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Type Reading Machines for the Blind

Glendon C. Smith

The most advanced personal type reading machine described provides the blind user with an aural "spelled speech" equivalent for each upper- and lower-case letter or ligature scanned by a hand-held optical probe. This character recognition machine recognizes the most popular type fonts with moderate accuracy and speed (80-90 words-per-minute). The development of the hand-held probe for this machine has resulted in a family of aural and tactile "direct translation" reading aids which are pocket-sized and battery-operated and may be used independently for low-speed reading.

Interest in providing a useful reading machine for the blind has been gradually increasing since the end of World War I. Most of the emphasis has been placed on simple direct translation machines (Optophone types) which commonly use a vertical row of narrow photocells to scan letters sequentially and generate a different audio frequency for each photocell while it is "seeing" black. While such machines are simple and thus relatively inexpensive, they have the shortcomings of requiring extensive training and yielding low maximum reading speeds (10 to 25 words-per-minute).

The work reported here is part of a continuous effort carried out by Mauch Laboratories, Inc., since 1957, toward the development of a personal reading machine for the blind. The most advanced system now being evaluated and improved will permit reading speeds up to 80-90 words-per-minute. It will be portable

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and will be reasonably priced when manufactured in moderate quantities.

In early studies we found that a speech-like aural output is necessary in order to achieve satisfying reading rates. Consequently, an electromechanical Word Synthesizer was designed and constructed which would play back stored tape recordings of individual phonemes in accordance with photoelectric scanning signals derived from the printed text. Full recognition of the entire alphabet was not intended at that time.

Somewhat later, a relatively economical scanning method was developed whereby a letter is seen simultaneously—as in a “snapshot”—by a number of photocells in a two-dimensional array (rather than by a single line of photocells which must progressively scan over a letter to establish its identity). This single snapshot recognition technique was incorporated in a prototype scanner which recognized all the lower-case letters of the IBM Executive typewriter alphabet. In order to recognize upper- and lower-case letters of a wide variety of type styles, a more versatile recognition scheme which utilizes multiple snapshots to collect information on letter features was devised. A Recognition Prototype I which uses the multiple snapshot technique was designed and tested with 498 letters from nine widely-used type styles (Figs. 1–3).

When it was realized that full recognition would be possible, the Word Synthesizer was equipped with tape recordings of “spelled speech” letters, developed by Prof. Milton Metfessel, University of Southern California, instead of phonemes. In the spelled-speech alphabet each letter has a standardized audible pronunciation somewhat like its usual pronounced name, but chosen to give maximum coalescence and smoothness when reproduced rapidly in combination with the sounds for other letters. Thus, the word “type” in spelled speech would sound something like [tiwaɪpii] where the letters in the brackets are International Phonetic Association symbols. The spelled speech output can be understood at 80-90 words-per-minute with little training and is much more suitable for an inexpensive reading machine for the blind than attempting to synthesize English words.

The character-recognition reading machine being developed by

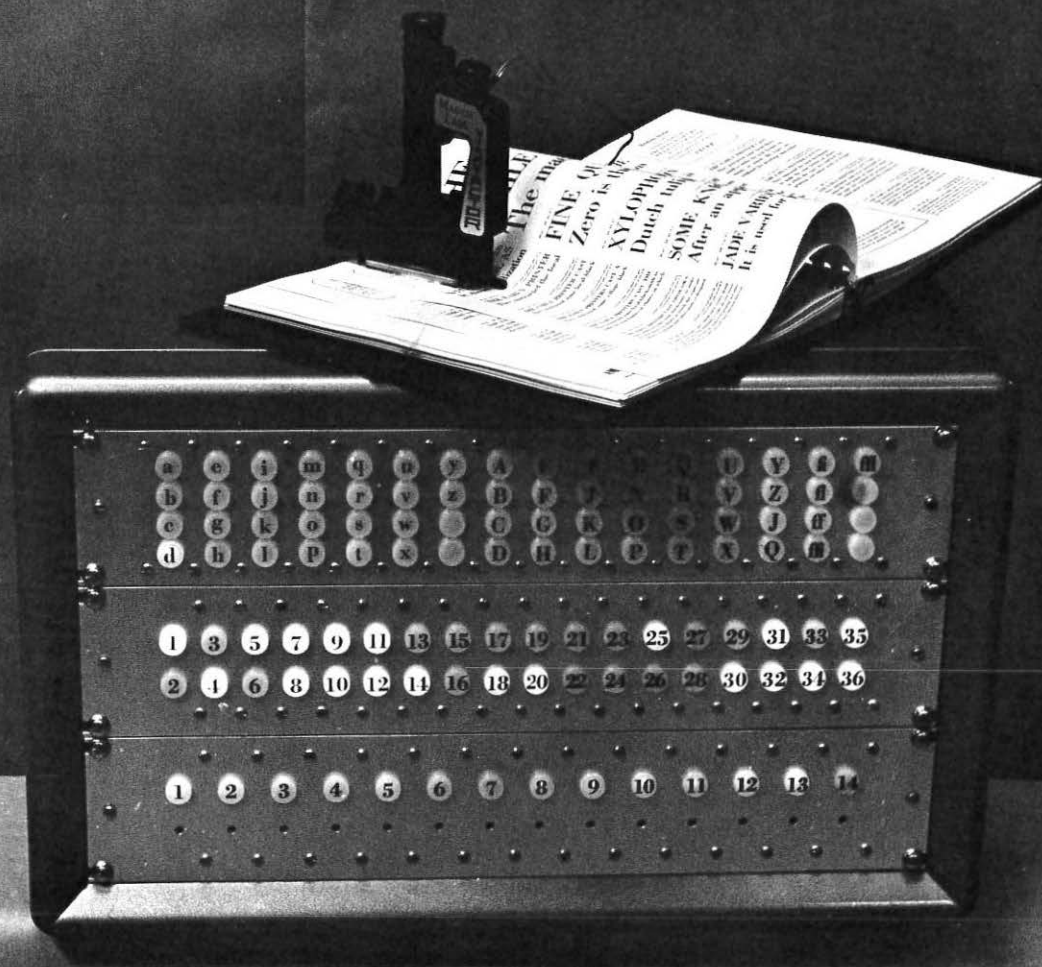
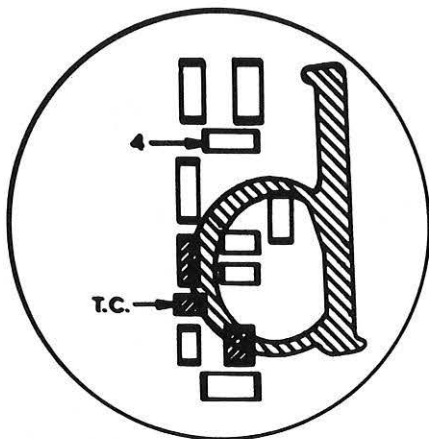
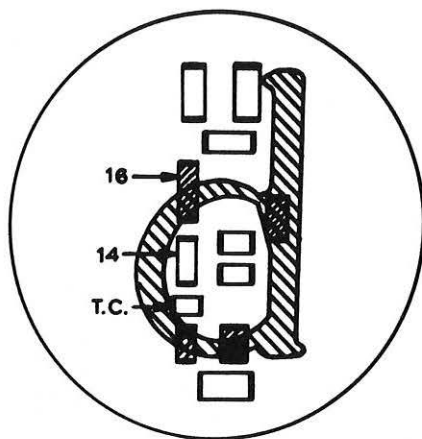


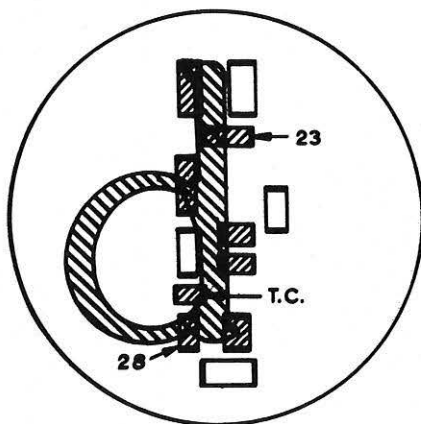
Figure 1. The Recognition Prototype and Visotactor show the indicator lamps after a lower-case d has been recognized but before the memory is cleared (see also Figure 2). The lower-most panel contains 14 Schmitt trigger circuits. Twelve of them connect one-for-one to photocells in the recognition array; the others are spares. The middle panel contains 36 memory units of which nine units are spares. Only memory units numbered 4, 14, 16, 23, and 28 are important in identifying a d. The top panel consists of output indicators.



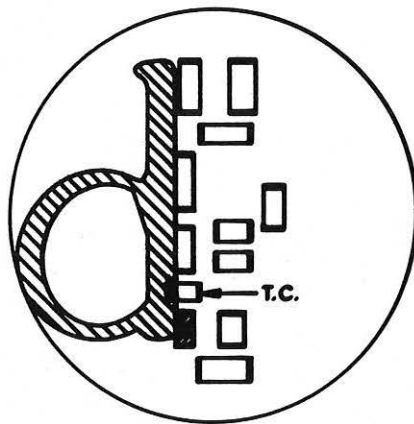
FIRST "SNAPSHOT"



SECOND "SNAPSHOT"



THIRD "SNAPSHOT"



FOURTH "SNAPSHOT"

Figure 2. The recognition array is shown scanning a lower-case d. (The photocells used for the tactile output are not shown.) Each "snapshot" is initiated by the trigger cell (T.C.) changing from "seeing" light to "seeing dark." Photocell information is quantised into light and dark and stored in different groups of memory units until the letter is past and the memory read out and reset. The numbers indicate which memory units are used to identify the d. The direction of current flow in each photoconductor is disclosed by the two bold sides which represent electrodes.

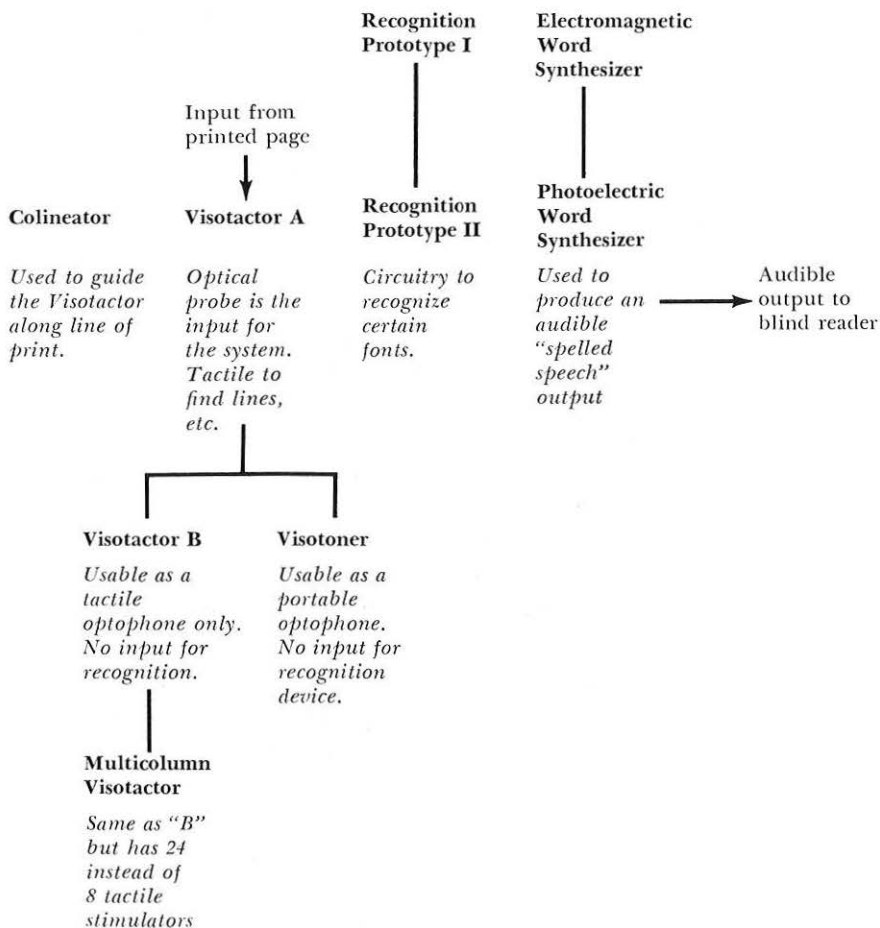
aaaaaaaa	AAAAAAAAAA	nnnnnn
bbbbbbbb	BBBBBBBB	nnnnnn
cccccccc	CCCCCCCC	nnnnnn
dddddddd	DDDDDDDD	nnnnnn
eeeeeeee	EEEEEEEE	nnnnnn
ffffffff	FFFFFFFF	
gggggggg	GGGGGGGG	
hhhhhhhh	HHHHHHHH	
iiiiiiii	IIIIIIII	
jjjjjjjj	JJJJJJJJ	
kkkkkkkk	KKKKKKKK	
llllllll	LLLLLLLL	
mmmmmmmm	MMMMMMMM	
nnnnnnnn	NNNNNNNN	
oooooooo	OOOOOOOO	
pppppppp	PPPPPPPP	
qqqqqqqq	QQQQQQQQ	
rrrrrrrr	RRRRRRRR	
ssssssss	SSSSSSSS	
tttttttt	TTTTTTTT	
uuuuuuuu	UUUUUUUU	
vvvvvvvv	VVVVVVVV	
wwwwwwww	WWWWWWWW	
xxxxxxxxxx	XXXXXXXXXX	
yyyyyyyyyy	YYYYYYYYYY	
zzzzzzzz	ZZZZZZZZ	

Figure 3. Almost 500 characters were photographed and arranged on transparencies to aid in the design of the photocell array and recognition matrix. The nine type styles illustrated here (Caledonia, Baskerville, Janson, Corona, Imperial, and Regal; plus elite, pica, and IBM Executive typewriter faces) are estimated to make up about 75% of the printed and typewritten material used in the United States.

Mauch Laboratories consists of several components (Fig. 4). The Visotactor A is the hand-held and guided optical scanner which at present contains eight tactile stimulators (two per finger) to operate as a type of tactile optophone enabling the user to adjust probe magnification for size of type (7- to 36-point), to locate the line of print, to scan along the line of print, and to decipher numerals and characters outside the spelled speech "vocabulary." In addition to the eight photoconductive cells in the optophone type array, the Visotactor A contains a two-line array of photoconductive cells which provide sequential signals necessary for our multiple snapshot character recognition technique. Logic circuitry located in the Recognition Prototype II operates from the photoelectric signals to determine the presence or absence of letter features independent, in large measure, of the letter width and type font. A bench model of this recognition machine recognizes the most popular type fonts with excellent accuracy (90-95 per cent). As soon as the letter (upper- and lower-case or ligature) has been determined, the logic circuitry translates its information into the five-bit Baudot code which causes the photoelectric Word Synthesizer to reproduce one of 31 pre-recorded outputs through a loudspeaker or earphones. A mechanical tracking aid, the Colineator, is an optional accessory which may be used for easier tracking over extended periods of reading.

The Visotoner is a compact, battery-operated optophone. The Visotoner frame contains nine transistorized audio oscillators which produce the optophone code. The Visotoner and its battery are also pocket-sized. Seven Visotoners (including Colineators) have been built and two are being used by blind individuals previously trained to use the Battelle optophone.

The Multicolumn Visotactor contains three adjacent columns of photocells and associated tactile stimulators which are sensed by the "Braille area" of the finger tips. Potential reading speed places it between the single-column Visotoners or Visotactors and the character-recognition machine. This device may evolve into a Digitactor, a simple direct-translation reading aid which will stimulate the underside of only one finger, probably the finger doing the scanning.



The principal VA-Mauch reading system for the blind as of mid-1967 is as shown in the four horizontal units above. The units above these are earlier variants, those below are separate device developments, offshoots of the principal system.

Figure 4. Evolution chart showing how the several units in the VA-Mauch Laboratories reading machine systems developed.

Development of the Recognition Prototype

The first miniature recognition array encapsulated during June 1965 was mounted in a Visotactor probe and used to scan letters attached to a rotating drum. The drum could be driven at variable speeds from 10 to 90 words-per-minute. Photographic reproductions of the nine type fonts (Caledonia, Baskerville, Janson, Corona, Imperial, and Regal; plus elite, pica, and IBM Executive typewriter) were attached to the drum. The Visotactor probe (containing the first miniature recognition array) was adjusted to the proper magnification and used to scan the upper- and lower-case letters of several type styles on the drum. For two of the type styles, Imperial and Regal, all the lower-case letters were recognized at 20-30 words-per-minute, and approximately 80-90 per cent of the letters in the remaining type styles were correctly recognized at this speed. As the speed was increased, the accuracy of recognition decreased, due mainly to the poor response of the photoconductor material to rapidly changing light levels.

Tests were undertaken to determine how far above or below the line of print the input probe could be placed and still have the Recognition Prototype I not miss more than 20-25 per cent of the letters in a typical test. A 12-point alphabet of lower-case Imperial was attached to the drum apparatus. The Visotactor scanned the alphabet at slow speeds. Beginning at a point below the letter base line, successive scans were made spaced .0016 inch apart. Four scans near the optimum height resulted in recognition accuracy of 90 per cent or better. Two additional scans, one on each side of this group of four, resulted in recognition accuracy of about 80 per cent. The six scans which produced a useful recognition accuracy enclose five spaces each .0016 inch, for a total of .008 inch. Since the x-height of this type style and size is .080 inch, the useful tracking band is 10 per cent of this figure.

These accuracy figures are based on the frequency of letters in common English rather than giving each letter equal weight. For example, at the upper tracking limit (above the base line) the Recognition Prototype I fails to recognize only three letters (a, e, b) out of the 26. Considering only the alphabet, this could be expressed as an 11.5 per cent error; but considering that a and e are very frequently used, the error rate in reading text would be about 22 per cent.

The ideas and plans for an improved Recognition Prototype II were incorporated in a new design during September 1966. Photographic transparencies of the nine type fonts were used to design a photocell array which would tolerate mistracking the line of print up to one stimulator photocell height. This new design also contains additional logic to permit recording in certain memory units whether or not a particular photocell "sees black" (or white) at any time between two snapshots. This new feature is used in several situations, e.g., by letting the photocell which straddles the baseline record "seeing white" between snapshots 2 and 3, one can distinguish more reliably between letters h and b; by letting the photocell which is designed to sense descenders record "seeing black" in a memory unit anytime during the letter scan independent of snapshots, the identification of g and Q becomes more reliable. Other memory units store whether or not certain photocells "see black" at least twice during the letter scan. For three memory units the appearance of selected combinations of photocells "seeing black" or "seeing white" between certain snapshots will flip the memory from one condition to the other. The logic to accomplish these operations was built with discrete components and installed in the chassis containing the 36 memory units.

In July 1966 an order was placed with the Cognitronics Corporation for a Model 632 Speechmaker, a 31-channel photographic film audio memory drum used to provide the spelled-speech output. Experiments indicated that the spelled-speech characters can be standardized to a duration of 140 milliseconds with little degradation of quality. However, the standard message length available with the Model 632 is 600 milliseconds, with an additional 25 milliseconds of suppression time used for switching. Engineers established that slight modifications in circuitry would permit four 140 millisecond messages to be recorded on the same track, allowing 16 millisecond suppression periods between the messages.

Because the memory drum has 31 channels, five channels are available for extra messages in addition to the channels needed for the spelled-speech alphabet. Sinusoidal signals of 440, 880, and 1760 cycles-per-second, as well as spelled speech characters 1

and u played in reverse, were recorded on magnetic tape with the spelled-speech alphabet and the tape was recorded on the 31 tracks of the photographic film drum.

The sinusoidal signals can be used to check the system response or possibly to indicate tracking errors. The reversed l character was included for possible use as an error signal. If, due to misalignment or poor printing, the recognition circuitry fails to make a positive identification, the Word Synthesizer will not respond at all. The resulting silent period may be more disturbing than the soft, rather indistinct, sound of the reversed l. Conversely, the spelled speech u has a very distinctive sound when played backwards and could be used as an additional signal.

Attempts to produce fi and fl ligature sounds short enough to fit the 140 millisecond-letter length requirement were not successful. The spelled-speech f would have been used for ff, the fi sound for both fi and ffi, and the fl for fl and ffl. Since the Word Storage Unit which precedes the Word Synthesizer can accept letters very rapidly, the recognition circuitry will be designed to generate the proper binary codes in sequence for each letter in the ligatures. This method has the advantage that words containing these combinations will sound the same whether or not ligatures are being read.

At present, the film drum contains the spelled-speech alphabet C developed by Prof. Metfessel six or seven years ago and simply cut to 140 milliseconds maximum duration. Although the resulting spelled-speech sounds quite good, a better alphabet might result if one were to develop the alphabet with the constant length requirement as a prime consideration from the beginning. A complete evaluation of the various alphabets perhaps should wait until a number of reading machines and blind users are available to assist in making the value judgments. At that time, several of the more promising alphabets could be recorded on the photographic film drums used in the Word Synthesizer.

Preliminary tests of the Recognition Prototype II were encouraging. A priority circuit which may be useful for a number of letters was installed and tested on the lower-case g. Because this letter has a somewhat irregular shape which varies among the type styles, the memory units which define it most reliably are

those two which indicate the absence of an ascender and the presence of a descender anytime during the letter scan. These two factors are common to the g, p, q, and y. The p, q, and y are reasonably uniform in shape and size from style to style and they can be defined more strictly than the g by using a number of memory units. The priority circuit allows the g to appear at the recognition matrix output only if the descender was present, an ascender was not present, and none of the separate sets of conditions for the p,q, and y are met. Additional priority circuits may be useful in other situations.

The Recognition Prototype II was tested for tracking tolerance and recognition accuracy at high speeds. The Recognition Prototype I recognized the lower-case letters of the IBM Prestige Elite with 90 per cent accuracy at low speed; this figure dropped to 79 per cent when the speed was increased to 7.5 characters-per-second. Recognition Prototype II was tested following the same procedure but using IBM Delegate (pica). The measured recognition accuracy was better than 99 per cent from very slow speeds to beyond 15 characters-per-second. During the test, tracking was set only once for best performance over a 10-inch line. Part of this considerable improvement is attributed to the "faster" photocell array and part to the fact that a large percentage of the diodes in the recognition matrix connect to memory units which record data between snapshots and are thus less dependent on photocell response time.

For the lower-case alphabet of IBM Delegate the tracking band of the Recognition Prototype II is .013 inch for a recognition accuracy of 90 per cent or better and .016 inch for 80 per cent or better. Since the x-height of these lower-case letters is .075 inch, these figures correspond to 17.5 per cent and 21 per cent of the x-height, respectively. By comparison, the Recognition Prototype I had a tracking band for 80 per cent accuracy which was only 10 per cent of the x-height.

Evaluation of the Visotactor B

Miss Bonnie Reinicke, a young blind woman, used a Visotactor B prototype and Colineator to read material contained in the 200-lesson Battelle Training Program (Fig. 5). Her reading speed was measured using test material provided at the end of each of the ten lessons (Fig. 6). About 130 hours were required to complete the program.

During January 1966 Miss Reinicke began reading a book of mystery stories, *Alfred Hitchcock's Ghostly Gallery*, with the Visotactor B and Colineator. After several hours practice, she became accustomed to the new type style and the techniques involved in reading a book. In the first test Miss Reinicke read for twenty minutes at an average speed (including line-change time) of 7.0 words-per-minute.

During February Miss Reinicke read in the Hitchcock book at an average rate of 8.0 words-per-minute. From January 1966, when she began reading test and practice material from her book, to June 1966, the average line-change time decreased to about three seconds. Maximum reading speeds of 15 words-per-minute for a two-minute period and 10 words-per-minute for 10 minutes were observed.

During January 1967 Miss Reinicke used the Visotactor A and Recognition Prototype II to read typewritten single sheets. Four reading sessions of about two hours each yielded a number of results. Miss Reinicke learned to identify correctly all the spelled-speech letters and acquired a small vocabulary of spelled-speech words such as: and, the, these, they, etc. Proper tracking was achieved early in the series of reading sessions although line change initially required 10-15 seconds instead of the 3-5 seconds required with the Visotactor B. With such a limited vocabulary, reading speeds were generally 20 words-per-minute or below.

The lower-case s presented some difficulty because it could be missed by the machine even if most of the other letters were correctly identified. To improve the recognition of the s a priority circuit like that used for the g was installed in the Recognition Prototype II. The upper- and lower-case z were connected so they are always pronounced s. (Since z occurs roughly only once in 500 letters, this simplification seems justified.) These changes



Figure 5a. Miss Bonnie Reinicke is shown using the Visotactor B and Colineator to read a book. She has used this equipment in her home since September 1964.



Figure 5b. Miss Bonnie Reinicke began using the Recognition Prototype II at Mauch Laboratories in January 1967. This bench model of the recognition machine contains the photoelectric Word Synthesizer, the Word Storage Unit, and electronic logic similar to that planned for the pre-production prototype.

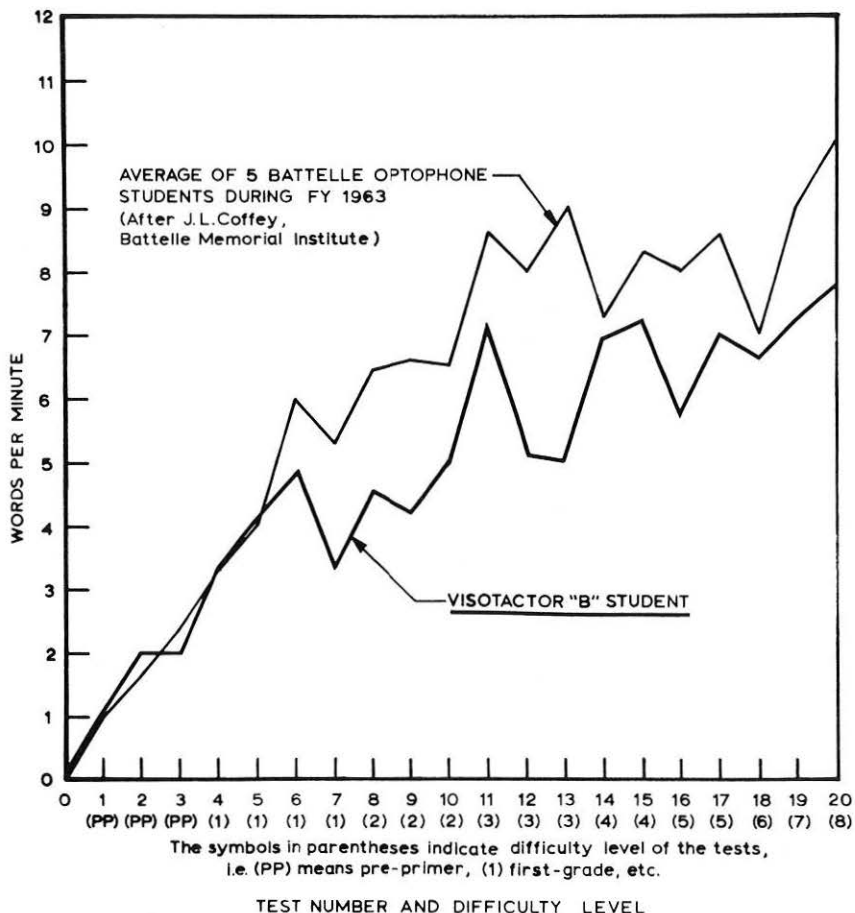


Figure 6. The learning curve for the first Visotactor B student closely follows a curve well established for students of an optophone. Training procedures for the Visotactor B student were very informal, since she read most of the Battelle lesson material at home, without guidance, and lacked the tape-recorded practice material used by optophone students. Both curves include line-change time. Each test score is for ten minutes of continuous reading. Word identification errors, mainly substitutions, are only about 1%.

permitted removing several diodes from the s letter line in the recognition matrix which, in effect, provides a less stringent definition of the letter s.

Sometimes a missed letter resulted in silence rather than the substitution of another letter. This was very misleading when the silence replaced the first letter in a word. The logic was modified so that such silent periods are replaced by the 440 Hz "beep." The silent channel (00000) is still available for use between words, as planned.

Miss Reinicke read additional typewritten material with the Visotactor A and Recognition Prototype II during three reading sessions in February 1967. The recognition errors which seemed to cause the most difficulty for Miss Reinicke were investigated after each session. Frequently, minor modifications in the recognition logic eliminated one or more sources of errors.

During March the Recognition Prototype II was used to read (at a speed of 6 letters-per-second) a list of the 500 most frequent English printed words. The error-free spelled-speech output was recorded on magnetic tape. The words were not arranged in any particular sequence. About one second was added between words to permit the listener to respond if he could identify the spelled-speech version. Replay of the tape recording takes 18 minutes and 40 seconds. Two sighted listeners without previous spelled-speech experience recognized 58 per cent and 63 per cent of the 500 words. Miss Reinicke correctly identified 70 per cent the first time she heard this recording; after playing the tape once per day for five days she scored 94 per cent (or 470 words) correct. Assuming that she would have a spelled-speech vocabulary of 500 words, the probability of encountering a word that happens to be outside the 500 most frequent ones is about 0.3. This means that in a line of ten words approximately three words are new to Miss Reinicke in the sense that the rapid spelled-speech versions are not recognized on the first scan and have to be re-scanned. This speed handicap will decrease gradually as Miss Reinicke's spelled-speech vocabulary increases. At the end of December 1967 the Recognition Prototype II was loaned to Miss Reinicke for daily use in her home to help increase her spelled speech vocabulary.

Several improvements planned for the Recognition Prototype

II were installed and tested during November 1967. The two main changes are a new photocell array to improve recognition of v, w, and y for certain type fonts and to improve word space detection, and a switch to detect reverse scanning.

Development of Multicolumn Visotactors

Exactly what modifications are made in the Multicolumn Visotactor design depends on the evaluation of the present prototype. The possibility exists that a future version of the Multicolumn Visotactor may stimulate the underside of only one finger with a large number of vibrators.

This direct translation reading aid which will fit on the finger doing the scanning has been given the name Digitactor. The Digitactor will not incorporate the lens and the variable magnification mechanism used in the Visotactor and the Visotoner. Instead, the Digitactor will have a number of light pipes which conduct light to the printed page or object being examined and other light pipes to guide reflected light to the array of photocells. By having 16 stimulators per column, the Digitactor can be used to read letters which may vary over a size range of slightly more than 2 to 1 (7- to 16-point size, for example). The resolution at the smallest type size will be as good as that in the Visotactors-Visotoners (eight photocells per column) and much better at the larger, more frequent type sizes. Many factors must be studied before the first Digitactor prototype can be built.

Miss Reinicke was given the Multicolumn Visotactor Prototype during June 1966. Only the center column of eight stimulators was turned on. One of the stimulators was adjusted to make better contact with her finger. Miss Reinicke's reading speed after several hours was less than 1 word-per-minute. After about ten hours practice she had become accustomed to the weak tactile stimuli produced by the piezoelectric stimulators in the Multicolumn Visotactor and she read at an average rate of 4.0 words-per-minute using only one column of the three available in the Multicolumn Visotactor (Fig. 7).

On June 19, 1966 Miss Reinicke read from *Alfred Hitchcock's Ghostly Gallery* at an average rate of 6.6 words-per-minute, using only the center column of stimulators. On July 25 she read at an

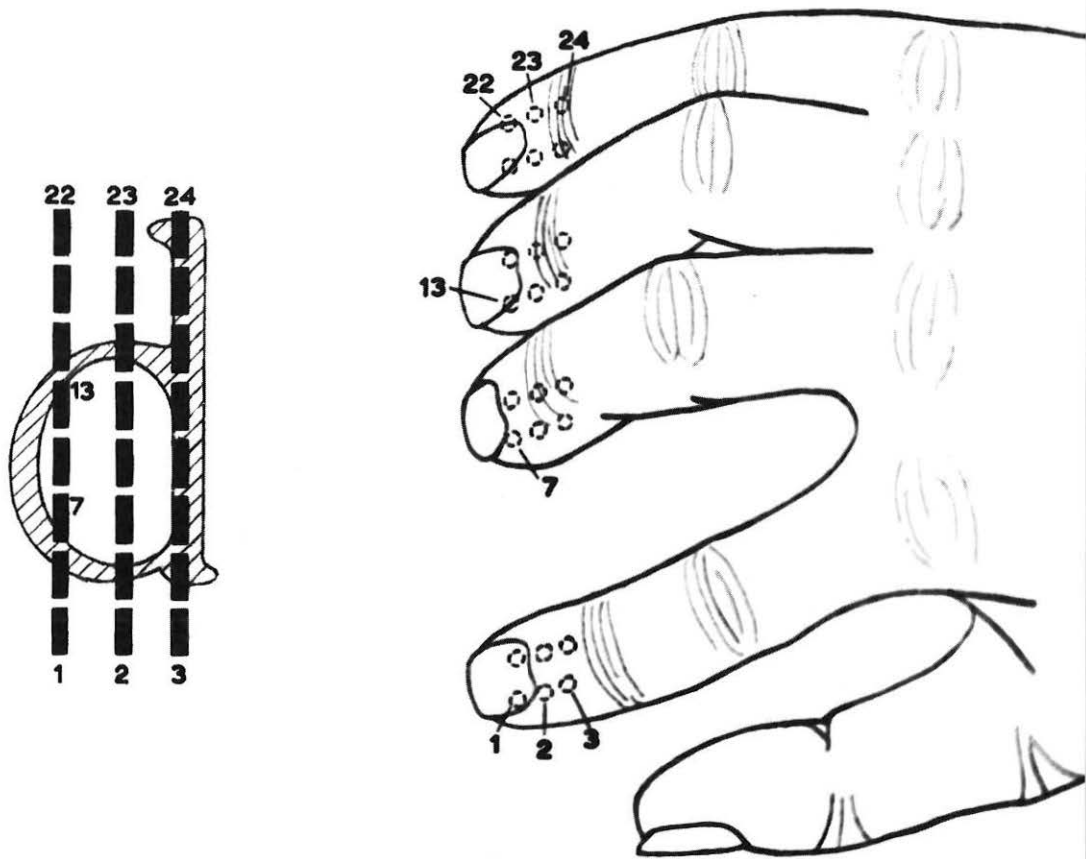


Figure 7. This schematic shows the image of the letter d projected on the photocells of the Multicolumn Visotactor prototype and the location of the stimulator controlled by each photocell.

average rate of 3.8 words-per-minute. An examination of the device disclosed that one stimulator was weak. Miss Reinicke was not aware of this, however, and it is not clear whether or not it affected her reading rate.

During October 1966 Miss Reinicke used the Multicolumn Visotactor with two columns (center and proximal) turned on. Her reading speed was less than 1 word-per-minute at the beginning of the month and increased to 4.0 words-per-minute by October 20, when she read from a second book, *Hitchcock's Solve Them Yourself Mysteries*.

Miss Reinicke continued to read at about 4 words-per-minute during November. Reading speeds of 2.5, 4.3, 3.9, and 3.4 words-per-minute were recorded. On November 29 Miss Reinicke began using the Multicolumn Visotactor with all three columns operating. On December 20 Miss Reinicke was timed for the first time using the Multicolumn Visotactor with all three columns of stimulators turned on. Her reading speed was 3.1 words-per-minute. During January 1967 reading speeds of 1.4, 1.7, 3.2, and 2.3 words-per-minute were measured.

With approximately 30 hours practice under each condition (one, two, or three columns on) her reading speeds averaged 4.1, 3.5, and 2.3 words-per-minute, respectively. Since Miss Reinicke had about 300 hours experience with the Visotactor B (single column of electromechanical stimulators) it may be that the time she spent with the Multicolumn Visotactor was not enough to outweigh the habits acquired earlier. To avoid this complication, it is intended for the future that naive subjects will use the present Multicolumn Visotactor or a modified version with all columns operating beginning with their first exposure.

It may develop that a Visotactor B simulator which presents "perfect" tactile stimulation to a student would speed learning. In its simplest form, the simulator would take the upper eight tones from a tape recorder which replays the tape versions (7-1/2 ips) of the 200-lesson Battelle optophone training course and use the presence/absence of each tone to turn on/off the corresponding tactile stimulator of a Visotactor. If a tape recorder with three operating speeds (7-1/2, 3-3/4, 1-7/8) is used with additional tone selecting circuits, reading speeds one-half and one-fourth that origi-

nally recorded could be simulated. Electronic logic similar to a shift register would permit an approximate simulation of a multi-column tactile reading aid. If a two-channel (stereophonic) tape recorder is used, the teacher's comments (or spelled-speech letters) could be recorded on the second track. In the future, this approach might facilitate learning the tactile output code of the Visotactors A and B and the spelled-speech output of the Recognition Reading Machine.

Summary

Several type reading machines for the blind have been developed which provide the user with immediate access to ordinary printed materials without the need for transcribing into Braille or recording by voice. Preliminary testing of prototypes of these machines by blind users has begun and the results are encouraging.

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Reading-handwriting Research

Early producers of moveable-type books in the fifteenth century went all the way back in history to stone-inscribed vertical print for type models. The hand-produced samples of book scripts at this time used forward slant but were difficult to read and so individualized that they did not serve as good, clear book models. Question: Was the adoption of vertical print for book type a mistake?

In recent years, handwriting programs for the second grade have produced a clear slant print style that better fits man's writing needs when he works on a flat writing surface. Many similar types have been produced by the printing industry during recent years. . . . The question is: Can this plain forward slant script be used to advantage in beginning reading materials? Can it be used to advantage for *all* reading materials—books, magazines, etc? (This easily read slant script must not be confused with *italic* script which slopes but is more difficult to read because of unnecessary ornamentation.)

The vertical pattern borrowed from Rome was upright because it was made with a chisel on an upright stone surface. Is such an alphabet, when reproduced as a reading script, harder to read? Many educators condemn backhand handwriting because it is felt that when eyes meet the backward leaning letters, they tend to slow the process—to block the easy forward sweep in reading. Is not the same true to some extent for the vertical print we inherited from traditional sources rather than obtained from scientific study and analysis? Does the forward slope permit the eyes to move more rapidly forward without encountering “walls” that tend to block and reduce speed? . . . Matching clear vertical and clear forward slant print types are now available; the backhand style can be produced with a camera. The next step would be testing of the reading efficiency (including speed) of all three and then making comparisons.

E. A. Enstrom, The Peterson System, Inc., Greensburg, Pennsylvania

Excerpted with kind permission from *The Reading Teacher*, Volume 21, Number 6 (March 1968) ; © 1968 by International Reading Association, Newark, Delaware 19711.

Reader Response to Newspaper Front-page Format

J. W. Click and Guido H. Stempel III

A study of responses to newspaper pages indicates that persons may make judgments about the entire newspaper on the basis of typography. Respondents were shown front pages from six newspapers they had not seen before and were asked to rate the newspapers on 20 semantic differential scales. There were significant differences between ratings of newspapers on 12 of the 20 scales. Respondents seemed to prefer horizontal pages and disliked symmetry.

A newspaper's make-up, we frequently hear, reflects its personality. Textbook discussions of make-up make the same point. As Turnbull and Baird (1964) put it: "Newspapers are like people in that each has its own personality expressed by its physical appearance. Like people whose habits of dress reveal age, background, and associates, the make-up of a newspaper also reveals these very same factors."

Westley (1953) says that a newspaper's make-up "is in large measure responsible for the 'personality' of the paper." Brown (1952) in suggesting that make-up reflects character and personality, puts it this way: "Just as clothes do not always make the man, type and make-up do not always make the newspaper; but a great deal can be gathered from a paper's appearance."

Tannenbaum, Jacobson, and Norris (1964) found experimental evidence that different kinds of type carry different connotations and inferred from this that the format of a message as well as its content communicates something to the reader.

Granting then, that a newspaper's appearance does matter, the question is, what precisely does the make-up of a newspaper tell the reader. What does the reader like and what does he dislike in newspaper format?

faces. We deliberately included both in the pretest to see if type-face would affect results more than format.

Because we wanted to know to what extent a person would judge a newspaper on the basis of its appearance, we needed to allow our respondents to make the same kinds of judgments they would make about an entire newspaper. We therefore used as the rating instrument a series of 20 semantic differential scales validated for use in rating newspapers. Studies by Tannenbaum and McLeod (1963) and the Inland studies by the late Paul Deutschmann (1960) had demonstrated that respondents could use these scales to evaluate newspapers they were familiar with. One of our concerns in the pretests was whether or not respondents could use them to rate newspapers they had never seen before. A discussion of the use of semantic differential scales in typographic research is given by Dirk Wendt (1968) in the previous number of this journal.

To limit response to typographical appearance, we decided to let respondents see each paper for only 15 seconds before rating it on the semantic differential scales. We felt that in this time period respondents would not become familiar enough with the content of the page for that to affect their ratings.

Another concern on the pretest was the extent to which respondents might rate a paper either on its reputation or on an impression about the city of its publication. To check on this, we varied nameplates with our two pretest groups. One group saw the pages with the correct nameplates. The other group saw the pages with the nameplates scrambled—for instance the *Louisville Courier-Journal* was shown with the nameplate of the Sandusky (Ohio) *Register*.

One pretest group was an editing class and the other a business magazine class at Ohio University.

The pretest indicated that respondents were able to evaluate the papers after a 15-second look and were able to use the semantic differential scales meaningfully. We also found that the name did influence results substantially. A prime example was the *Louisville Courier-Journal*. It was rated substantially higher when shown with its own nameplate than when shown with the

Existing research provides little in the way of an answer to this question. Researchers have been concerned with legibility more than appearance, and legibility is only one format variable. And legibility studies do not really provide an answer as to how to get maximum legibility in a newspaper page, other than suggesting that certain typefaces would produce greater legibility than others (Tinker, 1963).

Haskins (1958) found that *Saturday Evening Post* readers had distinct preferences among headline typefaces. He asked respondents to rate the appropriateness of various headline typefaces for various articles and found that preferences varied with the subject matter of the article. He also found that Bodoni had the best overall rating of 10 typefaces tested. Like the Tannenbaum, Jacobson, and Norris study, this study provides evidence that typography conveys meaning to the reader.

Method

When we discuss newspaper page make-up, we usually refer to two characteristics of a given page. One is the basic headline typeface used on that page. The other is the make-up pattern—whether it is balance, informal balance, brace, contrast and balance, horizontal, or circus. This study deals with the impact of make-up patterns. We were interested in seeing whether or not reader response to different patterns varied significantly.

As our discussion up to this point suggests, we were interested in the response to typography alone. This had two implications for our procedure. One was that we had to get pages that our respondents were not familiar with. The other was that we had to control exposure so that the respondent judged the typography and not the content of the paper. We kept these points in mind as we planned and carried out our pretest.

We began by selecting front pages from 10 newspapers. We tried to find pages that were reasonable representations of the various make-up patterns. It should be recognized that many pages are mixtures. For this reason, we had to go through more than 500 front pages to select the 10 that we used. Of the 10 selected, six used sans-serif typefaces and four used roman type-

nameplate of the Sandusky paper. This indicates that some respondents were probably influenced by the *Courier-Journal's* reputation.

The pretest also indicated rather clearly that the main source of variation in response was the format and not the typeface. Sans-serif and roman pages in similar formats had similar scores, but scores for various formats differed considerably. On the basis of this pretest, finding, we decided to use the six pages which used sans-serif typefaces, thus eliminating variation in typeface as a variable in this study. There were, of course, still some differences in size and style of type, but they were minor.

For the experiment we used these six newspapers (Fig. 1):

The Buffalo *Evening News*, which has a balanced front page.

The Charleston *Daily Mail*, which has a horizontal front page.

The Los Angeles *Times*, which has a six-column front page with a brace approach.

The Pittsburgh *Press*, which has a contrast and balance front page.

The Sandusky *Register*, which has a horizontal front page, with a somewhat freer use of pictures than the *Daily Mail*.

The Washington *Star*, which has a brace or focus front page. The page we used was more typical of brace make-up than most *Star* front pages.

To eliminate judgments about the paper or its community, we prepared six fictitious nameplates—the Bancroft *Star*, the Bancroft *Times*, the Cordova *Globe*, the Cordova *News*, the Denton *Eagle*, and the Denton *Record*. These were set in 72-point Bodoni Bold capitals. These nameplates were pasted over the real nameplates. Each paper was shown under three nameplates. The order of presentation was varied so that each paper appeared in three different positions among the six. For instance, one third of our respondents saw the Sandusky *Register* first, another third saw it

Figure 1. On the following pages are shown the six newspaper front pages used in the study.

Vol. CLXXII—No. 106

BUFFALO, N. Y., TUESDAY, FEBRUARY 14, 1967

40 Pages—2 Sections—8 Cents

Bandit Holds Up Bank on East Side

REDS' PEACE HINTS CAN'T HALT BOMBING, LBJ ORDER SHOWS

Raid by U. S. Resumes as Both Sides Refuse to Budge; President Won't Risk Air Power

WASHINGTON, Feb. 14—President Johnson ordered the resumption of bombing of North Vietnam because he refused to trade U. S. air power for a peace "possibility" of talks, while the Communists rapidly built up their military force...

North Viets Moved Month's Supplies During Truce

Foreign Estimates 2200 Trucks 950 Ships Carried 25,000 Tons of Supplies South

WASHINGTON, Feb. 14—The United States today said that North Vietnamese forces had moved 25,000 tons of supplies south during a truce...

House Probers Told of Powell's Trips to Miami

Witness Suggests 'Official' Inlets Made as Route To Vacation Retreat

WASHINGTON, Feb. 14—A House subcommittee today said it had learned that Sen. Frank P. McCloskey had made several trips to Miami...

ROBBER TAKES \$6705 FROM BRANCH OFFICE OF MARINE MIDLAND

FBI, Buffalo Police Investigating Robbery of Jefferson-London; Bandit Fires on Foot

Buffalo, Feb. 14—A bandit wearing a steel construction helmet held up a teller at the Buffalo branch of the Marine Midland National Bank...

Building a Fester

The administration has been and will be engaged in a campaign to get the U. S. out of Vietnam...

They're Hearts Are Young and Gay

At a time when the young men of the country are being called to arms...

Flying-Saucer Report Shows Growing State of UFO-ria

Sightings Reach Astronomical Proportions; A Force Often Seen in Earth Explorations

Gunman Escapes With \$70 In Liquor Store Holdup

Bandit, Described as 'Scarily Looking' Flees on Foot Following Robbery

Kosygin Meeting Nearly Led To Peace Talks, Wilson Says

WASHINGTON, Feb. 14—President Johnson today said that a meeting between Premier Alexei N. Kosygin and himself had nearly led to peace talks...

School Bus, Car Collide; One Hurt

Buffalo, Feb. 14—A school bus and a car collided today on the East Side of Buffalo...

Space Bugs Are Expected To Return to Earth Tonight

Insects, Other Organisms Believed Dead After Eight Weeks Extra Time in Orbit

Valentine's Day: 2000 Years In the Pursuit of Love

From Cheese to Chocolate, Affection Has Found Expression in Many Ways

Peace Plan Exalts Wilson Says

LONDON, Feb. 14—Prime Minister Harold Wilson reported today the acceptance of an international plan for peace in Vietnam...

Second Operation Required On Heart-Pump Patient

Buffalo, Feb. 14—A patient who underwent a first operation for a heart pump today required a second operation...

Watican Negotiator Seeks Polish Pact

WARSAW, Feb. 14—A Vatican negotiator today sought a Polish pact with the West...

New Recruits At White House

WASHINGTON, Feb. 14—President Johnson today announced the names of new recruits to his administration...

No New Hope for Viet Peace In Ho Message, Vatican Says

VATICAN CITY, Feb. 14—The Vatican today said it had received a message from North Vietnam...

New York Times

RESULTS of recent survey of New York Times readers...

The Boy Did Not Drink

ALABAMA mother says her 10-year-old son did not drink...

Buffalo Evening News

Buffalo Evening News balance format...

Table with 2 columns: Time and Page/Section

Table with 2 columns: Time and Page/Section

Table with 2 columns: Time and Page/Section

Red China's Army Put On Alert Along Soviet Frontier

THE WEATHER
DFT—likely cloudy and cold tonight with drizzle, with chance of snow tomorrow. Low in Mid W. 10-15. High in Mid W. 20-25. Windy tonight and tomorrow. Low in Mid W. 10-15. High in Mid W. 20-25.

BANCROFT TIMES

FINAL EDITION

SATURDAY EVENING, FEBRUARY 11, 1967

7th CENT

Why China Is Raving Soviet Attacks Used To Cover Up Moo's Mess



By ROBERT A. BEYD
Chicago Daily News Service
WASHINGTON—Chinese officials say that Communist China's current and future foreign policy is to make the Chinese people forget the damage caused by Mao Zedong's policies.

As official Russian analyses of the Chinese press campaign to blame Peking and nearby border areas around the globe was made available by the Soviet Embassy here, it is clear evidence that the Chinese at this point in history, but there is sympathy with the Soviet line that with their military Command in Peking.

But U. S. Chinese watchers also support the view that the Chinese are using the Soviet attacks to cover up Mao's mess. American reports on communists are also noted in the Soviet attitude toward the Chinese campaign. The fact is that Mao's "cultural revolution" has not only failed to improve the Chinese economy, but it has also failed to improve the lives of the Chinese people.



Reds Kill 17, Wound 126 GIs During Lull

SASSON, South Vietnam (AP)—Chinese and Viet Cong forces killed 17 American soldiers and wounded 126 during a lull in the fighting here. The lull was broken by a series of attacks on the night of Feb. 10.



FIDO'S HEROINE
A small dog named Fido is the heroine of a new book by the author of the best-selling 'The Dog Who Saved the World'.

100,000 STAGE PROTEST

Mao Alerts Army Against Russians

TOKYO—The Chinese news agency said that Mao Zedong has ordered the Chinese army to be alert for possible Soviet attacks. Mao is also reported to have ordered the Chinese army to be alert for possible Soviet attacks.

State Finance Chief's Son, 19 Killed On Road

BEIJING—The son of the Chinese state finance chief was killed in a road accident. The accident occurred on a road near Beijing.

U.S. Moving, Too, During Cease-Fire

BEIJING—The United States is moving troops during a cease-fire. The move is being made in response to the Chinese attack.

BOTH SIDES PREPARE

BEIJING—Both sides are preparing for a possible escalation of the conflict. The Chinese are preparing for a possible escalation of the conflict.

ON INSIDE PAGES

IN PREVIOUS EDITIONS
The article on the inside pages discusses the political situation in China and the impact of the Soviet attacks.

CHARLESTON WEST SAYS:



The lightning would not be so high-speed. For ALBERT, Pg. 1, Col. 1.

Elkview Youth Dies In Wreck

A 16-year-old Elkview youth died in a car wreck. The accident occurred on a road near Elkview.

RAINMAKER SAYS HIS PROCESS STOPS SNOWMAKING

Chicago 'Could Have Prevented' Snow
A rainmaker says his process stops snowmaking. The rainmaker claims that his process can prevent snow from falling.

Joan Dillon To Marry Prince Of Luxembourg

The engagement of Joan Dillon to Prince Charles of Luxembourg was announced. The wedding is expected to take place in the near future.

Gasoline Price Outback Spurred

Gasoline prices in the outback are being spurred. The prices are rising due to the high cost of fuel in the region.

EX-TRUSTEE SECRETARY'S DAUGHTER

The daughter of an ex-trustee secretary is the subject of a new book. The book tells the story of her life and her father's career.

Quake Shakes Siberia

A major earthquake shook Siberia. The quake caused significant damage and loss of life in the region.

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JOAN DILLON
Ex-Trustee Secretary's Daughter

Charleston Daily Mail: horizontal format



TRIAL BEGINS—Richard Speck, accused killer of eight, is escorted from a police van in Peoria, Ill.

Prosecution to Ask Death Penalty if Speck Is Convicted

PEORIA, Ill. (UPI)—Prosecutors here told Monday that they intend to ask for the death penalty if Richard Speck is convicted of murdering eight students in Peoria last fall. The state's attorney, John E. ...

Romney Says He Would Leave Church if It Balked Race Fight

SALT LAKE CITY—Merrill G. George Romney said Monday that he would leave the Mormon Church if it balked at his fight against racial discrimination. He said he would leave the church if it refused to support his efforts to end racial discrimination in the church's policies.

AFL-CIO Leaders Dismiss Charges Brought by Reuther

PHILADELPHIA—AFL-CIO leaders dismissed charges Monday brought by Walter Reuther that the two labor unions had conspired to rig the election of a new AFL-CIO executive director. The charges were dismissed as unfounded.

New Orleans Paper and DA at Odds Over Assassination Story

NEW ORLEANS—The New Orleans paper, the Times-Picayune, and the district attorney are at odds over the assassination of Dr. Martin Luther King Jr. The paper's report of a possible assassin is being challenged by the DA.

Vietnam Hanoi Fight Against Talks Even if Bombing Ends

Reddin Outlines Police Problems in Riot Disorders

Police Chief Thomas Reddin said Monday that riot disorders here probably will impact on the city's police force. He outlined the problems of police officers in riotous areas, including the need for more equipment and training.

250 WALK OUT AT STANFORD DURING HUMPHREY SPEECH

PALO ALTO—Vice President Humphrey accused 250 Stanford University students of being "un-American" and "reactionary" Monday when they walked out on him as he delivered the administration's Vietnam policy speech.

GI Withdrawal Also Required, Peking Asserts

BEIJING (UPI)—The Chinese government Monday asserted that the withdrawal of U.S. troops from Vietnam is a prerequisite for negotiations with North Vietnam.

Last-Minute Snag Holds Up Draft of Nuclear Arms Pact

GENEVA—Hopes for presenting a draft of a nuclear arms pact to the United Nations Monday were held up by a last-minute snag in the negotiations between the United States and the Soviet Union.

Death Toll Nears 100 in Rio Rains

RIO DE JANEIRO—The death toll from Monday's Rio de Janeiro flood rose to 97 as rescue workers continued to search for survivors in the flooded areas.

National Gallery Buys Leonardo Work for Reported \$5 Million

WASHINGTON—The National Gallery of Art announced Monday it had bought a Leonardo da Vinci painting for \$5 million, the highest price ever paid for a work of art.

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Help Rushed To Battered Yanks

SANIGON (UPI)—U.S. Marines rushed reinforcements to the North-South Vietnam border today after Leatherneck units underwent one of the war's heaviest bombardments that may signal a major Communist offensive.

MILITARY SPOKESMEN said three key Marine battalions just below the Demilitarized Zone (DMZ) driving the Communists back 1,600 more yards in almost unprecedented North Vietnamese shelling that began Feb. 12.

The outnumbered Marine units, who have killed hundreds of elite troops of three North Vietnamese divisions posted on the DMZ the past few days, were getting fresh arm supplies as well as more weapons.

U.S. Navy warships and American warplanes also came to help. American spokesmen said the cruiser Callaghan with the destroyers Keyhole and Ingersoll swept down the North Vietnamese coast along the DMZ starting 17 targets and silencing Communist shore batteries that tried to halt their ravaging of North Vietnamese supply lines.

WHILE THE WARSHIP'S blasted ports, supply dumps, oil depots and shipping points, Air Force F-4C Phantom jets and Navy planes from 7th Fleet carriers aimed to hit more Communist supply lines and border positions above the border zone.

U.S. Air Force B-57 Stratojets, the biggest warplane in America's Vietnam arsenal, roared on Tuesday night and plastered Viet Cong guerrilla hideouts and storage areas in the jungles below the Leatherneck position.

Marines opened the jungles in heavy rain for signs of the expected Communist reaction. News was reported especially tense near the key base of the 1st Marine Division.

tion of Gio Linh, which has taken 20 Communist mortar rounds since Feb. 12. Camp Carroll which was hit by 405 rounds, and Khe Sanh, struck by 7 mortar shells.

U.S. COMMANDERS long have predicted the Communists would make a major attempt to grab control of the northernmost sector of South Vietnam, striking at Quang Tri City. Repeated Marine spoiling operations have been credited with breaking up North Vietnamese invasion attempts. But the threat remained and apparently grew as the Marines brought in 120-million-pound "long tons" guns to blast over the six-mile-wide DMZ at the North Vietnamese invasion route.

MEADE GETS OUT OF MANY HANDSHAKES, SMILES AND CHEERS

... After the long battle for the school. (Register Photo-Tom Walker)

2-To-1 Levy Victory For Huron

BY THOMAS SAIZEN

Huron—The Huron school system's board of education voted 15-10 to pass a 2-to-1 levy on Feb. 27.

At 8 p.m., 15 members of the board voted 15-10 to pass the levy, which would increase the property tax rate from 1.5 to 3 percent.

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MEADE GETS OUT OF MANY HANDSHAKES, SMILES AND CHEERS ... After the long battle for the school. (Register Photo-Tom Walker)

With the levy passed the Huron Board of Education can now borrow with anticipated revenue from the levy to fund lateral. The additional funds furnished should enable the school system to avoid the kind of deficit spending which plagued the schools \$853 in deficit, as announced by Meade last December.

Meade's a written statement prepared in the aftermath of an open session last year. This is the largest day of open sessions since the people of Huron have ever met in good education for the boys and girls of the district.

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STARS PINPOINT FIGHTING

... another mass offensive?

He's Innocent Despite Loot

PREMIER — The kidnap last week in the car but the driver heard in the first trial was "no party."

WATMAN PATTERSON, 38, Detroit, was sentenced by a Sandusky County jury yesterday in a charge of armed robbery, but he still had his legal credentials in good standing and other citizens who have similar degrees pending against him.

Patterson was arrested on the Ohio Turnpike while on board of the Blue A train but had the Truck A head near

Here's What They Said

STEWART — "I'm having such a good dream I don't want to wake up," said House School Superintendent Jack Meade as he related the story of his victory in school board election.

DR. CARL SWANBICK, head of education president, "I think it's a real triumph for Jack Meade. I think it shows that the voters are interested in a better school system."

LEE SCHWAB, school board member, "I think it's a wonderful vote of confidence in our superintendent and his vision for the future of our schools."

MR. WILLIAM MACKENZIE, school board member, "I think it's a great day for our school system. The people of Huron should be glad they could have their say."

DR. EDWARD BARNES, school board member, "I can take a long breath now. I'm really happy our citizens did for their children."

EDWARD ROMAN, school board member, "I'm pleased the outcome was as great as it was. It shows the voters are interested in a better school system."

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LOOKING PICTURE PRETTY in her new spring dress is Sylvia Bowman, one of eight local beauties modeling Spring '67's newest fashions at the NAACP's annual luncheon luncheon, March 7 at 8. (Register Photo-Dick McCallough)

NAACP Intends To Air School Issue Thursday — Robinson

A formal complaint against the Sandusky School Board will be presented to the Ohio Regional Office of the United Negro College Fund by NAACP President Dr. Charles Robinson 21 days after the school board's decision to raise a 2-to-1 levy on Feb. 27.

ROBINSON pointed out that the school board's decision to raise a 2-to-1 levy on Feb. 27 is a violation of the NAACP's charter.

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Coalition Endangers DeGaulle?

PARIS (UPI)—President Charles de Gaulle said today France's position in the coalition with the Communists has emerged as the dominant opposition group.

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House Reform In Sight

WASHINGTON (UPI)—House Education Committee members are expected to pass a bill to reform the Federal Reserve Board in the next few days.

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MARRIAGE LICENSES

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Specials Here
If you wish to see the Specials
start may be for you. Review: John
Sullivan, The Washington Post,
says the show only mildly interesting.
Page 1 of the Washington

115th Year, No. 70

WASHINGTON, D. C., SATURDAY, MARCH 11, 1967—40 PAGES

Phone LI 3-5000

10 Cents

Rt. 1 Collision
Kills D.C. Man,
Two Students

Passenger Hurt
Slightly in Crash
At College Park

The University of Maryland students and a District resident were killed and a Maryland man was injured last night in a two-car collision on U.S. Route 1 in College Park, Maryland state police reported.

Those killed were identified as Joseph Mauer, 30, of 1210 Alton St., Silver Spring, Md.; Robert East, 21, of 10000 W. of Baltimore; and a 19-year-old student of the University of Maryland. The injured man was hospitalized for facial cuts and bruising.

The injured man, who was driving the sedan, was listed as Albert Johnson, 42, of 3300 Lake Park, Hyattsville, Md. He was treated at Landover Memorial Hospital for facial cuts and bruising.

Trooper J. E. Sheehan said the accident occurred on the northbound side of the highway. The foreign car, which was a 1965 Ford, appeared to cross the center line and hit the front of the sedan. The driver of the sedan, who was identified as a 19-year-old student, was killed.

Another student, who was in the sedan, was killed. The driver of the sedan, who was identified as a 19-year-old student, was killed.

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Bert Ray Workman in Moscow.

Russia Frees Workman
In 1st Successful Appeal

MOSCOW (AP)—Bert Ray Workman, the first of 422 U.S. prisoners held in the Soviet Union, was freed today after a successful appeal by the American people.

Workman, 40, was held in the Soviet Union for 10 years. He was the first of 422 U.S. prisoners held in the Soviet Union.

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Democrats Ask
LBJ, Humphrey
To Run Again

National Committee
Also Hails Johnson
For Peace Pursuit

The Democratic National Committee today urged President Lyndon B. Johnson and Vice President Hubert H. Humphrey to run for reelection.

The committee, which met in Washington today, also praised Johnson for his peace efforts.

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Biggest Steel Works
Near Hanoi Hit Again

U.S. Planes
Put Bombs
'On Target'

SAIGON (AP)—Thailand-based American bombers attacked North Vietnam's biggest steel-making plant today for the second time in two weeks.

The U.S. military command said the steel plant was a major target of the bombing.

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Stalina Stalin arrives in Switzerland.

Stalina Stalin, 68, arrived in Zurich today for a two-day visit. She is the first Soviet leader to visit Switzerland since the war.

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Woman Hit by Car
Critically Injured

A 30-year-old woman was critically injured today when she was struck by a car on the southbound side of Route 1 near the intersection of the road and the highway.

The woman, who was identified as a 30-year-old woman, was critically injured today when she was struck by a car on the southbound side of Route 1 near the intersection of the road and the highway.

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Goldwater Back
Merged on Delay
Of Consular Pass

BARRY GOLDWATER, Republican presidential candidate, was delayed today in receiving a consular pass to travel to the Soviet Union.

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Red Is Set to Roll

LONDON (AP)—Red forces are set to roll into the city of Moscow today, according to reports from the city.

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Stalin's Daughter in Geneva,
U.S. Silent on Asylum Plea

GENEVA (AP)—Stalin's daughter, Svetlana, is in Geneva, Switzerland, and has reportedly made an asylum plea to the U.S. government.

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GENEVA (AP)—Stalin's daughter, Svetlana, is in Geneva, Switzerland, and has reportedly made an asylum plea to the U.S. government.

Last of 8 Babies Born
To Mexican Wife Dies

MEXICO CITY (AP)—The last of eight babies born to a Mexican woman who died in childbirth today.

MEXICO CITY (AP)—The last of eight babies born to a Mexican woman who died in childbirth today.

MEXICO CITY (AP)—The last of eight babies born to a Mexican woman who died in childbirth today.

MEXICO CITY (AP)—The last of eight babies born to a Mexican woman who died in childbirth today.

MEXICO CITY (AP)—The last of eight babies born to a Mexican woman who died in childbirth today.

MEXICO CITY (AP)—The last of eight babies born to a Mexican woman who died in childbirth today.

MEXICO CITY (AP)—The last of eight babies born to a Mexican woman who died in childbirth today.

A MEAL WITHOUT
CROWDING ABOUT

The food of a meal was a success of the hour and a half, according to the report.

The food of a meal was a success of the hour and a half, according to the report.

The food of a meal was a success of the hour and a half, according to the report.

The food of a meal was a success of the hour and a half, according to the report.

The food of a meal was a success of the hour and a half, according to the report.

The food of a meal was a success of the hour and a half, according to the report.

TEEN Airlift Girls
Now in Junior Class

TEEN Airlift Girls, who were airlifted to the island of Guam, are now in their junior class at the University of Guam.

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Washington Star: brace or focus format

The Washington Star is planning to change its format to a focus format, according to reports.

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fourth and another third saw it fifth among the six papers. Likewise, one third of our respondents saw it as the *Bancroft Times*, one third saw it as the *Cordova Globe* and one third saw it as the *Denton Record*.

Subjects for the experiment were students in 14 sections of the required freshman speech course at Ohio University. With computer scheduling, assignment to sections is essentially random, so our subjects represented a cross section of freshman students. We went to discussion sections of the course. These sections ranged from 11 to 22 students; with groups this size there would be no problem in respondents being able to see the pages.

Our procedure was to explain briefly to the students that we wanted them to rate some newspapers, give them time to read the directions on the use of the semantic differential scales, and then show them each of the six pages for 15 seconds.

We had 236 subjects, two of whom did not complete the forms correctly, leaving 234 useable sets of rating forms.

Results

Average responses to the pages on the semantic differential scales are shown in Table I. Responses could range from 1 (low) to 7 (high). Analysis of variance was used to test whether or not differences between these averages were significant, and the *F* scores and significance levels are also reported in Table I. The averages for the six papers were significantly different for 12 of the 20 scales, and for eight the significance level was .01 or beyond.

We have arranged the scales in both tables according to groupings of scales or factors that McLeod and Tannenbaum (1963) developed empirically through correlational and factor analysis. The evaluative factor contains scales which reflect the general worth of a newspaper. The scales in the ethical factor reflect typical ethical norms. The stylistic factor includes scales which seem particularly applicable to typography and reflect artistic style in a broad sense. The potency factor includes scales covering power and strength. The activity factor includes scales which reflect activity and change.

Looking first at those eight scales for which differences were

TABLE 1: Mean Ratings of Six Newspapers on Semantic Differential Scales

EVALUATIVE FACTOR	Charles- ton	Wash- ington	San- dusky	Los Angeles	Pitts- burgh	Buffalo	F Value
Pleasant—unpleasant	4.20	4.58	4.88	4.25	3.69	3.92	3.70**
Valuable—worthless	5.01	5.06	4.80	5.11	4.94	4.20	3.07**
Important—unimportant	5.20	5.20	4.75	5.38	5.12	4.20	4.71**
Interesting—boring	5.26	5.20	5.12	4.93	4.77	4.05	3.50**
ETHICAL FACTOR							
Fair—unfair	4.39	4.57	4.60	4.61	4.67	4.33	0.57
Truthful—untruthful	4.55	4.83	4.77	4.83	4.86	4.63	0.53
Accurate—inaccurate	4.58	4.80	4.74	4.87	4.88	4.64	0.48
Unbiased—biased	3.99	4.19	4.03	4.27	4.24	4.09	0.42
Responsible—irresponsible	4.60	4.69	4.69	4.76	4.80	4.44	0.53
STYLISTIC FACTOR							
Exciting—dull	4.95	4.61	4.53	4.44	4.35	3.67	2.78*
Fresh—stale	4.71	4.69	4.72	4.52	4.35	3.78	2.40*
Easy—difficult	4.92	4.78	5.14	4.38	4.46	4.31	2.11
Neat—messy	4.81	5.00	4.99	5.16	4.50	4.32	1.65
Colorful—colorless	4.31	4.16	4.26	3.71	3.64	3.02	3.10*
POTENCY FACTOR							
Bold—timid	5.21	4.75	4.63	4.38	4.22	3.60	5.57**
Powerful—weak	4.86	4.52	4.36	4.48	4.27	3.41	4.47**
Loud—soft	4.81	4.46	4.44	4.33	4.19	3.59	3.83**
ACTIVITY FACTOR							
Tense—relaxed	4.68	4.32	4.00	4.50	4.44	3.98	1.82
Active—passive	5.09	4.78	4.68	4.63	4.49	3.79	4.12**
Modern—old fashioned	4.92	4.92	4.88	4.87	4.37	3.72	3.65**
Average	4.71	4.71	4.65	4.62	4.46	3.99	

* $p < .05$

** $p < .01$

not significant, we find that five were from what Tannenbaum and McLeod labeled the ethical factor. Differences between averages of the newspapers on these scales were approximately one fourth as great as they were on the other scales.

This probably is an encouraging sign, for it would seem that readers ought not to judge the fairness, truthfulness, accuracy, bias, or degree of responsibility of a newspaper solely on the basis of its typography.

The other three scales for which differences were not significant did nonetheless have fairly substantial differences, and the *F* values were not far below the level required for significance.

In general, responses were fairly consistent within factors, but varied considerably over-all. The stylistic factor is probably the one most closely related to typography, and two things stand out here. One is that the two horizontal pages were preferred, while the balanced page and the contrast and balance page scored poorly. The other is that none of these pages greatly excited our respondents. Considering the judgments of all six pages at once, we see that they were about midway between colorful and colorless and only slightly exciting and fresh. We ought to hope that we could create more favorable reader response than this.

The most favorable responses were on the evaluative scales, indicating that these newspapers in their typography did a better job of creating an impression of over-all worth than they did of creating an impression of artistic value. The responses on the potency and activity scales were somewhat comparable to those on the stylistic scales.

When we consider the responses for each paper individually, the first obvious point is that the response to the Buffalo page was substantially less favorable than that to any of the other five pages. The Buffalo paper had the lowest over-all average, as Table I indicates, and it was the only paper not to have a rating of 5 or more on any scale. Table II shows that the Buffalo paper had the lowest rating of any of the six papers on 16 of the 20 scales.

The Charleston paper, which along with the Sandusky paper had the best responses on the stylistic scales, also had the most favorable responses on the potency and activity scales. The

TABLE II: Rank of Mean Response for Each Newspaper on Semantic Differential Scales

	<i>Charles- ton</i>	<i>Wash- ington</i>	<i>San- dusky</i>	<i>Los Angeles</i>	<i>Pitts- burgh</i>	<i>Buffalo</i>
EVALUATIVE FACTOR						
Pleasant—unpleasant	4	2	1	3	6	5
Valuable—worthless	3	2	5	1	4	6
Important—unimportant	2*	2*	5	1	4	6
Interesting—boring	1	2	3	4	5	6
ETHICAL FACTOR						
Fair—unfair	5	4	3	2	1	6
Truthful—untruthful	6	2*	4	2*	1	5
Accurate—inaccurate	6	3	4	2	1	5
Unbiased—biased	6	3	5	1	2	4
Responsible—irresponsible	5	3*	3*	2	1	6
STYLISTIC FACTOR						
Exciting—dull	2	1	3	4	5	6
Fresh—stale	2	3	1	4	5	6
Easy—difficult	2	3	1	4	5	6
Neat—messy	4	2	3	1	5	6
Colorful—colorless	1	3	2	4	5	6
POTENCY FACTOR						
Bold—timid	1	2	3	4	5	6
Powerful—weak	1	2	4	3	5	6
Loud—soft	1	2	3	4	5	6
ACTIVITY FACTOR						
Tense—relaxed	1	4	5	2	3	6
Active—passive	1	2	3	4	5	6
Modern—old fashioned	1*	1*	3	4	5	6

*Tie

Charleston paper had approximately the same rating on the evaluative scales as the *Washington Star* and *Los Angeles Times*. Oddly enough, although the Charleston paper was rated most colorful and most modern, it was fourth on the pleasant-unpleasant scale.

The *Washington Star* had nearly as favorable an over-all profile as the *Charleston Daily Mail* and was slightly higher on the evaluative scales.

The *Los Angeles Times*, with the six-column format that is the most recent typographical innovation for newspaper pages, rated low on the stylistic scales and about average on the others. It was considered less modern and less colorful than average.

The *Pittsburgh Press* rated relatively low on everything except the ethical scales. The *Press* had the highest ratings on the ethical scales, but the relatively small and insignificant differences between papers on those scales diminish the importance of the *Press*' high ratings there.

The *Sandusky Register* had the most varied response. It had high ratings on the stylistic scales and was rated most pleasant of the six papers. Yet it was only average on most of the other scales.

Summary

In summary, then, this study indicates these things:

1. People can evaluate newspapers on the basis of typography alone, although they do not readily make ethical judgments on this basis.
2. The two horizontal pages rated highest on stylistic scales, and one of the horizontal papers, the *Charleston Daily Mail*, was one of the two most highly rated papers.
3. The other paper preferred by respondents was the *Washington Star*, which had a brace page.
4. Respondents rated the *Buffalo Evening News*, with a balance format, lowest of the six papers by a substantial margin.
5. The six-column format of the *Los Angeles Times* had only average appeal and was not considered particularly modern. It also had only average ratings on stylistic variables.

It must be remembered that these are findings from a study of

college students. Whether or not these preferences about typography hold for persons over 25 is a subject for future research.

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EDITORIAL NOTE

A color illustration (3x4 inches) of the Words in Color phonic code was prepared for insertion loose in the January 1968 number of this Journal—to accompany the article "Words in Color: Two Experimental Studies" by Drs. Lillian Hinds and William Dodds. Unfortunately U.S. Post Office regulations forbid loose insertions in second-class mail (except subscription forms), and the slip was not sent to Journal subscribers. If you would like a copy of the phonic code in color, ask for one on a card (with your name and address) sent to: The Journal of Typographic Research, c/o The Cleveland Museum of Art, Cleveland, Ohio USA 44106.

Word Fragments as Aids to Recall: the Organization of a Word

Leonard M. Horowitz, Margaret A. White,
and Douglas W. Atwood

This paper discusses the organization of a single word. It shows that the beginning of a word is the best cue for eliciting that word; the middle is the poorest cue. Subject was shown a list of words one by one on a memory drum. (Some lists had six-letter words and some had nine-letter words.) Then subject saw a fragment of the word, and he had to recall the entire word. A beginning fragment elicited the correct response most readily and with the shortest latency. The middle elicited the correct response least readily and with the longest latency. These results are also related to the issue of associative symmetry.

The term "organization" has frequently appeared in the literature of verbal behavior, particularly in studies of grammar, associative meaning, and free recall. In general, this literature has examined the organization of words into larger segments of verbal behavior. The present study, though, considers the organization of a single word alone.¹

Several studies have already hinted that a single word has a characteristic organization. That is, the parts of a word seem to vary in their importance to the word as a whole. Various techniques have shown, for example, that the middle of a word is less important than other parts for identifying that word. Miller and Friedman (1957) asked subjects to reconstruct a deleted letter

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from the body of a word. The subject performed best when the middle letter was the letter missing. As the missing letter moved to either end of the word, subject's performance progressively declined. Garner (1957, 1958, 1962), Carson (1961), and Garner and Carson (1960) have explained this result in informational terms: Letters which are adjacent in a word correlate more highly than letters which are one or more characters apart. Therefore, the best predictor of a missing letter in a word is the letter which lies next to it. A letter which is missing from the middle of a word has *two* "best predictors"—one on either side. But a letter which is missing from the end of a word only has one.

Method

The subject of the present study was shown four lists of words; two lists contained six-letter words and two contained nine-letter words. After subject studied a list, he saw a fragment of one of its words and he had to recall the word itself. The fragment was either the beginning, the middle, or the end of the word.

The four lists each contained nine words. Two lists had entirely six-letter words and two had entirely nine-letter words. List 6A contained the following words: SCHOOL, ACCEPT, FUTURE, CIRCLE, LENGTH, MINUTE, PUBLIC, TWELVE, FAMILY. List 6B contained: NATIVE, OBJECT, STRONG, SIMPLE, SECOND, FIGURE, GARDEN, DIVIDE, PERIOD. List 9A contained: RECOGNIZE, ESTABLISH, PASSENGER, PRESIDENT, VEGETABLE, UNIVERSAL, BEAUTIFUL, DISCOVERY, CHARACTER. List 9B contained: COMMUNITY, STRUCTURE, PRINCIPLE, RELIGIOUS, PHYSICIAN, OTHERWISE, NECESSARY, TERRITORY, KNOWLEDGE.

The words were all high-frequency words in the Thorndike-Lorge (1944) word count; their frequencies were 35 or more. There were no repeated consonants occurring consecutively in any of the words. As far as possible, letter combinations were avoided that violated the usual rules of English pronunciation. Words were also avoided that contained contractions or diphthongs. Only the present tense of verbs and the singular form of nouns were used. A six-letter word was not used if its beginning, middle, or final pair of letters made a word, or if the remaining four letters made a word. A nine-letter word was not used if its

beginning, middle, or final trigram of letters made a word, or if the remaining six letters made a word.

First, subject was given a practice task. Three words (CAT, TOY, PEN) appeared one at a time on a Lafayette memory drum. Each word lasted two seconds, and a two-second blank space separated one word from the next. After the subject studied this short list, he was tested on an MTA Scholar teaching machine for "aided recall." A fragment of one word of the list appeared, and subject was asked to think of the word as fast as he could. A timer began operating as soon as the word appeared. When subject thought of the word, he pressed a button which stopped the timer and allowed examiner to record his latency. First the subject was tested with the fragment c a -, then with t - y, and then with - e n.

Since redundancy is greatest in the middle of a word, a typographical error in the middle of a word is not very disruptive. Bruner and O'Dowd (1958) tachistoscopically presented words which had an error in the beginning, middle, or end. The subject had to identify the words as fast as he could, and his latencies were measured. The data showed that typographical errors at the beginning of a word are the most disruptive, and those in the middle are the least disruptive.

Because a word has its redundancy in this form, subjects primarily examine the ends of a word during a brief exposure. Haslerud and Clark (1957) presented nine-letter words for brief durations, and the subject reported whatever he saw. In one analysis the authors examined subject's mistakes and determined how often the letter of each position was correctly identified. The subject identified the end letters best, and his performance declined towards the middle. Apparently a subject spends less time looking at the middle since the middle is less informative.

According to Marchbanks and Levin (1965), a similar conclusion holds for kindergarten children who have not yet begun to read. In their study a nonsense syllable was shown to a child and the child was asked to find a syllable like it from a set of alternatives. The child had to select a syllable which resembled the one he had seen. Marchbanks and Levin showed that the child's choice was mainly guided by the first letter, and that the middle letter had the smallest effect. Thus, again, the parts of a word

contribute different amounts of importance to the word as a whole.

To speak of a word's "organization" also implies a second property: apparently, a fragment of a word can elicit the whole word faster than it can elicit some other ingredient fragment. Horowitz, Day, Light, and White (1967) studied common words as well as newly learned nonsense words; from their data, a subject who responds to a word-fragment can utter the entire word faster than he can utter a single missing letter.

But the different parts of a word vary in their importance; therefore, some fragments are probably better able than others to elicit the word as a whole. The initial part is the most informative, so it ought to be the best cue. The middle is the least informative, so it should be the poorest. Thus, the beginning of a word should be an excellent hint for helping a subject recall that word, while the middle should be a poor hint. This hypothesis is tested below.

After subject completed the practice task, he watched one experimental list appear on the memory drum. The nine words appeared one at a time. Each word lasted two seconds and a two-second blank space separated one word from the next. After subject studied the entire list, he was tested for aided recall on the teaching machine. He was shown a fragment of one word he had seen and he was asked to supply the entire word. He was allowed as much as 15 seconds for responding. When he responded (or when 15 seconds had elapsed), the next fragment appeared. The fragment was always one-third of the word—two consecutive letters of a six-letter word, or three consecutive letters of a nine-letter word. The fragment was always the initial part of the word, the middle part, or the final part. Blanks appeared in place of the missing letters. For example, the stimulus fragment for testing the recall of "twelve" was "t w - - -," or "- - - e l - -," or "- - - - v e." The fragment for testing the recall of "recognize" was "r e c - - - - -," or "- - - o g n - - -," or "- - - - - i z e."

Each word was tested by all three fragments, so the test list contained 27 items. The first nine fragments each tested a different word—three with the initial fragment, three with the middle fragment, and three with the final fragment. The next nine

items tested the words again but by a different fragment. The last nine items tested them again by the remaining fragment. The examiner recorded subject's latency plus any errors that occurred.

After subject completed one list, he immediately transferred to the next list. He studied each list on the memory drum and then, in the test of aided recall, he reconstructed the fragments into words. The subject worked on all four lists in this way. The order of lists varied from subject to subject; 16 different orders were used. Two subjects were tested with each order, making a total of 32 subjects. They were all students in the introductory psychology class at Stanford University

Results

Table I shows the mean number of items that subject recalled correctly to each type of stimulus fragment. Recall was best when the initial fragment served as the cue and poorest when the middle fragment served as the cue. Corresponding scores of Lists 6A and 6B were summed, and likewise, of Lists 9A and 9B. An analysis of variance was performed on these scores. This analysis showed that the fragment's position in the word was a significant source of variation: $F(2,62) = 122.32$ $p < .001$. The difference in recall for the initial vs. the final fragment position was more than three times as great as the difference for the final vs. the

TABLE I: Mean Number of Items Correctly Recalled on Each List (Maximum Score = 9)

	<i>Fragment Given As Cue</i>					
	<i>Initial</i>		<i>Middle</i>		<i>Final</i>	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
List 6A	7.78	0.93	5.78	1.49	6.25	1.30
List 6B	7.44	1.27	5.53	1.64	5.91	1.40
All 6-Letter Words	7.61		5.66		6.08	
List 9A	8.34	1.02	6.69	1.79	7.34	1.34
List 9B	8.56	0.66	6.28	1.28	6.53	1.41
All 9-Letter Words	8.46		6.49		6.94	

middle fragment position. Still, the final fragment-position differed significantly from both of the other two fragment positions. For six-letter words, the t 's were 2.26 and 8.23. For nine-letter words, the t 's were 2.45 and 8.15. All t 's had $df = 62$ and $p < .05$.

Table I further shows that nine-letter words were better recalled than six-letter words. The effect of length was statistically significant; $F(1, 31) = 31.16, p < .001$. The interaction between length and position was not significant, $F < 1$, so fragment position seems to have had a consistent effect for words of both lengths.

When subject recalled a word correctly, his latency was recorded. The means of these latencies are reported in Table II. (Items that were not recalled are not included in this analysis.) The pattern of Table II strongly resembles that of Table I. On the average, items were recalled fastest when the initial fragment served as a cue and slowest when the middle fragment served as the cue. An analysis of variance showed that the effect of position was significant, $F(2, 62) = 77.19, p < .001$.

As Table II shows, the latency difference between the initial vs. the final fragment position was greater than the difference between the final vs. the middle fragment position. Again, on the average, the final fragment position differed significantly from both of the other two fragment positions. The t 's for the six-letter

TABLE II: Mean Latency (in Seconds) of Items Correctly Recalled

	Fragment Given As Cue					
	Initial		Middle		Final	
	M	SD	M	SD	M	SD
List 6A	1.72	0.65	3.54	1.15	2.75	1.32
List 6B	2.09	0.71	3.36	1.48	2.89	1.08
All 6-Letter Words	1.90		3.45		2.82	
List 9A	1.54	0.38	3.58	1.61	2.21	1.12
List 9B	1.52	0.66	2.69	0.87	3.02	1.54
All 9-Letter Words	1.53		3.14		2.62	

comparisons were 3.70 and 4.97. Those for the nine-letter comparisons were 2.89 and 5.87. All t 's had $df = 62$ and $p < .01$. There was only one minor deviation from the overall pattern, and that occurred in the latency data of List 9B.

Table II also shows that nine-letter words were supplied faster than six-letter words. From an analysis of variance, $F(1, 31) = 12:30$, $p < .01$. This very consistent result may be due to the syllabic pattern of nine-letter words: in Lists 9A and 9B, a fragment of a word tended more often to be a syllable of the word. Thus, the syllable may comprise an important substructure within the word's organization. This view has been discussed by Hansen and Rodgers (1965). Two other factors may also explain the superior recall of nine-letter words. First, fewer nine-letter words exist in English, so there is a smaller set of nine-letter words from which subject draws. Second, a fragment of a nine-letter word contained more letters than one of a six-letter word; perhaps the extra length helped recall. The present study does not allow us to choose among these alternatives.

The latency of every subject on each word was also examined to determine which fragment position yielded the fastest recall. Then these data were pooled across subjects for each word. For example, in recalling "family," 20 subjects responded fastest to "f a - - -"; two responded fastest to "- - m i -"; and eight responded fastest to "- - - l y." (Two subjects did not recall the word at all.) These values were then averaged across all 18 words of each length. For the six-letter words, on the average, 18.60 subjects responded fastest to the initial fragment, 3.16 responded fastest to the middle fragment, and 6.96 responded fastest to the final fragment. The corresponding means for the nine-letter words were 20.38, 3.84, and 6.84. The two sets of values are highly comparable and again reflect the pattern of Tables I and II. Their similarity is even clearer when each value is expressed as a proportion of the three-value total. They then tell the proportion of subjects who responded fastest to each type of fragment: For six-letter words, the values were .65, .11, and .24; for nine-letter words, the values were .66, .12, and .22.

Other factors besides position and word-length might also help a fragment elicit the whole word. One correlate, for example,

might be the fragment's frequency of occurring as a letter-combination in English. An *unusual* letter combination might elicit the whole word faster. To examine this hypothesis, the frequency in English was examined of each digram of the six-letter words and of each trigram of the nine-letter words. Underwood and Schulz (1960) have reported the frequencies of various digrams and trigrams in English, and each fragment's frequency was converted to a logarithm. Means latencies were also recorded, showing how fast each digram or trigram elicited the entire word. These mean latencies were converted to logarithms, and they were correlated with the log frequencies. Separate correlations were computed for each fragment position and word length. These six correlations were not significant. They ranged from $-.03$ to $+.44$, averaging $+.27$. For all r 's, $p > .05$. Thus, a letter combination's frequency in English did not reliably predict how well it aided recall.

The digram frequency of word beginnings in Lists 6A and 6B averaged 942.2; of middle digrams, 969.1; of final digrams, 2,964.0. The corresponding means for the trigrams in Lists 9A and 9B were: 223.7 for initial trigrams; 122.4 for middle trigrams; and 291.8 for final trigrams. Thus, again, the frequency of letter combinations was not consistently related to subject's performance in recall: whereas a word typically ends with a more common letter combination, these end fragments had an intermediate ability to aid recall.

Data of free association. Some letter combinations might also have a greater *chance-probability* of eliciting the word in question. For example, "t w - - -" might make a subject think of "twelve" without any recent exposure to the word. On the other hand, some fragments might elicit so many different alternative responses that they could interfere with subject's recall.

Therefore, free-association data were collected to determine what words each fragment would elicit. Test booklets were prepared with the various fragments of the experiment. The subject was asked to write all the words he could think of that fit each frame. He was allowed 20 seconds for each fragment. A five-second pause occurred between fragments, and a minute rest occurred after each set of nine fragments.

A different fragment appeared on each page of the booklet, and subject was only tested with one of the fragments of any particular word. Therefore, three different booklets were needed. Each booklet contained 36 items: there were 12 initial fragments, 12 middle fragments, and 12 final fragments. Half of the fragments were from six-letter words and half were from nine-letter words. The order of items in a booklet was systematically varied from one subject to the next. The subjects were 24 students from the class in introductory psychology.

The resulting data were scored in three different ways. One measure reported the mean number of words that a subject produced to any one stimulus. These values are reported in Table III. The pattern of means in Table III resembles the pattern found earlier in the recall data. Responses occurred most readily to an initial fragment and least readily to a middle fragment. Furthermore, the largest differences were between initial position and each of the other positions. This result again shows how very effectively the beginning of a word elicits the whole word: The stimulus "t w - - -" helped subject think of words of the English language more effectively than the stimulus "- - - v e." As shown above, though, word *endings* are more common as letter combinations, so "ve" probably occurs in more different words than "tw" does.

TABLE III: Mean Number of Words Supplied in Free Association to Each Fragment

	Position of Fragment					
	Initial		Middle		Final	
	M	SD	M	SD	M	SD
List 6A	1.47	0.44	0.63	0.48	0.75	0.48
List 6B	1.58	0.77	0.92	0.55	0.65	0.52
All 6-Letter Words	1.52		0.78		0.70	
List 9A	0.96	0.39	0.21	0.30	0.46	0.38
List 9B	1.00	0.42	0.14	0.23	0.39	0.36
All 9-Letter Words	0.98		0.18		0.42	

If a subject responds to an initial fragment more readily, then he is more apt to think of any one particular word. A second measure reported the probability that subject in free association emitted the particular word which had been used in the experiment proper. These probabilities are shown in Table IV. They reveal the same pattern as the means of Table III. The result might be summarized this way: An initial fragment elicits more responses, so subject's recall is more apt to include some particular word.

A third measure told how many *different* words each fragment elicited throughout all the subjects. On the average, the initial fragment of a six-letter word elicited 8.67 different words; the middle fragment, 4.72 words; and the final fragment, 4.89 words. The corresponding values for the nine-letter words were: 4.78, 1.06, and 2.94. These values again reflect the pattern of Tables III and IV.

If a fragment elicits many different responses, more words could have interfered during the recall task of the experiment proper. Therefore, each fragment was given two scores which were then correlated. One score was described above as the number of different words the fragment elicited in free association. The other score told how often the fragment elicited a correct recall in the experiment proper. Six separate *r*'s were computed for each fragment position at each word length. Each *r* was based

TABLE IV: *Probability of Eliciting List Word in Free Association*

	<i>Position of Fragment</i>					
	<i>Initial</i>		<i>Middle</i>		<i>Final</i>	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
List 6A	0.19	0.16	0.01	0.07	0.00	0.00
List 6B	0.17	0.19	0.04	0.11	0.07	0.14
All 6-Letter Words	0.18		0.02		0.04	
List 9A	0.26	0.20	0.06	0.12	0.10	0.15
List 9B	0.33	0.30	0.06	0.16	0.06	0.12
All 9-Letter Words	0.30		0.06		0.08	

on 18 pairs of scores. The values of r for the six-letter words were: $-.41$ for initial fragments, $+.12$ for middle fragments, and $+.17$ for final fragments. The corresponding values for the nine-letter words were: $-.52$, $+.03$, and $-.01$. Only two values, those for the initial fragments, even approached significance: the former just missed significance at the 10% level and the latter reached significance at the 5% level. Thus, a relationship does hold for initial fragments: when there are more responses to compete, recall is poorer. However, the relationship is not very strong.

The number of correct responses on the recall task was also correlated with the response's probability in free association. For the six-letter words, the values of r were: $+.64$ for the initial fragments, $-.04$ for the middle fragments, and $+.03$ for the final fragments. The corresponding r 's for the nine-letter words were: $+.52$, $+.11$, and $+.39$. Only the r 's for initial fragments were significant; the six-letter value had $p < .05$ and the nine-letter value had $p < .01$. Thus, again, a relationship holds for initial fragments: A word which is likely to occur in free association is also likely to be recalled. Again, though, the relationship is not very strong.

Discussion

These data show that the different parts of a word have different abilities to elicit the whole word. Furthermore, the beginning's advantage over the end is greater than the end's advantage over the middle.

How does this organization come about? In part, it may be a matter of perceptual learning. In learning to read, a child may come to know that the middle of a word is more redundant. Therefore, as one efficient strategy, perhaps he examines the beginning of a word first; if the word is not recognized, he might then look to the end; and if the end is not recognized, he might then examine the middle. Thus, word beginnings would be called upon more often to elicit the whole word, the middles would be called on least often. Brown and McNeill (1966) have offered a similar explanation for recall patterns that operate in the tip-of-the-tongue phenomenon.

This explanation does have one shortcoming, though. It does

not explain why kindergarten children, before they learn to read, show the adult pattern in judging the similarity of nonsense syllables: according to Marchbanks and Levin (1965), kindergarten children mainly judge similarity by the beginnings of syllables and least by the middles. Why should this pattern appear *before* the children learn to read? Possibly such habits develop through prereading tasks before formal reading begins.

The present result has two implications for research in verbal learning. The first concerns the formal similarity between words. If two nonsense words only differ in their middle letters, they should seem to be more similar than two nonsense words which only differ in their initial letters. The nonsense words *neglan* and *nebran* should seem more alike than, say, *neglan* and *moglan*.

Second, the present result is related to the issue of associative symmetry. Suppose a subject learns an association between two nonsense syllables, A and B, which are equally available. According to the principle of associative symmetry, A and B elicit each other with equal strength. Data on this issue have been reviewed by Ekstrand (1965). Throughout this literature, forward and backward recall do not always differ *significantly*, but most studies have shown that forward recall is usually better than backward recall, even when item availabilities are equal. Can the principle of associative symmetry be reconciled with this slight advantage to forward recall?

Investigators who hypothesize associative symmetry seem to assume that the associates get merged into a larger whole. Suppose that two associated syllables (A and B) united as a single six-letter unit; call the unit AB. Now "forward recall" may simply mean that A has to elicit AB, so subject can select B as his response. Likewise, "backward recall" may mean that B has to elicit AB so subject can select A as his response. Thus, the forward or backward recall tasks may be measuring whether A or B better elicits AB. If so, forward recall may seem superior only because A elicits the whole more effectively.

Evidence in the literature of gestalt psychology already supports this interpretation. Meyer (1939), replicating an earlier study by Müller and Pilzecker (1900), presented nonsense-syllable triplets to subject. Let us denote the syllables ABC. The

subject studied all triplets for 10 trials. Then he was shown one syllable of a triplet and he had to report "whatever came to consciousness." Meyer's data yielded two interesting results: First, Item B was more apt to elicit Item A than it was to elicit Item C. In other words, the "backward" association B-A seemed to be stronger than B-C, the "forward" association. Second, Item C was more apt to elicit Item A than it was to elicit Item B. In other words, the "remote backward" association C-A seemed to be stronger than C-B, the "adjacent backward" association. These results can be used to further refute the chaining hypothesis of serial learning. More interesting, though, they show a tendency for the subject to respond to any ingredient of the triplet with Item A. This tendency, the *initial reproducing tendency* (Müller and Pilzecker, 1900), is perhaps the first step towards recalling the entire ABC complex.

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Readership of Advertisements with All-display Typography

A. T. Turnbull and David E. Carter

Experts differ in their opinions regarding the effect on readership of composing an entire advertisement in all-display typography. A sampling in *Life* and *Ladies Home Journal* magazines from 1954 through 1965 has revealed an upward trend in the use of such ads. To measure the effect, correlative studies were made relating the numbers of words to Daniel Starch readership records. Negative correlations were found for "Read Most" and "Seen Associated" ratings. With inherent reader interest in the advertised product held constant, correlations for both ratings were low. It was concluded that all-display typography may not be restrictive in dampening readership. However, rank correlations of all-display product categories with category rankings from Starch findings were so high as to lead to the conclusion that the effect on readership beyond the reader-interest level was not likely.

Rather recent comments from two well-known authorities in separate issues of an advertising trade journal represented divergent opinions regarding the increasing use of all-display type in advertisements.

One observer stated, "A venerable . . . school of advertising is finally and grudgingly biting the dust."¹ He referred to what he called "the old one-two ad presentation." This involves (1) getting attention and then (2) presenting the sales story. In today's fast-moving world, he pointed out, the one-two approach is giving way to a "big, fat Sunday punch." This involves dramatic delivery of the message utilizing, among other techniques, liberal use of display type. The objective is to assist the reader in getting the message *now*.

In a memo to the staff of Foote, Cone and Belding advertising

1. William D. Tyler, "One-Two Punch Is Out—You Must Score with 'One,'" *Advertising Age*, XXXVII (October 10, 1966), 106, 108.

agency, Fairfax Cone, the other observer, characterized the use of shouting type as "advertising's latest fad."² His memo referred primarily to the use of excessively large type in headlines, but he did point out that what is said is what counts and not how loudly it is said.

Concerning the use of larger type, two major questions seem to warrant research attention: (1) How significant has the increased use of display type in ads become? (2) Are there any possible discernible effects on ad performance? In this study we have attempted to find some answers to these questions.

Method

Life and *Ladies' Home Journal* were selected for this study because of their broad variety of consumer advertisements. The sample was composed of 12 issues of each publication, covering the years 1954 to 1965 inclusive. It was constructed as an artificial year. That is, for *Life* 12 issues were selected; January 1954, February 1955, March 1956, and so on. The same procedure was used for *Ladies' Home Journal*.

All ads one full page or larger were subjected to the following measurements:

1. Is the entire verbal message, except for such incidental information as standing detail, set in 18-point or larger type? Standing detail refers to recurring statements in ads, such as copyright notices, references to television programs, company address, slogans, price information, and so on.

2. The number of words in 18-point or larger type.

Figure 1 shows a variety of ads that would qualify as all-display.

Ads qualifying as having all-display typography were then followed up in an effort to learn something of their relative effectiveness. Each ad was checked for its Starch ratings. Daniel Starch and Staff, Mamaroneck, New York, cooperated by allowing us to check into ad performance records.

The Readers-per-Dollar ratings for three Starch categories (Noted, Seen Associated, and Read Most) were determined.

2. ———, "Must Ads Shout in Big Type?" *Advertising Age*, XXXVII (November 28, 1966), 72.

NEW DELCO ENERGIZER

IT IS SUCH AN IMPROVED SOURCE OF ELECTRICAL ENERGY THAT IT HAS BEEN GIVEN A NEW NAME. IT IS CALLED A DELCO ENERGIZER. IT IS THE FIRST VACUUM SEALED AUTOMOTIVE ELECTRICAL POWER SOURCE—VACUUM SEALED TO KEEP STARTING POWER FRESH UNTIL YOU BUY. IT WILL GIVE YOU A LOT MORE STARTING POWER THAN A SIMILAR CONVENTIONAL BATTERY—ESPECIALLY IN COLD WEATHER. IT HAS A BUILT-IN "DELCO EYE" THAT CHECKS ITS OWN FLUID LEVEL. IT IS AVAILABLE FOR MOST CARS AT UNITED DELCO DEALERS. IT IS CALLED A DELCO ENERGIZER. THE OLDER YOUR CAR OR THE COLDER YOUR CAR THE MORE YOU NEED A DELCO ENERGIZER.



Don't miss "NFL COUNTDOWN TO KICKOFF," Sunday, afternoons on the CBS Television Network.
UNITED MOTORS SERVICE, Division of General Motors

Figure 1. The advertisements shown here are typical of those that qualified as having all-display typography. Aside from incidental information, the entire message of each is composed of 18-point or larger type. These are shown as examples and did not necessarily fall within the range of the study.

Soft Whiskey doesn't pack a wallop. It packs a love tap.

If you so much as bat an eyelash when you take a drink of Soft Whiskey, you're a lightweight.

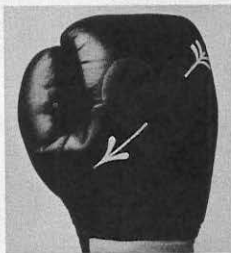
Soft Whiskey's very gentle going down. It swallows real easy. It sort of carries you for a few rounds. But not for too many rounds.

It's 86 proof and does anything any 86 proof does. It just does it softer.

How do we soften Soft Whiskey? Well, all we can tell you on that score is that we do some of our distilling in small batches as opposed to large



BLENDED WHISKEY - 86 PROOF - 100% GRAIN NEUTRAL SPIRITS ©1989 CALVERT DIST. CO., N.Y.C.



ones. And not another word more.

You can appreciate our being so secretive when you consider that other distillers have been dreaming of a Soft Whiskey for a long time. And it was a long, long time before we even had it. (Not to mention the thousands of experiments we had to go through.) After all that, we take a kind of selfish pride in being the only Soft Whiskey.

We're not about to give anyone a crack at the title.

Would you believe Avis is No.1½?



Avis

Well, in a manner of speaking, we're still No.2.

But technically, we're No.1.5556. After four years of trying harder, we've cut No.1's lead almost in half.

(Based on the latest figures from 26 major airports.)

And do you know what happens when you get that close to the top?

Your people try even harder.

Take Ernie Foote, for example.

A customer showed up with an expired out-of-state driver's license. So Ernie took him to the highway patrol for a driver's test. He passed. Got a Mississippi license. And was off in a shiny, new Plymouth.

Obviously, our people are keeping score. And they can smell the pennant.

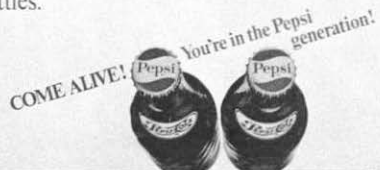


Push-button drive.
Custom-built for the Pepsi generation.

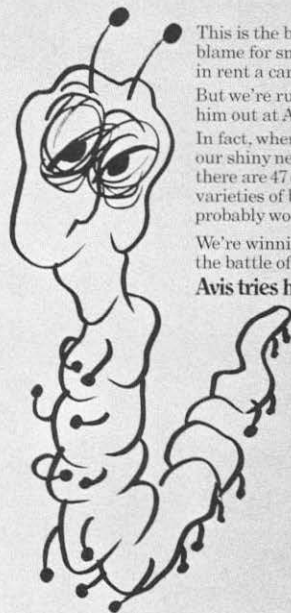
Instant pick-up.
More go for your money.

Taste?
Automatic.

Buckets?
Not yet. You'll have to
settle for bottles.



The Mirror Smearer.

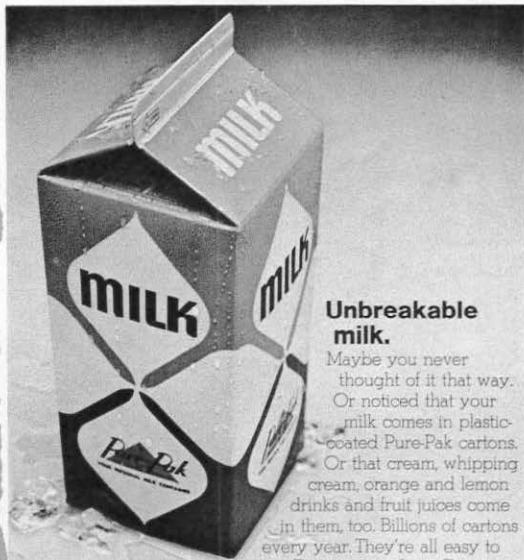


This is the bug to
blame for smeared mirrors
in rent a cars.

But we're rubbing
him out at Avis.

In fact, when you rent
our shiny new Plymouths,
there are 47 different
varieties of bugs you
probably won't be seeing.

We're winning
the battle of the bugs.
Avis tries harder.



**Unbreakable
milk.**

Maybe you never thought of it that way. Or noticed that your milk comes in plastic-coated Pure-Pak cartons. Or that cream, whipping cream, orange and lemon drinks and fruit juices come in them, too. Billions of cartons every year. They're all easy to carry. Easy to pour from. Easy to re-close and store in your refrigerator. And just as easy to crunch up and throw out. Now, how's that for convenience?

Ex-Cell-O Corporation, Pure-Pak Division, Detroit, Michigan.

No splashy picture.
No long story.
We know you know
what Michelob is.



In beer, going first class is Michelob. Period.

ANHEUSER-BUSCH, INC. • St. Louis

These ratings establish the performance of each ad in terms of readers reached per dollar invested. By use of Readers-per-Dollar, ads of different sizes and color treatments can be compared over a period of time.³

Readers-per-Dollar is established by multiplying the number of magazine readers by the per cent of the rating (Noted, Seen Associated, or Read Most) and then dividing the result by the cost of the space. The Starch method of securing the Noted, Seen Associated, and Read Most ratings involves a technique of recall survey in which respondents indicate whether or not they saw an ad, read or saw parts of an ad that indicated product or advertiser, and whether they read 50% or more of the verbal message.

Results

Our data confirm the observation that use of all-display ads has been on the increase. We found that of 1,147 full-page or larger ads run between 1954 and 1965, some 17% qualified as all-display. Figure 2 shows percentages of qualifying ads run in both publications.

Tables I, II, III, and IV show average performances by product category of all-display ads, 1954 through 1965.

In an effort to establish relationships between number of words and Read Most ratings, we did correlations for *Ladies' Home Journal* and for *Life*, men and women separately in the latter case. Statistics are shown in Table V.

With $\bar{X} = 47$ (words) and $\bar{Y} = 24$ (R/\$), we found that $r = -.44$ for *Ladies' Home Journal*. Testing the significance of r , we found a t of 4.12, allowing us to reject the null hypothesis that $r = 0$.

In the case of *Life* (women), \bar{X} equalling 47 and \bar{Y} being 15, $r = -.278$ and $t = 2.76$. For *Life* (men), \bar{X} and \bar{Y} were 48 (words) and 10 (R/\$). We found $r = -.16$ but had to retain the null, since N being 101, $t = 1.60$.

3. Daniel Starch, *Measuring Advertising Readership and Results* (New York: McGraw Hill, 1966), p. 117.

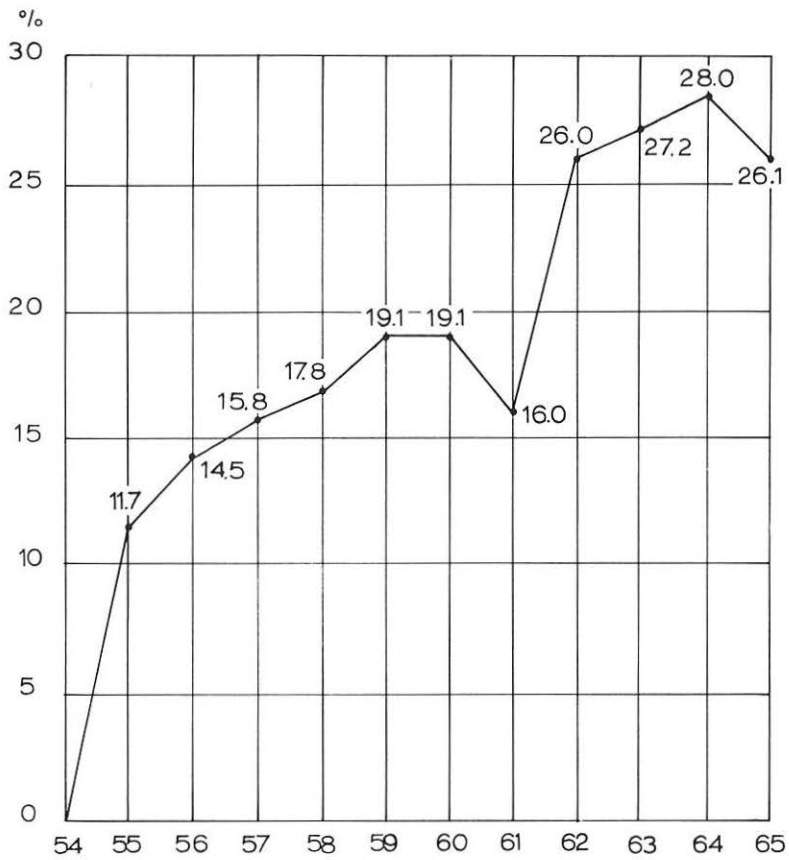


Figure 2. Percentages of All-display Advertisements each year in *Life* and *Ladies' Home Journal* from 1954 through 1965.

TABLE I: *Average Readers-per-Dollar Scores for All-display Advertisements—1954–1965*

<i>Magazine</i>	<i>Noted</i>	<i>Seen Associated</i>	<i>Read Most</i>
<i>Ladies' Home Journal</i>	91	75	24
<i>Life (Men)</i>	38	34	10
<i>Life (Women)</i>	49	43	15

TABLE II: *Average Readers-per-Dollar (Women) by Product Classifications for All-display Advertisements—Life, 1954–1965*

<i>Classification</i>	<i>Noted</i>	<i>Seen Associated</i>	<i>Read Most</i>
Automobile passenger cars	30	27	4
Automotive, miscellaneous	36	27	3
Books and magazines	32	28	16
Clothing, men's	72	28	16
Clothing, women's	86	75	43
Fabrics	64	53	11
Foods	69	63	21
Household equipment, major appliances	35	31	9
Household supplies	101	89	17
Insurance and finance	41	32	13
Jewelry and miscellaneous	41	32	13
Liquor	23	19	10
Motion pictures	61	57	29
Machinery, metal and industrial	29	14	—
Pharmaceutical	61	59	33
Radio-TV	59	55	11
Tobacco, cigarettes	40	35	8
Toilet goods	48	46	11
Travel	30	28	3

TABLE III: *Average Readers-per-Dollar (Men) by Product Classifications for All-display Advertisements—Life, 1954–1965*

<i>Classification</i>	<i>Noted</i>	<i>Seen Associated</i>	<i>Read Most</i>
Automobile passenger cars	53	50	13
Automotive, miscellaneous	49	46	10
Books and magazines	34	29	15
Clothing, men's	40	28	4
Clothing, women's	33	14	4
Fabrics	21	8	2
Food	39	27	7
Household equipment, major appliances	23	18	4
Household supplies	28	16	—
Insurance and finance	36	28	14
Jewelry and miscellaneous	61	56	16
Liquor	38	36	13
Motion pictures	59	45	31
Machinery, metal and industrial	41	32	11
Pharmaceutical	44	41	16
Radio-TV	66	63	16
Tobacco, cigarettes	36	33	5
Toilet goods	40	37	6
Travel	27	26	4

TABLE IV: *Average Readers-per-Dollar by Product Classifications for All-display Advertisements—Ladies' Home Journal, 1954–1965*

<i>Classification</i>	<i>Noted</i>	<i>Seen Associated</i>	<i>Read Most</i>
Books and magazines	59	46	8
Clothing, women's	99	87	22
Cosmetics	88	74	16
Fabrics	118	105	25
Food	92	85	24
Household equipment, misc.	102	94	8
Household supplies	88	78	29
Jewelry and miscellaneous	96	85	25
Pharmaceutical	107	91	34
Tobacco, cigarettes	28	28	2
Toilet goods	90	85	30

TABLE V: *Correlations of Numbers of Words and Read Most Readers-per-Dollar for Women in Ladies' Home Journal, Women in Life, and Men in Life*

	N	X	Y	ΣX^2	ΣY^2	ΣXY	r
Ads in <i>LHJ</i>	89	47	24	270,771	89,203	77,040	-.440*
<i>Life</i> (Women)	97	47	15	370,577	48,049	50,661	-.278**
<i>Life</i> (Men)	101	48	10	392,083	16,798	42,754	-.160

X = Average Number of Words

Y = Average Readers Per Dollar

* $p > .01$

** $p > .01$

TABLE VI: *Rank Order of Product Categories by Average Seen Associated Readers-per-Dollar Scores (Women), Life and Ladies' Home Journal—1954–1965*

1. Fabrics	9. Clothing (men)
2. Clothing (women)	10.5. Insurance and finance
3.5. Toilet goods	10.5. Books and magazines
3.5. Household supplies	12. Household equipt., major appli.
5. Pharmaceuticals	13. Tobacco, cigarettes
6. Food	14. Travel
7. Cosmetics	15. Automobiles
8. Motion pictures	16. Liquor

TABLE VII: *Rank Order of Product Categories by Average Seen Associated Readers-per-Dollar Scores (Men), Life—1954–1965*

1. Automobiles	8.5. Clothing (men)
2. Automotive	8.5. Insurance and finance
3. Motion pictures	10. Food
4. Pharmaceutical	11. Travel
5. Toilet goods	12. Household equipt., major appli.
6. Liquor	13. Cosmetics
7. Tobacco, cigarettes	14. Clothing (women)

TABLE VIII: *Correlations of Numbers of Words and Readers-per-Dollar (Seen Associated and Read Most) for Women's Food and Men's Auto Advertisements Combined*

	N	X	Y	ΣX^2	ΣY^2	ΣXY	r
Seen Assoc.	67	50	72	279,723	382,608	224,017	-.273*
Read Most	67	50	21	279,723	484,474	54,749	-.350**

* $p > .05$

** $p > .01$

It should be noted that all correlations were negative. This was to be expected in a test where rating increases as number of words decreases.

Inasmuch as there was no provision in the above for control of inherent reader interest in the product advertised, we devised another test, using men's and women's scores for all qualifying ads run in both publications. Averages were drawn for product categories shown in Tables II and III. Categories including one ad were excluded, as well as jewelry, since the latter contained ads primarily of interest to men.

These rankings were then compared with those shown by Starch.⁴ Our rankings were made in terms of Seen Associated scores, since this rating was used by Starch. The rank correlation for women was .724 and for men .742, both significant at the .01 level. Our rankings are shown in Tables VI and VII.

We then made another measurement by correlating numbers of words with Seen Associated and Read Most Readers-per-Dollar scores of all ads in both publications, holding reader interest constant by using women's food ad ratings from both publications and men's automobile ratings from *Life*. Utilizing a somewhat similar technique, Starch demonstrated that the lower the number of words the higher the two ratings.⁵ Our statistics are shown in Table VIII.

4. *Ibid.*, p. 89.

5. *Ibid.*, pp. 102, 103.

We found $r = -.273$ for Seen Associated and $r = -.35$ for the Read Most with $N = 67$. Both scores show a low correlation between words and ratings.

Conclusions

The range of our study might have been extended if we had secured ratings for the non-qualifying ads during the period. Time-cost considerations precluded this. There are, nonetheless, several interesting points to be observed.

The high rank correlations suggest that if the all-display technique is useful in extending readership, the technique's effect beyond the inherent reader interest level is questionable. In other words, the splash of a message in all-display should not necessarily be expected to excite readership from readers whose interest is low.

On the other hand, in those tests in which numbers of words were correlated with Readers-per-Dollar ratings, reader interest held constant, the correlations were for the most part low, suggesting that copy in all-display may not be severely restrictive in dampening readership scores.

Copy lengths in these measurements ranged from four to 242 words. Forty-eight per cent of the 67 ads contained above average length copy; 36% had above average Read Most Readers-per-Dollar scores, and 52% had above average Seen Associated Readers-per-Dollar scores.

Measurements in this investigation were made only on ads that qualified in terms of an extreme definition. That is, the entire verbal message had to be set in 18-point or larger type, except for incidental information. Many ads incorporate something of this technique into formats that include some body copy in display-size and some in reader-size type. A study of this effect on readership might prove interesting.

Journal Editor for Experimental Design

Pieter Brattinga has been named Editor for Experimental Design for *The Journal of Typographic Research*. This new editorial position was created to assist the Journal, among its other functions, to serve as a focal point of information about world-wide design research, both from design schools and from practicing typographic designers.

Art and design schools generally are not research-oriented, yet each year the instructors and students of these schools conduct a vast amount of experimentation with visual communication problems. Since these experiments are mainly institutional and personal projects, their results are rarely made available. By calling attention to visual design developments throughout the world and by providing a complete record of the cumulative progress of design experimentation, the Journal will contribute to the development of a universal design methodology, as well as encouraging the natural association of experimental work. It is also hoped that the Journal will provide a common ground for the healthy clash of experimental design ideas between schools and practicing designers on an international level.

Mr. Brattinga is particularly well suited for his new task. In 1952 he joined the printing firm of Steendrukkerij de Jong & Co. During 1960 he was a visiting lecturer at Pratt Institute, Yale University, and Southern Illinois University. In 1961 he was appointed professor of art at Pratt Institute, and, later in the year, chairman of the department of advertising design and visual communication. He travels extensively in the United States, the Far East, and Europe. Several of his designs are in the permanent collection of the Museum of Modern Art in New York, as well as in the museums of Amsterdam and Zurich. In addition to his accomplishments as a designer and educator, he is senior partner of Form Mediation, International (Amsterdam-New York-Tokyo); secretary-general of ICOGRADA, a director of the International Center for the Typographic Arts, director of design at Steendrukkerij de Jong & Co.; president of the Art Directors Club Nederland; a member of the board of the Netherlands Art Foundation; and a member of the Art Directors and the Type Directors Clubs of New York, Les Compagnons de Lure, and several other organizations. Two books of his are scheduled to be published in 1968 and he has published many articles in graphic arts and art magazines all over the world.

Pieter Brattinga may be contacted at Form Mediation, International: Europe, Prinsengracht 628, Amsterdam, The Netherlands.

The Diagram Is the Message

Jesse H. Shera and Conrad H. Rawski

The diagram is a special case of picture-making. It involves the same representational condition: the mapping of a content in shapes which themselves possess—and transmit—a characteristic content. It is necessary to distinguish between the paradigmatic intent and the emblematic form of a diagram. In the Postscript the error potential implicit in the interplay of these properties is demonstrated by examples which include the book arts.

From the grottoes of Combarelles and Altamira to the galleries of the Louvre the walls bear eloquent testimony to man's basic need for pictorial representation. First, say the historians of art, there was sculpture; "the object represented through all its profiles," writes Faure, "having a kind of second real existence." Sculpture was followed by the bas-relief, "which sinks and effaces itself until it becomes engraving,"¹ and finally there was pictorial convention, the representation of the object painted on a cavern wall. The modern archaeologist, armed with the tools of science such as carbon-14 dating, might disagree with this sequence, but the argument is irrelevant to our purpose. What is important is that man needed pictorial representation both for communication with his fellows and for self-expression. Pictorial representation, then, can not only be traced back to the Reindeer Epoch and the dawn of civilization; it shares with language, writing, kinesics, and all the variant forms of non-verbal communication a major role in that total process by means of which cultures came into

1. Elie Faure, *History of Art: Ancient Art* (Garden City, N. Y.: Garden City Publishing Co., 1921), p. 13; also, J. Pijoan, *History of Art* (London: Batsford, 1933), chap. 2: "Art in the Reindeer Epoch"; and R. Huyghe, *Ideas and Images in World Art* (New York: H. N. Abrams, 1959), pp. 104-24.

being and evolved.² From the bison of Font-de-Gaume to the image from an overhead projector is quite a leap technologically, but the intervening millenia have not altered the human compulsion to outwit time, as it were, by recreating to hold unchanged forever the fleeting image of a moment.

In the present essay, the authors are concerned with but one specialized form of the picture—the diagram. Diagrammatic representation is a skeletal form of graphic representation; in it extraneous detail is omitted, it is highly stereotyped and stylized. But it does not dispense with the pictorial *as if*.³ It merely employs reduction. This reduction may eventuate in outline drawings of botanical specimens in a fieldbook for flower identification, the denotative devices of a picture language (e.g., Otto Neurath's Isotype), the abstract figures used to exemplify molecular structures in organic compounds, the schematic wiring diagram for an electrical circuit, or Charles Morris' graphic representation of the human action system.⁴ The element of reduction that characterizes, and in a sense defines, the diagram may either facilitate or impede recognition, or even make recognition impossible. Its success or failure depends upon the extent to which it employs a form of signification that is meaningful to the viewer. For diagrammatic representation employs what may be regarded as a very special and often sophisticated form of *semasiography*, and the solution to the problem of signification that it presents is quite different from that which attempts to invoke reality in more elaborate pictorial terms. But if that which is pictured can-

2. I. J. Gelb, *A Study of Writing* (2nd ed., Chicago: University of Chicago Press, 1963); C. Cherry, *On Human Communication* (2nd ed., Cambridge, Mass., M.I.T. Press, 1966) esp. chap. 7: "On Cognition and Recognition"; E. T. Hall, *The Silent Language* (Garden City, N. Y.: Doubleday, 1959); J. Ruesch and W. Kees, *Nonverbal Communication* (Berkeley: University of California Press, 1957).

3. Cf. E. H. Gombrich, *Art and Illusion* (New York: Pantheon, 1961), chap. ii; and the same author's delightful *Meditations on a Hobby Horse* (London: Phaidon, 1963). See also Gelb, pp. 35 ff.; L. Hogben, *From Cave Painting to Comic Strip* (New York: Chantecleer Press, 1949), pp. 179-83.

4. *Toward a Unified Theory of Human Behavior*, ed. R. R. Grinker (New York: Basic Books, 1956), p. 350 f.

not be recognized by the viewer, it matters little how it is pictured. As Abraham Kaplan has observed, "Appearance is what is to be known, reality what it is known as."⁵ The object of the diagram is to reveal this reality. There is no other justification for its existence.

The diagram is a special case of picture-making: it bodies forth its subject in a pictorial way, in shapes which themselves possess a characteristic content, but are used to represent another. Any histogram in *Fortune* magazine illustrates this characteristic of the diagram.

The problem of symbolic significance presented by diagrammatic representation—one might say the semiotic of the diagram—have long occupied the most competent minds of Western scientific and philosophic thought. We do not propose to attempt to scale these precipitous paths, even were we competent to do so. Our objective is much more humble. Science is probably responsible for the extensive use of diagrams because the attributes of the diagram as representation fit so appropriately many of the concepts, phenomena, and processes of science. From the literature of science the diagram, which probably began in that shadowy realm of cosmology, or had, at least, philosophic origins, spread to other neo-scientific fields, the social sciences, management, history, linguistics, and eventually even librarianship. So recent has been its introduction into library literature that one will find few examples of diagrams prior to the 1930's, for it was during those years that librarians turned the corner and saw before them the vision of a new heaven and a new earth bathed in the light of the scientific method.

It may, therefore, not be altogether inappropriate for librarians to pause for a moment in their mad rush into scientific methodology to inquire into the nature of diagrammatic representation, to remind themselves of its proper use, and to ponder Alfred North Whitehead's remark that "the object of symbolism is the enhancement of the importance of that which is symbolized."⁶

5. A. Kaplan, *The Conduct of Inquiry* (San Francisco: Chandler Publications, 1964), p. 85.

6. Quoted after C. Morris, *Signification and Significance* (Cambridge, Mass.: M.I.T. Press, 1946).

Part II

A simple diagrammatic situation obtains in the family tree reproduced in Figure 1. Correspondence with fact is obvious in this filiation scheme. It becomes much more subject to interpretation when used, e.g., as a stemma in descriptive bibliography⁷—although specialists, who are painfully aware of the complexities behind the lines connecting texts A and B, may remind us that certain skeletons in family closets could also affect the stemmatic simplicity of family trees.

Similar relatively straightforward situations obtain in various kinds of block-diagrams as long as they map synchronous or diachronic situations as in Figures 2 and 3. Both diagrams involve, as it were, implicit locus problems. In the case of Figure 3 this is duly accounted for by Professor Ash, when he refers to information theory as “an attempt to construct a mathematical model for each of the blocks” in the figure, and adds that “we shall not arrive at design formulas for a communication system. . . .”⁸

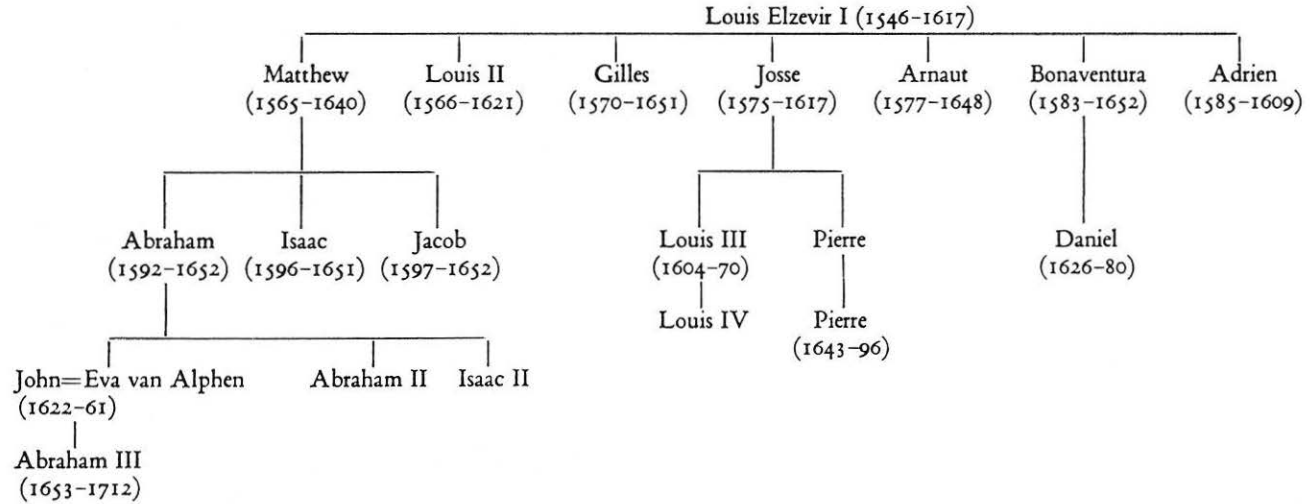
The diagrammatic situation recalls Clyde Coomb’s insistence that the term *data* be restricted to observations which are already interpreted in some way and “are in part a product of the mind of the observer. . . . We buy information with assumptions—‘facts’ are inferences, and so also are data and measurements and scales.”⁹ Pictorial information likewise is bought with assumptions. If one would not understand that in Figure 4 the legends enclosed in blocks and the swirl of connecting lines between them signify steps, decisions, conditions, and circumstances which are considered to be situationally related significant determinants in accordance with present-day theoretical convictions, he would not benefit from P. J. Runkel’s careful commentary.¹⁰ As soon as we are not attuned to the inferential situation and, if you will, the

7. Cf., e.g., P. Maas, *Textual Criticism* (Oxford: Clarendon Press, 1958), pp. 42–49.

8. R. B. Ash, *Information Theory* (New York: Interscience, 1965), p. 1.

9. C. H. Coombs, *A Theory of Data* (New York: John Wiley, 1964), pp. 4, 5.

10. *Handbook of Research on Teaching*, ed. N. L. Gage (Chicago: Rand McNally, 1963), p. 126 f.



The Elzevir Family

Figure 1. N. E. Binns, *An Introduction to Historical Bibliography* (2nd ed.; London: Association of Assistant Librarians, 1962), p. 96.

THE CLASSIFIED CATALOG SYSTEM

Public Use
Special Indexes
(if any)

Administrative Aids

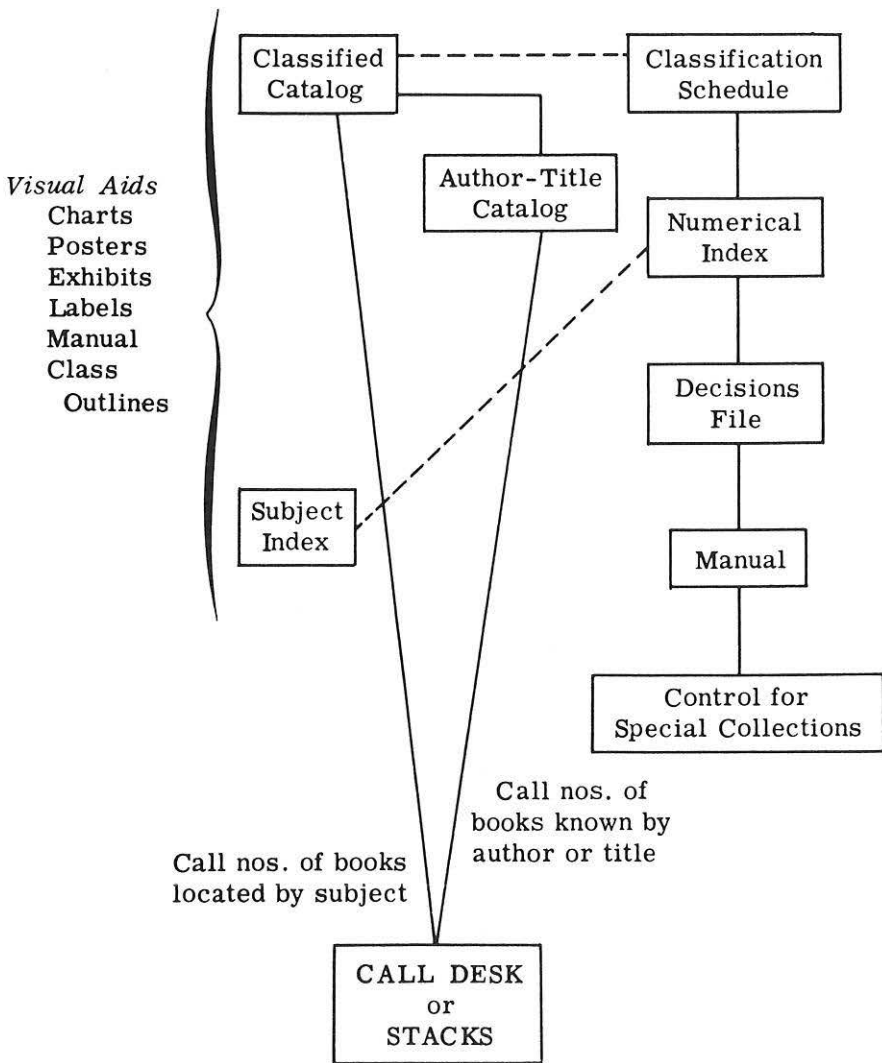


Figure 2. J. H. Shera and M. E. Egan, *The Classified Catalog* (Chicago: American Library Association, 1956), p. 67.

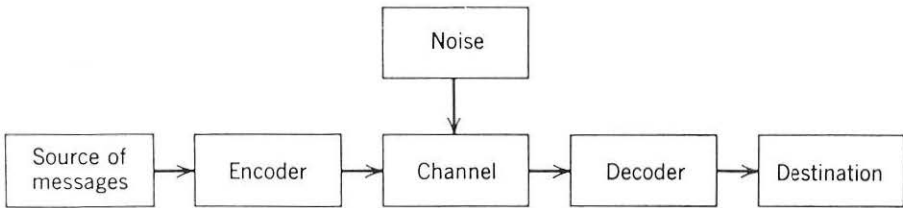
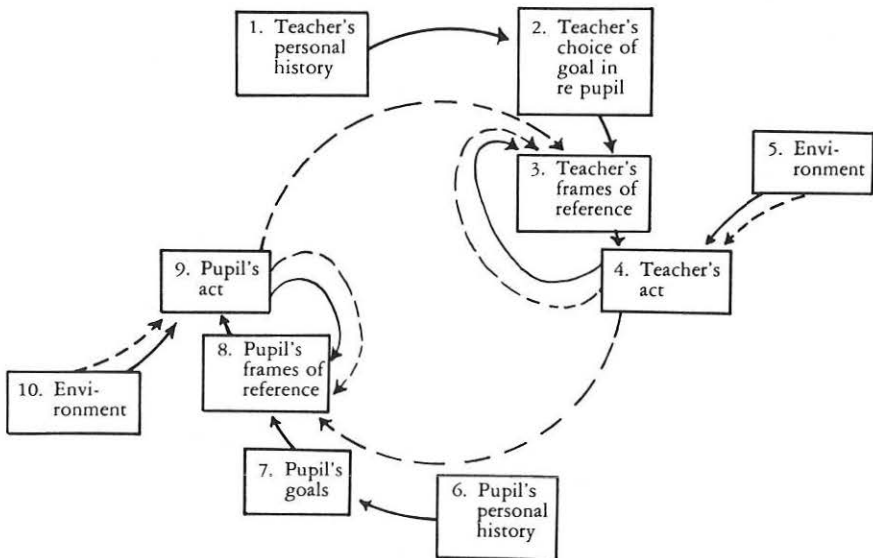


Fig. 1.1.1. Communication system.

Figure 3. R. B. Ash, *Information Theory* (New York: Interscience Publishers, 1965), p. 1.



Solid lines represent intrapersonal communication via the nervous system, etc. Dashed lines represent interpersonal communication via vision, speech, etc.

Fig. 22. A Brief Model for Pupil-Teacher Interaction (P. J. Runkel, personal communication, 1958).

Figure 4. N. L. Gage, *Handbook of Research on Teaching* (Chicago: Rand McNally, 1963), p. 126.

style of thought which generate the diagram, we find it difficult to read the picture. Figure 5 is a representation of the mechanism of government, the wheels of state in the Holy Roman Realm. Iconographic expertise may bring us somewhat closer to the meaning of the diagram and contemporary modes of representation. But the hierarchical pattern, significant as it is, will surrender its message only if and when we understand the theory of state and government and, in this case, certain specific popular and regional ideas, traditions, and idiosyncrasies held by the fifteenth-century designer.¹¹ Modern organization charts are said to harbor similar intricacies. Conversely—Figures 4 and 5 do make explicit situations of complexity and articulate pictorially, at least, certain aspects of these situations which as such do not seem to lend themselves readily to articulation.

S. R. Ranganathan uses diagrammatic representation for his modes¹² “by which the field of knowledge may throw forth new specific subjects:”¹³ dissection; denudation; lamination; and loose assemblage.¹⁴ These diagrams are well known to librarians. They have a long and interesting history as representations of class relations and syllogistic moods in formal logic. Schopenhauer, who used the familiar circle diagrams to indicate conceptual relationships in his *Die Welt als Wille und Vorstellung* (1818),¹⁵ credited the “exceedingly happy idea” of graphic representation of these relationships to L. Euler (1768), J. H. Lambert (*c.* 1765), and G. Ploucquet (1763), “who used squares and probably thought of it first.” Actually, the use of the figures can be traced further back to J. C. Sturm (1661), J. H. Alstedius (1614), and

11. Cf., e.g., T. Steinbuechel, *Christliches Mittelalter* (Leipzig: J. Hegner, 1935), pp. 208–72.

12. R. S. Parkhi, *Decimal Classification and Colon Classification in Perspective* (New York: Asia Publishing House, 1964), pp. 415–18.

13. S. R. Ranganathan in *Bibliographic Organization*, ed. J. H. Shera and M. E. Egan (Chicago: University of Chicago Press, 1951), p. 96.

14. J. H. Shera and M. E. Egan, *The Classified Catalog* (Chicago: American Library Association, 1956), p. 30.

15. i, 1, 9.

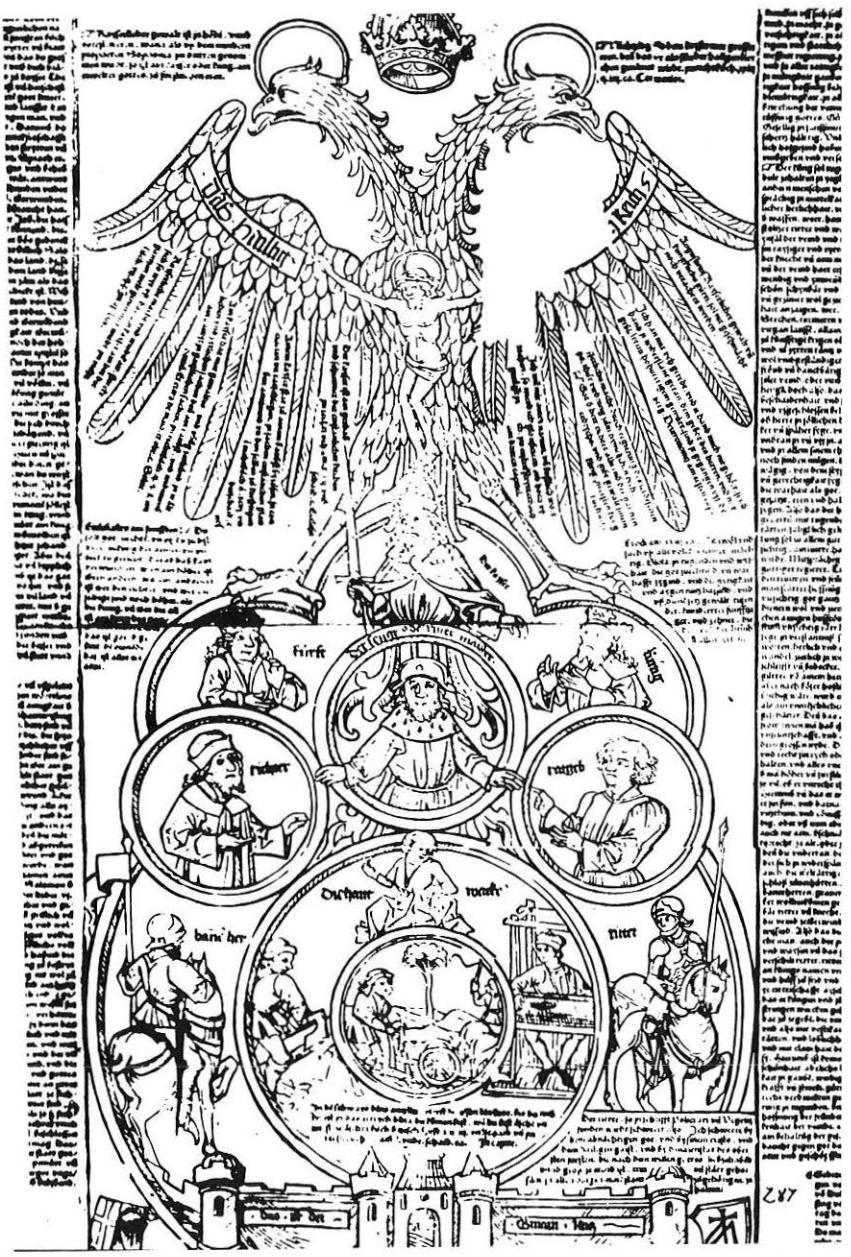


Figure 5. W. L. Schreiber, *Holzschnitte, Metallschmitte, Teigdrucke* aus dem Herzoglichen Museum zu Gotha. . . (Strasbourg: Heitz, 1928), plate 15.

L. Vives (1555).¹⁶ Leibniz used both circles and straight-line figures to diagram the old mnemonic designations coined by Peter of Spain.¹⁷ Syllogistic diagrams were familiar to the ancient commentators of Aristotle and the Megarian Stoic school. Their use during the Middle Ages is yet to be explored, although medieval predilection for diagrammatic representation and, specifically, the *pons asinorum* (a diagrammatic statement of the Aristotelian doctrine of the *inventio medii*), is well established.

Schopenhauer diagrams within the context of his presentation and with obvious reliance on the traditional Euler figures. He diagrams what we know and neglects the visual factors exhibited by his figures. This is amusingly demonstrated in his representation of “dissection” of a conceptual sphere including two or more concepts which “exclude each other,” yet fill the sphere (Figure 6).

Euler’s graphics of propositions and syllogisms in his *Lettres à une princesse d’Allemagne*¹⁸ are much more elaborate. He is fussily concerned with the proper interpretation of his figures: One might make bold to state that Euler would not have let pass Schopenhauer’s figure, above. “These circles, or rather these spaces, for it is of no importance of what figure they are, are extremely commodious for facilitating our reflections on this subject, and for unfolding all the boasted mysteries of logic, which that art finds it so difficult to explain; whereas by means of these signs the whole is rendered sensible to the eye. We may employ, then, spaces formed at pleasure to represent every general notion, and mark the subject of a proposition by a space containing A, and the attribute by another which contains B. The nature of the proposition itself always imports, either that the space of A is wholly contained in the space B, or that it is partly contained in

16. I. M. Bochenski, *A History of Formal Logic* (Notre Dame, Ind.: University of Notre Dame Press, 1961), p. 260 f.

17. *Opusculs et fragments inédits de Leibniz*, ed. L. Couturat (Paris: F. Alkan, 1903). Bochénski, p. 258, ascribes to Leibniz the introduction of the Euler diagrams.

18. *Letters of Euler on Different Subjects in Natural Philosophy Addressed to a German Princess*, ed. D. Brewster and J. Griscom (New York: J. & J. Harper, 1833), I, 337–54.

(3.) A sphere includes two or more spheres which exclude each other and fill it.

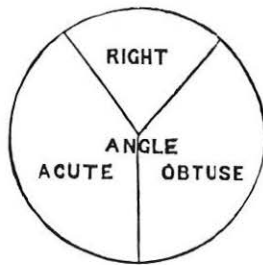


Figure 6. A. Schopenhauer, *The World as Will and Idea* (New York: Charles Scribner's Sons, 1883), I, 56.

that space; or that a part, at least, is out of space B; or, finally, that the space A is wholly out of B" (Letter 103, February 17, 1761). Euler uses these "emblems" to develop a veritable pictorial notation which, he hopes, would be "a great assistance towards comprehending more distinctly wherein the accuracy of a chain of reasoning consists" (Letter 102, February 14, 1761).

Euler, Schopenhauer, and Ranganathan use diagrammatic figures of great similarity. Ignoring the purposes for which each employs the figures, we may observe that a variety of situations is mapped with essentially identical graphic shapes. Euler's emblems "are" more explicit than Ranganathan's because of Euler's insistence on detailed contextual exploration, illustrated by the diagrams in Figure 7. The "lamination" emblem, for instance, appears as a paradigm for both, affirmative and negative situations, and we are reminded to look, as it were, in more than one direction, beyond the shape of the emblem. In the case of syllogistic diagrams the figures for relations between more than two or three classes developed by J. Venn¹⁹ and W. E. Hocking,²⁰ are

19. J. Venn, "On the Diagrammatic and Mechanical Representations of Propositions . . ." *London, Edinburgh and Dublin Philosophical Magazine*, 5th Ser., X (1880), 1-18.

* Our author subjoins here the following diagram, with this short introduction:—"I shall once more give you a visible representation of these figures or emblems of the four species of propositions."

Emblems of the four Species of Propositions.

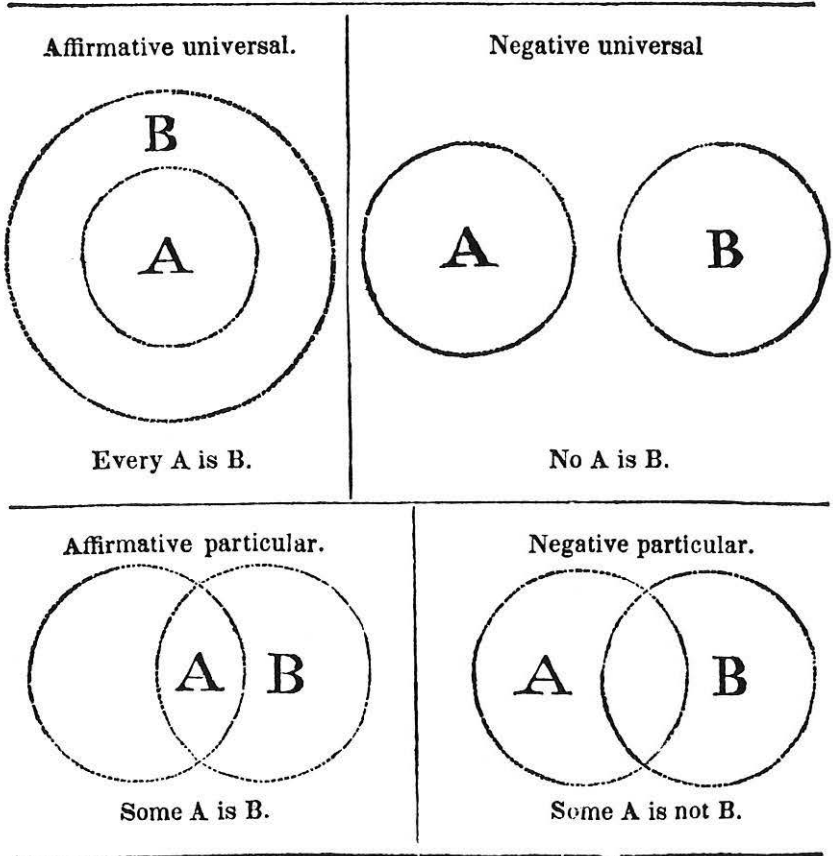


Figure 7. *Letters of Euler on Different Subjects in Natural Philosophy Addressed to a German Princess*, ed. D. Brewster and J. Griscom (New York: J. & J. Harper, 1833), I, 341.

the graphic results of precisely such “thinking beyond the diagram.” On the other hand, the concrete pictorialism of the emblem as such may invite further interpretations resulting in clarification or extended application. Thus Peter Caws uses a series of “lamination” emblems to represent the relations between the world of ordinary experience and scientific theory, and maps imaginatively the scope of argument in each part of his *Philosophy of Science*.²¹

Part III

In our attempt to follow on a humble level Wittgenstein’s advice to “treat of the network, not of what the network describes” we have traversed familiar territory. We all have long been aware of the fact that pictures depict as we look at them, that they are what we see and signify what we know. It does not take much intellectual effort to understand the implications of the diagrammatic situation which offers concrete, definite emblems and the attendant advantages of explicit relationships graphically represented, but has to be clearly understood in its conceptual context in order to be properly construed as a paradigm.

Most of us, at one time or another, have been aware of the illusion created by certain forms of advertising, which shrewdly ring the changes on these properties of the diagrammatic situation as they present us with stunning graphic tableaux of “irrefutable objective scientific data gathered by an independent research organization.” This is abuse, or more or less serious deceit, aimed at “them”—the unthinking public. But it is important to remind ourselves that essentially the same conditions obtain when we use diagrams in our attempts to ascertain the truth through reflective inquiry. If used properly, diagrams can explain and simplify, can reveal an underlying order, permit systematization, and point to gaps in our knowledge or our design. They enable

20. W. E. Hocking, “Two Extensions of the Use of Graphs in Elementary Logic,” *University of California Publications in Philosophy*, II (1909), 31–44.

21. P. Caws, *Philosophy of Science* (Princeton, N. J.: Van Nostrand, 1965), p. vi.

function determining a “simple” straight line would be quite complicated.”²

(2) Conversely, we might consider this interplay and its effects as such. In the field of the book arts this has been done primarily in terms of artistic creation and its impact. When William Morris championed Emery Walker’s “principles” of book design—at about the time Charles Sanders Peirce developed his pragmatic theory of signs—he may have had in mind systemic interpretations and their potential, although the products of the Kelmscott Press do not graciously corroborate such an assumption. Today we have a whole literature on the design of books and the component parts of books. Yet when it comes to inquiry into the effects (and the intrinsic properties attendant upon these effects) wrought by the emblematic characteristics of books and related materials, we do not seem to have gone very far beyond the position held by early commentators, such as Polydore Vergil, who noted in 1499 the “new kind of writing, invented in our times,” which makes it possible that one fellow prints in one day all that could be written by several scribes within a whole year.³

We coin terms such as *mis-en-page*, *Schriftbild*, etc., which designate but do not explain. We draw more or less appropriate analogies concerning typographic characteristics, letterform, and over-all arrangement, and express expected and experienced effects in a metaphoric phraseology fully as naive, but seldom as charmingly compelling as Hogarth’s “peculiarity in the lines . . . that *leads the eye a wanton kind of chace*.”⁴ We map page spaces and opening. But we do rarely probe for causes or implications and ignore the pertinence of history. After a century, Theodor Birt’s *Buchbegriff* remains simply outside the “professional” liter-

2. Carl G. Hempel, *Philosophy of Natural Science* (Englewood Cliffs, N. J.: Prentice Hall, 1966), 40 ff. For an interesting illustration of, as it were, the emblematic properties of terminology, see *The State of the Social Sciences*, ed. L. D. White (Chicago: University of Chicago Press, 1956), p. 44.

3. Polydore Vergil, *De rerum inventoribus* ii, 7.

4. William Hogarth, *The Analysis of Beauty* (1753), ed. J. Burke (Oxford: Clarendon Press, 1955), p. 42. Italics are quoted.

ature and its concerns.⁵ Even sophisticated approaches, such as tachistoscopic experiments, seldom question the status-quo of traditional notions: syntactic and diacritic marks, letter width, word separation, etc., are treated as “data”, i.e., as quasi absolutes of “the” printed page.⁶ In the forties and fifties we discussed the ideas of William Ivins.⁷ Now we have exchanged them for the more buxom pronouncements of Marshall McLuhan. But, somehow, we do not get down to the specifics and reflective inquiry into the specifics of the problem of the book as an object which offers its contents in terms of its properties as an object—designed within a specific contextual field of purposes, conventions, assumptions, etc.

How did a fifteenth-century reader approach a page of tiny black letter crowded into compact double columns? What does the closely-spaced roman, unrelieved by paragraphs, or the simultaneity of text and surrounding scholarly commentary on a Renaissance folio tell us about the designer’s intent; and what effects do these visual arrangements entail? Have you ever contemplated the unmitigated uniformity of a mid-sixteenth century duodecimo in italics and asked questions concerning the matrix of subordination supportive of interrelated contents, which most of us take for granted? We smile at the “allusive” printing of the 1800’s, but may ignore, at the same time, allusive effects operative in the “standard” product of our time.

All these questions involve emblematic properties which are the *terms* on which the contents is offered. How intricately these terms may affect the “information” becomes crystal clear in situations involving contexts that are foreign to us or with which we have lost direct or imagined affinity, e.g., Chinese xylography, or

5. Theodor Birt, *Das antike Buchwesen* (Berlin: W. Hertz, 1882); and “Abriss des antiken Buchwesens,” in I. von Mueller, *Handbuch der klassischen Altertumswissenschaft*, i, 3.

6. Cf., e.g., L. Carmichael & W. F. Dearborn, *Reading and Visual Fatigue* (London: G. G. Harrap, 1948); and H. F. Brandt, *The Psychology of Seeing* (New York: Philosophical Library, 1945).

7. W. M. Ivins, *Art and Geometry: A Study in Space Intuitions*, 1946; *Prints and Visual Communication*, 1953; both published at Cambridge, Mass.: Harvard University Press.

ancient “books”.⁸ It seems that a generation concerned with electronic media, CRT terminals, KWIC and KWOC indexes, and computer printouts can no longer afford to ignore them.

(3) The following two items are offered by way of summary. We have found them easy to keep in mind.



“Well! I’ve often seen a cat without a grin,” thought Alice, “but a grin without a cat! It’s the most curious thing I ever saw in all my life.” Lewis Carroll, *Alice in Wonderland*.

J.H.S.
C.H.R.

8. Note, in particular, the remarkable chapter v, “Laterculus coctilibus,” in A. Leo Oppenheim’s *Ancient Mesopotamia* (Chicago: University of Chicago Press, 1964).

Book Review

The Spiral Press through Four Décades/An Exhibition of Books and Ephemera, with a Commentary by Joseph Blumenthal. New York: Pierpont Morgan Library, 1966. 100 pages. Clothbound edition out of print; paperbound edition, \$2.85.

There are a number of small presses throughout America that have been set up primarily to print books. These differ from a "private" press in the stricter definition of that term in that, while remaining to a considerable degree a means for personal expression in book design and production, they must also earn a living for their operator. On the other hand, they purposely keep their operation small so that it can be closely controlled by one man, and consequently these plants are best fitted for short-run editions. Edmund Thompson, who operated such a press at Windham, Connecticut, in the 1930's, gave us a usefully descriptive term—the "personal" press.

The existence and continuance of such a press depend primarily upon two things: first, a man who possesses the taste and the several talents necessary to produce excellent book work, plus the business ability to keep such a press going without lowering standards, and, second, the existence of a sufficient number of customers who recognize the virtues of such services and who are willing to pay accordingly.

One of the most persistent of these presses in terms of both longevity and quality of output has been Joseph Blumenthal's Spiral Press of New York. Its operator is amply supplied with the necessary talents and business ability, and a few good customers such as the Pierpont Morgan Library, The Metropolitan Museum of Art, the Curtis Paper Company, and various book publishers wanting special editions, have given the Press a sustaining nucleus of work. To these have been added commissions from The Limited Editions Club, The Grolier Club, the Frick Collection, the Twentieth Century Fund, and many other discriminating buyers of printing.

Beginning in 1926, Blumenthal has continued for four decades, except for depression-time and war-time interruptions. In 1966 an exhibition of the work of the Press at the Pierpont Morgan Library marked the completion of forty years. It was an impressive exhibition of a solid body of fine bookmaking, plus charming ephemera, and the resultant "catalogue" is a fine addition to the library of any serious printer or bookman.

The book is far more than simply a catalogue of the exhibition. There are 45 pages of fascinating "Notes on The Spiral Press." These notes demonstrate that the clarity of Blumenthal's typography extends to his writing. Following the notes the catalogue requires twelve pages, and the book winds up with 24 pages of illustrations of Spiral Press work, plus a showing of the Emerson type, designed by Joseph Blumenthal.

While the catalogue portion and the illustrations are valuable in describing and showing the product of The Spiral Press, the "Notes" are wholly engrossing as they re-create the impulses and conditions that shaped the man behind this "personal" press.

Joseph Blumenthal came to his vocation well-equipped. A background of family substance, if not affluence, gave him a good education and left him free to choose between a business career such as his father's or a more interesting and varied life with books. Thanks largely to his mother, books and reading had been commonplaces in the home, and directed an excellent mind. Once the choice of a career had been made, Blumenthal followed a fairly straight line, except for the depression and war-time interruptions mentioned. It is a line that began with a short apprenticeship in the Rudge plant, and soon progressed to a shop of his own, as was the case with several of the bright young men who started with Rudge. Over the years the line has kept straight, never deviating from the highest standards of good bookmaking in conception and execution, with no concessions to commercial expediency or customers' whims. As with all good book designers and printers, Blumenthal has never permitted the physical book to get the upper hand over the text.

Joseph Blumenthal's typography has always been functional and contemporary; he has never yielded to the urge to do "period" or allusive typography. It is true he began with such self-conscious types as Pen Print Bold and Eve, but after a trip to Europe he began again at Croton Falls in an austere style. This was soon softened and warmed by a loosening of his layouts and a greater use of color. The foregoing applies to his book typography; his ephemeral work has never been as restrained as the books. This is only logical, and is true of the work of

CHINESE
CALLIGRAPHY AND
PAINTING
IN THE COLLECTION OF
JOHN M. CRAWFORD, JR.



NEW YORK · 1962



Presenting a scene so perfectly typical of the Ma school that it must seem familiar at sight, the picture displays, compared in the lower left half, a combination of angular and slightly flattered rocks, an overhanging cliff, and a diagonally drawn mountain outline with the tortuously swirling shapes of plum trees silhouetted against the infinity of a hazy full moon sky. Browns and blacks in the trees and rocks contrasted against light grayish blurs of cliff and mountain as well as the tree farther back produce the effect of a bluish, moonlit atmosphere. The gentleman who contemplates the moon disk rather than the plum blossoms is robed in white, while the boy wears a light blue gown. Both figures are rendered with a few terse, simple, and elegant strokes which harmonize with the angular motifs of the setting. Despite concentration in the selection of the pictorial elements, the design conveys no sense of repose; there is a slight yawning of the forms, and the studied coyness of the angular rocks and trees does not result in quiet, harmonious patterns. The encounter, for instance, of the overhanging cliff with the triangular rock to the right of the seated gentleman is a little disquieting, and instead of enhancing a sensation of repose rather has the effect of a locking-in. In short, the forms appear active in a way that betrays the painter's interest in formal problems rather than the content of his picture, which accordingly changes.

These aspects be no valid reason to question the thirteenth-century date of this painting, even though it is not recorded under the title it is given in *Ta Cheng Cheng*, namely, *T'ai Mei Tu*, "Gathering Plum Blossoms."

M. L.

31

WATCHING A WATERFALL PLATE 20

Artist unknown, thirteenth century

Ink and faint color on silk, fan-shaped album leaf, 10½ inches high, 10½ inches wide

The painting is mounted on an album leaf bearing a label that gives the name of Ma Yuan (late twelfth–thirteenth century) and the title, *Kuan Pao Tu*, "Watching a Waterfall." In addition it is inscribed by Wang To (1590–1653), whose hand recurs on the leaf no. 28; his short eulogy may be rendered as follows:

There is a rare spirit and determination in this painting; it is quite free of the capriciousness of mere routine.

Wang's name is preceded by a cyclical date, *Argo jin*. On the painting itself is one seal, reading *Tsai 32 Chang Kuo* (unidentified, cf. no. 28); a seal impressed on the mounting reads: *Ichou Li Ta cheng Shih-shan* 1592 Wang "Ishen collection of Li Ta cheng, [read] Shih-shan, [from] Ichou" (likewise unidentified).

The scenery shows a narrow gorge with a winding stream that forms a cascade between a small plateau on the left side and an oppressively overhanging wall of rock on the right side, cutting diagonally through the middle of the picture; this overhanging rock, which is only partially defined by a few molting strokes at its foot, fades out toward the right and upper edges. Issuing from a declivity at the left, a group of gnarled trees forms a roof of dark foliage over the platform where two gentlemen ac-

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companied by a boy are contemplating the gushing waters. A heavily shaded triangular tip of a large rock in the foreground adds poignancy to the design and the somberness of the setting.

Executed in a sure, broad, and wet manner, derivative in its style and conventional in subject matter, the painting is saved from sentimentality and the danger of tedium by its forthright formalization. To the degree that the design becomes abstract, the human figures become accessories; no longer do they convey a sense of oneness with Nature or harmonious, blissful companionship with her; small, lean, and tense figures, they seem now almost forgotten, untranslated remnants from the tradition of Ma Yuan and Hsia Kuo, whose landscapes, rocks, and waters are turned into brushwork and chiaroscuro patterns, generic elements and frozen acts.

M. L.

32

GENTLEMEN GAZING AT A WATERFALL

Artist unknown, late twelfth to thirteenth century, formerly attributed to Li Tang

Ink and faint color on silk, fan-shaped album leaf, 9½ inches high, 10½ inches wide

The painting is not signed and bears no seal, nor does any label indicate its Chinese title.

It depicts two slender men seated on a rock by a mountain pool, quietly contemplating a small waterfall that plunges down on the opposite side of the stream. The waterfall cuts through a gully above which rises a vaguely defined slope dotted with trees like those of the bamboo on the left side. Presently that slope blends into a summarily outlined hazy silhouette like that of a bulky mountain in the distance, forming the backdrop for the foreground scenery of dark rocks and a neatly defined bamboo grove above them. Distant ranges of undulating hills appear over the slope to the right of the waterfall.

Obviously this fan represents a different school from that which is exemplified by no. 31, where the same theme is treated with formalistic vigor but a loss of warmth and reposefulness. Though less concerned with formal problems, the present painter too is conventional; it would be difficult to discern strongly personal features. Nor is it easy to assign the painting to a closely delimited period. The absence of traits reminiscent of the Ma-Hsia style should favor a later twelfth-century date as the earliest, but it is unsafe to insist on this possibility; a later Southern Song date, however, appears to be justified.

M. L.

33

STROLLING ON A MARSHY BANK PLATE 21

Luang K'ai, early thirteenth century

Ink on silk, fan-shaped album leaf, 8½ inches high, 9½ inches wide

This important, austere, and beautiful work, signed by the artist, was previously reproduced in *Ta Cheng Cheng* (vol. IV, p. 14) under the title *Tsai Hsing Yen*, "Strolling and Humming on a Marshy Bank." It does not seem to be recorded, nor does it bear earlier collector's seals. It is missing in both Ts'ao's *monograph*, *Luang K'ai*, and *Siren's List*.

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made the mason, made the house. We may easily hear too much of rural influences. The cool disengaged air of natural objects makes them enviable to us, chafed and irritable creatures with red faces, and we think we shall be as grand as they if we camp out and eat roots; but let us be men instead of woodchucks and the oak and the elm shall gladly serve us, though we sit in chairs of ivory on carpets of silk.

This guiding identity runs through all the surprises and contrasts of the piece, and characterizes every law. Man carries the

world in his head, the whole astronomy and chemistry suspended in a thought. Because the history of nature is characterized in his brain, therefore is he the prophet and discoverer of her secrets. *Every known fact in natural science was divined by the presentiment of somebody, before it was*

actually verified. A man does not tie his shoe without recognizing laws

most good typographers. Along with them, Blumenthal realizes that the book, being a durable thing, should not be dated with current mannerisms. Devices that might be charming in an 8-page pamphlet would become tiresome and objectionable in a 200-page book.

Blumenthal's casual work—bookplates, folders, booklets—is most agreeable, and probably the most attractive segment of such work is the series of Christmas keepsakes that combined Robert Frost's poetry, Spiral Press typography, and the work of numerous fine graphic artists.

The one type Joseph Blumenthal designed, called Emerson from its first use for Emerson's essay on nature, resulted from a stay in Europe after the Press had closed early in 1931. It is a good type, with strength and slightly more weight than most types. Perhaps it is a trifle too "smoothed," which may be why Blumenthal has used it less in recent years, relying more often on Baskerville, Bulmer, Bembo, and occasionally Caledonia or Scotch. For display, after early experiments, he used Lucian often, and Bodoni. In recent years he has settled down to Bulmer and Perpetua, with occasional resort to Sistina and Bembo.

The Press controls a large part of the bookmaking process by setting display in the shop, making up pages, and doing the presswork. Quite a few of the books have been completely hand-set at the Press. But many of the larger books have the text machine-set outside, and the binding is done elsewhere. A few books are printed in other shops by offset lithography from Spiral Press proofs.

The Spiral Press Through Four Decades is a gratifying book. There are errors, to be sure. In at least two cases the notes and the catalogue do not agree, there is a 36-point wrong font on the first page of specimens, and one in the first page showing the Emerson type. But perfection is not for mortals, and this book comes close enough.

Carroll Coleman

Carroll Coleman has been in various phases of printing and publishing for more than forty-five years. In 1935 he began publishing books under the imprint of The Prairie Press. In 1945 he set up a typographic laboratory at the University of Iowa and taught there until 1956 when he became University Editor and Director of Publications. In 1961 he left the university to devote full time to book publishing and to designing and printing books for others.

Correspondence

The editors welcome comments on articles, reviews, and letters that have appeared in the Journal. Communications should be addressed to the Editor, c/o The Cleveland Museum of Art, Cleveland, Ohio 44106.

To the Editor:

Could other subscribers to *The Journal of Typographic Research* provide us with the proper English (American?) term and definition of “free line-fall,” the unjustified lines in graphic texts? In Dutch jargon some people speak of “free line-fall,” others of “English line-fall,” and by it mean two different things. Financial consequences can be serious. We fail to find a definition in existing literature on the subject. We wish to establish some kind of generally accepted definition for use in our specifications.

Some considerations:

1. We speak of “free line-fall” meaning lines are unjustified to the right as, for instance, the typewritten lines of a letter; *words can be hyphenated*. Spacing between words in a line can be variable.
2. We speak of “English line-fall” meaning that the lines are unjustified to the right; *words are never hyphenated*. Spacing between words in a line can be variable.
3. We understand that lines are always justified towards the left (flush left?) except for indentations for paragraphs, etc.
4. The centering of poetry lines and of mathematical equations has apparently no relation to what is understood by “free line-fall.”
5. Apparently in a number of cases the decisions of where to break off a line is not only a matter of considering space from left to right in one line but also considerations as to the esthetics crop up. Thus the overall impression from top to bottom of a page is taken into consideration. Strange as it may be, this can require author’s corrections.

J. J. Taks, Centrex Publishing Company
Stratumsedijk 26/29, Eindhoven, The Netherlands

Résumé des Articles

Traduction: Fernand Baudin

Machines pour lire les imprimés à l'usage des aveugles *par Glendon C. Smith*

Parmi les modèles présentés, le plus poussé procure à l'aveugle un texte oralement épilé. Chaque caractère, capitale ou bas-de-casse, est déchiffré pour lui par un dispositif optique actionné manuellement. Ce dispositif lit les caractères les plus répandus avec une précision suffisante et au ralenti (80-90 mots minute). L'élaboration de cet instrument manuel s'est traduite en une série d'accessoires pour la "traduction en direct" orale ou tactile. Tous sont au format de poche, actionnés par batterie et utilisables pour la lecture au ralenti.

La mise en page de la "une" et les lecteurs *par J. W. Click et Guido H. Stempel III*

L'analyse des réactions à la mise en page des quotidiens montre que les gens peuvent fort bien porter un jugement sur l'ensemble d'un journal à l'occasion de sa typographie. La première page de six journaux qu'ils n'avaient jamais vus fut montrée à quelques sujets volontaires qui les cotèrent selon 20 différentielles sémantiques. Il y eut des écarts significatifs 12 fois sur 20. Les sujets marquèrent une préférence pour les pages à la dominante horizontale et de l'éloignement pour la symétrie.

Les mots fragmentés et la mémoire: la composition des mots *par Léonard M. Horowitz, Margaret A. White et Douglas W. Atwood*

L'article est consacré à la composition des mots. Il montre que le début d'un mot est la meilleure amorce pour en rappeler la suite. Le milieu est mnémotechniquement la partie la plus faible. Au cours des expériences, on fit passer des mots, un à un. Des mots de six et de neuf lettres, selon les cylindres. On en montra ensuite des fragments, à partir desquels il fallut reconstituer les mots entiers. Les débuts rappelaient, plus souvent et plus vite, le reste. Le milieu donnait les résultats les plus lents et les moins exacts. La symétrie associative n'est pas oubliée dans les conclusions.

La portée des annonces purement visuelles *par A. T. Turnbull et David E. Carter*

Les experts ne sont pas d'accord concernant la portée que peut avoir une annonce conçue en termes purement visuels. Des spécimens pris dans les collections de 1954 à 1965 de *Life* et de *Ladies Home Journal* ont fait apparaître que ce type d'annonce est de plus en plus fréquemment utilisé. Pour en mesurer les effets, des tests de corrélations ont été entrepris, mettant en relation le nombre des mots et les tableaux de Daniel Starch. Les scores de "lecture maximum" et de "association maximum" furent défavorables dans *Life* comme dans *Ladies Home Journal*. Quoiqu'on eût veillé à un intérêt réel et constant chez les sujets pour les produits annoncés, les deux scores furent très bas. D'où l'on a conclu qu'une annonce purement visuelle n'est pas nécessairement fatale en "douchant" l'intérêt du lecteur. Toutefois, les corrélations des annonces visuelles par rapport aux critères Starch étaient si élevées qu'il fallut bien conclure qu'il est peu probable que l'impulsion donnée s'exerce au-delà de la simple lecture.

Le diagramme et le vrai message *par Jesse H. Shera et Conrad H. Rawski*

Le diagramme est un cas particulier en fait d'illustration. Il doit, lui aussi, figurer un message au moyen de formes qui par elles-mêmes possèdent—et transmettent—une communication propre. Il convient cependant de maintenir une distinction entre la référence intentionnelle à un paradigme déterminé et la valeur visuelle du diagramme. La part d'ambiguïté et d'interférence possible est illustrée, en Postface, par des exemples empruntés au livre.

Kurzfassung der Beiträge

Übersetzung: Dirk Wendt

Druckschrift-Lesemaschinen für Blinde *von Glendon C. Smith*

Die am weitesten entwickelte Druckschrift-Lesemaschine, die beschrieben wird, gibt dem blinden Benutzer ein hörbares "buchstabiertes" Sprach-Äquivalent für Gross- und Kleinbuchstaben und Ligaturen, die mit einem optischen Gerät abgetastet werden, das in der Hand gehalten wird. Diese Buchstaben-Erkennungsmaschine erkennt die verbreitetsten Schriften mit mässiger Genauigkeit und Geschwindigkeit (80 - 90 Wörter pro Minute). Die Entwicklung dieses Hand-Gerätes hat zu einer Reihe von akustischen und taktilen "direkt übersetzenden" Lesehilfen geführt, die Taschenformat haben, mit Batterien betrieben werden und unabhängig für langsames Lesen benutzt werden können.

Reaktionen von Lesern auf die Gestaltung der Titelseiten von Zeitungen *von J. W. Click und Guido H. Stempel III.*

Eine Untersuchung von Reaktionen auf Zeitungsseiten zeigt, dass es möglich ist, eine ganze Zeitung aufgrund ihrer Typographie zu beurteilen. Die Befragungspersonen bekamen Titelseiten von sechs Zeitungen gezeigt, die sie vorher nicht gesehen hatten, und wurden um Beurteilung der Zeitungen auf 20 semantischen Differentialen gebeten. Auf 12 von den 20 Skalen ergaben sich signifikante Unterschiede zwischen den Urteilen. Die Befragten schienen horizontal aufgebaute Seiten zu bevorzugen und unsymmetrische weniger gern zu mögen.

Wortfragmente als Erinnerungshilfen : der Aufbau eines Wortes

von Leonard M. Horowitz, Margaret A. White und Douglas W. Atwood

Dieser Aufsatz diskutiert den Aufbau eines einzelnen Wortes. Er zeigt, dass der Anfang eines Wortes der beste Hinweis ist, um das Wort herauszubekommen, die Mitte ist der schlechteste. Der Versuchsperson wurde eine Liste von Wörtern eines nach dem anderen auf einer Gedächtnisstrommel gezeigt. (Einige Listen enthielten sechsbuchstabile Wörter, andere neunbuchstabile.) Dann sah die Versuchsperson ein Bruchstück eines der

Wörter und sollte sich des ganzen Wortes erinnern. Ein Anfangs-Fragment konnte die richtige Antwort am leichtesten und mit der kürzesten Latenzzeit hervorrufen. Die Mitte löste die richtige Antwort am seltensten und mit der längsten Latenzzeit aus. Die Ergebnisse werden auch zum Problem der assoziativen Symmetrie in Beziehung gesetzt.

Die Leserschaft von Anzeigen mit grosse Type von *A. T. Turnbull und David E. Carter*

Über die Wirkung von rein typographischen Anzeigen auf die Leserschaft sind die Fachleute geteilter Meinung. Eine Stichprobe aus den Zeitschriften *Life* und *Ladies Home Journal* von 1954 bis 1965 hat eine Aufwärts-Tendenz solcher Anzeigen ergeben. Um die Wirkung zu messen, wurden korrelative Untersuchungen durchgeführt, in denen die Anzahl Wörter zu den *Daniel Starch readership records* (Anm. d. Übers.: Ein Test, der Interesse und Erinnerung an Anzeigen in einer durchgeblätterten oder gelesenen Zeitschrift misst) in Beziehung gesetzt wurden. Für die Urteilskategorien "am meisten gelesen" und "assoziiert gesehen" ergaben sich negative Korrelationen beim *Journal* und bei *Life*. Wenn das ohnehin vorhandene Leser-Interesse an dem inserierten Produkt konstant gehalten wurde, waren die Korrelationen für beide Urteilskategorien niedrig. Es wurde geschlossen, dass die Anzeigen mit grosse Type keine einschränkende Wirkung durch Verringerung des Leser-Interesses haben kann. Jedenfalls waren die Rangkorrelationen der Produkt-Kategorien in den Anzeigen mit den Kategorie-Rängen der Starch-Ergebnisse so hoch, dass eine Wirkung auf die Leserschaft über das Leser-Interesse hinaus unwahrscheinlich war.

Das Diagramm als Nachricht von *Jesse H. Shera und Conrad H. Rawski*

Das Diagramm ist eine besondere Art der Bildgestaltung. Es bringt die gleichen Darstellungs-Bedingungen mit sich : die Abbildung eines Inhaltes in Formen, welche selbst den charakteristischen Inhalt enthalten und übermitteln. Man muss zwischen der paradigmatischen Absicht und der sinnbildlichen Form des Diagramms unterscheiden. Die Möglichkeit eines Missverständnisses in Wechselspiel dieser Eigenschaften wird im Postskriptum an Beispielen gezeigt, welche die Buchkunst einbeziehen.

The Authors

Glendon C. Smith is a senior project engineer with Mauch Laboratories, Inc. (3035 Dryden Road, Dayton, Ohio 45439). He received the B.S.E.E. degree from the University of North Carolina at Raleigh in 1961. His interest in the applications of technology to blindness began in 1960–1961 when he lived on the Raleigh Campus of the N.C. State School for the Blind and Deaf. After two years with the Laboratory of Medical and Biological Sciences of the Public Health Service in Cincinnati, Mr. Smith joined Mauch Laboratories' reading machine program in August 1963.

J. W. Click and Guido H. Stempel III are faculty members in the Ohio University School of Journalism (Athens, Ohio 45701). Mr. Click teaches graphics and magazine design. He has been a member of the Graphic Arts Committee of the Association for Education in Journalism. His articles have appeared in *Public Relations Quarterly*, *Editor & Publisher*, and *College Press Review*. His Master's degree is from Ohio University.

Dr. Stempel, who has his doctorate from Wisconsin, is a member of the Research Committee of the Association for Education in Journalism. His research interests include content analysis and media audience surveys. His articles have appeared in *Journalism Quarterly*, *Columbia Journalism Review*, *Quill*, and *College Press Review*.

Leonard M. Horowitz is associate professor of psychology at Stanford University (Stanford, California 94305). His research concerns psycholinguistics and verbal learning. He is a consulting editor for the *Journal of Experimental Psychology*.

Margaret A. White (now Mrs. Arnold Matlin) did her undergraduate work at Stanford University and is now a graduate student in psychology at the University of Michigan.

Douglas W. Atwood did his undergraduate work at Stanford University and is now a graduate student in psychology at the University of Illinois.

A. T. Turnbull is a professor of journalism at Ohio University (Athens, Ohio 45701) where he teaches courses in graphics of communication and in advertising. He is co-author with Russell N. Baird of Ohio University of three journalism textbooks, one of which, *Graphics of Communication*, will appear in its second edition this spring. Mr. Turnbull is also active as a consultant in the field of graphic design and in advertising.

David E. Carter is an instructor in advertising and director of educational television at Ashland Community College, University of Kentucky. He obtained an MS from the School of Journalism at Ohio University in 1967. Mr. Carter also operates an advertising service in Ashland, and has won a number of awards in recognition of his advertisements.

Jesse H. Shera is dean of the School of Library Science, Case Western Reserve University (Cleveland, Ohio 44106). Internationally known in library circles, Dr. Shera is the author of a large number of professional publications, among them two volumes of collected papers, *Libraries and the Organization of Knowledge* (1965) and *Documentation and the Organization of Knowledge* (1966).

Conrad H. Rawski, who earned his Ph.D. degree in musicology and history, is Professor of Library Science at Case Western Reserve University. He is a student of medieval Latin literature and divides his special interests between text-analysis and studies concerning the media and forms of transmission of the texts. His *Petrarch: Four Dialogues for Scholars* appeared in 1967.

The Penrose Annual 1968

Regular readers of *The Penrose Annual* (and they number well over 6000, dispersed throughout virtually every country in the world) need no introduction to an annual that has come to be recognized as 'the natural forum in which to describe, discuss or illustrate the most significant developments in the graphic and reprographic arts' (*Times Literary Supplement*). Even they, however, will want to know that this year's annual, Volume 61, is set in Sabon, a new type-face designed by Jan Tschichold, and that the jacket design is by Bob Gill. The twenty-five contributions in this edition range almost improbably from copyright to dichromated colloids, from graphic design in the supermarket to print for poor-vision readers, but this merely serves to indicate the widespread involvement of the graphic arts and the catholic interests of the Penrose readership.

Of particular interest to readers of *The Journal of Typographic Research* will be the articles on a general purpose typefont suitable for use with optical reading equipment, on typographic design and the computer, on an harmonic system for computer-controlled typesetting, and on types of the 'sixties (which asks which of the 150 'new' types have really proved their claims to bring to the printer and designer 'something new').

For all those who relish fine printing and the ideas that make it possible, *The Penrose Annual* (first published 1895) continues to offer a magnificent work of reference, by means of which each generation can hold up a mirror to itself and its achievements in representing and reproducing the word and the image.

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