WEPT: A Week on Electronic Publishing and Typography

Michel Goossens

From Monday April 11th to Friday April 15th the Lufthansa Training Center in Seeheim, a few kilometers south of Darmstadt, was home to WEPT, a Week on Electronic Publishing and Typography. The Center is situated on a hill overlooking the health resort of Seeheim (pop. 18,000) and lies in the Bergstrasse ('Mountain Road', from the Latin *strata montana*) holiday area, the "German Riviera", well-known for its mild, almost Mediterranean-like climate, in Roman times. The Center is surrounded by a forest, with several scenic footpaths. However, while I was there, both the tight conference schedule and the rainy weather conspired against us, and I had no occasion to find out how quiet and relaxing the surroundings were.

Four events in one

WEPT was in fact a combination of two international conferences — RIDT'94 (Raster imaging and digital typography) and EP'94 (Electronic publishing, document manipulation and typography) — and two international workshops — PODP'94 (Principles of document processing) and TEP'94 (Teaching electronic publishing and digital typography), plus a set of tutorials. WEPT was organized locally by Christoph Hüser of GMD/ISPI Darmstadt. Upon registering, every participant got, together with a printed copy of the proceedings (published as issues 3 and 4 of volume 6 of the journal *EP-ODD — Electronic Publishing-Origination, Dissemination and Design*), an electronic copy in Adobe's PDF format on CD-ROM (more on this later)[1]. As those of us who have been involved in preparing conference proceedings know, it cannot be emphasized too much what a magnificent job the editors have done to be able to distribute the proceedings at the conference; reading their Colophon in both the EP'94 and RIDT'94 issues tells an interesting story about electronic publishing in real life. As several of the activities ran in parallel, I can only describe the ones I attended. Moreover this report will necessarily be biased towards subjects I think I understand best.

Act I: RIDT'94

The formal opening of RIDT'94 (the third international conference on Raster Imaging and Digital Typography), by Jacques André, was followed by a session on font modeling, where we learned about *Infinifont*, a new product for high-performance parametric font generation starting from a single compact set of typographic characteristics. This was followed by a discussion of a font-independent way to describe Kanji that should make it easier to (semi-)automatically design large character sets in a coordinate-independent fashion. Then Yannis Haralambous argued that it is possible to group PostScript fonts into meta font families by defining a set of METAFONT parameters that can be varied to obtain different weights (condensed and extended versions), small caps, and optical scaling. The last talk in the session introduced object-orientation to extend a font-scaler to generate acceptable quality screen fonts on-the-fly.

After coffee there were round table discussions on fonts and piracy, and about the future of type. Two well-known font designers, Hermann Zapf and Charles Bigelow, participated actively in the discussion. Zapf said that there is no future for font designers while their works are freely copied, and in any case, even if a company has the copyright of a set of fonts, it is almost impossible to have it enforced. It was noted that this will be a problem, not only for type, but for all material that is available electronically, so that companies active in the field of publishing or distributing electronic documents (films, music, books, etc.) all face the same problem of how to make the viewer/user pay. The future of typography is closely linked to the development of multimedia techniques, where animation, electronic books, sound, will be all important players. Most speakers seemed to agree that the techniques for rasterizing type at medium and high resolutions are well understood by now, but that a lot of work still needs to be done to improve readability on low-resolution devices, such as computer screens, where reading speed can drop by up to 30%. Grayscale fonts, the active use of color, and a more optimized layout of the information on screen are a few possibilities being studied to improve this situation.

The second day started with a session on raster imaging and fonts. Various optimizations for rasterizing Bezier curves, variable width splines, how to fit a curve to a gray-level image of scanned font characters, digital halftoning and error diffusion, and dynamic regularization of outline fonts, were some keywords I picked up from the titles of the talks, which seemed to indicate that rasterization is at present a well-understood technique. After the break we had two presentations on readability. The first one showed that typography is not only about letterforms, but also about symbolic characters. In a study to classify various symbols by a rule-based

[1] The two issues, as well as the CD-ROM can be obtained separately; please contact the publisher John Wiley & Sons for more details

system, it was found that it is much more difficult to build a semiology for symbols than for typefaces, since symbols are more difficult to identify and discriminate simply. The second talk presented the results of a comparison of possible differences in readability between Times Roman (serif face) and Helvetica (sans serif face). In agreement with other recent work no differences were detected, and it was found that familiarity with a typeface is more important than the presence or otherwise of serifs. These results once more show that the need for serifs in typeface design should be questioned if its main purpose is to make the typeface more legible.

A crash course on hypertext

In the afternoon I could not attend the talks on character recognition, since I wanted to listen to the tutorial on hypertext techniques by George Landow. The speaker first presented the historical evolution of the presentation form, and then went on to describe case studies. He emphasized that one cannot just transpose the printed book typographic model into the electronic world, but that "real" hypertext does not have pages, so that it is not always obvious to talk about equivalents for footnotes, indexes, title pages, etc. Added value is the presence of (hyper)links to navigate freely through a document, and the availability of an easy-to-use find function is a must. Good typographic design based on printed book tradition should certainly be used, but the chunks of information have to be smaller. Information presented to the user/viewer should never annoy or distract, and visual features and gadgets should only be added to the representation window when they serve a well-defined purpose.

The cradle of the printing art

In the evening we visited the Gutenberg Museum, located in Mainz, and founded in 1900 to celebrate the 500th anniversary of Gutenberg's birthday. Gutenberg was above all an engineering genius, who combined various already well established techniques into a practical procedure to print books relatively cheaply using movable metal type. The museum was completely destroyed during an Allied bombing raid on Mainz on February 27th 1945, but thanks to numerous donations from individuals, institutions and companies it was reopened in new buildings in 1962.

The main purpose of this temple of the printing art and technology is to bring together, classify, study, and display everything connected with Gutenberg's invention. The Gutenberg Foundation, which administers the Museum, also considers that one of its main rôles is to disseminate as widely as possible by scientific and other publications all information relating to the history of printing. The museum contains over 24,000 volumes, amongst them more than 2,300 *incunabula* (books printed before the year 1500), but probably its most valuable piece is one of the few remaining complete copies of the original Gutenberg 42-line Bible.

On the several floors of the museum the visitor can also admire many interesting and unique typesetting machines from all over the world. A very interesting "live" experience was a demonstration in Gutenberg's reconstructed workplace of how a page would have been printed on paper manufactured 500 years ago, using "his" printing press. Moreover, a molten metal alloy was taken out of the oven, and the fluid poured into a letter form. To everybody's surprise, after only a few seconds, the letter was cold enough so that it could be handled safely, and used to compose a line of text. As we arrived rather late at the museum (in fact after closing time), we didn't have enough time to spend there. I now know, however, that next time I visit Mainz, I shall put aside at least half a day to go to the Gutenberg Museum and have a good look at all the treasures on display.

After a walk of a few hundred meters we arrived at the restaurant, where the conference banquet was held. On the menu we had the typically German Sauerkraut and, of course, beer flowed freely. As we were seated along long wooden tables, we had ample occasion to "socialize". Amongst less technical discussions about Disney World in California or sailing in Brittany, I was able to get some interesting information about Unicode 16-bit character support in Apple's next update of their operating system (foreseen for the end of 1994).

A tutorial on color

I started the Wednesday morning early with a tutorial on color printing. In less than three hours we received an overview of colorimetry, device calibration, a study of Moiré patterns, halftoning techniques, and a report on ongoing development work among many companies active in the field of color printing and display on a standard describing quantitative color matching techniques for various output devices.

Then we came all together...

Just before lunch the participants of all four concurrent WEPT events were encouraged to enjoy an invited talk by Hermann Zapf on his *hz* program, where he uses micro-typographic algorithms to obtain optical margin compensation at both sides of a column. His program is based on scaling, i.e., applying typographically acceptable expansion or condensing of letters, together with positive and

negative kerning. R.F. Bruine, a Director at the E.U., then gave a keynote address on the importance of informatics technology for the future of Europe, where several millions of new jobs have to be created before the year 2000.

The afternoon began with an invited talk by Charles Bigelow, who described his work on the Unicode sans serif Lucida font, that he designed together with Kris Holmes. He started with a few slides showing the evolution of writing over the ages. Then he went on to show why a world-wide character (not glyph) encoding standard is needed to allow an easy exchange of information between various alphabets and more complicated writing systems. He described the work of the Unicode Consortium, who developed the 16-bit Unicode character encoding standard where, in their version one, they define about 30,000 characters, 4,000 of which are alphabetic or mathematical ones, while the others correspond mostly to Japanese/Chinese Han characters or Korean Hangul. The first release of the Bigelow/Holmes Lucida Sans font contains about 1,725 of the Unicode "letters", and it is used by the Windows/NT, Apple GX, and AT&T Plan 9 16-bit operating systems.

Act II: EP'94

The Bigelow talk formally concluded the RIDT'94 Conference, and after a short break Vincent Quint opened EP'94 (the Fifth Conference on Electronic Publishing, Document Manipulation and Typography). The first session was about document manipulation techniques, and the first speaker drew a parallel between document preparation and the processes of compilation and link editing of computer programs, allowing various blocks of documents to be compiled separately. The next presentation discussed formatting of structured documents within the framework of the Grif SGML editor, and the importance of document reuse issues. The final talk described a constraint-built interactive editor for introducing SGML markup in linguistic texts. This editor includes a context-sensitive search mechanism and will be used in the Text Encoding Initiative.

The Thursday program started with a session on structure transformation. The talks concentrated on explaining ways to compare or transform structured documents, formulate queries, or perform context-sensitive pattern matching on the global structural level. After the break we addressed the "hot" topic of multimedia and hypertext. We first got a clear introduction to the syntax of the HyTime standard. This was followed by a description of the Multimedia Forum project, developed at GMD, Darmstadt, which is a working example of a multimedia interactive online journal. The morning ended with a somewhat more theoretical talk about ongoing work at Xerox Japan on techniques for building structured document views on hypertext networks.

Document recognition was the subject of the afternoon session, with a first presentation on recognizing the logical structure of OCR scanned bibliographic references. *MarkItUp*, a system using incremental generation of structure recognition grammars from example structures to detect the logical structure of untagged electronic documents, was described next. The third talk introduced an approach based on fuzzy logic in the matching stage that provides some error tolerance in the parsing process to increase system robustness. Then there was an extended demonstration session, where all conference participants could see most of the systems described during the week at work. The evening was spent in Auerbach Castle, where we attended a middle-age style knights' feast.

The final morning had as its theme document preparation and publishing. An integrated publication environment, based on dynamic DTD management using an object-oriented database, VODAK, was described. It is used in the MultiMedia Forum application. Then came the story of the CAJUN project, or how the articles of all six volumes of the EPODD journal were successfully translated into PDF format, which is the language used by Adobe's Acrobat. These files were made available on a CD-ROM, together with the PDF reader software for Mac, MS-DOS and Windows, and given to each participant to the conference. One of the conclusions of the talk was that it is relatively easy to transform electronic documents into PDF, by adding information in the files, but that the format is at present too page- and contents-based, and links are anchored to physical positions on the page, rather than to logical locations in the document. It is expected that Adobe will enhance Acrobat in an upcoming release to eliminate most of these limitations, and implement a more complex search algorithm than that available at present.

When I started using this CD-ROM on my PC at work, I must say I was quite impressed by the work that the CAJUN people had put into their CD. One is, however, somewhat limited by the amount of information one can display on a screen (to be readable I was using 143% magnification, which is about the minimum; 200% is even better). Also, the lack of links (apart from the ones to the bibliography entries, and the index, which uses the keywords of each

article) does not show all the possibilities of hypertext. The absence of backlinks is especially annoying, since you cannot jump back to where you were, before going to the bibliographic reference. Nevertheless, the CAJUN CD already shows some of the possibilities of an information technology that will become ever more evident in the near future.

Large-scale encyclopaedic reference works were discussed in a another presentation by the GMD group. The experience gained while developing efficient tools for the simple construction of the object network of the SGML-tagged corpus of the 34,000-page *Dictionary of Art* (to be published by Macmillan in 1996), was discussed. The last talk before the break was an introduction to the Score TEX (ScEX) system, which is a front-end to Daniel Taupin's MusicTEX. ScEX consists of a Voice Language (SVL), and a Score Language (SSL), and tools exist to move between SVL input and SSL output, and vice versa.

The morning — and the EP'94 Conference — ended with an inspiring invited talk by Roberto Minio. His theme was "Publishing and mathematics — analogous evolutions". He began by saying that publishing is about communicating knowledge, while mathematics is about creating, or discovering knowledge. He presented five parallel areas of evolution.

(a) Today one often talks about the *death of proof*: various articles show that computer proof, using tools such as Mathematica, etc., is not considered acceptable or "mathematically rigorous" by many pure mathematicians, i.e., the use of electronically-assisted tools is not yet socially accepted. Similarly in publishing, for the *paperless office*, tools like Acrobat pose more problems than they solve. Questions about the ownership of the contents of electronic documents, the exploitation of their copyright, and optimal document reuse are being debated at present, with the "classical" printing industry trying to carry the old way of doing things over into the next century.

(b) Although considered "non-rigorous", speculative, intuitive, visual and experimental computer based computation techniques are spreading rapidly in the different fields of mathematics. The world of publishing is actively experimenting with multimedia and network publishing. In both cases one should not be confined to traditional techniques but actively embrace new developments.

(c) Everywhere "marketing hype" is fashionable. Fractals and fuzzy logics are not taken seriously; multimedia and on-demand publishing are victims of their high profile in the press, with expectations often being too high.

(d) Both math and publishing are subject to market forces. The abacus came only into real use when the average man in the street in the late middle ages needed to count beyond a dozen or so. Today multimedia remains a zero-billion dollar business, with many initiatives failing after a few months. To be successful, one needs customer awareness, the willingness and the ability to absorb the technology, and make it feasible. Only then will the market catch on.

(e) Research and innovation must be in synch with the needs. The strength of math is its unity, but that is also its weakness. The strength of electronic publishing is that it can draw on different fields and tap every-day innovation. However, it needs serious quality design, a deep knowledge structure, and above all, an understanding of user needs. A research-driven collaborative effort needs to be set up as a way to develop adequate tools for the user community. Therefore, researchers should remain in permanent contact with the publishers.

For all these reasons, Roberto thought that, at present, and probably in the future, content is and will be more valuable than the application used to capture or deliver it.

A fruitful experience

The possibility of discussion with people attending the various conferences and workshops allowed all participants to widen their horizons beyond their direct field of interest, and to profit from the expertise in these other areas, so I think that the idea of running these conferences in parallel at the same place was an extremely fruitful one, which I hope will be repeated in the future.

As a final remark let me mention that the TEX world was extremely well represented in this cosmopolitan audience (the 87 participants of RIDT'94 and the 105 participants of EP'94 came from about 20 different countries), since I counted at least five active TEX hackers from France, four from Germany, and one each from Great Britain, the Czech Republic, and ... Switzerland.

◇ Michel Goossens
CERN, CN Division
CH1211 Geneva 23, Switzerland
michel.goossens@cern.ch