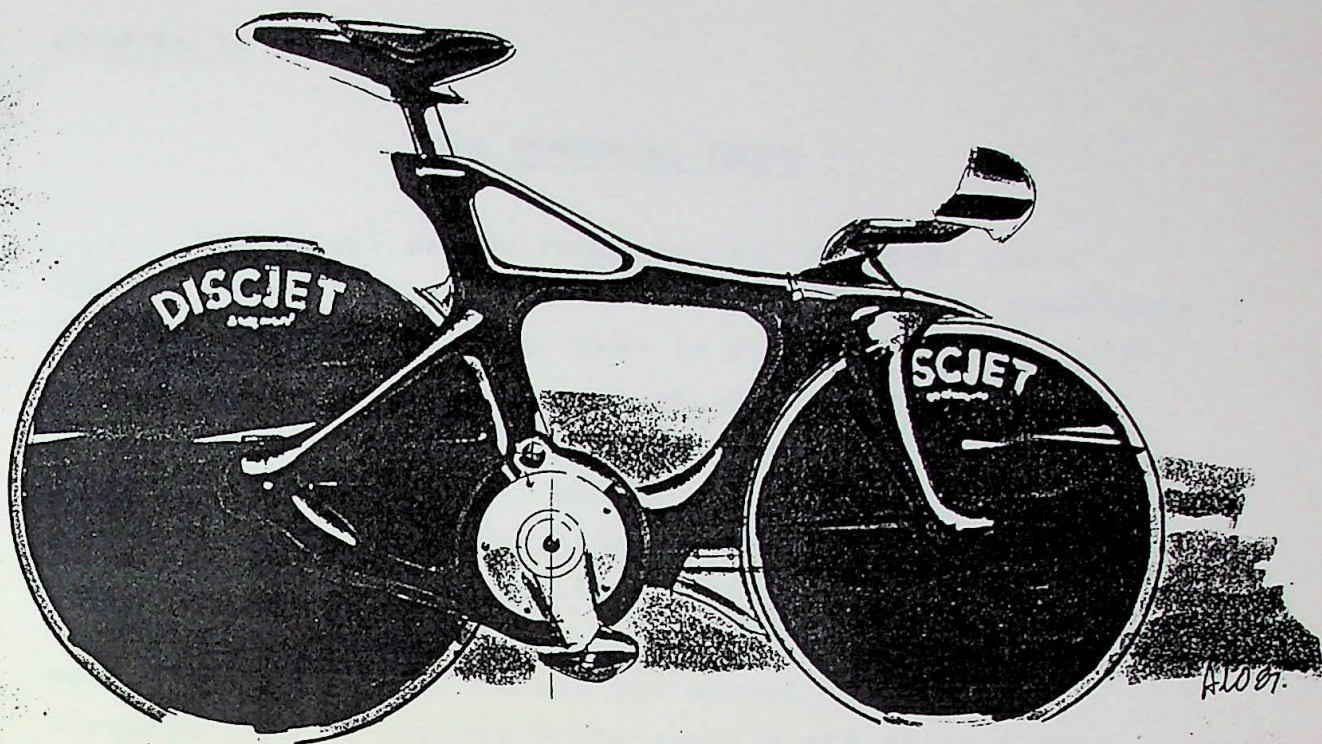
ITAL studio drawings are famed for their 'cleanliness' and distinctive use of plain blue colour backgrounds. Unlike typical R.C.A. concepts, for example, or even those of Colani, Giugaro's design frequently enter large scale production; there is little scope for 'pretty pictures'.

Colani's drawing style is worthy of note to contrast against Giugaro; Colani has always been considered more of a visualiser - a futurist - a designer with a style of his own which imposes organic form on, occasionally, the most unlikely of objects. This style appeals, if it appeals at all, to the senses of touch and sight; encouraging forms that are generally strong visually and extremely tactile. His recent work for Canon, on new camera designs, publicised some of his rendered proposals. They are entirely more suggestive and 'conceptual looking' than a Giugaro. Why? Because Colani was being employed as an 'ideas-man', in terms of form and structural concept which he would interpret as being given carte blanche to approach the designs in an original way within his own characteristic precepts of style. This difference is evident in the style of rendering which was used to portray the concepts. Whereas Giugaro has to think much more of production and realistic restraints, Colani will often ignore over restrictive details, to the apparent chagrin of the the Canon in-house design team who were left to sort out the wheat from the chaff in Colani's styling work.



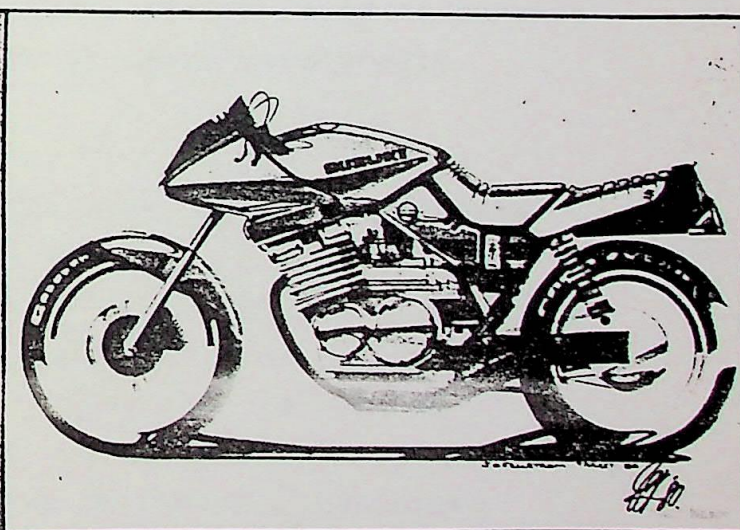
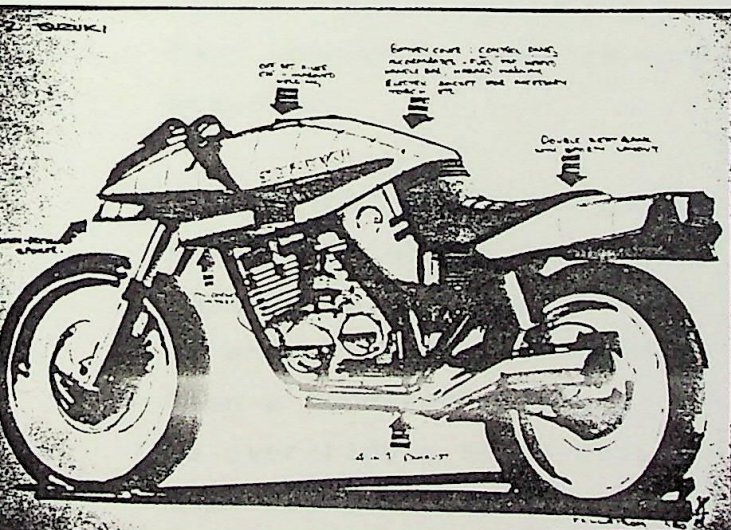
By the same token R.C.A. students are naturally encouraged to be as creative as possible, as indeed designers are frequently encouraged in industry itself; it being widely believed that it is only through much superfluous conceptualising that an eventual realistic direction can be taken. By the very nature of really fundamental concept work, the process must be restrained as little as possible by working method and slow technique, a quickfire approach is obviously the most appropriate. This often results in very instantaneous direct drawings which can put more final, laboured 'illustrations' to shame. On the other hand it is not uncommon for designers to develop a methodical and precise technique from much practise and refinement, yet their aim is to make the rendering appear loose, free and born of five minutes of genius! This type of rendering is often the most seductive to the unwary, appearing to be easily imitated; however, these same renderings usually harbour the most personal and inimitable of qualities which the designer himself might not always be able to reproduce precisely - never mind an admiring student. (Ref. Figs.38, 39).





Figs.38,39

Confident sketch techniques using marker rarely provide boring results; what is omitted is as important as what is coloured-in. Both these drawings show details deliberately left unfinished with simple streaked marker work which follows a dynamic angle through the drawing, strongly suggesting shadows and reflections.





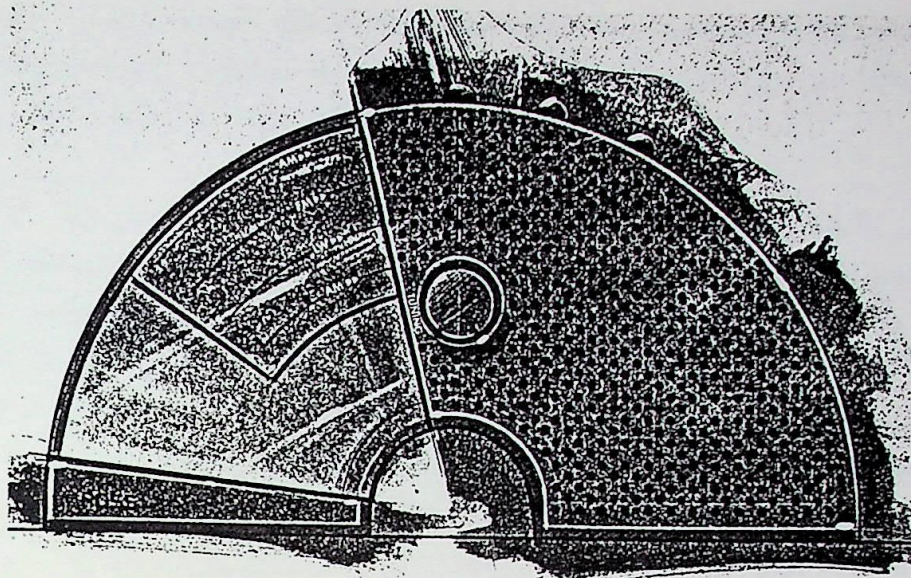
## CHAPTER 10

### THE RENDERING TODAY

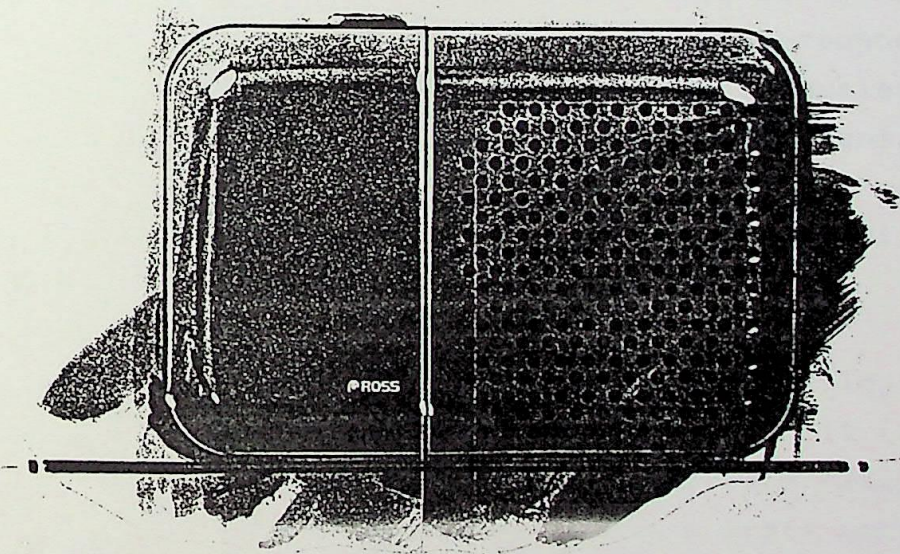
Industrial design rendering as it stands today remains primarily a development of the increased importance of selling and explaining ideas to a client as expediently as possible using the most effective means available (otherwise the marker might never have been popularised and renderers would still be using paints). Within these universal constraints designers may love brash 'pretty pictures' and may continue to use them, secondarily, to reflect their own skills, talents and design personalities. Nevertheless the actual methods and formulas used to produce these visuals are still firmly rooted in fiscal convenience to produce a desired effect. The general proof of this argument being found in the much more 'extroverted' character of typical automotive renderings in comparison with product-renderings. Automotive design is a very high cost business, particularly with regard to the construction of prototypes and it is in this branch of design that the most extensive use of 'flash' rendering techniques are employed to enhance fast conceptual work as much as is two-dimensionally possible.

This general argument may sound utterly commercial and devoid of any 'drawing for the sake of drawing' sentimentality - but in reality this is often the level to which the less enthusiastic renderer will arrive. When a renderer allows all the commercial restraints to over-ride a basic enjoyment and creativity in drawing, that renderer might as well give up (as many designers do - avoiding the rendering role, preferring to pass it to someone else). This harsh conclusion derives from the knowledge that loss of enjoyment and confidence in the drawing process must produce less satisfactory results;





Figs.40,41 'State of the Art' concept sketches in marker and quooache showing rapid confident technique while fully explaining the idea; radio concepts for Ross by Graham Thomson, 1986.



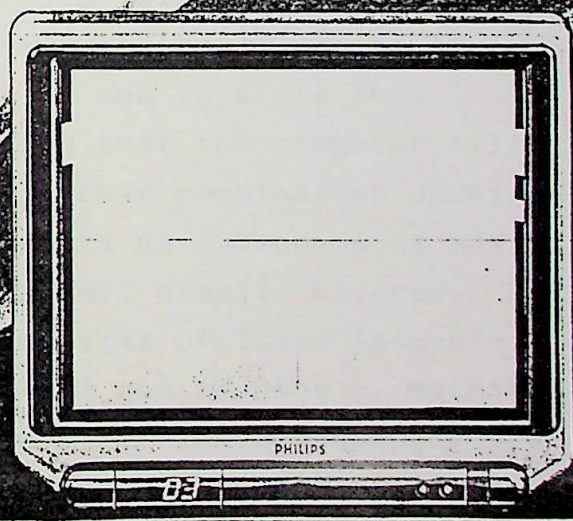
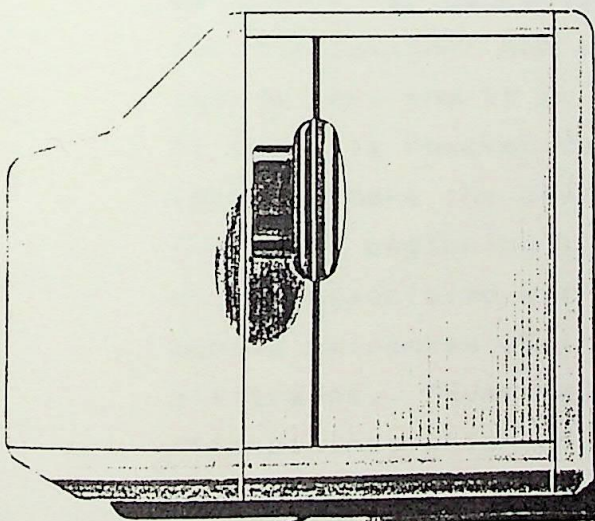
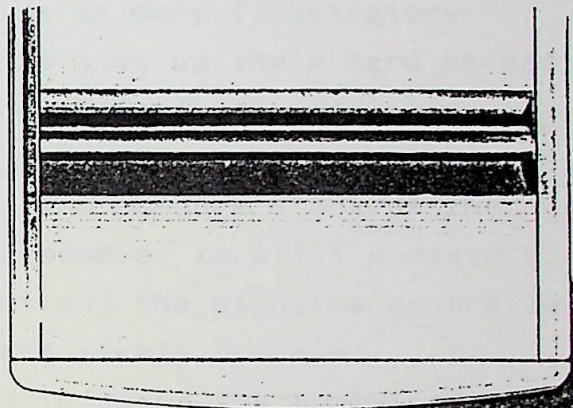
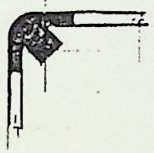
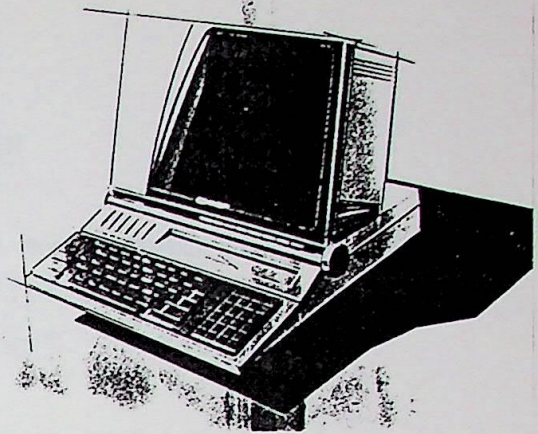
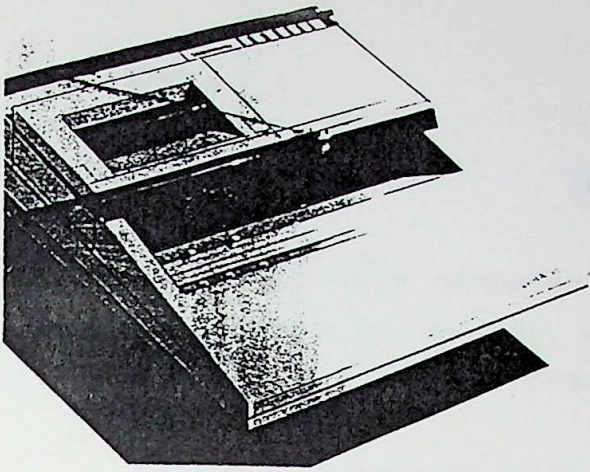


design renderings do so often rely on projecting confidence and dynamism, which will be lost qualities in a 'churned-out' or 'run-of-the-mill' rendering.

It is arguable whether a good designer will, by definition, be a good renderer as well. He will generally be an adequate sketcher, (this basic requirement is questioned also, later) but in reality the quality of rendering expected by a client may not always be within the capabilities of every designer. In practice, many designers tend to do their best renderings in College, where it is a gauge of ability and once established as designers let their hard won skills settle or slide, opting then to pass the buck to others. It is not an uncommon practice in consultancy work to sidetrack the presentation rendering and drawing aspects to an individual who can give 'specialist' attention, following the sketches of the actual designer to ensure concepts are given full justice in the quickest time. To be fair, it is rare for any individual designer to be a full all-rounder, accomplishing with consummate ability, or enthusiasm, the myriad disciplines demanded of him by a client within the short timescales often specified; rendering, conceptualising, modelmaking, detailing, sourcing, report writing and so on.

As the rendering is so important in selling ideas to the client as a first tentative step, then it is politic for the design businessman to achieve optimum results from a 'specialist'. Rendering is but a small part of any project but no less important than any other discipline in the designer's toolbox as the results usually constitute the first 'contact', for the client, with actual design-work. If the renderings are unsuccessful in explaining and then selling the ideas, then the whole project may be in some jeopardy, or at best there will be some loss of client confidence. This will clearly depend on the expectations of the client, but they are generally high in line with the high cost of design work.





Figs.39,40

Typical concept work for computer hardware: confident style reflects on the designer and will help a consultancies work to stand out in a competitive business.



## CHAPTER 11

### THE COMPUTER

"In this computer age where even rendering plans can be done by machine, we must utilize our full artistic ability to imbue ....creative energy". Eiji Milooka.

The computer will soon reach a technological level where the screen can replace the sketch pad entirely, already having gone some way towards doing this (if one can afford it). Naturally, just as many illustrators in the sixties were reluctant to give up their hard earned painting techniques to invading markers, so today many renderers are reluctant to take the plunge which will finally establish computers as the pandora's box of the designer future. The computer however is still a mystery for many of the present generation; the eighties generation; the designers of the future, are likely to have considerably fewer inhibitions in using the computer as a tool for conceiving and visualising ideas. Luckily for the designer and artist, however, the computer is just a tool and it is a cliché by now to state this. It is still however darkly hinted that the computer will some day make the designer - sketcher combination obsolete. the quote beginning this chapter is as ambiguous as most quotes associated with the computer, despite widened public awareness of the true benefits of these jack-of-all-trades. "Even rendering plans can be done by machine", it explains, which as a statement remains ambiguous enough to suggest that by pressing the odd button the entire job will be done by the machine. What it might more precisely state is that the versatile computer "can even aid in renderig plans". The designer still needs to manipulate the images on the screen, by exhaustive programing; or by the more 'designer-friendly' software packages, increasingly available, which will allow him to manipulate cursors about a screen, like the point of a pencil.



The computer as a drawing tool, indeed, tends increasingly towards 'pencil and pad' type interaction which suggests that drawing skills are not so easily avoided. Melvin L. Prueitt in his book 'Art and the Computer' states that, "computer art..... does not depend on the dexterity of the artist... it is an art created by the mind rather than by the body". One can only surmise that he thinks of a time when computers will plug directly to a user's 'imagination' in some way. Otherwise some interactive method will be required and in terms of image making this must involve hand dexterity for the near future.

At this point it would be appropriate to diverge slightly and answer the question; will a good designer automatically make a good sketcher or does the designer really need to be able to sketch? There is no doubt that formal and mechanical innovation is possible through three dimensional work alone, without recourse to paper. However, it is also accepted that the element of inventiveness; of abstract lateral thinking, can best and sometimes only be stimulated by, and recorded in quick sketch form until the idea can be realised in three dimensions. Good sketch technique, in terms of illustrating three dimensional forms and solutions for others, simply allows a more rapid, effective turnover of ideas. The better the sketching ability, the more likely it is that the designer can truly visualise the ideas in his mind's eye.

There is probably a trend which immediately equates good design with good rendering technique (even separately from sketching). There are examples (always arguable of course) to back this up and there are supposedly the odd few to refute it. (Loewy, for example, is rumoured to have been a poor renderer). What is certain is that by necessity the best designers have tended to be extra



creative which in itself encourages excellent drawing, not as a mere skill, but as an extension of the person's 'mind' and as the initial means of manipulating images in the physical world. The sketch completes the cycle because it is so rare for a thought to translate to the physical world intact or as first conceived in the often incomplete mind's eye. The individual more likely to make the better designer will also tend to be the more appreciative and observant of formal modelling, reflections, effects and so on. These observations are separately weak and inconclusive but combined they tend to draw a picture which supports the overall argument. What cannot be doubted is that in practice industrial designers are encouraged to obtain high levels of rendering skills not for increased problem solving ability, nor even design awareness; but because it is simply the currently accepted and expected means of expressing ideas as a quicker, cheaper alternative to the three dimensional model. In practice most established designers tend to carry on sketching but not rendering. The fact that they might be good renderers being merely a byproduct of the same basic range of talents which encouraged them to embrace the activity of industrial design, as we now recognise it, in the first place.

That being sorted out it is essential to return and immediately establish some of the redeeming points for the computers invasion of the design studio. The advantage that the computer really has over more low-tech' media is simply that once an image has been inputted to the screen, by whatever means, and once the computer has been programmed with enough information, manipulation of the image is possible. Whereas a drawing on a sheet of paper remains - a drawing on a sheet of paper, an image on a screen can be recorded and repeatedly altered in detail, colour or even perspective until the optimum is achieved (depending always on the capacity of the programme). This can allow a computer operator to sort through numerous alternatives while his colleagues are busy overlaying reams of paper.



This mobile computer is based on a plot generated from Jim Hennessey's Industrial Design Drawing Programs software. The selected plot was reproduced onto vellum and then lighter fluid and pastel chalk were blended over the plot. This allowed the final rendering to stand out from other similar, uncolored plots.

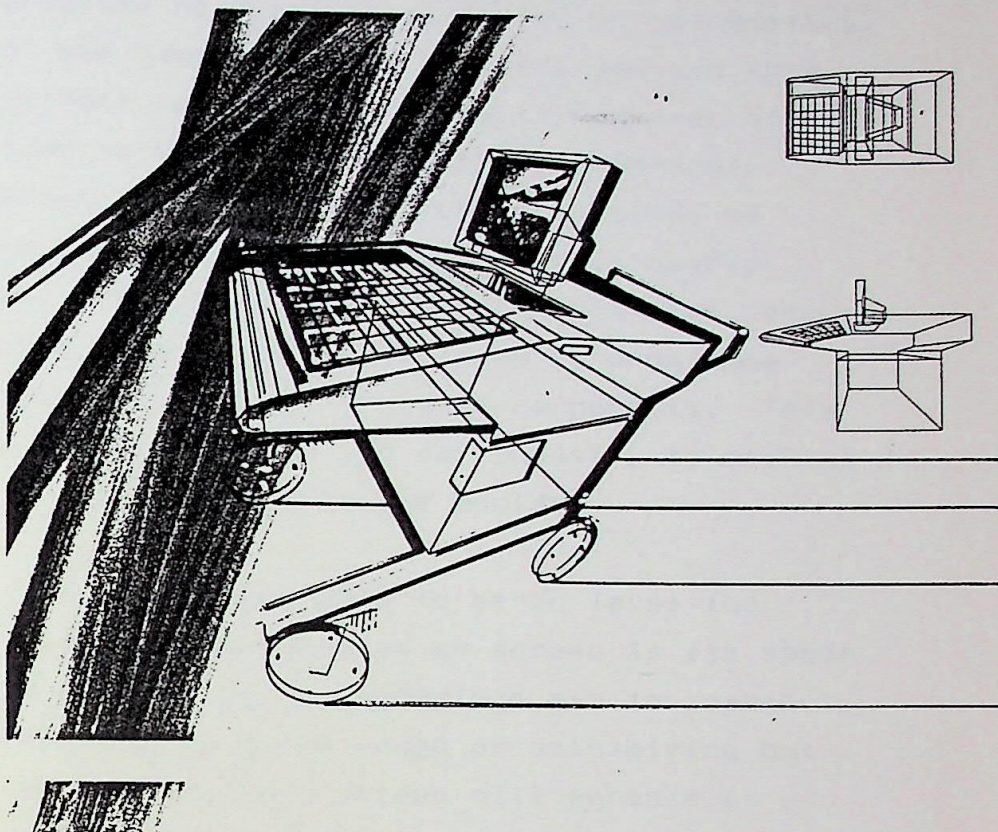


Fig. 41

An immediate benefit of computer-generated design work; printouts can be used as underlays for 'rendering-up' using traditional technique.



Where there is considerable and constant change of style and content using the computer is without doubt slower, or at best as slow, as using the traditional pen and marker. Where there is variation of detail, repetition or mathematical analysis required the computer comes into its own and this is particularly evident in the growing use of Computer Aided Design (CAD) systems, notably for completing orthographic and assembly drawings. As technical drawing involves so many standards and common symbols the computer is nearly ideal for the task. The added advantage, in this case, occurs when computer generated drawings can be used to programme machines to produce prototypes or finished components. This same idea is used successfully in the car industry to machine complex bodywork profiles on models and moulds.

On a more practical, more down to earth level the real benefit of the rendering produced on screen is its sheer novelty, a quality which a lot of renderings aim to possess. The image might otherwise be quite rough or uninspiring but the fact that it is actually on a screen will enhance it considerably. At least in the eyes of the average person who will most often hold the computer in some awe, and will even feel that the image and idea has added status or is particularly hi-tech because the computer accepts it; ie. if it is on-screen - it must be right!

All this can only touch the tip of the iceberg in terms of the computers assured impact on design and design visualisation - suffice it to say that manufacturers and programmers are going to great lengths to convince designers that the computer is the way forward. They have succeeded in principle, but where is that elusive, utopic machine that is the answer to our every dream?



## CONCLUSION

The industrial design visual - or rendering - or sketch - or even illustration, call it what you may - is distinctive. It appears precise and mechanical, while also retaining a quality of confidence and imaginative flair rooted in the very stroke of the pencil or streak of marker with which it has been methodically but freely created. The secret to success is in combining (or juxtaposing) these opposing qualities to produce a visual which is both stimulating and reassuring, impressive and enthusiastic, imaginative and down-to-earth to reflect these same qualities in the design itself. Qualities which the majority of commercial designs will seek to possess.

Perspectives have long existed to communicate the purpose of a design and "...to convey a reality of its space", but perspectives must now be more than just a group of lines lacking the intelligibility which rendering can provide. Today the renderer is free, and encouraged ... "to eliminate excessive lines, to add scrupulous drawing or to concentrate on the parts to be emphasized. All perspectives before they become picturesque must go through this design process, in which all the elements are once absorbed and then, after choosing only the valuable elements, are reconstructed". Eiji Miyooka in the introduction of 'Airbrush in Rendering'.

Few design disciplines rely upon graphic visualisation skills as heavily as industrial design, no matter whether the way forward means embracing the computer, or whether the pad and marker continues to hold its own. Sketching and rendering remain indispensable skills which every trained industrial designer is encouraged to master. Success and ability will always enhance design ability whether one agrees that the two relate or not. For those outside the design 'pale' rendering is one of the links to understanding; essential for clients, engineers and even the public sometimes for explaining and enhancing the designer's intentions before they are finally fully realised.



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