NEON & ILLUMINATED SIGNS

by Paul Ross Coffey

A Thesis

1977


THE CALIFORNIA ELECTRIC
SIGN ASSOCIATION AND THE
SIGN USERS COUNCIL OF CALIFORNIA
WANTS YOU
TO VOLUNTARILY TURN OFF YOUR ELECTRIC BUSINESS SIGN AT 10:00 P.M. DAILY OR IF OPEN LATER, 15 MINUTES FOLLOWING CLOSING TIME
Even though electric business signs only use two-tenths of one percent of total state-wide energy . . .
and even though the state of Oregon has reversed earlier prohibition of electric business signs due to vandalism, increased unemployment and decreased business activity . . .
we urge your community support and voluntary cooperation by offering your assistance to this vital cause.
(A Paid For Public Service Message)

NEON AND ILLUMINATED SIGNS

By Paul Ross Coffey

Final Year Thesis for Diploma in Communication Design

National College of Art and Design, Dublin

June 1977

CONTENTS

INTRODUCTION

I am dividing this text into six sections beginning with an introduction to the method of amnufacturing cold cathode or "neon" signs today.

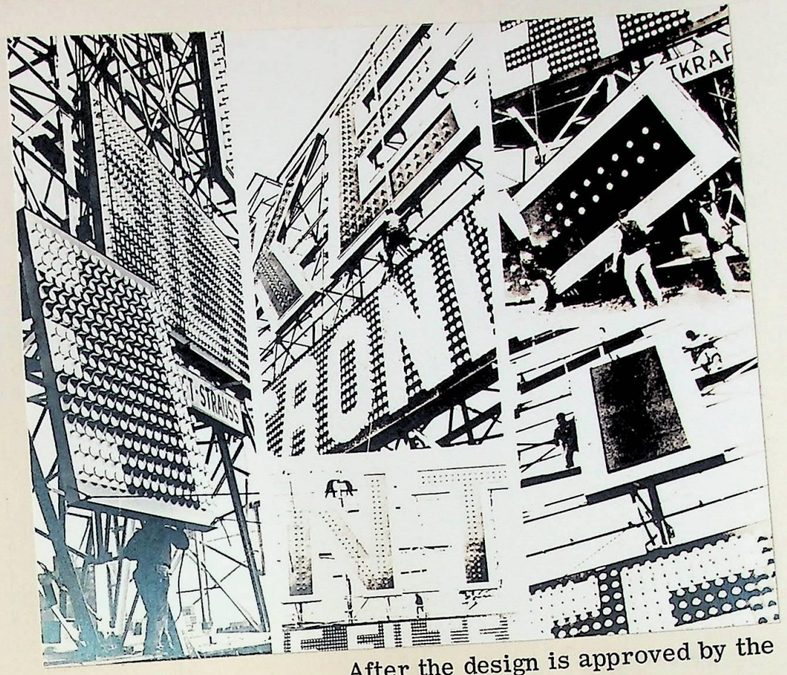
I will give this information, not from the point of view of a chemist but as one who has worked in a neon sign factory and who has seen and understood the basic manufacturing processes.

I write in support of neon tube lighting, not only to revue images of Art Deco but also to try to visualise neon in use in a new and totally '70's style, where whole streets may be limited to a single colour outdoor advertising for example. Thus would be created a harmony of line in keeping with the environment whilst still the message is being communicated, rather than the garish 'hard-sell' signage thrust before the public today.

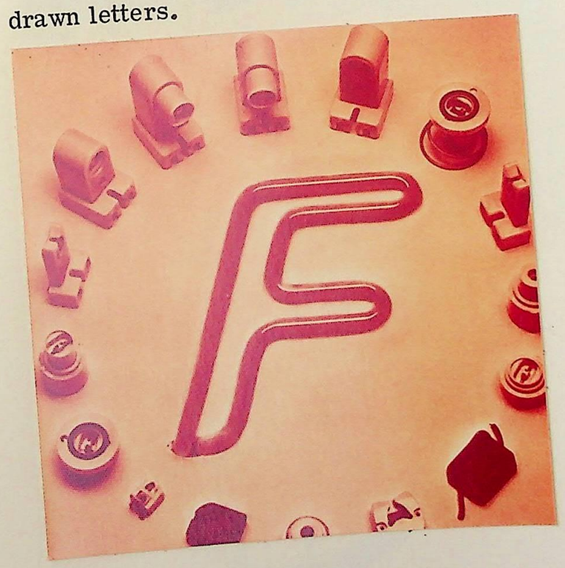
1. MAKING A NEON SIGN

The main bulk of neon, helium, argon and crypton is manufactured in England by a Company called Masonlite. There are a few small plants in Ireland that manufacture the rare gases but at double the cost of their British counterparts. The Irish gas is made to order and is used by Irish sign companies, only when their stocks are depleted and they are awaiting stock delivery from England.

The first stage in neon sign manufacturing after an enquiry has been made by a retailer, is to produce artwork to give the client a fair idea of how the sign might look both by day and by night. The job of the sign company artist is highly specialised: he must draught out the wording and logo for the client in coloured, airbrushed strips, breaking the strokes to specific lengths according to the width of the tube used; he must be familiar with all processes so that his design will run smoothly through the production line and finally he should know the site where it is to be erected, generally busy shopping areas, congested high streets and after dark entertainment areas.



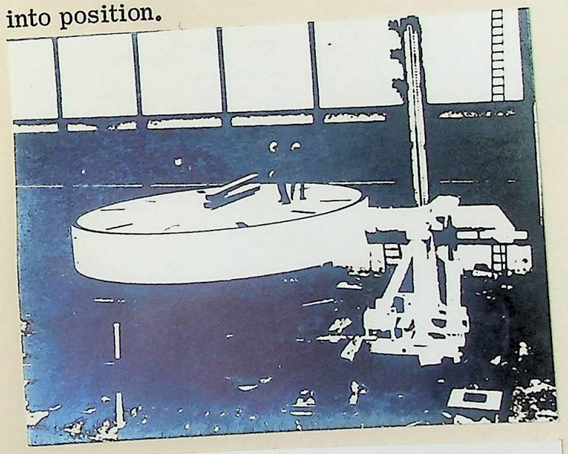
After the design is approved by the client, the artist, working with the engineer, produces working drawings for the Metal department, colour separations for silk screened panels and actual size drawings of the neon shape so that the glass can be blown and bent to the exact shape of the drawn letters.

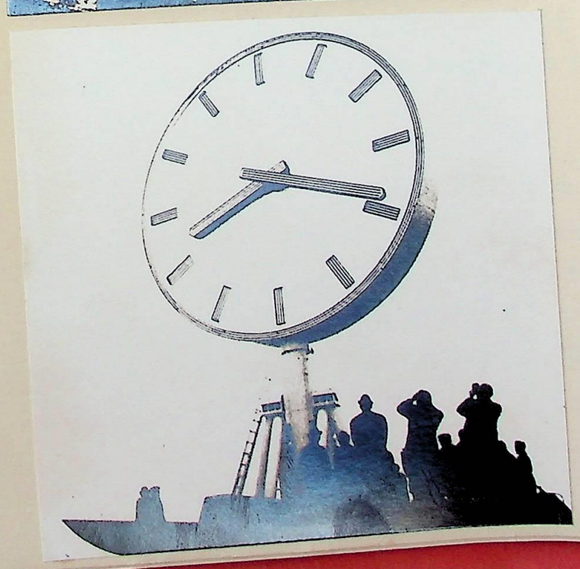


After shaping the tubing according to the drawings, the next stage for the glass bender

is to heat-seal electrodes on to each end of the letter. Finally all the air is sucked out and the selected gas inserted, the electrodes are then connected up to the positive and negative terminals of the transformer and it is tested. The transformer boosts the domestic 250 volts to 10,000 volts and produces the high tension needed to bombard the atoms of gas, which produce the light.

When ready the glass and the framework are packed separately(the fragile glass letters must be protected) into a truck and the sign is erected as the metal framework is screwed into position.





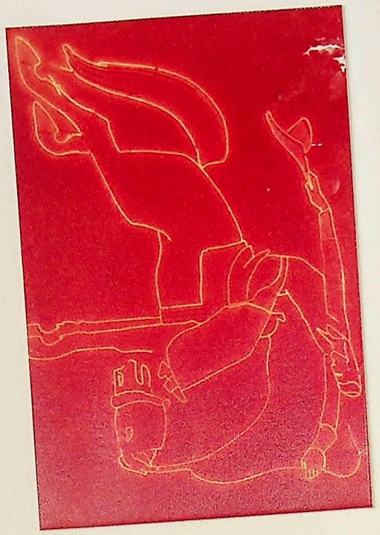
2. HISTORY

If the reader could imagine a Frankenstein-type laboratory of the early 19th Century, where experiments of generating radiation were performed by striking an arc between electrodes in an evacuated tube to which small amounts of elemental vapour had been admitted, he would have a fair picture of the laboratory of Sir William Ramsey, who discovered neon in 1898 by the fractional distillation of air. Neon - the new one, had an atomic weight of 20.183 and an atomic number of 10 - chemical symbol Ne for neon.

Sir William Ramsey in 1915 wrote "The Rare Gases of the Atmosphere and History of Their Discovery", in which a highly technical detailed account of his findings were given.

Although the science of electrical discharge in vacuna dates from the early part of the 18th Century, it was not until 1900 that the first successful electrical discharge tubes were made in America by someone called Moore. These tubes were long and contained rarified air, which was automatically replensihed as it was used up.

In 1910 the first Exhibition of Advertising was held in the Horticultural Hall, Westminister, and was recorded in "The Times" of 10 December of that year, "The best advertisement for advertising that has ever been advised". There



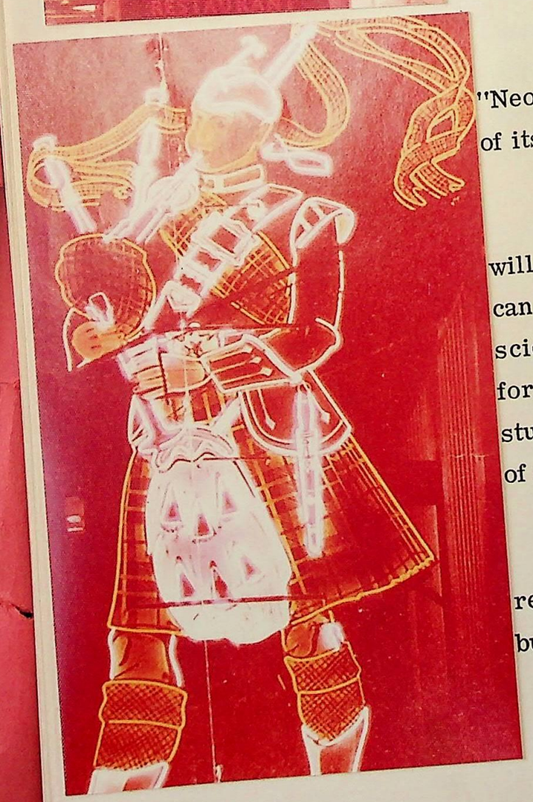
followed, "Flashing coloured lights and illuminated advertisements! All those contrivances to be seen at the Exhibition in the Horticultural Hall, Westminister, whether they be dissonant and jarring, or tranquil and restful, teach the lesson that the day of sporadic and haphazard advertising has come to an end".

Also in 1910, the first successful "neon" tubes were devolved in Paris by Monsieur Georges Claude. Claude erected the premier neon sign in Paris on the Grand Palais by the River Seine. According to Orr and Forrest, who in 1936 wrote "An Introduction to Neon Lighting", it was not until the early part of 1934 that the first commercially successful tubes, having a wide range of colours, became available. Also at this time there was considerable experimentation with neon lighting for indoor use.

Therefore, it could be assumed that mass production lighting fitted into the following three categories:

1. Neon for animated advertising, such as places of entertainment, theatres, cinemas etc.
2. Sodium for street lighting
3. Fluorescent or mercury discharge hot cathode for factory interiors, railway stations and public service depots.

Orr and Forrest also gave some interesting facts



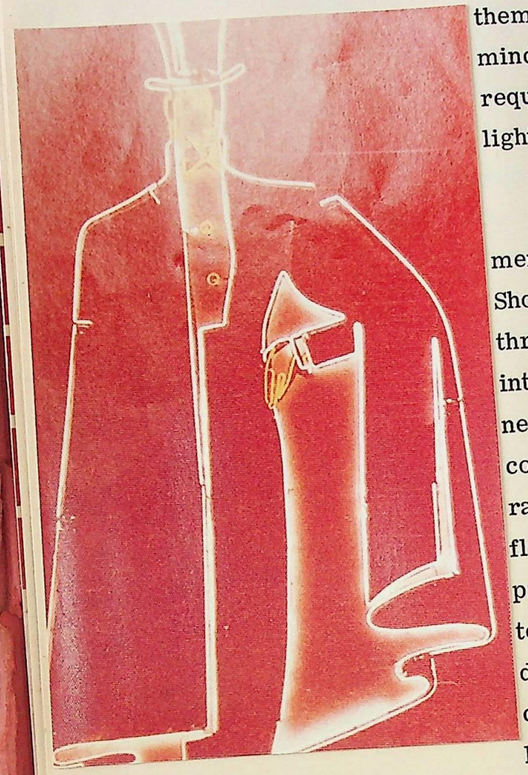
on the boom of the neon business in the United States. In 1933, 16,254 neon signs were installed in Manhatten and Brooklyn alone, of which 75% were indoor and in 1935, the total turnover in the U.S. was $20,000,000. In Times Square 300 separate signs, ranging from small window displays to massive roof-type canopies covering neon areas of up to 1,500 sq. ft, existed. Orr and Forrest add an interesting fact to illustrate what a boom business neon was in 1935 by saying that one of the companies revealed, sixty days after the first day of business, a turnover of $1,000,000!

With the new phenomenom of mains electricity, it was seen by traders as an element that should be used to generate clientele and it was neon that burnt their energy for them.

W.L. Schallreuter in 1933, whose book, "Neon Tube Practice", perhaps published ahead of its time, says,

"The future development of neon signs will largely depend on the artistic effects which can be obtained by the tubular light, for example, scientifically neon and such gases in tubular form have been successfully investigated but the study of the artistic aspect of this new means of advertising is still in its infancy".

Neon signs of today frequently bear no relation to the architectural features of the building on which they are erected and architects

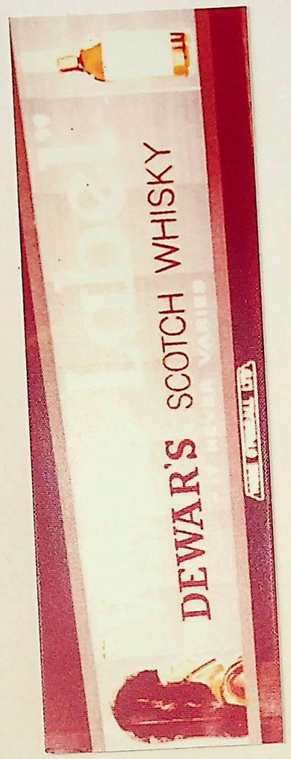


themselves are far from being really 'neon-minded' and fully acquainted with the essential requirements and special possibilities of tubular lighting.

Schallreuter also talks of another development of neon without the use of such high voltage. Shortly after writing this book, a new breakthrough in low voltage tubular lighting came into effect using mercury vapour instead of neon gas, where the walls of the tube were coated with material which when subjected to radiation of the mercury discharge became fluorescent. However, the fluorescent tubes produced patchy light and were more complicated to assemble and maintain. Together with difficulty in maintenance and the high running costs of the fluorescent bulbs, the incandescent lamp, which has a filament or metal coil through which the electricity runs, is far more expensive to run for long periods of time, e.g.

fluorescent needs 450 milli amps.
neon only needs 60 milli amps.

During the power crisis, when the U.S. government ordered all neon signs to be turned off, this was only a publicity seeking nominal action since the small amount of electricity used by neon signs had little effect on conservation of energy. Rather did it only serve to make the city depressing and curfew bound. Neon lighting is so much part of city life.

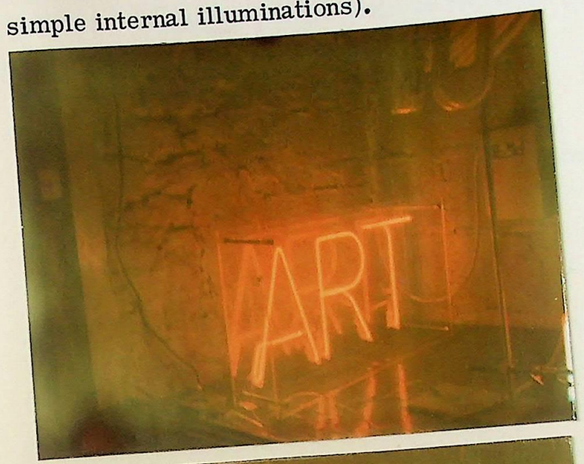


Because of the increasing demand for illuminated signs, glass benders, who were few in number, were overworked to the point where they did not have time to train new benders but in the late 1950's neon manufacturers found a solution to meet the demand. As an alternative to each letter being individually blown, thus limiting the client to the amount of text he could display, large sheets of 'cast acrylic' were used, silk screened multi-coloured messages having been printed on them, and these were back lit with a standard, machine-made strip of neon. This meant that thousands of copies of the same sign could be produced without using the valuable time of the glass bender, who was fully occupied producing 'one-off' jobs requiring exposed, crafted neon letters.

Regrettably in the years from 1956 until 1963 there was a decline in the use of neon; it was regarded as unfashionable by advertisers, who favoured printed plastics and metals with little or no illumination. During this 'unfashionable' period and combined with the introduction of printed perspex and automation, the craftsmen glass benders became fewer in number until in 1963 there were only 200 registered glass benders in the U.S. and only 3 here in Ireland.

During the late 1960's and early '70's there was a slight revival in the use of exposed neon , however the interest is weak and although we may see masters of realism, such as Sid Goings painting neon signs on canvas and night clubs utilising neon in interior decoration, the big boom for the neon manufacturer is past history.

Today the sign manufacturer produces less and less neon signs but more 'point-of sale' items such as perspex furniture and in the U.S. small inter-changeable desk signs are popular (.e.g. vacuum formed shapes with simple internal illuminations).

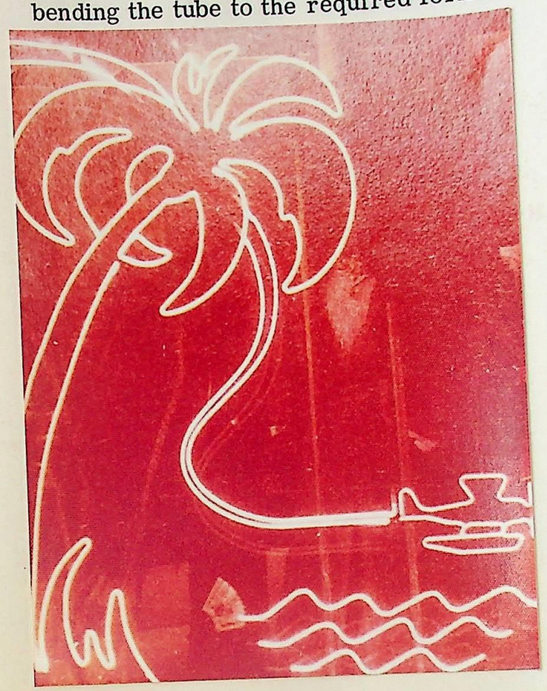


3. CATEGORISATIONS OF NEON SIGNS

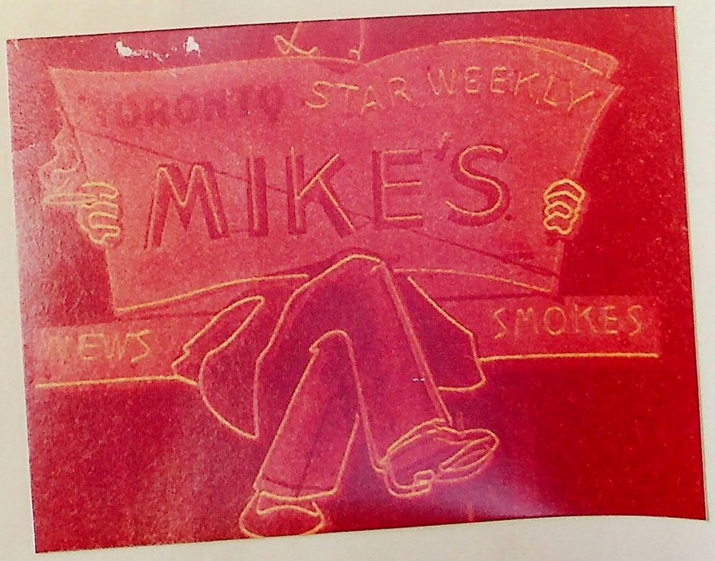
The reader must be made aware that "perspex" is a trade name for the material called 'cast acrylic' but for ease of reading it shall be referred to as 'perspex' in this text. Many of the most successful perspex signs in use today are made of translucent perspex sheet, in which the actual illumination is provided by neon tube.

There are in use today seven main types of illuminated signs that produce various different effects and appearances according to their construction and application. These can be classified as follows:

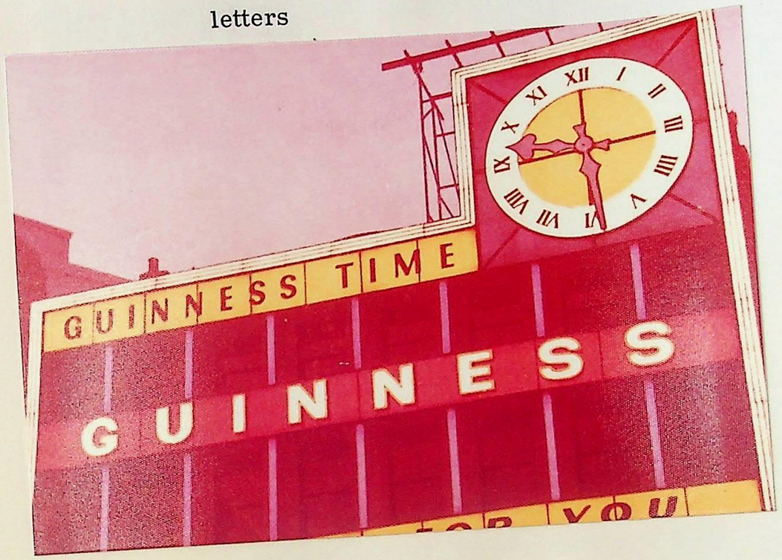
(1) Simple neon letters or shapes, made by bending the tube to the required forms



(2) Superimposed neon, made by fixing one or more lines of neon tubing so that they stand proud of the surface of the perspex letter. This is quite effective when viewed 'head-on'.

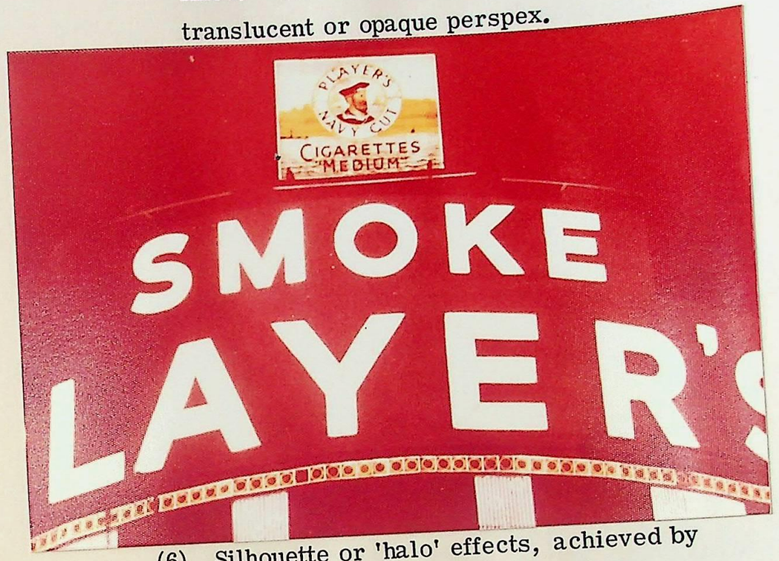


(3) The 'stepped-edge' sign, when the strokes of the letter are, in section, 'stepped' or rebated at the edges and the tubing outline is mounted flush with the edge of the actual letters



(4) Semi-recessed neon signs made by fixing the neon tubing, either partly or wholly in the recessed centres of the strokes of the letter

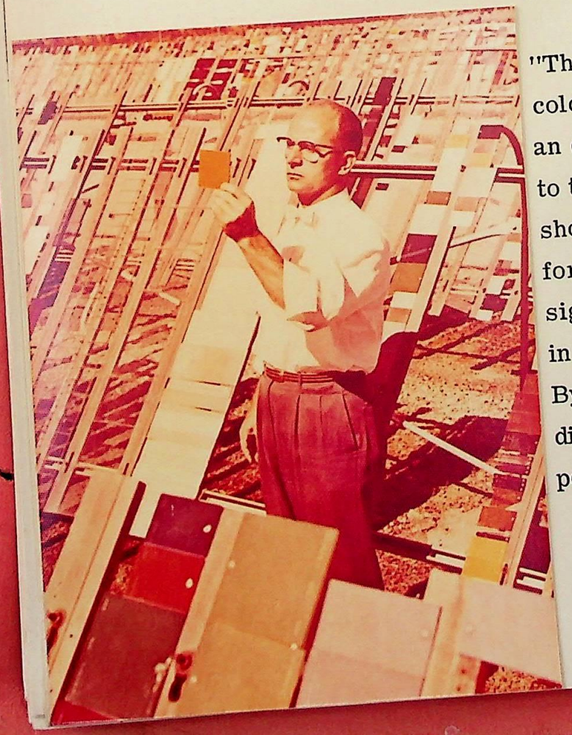
(5) The built up internally illuminated neon signs made by building up perspex letters with open backs, in which the neon tubing is fixed. The sides or returns may be made of translucent or opaque perspex.



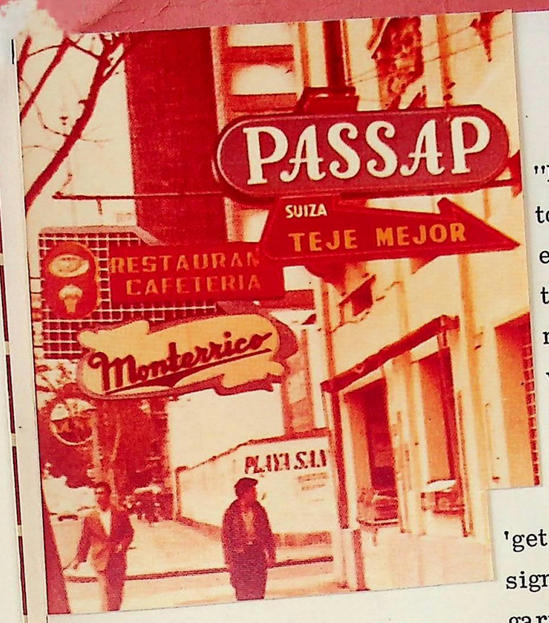
(6) Silhouette or 'halo' effects, achieved by using hollow letters of opaque perspex, fitted to the wall so that they stand proud, while illuminating this background by means of tubes concealed inside the letters themselves

(7) Illuminated facias, consisting of a long continuous box of opaque perspex with letters struck on the surface and neon tubing fixed inside the box. Alternatively, there may be a separate box for each letter.

The following is an extract from an I.C.I. Perspex Catalogue of the 1950's:



"There is no doubt that the combination of cold cathode lighting and perspex produces an effective sign. Of considerable importance to the customer is the fact that perspex signs show equally well by day and night and therefore serve a dual purpose. This of great significance during the summer months, or in those countries of long hours of daylight. By using perspex, the sign maker has at his disposal a wider range of colours than is possible by restricted use of neon alone.



"Moreover, perspex offers an opportunity to the maker to develop many new and exciting colour effects. There is also the fact that perspex signs illuminated with neon are easy to read and can be made in well-known and popular type-faces, with cut, struck or moulded letters".

However, it is an unfortunate fact that the 'get rich' quickly attitude to business by many sign manufacturers has produced those ugly and garish illuminated plastic facades, which are so familiar today in the premises of ill-advised local traders.

4. ARE SIGNS OF ANY KIND JUSTIFIED?

From an article on "Signage" written by Dr. James Closs,

"In the days when environmentalists, planners, government officials and legislators are asking why signs are necessary and why restrictions can interfere with the economic functioning of an area or district, it is increasingly important to answer this question with facts and figures. With countless signs in operation down through the centuries, it would seem that there would be a wealth of material on the subject, but such is not the case. What complicates the situation is that it is almost always difficult to isolate results of the signage from what is being accomplished by other advertising, promotional and selling activities. It is virtually impossible to determine which customers came in and bought entirely on the basis of having seen the signage, or what proportion of the accomplishment was a result of the signage as compared with other factors that contributed".

The following example illustrates how necessary signage is, whatever medium is used, for the sale of even a commonplace and basic object. At Coney Island Amusement Park in Cincinatti, where within the confines of its bustline operation the management was in the unique position to

tabulate results. Coney Island Amusement Park records contuing performance reports on each of its concessions are remarkable enough management control.

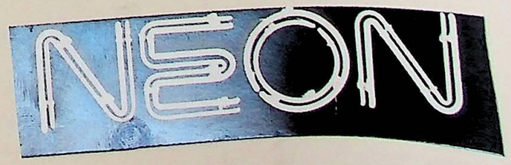
The experience began with the opening of the Park for its 1963 session. The refreshment stand in the centre of the main mall had been replaced with a much more substantial and attractive structure. Because of the importance of the location, the installation was up-graded with an investment of $17,000 and was architecturally designed to add attractively to the scene. As this location was in the main stream of pedestrian traffic up and down the mall and had been a refreshment stand for years, a decision was made that no identification signs were needed; obviously, it seemed the long-standing image of the location as a refreshment stand and activity at the stand would be adequate to indicate what would be its function. Thus the refreshment stand opened in 1963 without signs.

But, as so often happens, the people did not act in accordance with the planner's views. During the opening months business at the stand lagged substantially behind the previous year, in sharp contrast with the admissions and volume at other Park installations. Naturally, after noting the trend in the records the management officials took a look around the stand and at what was happening. They found their suspicions confirmed - the multitudes of people crossing the mall simply strolled past the stand without much realisation that it actually existed.

Needless to say the response of the management was to order hand-lettered type signs to be put up immediately. The response in the increased volume of sales at the stand was remarkable. Then internally illuminated signs were produced and installed, colourfully merchandising the sandwiches, iceballs, soft drinks, popcorn etc. on sale. When the Coney Island Park opened in 1964, the seasonal volume comparisons could most accurately show the trend: the sales volume with signs upped 35% from the 'no-sign' period.

Princeton Psychologist, George A. Miller, has concluded from various experiments that we possess a finite and small capacity for making judgements about the information received through the operation of our senses and this capacity does not vary much from one sense to another (hearing, sight etc.) Miller defines this capacity as the span of absolute judgement and his findings indicate that the limit of this span is about seven categories of information. That is to say that the average observer cannot distinguish between more than seven different sights and sounds presented to him simultaneously.

Therefore, the case for restricting traders to one format is strong if people can only take in five or six images at one time: the other hundred or so signs are superfluous and environmental eyesores. In the Champs Elyseés in Paris, the visual format of neon advertising is limited to



one colour: white. This means that the pedestrian is not bombarded by too much stimulus and therefore has more room to observe, for example, the architecture.

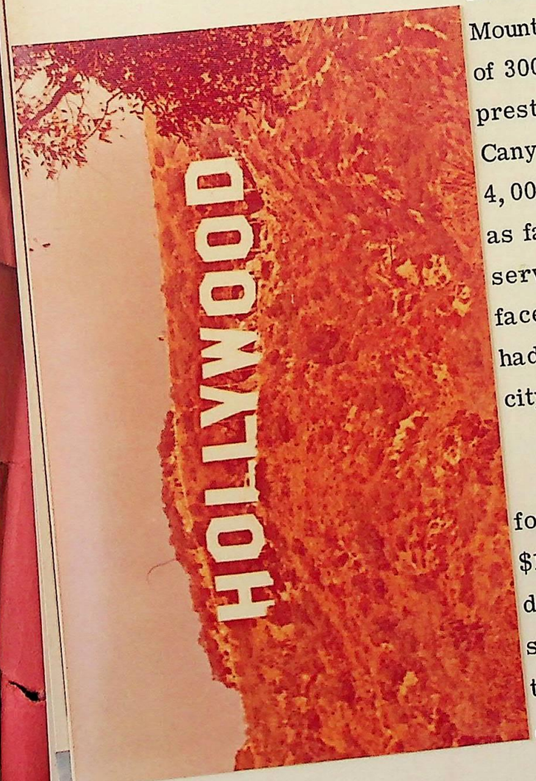
In parts of the United States, certain busy streets are overwhelmed with signage. In the beginning there would be painted signs over the doors, then some hanging at right angles to the building. Later as one trader felt his sign was being blocked by neighbouring signs, he would enlarge his and so on until the competitive nature of these signs produced a nightmarish cluster. At this stage the only solution is to stop, pull all the signs down, plan a general format in one colour strip neon tubing so that each corporate identity can be seen and viewed without pressure.

In an experiment carried out by Ashley Myer Smith, architects and planners, to discover how well people observed commercial signs, a further argument in favour of controlled and selective signage could be added. The experiment took place on Washington Street, Paulo Alto. Slides of 16 commercial signs, 8 windows and 8 buildings were prepared from photographs of other streets. These slides included 4 commercial signs and two windows and two buildings. Two sets of slides of these commercial signs were made- one with background and one set with the backgrounds masked.

The investigator told his guinea pigs to walk at a normal pace up Washington Street, behaving as if they were on their own. It was

about a 10 minute walk. The subjects were not advised of the nature of the experiment, when they walked down the street. On completion of the walk both subjects and investigators entered a room, where the subjects were shown the slides. After completing a recognition test the subjects filled out a short questionnaire: The subjects recognised 50% of the Washington Street slides, 47% of the window slides and 38% of the building slides.

Then on the other hand people can be sentimental over a sign that is a recognised land mark as the following example of a community resisting the local authority by saving a condemned environmental eyesore, illustrates. The "HOLLYWOOD" sign atop Mount Lee, originally built in 1923 by a crew of 300 men, read "HOLLYWOODLAND", a then prestigious sub-division at the top of Beechwood Canyon. The 13-letter sign was equipped with 4,000 incandescent bulbs and could be seen from as far away as 20 miles. In recent years public service organisations have supervised minor facelifting operations. However, major repairs had to be made if this sign was to be saved and city funds were not available for the project.



The "Save the Hollywood Sign" Committee found enough small contributions to cover the $15,000 estimated to be needed to restore the decaying sign. This is not the first time in sign history that the existence of a sign was threatened and eventually saved because of public opinion and action.

5. "A BAD SIGN"

The obvious objections on behalf of the police with regard to neon signs, is in the case of green lighting in close vicinity to traffic lights. There is a sign in Drogheda, which had to be taken down as a direct result of a serious accident, where a motorist shot straight through a traffic light to collide with another car. When the scene of the accident was examined it was found that the green neon logo of a sign company at the base of a beer advertisement had confused the motorist.

In Germany there are specific laws regarding the appearance of a neon or plastic illuminated sign. For example, a manufacturer must conceal all transformers inside the letters or facia boxes. In Ireland, the electrical vertebrae of the sign is exposed, while less skilful companies leave their signs looking by day what can only be described as an eyesore. In Los Angeles, the City Planning Commissioners' Office recently rejected a proposal to outlaw outdoor advertising throughout the city. The Commission did, however, return a proposal to the planning department to determine if alternate measures of control could be developed with the assistance of the outdoor industry.

"I would have supported the idea in 1970", one commissioner was quoted as saying, "but not in December 1975 - we are too far gone now!"

The proposed code would have prohibited

the construction of any new units and called for the removal of existing structures within a three-year period.

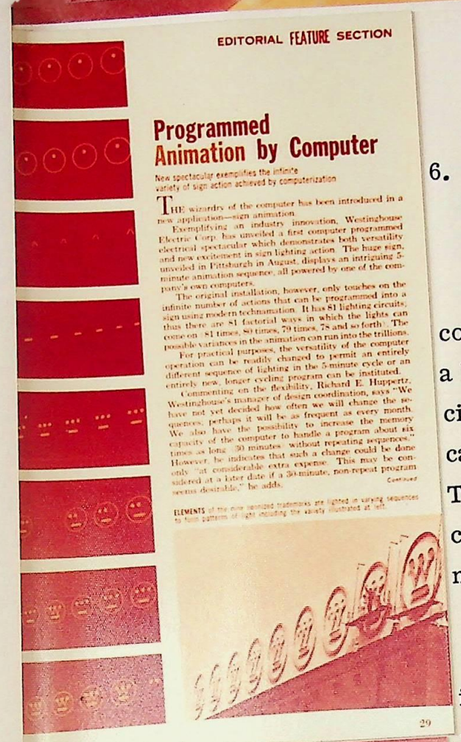
In Dublin, sign manufacturers feel that planning authorities judge signs in a computerised fashion. Instead of pronouncing judgement on a sign on its aesthetic and architectural merits, it appears to be the rule to allow 10% of all applications to be passed regardless of how well suited the particular sign might be to its proposed siting.

With regard to the good and bad use of materials, a neon sign manufacturer has outlined the differences as follows:

1. It is recommended that in heights of over 2ft. that 5mm. perspex should be used rather than 3mm. thickness, often used because it is half the price of the 5mm.

2. With regard to facia boxes the joining of panels is most important. A good panel should be joined in an L-shaped fashion and not glued, to prevent dirt leaking behind the perspex. (This could also cause cloudy dark patches to appear at the joints in the perspex).

3. In separate level signs and facia backlit-boxes, the perspex used should be given sufficient room for expansion so that it does not buckle under heat.



EDITORIAL FEATURE SECTION

Programmed Animation by Computer

New spectacular exemplifies the infinite variety of sign action achieved by computerization

THE wizardry of the computer has been introduced in a new application—sign animation.

Exemplifying an industry innovation, Westinghouse Electric Corp. has unveiled a first computer programmed electrical spectacular which demonstrates both versatility and new excitement in sign lighting action. The huge sign, unveiled in Pittsburgh in August, displays an intriguing 5-minute animation sequence, all powered by one of the company's own computers.

The original installation, however, only touches on the infinite number of actions that can be programmed into a sign using modern technimation. It has 81 lighting circuits, thus there are 81 factorial ways in which the lights can come on—81 times, 80 times, 79 times, 78 and so forth. The possible variances in the animation can run into the trillions.

For practical purposes, the versatility of the computer operation can be readily changed to permit an entirely different sequence of lighting in the 5-minute cycle or an entirely new, longer cycling program can be instituted.

Commenting on the flexibility, Richard E. Huppertz, Westinghouse's manager of design coordination, says: "We have not yet decided how often we will change the sequences, perhaps it will be as frequent as every month. We also have the possibility to increase the memory capacity of the computer to handle a program about six times as long—30 minutes without repeating sequences." However, he indicates that such a change could be done only at considerable extra expense. This may be considered at a later date if a 30-minute, non-repeat program seems desirable," he adds.

Continued

ELEMENTS of the new computer programmed are lighted in varying sequences to form patterns of light including the shown illustrated at left.

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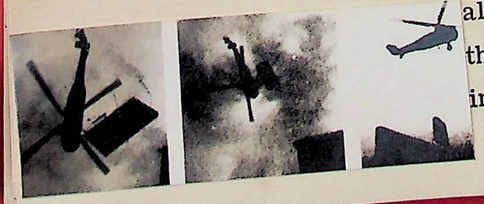


6. INNOVATIONS

Animation of Neon Signs by Computer

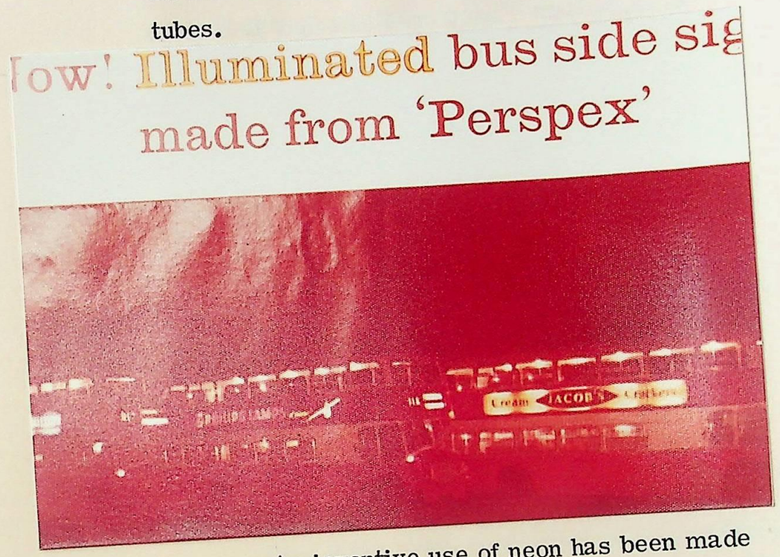
One of the most advanced examples of computer animation exists in Missouri, where a brand called Westinghouse has 81 lighting circuits plus 81 factorial ways in which lights can come on, that is: 81 x 80 x 79 x 78 x 77 etc. The possible variations are endless. The sign can have a sequence of animation running 30 minutes without repeating itself.

As signs get more and more outrageous in complexity, sign manufacturers have to cope with the safe erection of such signs. Sights such as the Quality Inn logo installed in Cincinatti which weighed 4,000 lbs., was 27 ft in diameter and had to be secured atop an 18-storey building by a St. Louis helicopter company. The hoisting took less than ten minutes. In Witchitaw a word measuring 10ft x 105 ft was dropped into position by the same helicopter company in only 33 minutes.

Here in Ireland an Irish neon sign manufacturer is working on a patented design for a computerised digital clock scoreboard and temperature system using neon strips, having a visual appearance similar to that of a calculator, instead of using the conventional bulbs.

The Clearwater Sign Corporation of Florida are selling trailers with custom neon advertising that can be towed by the advertiser around a city all night; like Air-Ad., Clearwater advertises the fact that no site is necessary. Therefore, instant communication with the public is assured.

The transport authority in London are trying out illuminated signs on double-decker buses. As shown below a very slim facia box sign is fitted into the normal advertising space on the bus and back-lit by lengths of fluorescent tubes.



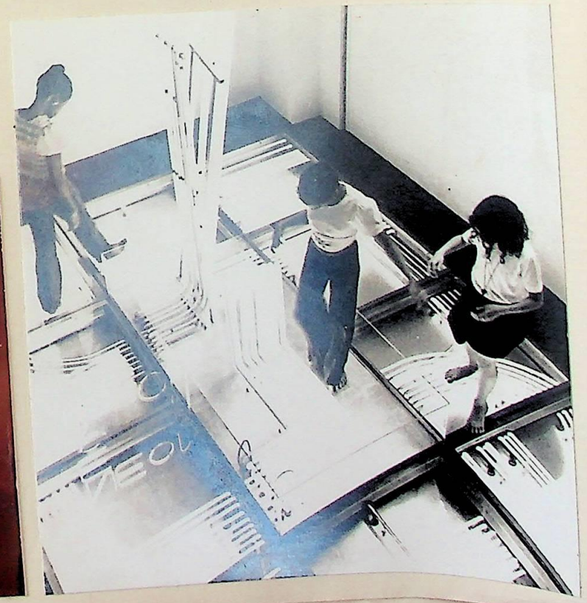
An inventive use of neon has been made by Sisk Builders. On top of their cranes the 7ft high neon sign "SISK" looms above buildings, a message for the people of Dublin and a warning of its approach.

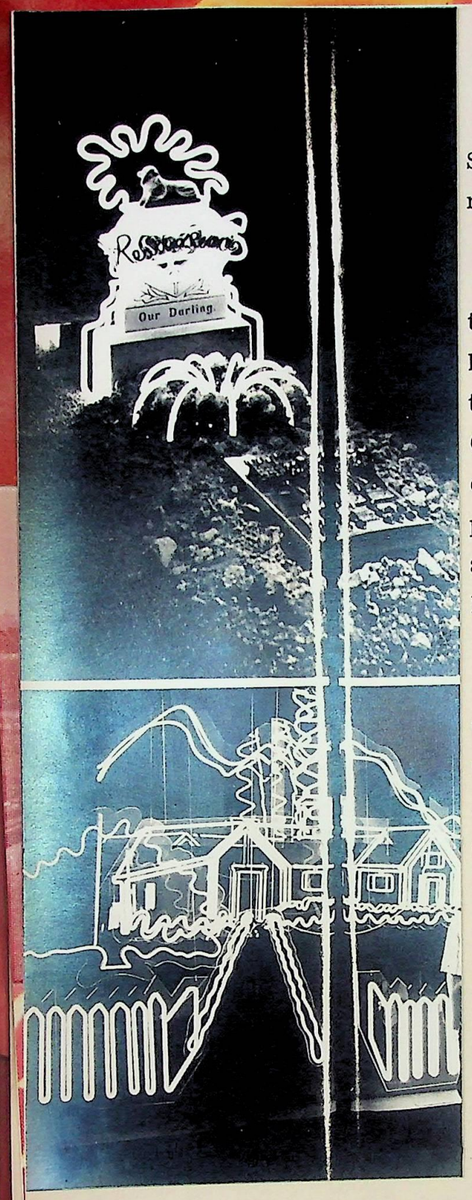
In New York pedestrian traffic signals are neon: "WALK" in white and "DONT WALK" in red.

A flying neon sign known as "Air-Ad" has been developed throughout three years experimentation involving hundreds of flight hours, by a newly-formed company, Airborne Advertising Incorporated. The idea was to

establish a novel form of advertising to fill a void in tobacco company advertising created by the banning of cigarette advertising commercials. The prototype sign is composed of 432 ft of glass, and three layers of superimposed multi-colour neon 12 ft high and 40 ft wide. The wings of the plane were modified to support the bracketry needed for this huge sign. "The Hopper" normally an insecticide holder, provided space for the transformers supplying the required 15,000 volts. Power source for the transformers is 110 volt generator located in the front of the plane. The sign is capable of displaying 1,200 ft of neon in the form of multi-colour messages, trademarks or slogans. The plane is fully instrumented to fly from city to city at speeds of more than 100 m.p.h.

Rudi Stein, owner-operator of a Manhatten Gallery "Let there be Neon" is influencing neon's resurgence: the flower pot design where a stem and a flourish of coloured linear petals sprout from a transformer concealed as a flower pot.





Stein describes neon as a versatile, mobile medium with vast unexplored creative possibities.

Rudi started ten years ago a series of training shops in New York City, where he hoped to produce neon glass benders to fill the vacancies in that department of May Sign Company on the East Coast. In the process of training the men, hundreds of irregular practice shapes appeared. Rudi then opened a gallery and proceeded to make a fortune with his pupils' experimentation!

These examples above are some creative uses of neon but there must be many variations unexplored. Rather than the modern slavish devotion to plastic, it would be preferable to use more neon: our cities could house neon sculpture in art galleries. Neon as an essential element of the communications media, should be regarded with the respect it deserves: a good sign is the result of good graphics and good workmanship.


FACTOR
LEMON HART
KENT
TRUCK STOP
Grants
SCOTCH WHISKY
TAVERN
JAGUAR

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