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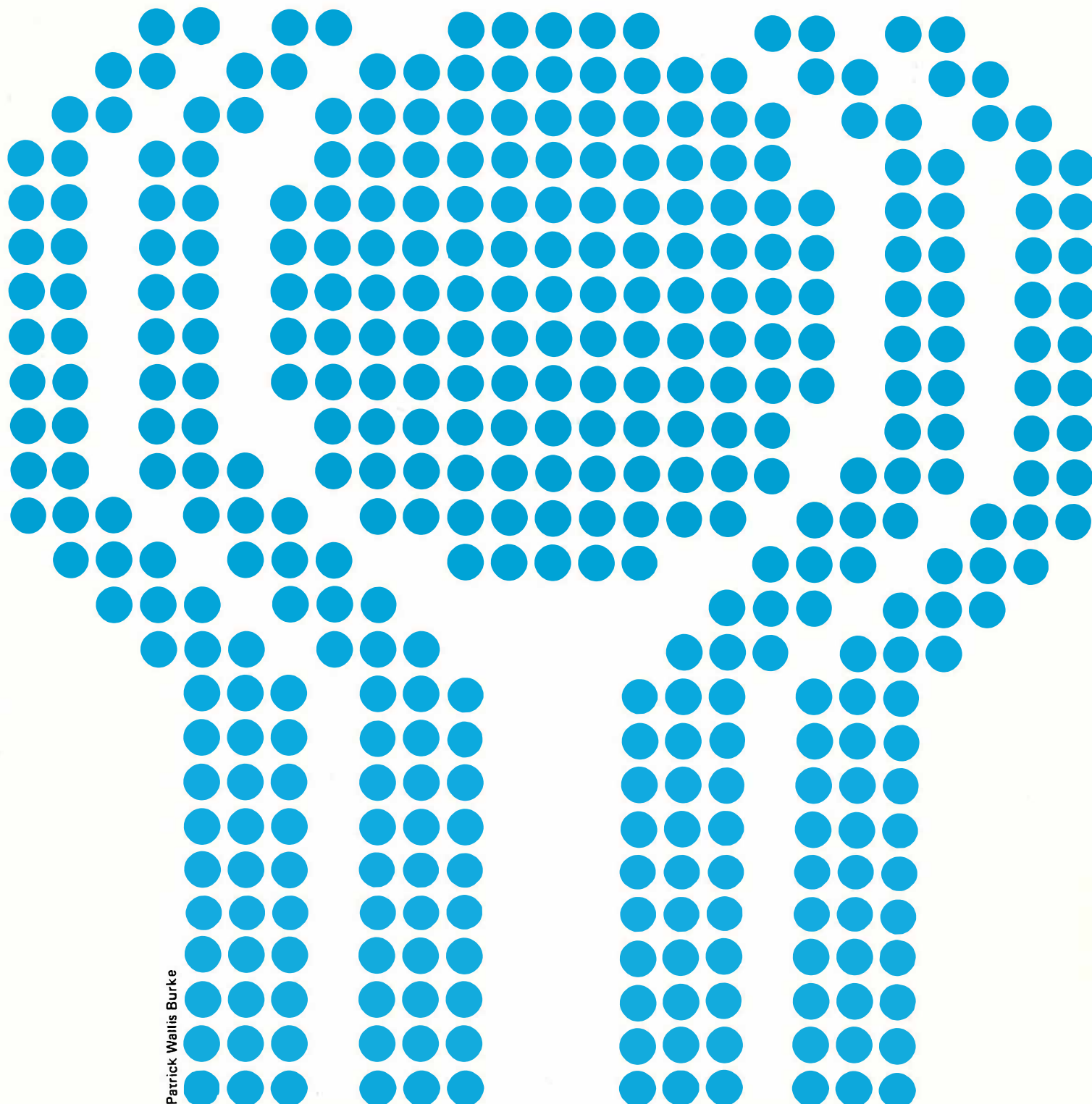
Children's picture preferences—
a comparative study
Otl Aicher's sign posters

Button-down-graphics—the signing
for the World Cup '78

Theme and variations—giving visual
identity to a school of music
A printer's alphabet

Re-thinking research into visual
communication

First steps on a thousand mile
journey—part 3
A new development in data entry



Patrick Wallis Burke

ART·SCIENCE·ART·TECHNOLOGY·ART

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Aims and Scope

Leonardo is a quarterly international professional archival journal for artists, art teachers and other interested in the contemporary visual or plastic fine arts.

Illustrated articles by artists are published which deal with aspects of their work, with no restrictions on artistic tendency, artistic content and medium.

Leonardo also contains articles on developments in the other arts, on new materials and techniques of possible use to artists and on subjects in aesthetics, architecture, education, the natural and social sciences and technology.

Selected texts of a special character are published in the *Documents* section. Also included in the Journal are the following sections: *Terminology*, *International Science-Art News*, *Aesthetics for Contemporary Artists*, *International Opportunities for Artists*, *Calendar of Events*, *Books and Letters*

Partial Contents of Volume 11, Number 1

K.K. HEBBAR with S.I. CLERK: A memoir on the work of a painter in India

JOHN H. HOLLOWAY: Implementation of notions of science in some of my reliefs and drawings

EDVARD ZAJEC: Computer art: A binary system for producing geometrical nonfigurative pictures

EDMUND BURKE FELDMAN: A socialist critique of art history in the U.S.A.

CHARLES G. GROSS and MARC H. BORNSTEIN: Left and right in science and art

FRANK BROWN: Computer music produced with the aid of a digital-to-analog converter

ALBERT GARRETT: Report on *Color 77*, Third Congress of the International Color Association (AIC)

JORGE GLUSBERG: 1977 Symposium on Video and Communication, Barcelona, Spain

PAUL HUBBE and NANCY HUBBE: Inexpensive stage scenery made from materials for paper manufacture

PIERRE BOULEZ: Technology and the composer

GERHARD CHARLES RUMP: The possible impact of comparative ethology on the analysis of works of art



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**Children's picture preferences—
a comparative study***C J Ladan and J Frascara*

The authors describe a cross-cultural study of children's picture preferences. Children were shown specially prepared pictures of a pair of giraffes, each painted in a different manner. In one picture, for example, the animals were represented naturalistically, in another they were stylised. The complexity of the background was also varied, as were the outlines of the figures, these being varied from hard-edged to soft-edged. The authors' expectation was that age, sex, and geographic region would influence children's preferences along three dimensions, which they termed 'edge,' 'form,' and 'simplicity-complexity.'

The study described involved Canadian schoolchildren of both sexes, between the ages of 7–11, and these results were compared with an earlier study of Argentinian boys and girls within the same age range.

The authors find that, in general, children of both cultures typically prefer natural images incorporating detail and with a good analysis of contours, although some age/sex exceptions are noted.

A new development in data entry

The article briefly describes the general principles of a newly developed Data Entry machine. This device is capable of recognising ordinary print in any typestyle, combinations font, and a wide range of sizes. This information it can then convert to computer code, either on disc, tape, or teletype compatible interface.

**Button-down-graphics—the signing
for the World Cup '78**

The article describes and illustrates the signing system developed by Gui Bonsieppe and Carlos A Mendez== Mosquera for the latest World Cup football competition held in Argentina recently. It uses an ingenious system of plastic buttons that can be positioned upon perforated metal plates, so as to generate the various required signs. The system is modular and was produced in a range of four different sizes.

**First steps on a thousand mile
journey—part 3***Patrick Wallis Burke*

The author continues his analysis of the fundamental differences between ideogrammatic and alphabetic writing. He describes some of the problems that have occurred over various attempts to write Chinese in Latin characters. He shows how the Chinese writing system manages to solve the phonetic problems that occur when rendering foreign words of various kinds, and includes some examples of modern technical terms in their

Chinese forms. He concludes with some examples of 'concrete' poetry that make use of Chinese characters.

**Theme and variations—giving visual
identity to a college of music***Keith Murgatroyd*

The author briefly describes and illustrates his work as design consultant to the Royal Northern College of Music, Manchester, England. This would seem to be a very rare example of an enlightened educational establishment which, although primarily concerned with sound, was also determined to give itself a strong visual identity.

**Fog signals—experimental signs for
Britain**

We show a group of traffic signs to be tested experimentally on British roads during the next few months. They have been specifically developed as fog hazard warnings. Using computer-type dots, any one of these 12 signs can be flashed on to an illuminated panel, which also has flashing warning lights at each corner.

**Re-thinking research into visual
communication***Jocelyn Chapman*

The author is sceptical about much of current research into visual communication. She points out that although an immense amount of research has been carried out, no general principles of any kind have emerged that might aid designers to improve their performance. Most research, she argues, concerns itself only with those factors which can be measured.

After listing the various approaches that can be taken to research, she goes on to suggest that the task of finding out what people really feel about particular items of communication requires methods of research that include a genuine understanding of the people concerned.

All too often, present-day methods are simply aimed at getting useful feedback so that the producers can do a better job. The emphasis is not on the person looking. He or she is merely a 'subject' in an experiment. Researchers do not usually care about them or respect their personal opinions. As a result, the wisdom of ordinary people is left untapped because we insist on using 'experts.'

As she remarks, "when you know and respect someone you cannot treat them as a 'subject.'"

The questions you are asking them from your book seem suddenly absurd. The new methods must include empathy, respect and caring for and understanding the whole person."

Children's picture preferences—a comparative study

C J Ladan and J Frascara

Books for children present a variety of visual image styles. Possibly the diversity in their appearance arises from lack of knowledge regarding children's picture preferences, requiring editors, designers and illustrators of children's books to rely upon personal preferences alone.

The predominant focus of attention in investigations of children's responses to images has considered perceptual development while selections among various style types received little attention. In fact, investigations of children's picture preferences may produce new data which clarify and extend results reported by studies of perceptual development.

Gray (1938) encouraged the study of children's picture preferences, believing this knowledge would allow a basis for the development of art appreciation. French (1952) remarked that much of the research in the field is motivated by the belief that children's responses to art are only of value if employed as the basis for more effective teaching. But while there is some understanding of picture content variables enhancing learning (Levie, 1973), these same variables have not proved to correspond with those integral to pictures that children find pleasant (Dwyer, 1972).

Children's books are commonly selected by adults for their pupils or family. But adults' visual abilities (see Hanes review, 1973) and pictorial preferences (see Stweig's review 1972) differ greatly from those of the young. Faw and Nunnally (1968, 1973), for example, report that while adults prefer pleasant and avoid negative stimuli, children will view some negative stimuli for longer periods than they will view positive or neutral picture content. Waymack and Hendrickson (1932) also report a lack of congruence between children's choices and adult's judgements of acceptability for picture study, and suggested that adult's assessments of pictures perceived to be enjoyable to children do not, in fact, reflect an understanding of the basis of children's selections.

Stewig (1972) reviews 16 investigations of children's picture preference spanning a 50 year period. General agreement among these studies is lacking however, perhaps due to insufficient attention to age and sex as variables. His later (1974, 1975) investigations of pictorial visual elements enhancing enjoyment considered these factors as well as race and found both age and race to influence preference for colour realism, dimensionality, amount of detail and use of perspective. A sex difference in preference for realistic vs. exaggerated body

proportions was observed.

Our investigations expanded study of the stimulus variables influencing children's preferences. *Form* is a major variable as reported by Harris, Schaller and Mitler (1970) who observed that pre-school to third-grade groups prefer geometric to realistic pictures. Mellinger (1932) likewise found that first-graders preferred angularized, sharply faceted forms but reported that the preferences of third and fifth-graders altered toward favouring realistic representations that were literal and clearly outlined. However, it is generally concluded (Lam, 1969; Levie, 1973) that realism is preferred to abstraction, and in Martin's (1931) opinion, realism in picture context is the most important factor in selection.

The body of prior research investigating children's picture preferences also considered the visual dimension of *complexity*. Reduction of detail apparently enhances learning (Daves, 1975), but increasing simplicity has an opposite effect of preference (Stewig, 1974, 1975) that is cross-cultural (Farley and Dowling, 1972). Researchers are by no means agreed on the positive effect of complexity in pictures, while some researchers report a preference for complexity and variability over a wide range (Willis and Dornbush, 1968; Unikel and Harris, 1970; Baltes and Wender 1971; Stevenson and Lynn, 1971; Hanes, 1973), other investigators report that young children favour simplicity in pictures (Hutt and McGraw, 1969; Black, Williams and Brown, 1971; Hanes, 1973; Wohlwill, 1975). Levie (1973) suggests that preferences for complexity is age-related, and depends upon the rapid development of visual competence that occurs in the 5–10 age range. Thus it has been suggested that the ability to perceptually organize pictures may be a limiting factor in preference (Travers, 1969), as might confounding with variables that divert the attention of younger children (Aitken and Hutt, 1974). French (1952) elaborates upon the possible developmental factors limiting a preference for complexity and suggests that these are not necessarily physiological but instead may be related to children's previous visual and aesthetic experiences.

Contour distinctiveness as a third visual variable possibly influencing children's picture preferences has not been extensively researched. According to Wolfflin (1925) "soft" borders suggesting contoured, light=gradated three-dimensional images may be contrasted with "sharp" edging that stresses flat, uniformly=lighted surfaces of closed contours, enhancing figure-ground distinctions. This variable has not received study

in the context of children's pictorial preferences, and thus our knowledge of the factors encouraging children's contact with illustrated books is incomplete.

In general, pilot research of children's picture preferences indicates that age is an important variable; however, sex has not usually been considered as a factor although male-female differences may have been concealed by averaging over age. The present report will consider age X sex interactions, and will also study the influence of cultural variables since these have earlier proven to influence preference, as evidenced by the several studies reporting cultural variations in colour preferences (see Nelson, Allan and Nelson's review, 1971). Cross-cultural studies of pictorial variables other than colour have usually been limited to Black and White groups sharing urban US centres, and while the experiences of these two groups undoubtedly differ greatly and influence a variety of variables determining picture preference, cultural differences alone are not as likely to distinguish picture preference as are climatic and geographic factors in combination with cultural variations. The possibility that children's picture choices may differ greatly depending upon whether their environment is semi-tropic or is perceptually undifferentiated because of snow cover for the greater portion of each year will be considered in this present report.

We expect that age, sex and region may influence selection among pictures, varied along three dimensions, termed "Edge," "Form," and "Simplicity-Complexity." Muted edging, as opposed to distinct or "sharp" contours provides our first variable and because prior research has been limited to investigation of visual abilities rather than to preference-related variables, our prediction is open ended and non-directional.

We also predict that selection from among various types of "Form" will be unequivocal because form is thought prepotent in pictorial preference for all ages (Nelson and Vasold, 1965), but is particularly influential in children's choices (Nelson and Flannery, 1967). However, there is some disagreement among prior researchers as to the relative merits of realistic versus geometric presentations, and hence we chose these elements for investigation.

Developmental limitations, whether physiologically or experientially based, may also be expected to influence children's preference for simplicity and complexity. A developmental trend indicating a shift toward a preference for

complexity in older children is predicted on the basis of previously reviewed research. Studies of the influence of this variable upon children's picture preferences have generally employed multi-sided, random shapes as stimuli; however, we instead chose to select images likely to be more familiar to the children, as did French (1952) who reports that grades 1 and 3 prefer simple picture versions, but that both preferences and the organizational pattern of art products shifts toward complexity in grade 4. Neither sex, race nor socio-economic variables contributed to the variance in this study.

In order to test the aforementioned hypotheses North American children of both sexes aged 7, 9 and 11 years were shown pairs of pictures containing the subject content, and asked to indicate which they preferred. Stimulus pairs differed along the dimensions of "edge," "form" and "complexity" as described. The results were compared with Frascara's (1975) observations of the pictorial preferences of South American children of several socio-economic groups. The North American study did not consider social class as a factor however.

Children of both cultural groups viewed an animal subject similar to those found in children's books, either within a scene including sparse detail ("simplicity" level of this factor) or in a context with abundant detail ("complex" level). This approach investigates children's ability to discriminate figure (subject)—ground (context) in a non-abstract example that is closely related to their experience with book illustrations. Our study of children's ability to discriminate is of course limited in its generalizability because of the use of one example only.

Method

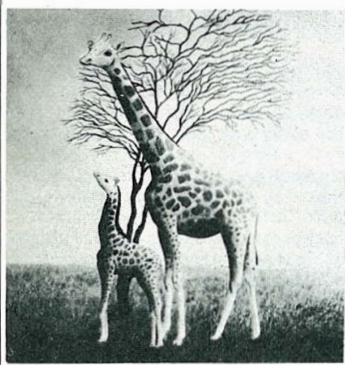
Participants

Seventy-one (71) Canadian children sampled from one urban school participated. Twenty-eight (28) seven-year olds equally divided by sex were tested, as were 23 nine-year olds (10 boys, 13 girls) and 20 eleven-year olds (8 boys, 12 girls). Representative sampling based upon the age and sex proportions reported by Frascara's group of 440 Argentine boys and girls was approximated.

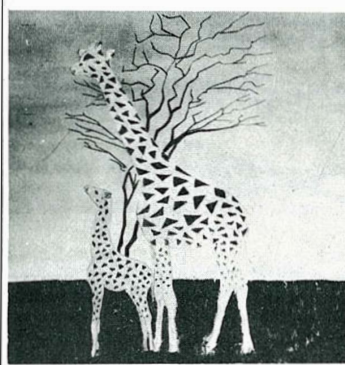
Materials

Three pairs of picture stimuli showing a giraffe and tree as subject content were employed. The North American children viewed black/white photographs (see accompanying illustrations) reproduced and reduced in size to 2½" x 3½" from the larger colour drawings viewed by the South

A0



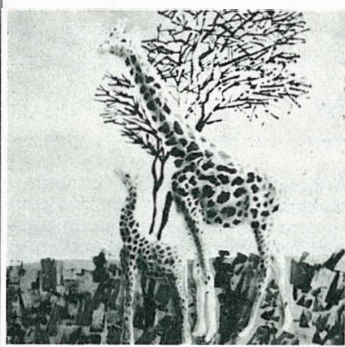
B0



A1



C



A2



D



American children. Our presentation order was as follows:

- 1 Naturalistic vs. Geometric shapes—A0 - B0
- 2 Simple vs. Detailed context—A0 - A2
- 3 Soft vs. Sharp edges—C - D

Image code:

- A = naturalistic images
- B = geometrical simplification
- 0 = main subject alone
- 2 = subject with environmental detail
- C = image with soft edges, light
- D = sharp edged, flat surface
- 1 = intensified colours (not included for black/white test and shown here only for information)

Pairs were presented as follows:

- A0 - B0 Tests preference for naturalistic vs. geometric shapes
- A0 - A2 simple vs. detailed context
- C - D soft vs. sharp edges

Procedure

Testing was individual and conducted in school areas familiar to the children. Every child attending each of three home rooms (grades 2, 4 and 6) was shown three pairs of stimuli, each pair representing two levels of one of the three variables of interest. Each participant indicated which of the pair he/she "liked better" in a forced choice situation, and the response was recorded before the next set was presented. Presentation of the pairs and left-right positioning was randomized. Testing was accomplished in two consecutive days during northern Alberta's lengthy winter.

Results

The percentage of children preferring each picture of a given stimulus pair representing one level of one of the three variables of "edge," "form," and "complexity" was tabulated and graphed (see following page). Age trends in the preference expressed by North and South American boys and girls for different types of edge, form and simplicity= complexity are shown.

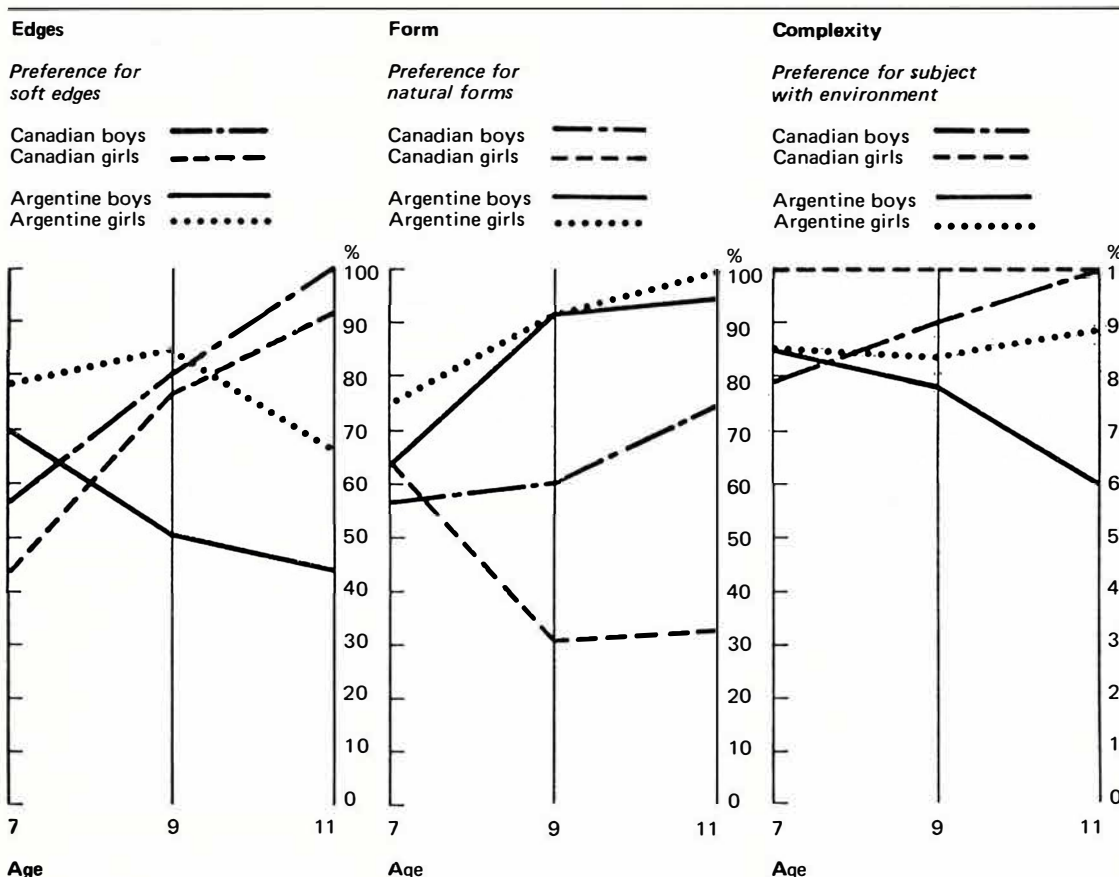
The results indicate that North American boys and girls do not differ in their preference for "soft" edges, $\chi^2(2) = 2.99, p > .05$, a choice that increases in prevalence with age. North American boys prefer "soft" edges at significantly greater than chance levels, $\chi^2(2) = 17.98, p < .01$, while their female classmates initially show a preference for natural images, but at age 9 shift to a preference for geometrical abstractions. South American girls aged 7 to 11 also prefer "soft" edges while their male classmates initially select muted

edges but change to a relatively equal division between preference for distinct and "soft" edges in later childhood.

Although North American boys and girls differ significantly in their choices on the variables of form only, $\chi^2(2) = 25.98, p < .01$, it was decided that the analysis of cross-cultural comparisons would consider interactions with sex because it is possible that averaging over this factor could conceal general differences observed graphically. In this regard, cross-cultural differences in preference for contour types were found for boys, $\chi^2(2) = 29.52, p < .01$, in the direction of an increasing preference for "soft" edges as North American boys grow older, while South American boys appear to develop a preference for distinct edging. North American girls mirror their male counterparts, while South American girls retain a high preference for muted edges over age, showing a particularly strong preference at age 9. The cross-cultural difference between girls' preference for edging types proves significant, $\chi^2(2) = 14.80, p < .01$. "Soft contours are generally preferred over "sharp" in both cultures, with two exceptions: 11-year-old South American boys prefer distinct contours as do 7-year-old North American girls.

South American boys and girls of all ages prefer natural forms, and the preference strengthens with age. Cross-cultural differences in form preferences are emphasized with age, but the shape of the function differs for boys and girls. Girls at age 7 of both groups show a high preference for natural forms, and this preference strengthens as South American girls grow older. Older North American girls shift to choosing abstract forms and the cross-cultural difference for girls is highly significant, $\chi^2(2) = 64.87, p < .01$, as it is for boys, $\chi^2(2) = 9.49, p < .01$. The significant difference between male cultural groups derives from the more rapidly increasing preference for natural shapes observed for South American boys, although both cultural groups at age 7 show some preference for natural forms, a tendency that also increases over age. Preference for natural forms also increases over age for South American girls; however, North American girls prefer geometrical images at ages 9 and 11.

A consistent preference for complexity is recorded for North American girls of all ages. South American girls showed a strong preference for detailed drawings, and as observed for North American girls this preference is irrespective of age. Cross-cultural difference between girls on this variable proved not significant, $\chi^2(2) = 2.76, p > .05$.



noting that "ability" can be modified by past visual experiences. The current investigation provides data supporting this contention, one that is not wholly consistent with classic developmental theory. In this regard, the *decreasing* preference for complexity over age demonstrated by Argentine boys is especially noteworthy.

The results also indicate that North American children prefer soft, detailed images of natural form, with the exception that girls aged 9 and over prefer to view geometric abstractions, a developmental trend that may relate to female recognition that "soft" structures are characterized as feminine, and angular objects of rigid appearance are characterized as masculine. At this age North American girls become aware of the preferred and powerful status of the masculine role in society. Thus our results may reflect their general preference for masculine prerogatives (Brown, 1956; Grief, 1973).

The current study is intended to contribute to an understanding of children's picture preference in ways that may aid effective teaching. Since people of all ages seek out and view those stimuli they prefer, a knowledge of the variables basic to children's picture selections when applied to classroom illustrations may promote continued attention, notoriously difficult to achieve when teaching the very young.

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An initially high preference for detail was recorded for South American boys, although an age trend toward preference for simplicity, not reaching significant levels, $\chi^2(2) = 4.5$, $p > .05$, within the range studied was noted. Cross-cultural differences in boys' preferences for simplicity proved significant, $\chi^2(2) = 11.08$, $p < .01$, with greatest differences observed for the 11-year-olds. This difference in fact derives from opposite age trends; North American boys show an increasing preference over age for subjects seen in context, while South American boys show an opposite trend. No differences between the female cultural groups are recorded, $\chi^2(2) = 2.73$, $p > .05$; South American girls greatly prefer the subject-plus-context photos at all ages (range: 84-89%) over the subject only photos, as do North American girls who completely agree (100% preference) in selecting the subject plus environment.

As a fourth variable Frascara (1975) studied children's preference for natural as compared to "intensified" or highly saturated colours in pictures. However, our schematic reproductions did not allow cross-cultural comparison of preference on this variable.

Overall, North American boys and girls show significantly greater-than-chance preferences for soft edges and detail, and while North American boys prefer natural forms North American girls in later childhood prefer geometric abstractions at significantly greater-than-chance levels, $\chi^2(2) = 16.92$, $p < .01$. South American boys and girls prefer natural images viewed in context. South American girls aged 7 and 11 prefer muted edges, as do seven-year-old boys who prefer distinct contours in later childhood.

Discussion

In general, children of both cultures typically prefer natural images incorporating detail and a good analysis of contours, with some age/sex exceptions as noted.

Our findings may be of interest to illustrators of children's books and to teachers who strive for visual effects in the classroom through the preparation of posters and other audio-visual aids. The effects reported here may or may not stimulate learning; however, their visual appeal may serve to attract and maintain the child's attention so that learning may take place.

Although French (1952) contends that study of children's picture preferences is only of value if the ultimate goal is an enhancement of aesthetic appreciation, it is perhaps unwise to structure every contact a child has with a book as a learning experience, for fear of channelling the child's later expectation of books as learning tools only and thus decreasing the likelihood that he/she will discover the recreational potential of reading. Books created for recreational purposes may not appeal to their young audience if their illustrations are aimed at teaching; for example, "bed-time stories" are usually well-illustrated for the child's sake, but illustrations designed to stimulate thought defeat the book's purpose.

Prior research has not proven conclusive in describing the qualities that promote children's picture enjoyment, perhaps because almost all these investigations have ignored age as a variable, although developmental limitations in ability are expected to be in rapid transition during this period. The nature of the aforementioned "ability" is in question however. French (1952) suggests that physiologically-based factors do not provide a complete explanation of transitions in choice,

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Footnotes

This article was previously published in *Reading Improvement*, Vol 14, No 2, 1967, under the title 'Three variables influencing the picture preferences of South and North American boys and girls.'

Following the publication of this paper a more extensive study has just been completed by Prof. Horst Deppe at the Nova Scotia College of Art and Design.

Fascara's stimuli were 60cm x 60cm colour drawings prepared using poster paints by second year graphic students under his direction at the Escuela Panamericana de Arte in Buenos Aires. Black and white photographs were produced from these drawings and reduced to 2½" x 3½." for presentation to North American samples.

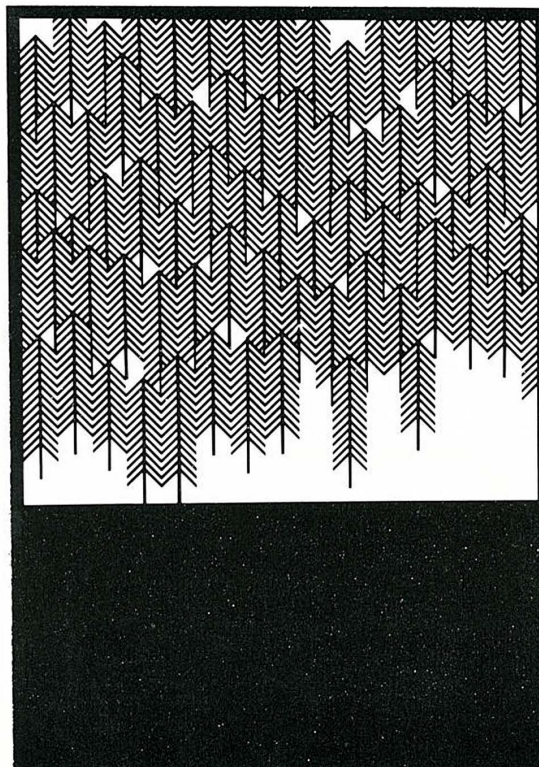
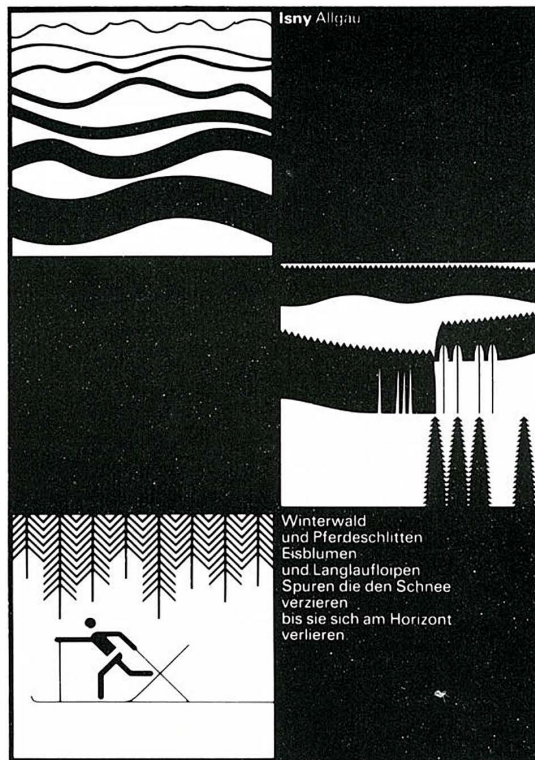
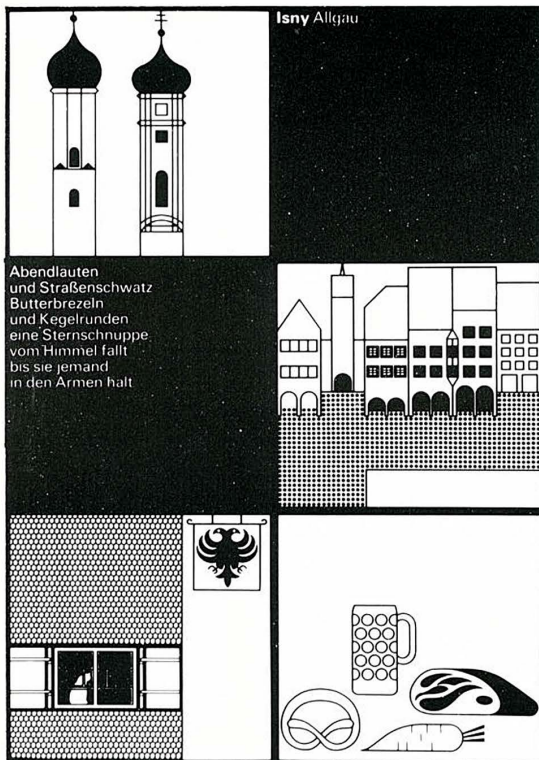
This group of traffic signs is to be experimentally tested on British roads during the next few months. They have been specifically developed as fog hazard warnings. Using computer-type dots, any one of these signs can be flashed onto an illuminated panel, which also has flashing warning lights at each corner.

The twelve signs shown here are to be tested on a 12-mile stretch of the M1 motorway in Bedfordshire. Testing is expected to last for several months while experts study their effectiveness. Motoring organisations are also being asked to gather motorists reactions to the new signs. The scheme has been developed jointly by the Ministry of Transport and the Road Research Laboratory.

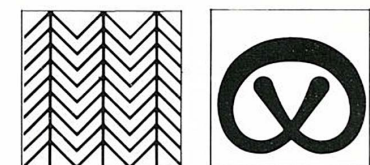
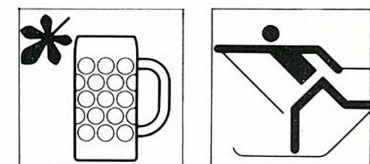
Whilst applauding this initiative, one can't help feeling that the designs are pictorially weak. On pages 8-13 we show the *punto-grama* signs designed by Gui Bonsiepe for the World Cup '78 football competition in Argentina. Whilst these were not designed as illuminated signs, they demonstrate that a good designer can make use of a matrix with considerably more skill than that shown in these experimental signs.



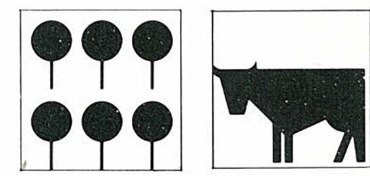
- | | | |
|--------------------------|-----------------------|------------------------|
| 01 fog conditions | 05 strong winds ahead | 09 two-way traffic |
| 02 deer/animals crossing | 06 slippery surface | 10 men at work |
| 03 lorry with shed load | 07 heavy snow | 11 heavy rain |
| 04 accident | 08 break-down vehicle | 12 slow moving traffic |



Readers of our last issue will remember that we featured Otl Aicher's ingenious 'off-the-peg' graphic signing system. These four delightful posters, which subtly announce the attractions of Isny and Argenbühl in the Allgäu region of Austria, are from the same design office. As a series they echo the style that was created for the sign 'alphabet.' Indeed, many of the individual elements have been taken from the signing system, either directly, or in some modified form. As a reminder, here are some of the signs that figure in these particular posters.



Otl Aicher's work in the field of graphic signing has been concerned with evolving a visual language capable of expressing a wide range of information. In these posters he uses this same language to write poetry and the results are enchanting.



A new development in data entry

What appears to be the first commercially practical system capable of replacing manual key entry of virtually any printed material has been developed by an American company. Described as a Data Entry Machine, the system scans and recognizes ordinary print in any type font or combination of fonts, and a wide range of sizes. This information it converts to computer code, either on disk, tape or teletype compatible interface.

No special preparation of the source documents is necessary. The machine reads documents in their original forms including; hardcover and paperback books; magazine, newspaper and journal articles; company or government manuals; telephone directories; photocopies; and type-written pages.

It can also handle substandard print containing fragmented, joined and broken characters.

Operation of the machine

In order to optimize the system's internal character definition tables which control the character recognition process, or to create these tables for sets of special character forms, the system is operated for a brief period in *Training Mode*. In this mode, one line at a time is scanned and the recognized characters displayed on the CRT terminal. The operator verifies each identification and edits corrections, if any. Characters that have not previously been verified in this or any previous training sessions for the material are highlighted on the screen.

Data entered in Training Mode is stored and does not need to be rescanned. The length of time required for a particular entry task depends on its complexity (number of fonts, special characters, unique format, etc), but is typically less than thirty minutes.

Once the training is completed, the bulk of the data entry task is performed at the maximum throughput rate in *Production Mode*.

Entry speed depends on a number of factors, including character size, number of intermixed characters and fonts to be identified, print quality and page format. For most tasks, the entry speed is many times that of manual key entry. Accuracy rates depend on a number of parameters, particularly print quality. On reasonably well printed material, accuracy rates of one substitution error in 20,000 characters or more can be achieved. Accuracy rates of one error in several thousand characters can be achieved on material with significant numbers of such printing errors as fragmented letters, joined letters, breaks, and poor contrast.

How the machine works

The scanner, a specially designed camera with lighting system, integrated sensing array and preamplifier

circuit, riding on a computer-controlled X-Y mover, scans the printed page and transmits the analog image to an image enhancement circuit. This circuit brings out features which improve the recognition process by increasing the contrast found on the page and eliminating 'noise.' The enhanced image, now in digital form, is transmitted to a computer contained within the data entry machine.

The computer, under software control, first separates the image into discrete character forms. Characters are considered to be discontinuous forms, with special algorithms handling joined and fragmented characters. Once separated, several hundred features, including topological and geometric properties such as loops, concavities, line segments, vertices, loop extensions and the relationships of these properties are extracted from each character.

This set of properties, called a *Multiple Property Descriptor* (MPD) is compared to MPD's in the character definition tables to generate a tentative identification.

This tentative identification can be changed by post-processing routines that consider size and positional relationships. The character identifications generated by the post-processing routines are then subject to further modification by operator interventions and editing.

Special routines compensate for broken characters.

Development of the data entry machine

The machine is an outgrowth of the research and development that went into the production of a Reading Machine for the Blind—a device that converts printed and typed material into synthesized spoken English. Such a machine had to be capable of accommodating any material that a blind person might want to read.

After six years of preliminary research and design by Raymond Kurzweil, Kurzweil Computer Products was formed in 1973 to complete the implementation of an OCR-based Print-to-Speech reading machine for the blind. A working model was completed in 1974. Production models of this machine have since been installed in cities across the United States. Currently, there are 35 such reading machines in use, with additional units being produced at the rate of one per week.

In 1976, a project to optimize this multi-font character recognition technology for the specific requirements of high accuracy data entry was initiated. The first Data Entry Machine was completed in 1977 and is being used in the company's data entry service bureau.

Data entry machines are expected to be installed in a variety of commercial settings during 1978.

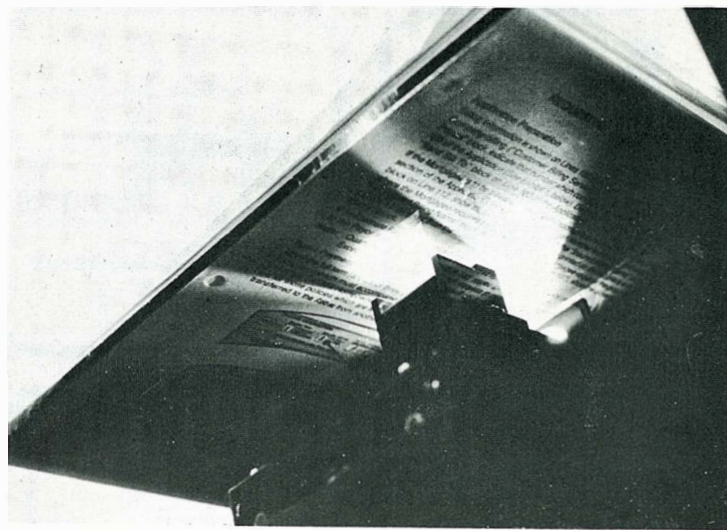
Top: The scanner 'reads' printed text material.

Centre: The operator verifies an ambiguous letter.

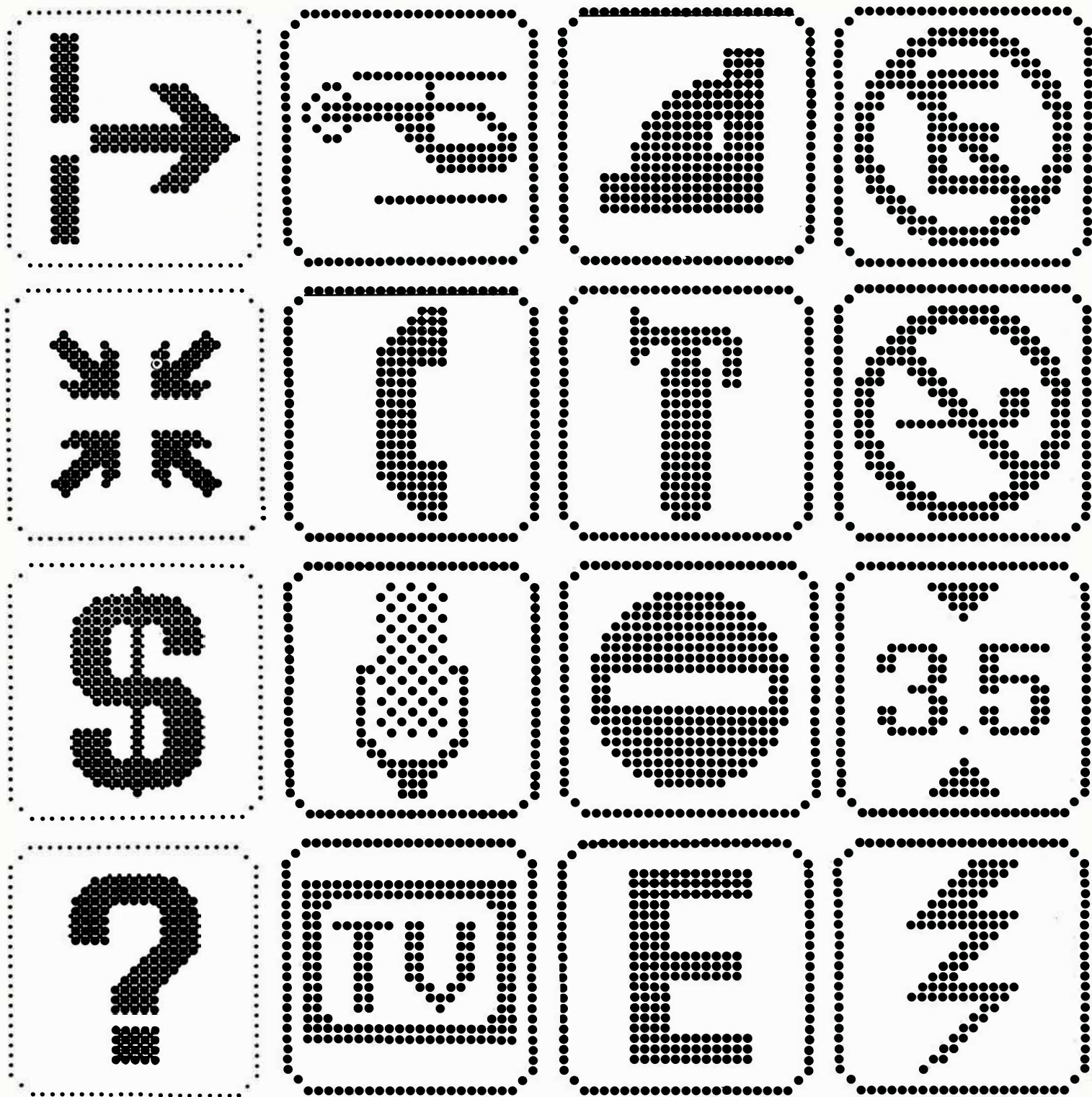
Below: The complete system which includes scanner, CRT, disk, tape drive and computer.

icographic 13, 1978

Information for this article was supplied by
Kurzweil Computer Products, Inc
264 Third Street
Cambridge, MA 02142
USA



Below, a group of 'puntograma' signs developed for use during the World Cup '78



01 exit

02 meeting point

03 exchange

04 information

05 heliport

06 telephone

07 interviews for broadcasting

08 television

09 cashier

10 fire extinguisher

11 no entry

12 parking

13 no parking

14 no smoking

15 maximum height 3.5m

16 danger (high voltage)

Every four years sixteen qualifying countries compete for the Soccer World Cup. This year the competition was staged in Argentina and so, as host nation, they duly set about the task of impressing the hundreds of thousands of football fans who would pour into Argentina, intent on watching their heroes perform.

In honour of the occasion, three new football stadiums were built and three others extensively renovated. Given that visitors of all nationalities would descend on Buenos Aires, the treatment of the signing was given special consideration. Perhaps inspired by the fact that a spherical object would be skillfully booted about for several frenzied weeks, the whole of the signing system is based on circular discs. At first glance, the signs look as if they were designed with lighting in mind, since one is immediately reminded of the technique of producing letters or symbols by means of a matrix of electric light bulbs. The designers, however, describe their signs as *puntograma* or, as we might say in English 'point-o-grams' or 'dot-o-grams.'

A wide range of signs was developed to guide visitors and participants to the various events. Basically, the signs are constructed by using perforated metal plates, into which are pressed polypropylene discs at appropriate points. In general, the background plates are painted dark green, whilst the plastic buttons are greenish white. The system is modular and employs four different unit sizes, to cover signage of comparatively small size, such as identifying signs on toilet and changing room doors, all the way up to monster welcome signs at airports.

Small signs use a grid of 5mm holes to correspond with plastic buttons of 8mm diameter. The largest signs use a grid of 10mm holes to accommodate plastic discs of either 32mm or 64mm diameter. There are some 21 types of panel which can either be mounted into a self-supporting structure or fixed directly to walls and doors.

About half of the symbols used in the system are already in use internationally. The remainder were newly designed by the design team for the entire project, MM/B Design Consultants. The initials of this company are those of its two principals, Messrs Carlos A. Mendez= Mosquera and the redoubtable Gui Bonsiepe.

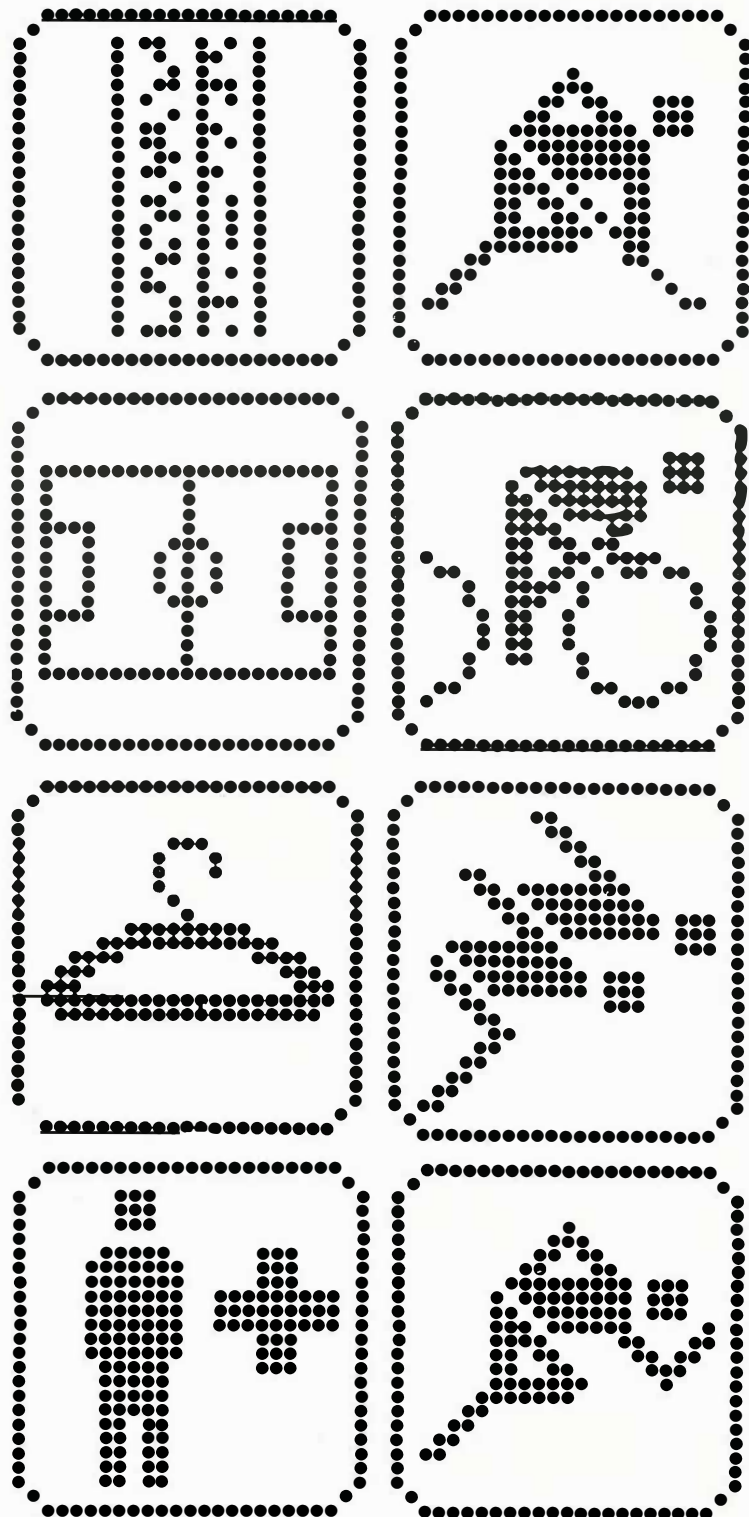
Not surprisingly, the rumblings of protests and the threats of boycott that surrounded this particular World Cup, did nothing to dampen the enthusiasm of the aficionados of the 'boot.' Soccer fans, like most sportsmen it seems, are far more

interested in the exploits of their idols than in the excesses of particular governments. Nevertheless, it came as a surprise to see that this graphic enterprise was headed by Gui Bonsiepe, who had never struck one as a likely sympathiser with a military regime.

The scheme seems to have been very thoroughly detailed, the designers leaving little to chance. All the symbols are catalogued, with the number of buttons required specified and positioned. The rules of application are strict and there are exhaustive examples of how text, symbols and directional arrows should be combined.

About 6000 panels of various kinds were used for the World Cup of 1978 and the system is said to have been effective and flexible enough for the designers to hope that it might secure wider use, since it is also claimed that its price is competitive with other comparable systems.

Certainly the system is ingenious and in full accord with the impressive front-of-house operation carried out by the Argentinian authorities. Indeed, the event was so well organised that they even managed to get their own team to carry off the trophy! What more can one say?



17 telex

18 football field

19 cloakroom

20 doctor

21 hockey

22 cycling

23 swimming

24 track and field

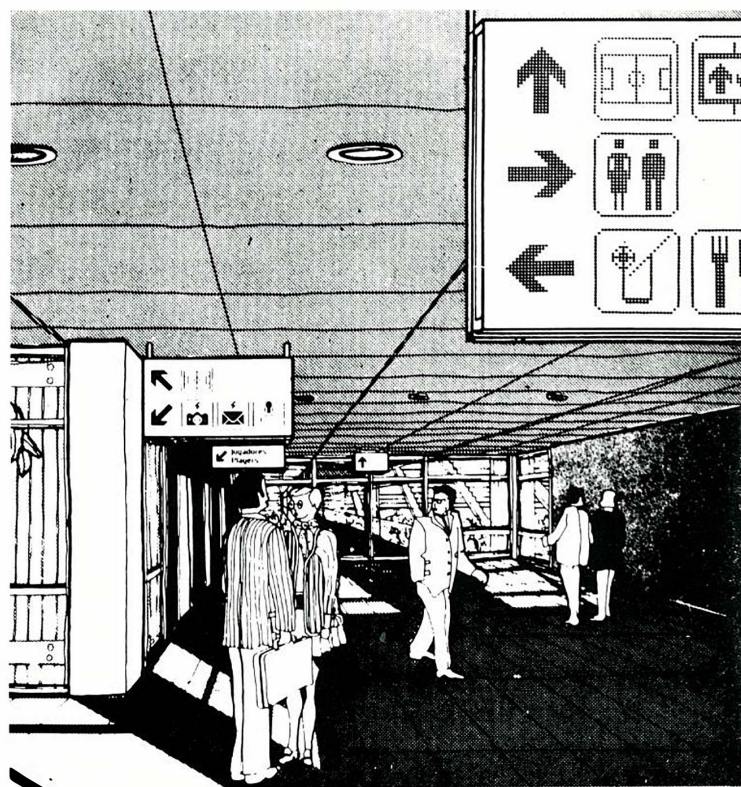
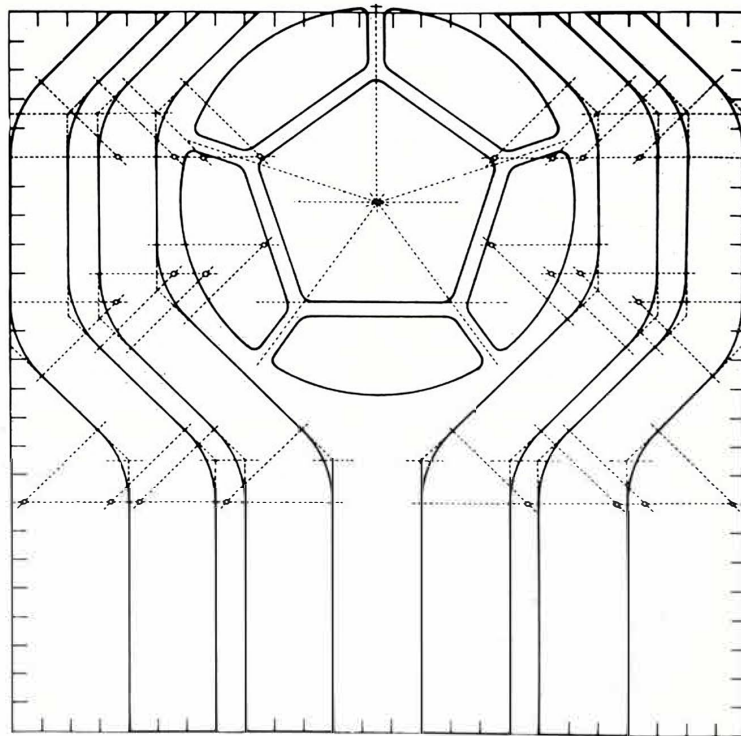
Button-down graphics—the signing system for the World Cup '78

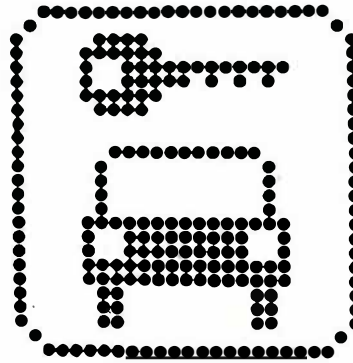
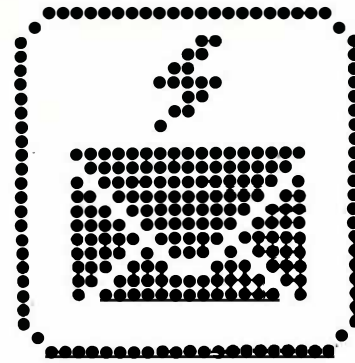
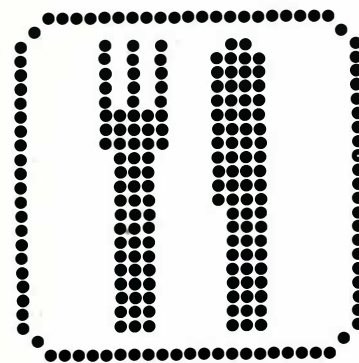
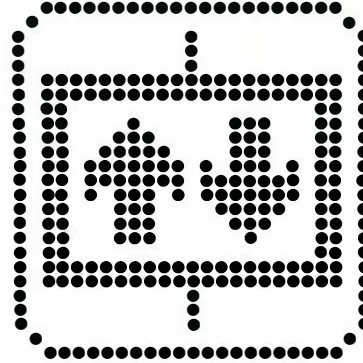
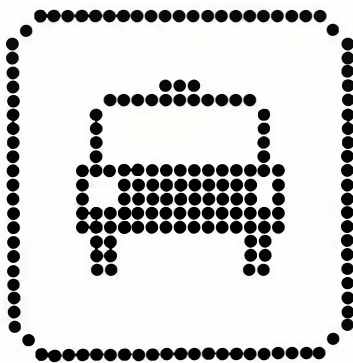
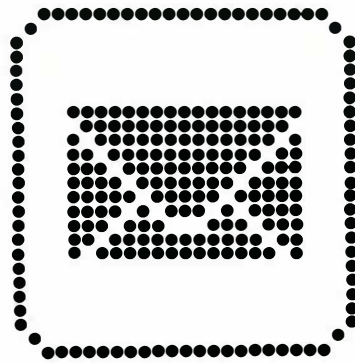
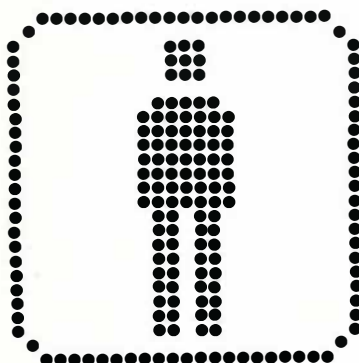
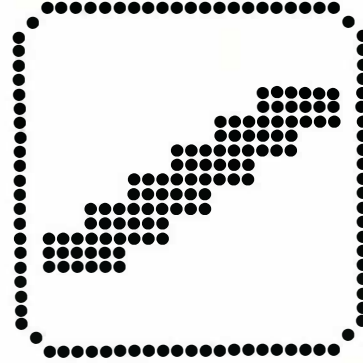
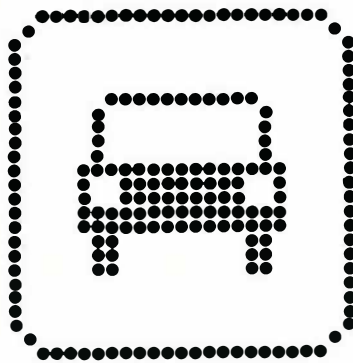
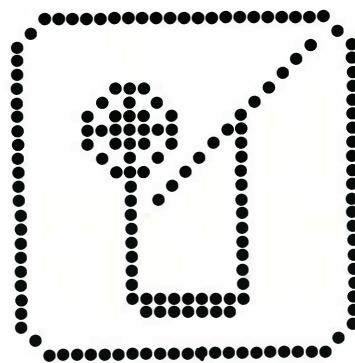
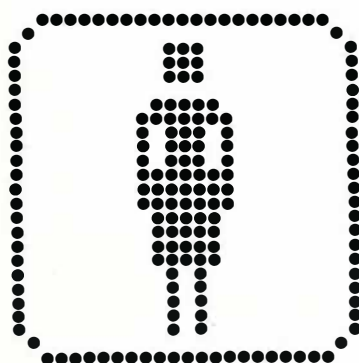
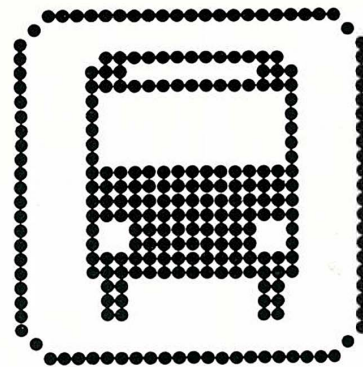
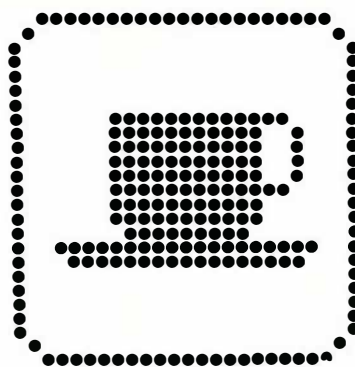
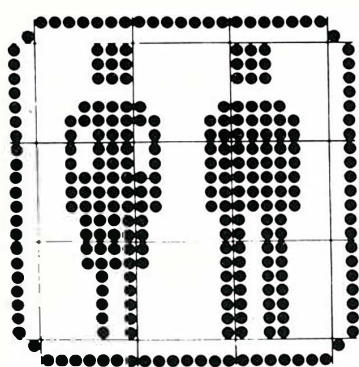
Top, the emblem of the Soccer World Cup '78.

Below, two views of the signing system in operation.

Left, a sign at the entrance to the Mendoza Stadium.

Right, a view of the interior of the principal building in the same stadium.





01 toilet

02 toilet, women

03 toilet, men

04 restaurant

05 cafeteria

06 bar

07 mail

08 telegrams

09 radiophoto

10 automobiles/cars

11 taxis

12 rent-a-car

13 bus (bus stop)

14 stairs

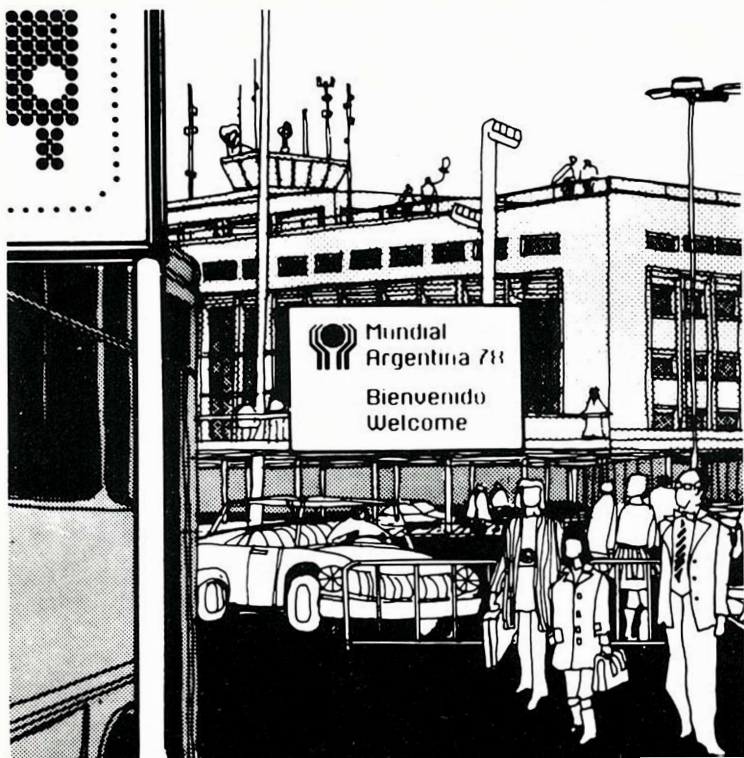
15 elevator/lift

16 entrance

Top, the emblems for the six football stadiums in which the various matches were played. The top three emblems were specially designed for the newly constructed stadiums and use images that have associations for each of the areas in which the buildings are located. Waves for the stadium at Mar del Plata; Mountains for the stadium at Cordoba, and a bunch of grapes for the stadium at Mendoza. The symbols for the

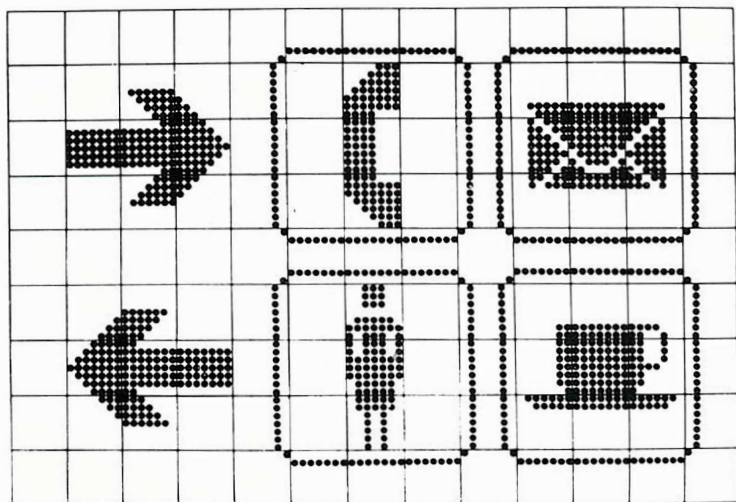
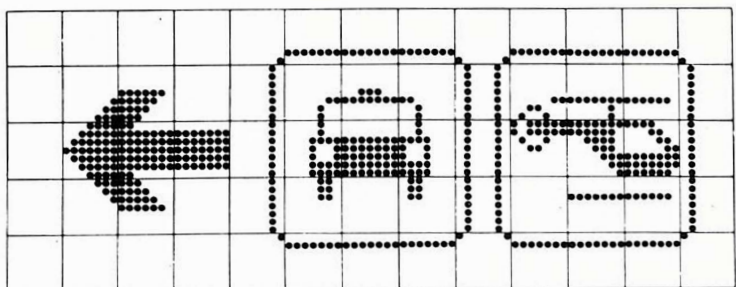
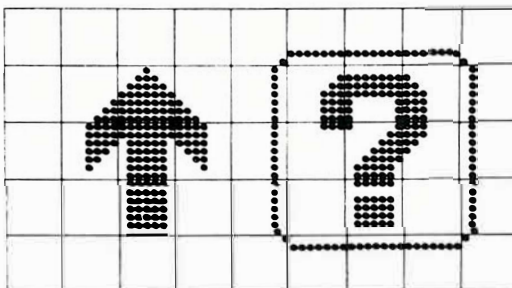
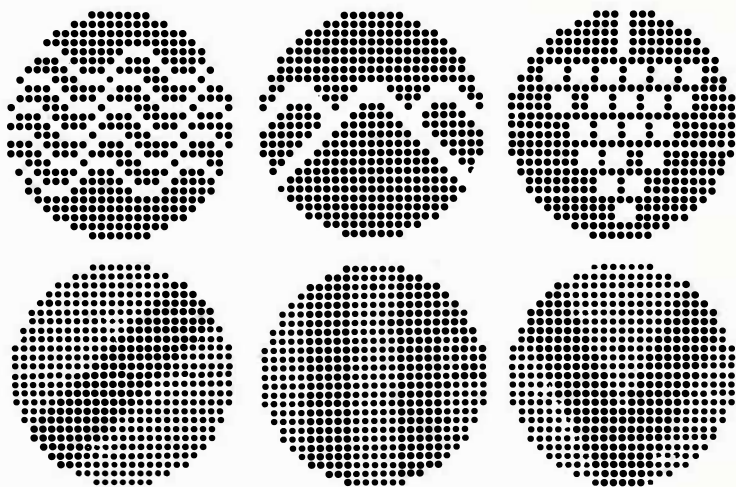
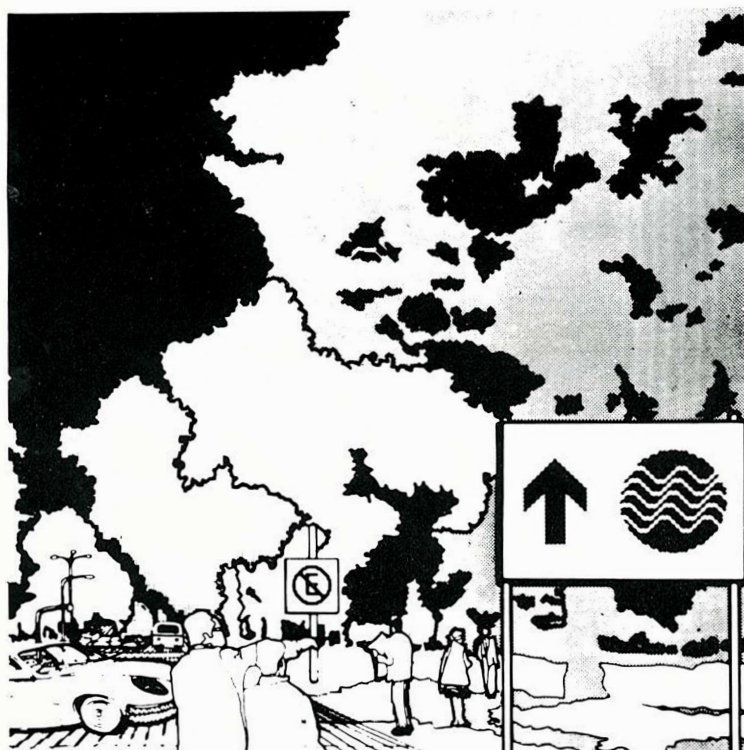
renovated stadiums use the existing club colours. A diagonal red stripe on a white background for the River Plate stadium; two vertical blue stripes on a yellow background for the Rosario Central stadium, and a blue V-shape on a white background for the Velez Sarsfield stadium.

Below, some examples of how the sign elements can be built up to form larger complex units.



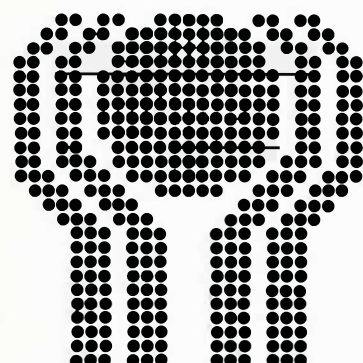
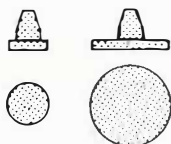
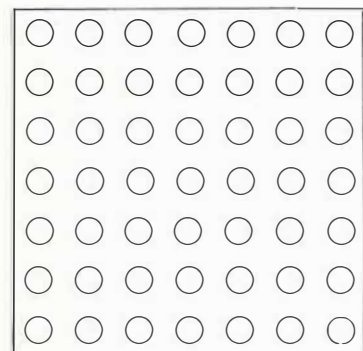
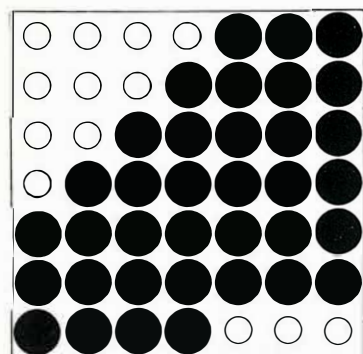
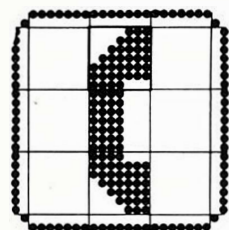
Above, a 'Welcome' sign at the airport of Ezeiza.

Below, a sign at the access road to the newly designed stadium at Mar del Plata.



Top, a typical 'puntograma' sign, with an enlarged section showing the method of building up the image in small basic units.

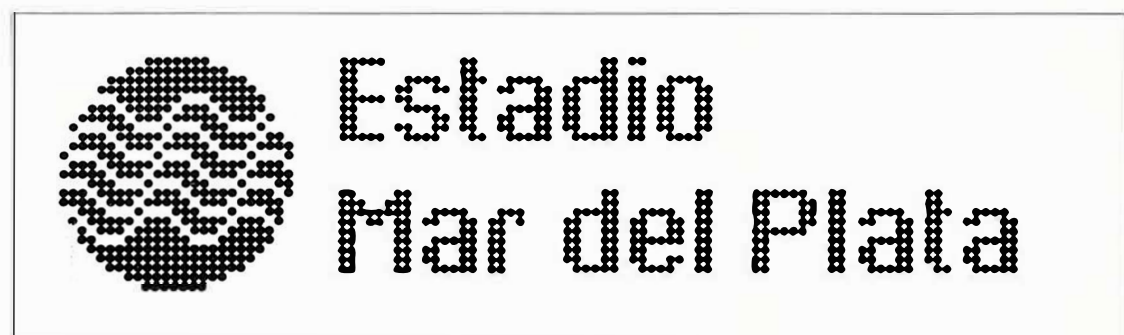
Below, the symbol for the World Cup '78 in its 'puntograma' form.



Top, a 'Welcome' sign for use at ports, airports and railway terminals.

Centre, the sign for the stadium at Mar del Plata.

Below, the specially designed alphabet which the designers say was based upon the proportions of Standard Univers.



A B C D E F G H I J K L M N O P Q

R S T U V W X Y Z

á b c d e f g h i j k l m n ñ o p q r s t

ú v w x y z

1 2 3 4 5 6 7 8 9 0

Begin difficult things while they are easy: do great things while they are small. The difficult things of the world must once have been easy; the great things must once have been small. . . A thousand mile journey begins with one step.

Lao-tse

First steps on a thousand mile journey—part 3

Patrick Wallis Burke

雲只言松
深在師下
不此採問
知山藥童
處中去子

16 **cloud(s)**;
short for Yunnan
Province

17 **deep**,
profound; dark
colour; hidden;
deeply, greatly,
very

18 negative
prefix—**not**

19 knowledge;
wisdom;
to **know**;
to feel;
to sense;
to be a bosom
friend;
to recognise;
to be expert
in the subject;
to communi-
cate officially,
to be in charge
of office

20 **a place**:
bureau, office,
department,
section;
to live, stay

11 **only**; just,
simply; except,
but, however

12 exist, live,
remain, stay;
be in, at, on;
lies in, rests in

13 **this**, then

14 **a mountain**,
a hill

15 centre,
middle, inside;
hit (target);
be touched by
(weather,
poison, etc);
pass examination;
to fit taste,
liking, be agree-
able to;
in the middle,
halfway

6 speech, talk,
what one says or
professes;
language,
spoken language;
speak, say(s)

7 **teacher**;
military division,
troops;
to imitate

8 to pluck,
gather, collect
(flowers, tea,
mulberries, etc);
mine for
(minerals, etc);
to select, adopt

9 medicine,
herbs, certain
chemicals;
to cure

10 to go to a
place, to leave,
depart;
to drop (habits,
office, etc);
to drive away
(heat, cold, etc);
leave (country);
away; past,; off

1 **pine tree**,
fir tree; symbol of
integrity

2 underneath,
position under,
beneath, below;
to descend,
dismount, unload;
down

3 a question,
to ask, **inquire**,
consult

4 a child, boy;
young, innocent,
virgin

5 fruit or seeds
of plants; eggs
of animals; roe
of fish, offspring;
pupil, **disciple**;
title of respect
for men of
distinction,
one's spouse;
a nobleman;
anything small
in size

These twenty characters comprise a poem by Jia Dao, a Chinese poet of the Tang dynasty, who died around the middle of the ninth century. No doubt its title will appeal to all of you who managed to get a regular ration of Oriental wisdom from such TV soap-operas as 'Kung Fu' or 'The Water Margin.' It is called 'Looking for a hermit and not meeting him,' which seems to have just the right amount of ambiguity that gives literary Chinese so much of its flavour.

Like all living languages, *spoken* Chinese has changed considerably over the centuries. The spoken language of Jia Dao and Confucius would mean nothing to a modern Chinese speaker, just as the spoken English of Alfred the Great would be unintelligible to all of us. Throughout China dialects have evolved that are now so far apart in their sounds that they are virtually separate languages. The man from Peking is hard put to it to order food in a Cantonese restaurant.

But because the prime purpose of the Chinese characters is not to represent sounds, the Chinese *written* language has developed independently of the evolutionary changes that have taken place in the *spoken* language. This gives Chinese writing the inestimable advantage of being read and understood by people who may well pronounce the names of the symbols quite differently from one another. And since the Chinese taught their writing system to many other peoples, this means that throughout the provinces of China, as well as in Japan, Tibet, Vietnam, Mongolia, Korea, Singapore and Hong-Kong, the characters may be pronounced in a hundred different ways, but their meaning remains constant.

I have set Jia Dao's poem in traditional form. The characters are read from the right hand side in four descending rows, and there is no punctuation. Beneath the poem I have given some of the meanings for each of the characters, taken from Lin Yutang's Chinese—English dictionary. Just like English words, each character has a variety of meanings, sometimes seemingly contradictory. This does not mean necessarily that one has to try out innumerable permutations in order to decipher the poem. Context usually dispels ambiguity.

In bold type I have set the most likely meanings, and from this preliminary sorting can offer this rough translation.

*Beneath a pine tree I inquire of a young disciple
Who says, 'My master is away
gathering herbs—
Somewhere among the mountains.
But the clouds are thick and I do not
know the place.'*

I have to admit that, as Chinese poems go, this is a comparatively simple one. It is also likely that my crude analysis of it will outrage any Chinese literary expert. Nevertheless, I marvel at the fact that someone with very little knowledge of the Chinese spoken language can manage to squeeze out a part of its meaning. This thousand year old poem can still be read and enjoyed throughout China because its *visual* message has remained the same. Most of the characters that Jia Dao wrote are still in use and many have retained their original meanings. Read aloud by speakers from Peking, Canton or Shanghai, the poem will sound quite different, of course. And none of these spoken versions would resemble the speech of dear old Jia Dao. Yet each reader can understand his meaning.

Perhaps only the language of numbers provides Westerners with a comparable phenomenon. The figures for a piece of simple arithmetic look just the same whether you happen to be English, French or German. If, for example, I write 13+27=40, there is no problem for anyone familiar with the use of Arabic numerals. It is only when we come to speak the figures that any difficulty occurs. Whereas I label the answer 'forty,' to any Frenchman it is 'quarante,' whilst to the German it is 'vierzig.'

So look again at these twenty unique characters that have carried a man's thoughts across a thousand years. Each is an entity, a little thought= picture, rather than a unit in the systematic dissection of the sound structure of the Chinese language. And it is this independence of the characters from the spoken language that has enabled them to provide a literary continuity over many thousands of years, as well as binding together the diverse cultures of China and much of East Asia.

Bēowulf maðelode — on him byrne scān,
 searu-nett seowed smiðes orþancum —:
 ‘Wes þū, Hrōþgār, hāl! Ic eom Hyzelāces
 mæȝ and magu-þeȝn; hæbbe ic mārða fela
 ongunnen on zeoguðe. Mē wearþ Grendles þing
 on mīnre ēðel-tyrf undierne cūp;
 sećȝaþ sē-liðend þæt þes sele stande,
 reced sēlesta, rinca zehwylcūm
 idel and unnytt siþþan æfen-lēoht
 under heofones hādor beholen weorðeþ.
 Ðā mē þæt zelærdon lēode mīne
 þā sēlestan, snotore ceorlas
 þēoden Hrōþgār, þæt ic þē sōhte
 for-þon hie mæȝenes cræft mīnne cūðon.
 Selfe oversāwon þā ic of searwum cōm

Unlike Chinese writing, the visual message of alphabetic writing changes with time. This is a short extract from *Beowulf*, an ancient Germanic epic poem. It was written in the early part of the eighth century and is roughly contemporaneous with the poem by Jia Dao. The English which I am using to write this article is a twentieth century descendent of the language of this long dead poet. And well over a thousand years separates my words from his. During that time radical structural changes have taken place in our language. From being a highly inflected Germanic language, English has gradually changed into a mixed language of few inflections. Fundamentally, however, it is still a Germanic language despite the immense influx of foreign words, at first Scandinavian, then for three centuries almost exclusively French, and later mainly Latin and Greek.

The pronunciation, too, has changed considerably, but its spelling remains largely what it was in the beginnings of the fifteenth century. Printing froze spelling in English, which is why English orthography is utterly unphonetic and so exasperating to foreigners.

I suspect that few of my readers will be able to translate this fragment of *Beowulf*. Even if they were to hear it read aloud in the pronunciation of the period it would seem a strange and unfamiliar tongue, as foreign as Japanese or Urdu.

maa

馬
 horse
 xopc

Chinese characters have a more direct connection with their meaning than do English words. If we write down the sequence of letters that spell 'horse,' it has meaning only through the mediation of the sounds that each of the letters makes. It would make very little real difference to English-speakers if we adopted the Cyrillic alphabet to write the same sounds. St Cyril's alphabet may be something of a ragbag collection of bits from the Greek and Roman alphabets, but it has most of the sounds needed to write English.

Everything would look totally different, of course, but this odd collection of letters from the Cyrillic alphabet (xopc), gives a passable imitation of the sound of the English word 'horse.' But the Chinese character 'horse' means horse without any reference to the sound of the word. Its early form was pictorial, and its hold upon the memory is just as vivid, even in this later conventional modification. It still bears the echo of the animal that inspired the early symbol. Form and meaning are much more closely linked.

| | | |
|---|----|---|
| <i>kung¹ yeh⁴</i> | 工業 | industries |
| <i>kung¹ fu¹⁴</i> | 功夫 | work; service; meritorious employment; time |
| <i>kung¹ hsiao⁴</i> | 功效 | effect; merit; result; efficiency; efficacy |
| <i>kung¹ k'ō⁴</i> | 功課 | a task; school-work |
| <i>kung¹ nêng²</i> | 功能 | ability; skill of hand and eye; efficiency |
| <i>kung¹ chi¹</i> | 攻擊 | to attack; to assault; offensive |
| <i>kung¹ ta³</i> | 攻打 | to attack; to assault; to fight; to engage in battle |
| <i>kung¹ hsin¹</i> | 公心 | public spirited; public spirit; public mind |
| <i>kung¹ kan⁴</i> | 公幹 | public affairs; official business; (also polite for business) |
| <i>kung¹ kuan³</i> | 公館 | a public office; official residence; |

Ever since the Jesuits reached China at the end of the sixteenth century, there have been many attempts to write Chinese in Roman letters. Anyone who has begun to learn something of the language will have encountered spelling systems like the Wade-Giles shown here—which contrives to look like a combination of alphabet and arithmetic. Since 1958, however, the Chinese government has introduced *Pinyin* (literally meaning 'spell-sound'), as the official system of romanised spelling.

To understand the difficulties of writing Chinese in the Roman alphabet we have to look at the sound structure of Standard Chinese which is now being taught in all parts of China. This is based on the Peking dialect, since more than two-thirds of the population already speak a version of it. Westerners know it as

'Mandarin' and it gets its name from the fact that it was the speech of the Chinese government officials, or mandarins. It is rather like describing a dialect of English as 'Civil Service' or, perhaps, 'BBC announcer' English.

The adoption of Pinyin by the People's Republic will bring some benefits to countries outside China. Although many European countries use the Roman alphabet, they each give different sound values to its letters. So that what happens is that each romanisation attempts to imitate the sounds of Chinese by using the sound values commonly encountered in that country. As a result, the Chinese word for book may be written as *shu* in English, *chou* in French, or *schu* in German romanisation. Pinyin offers the chance of a world-wide uniform system.

方
芳
肪
防

fang

- (1) surname
- (2) direction
- (3) locality
- (4) party, side
- (5) method
- (6) square

fang

- (1) perfume
- (2) perfumed

fang

- (1) animal fat, fatty tissue

fang

- (1) dam or embankment
- (2) defend against, provide against

昉
妨
紡
訪

fang

- (1) dawn
- (2) to begin

fang

- (1) interfere with, upset, harm

fang

- (1) reel, spin
- (2) spinning

fang

- (1) personal call, visit, interview

Whereas a good Chinese dictionary will list at least 16,000 characters, there are only some 420 monosyllables in the entire spoken language. This means that each of these individual sounds will have to do duty for a large number of words. If, for example, you look up the Chinese word *fang* you will find that it applies to no less than eighteen different ideograms which, in turn, carry two or three different meanings. A quick search will turn up such things as 'direction,' 'square,' 'perfume,' 'animal fat,' 'dam,' or 'begin.'

Here is a sample of eight such ideograms with their various meanings. You will notice that the first character reappears in all the others. In these cases it acts as a 'phonetic' indicating that all of them take the sound 'fang.'

But Chinese is a tonal language and it makes a hell of a difference whether you say 'fang' with a flat, rising, swooping or falling inflection. A tone is an integral part of any Chinese syllable, and this tonal change alters the meaning as drastically as changing a vowel or a consonant in an English syllable. 'Mandarin' or Standard Chinese has four tones, which have the effect of boosting the 420 basic monosyllables of the language to just under 1600 separate sound units. (The reason for the mathematical discrepancy is that not all monosyllables carry all four tones). And this extraordinary phonetic poverty means that you have an enormous number of words chasing very few sounds. It also means that you don't get many marks for punning in Chinese. Homophones—words that sound the same, but mean different things—abound in Chinese.

Oddly enough, the Chinese have long had a fondness for the pun. It is said that the First Emperor was told that if he buried ten thousand men in the foundations of the Great Wall it would last for ten thousand years. Given the track records of many subsequent rulers, he showed remarkable restraint. Instead of immediately ordering a massacre, he merely buried the unfortunate Mr Wan. Why? Because one of the meanings of the sound 'wan' is 'ten thousand.' Presumably the Gods enjoyed this bizarre piece of word play, for they've already let the wall stand for a couple of thousand years.

The reason for the variations in the spelling of the word 'fang' are because I have made use of yet another system of romanising Chinese, called *Guoryuu Romatzyh*. My choice was dictated by the fact that the *Pinyin* system requires special diacritical marks and my particular typesetting machine does not have them.

Guoryuu Romatzyh is a simple notational system for showing the tone changes. To indicate the first tone the vowel is left unmarked and is written *fang*. To indicate the second tone an *r* is placed after the vowel to give *fangr*. The third tone is shown by doubling the vowel to give *faang*. Whilst to show the fourth tone an *h* is placed after the vowel to give *fahng*. However, these additional letters (*r*, *a*, *h*) have no phonetic value. They are simply a device for indicating which tone is used when speaking the sound.

天 子 聖 哲

dah

tzyy

shehng

jer

Most Westerners have heard of the spoken tones of Chinese even if the only Chinese words they know are 'chop-suey.' They seem to be a phenomenon peculiar to the Chinese language and to some of the languages of South East Asia that have been influenced by the Chinese.

And clearly these special tonal properties have been a feature of the language for a very long time, since one of the earliest references to them occurs in a written work of the sixth century. When an eminent scholar was asked by the Emperor of Liang to explain the meaning of the four tones he produced this ingenious four syllable answer.

It is doubly ingenious for, in the first place it simply means "The Son of Heaven is divine and wise," which is just the kind of utterance that Chinese Emperors loved to hear. But secondly, in the speech of that time, each of these syllables demonstrated respectively the first, second, third and fourth tones.

你 是 什 么 时 候 来 中 国 的 ?

Nǐ shì shénmo shíhou lái Zhōngguó de?
You are what time come China?

我 是 二 月 初 来 的 。 你 呢 ?

Wǒ shì èryuèchū lái de. Nǐ ne?
I am early February come. (And) you?

If, as we have already seen, each ideogram identifies both the meaning and the sound of a word of merely one syllable, does this mean that the Chinese speak in strings of mono-syllables?

It does seem possible that the early classical language was largely mono-syllabic, but this is quite untrue of modern Chinese, since eighty per cent of words in present-day speech are of two or more syllables.

One of the effects of romanisation has been to vividly reveal the obvious polysyllabism of everyday Chinese speech. Written in Roman letters it is possible to see that syllables coalesce to form larger word units.

And this tendency towards many-syllabled words is increasing.

Shown here are two short sentences in Mandarin that have been written in Chinese characters with a Pinyin romanisation beneath them.

This is taken from a mainland Chinese publication and it is interesting to notice that the characters have been bunched together, rather than set equi-spaced.

This is to signal visually the fact that particular syllables join to form two, and sometimes three syllable words.

lun dun

倫敦

One of the pressures that must have led early picture-writing systems into becoming phonetic is the difficulty of rendering the sounds of other people's languages.

As, for example, the names of foreign countries, cities, or products.

So how do the Chinese, with their non-alphabetic system, solve such problems?

Here are a pair of characters which puzzled me greatly when I first met them in a printed headline.

My dictionary told me that the one on the left meant 'human relations,' the second meant 'sincere' or 'friendly.'

Neither seemed to make much sense in context.

I took my problem to one of my Chinese students, who patiently explained that what I was looking at was the name of my own native city. The two characters were being used for their sound value only. They spelt 'London.'

ying guor

英國

What about the names of countries?

These are the two characters that are used to write 'England.'

If you look up the first, you will find that it means 'heroic,' or 'outstanding.' The second simply means 'country,' or 'nation.'

Most true-blooded Englishmen would agree that this is a pretty fair description of their country.

But I have to point out that the first character is only being used as the phonetic equivalent of the initial stressed syllable in *Yingland*.

meei guor

美國

The same is true of America.

Here the first character means 'beautiful.'

'Beautiful country' it may be, but this initial character, pronounced *mei*, is being used because it approximates to the major stressed syllable in the word *A me rica*.

jung guor

中國

Whilst we're looking at countries, I cannot possibly omit the name of China. These two characters proudly proclaim the words 'Middle Kingdom,' and one is reminded of that long succession of emperors who sat the Dragon Throne, confident in the belief that anything that lay beyond their celestial rule was either benighted or barbaric.

lin ken

林肯

And how do the Chinese write people's names? This is the surname of Abraham Lincoln, and it is quite a good rendering of the sounds. The first character we have met before. Pronounced *lin*, it means 'forest.' It is quite a common name in China, just as it is in England. The second character, pronounced something like *kern* means, with a certain aptness, 'willing.'

maa keh sy

馬克斯

Unlike most European languages, Chinese never has words in which there are clusters of consonants before or after the nucleus vowel—such as the English words *strength* or *grasps*. This means that European words have to be broken up and each consonant given its own syllable. 'Marx' is usually written like this, which gives a pronunciation rather like *Ma-ke-si*. The initial character we have already met as one of the 'radicals.' It means 'horse' and is quite a popular Chinese surname.

bor keh

伯克

My own name gives similar problems. It would be conventionally rendered like this, which gives it a sound that falls somewhere between *Bor-ker* and *Bocker*.

mir ni

迷你

My next two examples come from that seemingly far off period when England was deemed to be 'swinging.' Two of our cultural exports of that time were miniskirts and the 'Beatles.' One of the nice things that the Chinese can do when coining a phonetic equivalent is to choose characters that have meanings appropriate to that of the imported foreign word. Here these two characters give a passable rendering of the sound 'mini,' but the first means 'beguile' or 'enchant,' whilst the second is the first person singular 'you.' So we get the 'beguile-you'skirt.

pi tou syh

披頭四

Now to the Beatles. Again the first two ideograms give a sound value roughly like *Bi-too*, but as a pair they also mean 'dishevelled head.' The third character merely means four.

buh ding

布丁

Now that we've lived to see the age of the Chinese takeaway, it might interest you to know that not all this culinary traffic has been one way. At some point we seem to have given the Chinese the word 'pudding'—an obscure Middle English word of unknown origin.

This is what it looks like.

The first character means 'announce' or 'plan,' whilst the *ding* character can mean anything from 'a male adult,' 'T-shaped,' or be descriptive of a bell clanging, as in 'ding-dong.'

Incidentally, somewhere in the nineteenth century, we gave them another word that we'd become rather fond of, which had come to us by a long route from Greece. The Chinese rendered it *de-mo-ke-le-s* although they subsequently abandoned this alien graft and shortened it to *minzhu*, which means 'people-rule.'

jyy narn jen

指南針

Science has a long tradition in China, and from earliest times they discovered many scientific principles and produced an astonishing range of inventions.

These three characters literally read 'point-south-needle,' a device that we now speak of as the magnetic compass. Polarity and magnetic variations were understood in China by the eighth century. Europe had to wait a further six hundred years for such understanding.

Just twenty years before the Norman Conquest, the Sung armies were already employing the 'point-south=needle,' and China was manufacturing both floating and dry= pivoted compasses.

ting jeen chih

聽診器

The Chinese have a fondness for describing things, rather than inventing mere labels.

Your local doctor makes use of the stethoscope, which gets its name from two Greek words, *stethos*—the chest and *skopeein*—to look at, or examine. The Chinese are less vague.

They write these three characters which read 'listen-examine-instrument.' And in case your local GP is ever moved to try out his sphygmometer, you might like to know that the Chinese call it a 'blood-pressure=calculator.'

A lot of English metaphors lie buried in tombs that bear Greek or Latin inscriptions.

If you think it quaint that the Chinese describe psychology as 'mind-principle-study' and sympathy as 'together-feel,' then it probably means that you've never bothered to look up the origins of this pair of Greek words, which respectively translate as 'soul-study' and 'together-suffering.'

All human languages are forged from the same raw materials.

taih kung ren

太空人

Moving forward in time, we come to some more recent coinings.

A literal translation of these three ideograms gives 'beyond-sky-man.' We know him as an astronaut or a space man, in which the word 'space' is a drastic contraction of 'outer-space.'

Language changes with changes in man's thoughts, and in response to the enormous growth in modern terminology, it is now possible to express almost every bit of Western jargon by its Chinese equivalent.

chau yin shuh

超音速

These three characters, for instance, read literally 'extra-sound-speed,' and are a present-day coining for the phenomenon of 'super-sonic-speed.'

yuarn tzyy nerng

原子能

Next, a slightly more ominous group. In 1964 China exploded her first atomic bomb, and once more these ancient ideograms were rearranged to describe a new understanding. The first means 'origins,' the second 'small.' The two together represent the chemical atom. The third character means 'capability.' We ourselves speak of 'atomic energy.'

iy

隻只

kai

開开

wur

無无

聖圣

花瓶

As well as declaring Mandarin the national language and Pinyin its official written romanised script, the Chinese government has set about simplifying the ideogrammatic characters.

In 1956 the State Council ratified the introduction of 515 simplified characters, as a first step in an overall plan of simplification.

It needs saying that these so-called 'new' characters were not just arbitrary coinings. More than half were already in use and some had been around for centuries.

Here are four such changes, with the traditional character on the left and the simplified form on the right.

It should be obvious that these alternative forms drastically reduce the number of pen strokes required to write each character.

These changes introduce a further complication in that there are now two written Chinese languages, because the overseas Chinese have tended to stick to the original ideograms.

Some cynics have suggested that this suits the Peking government perfectly, since the new generation of Chinese 'literate' will find themselves unable to read deviationist works written in the old characters.

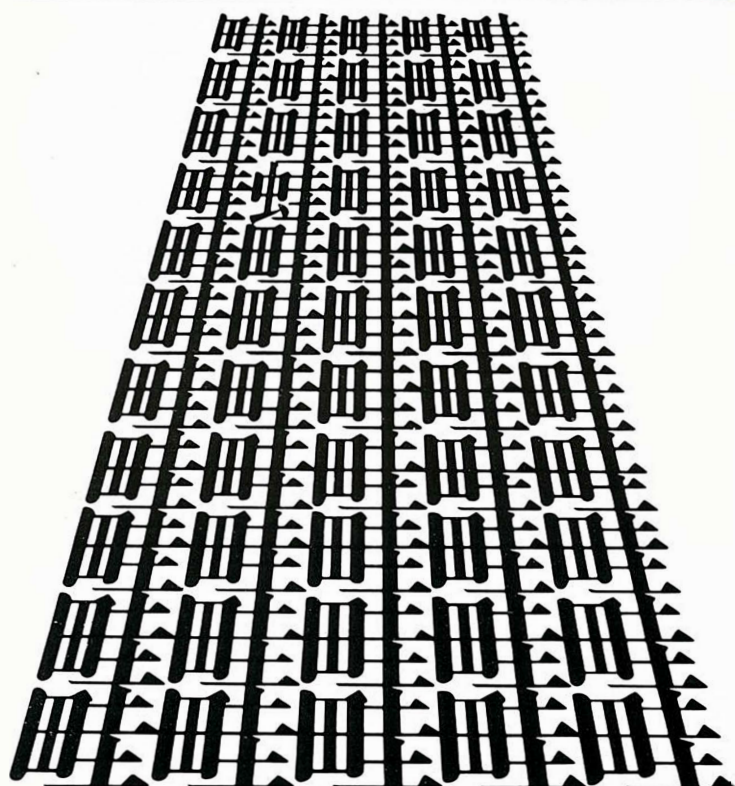
But to be fair, it seems unlikely that they will jettison their magnificent literary past, and no previous regime has ever promoted it with such enthusiasm, publishing huge editions of the classics, some in the simplified characters.

shehng

On a less serious note, I was delighted to come across this pair of characters which simply mean 'flower-vase.'

The Chinese sometimes use this term facetiously, however, as a way of describing a lady secretary who is employed for her looks, rather than her work.

Anyone who has worked in publishing will have met a great number of 'flower-vases.'



tuu—earth, soil

tiarn—field, farm

churng—insect

wa—frog

土
田
虫
蛙

Chinese characters offer a rich source of inspiration to any budding 'concrete' poet. They allow opportunities of a quite different kind from those of alphabetic writing.

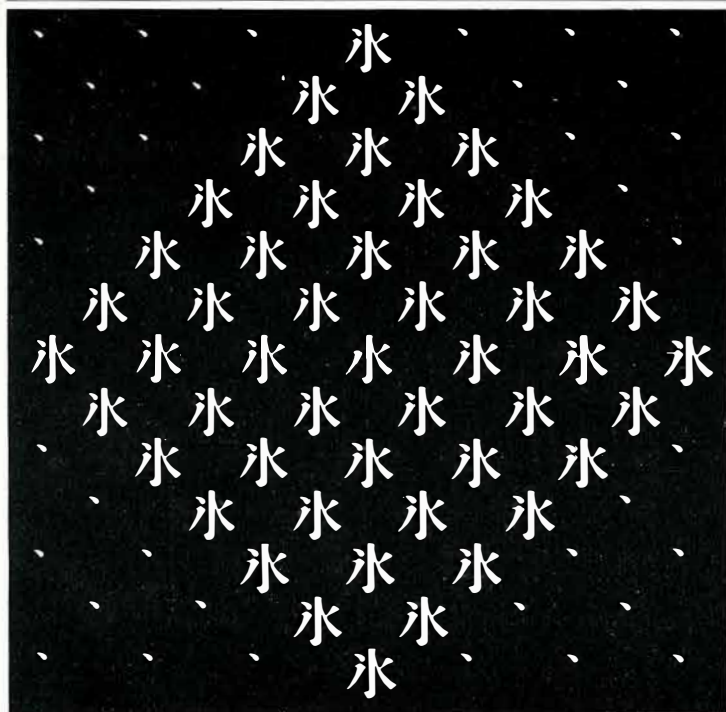
This is a poem by the Japanese artist Kamimura hito, which he entitles 'footpath between rice fields.'

Kamimura 'paints' his landscape by using the two Chinese printed characters which mean 'earth' and 'field.' He tilts them optically so that we can see neatly irrigated fields, divided by paths, stretching to the horizon. Incidentally, if you look at the 'earth' sign you'll notice that you only have to put a fence round it and you've made the sign for 'field,' which seems wonderfully appropriate. But the poet has arranged some little surprises for us, just as one would expect on a real-life walk.

Along one of the paths we meet an insect. He is very difficult to see, since he is trying to look like a field. My third drawing shows what he looks like out of hiding. And then a flash of wit.

As we find the insect, we have only to turn our eyes to see that he sits beside two 'earth' signs, one above the other, just as I show in the fourth drawing. For anyone with a knowledge of Chinese writing, this means that, like a fairy-tale prince, he is turned into a frog!

A piece of pure magic.



shueei—water

bing—ice

水
氷

Kamimura calls his second poem 'Water and ice.'

As you can see from the drawings, the character for 'water' becomes 'ice' simply by adding a little comma-shaped tick.

So the artist arranges his characters like a grove of snow-covered trees on a winter's night.

The little additional tick is scattered across the page like falling snow.

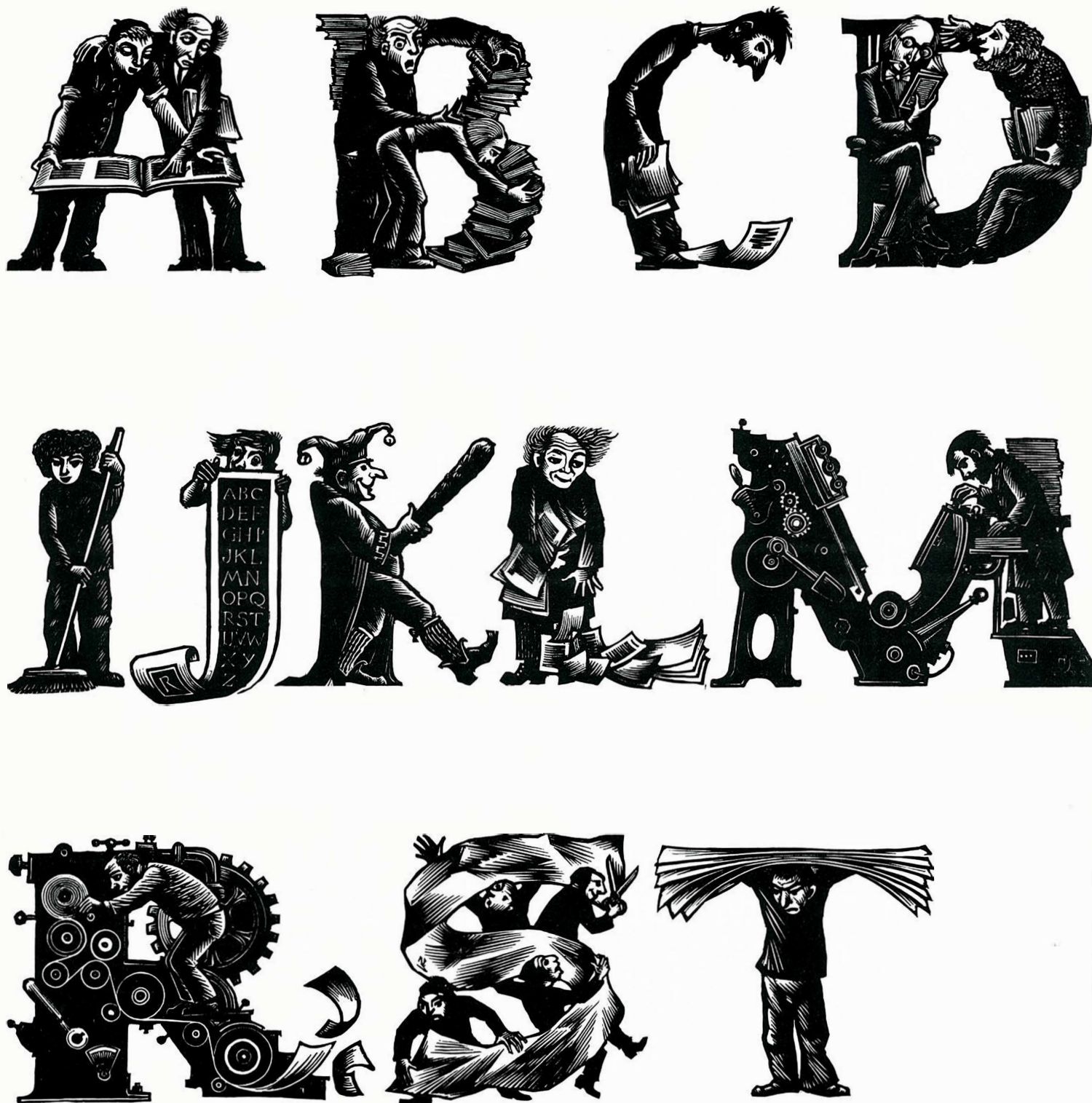
And if you look carefully you will see that everything has turned to ice except for the character that sits at the dead centre of the picture.

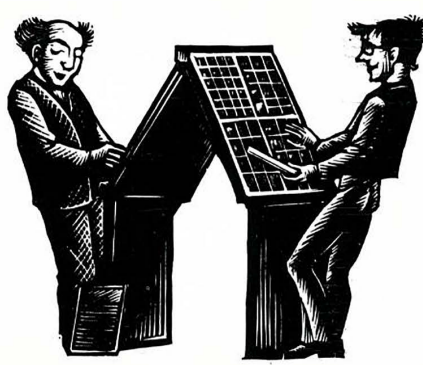
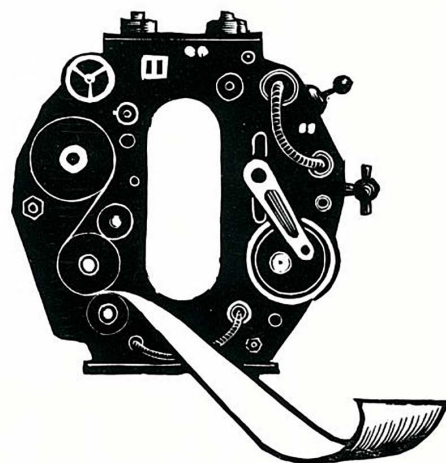
This article will be concluded in the forthcoming issue of this journal

A printer's alphabet

The letterforms of the Latin alphabet seem to have fascinated artists and designers throughout the many centuries since it was invented. We show here a recent 'Printers Alphabet', invented by the Dutch artist, Pam Rueter, which should

delight all publishers, printers and typographers. The letters, which are wood engravings, will shortly appear in book form, published by the Gaillarde Press of Zutphen, in the Netherlands.



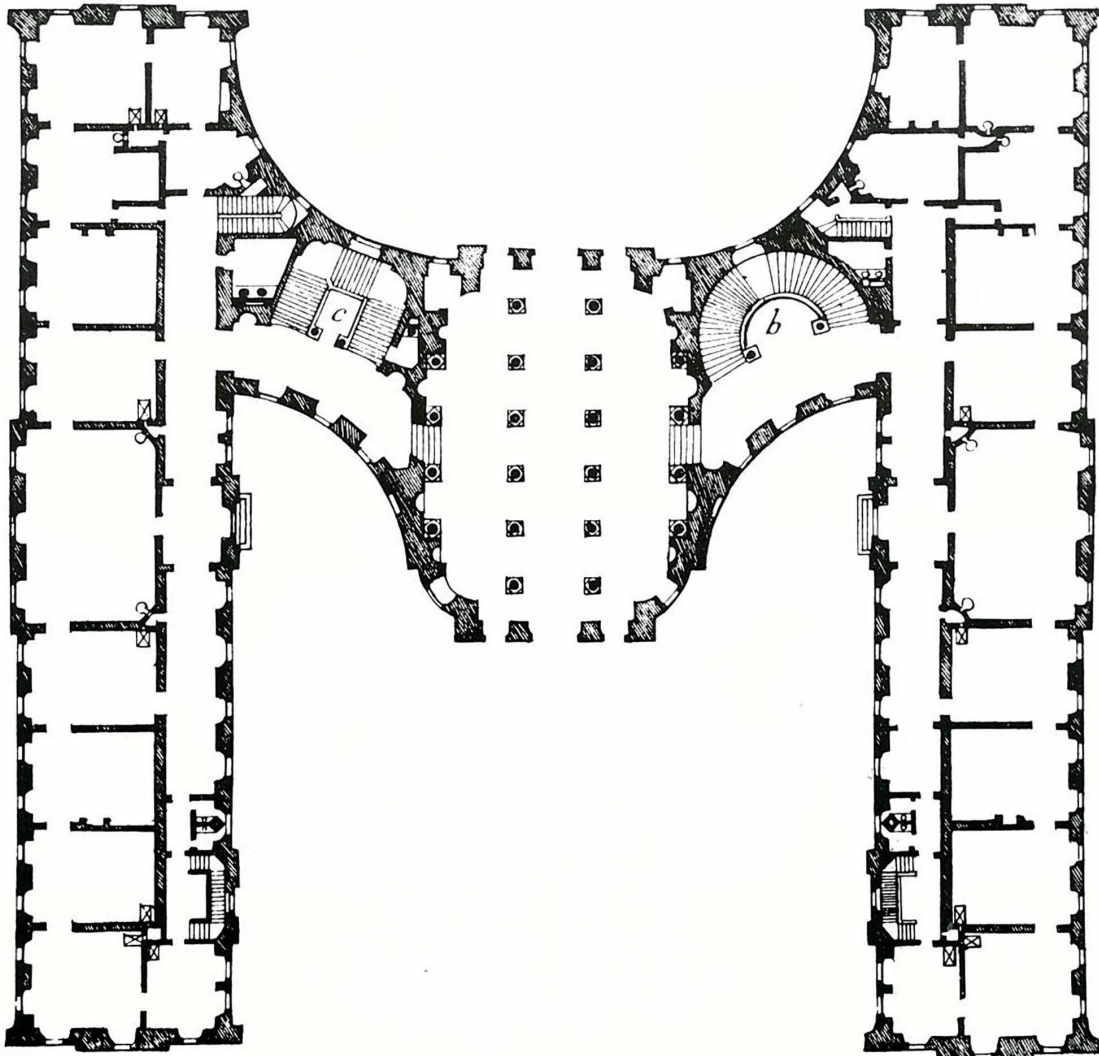
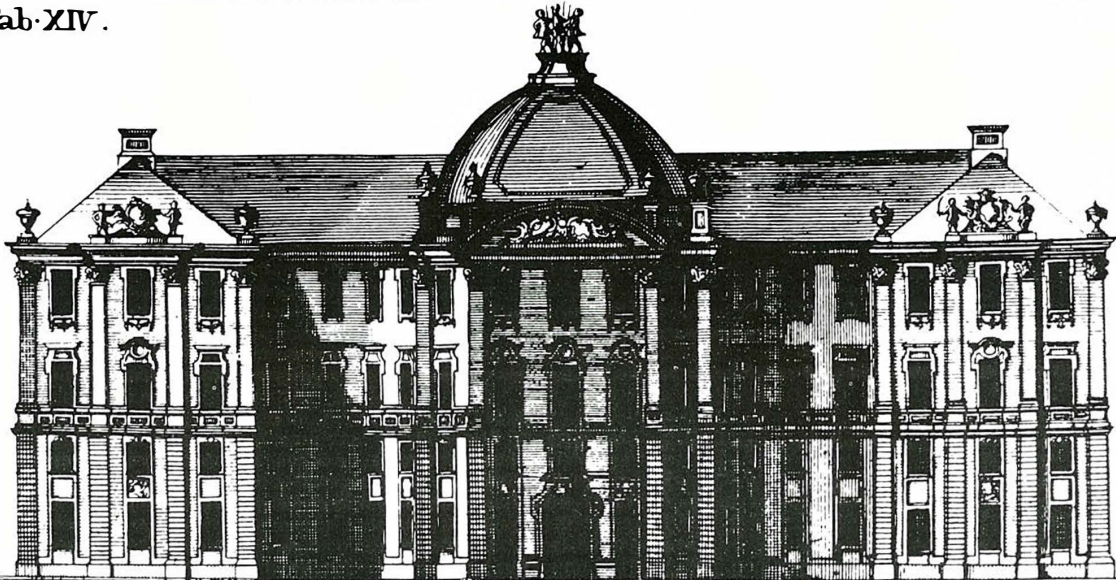


An architect's alphabet

Whilst on the same subject, here are two letter designs from the extraordinary 'Architectural Alphabet' of Johann David Steingruber (1702-87), who was born in Ansbach in Bavaria and was a leading architect of his time. During his working life Steingruber designed some 250 houses and 50 churches, most of which are still standing. His Architectural Alphabet, developed over many years, was finally published at his own expense in 1773. The remarkable thing about his designs is that they are completely feasible pieces of architecture, in

which even the heating problems are taken into account. Since churches were customarily dedicated to saints, it appears that Steingruber intended his alphabet to serve as a catalogue of all possible saintly initials. In all, he produced 30 different designs, since he offered two alternative versions of the letters A, M, Q, R and X, whilst the letters I and J use the same design. Steingruber's alphabet appears in Massin's 'Letter and Image,' and there is a version published by the Merriam Press, England, in 1972, in a limited edition of 425 copies.

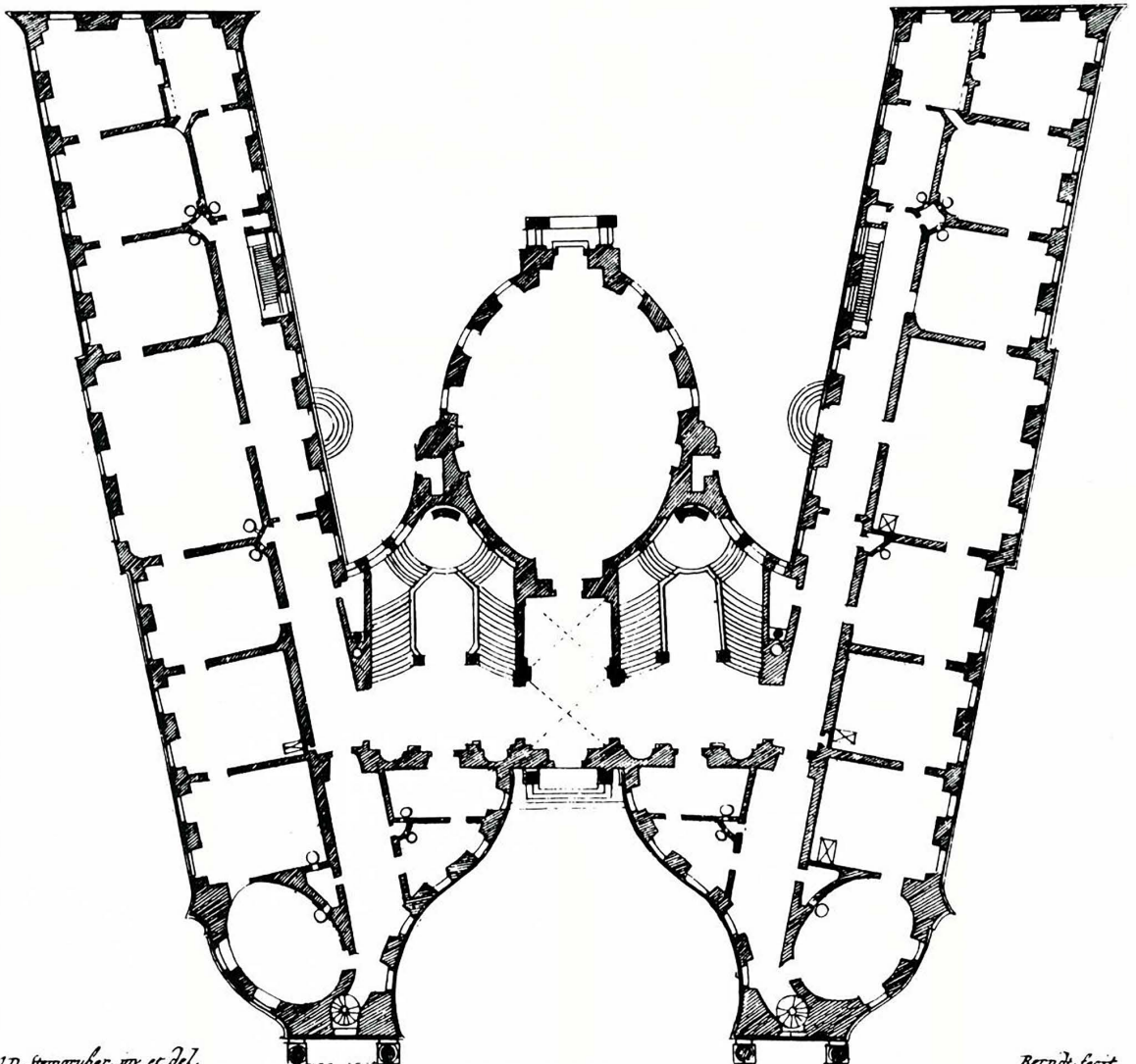
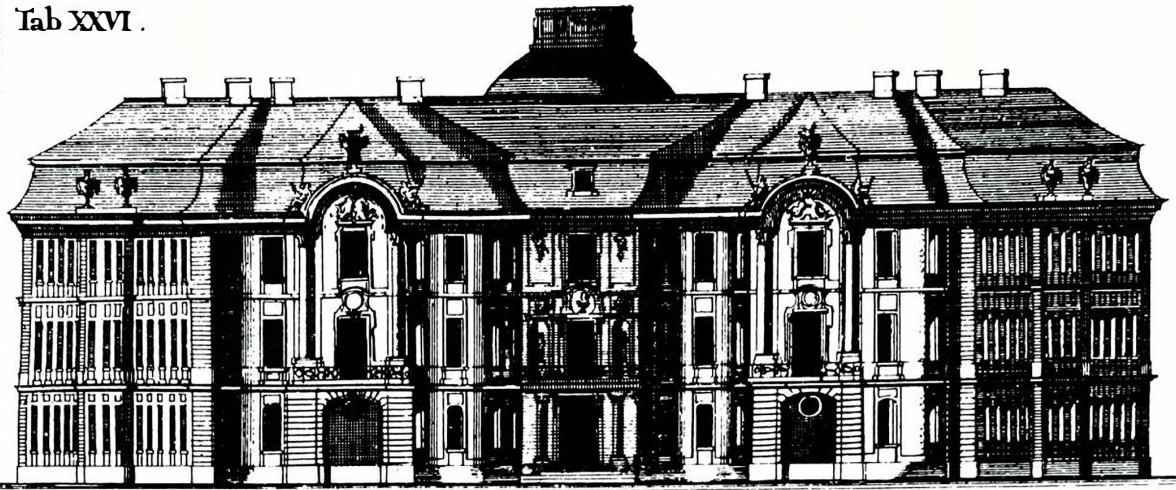
Tab. XIV.



J.D. Steingruber, bor. et del.

Bernadt Sculp.

Tab XXVI.



U.D. Steingruber. inv. et del.

Bernold. sculp.

Theme and variations— giving visual identity to a school of music

Keith Murgatroyd

The Royal Northern College of Music, in Manchester, England, is the first musical conservatoire to be built in the United Kingdom this century. An amalgamation into a fine new building of two long established local music colleges, it was formally opened in 1973 by the Duchess of Kent.

What is interesting, from the point of view of the graphic design profession, was the decision by the newly appointed principal, John Manduell, to retain a designer to oversee all printed material from day one.

It is rare indeed, especially in what might be called a 'public service' area, for such an enlightened and progressive decision to be made at exactly the right time. From the beginning, the consideration that in an educational establishment, concerning itself primarily with sounds, students and staff should be made aware of things visual, was very important to Manduell. He was also aware of, and committed to the principle of establishing a clear visual identity.

The new college was not only to be a teaching academy, but an arts centre with splendid facilities, including a concert hall and opera theatre, equipped to the highest professional standards.

The principal's brief to his newly appointed designer was crisp and characteristic. 'I want a clear visual identity, it has to be up-to-date and yet restrained, it has to be insistent and versatile. It has to cover everything the college prints, go and do it, and if you promise not to start composing music, I will promise not to start designing.'

The designer's first problem concerned costs. In any establishment financed from public funds every penny had to be made to work and to be accounted for. Concert programmes were a primary case in point. By tradition in England these are not given great importance and are expected to be cheap. To offer A4 fly programmes on good art board and printed in up to three colours was almost a revolution in itself. But the crowds who fill the College theatres quickly accepted that whilst sitting in superb surroundings, listening to great music this was no unnecessary expense. They also appreciated legibility! After five years, concert programmes from The Royal Northern College of Music are being collected for their own sake.

In order to cope with the sheer number of programmes which the college needs, it was necessary to design systems for production and printing. The printers work to a predetermined grid and now produce

the guts of a programme without reference to the designer, who only has to give proofs a cursory check for any glaring typographic errors—these are very few. Standard covers are produced in quantity for concerts, the inside being printed-in as required in one colour. International visiting concert and opera 'stars,' of which there are many, are usually given a custom-designed cover, and foreign touring companies always have their national flag printed on programme covers as a gesture of goodwill.

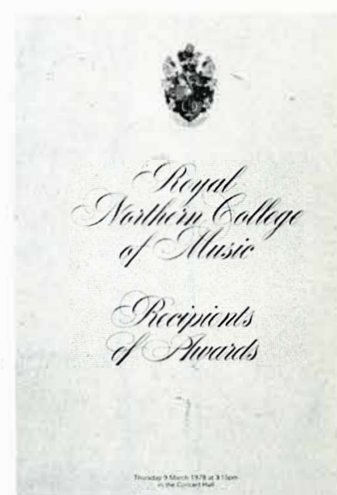
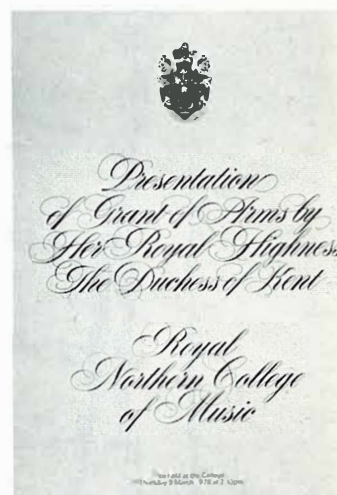
Programmes are, of course, only a part of the job. Everything printed has to pass over the designer's desk. Stationery, orders, requisitions, promotional material of all kinds. Even student union cards.

The credit for what is undoubtedly a most successful design programme must go to the client—given such a far-sighted and generous approach, no designer should fail to be inspired to give his best.

The initiative of the client has been officially recognised, for the College was recently given the Duke of Edinburgh's Award for Design Management.

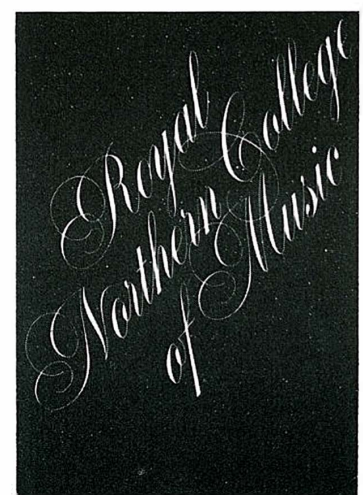
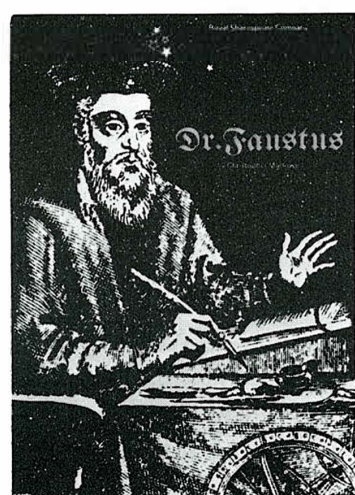
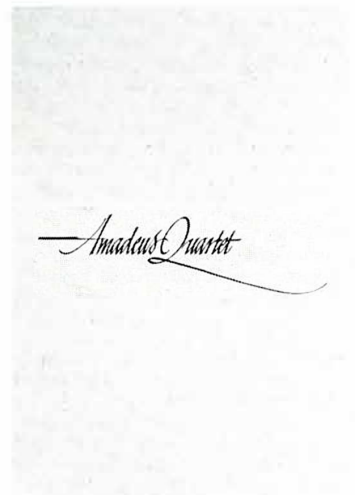
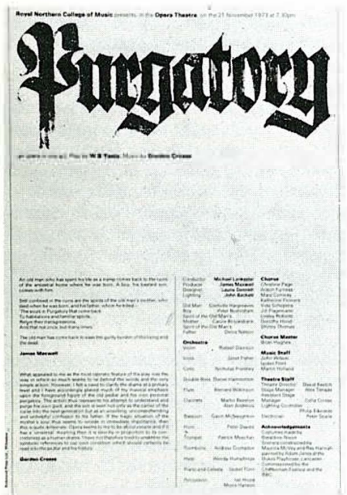
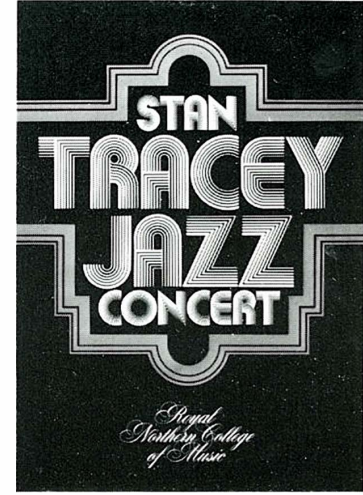
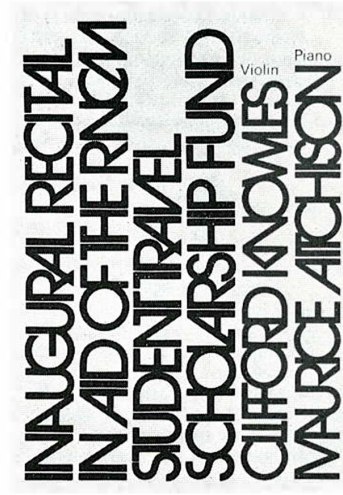
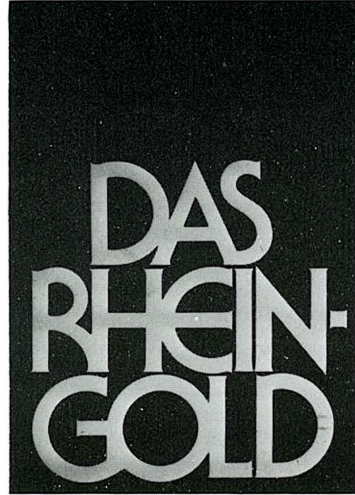
Internationally, after only five short years, The Royal Northern College of Music has made for itself a fine reputation. It is already considered to be one of the more important teaching academies. Its operas and performances have been enthusiastically received and acclaimed.

The graphic designer's real problem is to try to keep all the College's visual manifestations up to the high musical standards. The College sets a hot pace.



Shown here is a small selection of programme covers from the very wide range that have been designed since the Royal Northern College of Music came into being.

In the first column are three programme covers which show the style adopted for various academic events within the college, such as the Confraternity of Companion and Fellowships, the Grant of Arms, and the Diploma awards, medals and prizes. The remainder are programme covers for operatic performances, theatre performances, recitals, ballet and jazz concerts.



Re-thinking research into visual communication

Jocelyn Chapman

Most present day research into visual communication is waste of energy. This is not to suggest that all kinds of possible research in this field are a waste of energy; only the kinds being done now. This research has concentrated on attempts to measure effects of design objectively, using methods borrowed from the so-called 'social sciences.' It searches for *proofs* that a certain effect has a particular cause.

It has been largely wasted for a variety of reasons; some of which I believe are more important than others.

Lack of access

Most designers don't even know that all this research exists. Yet there are hundreds of reports on print legibility sitting on dusty shelves in university libraries and volumes of market research in company files.

The reports don't get circulated in a form that would encourage designers, who are mostly visual people, to look at them. Research results are described in psychological jargon as pages of boring print. They may seem to have no relation at all to the practical problems facing designers at their drawing boards. The meaning or *significance* of the statistical research can be quite obscure.

What does a 'significant' difference between the readability of two print layouts, really mean? Significant for whom? Significant in what sense? Statistical significance is not the same as human or practical significance. It is a technical term. It can represent very small real differences. One layout may be read in 2 minutes, 30 seconds, and the other in 2 minutes, 10 seconds. The real difference may be statistically significant but does it *mean* that a designer should *always* use the first layout?

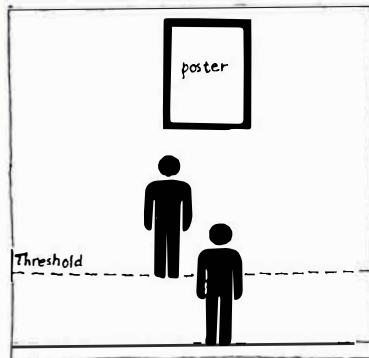
Even if the designer was interested in the research, he would have difficulty finding it as there is no central place or publication that he could turn to. He may not even have the time to look.

Results usually only relate to specific problems

It may be useful for a firm to engage a market research team for a *particular* advertising campaign. Research has often increased the effectiveness of advertising.

It may be very useful for a government department in a *particular* country to test out new road signs. But these results could not be generalised to other advertising campaigns or to other countries.

Out of all this research there has not emerged one general theory or a new set of rules. The colour red works for

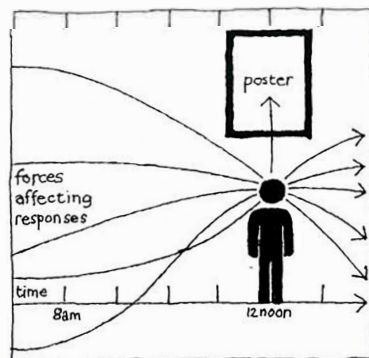


one purpose at one time and not in another situation. It doesn't always create the same response in us. Different research situations have found different results as to typeface legibility. Some experiments have shown that serif faces are more legible, and others that sans-serif faces are better. We could ask, what distance away was the reader, what was the lighting, what was the print about? etc.

A particular typeface may work in a particular poster to be read in certain lighting conditions and at a given distance. It may become quite illegible when viewed from further away. Anyone could tell us that distance of reading and legibility are correlated. It is commonsense. It might, however, be useful to measure more precisely at what point the type face becomes illegible. What is the threshold distance, beyond which no one can read the poster? Good, so we have discovered something 'scientific'!! But what about all the other sizes of the same typeface? What about all the other type faces? And there are almost infinite kinds of background to the letters. Imagine the number of experiments needed to find thresholds in all *typefaces*, in all *sizes* on all *backgrounds*!

Too many factors

There are thousands of interconnecting factors affecting the effectiveness of even one poster in one place at one time. The people looking at it bring their pasts, presents and futures



to that moment when they look at it. There are infinite variations of the physical stimuli on the poster. All the arrangements of colours and shapes could be just slightly different and the effects might be completely different. Then each shape may have many levels of meaning from the biological to those of the unconscious mind. It would take a statistical analysis of *gigantic* proportions to relate all these factors to each other, even supposing they could all be recognised in the first place.

Research that tries to link factors through cause and effect must be limited to only one or two of the thousands of factors in existence. All the rest have to be 'accounted for' in the experimental design, through the use of various statistical techniques. They are seen as 'interfering factors.' In the design of the experiment they are merged into the rest so as not to be a nuisance. Individual differences between people may be considered 'interference.' But who is to say that those factors are not more important than those being deliberately tested???

Testing conditions

An experiment could be carried out to show that there is no difference (as measured by speed of reading) between an ugly, crowded layout and a carefully designed, spaced-out one. It's more than likely 'true.' But let us look at the measuring technique used.

People are seated in a classroom. Students are usually used for such experiments, as they are available and have to do what they are told. In psychological jargon they are called 'subjects.' In the test situation they are forced to concentrate on the print. They are motivated to do well, perhaps better than the next person. This is, after all, what most tests are about.

If a person is motivated enough, he will read almost any kind of print, in any conditions so long as he understands the language. It could be so badly degraded that a quick glance would convince you it was illegible, just a grey mess. The letters could be tiny, the light poor and the layout squashed; but if you were in the desert and your life depended on reading the instructions for opening a water carrier, you would suddenly find the letters quite legible. Surprise, surprise!

If you were reading about deserts in a holiday brochure with a view to possibly taking a holiday in the Sahara your response to print would be different. A crowded, ugly page on the Sahara could be read just as *fast* as another page; but you are likely to flip over in favour of a more attractive page on holidays in the

Alps. This is more interesting to read

In complex 'real' life situations, speed of reading is only one, rather unimportant factor amongst a mass of other influences. Yet it is the main measuring tool used in legibility studies. It is the one human factor of concern. Why? Partly because you can easily measure it. Time can be quantified in minutes or seconds. How do you quantify interest? How do you discover deep motivations affecting reactions to print?

Dependence on measurability of factors

Research is often done only on those factors that can be measured in numbers. This is safer than exploring the 'dark recesses' of human motivations, meanings and interests.

There have been many attempts to artificially measure these more elusive factors. Numbers are given to qualities so that they can fit into a neat statistical analysis.

Endless questionnaires ask questions like, 'Are you—very interested, slightly interested, indifferent or disinterested?'

This technique could be applied to a poster. If you were very interested in it, you could tick the first answer. This would give you a score of 1. The lower the numbers the greater your interest. Logical? This number can then be correlated with other numbers. The income you earn is quantifiable, so let us see if there is a connection between income and interest in this poster.

To be fair, psychologists do work out these questionnaires with a great deal of thought. They work into the questions ways of detecting lies, inconsistencies, bias and ambiguity. But the real problems lie in the basic assumptions of the whole experiment. Is this the most helpful way of analysing 'interest'?

What exactly do we mean by 'interest'? Do you mean the same as I mean by it? Is what I say I mean, what I *feel*? Are we so determined to look like a scientific experiment that we close our eyes to other methods.

The objective often seems to be finding measurable causes for particular effects. Is this a useful or worthwhile objective? Will it help solve complex human problems? Will it increase our understanding of the modern world?

It is based on the old linear concept of cause and effect. It is machine age thinking. Machines do have simple relationships between causes and effects. But people don't.

You can turn a handle and *cause* a wheel to go round. But you don't *cause* a person to stand still every time they see a red light. If they are walking and stop when the traffic light is red for cars, they will miss their chance to cross. If they are

driving a car, then they have to stop at a red traffic light. The effects of a stimulus on a human being depend on all the many forces affecting him at any one point in time. There are few, if any, direct relationships between stimuli 'out there' and human reactions. People *learn* connections. To understand the patterns of all these forces requires a totally different approach to research.

Inappropriate methodology

Already psychologists and sociologists are realising that methods based on Newtonian physics don't often work for solving most human problems. Humans are more complex than machines. Derek Phillips, a sociologist, has recently revealed the many biases and very small amounts of real significance actually present in most social science experiments. He argues for a more creative approach to research; one that is not based on attempts to be 'scientific.' Karl Popper has described our inability to really prove anything. He says we can only disprove things. Wittgenstein showed long ago that all our so-called 'proofs' are entirely dependent on the language we use.

Each group of specialists has their own language. Within this group all kinds of interesting relationships can be found. But they don't necessarily relate to anything outside. There is great personal satisfaction in playing with concepts and fitting them into each other like a jigsaw puzzle. But it is rather presumptuous to then act as an authority for problems belonging to other areas of life. There is no absolute truth in design, or anywhere, but different methods of analysis are appropriate for different problems. The problem of 'interest' may be helped by turning it into a measurable quantity amenable to statistical analysis. First we must define the problem and then find the appropriate research method. At the moment the method tends to come first and itself define the problem.

The main problem

The main reason that most of the research in design has been a waste of time is not any of the above problems. After all, if we accept the limitations of the methods available and the distance of the laboratory from real life, we may well find out some interesting facts that could be useful for a specific purpose.

No, the main reason is that *the research has come nowhere near tackling the most urgent questions in design and society today.* Most of the research has created its own internal problems in its own internal language for its own group of specialists. It has not grown naturally out of

existing problems in design and society.

Research has often been done for the wrong reasons. These tend to lack any fundamental human values or purposes. Yet we are living in a time when the need for value and purpose is apparent even to the most unsophisticated mind.

Typical reasons for research projects in design

Research may be done by a company to increase its profits through more effective selling. There is no need to go further into the dangers of such motivation. We can see the devastation of all basic human values subordinated to the aims of greater efficiency and more profit, in our schools, homes and shops. Research done by government departments to increase their effectiveness is just as dangerous. Its aim is greater control over people and to make them better able to fit into an increasingly inhuman situation.

Research may be commissioned by a designer to convince his client that his design is superior to others. He knows that clients are impressed by statistics and 'proofs.' Research is good PR. He is using it as evidence to back up personal design decisions.

Note, that in all tests on designed material, someone has to do the designing first. Research never replaces design.

Research is also done by people, or for people, who genuinely hope to find answers to their questions about design. Should they use an abstract symbol on a company letterhead or a more realistic one? Does the public notice aesthetic differences between posters on the tube? Is there a universal sign language? These are extremely general questions that present research methods cannot answer.

People, including trained designers, have often come to me to see if my research has shown that white letters on black are more effective than black on white in street posters. Which posters? Effective in what sense? For whom are the posters intended?

They are looking for rules, for an authority to tell them what to do. People sometimes turn hopefully to research as if it were some mythical god of objectivity.

If research says so, then it must be right. Then they don't have to take personal responsibility for their decisions. When I can't tell them about any golden rules from heaven, they turn away disappointed.

Sometimes they can be helped by a psychologist who knows about

different research methods.

They can at least be told which method they could use to help solve the specific problem they have. They could also be told about previous work on a similar problem. *But they cannot be given rules.*

What is research?

All of us spend some of our lives 'doing research.' *Research is an exploration, a voyage of discovery to acquire information on which to base decisions.* We often do research when shopping for a pair of shoes. We may do it before cooking a meal, going on holiday or applying for a job. We want to know what shoes are available and what their advantages and disadvantages are. We want to know where to buy them and how long it will take us to get there. A discussion with these factors over a cup of tea with a neighbour, could be called research. She may know all about local shoe shops. We may be judging this information as we are talking. We may decide that one of the shops is too far away.

We can, of course, perform these actions without research, out of habit or lack of choice.

Research is also a set of tools or methods that we use to learn more about the world we live in. Painting and poetry are also tools for understanding. They can extend the 'naked' human senses like a knife extends the human hand. There are many styles of painting, of tools for cutting and of research. They are usually called techniques. No one way of increasing understanding is superior to any other. Our world exists on many, many levels, each with its appropriate methods of analysis. No single method ever tells us 'the truth.'

Different methods are appropriate for solving different problems. To define a problem we must first find out which level of 'reality' it exists in. A philosophical problem is different from a social problem. A design problem is different from a mathematical problem. The levels may affect each other in many ways, but first they have to be understood separately, because they require different tools of diagnosis. There is confusion when the levels are mixed up accidentally, rather than brought together consciously, after separate analyses.

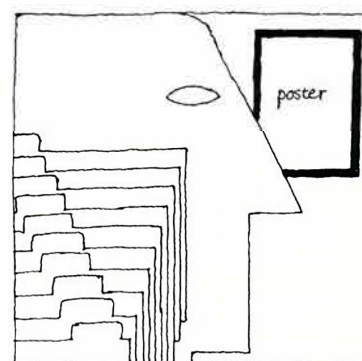
If, what is actually a social problem, is mistaken for a philosophical problem, the wrong tools will be used to analyse it. For example, a lack of creative expression amongst the majority of people in cities, may be a social problem. It is not helpful to analyse

it by trying to philosophically define the word 'artists.'

There is a great need for researchers to define their problems more clearly. There is a need to separate out levels of reality, and there is a need to make sure that the appropriate method or tool is being used. This is not a plea for more division of labour, specialisation and expertise, in isolation from visions of the whole. It is, however, a suggestion that separate analysis comes before meaningful synthesis. The whole is greater than the parts, but the parts cannot be consciously integrated without being recognised as parts first. There can be no unity without prior separation. What we seem to have now is one great big muddle.

An example of different levels and different methods

Let us take one poster in a London library advertising rent allowances. Its effects exist on many levels. Some of these I believe to be more important than others.



Each level has its own research methods. Some of these have been explored far more thoroughly than others. There has been a lot of work on the more superficial perceptual problems of print legibility, for example. But very little research has touched on the deeper social, psychological levels and the long-term effects of the poster, except in relation to the profit motive. Let us look briefly at some of these levels and at a few of the methods appropriate for analysing them.

Physiological level

Light from the poster registers on the retina of the eye and is turned into nervous impulses. These are sent on to the brain. Physiologists stick electrodes on the head and have elaborate instruments for measuring the impulses.

Perceptual level

The brain organises the impulses into whole patterns and shapes. Certain shapes attract attention more easily than others. There are many psychological tests to find out how

people organise this visual information in the brain. For example, they are asked to look at apparently random dots to see if they can perceive a particular shape in them.

Recognition level

In the brain we then recognise meaningful objects out of the physical stimuli. We see trees and faces, not just abstract shapes. We may use very few visual cues or indicators to recognise a familiar face in a crowd. We fill in all the missing bits with our brain. A tachistoscope is often used to flash stimuli very fast on to a screen, to see how fast we can 'fill in' and how much visual information we need to give a shape a name. There are other techniques for measuring recognition. We could show someone a poster and ask them whether they have seen it before.

legibility level

Legibility tests aim to find out what physical factors in the print affect our ability to read it. We may use the technique of measuring speed of reading or we may measure the amount of text read in a given time. Or we could ask people to search for specific items in the text and see how quickly they can do this.

External conditions, such as lighting, may be varied to see what their effects on legibility are. Internal physical features of the poster itself may be varied. Different typefaces, sizes and weights of letters may affect results.

Interest level

We can observe the length of time a person spends looking at a poster in a library. Or we could measure his eye-movements on a special camera and see what parts of the poster he looks at for the longest time.

Comprehension level

The poster still has to be understood. We can give a comprehension test. This could be open-ended, asking people what they thought the poster was about. Or they could be given multiple-choice questions with possible answers suggested for them.

Memory level

The poster has to be remembered. We could go to see people a week or a year later with the same poster under our arm and ask them, 'Do you remember this?' Or we could show them nothing and just ask if they could remember seeing anything on the wall of a certain library when they were last there.

Association level

The words and pictures on the poster may be associated with memories already existing in the brain. We could use depth interviews to discover these. It may take many sessions with one person to discover

childhood associations. There is rarely time for this. Group interviews and the use of questionnaires can get at the more superficial associations. People could be shown pictures and asked to match words to them. They could be asked what they associate with certain key words. In a rent-allowance poster these might be 'help' 'allowance' 'deprived.' Do these words smack of charity?

Value level

This may be the most important level but it is also most difficult to measure. Is it a good or a bad poster? What designers mean by good may not be what readers mean by good. The designer may be more concerned with the aesthetic form while the reader may be more interested in content. Is the message a good one or a bad one?

We could ask people to rate the poster on scales like those used in the Semantic differential technique. This uses many pairs of opposite qualities like good and bad, heavy and light, active and passive, on seven point scales. Each object is rated on all scales so an overall picture is built up. It may get 5 points for good and 2 on the light-heavy scale. The poster would be seen as being very light and quite good.

We could also ask people for their own judgements, using their own criteria. This is just as valuable as the judgements of experts. It may be just a different kind of value judgement.

Action level

How does the poster affect the actions of the person who has just looked at it? He may have taken in all the information *and* remembered it, but still he doesn't apply for a rent allowance. There may be many reasons. Is it worth the bother? We can observe the person, ask him why he doesn't bother, what he is going to do about it or we can collect statistics about the number of applications for rent allowances at the town hall.

These are a few of the many levels and techniques.

Other levels

The whole question of rent allowances, the most obvious purpose of the poster, brings in political and economic issues. How come some people can't afford to pay the rent they are asked for? Why do they need rent allowances? Who is giving the allowances and why? Economists can draw their graphs and political analysts can describe it in terms of power relationships. All these levels have their characteristic methods of study.

But what about the non-specialist looking at the poster. What does it mean to him?

The most important level of the meaning of the poster is that which belongs to the people looking at it. How can this be researched? Does the poster make his life better materially? Does it make him feel more or less powerful? Does it make him more or less aware of the contradictions in society? Does the poster's friendly image remind him of the gap between what the council says it does and what it actually does? Does it help improve communication between the council and the public? Does he enjoy looking at it?

To find out what people are 'really' feeling about even one poster requires methods of research that include a genuine respect and understanding of the people concerned.

Present day methods are simply aimed at getting useful feedback, so that the producer of the poster can do a better job. The emphasis is not on the person looking at it. He is either a mere 'subject' in an experiment, a questionnaire respondent or, perhaps, an object being observed for particular reactions. He is not seen as a whole person. The researcher does not usually care about him or respect his personal opinions. The wisdom of the 'people' is largely untapped in modern society because we insist on using experts. A new attitude to the 'people' being 'researched' will itself dictate new methods which will grow naturally out of it. When you know and respect someone, you cannot treat them as a 'subject.' The questions you are asking them from your book, seem suddenly absurd. The new methods must include empathy, respect and knowing, caring for and understanding the whole person.

What are the priority problems?

There is a great deal of evidence that society in general, and designers and students in particular, are concerned about the same kind of problems. Power and control is one burning issue today. Who has it and what do they do with it? Other issues include the alienation of labour, the divisions within people as well as between them. The need for integration of the whole person. These are mainly problems of value. The people are more valuable than profit.

We can see around us a disintegrating culture, ever widening gaps between rich and poor, and overcrowded, over polluted, overcentralised and dehumanised cities. What we feel is frustration and powerlessness, humiliation and anger.

What we believe is that the situation

is due both to the capitalist system in general and to the concentration of power in the hands of a small elite in particular; to the rapid growth of technology in isolation from the real human needs and its misuse by those in power.

Reason, the god of the 19th century, has failed us in the 20th. It has not created a more human, logical society. Reason is an essential part of the human make-up, but value and emotion are of equal importance. These latter qualities have been submerged. Yet they keep coming up from under the apparently logical superstructures of society.

Today we are witnessing a massive change in emphasis towards value and emotion, away from reason, perhaps to redress the balance. It can be seen in the starry eyes of the new mystics and in the passionate ideological commitment of Marxists all round the world.

Whether we admit it or not, we are always giving our actions values and meanings that are not entirely logical. There is no meaning in nature, only necessity.

Meaning belongs to people.

Meaning can be seen in opposition to materialism. It exists in the inner world of symbolism rather than 'out there in reality.' It involves the way we see the reality. In recent years there has been a belief that we can see that reality directly, not just through symbolism. Science became magic. Symbolism is hard to analyse, partly because we need to use symbolism to do the analysing. Many words are symbolic. They represent concepts and are not themselves those concepts. The word 'love' is not the feeling. A graph of population growth is not itself that population growing.

The meanings we give to material objects are just as important as their material qualities. They may come into existence through necessity first of all like a tree or a baby. But once human beings have given them meaning they fulfil a whole lot of other functions too. Symbols can make our stark lives more bearable. They can help us cope with life's contradictions, or they can blind us to them. They can soak up loose energy, such as powerful feelings. Flags used to soak up patriotism. They can serve to hold groups together as the crown used to in England. They can support present power relationships by giving those in power a mystique. Anthropologists have been studying these aspects of symbols in so-called 'primitive societies' for years. Their technique is usually just to get to know the people, speak their language, observe and ask a few

leading questions occasionally. Could not the same be done in greater depth, here and now?

The questions being asked by students, designers and the 'designed for' today, relate more to meanings and values of design than they do to the legibility of typefaces.

Some typical statements

"Designers are a rich elite; they should be more socially responsible. They shouldn't be so involved in advertising which is just conning people to want things they don't need. Designers should be more concerned with communicating effectively than in simply expressing themselves. Aesthetics aren't important any more."

"The 'people' can learn to design and produce work for themselves. Everyone is an artist. Skilled and talented individuals should be in the service of the community and not be acting as outside experts making all the decisions." These remarks are all loaded with value judgements.

Communication

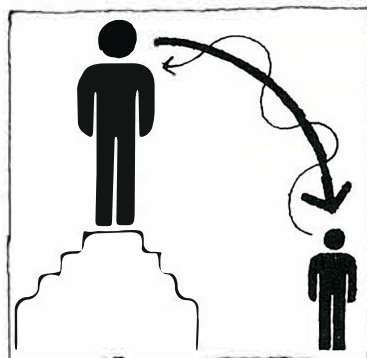
The word 'communication' has been cropping up a lot recently. The implication often is that it has some value in itself. This is clearly not strictly the case, as you can communicate how to kill an innocent child, just as you can communicate love. This is just how the word is used at present. Most of what is called 'communication' I would rather call 'exchange of information.' Often only one side is passing information to another. That is not even exchange.

However, the word 'communication' does have its roots in the Latin word 'communico,' which means 'to share.' There is a very important but subtle difference between exchange and sharing. Exchange is typically capitalistic and sharing is typically socialist. In exchange, you give me something if I give you something in return. What is now called communication is not often sharing. How can we decide whether real sharing communication is going on? There are three main criteria—

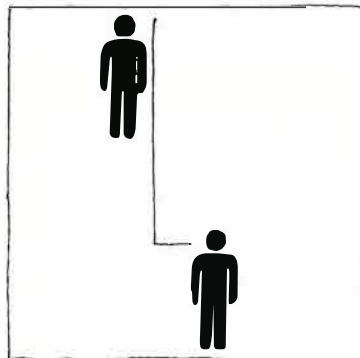
Both sides must have *equal power and control* over the situation in which they are communicating. If one person is telling the other what to do, this is not communication.

There must be a *common language*. Otherwise there may be misunderstanding which limits communication. This language can be visual or tactile, not just verbal.

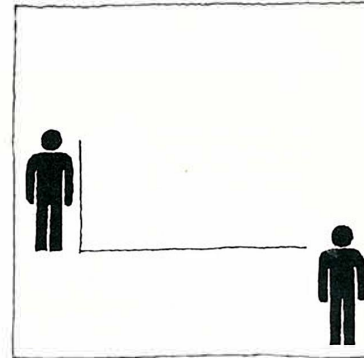
There must be *empathy and respect*. If you look down on a person you cannot really communicate with him.



unequal power relationship



large power difference



large language difference

These criteria can be used to evaluate any situation in which there is supposed to be communication. It is often not difficult to see if there is an equal power relationship within the particular situation. You could count the number of times orders were given or that one side got its way.

Power relationships vary enormously from situations where one side has total control over the other and friendly situations where one person is a little dominating.

It is not easy to measure precisely the amount of power difference between sides, but this could be visualised as spacial height. How far is one side *above* the other? This could be very important as a way of approaching problems in the future. Often exact measurements are not necessary. What is important is that the essence of the situation can be seen at a glance. Complex processes may be more easily described visually too. Simplification would be inevitable but this may not matter. Most human problems have to be simplified anyhow.

The common language could be discovered by a variety of techniques, if it was not immediately obvious. In Africa I showed children simple line drawings of houses and setting suns, and asked them to name the pictures in their own language. When the picture had the same meaning for them as it did for me then we were speaking the same pictorial language, at least.

But do pictures also have the same associations for me as they do for other people? In London I have shown people photographs of buildings and asked them to describe these with one word of their own. They were also asked to choose from alternative descriptions.

Sometimes their meanings were similar to those of the architects and planners and sometimes they were quite different. Where the meaning was similar there could be more communication. For example, everyone agreed about what was

depressing in one picture, but 'an exciting new development' to architects was seen as 'disgusting' by the people. The language agreement could also be described spacially as horizontal distance between the two sides.

A model could now be built up to describe any communication situation on both vertical and horizontal dimensions. The vertical dimension is power and control differences, the horizontal dimension represents the amount of language sharing.

For example, the council might put on an exhibition showing a new housing estate to be built. Visitors to the exhibition may be asked to fill in a questionnaire asking them whether they liked the new development or not. This is supposed to be communication, and two-way as well!!! The council is, after all, getting feedback. It is creating participation!!!

Now we could come along with our new research tool and say, "Let's see, is this really communication. Who has control of the situation? Hmmm! The council seems to have almost total control over the exhibition, the actual building of the estate and the lives of the people in it!!!" Let us draw a very tall vertical line. That's the public at the bottom and the council at the top. Now let us see if the two sides are speaking the same language. We could ask people at the exhibition what they thought certain words or pictures represented. We may find that their meanings correspond quite closely to the intended meanings. So we draw a short horizontal line. But the power relationship is so drastically unequal that there could never be real sharing anyhow.

Research as definition

Laswell defined communication as 'who says what, to whom and with what effects?' This is what research could be telling us. It cannot give things value. But once a value is decided on, such as the importance

of sharing, research can tell us where that value exists and where it doesn't. It can be concerned with the content and functions of design rather than with its formal qualities, that are better understood through other existing methods.

Form follows function, but what *exactly* are the many functions? There is never only one. Research cannot give value but it can clarify whether giving value is one of the functions of a piece of design or not. If it is, then what value is being given? For example, you can communicate with what a designer would call good design or with what he would call bad design. You can also fail to communicate with good or bad design. Research cannot say what is good or bad design but it can tell whether you are communicating or not.

Research can help to define the problem, but it cannot produce a poster.

Models of communication

We all know of certain simplistic models of communication going around the lecture rooms today. There is a box with the word 'sender' inside it. There is an arrow sending the 'message' down a 'channel' to another box with the 'receiver' in it. There are also more complex variations including feedback mechanisms. These are all analogies taken from the field of electrical engineering. They do have some limited usefulness but are badly in need of revision and expansion.

Finding and drawing models as analogies of situations is a most important area of research. The diagram has not been at all fully explored in this connection. For example, diagrams of communication could include all the subtle influences and processes going on in a visual form. There could be an enormous range of arrows to show different spreads and intensities of 'message sending.' There could be long ones, short ones, thick ones, thin ones, straight ones, and curved ones all with different meanings.

Communication is a process that changes over time, so this factor should somehow be included in the description.

The very idea of there being separate senders and receivers is against the concept of sharing. When communication really is sharing *both* sides can be both senders and receivers, perhaps at different times. They are in horizontal circular relationships rather than a vertical triangular one. Messages are not being sent down to receivers like they are from a local council to the public.

In sharing, one person speaks and the other listens and then makes a reply, and so on. They respect each other and they understand the same language. We need new models to describe this kind of communication and all the variations in between. These models could be imaginatively visualised. It may well be the task of future artists and designers to apply their skills to what we now call research; that is, defining and describing human problems.

Research as communication

Research itself can be a form of communication. This is not the same as merely obtaining 'feedback' for a specific purpose. By going to people openly with a problem you are involving them in decision making at an earlier stage of the process. If your questions are pre-prepared and too precisely defined, it means that certain basic decisions have already been made about defining the problem.

You could spend days researching designs for a poster on rent allowances. But by talking to some of the intended audience you may find out that it would be a waste of time. Even if the most beautiful poster were produced they still wouldn't apply for the allowances for reasons you may never have guessed. The people themselves would redefine the problem.

Researchers specialising in communication should ask the people first of all what information they want, how they would like to receive it and then get down to details with them. At this stage alternative visuals could be designed and taken round to be discussed with them.

This does not mean that there is no place for the creative designers. The alternative ideas and designs have to be thought up first. The better they are the more the people will learn to appreciate good design. Instead of only persuading the client of the advantages of the best design, the people have to be persuaded too. The whole process of discussing alternatives with them is a way of educating the public.

Participation in design need not mean more bad taste, especially if good designers get involved.

In the future, communications problems will have to be tackled by small teams working together, with each person contributing particular knowledge and skills. Designers have to be able to work with members of the public, psychologists, sociologists and organisation men. Instead of a separate research team going out and using people to obtain facts, and the designer sitting alone in his studio and the client frowning over his desk high above the city, they will all come together at an early stage and do 'research' as a team. This may involve getting facts and figures. It could be creating analogies and models. But what it must involve is defining and describing the problem.

This is not 'scientific' research, but it is the direction that research will have to take in the future, if it is going to be relevant to the needs of today. It is also less time-consuming and expensive than 'objective' laboratory tests or elaborate social surveys.

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To the Editor,

In *icographic* numbers 10 and 12 the work of Rudolf Modley is discussed under the heading 'Isotype in the USA,' and the suggestion is made that Modley directed the work of Isotype in the United States after 1934. Rudolf Modley's organisations (Pictorial Statistics and Pictograph Corporation) had, however, no connection with Otto Neurath's International Foundation for Visual Education (which carried out work in the USA independent of Modley), nor with the Isotype Institute, which became responsible for Isotype after 1942.

After 1934, the work carried out by the teams under the direction of Neurath and of Modley was marked by a difference of approach to symbol design. Rudolf Modley himself indicated the reasons for his departure from the Isotype approach to symbol design when he wrote:

"The American development of pictorial statistics has tried to avoid overstandardization of symbols. It has not wanted to create an international picture language with all the rigid forms and abstract concepts which support that idea; it has wanted to bring symbols to life and to adapt them to each new audience . . . this personal touch may have to vary from country to country, from audience to audience. For this reason, the creation of new, individualized symbols becomes necessary. This is particularly important now when the increasing number of illustrations in advertising and television is a constant challenge." (Modley and Lowenstein, *Pictographs and graphs*, New York, 1952, p.8)

Modley's different approach shows itself at once in the work produced under his direction. It is this fundamental divergence that makes it impossible to regard Pictorial Statistics and Pictographic Corporation as "essentially an American wing of the Isotype movement."

A second possible misconception arises from the cover of *icographic* number 10, which shows symbols from the 'dictionary' compiled by the Isotype team. A casual reader might take this to be some sort of statistical statement, of the kind Neurath deplored, using enlarged symbols to represent an increase in quantity. But, as is clear from a comparison with the illustrations on page 4, this is a montage using four symbols from the leaf reproduced there. The numbers are merely index numbers—at that time each symbol was cut in lino, prints were taken and then pasted onto large exhibition charts. The 'dictionary' was a visual index to the linocuts, arranged by subject. Perhaps I can add that these are the

kind of misunderstandings which I hope to be able to clear up in a forthcoming dissertation on the subject of 'Otto Neurath and his contribution to graphic communication.'

Robin Kinross,
University of Reading,
Department of Typography and
Graphic Communication.

I am grateful to Mr Kinross for drawing my attention to the ways in which Neurath and Modley, after initial collaboration, progressively diverged in their approach to symbol design. His criticism of my cover design I find a little harder to understand. I chose Neurath's 'manikins' for obvious reasons, since they are probably the best known symbols of the Isotype movement. For me, they also typify the decade of the 20's. In 1919 the Bauhaus was founded, whilst in 1920 the word 'robot' entered the English language via Karel Capek's play *RUR* (Rossum's Universal Robots), from the Czech word *robota*, meaning 'statute labour.' The Isotype men have always seemed like automatons to me, so that it seemed quite natural for them to wear their index numbers, like epaulettes upon their shoulders. I also have little doubt that if Neurath's co-workers could have had access to an IBM composer, they too would have typed the identification numbers rather than write them by hand. My idea may have been fanciful, but it was not intended to mislead.

Patrick Wallis Burke

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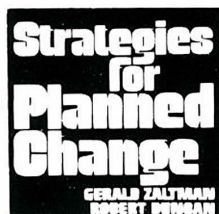
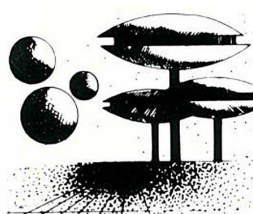
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- 2
to improve and expand the contribution of graphic design and visual communication technology towards a greater understanding between people everywhere, and towards a better solution of social, cultural and material problems.
- 3
to act as an international forum for cooperation and exchange of views, information and research between designers, and with professionals from allied and related fields and those of industry and commerce.
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