The Design of a Typeface

The design of Demos typeface was the result of technical as well as aesthetic considerations. Demos was designed for the Hell CRT Digiset, an electronic composition process that creates type by vertical lines. Curves and angles appear smooth only after emulsion. Rather than falling back on hot-metal methods, the unique characteristics of the Digiset were used to determine the design, ever mindful that visual appearance is the final arbiter of any letterform design. All of the type for this issue of Visible Language *has been set in Demos on the Hell Digiset; a few of the typographic elements have been set in the companion face Praxis.*

In designing Demos typeface for the firm of Dr.-Ing Rudolf Hell GmbH (Kiel, Germany) specifically for its electronic typesetter, the Digiset, I encountered the various problems that beset any designer when he must match his own desire for aesthetic as well as perceptual quality with the necessary restrictions of technology. The results of this experience are what I wish to share in this essay.

Figure 1.

Visible Language
XIII 2 (1979)
pp. 134—149

Author's address:
Prins Mauritslaan 26
1405 CW Bussum, Holland

0022-2224/79/0400-0108
$02.00/0

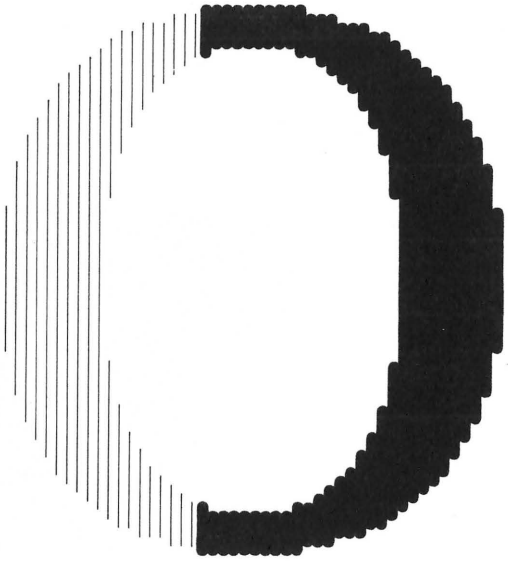
The Photographic Process and Quality Control

The design of new typefaces for electronic typesetting has traditionally been carried out along lines derived from the method of adapting hot-metal faces to filmsetting. Practice was, and still largely is, to anticipate photographic reproduction distortion by exaggerating certain details, as is done with the extension and cutting out of corners (Figure 1). But one is left in doubt about what the final result will be. Will the thorns and cuts still be visible in print? Or will they disappear through the several stages of reproduction? What happens if all point sizes are scaled from one set of matrices? Quality control becomes precarious, since the original image can hardly be compared with the printed result.

Filmsetting is an uncertain business that we have yet to master completely. In many ways it is a more complicated process than hot-metal setting, with different influences on type forms. And we will never fully be able to master it if we continue to apply hot-metal standards to filmsetting designs.

Rather than work against the requirements of the electronic process, I designed Demos to work with it. The Hell Digiset builds up characters from vertical lines on photographic material (Figure 2). The photographic material used in faster filmsetters cannot produce an absolute separation of black and white areas; there is always a gradual transition, a soft edge. This effect causes the well-known rounding off and filling up of corners (Figure 3).

Figure 2.



The design of Demos rests on the principle that a halftone dot is usually underexposed and tends to shrink. Then, on the offset plate as it is overdeveloped the dot tends to regain its original size; printed with an excessive amount of ink, it enlarges a few additional microns. Through all these stages the dot retains its circular shape (Figure 4). With similar treatment a typeface with sharp corners becomes more and more blunted and loses its sharp character at every stage. But when all vulnerable details are rounded off in advance, letters retain their basic shapes as do halftone dots (Figure 5).

Figure 3.

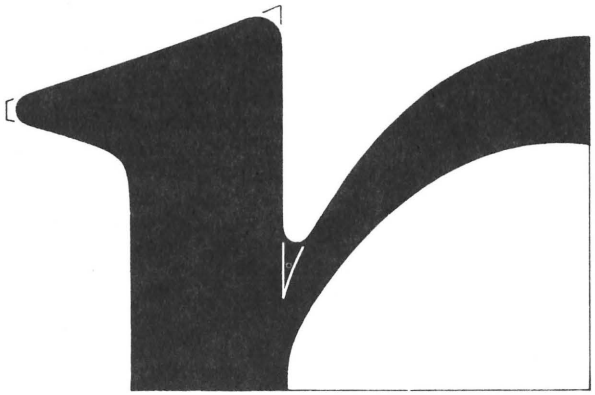


Figure 4.

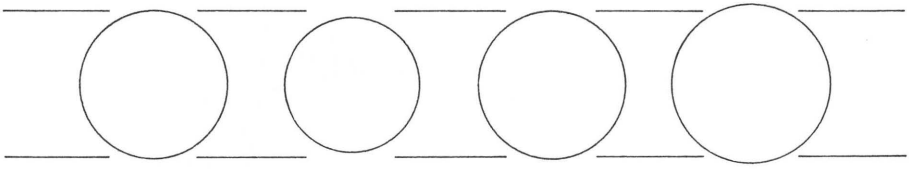
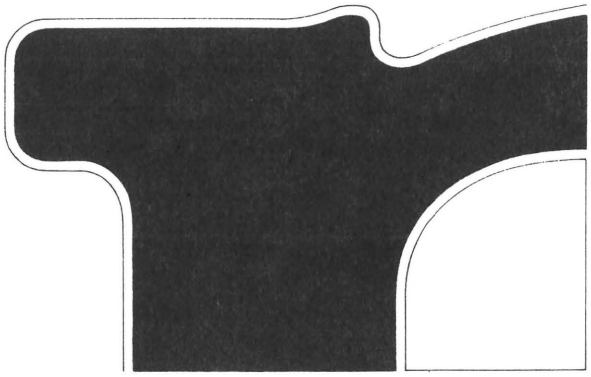


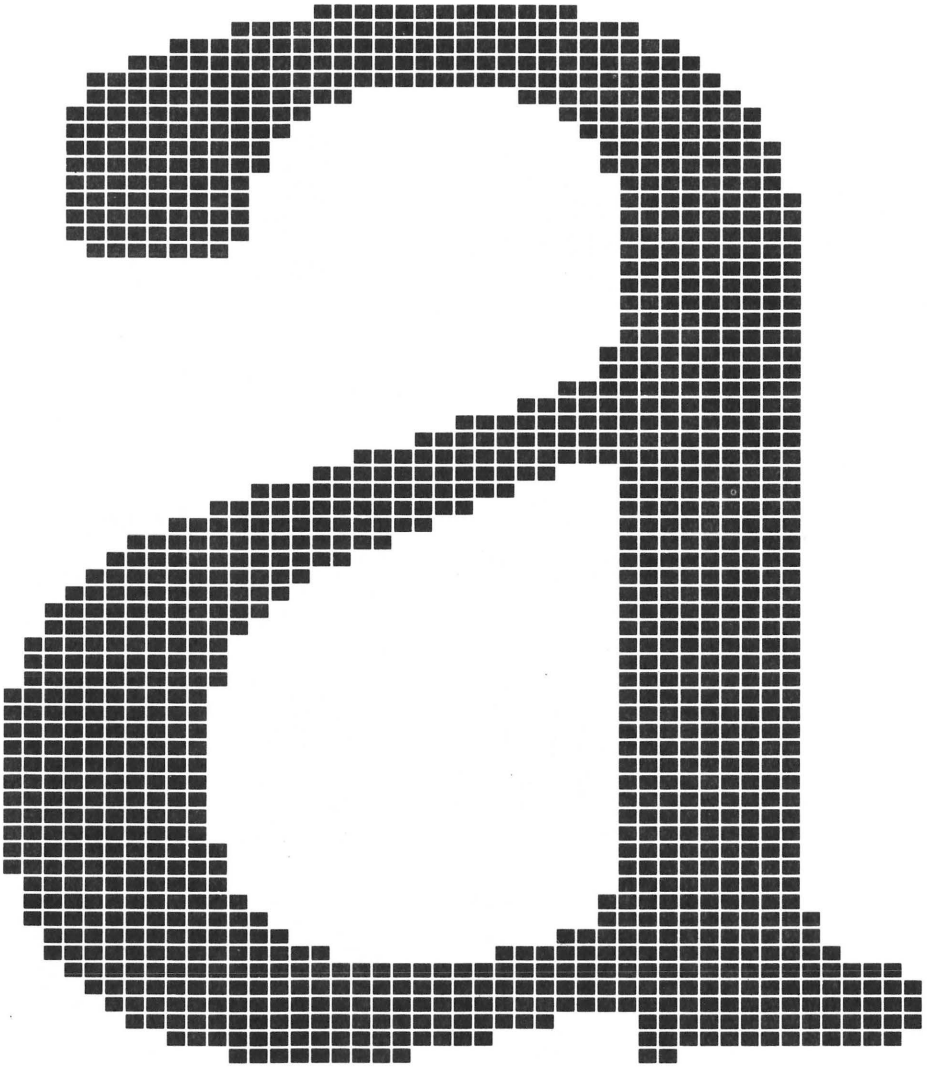
Figure 5.



Designing for the Cathode Ray Tube.

Demos was conceived specifically for the cathode ray tube (CRT) grid, a recent innovation in typeface design. (Hermann Zapf's Marconi, which appeared in 1976, was the first type design made especially for CRT typesetting.) I made sketches and original drawings on the CRT grid for type sizes 8- to 16-point Didot (no metric measurements yet), with 100 horizontal positions per em horizontally and 120 positions vertically. Coordinates, which together form the characters, are read into the computer and are recalled without the aid of a visible matrix. The Digiset equipment produced since 1976 can set from 6- to 16-point from this master (Figure 6).

Figure 6. *An example of an original drawing showing the CRT grid.*



Not every curve works out well in the grid. Horizontal and vertical lines pose no problems; neither do lines at an angle of approximately 45° (Figure 7). But curves formed between 45° and the horizontal or the vertical do cause problems; the longer and smoother a curve must be, the more difficult it is to realize. Thus before I started designing, I sorted out within the grid the combinations of steps which in an impressionistic way present themselves as smooth curves to the reader's eye (Figure 8) and which dissolve due to emulsion characteristics in the photographic process (Figure 9). The emulsion results in a 50% reduction of notches as the type transfers from film to plate (Figure 10). Remember also that the grain of the paper is often coarser than the unevenness of the contour at the end of the process of film to plate (Figure 11).

Figure 7.

An enlarged 45° line on the CRT grid (left) and how it appears when printed.

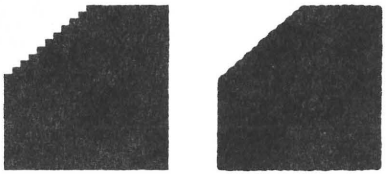
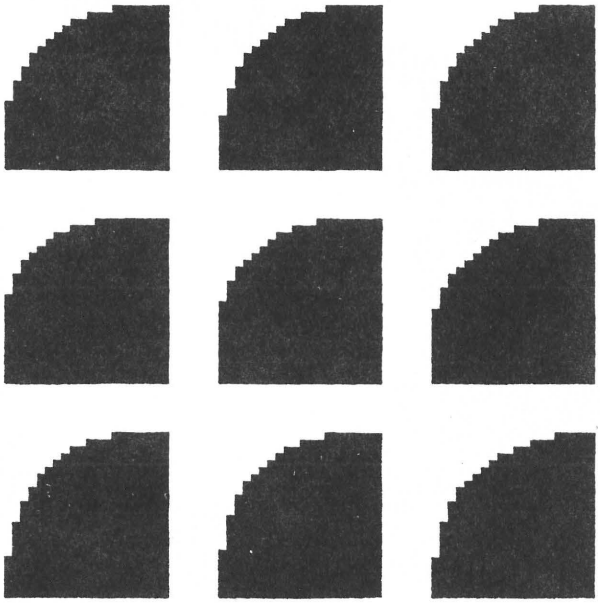


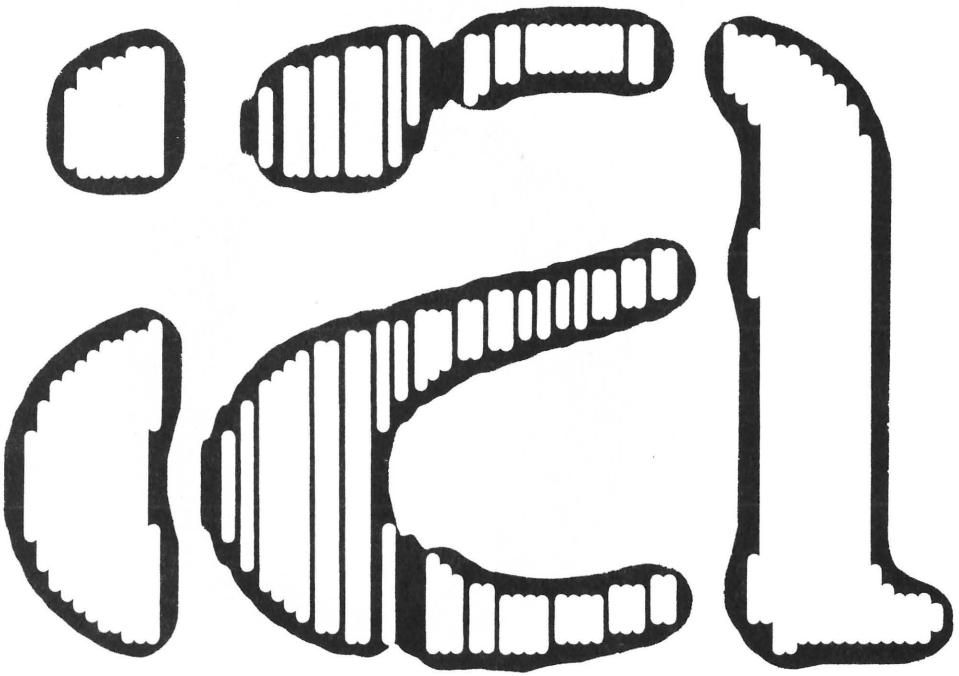
Figure 8.

One of the specimen pages used to check the smoothness of various curves in the CRT grid. Curves were evaluated with a reducing glass from a distance of two meters.



Another reason why all corners of Demos are rounded off is that the cathode ray has a half-circular ending and therefore all outward corners are rounded off automatically in the grid for the most frequently used text sizes of 8- to 12-point.

Figure 9. *An experimental print to show what photographic emulsion does to the contours of a CRT letterform.*



Having determined the most favorable curves and with a set of other elements and measurements — the thickness and width of horizontal and vertical parts, transitions from thick to thin, junctions, horizontal and vertical proportions, the weight and the formation of serifs, etc., all determined through a series of tests —I started to make the final drawings.

Figure 10.

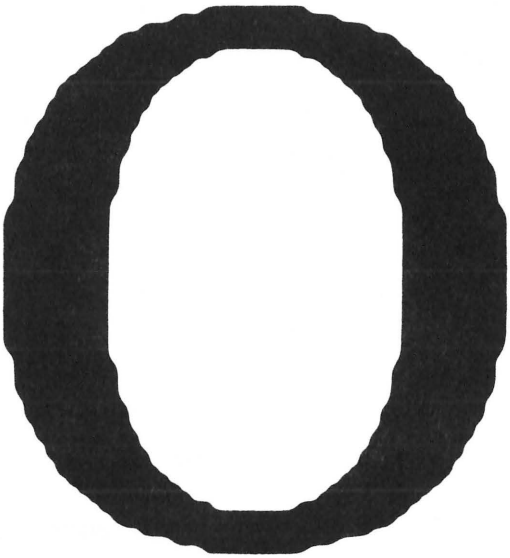
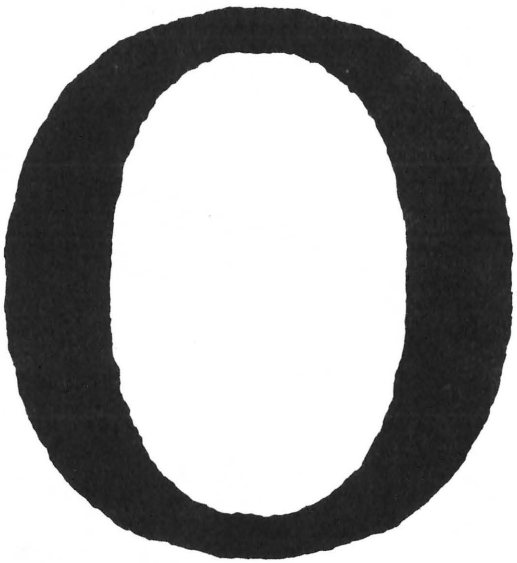


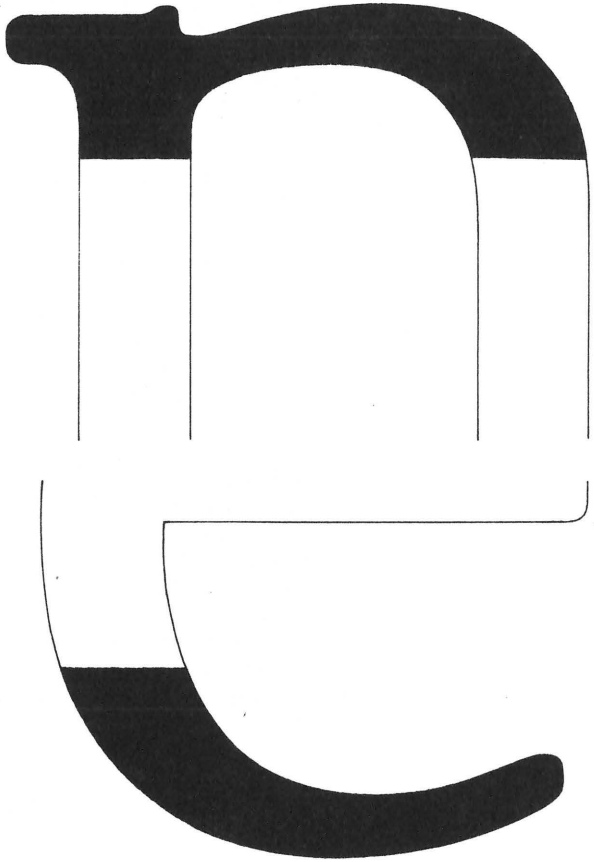
Figure 11.



The X-Height and Other Vertical Proportions.

To be economical of space Demos has a large x-height: 55% of the distance between the top of an ascender and the bottom of a descender. In 10-point Times New Roman (Monophoto), for example, the ratio is 50%. Too often a large x-height requires extra leading, thus nullifying most of the saved space. To keep leading to a minimum and as an aid to the formation of words and lines, every character is stressed horizontally (Figure 12). Such an effect also results in wide open counters, giving the typeface a large look and allowing for a choice of type size one or even two sizes smaller than is possible with most current designs (Figure 13).

Figure 12.



In this way the text area can be reduced considerably; in comparison with many other designs, Demos can save up to 15% in space. And when a point-size is set on the narrower width of a smaller point size (e.g., 9-point on 8-point width), another 10% is added, allowing production of less bulky dictionaries, encyclopedias, and telephone books (Figure 14). Being a bit shorter than the ascenders, capitals and numerals blend easily with the large lower-case (Figure 15).

Figure 13.

Demos 9-point (top), 9-point one point leaded (middle), and bold 9-point one point leaded (bottom).

Europa has two distinct types of climate; a north suited to the production of fine cream and dairy produce, excellent beef and wonderful bacon; and a south that produces olives for olive oil, vines for wine of all kinds, luscious southern fruits, vegetables and sea food. France is the only country in Europe that includes both types of climate, and therefore has a range of foodstuffs second to none.

Europa has two distinct types of climate; a north suited to the production of fine cream and dairy produce, excellent beef and wonderful bacon; and a south that produces olives for olive oil, vines for wine of all kinds, luscious southern fruits, vegetables and sea food. France is the only country in Europe that includes both types of climate, and therefore has a range of foodstuffs second to none.

Europa has two distinct types of climate; a north suited to the production of fine cream and dairy produce, excellent beef and wonderful bacon; and a south that produces olives for olive oil, vines for wine of all kinds, luscious southern fruits, vegetables and sea food. France is the only country in Europe that includes both types of climate, and therefore has a range of foodstuffs second to none.

Figure 14.

Demos 9-point on 8-point width without leading (top) and one point leaded (bottom).

Europa has two distinct types of climate; a north suited to the production of fine cream and dairy produce, excellent beef and wonderful bacon; and a south that produces olives for olive oil, vines for wine of all kinds, luscious southern fruits, vegetables and sea food. France is the only country in Europe that includes both types of climate, and therefore has a range of foodstuffs second to none.

Europa has two distinct types of climate; a north suited to the production of fine cream and dairy produce, excellent beef and wonderful bacon; and a south that produces olives for olive oil, vines for wine of all kinds, luscious southern fruits, vegetables and sea food. France is the only country in Europe that includes both types of climate, and therefore has a range of foodstuffs second to none.

Figure 15.

Demos 16-point. Top line shows the substitute form of letter g.

HaHbHcHdHeHfHgHhHiHjH

HaHbHcHdHeHfHgHhHiHjH

H1H2H3H4H5H6H7H8H9H0H
o1o2o3o4o5o6o7o8o9o0o

tusmuziek. Aanvankelijk werden de nieuwe religies in Rome verboden. Maar dat was niet vol te houden. In 204 v. Chr., tijdens de oorlog tegen Hannibal, werd de cultus van Kybele, de grote moedergodin uit Phrygië, naar Rome gebracht. De vreemde priesters namen hun eigen muziekinstrumenten mee: de Phrygische tibiae

Photographic Reproduction and Printing.

With high quality offset lithography a typographic image can be faithfully reproduced (Figure 16), but in mass production type can be severely affected, especially on coarse papers (Figure 17). Rotogravure plays havoc with any delicate detail (Figure 18). To remedy some of the problems, I specified in the design brief that the Demos letterforms should be tolerant; throughout the design I have kept all details simple and firm: sturdy serifs, joints at obtuse angles, a strong color, and no extreme thin strokes.

Reduction and Enlargement.

As with most typefaces for CRT composition and for filmsetting, Demos is subject to linear reduction and enlargement within size-groups; e.g., one set of matrices designed with the 10- and 12-point sizes in mind is used for 6- to 16-point sizes. This practice could make the larger range of sizes look too heavy and too wide; conversely, the smaller sizes may look cramped. I don't think this problem will ever be solved satisfactorily except through the use of the smallest possible size-groups. It helps, however, when the typeface is made relatively wide, when the difference between thick and thin parts is not pronounced, and when the face is comparatively heavy.

Figure 16.

An enlargement of Demos 8-point printed by offset lithography on smooth paper.

Figure 17.

An enlargement of Demos 8-point printed by offset lithography on rough paper.

Figure 18.

An enlargement of Demos 12-point printed by rotogravure.

Electronic Distortion and Variations.

An electronically generated typeface can also be slanted (Figure 19), compressed, and extended electronically. But when a typeface is conventional in design, such distortions can spoil the overall look of the face. In the future it may be possible to start with a simple basic design which can be fattened, slanted, stretched, or fitted with serifs according to printing techniques and papers or by the contents of the text. This is being done experimentally with computer programs for modifications, such as the Ikarus program by Rubow-Weber in Hamburg. Conventional typeforms, however, are often too delicate and complicated to be distorted without ill effects. It can be made easier by lessening distortion and keeping the design simple. The horizontal stress of the characters of Demos allows for relatively successful condensation and expansion.

Figure 19.

eerst wordt de tekst gezet, of liever gezegd

Figure 20.

Praxis medium 9-point one point leaded, normal width (top) and on 8-point width (bottom).

Europa has two distinct types of climate; a north suited to the production of fine cream and dairy produce, excellent beef and wonderful bacon; and a south that produces olives for olive oil, vines for wine of all kinds, luscious southern fruits, vegetables and sea food. France is the only country in Europe that includes both types of climate, and therefore has a range of foodstuffs second to none.

Europa has two distinct types of climate; a north suited to the production of fine cream and dairy produce, excellent beef and wonderful bacon; and a south that produces olives for olive oil, vines for wine of all kinds, luscious southern fruits, vegetables and sea food. France is the only country in Europe that includes both types of climate, and therefore has a range of foodstuffs second to none.

Figure 21.

A test line of Demos italic.

Hamburgos grub sorgsam um Hugos Harro
amburgos grub sorgsam um ugos arro
Hamburgos grub sorgsam um Hugos Harro

As a companion face to Demos I have also designed the sans-serif typeface Praxis (Figure 20). It harmonizes with Demos in shape, weight, vertical and horizontal proportions, and many constructional details, and is executed in five different weights. An italic to Demos is also in execution (Figure 21).

General Considerations.

Techniques should be allowed to influence a design but not to dictate it. Nor should any technique in particular (digitation, CRT, optics, photography, offset lithography) be allowed to dominate or be the cause of obvious design characteristics, at least when the typeface is intended for continuous reading and for general use. The characters of a text face are subject to optical distortion in the reader's eye by their continuous repetition, constant change in combination, speed of reading, and the half-conscious reading process. Wherever necessary, details of Demos that were originally shaped by formulas based on technical considerations were reshaped by design insight.

Figure 22. *A paperback book page in Demos 8-point, one and one-half point leaded.*

When the subject of Mr Denby fell of its own weight, he essayed other equally irrelevant themes, but each time the very deference of Dick's attention seemed to paralyse him, and after a moment's stark pause the conversation that he had interrupted would go on without him. He tried breaking into other dialogues, but it was like continually shaking hands with a glove from which the hand had been withdrawn—so finally, with a resigned air of being among children, he devoted his attention entirely to the champagne.

Rosemary's glance moved at intervals around the table, eager for the others' enjoyment, as if they were her future stepchildren. A gracious table light, emanating from a bowl of spicy pinks, fell upon Mrs Abrams' face, cooked to a turn in Veuve Cliquot, full of vigour, tolerance, adolescent good will; next to her sat Mr Royal Dumphry, his girl's comeliness less startling in the pleasure world of evening; then Violet McKisco, whose prettiness had been piped to the surface of her, so that she ceased her struggle to make tangible to herself her shadowy position as the wife of an arriviste who had not arrived.

Then came Dick, with his arms full of the slack he had taken up from others, deeply merged in his own party.

Then her mother, forever perfect.

Then Barban, talking to her mother with an urbane fluency that made Rosemary like him again. Then Nicole. Rosemary saw her suddenly in a new way and found her one of the most beautiful people she had ever known. Her face, the face of a saint, a viking madonna, shone through the faint notes that snowed across the candlelight, drew down its flush from the wine-coloured lanterns in the pine. She was still as still.

Abe North was talking to her about his moral code: 'Of course I've got one,' he insisted, '—a man can't live without a moral code. Mine is that I'm against the burning of witches. Whenever they burn a witch I get all hot under the collar.' Rosemary knew from Brady that he was a musician who, after a brilliant and precocious start, had composed nothing for seven years.

Next was Campion, managing somehow to restrain his most blatant effeminacy, and even to visit upon those near him a certain disinterested motherliness. Then Mary North with a face so merry that it was impossible not to smile back into the white mirrors of her teeth—the whole area around her parted lips was a lovely little circle of delight.

Finally Brady, whose heartiness grew moment by moment, to

100

Figure 23.

A sample of newspaper composition in Demos. The headline is Demos bold 20-point on a 16-point width.

Twee vakbonden zoeken contact met VMF-leiding

Utrecht, 16 april—De Industriebond CNV en de beambtenbond Unie BLHP hebben zich tegenover de raad van bestuur van VMF bereid verklaard het overleg te hervatten over alle problemen, die zich bij het concern voordoen. Als voorwaarde vooral stellen de twee bonden dat bij de plasticmachinefabriek SPPM in Hengelo een 'zo groot mogelijke werkgelenheid' in stand wordt gehouden. De raad van bestuur staat op het standpunt dat het VMF-bedrijf SPPM moet sluiten.

Volgens een woordvoerder van de Industriebond CNV is de bereidheid om het overleg te hervaten een allerlaatste poging. 'Wij hebben de hoop, dat de VMF-top inziet dat er acties komen en dat onder die druk nog kan worden onderhandeld.'

In een brief aan de VMF-top hebben beide vakbonden laten weten uiterlijk maandag 18 april voor 's-middags zes uur een reactie op hun aanbond te verwachten.

Burgemeester en wethouders van Hengelo hebben met 'verontwaardiging en verbazing' kennis genomen van het antwoord van de raad van bestuur van de VMF op een brief van het college over gevolgen voor de werkgelegenheid van de aangekondigde sluiting. Het college sprak in zijn brief 'ernstige teleurstelling' uit over het niet aanvaarden van het aanbod van het ministerie van economische zaken van een achtergestelde lening van 15 miljoen gulden voor voortzetting van de SPPM.

Het gemeentebestuur zei in de brief erop te rekenen dat de raad van bestuur van VMF Stork alles in het werk zou stellen de werkgelegenheid in Hengelo te behouden. In het antwoord stelt VMF Stork dat men gaarne verneemt welke positieve stappen door het gemeentebestuur zijn genomen voor de werkgelegenheid in Hengelo. 'Onzerzijds,' aldus de brief, 'hebben wij de afgelopen jaren de grootst mogelijk inspanningen getroost hetgeen blijkt onder meer uit het feit dat wij SPPM gedurende tien jaar hebben voortgezet zonder dat ook maar enig jaar winst werd gemaakt.' (ANP)