Goossens at TUG '94

July 31st, Santa Barbara, California, USA.

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1 Introduction

July 31st, Santa Barbara, California, USA. Just the right combination of sunshine, temperature, and sea breeze. The mountains in the background, the beach nearby, the food nearly perfect. The ideal setting for a conference. And here we were, some 120 TeX enthusiasts, coming from many countries and cultures, to meet each other, and talk about and listen to presentations of the latest developments in the area of high quality typesetting.

We were not disappointed. The quality of the presented papers was uniformly good, or even outstanding, so many Birds of a Feather (BoFs) were going on in parallel that it was impossible to keep track of the many hot topics being debated by specialists and users in these informal meetings that took place when there were no formal presentations.

The formal theme of the conference was 'Innovation'. Malcolm Clark and Sebastian Rahtz brought together a tremendous programme that clearly showed how TeX is now making inroads in many areas of book production, like colour support, more flexible page layouts, scholarly and non-Latin alphabet editions. Several groups are working on extending TeX or LaTeX so that these tools become ever better adapted to the demands of present-day document handling and are integrated more readily into electronic distribution networks or databases. Several new approaches introduce object-oriented programming techniques, and hence show that TeX forms an integral part of a modern computing development environment.

I hope that the following detailed overview will give you a flavour of all these developments, and that it will convince you that you want to know more about one or more points. You can obtain the proceedings of the Conference by becoming a TUG member for $60, which entitles you to four issues of TUGboat and of TeX and TUG News, or else for $30 you can obtain a copy of the Proceedings only. For more details contact the TUG office at the following address

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2 Saterday July 30th

It all started Saturday July 30th in the evening with the traditional Welcome Party, where one meets old friends and colleagues or discovers new faces, that are at first looking around with somewhat anxious eyes, but are quickly surrounded by reassuring oldies, shaking hands, and being welcomed to the 'Family'. The Californian wine, beer, or lemonade flowed freely, and by the end of the evening all ice was broken and the atmosphere was one of harmonious warmth and unity.

3 Sunday July 31th

The Conference was formally opened the next day by TUG'S Executive Director, and local organizer, Patricia Monohon, and Christina Thiele, TUG's President also spoke a few words of welcome.

The theme of the day was 'Publishing, languages, literature and fonts.' It was Charles (Chuck) Bigelow who had the honour to present the first paper. He started by looking back at letter forms over the past 2500 years or so, and then discussed work — together with Kris Holmes — on the Lucida Sans Unicode font, that contains at present some 1700 alphabetic and mathematical symbols and is or will be available with the multi-byte operating systems Windows/NT, Apple GX and AT&T Plan 9.

Frank Mittelbach then discussed some of the do's and don't's that he learned while preparing the *LaTeX Companion*. From the discussions following the talk it seemed that his impressions were shared by many other authors/editors who are in the publishing business.

Just before tea it was Yannis Haralambous who showed off his artistic talents using METAFONT when he presented his work on typesetting the Holy Bible in biblical Hebrew using his *Tiqwah* system, that will make it possible, for the first time, to use the typographic powers of TeX to typeset high-quality Bible editions. Together with his work on typesetting the Holy Koran using several thousand ligatures, and his font developments for many other scripts, (as described at earlier conferences, and later in the present one) this will allow scholars in many disciplines to typeset their works at affordable prices using TeX and any computer.

Michael Cohen, an American teaching at the University of Aizu in Japan, explained how his *Zebrackets* system of meta-METAFONTs can generate striated parenthetical delimiters on demand. This offers the reader a more complete graphical picture of the relationship between various document elements by augmenting the information content of their representation.

Yannis Haralambous then came back on stage to present 'Humanist', his new system to 'humanize' LATEX. Document input, markup and editing is performed using any word processor that supports RTF output (like Word, Word-Perfect), that will then be turned into LATEX code by the Humanist system. A user can thus work on a text in the most friendly and natural way (i.e., without a single LATEX command), but will get syntactically correct LATEX output so that the powerful TEX engine can be used to obtain high-quality typeset output.

The final paper of the Sunday was by Basil Malyshev, on converting METAFONT fonts automatically into PostScript Type 1 outlines. It was read by Alan Hoenig in the author's absence. Various techniques to perform the conversion in question were presented and the one chosen for the creation of the *Paradissa Fonts Collection* was described. This collection offers a freely available set of PostScript Type 1 renderings of all Computer Modern, Euler, CM Cyrillic and LATEX fonts.

4   Monday August 1th

It was Leslie Lamport who had the honour to start the presentations of the second day, which had LATEX and Colour as its theme. He gave us his ideas on 'LATEX4', a WYSIWYG-like, though structured text editor, well integrated into the user environment.

James Hafner gave a short historical overview of how colour was first implemented in Tom Rokicki's dvips `.dvi` driver to provide an efficient and simple method for specifying colour with TEX. Tom Rokicki then discussed a new implementation of colour support and proposed a standard way for specifying colour and colour-like specials, implemented by modular C-code, that can be easily integrated into the `.dvi` drivers. Angus Duggan described his program DVISep, a simple colour separator for `.dvi` files, as well of some other tools for working with `.dvi` files. Sebastian Rahtz provided an introduction to the colour commands available in LATEX2$_\varepsilon$ and showed some interesting examples. Michel Goossens discussed some of the more basic issues concerning the use of colour in documents. He emphasized that the colour dimension has to be used with great care, so as not to distract the reader from the main message. Colour, like typography, has a set of rules, that have to be learnt and applied for greater effectiveness. Friedhelm Sowa presented his original and device-independent approach to colour support and showed some results obtained using BM2FONT on a Hewlett Packard inkjet printer. Michael Sofka gave an overview of the various stages in the production of a colour book. He addressed the issues involved in professional colour separation, and demonstrated how TEX, with a suitable driver, can be used to produce high-quality custom and process colour books. Then Sebastian Rahtz returned to the spotlight, with a presentation of PSTricks, a paper by Denis Girou and Timothy van Zandt, who could not be present. Sebastian, in his usual clear style, showed how PSTricks provides a convenient interface to PostScript from within TEX. It allows one

to draw any kind of graphics object, like circles, polygons, curves, springs. It offers several drawing tools, grids and has various commands to place text along a path. Objects and text can be rotated, scaled and tilted, and 3-D effects are available. Framing and clipping are supported, as is a general tree-drawing package. A package for generating slides, `seminar`, exists, and an early version of a plotting package is also ready.

After the presentations on colour our attention turned to the subject of general LATEX-related developments. First, Jon Stenerson showed us his system for creating customized LATEX style files via a graphical user interface, composed of menus, windows, and dialog boxes. It is at present closely linked to the Scientific Word text processor, although, in principle, it could be used with any LATEX environment. Johannes Braams provided a clear introduction to classes and packages and LATEX2$_\varepsilon$. He started by relating the LATEX2$_\varepsilon$ packages and classes to LATEX 2.09 major and minor styles. Then he discussed how old styles can be most easily upgraded. In the last part of his talk he gave a concise overview of the document classes and packages that come with LATEX2$_\varepsilon$. The last talk of the day was by Alan Jeffrey, who covered the subject of using PostScript fonts with LATEX2$_\varepsilon$. He described the LATEX2$_\varepsilon$ font packages `psnfss` and `mathptm` and some of the design decisions made in their development.

Before the dinner 'on the beach' several BoF sessions took place. One was on 'colour', coordinated by David Carlisle, another on 'practical indexing', coordinated by Nelson Beebe, and one on 'font encoding', coordinated by Alan Jeffrey. Many of the discussions in the BoFs carried over into the beach dinner time, but, as families were also present, other more mundane subjects were also addressed. It was one more golden occasion to get to know each other in a more personal context, without reference to glue, (coloured) boxes or other TEX speak.

5   Tuesday August 2th

Tuesday morning was devoted to 'Tools', and started with a presentation by Oren Patashnik, the author of BIBTEX. He first took a look back and explained why some of the design decisions of BIBTEX were made. Then he discussed some of the features that he plans to include in the new version, such as an easier interface to create non-standard bibliographies, support for national languages and the possibility of multiple bibliographies in a single document. The next talk was by Pierre MacKay, who presented his typesetter's toolkit, which includes tools for remapping fonts and generating composite glyphs, and a program for generating AFM PostScript metric files for the Computer Modern fonts. Michael Barnett described a remarkable application where a combined use was made of electronic typesetting and symbolic computations. His work seems to indicate that a considerable amount of time and effort can be saved when complex formulae are obtained symbolically by a computer program, like MATHEMATICA. Minato Kawaguti, of Japan, proposed a new and efficient method

to edit (LA)TEX source files by combining an emacs-type editor and a special version of `xdvi`, where the two windows (emacs and `xdvi`) are displayed simultaneously, and pointing to a portion of the document in the `xdvi` window positions the text in the editing window in the same region.

After coffee Yannis Haralambous showed his work on the Indica system, and a completely new TEX system for Sinhalese. The Indica system is a generalized preprocessor for Indic scripts (scripts of languages used on the Indian subcontinent, plus Sanskrit and Tibetan. Urdu, where the Arabic script is used, is not supported). Various input encodings are accepted and with the help of flex, a UNIX-based lexical analyser generator, are translated into TEX commands. Identical input encodings can be used for different languages, thus minimizing user retraining when inputting in different languages. The Sinhalese TEX system is a complete typesetting workbench for that language, containing specially designed fonts. Jean-luc Doumont explained how pretty-printing of Pascal programs can be done entirely within TEX, without the need of a preprocessor. He showed how this approach of 'preprocessing within TEX', using two-token tail-recursion, can also be applied to other situations, e.g., for an elementary chemistry mode.

After lunch we had the afternoon off and most of us spent it in the nice town of Santa Barbara (the town itself has a population of 86,000, while the county counts about 360,000 inhabitants). The town lies about 150 km north of Los Angeles, and 530 km south of San Francisco. The climate is sunny and temperately warm (average temperature is about 12 centigrades in December, and 20 in July). The architecture of the town offers a unique blend of Chumash, Spanish, Mexican and American heritage. State Street, Santa Barbara's main and most famous street, whose lower lying part was rebuilt after the 1925 earthquake as a beautiful Spanish-style avenue, lined with trees, plants, benches, and lamps is the town's favorite shopping area. At the end of State Street Stearn's Wharf, built in 1872, and the oldest operating wharf on the west coast, offers a lot of restaurants, gift and souvenir shops, wine tasting, a seafood market and other small shops. From the wharf one has a marvelous view of the mountains, the ocean and the yacht harbor.

Santa Barbara also has an interesting history, and many of its buildings and museums will give the visitor an overview of what happened since 1542, when the first European, Juan Cabrillo, set foot in the area. But it was not until 1782 that the Spaniards came to stay, and also around that time they established a military presidio and the now famous Mission, established in 1786. Its beautiful setting, unique twin bell towers and lovely facade have earned it the title 'Queen of the Missions'. Santa Barbara, heart of the American Riviera, also offers white-sand beaches, whale watching, mountain biking, sailing, and many good restaurants. In fact, during the Tuesday afternoon we were supposed to go and have a look near the Santa Barbara Channel Islands, that provide a shelter for the area between the islands and the mountains, thus giving Santa Barbara its unique sub-tropical climate. The plan was to go and spot a few whales,

but the sea was somewhat rough, and the captain preferred to take us on a 3-hour tour along the coast. Even so quite a few of our passenger-colleagues felt sick, and it was with some relief that many of us set foot ashore again around 7 pm, and set off to go and pick a restaurant to enjoy the local food.

6   Wednesday August 3th

The next day's theme was 'Futures', and Joachim Schrod thought that interactivity was the way forward. He emphasized that Knuth already very early on thought that an interactive TEX would be useful. Many TEX systems have been built that contain some interactivity. To better understand the actions of TEX he proposes that a formal approach should be used since, according to his views, informal descriptions have failed. As part of a solution he presented, after developing an abstract decomposition, a formal description for TEX's macro language. The latter can be interpreted by a Common Lisp system and the resulting Executable TEX Language Specification (ETLS) can be used as the basis for a debugger of TEX macros. Chris Rowley then reviewed some of the investigations of the LATEX3 team in the area of modeling and specifying page layouts. One of the questions that they asked themselves was how well LATEX can cope with that job compared to other text processing software systems, and whether a complete redesign of the system is needed. He also mentioned the wider question of how these aspects should be addressed in future typesetting systems. Don Hosek gave an overview of various page layouts he had tried for his new magazine *Serif*, and showed how he could massage TEX into doing (almost) everything he wanted, mainly using code from the infamous Appendix D of *The TEXbook*. John Plaice then reported on the present status of the Omega project, which is a series of extensions to TEX to improve its multi-lingual abilities. It supports multiple input and output character sets and allows any input encoding. Transformations from one coding to the other are supported. 16-bit or 32-bit virtual fonts can also be used, so that even scripts requiring a very complex contextual analysis, such as Arabic or Khmer, can be handled elegantly.

After a short break Arthur Ogawa showed ways of combining within TEX the descriptive markup and object-oriented programming (OOP) paradigms. He discussed an extension to LATEX's markup scheme that more effectively addresses the needs for a production environment, and for implementing such a system he heavily relied on the use of OOP techniques, where LATEX environments can be thought of as objects, and several environments can share functionality of a common, more general object. In his companion talk to Ogawa's, William Baxter went on to describe the actual implementation of an OOP system in TEX, where formatting procedures and markup are strictly decoupled, so that, indeed, designers can fully benefit from the OOP techniques available.

The afternoon started with the TUG Business meeting, where decisions taken by the TUG Board of Directors

for the coming year were presented, explained, and discussed. These decisions will be presented in a separate message. The Knuth Scholar was also announced: Shelly Lee Ames of the University Manitoba, where she works for the Canadian Mathematical Society (Société mathématique du Canada) preparing formats and proofing all papers published by the society in their Journal and Bulletin. This involves handling submissions in many different flavours of TEX, and initiating the development of macros to implement their formatting requirements.

After the meeting Yannis Haralambous, in a companion paper to Plaice's on the Omega project, showed a few applications for fully diacriticized scholarly Greek, vowelized Arabic, properly kerned Khmer, and for Adobe's calligraphic Poetica font. Then Phil Taylor reported progress on the NTS project. This project was started in 1992 by the German-speaking TEX user's group, DANTE, and has as its main task the development of a successor to Donald Knuth's now frozen TEX system. In fact two paths, one evolutionary, with e-TEX, and one more revolutionary, with NTS (New Typesetting System) are at present being investigated. As the TEX typesetting system consists of a rather complex set of tools, the group proposed to define a 'canonical TEX kit', which is assumed to be present at every installation. The status of the e-TEX project was reviewed by Peter Breitenlohner. At present improved control over tracing, additional math delimiters, improved access to the current interaction mode, checking for the existence of a control sequence, alternative ligature/kerning, extensions to the set of valid prefixes for macro definitions (e.g., `\protect` and `\bind`), support for colour. Finally it was Jiří Zlatuška who told us about the team's present thinking on the more ambitious NTS project. He sees essentially a two-phase approach, namely first a re-implementation in a rapid-prototype language such as CLOS or Prolog, so that one can experiment easily with various modular representations of the present TEX engine. Using this model one will try and identify functionally independent units, for which various alternate ways of extensions can then be proposed and tested. Based on the knowledge gained in phase one, the second phase will then see the step-by-step re-implementation of the functional units in a more efficient and widely available programming language, such as C++. Initially only e-TEX will be implemented in NTS, but later on alternate algorithms can be included to perform some of the typesetting tasks better. The long-term aim of NTS is thus to make maximum use of the phase-1 test bed to investigate and evaluate possible approaches to overcome various of TEX's perceived shortcomings. A lively discussion followed these presentations, and then the participants went off into one of the three BoF sessions. The first was on WWW servers, coordinated by Peter Flynn and Norman Walsh, where the latter discussed at some length his paper describing his WWW interface to the CTAN archive, which provides an attractive means to combine different views of the archive into a single view. Marko Grobelnik coordinated a BoF on database publishing, while Oren Patashnik discussed extensions to BibTEX in his BoF. At the Banquet,

that started at 19:30, all participants had one last chance together with their families to socialize, and enjoy the good food, wine (some had original 16 year old cask Caol Ila malt Whisky...), and the music.

7   Thursday August 4th

It was a little difficult for some of the participants to get up on time for the last morning, which had the theme 'Publishing and design'. Yannis Haralambous and Maurice Laugier discussed some of the tools used at the Louis-Jean Printing house in Gap (France) to typeset books. The TradTEX-SGML program was introduced. It is used to convert TEX and LATEX files into SGML. The tool is presently implemented on a Macintosh and is in real-life production. eDVItor is a program that allows interactive editing of a `.dvi` file, using a mouse-driven cursor to move blocks of text, insert illustrations, change colours, etc. It runs on both DOS and Macs. Michel Downes stated that the American Mathematical Society produces almost all its publications (a couple of dozen journals and book series) with TEX using AMS-developed macro packages. About two years ago a major overhaul of the macros package was decided, one of the goals being to ease revisions to the visual design. In this new approach the design specifications are kept outside of the TEX code in an element spec template that is relatively easy to understand and modify by traditional book designers. Alan Hoenig then showed us some examples of visually pleasing page layouts, which most TEX users only thought possible with PageMaker or Quark Express. His secret is to turn off some of the TEX functions, like vertical glue or tall characters, and all lines are assumed to have the same height and depth. It is to be said that this arguably restrictive set of conditions still allows one to typeset probably at least 99% of all printed material in the world. And, indeed, the model is not so limited as it seems, since with some work one can include section heads, display material, and so on. Just before the coffee break, Malcolm Clark presented Jonathan Fine's paper in his absence. He described first some historic aspects of the TEX typesetting program, leading to a discussion of strategies for possible future extensions. He strongly believes that with improved macro packages and `.dvi` processors many of the present problems will be solved. Also imposing a more rigorous syntax for inputting compuscripts should help. This will not only allow the source to be used with a possible future successor of TEX, but also ensure re-use with other, not-necessarily typesetting, applications.

Marko Grobelnik presented a TEX-based system developed in Slovenia for publishing dictionaries, lexicons and encyclopedia. The TEX macros are augmented with many special purpose written editing tools to assist the editor, who looks after the contents and form of the publications. The final talk was by Henry Baragar, who showed how special purpose ('small') languages can be used for documenting Knowledge bases so that LATEX can be augmented by adding expressiveness for specific tasks. He introduced the language TESLA, that allows Expert System analysts to mark up groups of rules into tables so that the logical

structure of the database becomes clear. The system generates LaTeX tables, that can be typeset in tabular form to be used by expert system programmers or typeset as text, to be used by Domain experts, thus yielding presentation forms adapted to the targeted audience.

8   See you next year in Florida

The conference was brought to a close by Christina Thiele, but not before Mimi Burbank, coordinator of next year's TUG meeting, gave us a short outline of plans for the 1995 meeting, to be held during the week of July 24–28th 1995 in the Trade Winds Hotel in Florida. It was also the occasion to honour the winners of the trophies for the best papers, namely Alan Hoenig, Yannis Haralambous and Tom Rokicki.

I think that I can safely suppose that at the end of our five day conference all participants left the University of California, Santa Barbara Campus satisfied to have taken part in this unique event. Even though most of us, Internet addicts, were a little surprised to find only very limited access to the Internet, this fact might indeed have been more of a blessing than a shortcoming, since in this way we were not distracted by having to answer e-mail or otherwise respond to 'urgent requests' from home. In any case it certainly benefited contacts between the participants and hence contributed to the friendly atmosphere. Another positive factor was the hard work of John Berlin and Janet Sullivan of the TUG office, who did their best almost 24 hours per day to help solve problems, or better, trying to prevent them before they occurred. Their kindness and helpfulness were truly appreciated by all those present. Thanks once again to John, and to Malcolm Clark, as co-editors of *THE TUGLY TELEGRAPH*, which kept us informed of the latest conference news, and to Katherine Butterfield, Suki Bhurgi, and Wendy McKay for helping with staffing the on-campus TUG office.