10 Mar 1978
1 Rename a few external variables to make their first six letters unique.
2 Initialize \texttt{escape\_char} to \texttt{−1}, not \texttt{0} [it will be set to the first character input].
3 Fix bug: The test \texttt{‘id \textless \ ’} was supposed to distinguish one-letter identifiers from longer (packed) ones, but negative values of \texttt{id} also pass this test.
4 Fix bug: I wrote \texttt{‘while }\texttt{α ∧ (β \lor γ)’} when I meant \texttt{‘while }\texttt{(α ∧ β) \lor γ}’.
5 Initialize the input routines in \texttt{INITEX} [at this time a short, separate program not under user control], in case errors occur.
6 Don’t initialize \texttt{mem} in \texttt{INITEX}, it wastes time.
7 Change \texttt{‘new\_line’} [which denotes a lexical scanning state] to \texttt{‘next\_line’} [which denotes \texttt{carriage\_return} and \texttt{line\_feed}] in print commands.

11 Mar 1978
10 Insert space before \texttt{‘(’} on terminal when opening a new file.
11 Put \texttt{‘p ← link(p)’} into the loop of \texttt{show\_token\_list}, so that it doesn’t loop forever.
12 Shift the last item found by \texttt{scan\_toks} into the info field. [With SAIL all packing of fields was done by arithmetic operations, not by the compiler.]

12 →
13 Fix the previous bugfix: I shifted by the wrong amount.
14 Add a feature that prints a warning when the end of a file page occurs within a macro definition or call. [System dependent.]
15 Add the forgotten case \texttt{‘set\_font’} to \texttt{eq\_destroy}.
16 Change \texttt{\require} to \texttt{\input}.
17 Add code for the case \texttt{cur\_cmd = 0} [later known as the case \texttt{‘t ≥ cs\_token\_flag’}] when scanning a tokenlist.
18 Introduce a \texttt{‘d’} option in the error routine, to facilitate debugging.
19 Assign a floating-point constant \texttt{ignore\_depth} to \texttt{prev\_depth}, instead of assigning the integer constant \texttt{flag} [since \texttt{prev\_depth} is type \texttt{real} in \TeX78].
20 Improve the readability and spacing of \texttt{show\_node\_list} output.
21 Set the variable \texttt{v} before using the \texttt{case} construction in \texttt{show\_node\_list}, because there’s one case where \texttt{v} didn’t receive a value [as part of the field unpacking].

12 Mar 1978

• One hour to enter yesterday’s corrections and recompile.
• At this point \TeX correctly located further unintended syntax errors in \texttt{acphdr} [the test file].
22 Insert \texttt{debug\_help} into \texttt{succumb}, giving a chance to look at memory before the system dies.
23 Use \texttt{eq\_destroy} wherever necessary in \texttt{unsave}.
24 \(t \leftarrow (t - 1) \mod 8\) to \(t \leftarrow (t - 1) \land 7\) in id\_name, since \$HIL has \(-1 \mod 8 = -1\). [At this time, id\_name is a routine that unpacks control sequence names, according to a scheme that will become obsolete after change \#422.]

25 Remove the space that appears at end of paragraph. (I hadn’t anticipated that.)

26 Throw away unwanted line\_feed after getting a carriage\_return in response to in\_chr\_w [a system routine for input from the terminal].

27 Delete spurious call to flush\_list in end\_token\_list.

- Why did I make such a silly mistake?

28 Fix bug in get\_z\_token: I forgot to say ‘macro\_call’ (which is the main point of that routine)!

- While tracking that bug down, I found out incidentally that kerning is okay.

- Also \TeX correctly caught an error 0p for 0pt.

29 Fix bug in scan\_spec (while instead of repeat).

30 Make the table entries for \hfill and \hskip consistent with the program conventions.

31 Disable unforeseen coercion: When scan\_spec put hsize on save\_stack, the value changed from real to integer.

32 Use ‘*’ instead of ‘-1.0’ for running dimensions of rules in show\_node\_list.

33 Clear mem\[head\] to null in push\_nest [in \TeX82, this will be done by get\_avail].

- A rule link got clobbered because I forgot to do this.

34 Translate ASCII control codes to special form when displaying them.

35 Remember to clear parameters off save\_stack in package routine.

- About eight hours today.

\[13\text{ Mar 1978}\]

36 Introduce a new variable hang\_first [later the sign of hang\_after].

37 Simplify the new code, realizing that if hang\_indent = 0 then hang\_first is irrelevant.

- Time sharing is very slow today, so I’m mostly reading technical reports while waiting three hours for compiler, editor, and loading routine.

- I’m not counting this as debugging time!

- ( Came back in the evening.)

38 Spruce up the comments in the line\_break routine, which appears to be almost working.

39 Rethink the setting of best\_line; it’s 1 too high in many cases. [The final line of a paragraph was handled in a treacherous way.]

40 Compute proper initialization for prev\_depth when beginning an \hbox with a paragraph inside. [This refers to a special ‘paragraph box’ construction, used when an hbox of specified size becomes overfull; \TeX78 doesn’t have the concept of internal vertical mode.]

41 Also initialize tail in that case.

42 Also put the result of line\_breaking into the correct list.

43 Fix a typo in the free\_node routine (‘link’ not ‘llink’); by strange chance it had been harmless until today.

44 Fix bug: post\_line\_break forgot to set adjust\_tail.

45 Update act\_width properly when looking for end of word while line breaking.

46 Repair the “tricky” part of get\_node: I used the info field when I meant to say link.

- Now the \corners macro of acphdr works! [See \setcornerrules in The \TeXbook, page 417.]
47 Reset contrib_tail properly in build_page. §995 D
48 Fix typo (− for +) in computation of page_total. §1004 T
49 Change the page-breaking logic: \TeX reached fire_up with best_page_break = null in one case, since the badness was too bad. §1005 S
50 Perform the operation delete_token_ref (top_mark) only when top_mark ≠ 0. §1012 M
51 Make scan_toks omit the initial \{ of an \output routine. §473 F
52 Insert a comma to make memory usage statistics look better. §639 I

• About seven good hours of debugging today.
• Tomorrow will be first-output day (I hope).

14 Mar 1978

• (came in evening after sleeping most of day, to get computer at better time.)
• (Some day we will have personal computers and will live more normally.)
• 8:30pm, began to enter corrections to yesterday’s problems.
53 Issue an error message for non-character in filename or in font name. §771 I
54 Display ‘...’ for omitted stuff in show_context routine. §643 I
55 Watch out for the SAIL syntax ‘α + β lsh γ ’; it doesn’t shift α + β left (only β). §464 L
• That error was very hard to track down; it created a spurious link field and sent hash[0] = \beta to the scanner!
• I could have found this bug an hour sooner if I had looked at the correct stack entries for name and token_type.
56 Show the correct page number when tracing pages before output is shipped. §638 D
57 Remember to nullify a box after using it. §1079 F
58 Issue an error message if \box255 isn’t consumed by the output routine. §1015 I
• I’m having trouble with the BAIL debugger; it makes an illegal memory reference and dies, when single-stepping past the entry to recursive procedures hlist_out and vlist_out. So I have to reload and be careful to go thru these procedures at high speed.
59 Fix bug in comment (memory parameter description said ≥ not ≤). §11 P
60 Fix typo in definition of rule output (said x, y not x0, y0). [This part of the code went away when DVI files were introduced.] B
61 Correct the embarrassing bug in shellsort, where I said ‘≤ str[k]’ not ‘≤ t’. [The first \TeX had to sort all output by vertical position on page.] B
62 Make start_input set up job_name in the form needed by shipout; it uses obsolete conventions. §532, 537 M
63 Insert ( and ) into the SAIL macro definition of new_string. [This macro was for pre-DVI output.] L
64 Unscramble the parameters of out_rule: The declaration was (x0, y0, x1, y1) while the call was (x0, x1, y0, y1). M
• 4:30am, \TeX ‘s first page is successfully output!
• (It was ‘\titlepage\setcpage1\corners\eject\end’)

15 Mar 1978

• 10:30pm. Today I’m instrumenting the line-breaking routine and putting it through a bunch of tests.
• (The inserted instrumentation had bugs that won’t be mentioned here.)
65 Don’t abort the job when eq_destroy redefines a \TeX control sequence. §275 C
66 Fix the typo in line_break that spoils the test for ‘letters in the same font’. §896 T
• The effect of that typo was to suppress all hyphenation attempts.

25 Replace the space at paragraph end by fillglue, not by zero. §816 B
68 Pack the hyphen character properly into its node. §582 L
69 Fix a typo (‘←’ for ‘+’) in the computation of break_width. §838 T
70 Change the \end maneuver; the present code doesn’t end the job, since I forgot that back_input uses cur_tok. §1054 M
71 Add a parameter to try_break, since the width is different at a discretionary hyphen. [This problem will be solved differently in \TeX\, when discretionary becomes much more general.] §840 A
72 Bypass kern nodes in pre-hyphenation. §896 F
73 Supply code for the forgotten case \texttt{‘< “<’} in pre-hyphenation. [This case was later generalized to a test of \texttt{lc_code}.] §897 F
74 Change mem\texttt{[q]} to prev_break\texttt{(q)} in the reverse-linking loop. §878 B
75 Introduce special logic for eject_penalty; I was wrong to think that forced ejection was exactly like an infinitely negative penalty. §851 A
76 Use \((1+b)^2 - p^2\) when computing demerits with \(p < 0\). §859 A

- 6:30am. The line-breaking algorithm appears to be working fine and efficiently. On small measures (about 20 characters per line), it gives overfull boxes instead of spaced out ones. Surprising but satisfactory.

16 Mar 1978

- 9pm. The plan for tonight is to test page breaking and more paragraphing.
77 Insert \texttt{‘\topskip’} glue at beginning of page. §1001 G
78 Add \texttt{‘pausing’} feature. §633 I
79 Fix discrepancy: In make_accent I called \texttt{vpackage} with a pointer to the first list item, but \texttt{vpackage} itself assumes that the parameter is a pointer to that pointer. [The \texttt{vpackage} of \TeX\,82 will be different.] §668 M
- I checked for other lapses like that. Result: 14 calls OK, 12 NG.
80 Create a new temporary list head location, \texttt{hold_head}, since there’s a case where \texttt{vpackage} is improperly called with parameter \texttt{temp_head}. [At this time \texttt{vpackage} uses \texttt{temp_head} to make a list of all insertions found.] §1014 M
- 11:30pm. The machine is tied up again.
81 Write code to handle charnodes in vlists; I forgot that I’d decided to allow them. [Later I prohibited them again!] §669 F
82 Combine the page lists before pruning off glue in fire_up; otherwise the pruning doesn’t go far enough. §1017 F

25 ↔ 83 Fix typo where line-breaking starts: \texttt{‘fill_glue’} should be \texttt{‘new_glue(fill_glue)’}. §816 B
84 Add /q to \texttt{xspool} command (cosmetic change). [This changes a system command that causes \TeX\ output to be printed on the Xerox Graphics Printer (XGP), the progenitor of future laser printers; the /q option says that the queue of printing requests should be displayed on the user’s terminal.] §642 I
85 Don’t write a form feed after the last page of output. §642 E
- To fix this, I reorganized ship_out, and it became simpler.
86 Correct a typo \texttt{‘+’} for \texttt{‘+’} in the vlist_node case within hlist_out. [The output routines were quite different at this time, because output went directly to the XGP.] §622 T
87 Change the message \texttt{‘completed page’} to \texttt{‘Completed for page’}. §638 I
48 ↔ 88 Fix yet another typo in the computation of page_total: My original code said \texttt{stretch(p)} instead of \texttt{stretch(q)} (terrible). §1004 B
89 Document the dirty trick about bot_mark’s reference count. [That trick is, fortunately, no longer useful.] §1016 P
90 Rethink the algorithm for contributing an insertion: The original code tests for a page break after incrementing the totals but before the contrib_list is updated. [\TeX\,78 handles insertions in a hardwired manner that will be greatly generalized in \TeX\,82.] A
THE ERRORS OF \TeX

91 Fix \texttt{get_node} again: After the variable memory overflows, control falls through to \texttt{found} instead of going to the \texttt{overflow} call. §125 F

\begin{itemize}
\item I spent several hours tracking down that data structure bug!
\end{itemize}

92 Change \texttt{new_line} to \texttt{next_line} in yet another print command (see #7). B

93 Amend the line-breaking algorithm: \texttt{\textbackslash break} in paragraph doesn’t work with really bad breaks. §851 A

\begin{itemize}
\item A problem to be diagnosed tomorrow: Each time I run the test program, the amount of memory in use grows by 13 cells not returned.
\item Seven hours tonight.
\end{itemize}

17 Mar 1978

94 Introduce \texttt{dead_cycles} to keep \texttt{\textbackslash end} active until \texttt{ship_out} occurs. §1054 G

95 Don’t call \texttt{line_break} with an empty list. §1096 E

96 Take proper account of the (infinite) fillglue when computing the width of a paragraph line preceding a display. §1146 S

97 Add a new parameter to \texttt{hpack} so that \texttt{line_break} won’t be called at the wrong time. [This is for the soon-to-be-obsolete feature described in #40.] M

98 Give a warning message if there’s an \texttt{\textbackslashhf ill} in the middle of a paragraph; fillglue upsets the line breaker, because floating-point calculations don’t have sufficient accuracy.

\begin{itemize}
\item I spent an hour looking for another bug in \TeX{}, but the following one was in \texttt{METAFONT}: The \texttt{xgp} height data in fonts had been supplied wrong.
\item It took two hours to recompile 32 fonts with proto-\texttt{METAFONT}.
\end{itemize}

99 Make \texttt{show_node_list} and \texttt{show_token_list} more robust in the presence of software bugs. §182 R

97 \mapsto 100 Do not remove nodes with \texttt{eject_penalty}, when the new parameter to \texttt{hpack} is \texttt{true}. D

97 \mapsto 101 Put a fast exit into \texttt{hpack}; e.g., at glue nodes, test ‘if \texttt{paragraphing} $\land$ \texttt{\langle current width is large \rangle}’.

\begin{itemize}
\item 2am. I have to go to bed “early” tonight.
\end{itemize}

18 Mar 1978

\begin{itemize}
\item 3:30pm. (Saturday)
\end{itemize}

102 Add a parameter to \texttt{check_mem} (to suppress display unless needed). §167 I

103 Introduce a user-settable parameter \texttt{\textbackslash maxdepth}, and pass it as a parameter to \texttt{vpackage}. §668 G

\begin{itemize}
\item I realized the need for \texttt{\textbackslash maxdepth} while fixing insertions (see #90).
\end{itemize}

104 Introduce a user-settable parameter for \texttt{line_break}: The constant 2.0 in my original algorithm becomes \texttt{\textbackslash par} [later \texttt{\textbackslash tolerance}], to be set like \texttt{\textbackslash tracing}. §828 G

105 Reclaim the \texttt{eject_penalty} nodes removed during line-breaking.

\begin{itemize}
\item (Those were the 13 extra nodes reported on Thursday.)
\item The \texttt{\textbackslash init_align} procedure worked right the first time!
\item Also \texttt{\textbackslash init_row}, \texttt{\textbackslash init_col}. But then…
\end{itemize}

106 Rethink the command codes: \texttt{ende} in a token list has too high a code for the assumptions of \texttt{get_next}. §207 S

107 Add a \texttt{prev_cmd} variable for processing delimited macro parameters; the original algorithm loses track of braces. [The rules will change slightly in \TeX{}82, and \texttt{\textbackslash brace_ptr} will take on a similar function.] §400 A

108 Make the \texttt{get_next} routine intercept \texttt{\&} and \texttt{\textbackslash cr} tokens. §342 S

\begin{itemize}
\item I’d thought I could just put \& and \texttt{\textbackslash cr} into \texttt{\textbackslash big_switch} [i.e., in the stomach of \TeX{}, not the eyes]; that was a great big mistake.
\end{itemize}

109 Make more error checks on \texttt{ende}; e.g., it must not occur in a macro definition or call. §780 R
No, rethink alignments again; the new program still fails!

- For the first time I can glimpse the hairiness of alignment in general (e.g., \halign{\&\&v&...} when \& and v are defined to include \&'s and possible alignments themselves).

- I think there’s a “simple” solution, by considering only whether an alignment is currently active [in §342].

11:30pm. Went to bed.

19 Mar 1978

- Woke up with “better” idea on how to handle \& and \cr.

- (Namely, to consider a special kind of \def whose parameters don’t interrupt on \&’s and \cr’s.)

- But replaced this by a much better idea (to introduce align_state).

11pm. Began to use computer. Performed major surgery (inserting align_state and updating the associated routines and documentation).

- I had a mistake in acphdr definition of \quoteformat; also extra spaces.

- My first test programs, used before today, were contrived to test macro expansion, line-breaking, and page layout.

- Next I’m using a test program based on Volume 2.

- Make carriage-return, space, and tab equivalent for macro matching.

- Correct a silly slip: I wrote ‘type_displacement’ instead of ‘value_displacement’ when packing data in a penalty node.

- Don’t go to build_page after seeing \noindent; \TeX isn’t ready for that. [In the original program, this was an instance of a bad goto.]

- I had undesired spaces coming thru the scanner in my macro definitions of \tenpoint [see The \TeXbook, page 414].

- 4am. \TeX now knows enough to typeset page 1 of Volume 2!

- Also it did its first “math formula” (namely ‘$X$’) without crucial error.

- (Except that the italic correction was missing for some reason.)

Remember to decrement cur_level in fin_align. [The routines will eventually become more general and use unsave here.]

Remember to increment cur_level in error corrections by handle_right.brace. [A better procedure will be adopted later.]

Fix a typo: (‘C instead of ‘Y’) in error message for mmode + math_shift.

Make show_noad_list more robust and more like the new show_node_list. [The routines will be combined in \TeX82.]
20 Mar 1978

• 8pm. I decided to work next on a super-hairy formula.

127 Change `\ascii' to `\cc' (character code). [This name will change again later, to `\char'.] §265 C

128 Don’t bother to store a penalty node at the beginning of $\$\$ when the paragraph-so-far fits on a single line, since such a penalty has already been stored. [These conventions will change later, and the \predisplaypenalty will always be stored.]

§1203 E

129 Avoid reference to tail in build_page, if nest_ptr > 0.

§905 S

130 Correct a silly slip in math_comp (the exact opposite of what I did in #118). §1158 B

131 Rectify my mental lapse in make_fraction; I said nucleus instead of thickness. §743 B

132 Mask off the math class when scanning delimiters.

§1160 F

133 Allow an optional space after `\def{...}. [This decision will be retracted later.] §473 C

• My test example is so complicated it causes the semantic stacks to overflow!

134 Don’t test for no pages output by looking at the channel status.

§642 L

135 Fix typo in definition of \mathop (open_noad not op_noad).

§1156 T

136 Rewrite fin_mlist, because `\left(...\above...\right)' doesn’t parse correctly; the \left goes into the numerator, the \right into the denominator.

§1184 A

137 Correct the use of depth_threshold in print_subsidary_data: Simple fields get shown while others look empty.

§692 B

78 → 138 Return the carriage before showing the first line of a new file when pausing.

§538 I

139 Fix bug: The call show_noad_list(mem[...]) should be show_noad_list(...), in the incompleat_noad case of show_activities.

§219 M

• 3am. The whole messy formula has been parsed correctly into a tree.

• The easy part is done, now comes the harder part.

140 Don’t shift single characters down in make_op.

§749 F

141 Make clean_box return a box (as its name implies), not an hlist.

§720 D

• Font info still isn’t quite right, it has the wrong value of quad.

142 Retain the italic correction when doing rebox; can make glue_set ≠ 0 a flag for this. [A better solution will be adopted later.]

§715 A

143 Fix the bug that makes rebox bomb out: value(p) should be value(mem[p]).

§715 B

• 6am; ten hours today. \TeX\ didn’t do $\pi\over2$ correctly, but was close.

• I found that the rebox problem (#142) went away when I fixed the clean_box problem (#141); but I will leave the extra stuff about glue_set ≠ 0 in the program anyway, just for weird cases.

144 Omit extra levels of boxing when possible in clean_box.

§721 E

• (To do this, I need to face the rebox problem anyway.)

21 Mar 1978

• 10pm. The computer is rather heavily loaded tonight.

145 Don’t forget thickness when making a square-root sign (see #131). [The rule thickness will later be derived from the character height.]

§737 F

146 Define p local to the make_fraction routine.

§743 L

• Unwittingly using the global p was a disaster.

147 Don’t show the amount of glue_set when it’s zero.

§186 I

142 → 148 Make glue_set nonzero in the result of var_delimiter.

§706 D

149 Fix bug: The math_glue function didn’t return any result.

§716 F

150 Fix typo in char_box (c not w); this caused a subscripted P to come out the same width as an unsubscripted P. [Later changes in the rules will move this computation to §755.]

§709 T

144 → 151 Revise clean_box to do operations that are needed often because of the rebox change.

§720 P

152 Use the new clean_box to avoid a bug in $\sqrt{\raise\ldots}$. §737 D
153 Change the definition of \not so that it’s a relation (which will butt against the following relation). [All math symbols and Greek letters are defined in INITEX at this time, not in a changeable format definition.]

154 Give error message ‘Large delimiter must be in mathex font’, instead of calling confusion, since the error can occur. [This particular error is impossible in \TeX82.]

155 Change the use of \mathchar in \var_delimiter; it isn’t always set when I say \texttt{goto found.}

• Another font problem now surfaced: The mathex meta-font didn’t compute \TeX info in a machine-independent way. (It took two hours to correct this.)

156 Don’t forget to set \mathcode \mathex \shift \mathex \space \... 8 in \TeX82, represented as a string called \texttt{mathex_spacing.}

157 Use the correct sign convention for \texttt{shift_amount} in \texttt{hpackage}.

158 Always kern by \texttt{delta} when there’s no superscript.

159 Declare \texttt{space_table} to be \texttt{[0..6,0..6]} not \texttt{[0..7,0..7];} otherwise its entries are preloaded into the wrong positions. [The \texttt{space_table} in \TeX78 is \texttt{7 \times 7}; it will become \texttt{8 \times 8} in \TeX82, as \texttt{font} \texttt{mathex}.

160 Use a negative value, not zero, to represent a null delimiter. [Actually zero will come back again later.]

161 Change \texttt{\cc} to \texttt{\char}.

162 Don’t use tricky subtraction on packed data when changing \char to an \texttt{ord_noad} in \texttt{mlist_to_hlist}; subtraction isn’t always safe.

163 Fix two typos in the \texttt{space_table} (* for 0).

164 Initialize \texttt{cur_size} everywhere (I forgot it in two places).

165 Reset \texttt{op_noad} before resetting \texttt{bin_noad}.

166 Treat \texttt{display_style + cramped} the same as \texttt{display_style} inside \texttt{make_op}.

167 Shift the character correctly in the non-\texttt{\displaystyle} case of \texttt{make_op}.

• Still another font problem: The italic corrections are wrong because the corresponding array was declared \texttt{real} in \texttt{proto-METAFONT} (and italic corrections were used in nonstandard way in \texttt{mathex}).

168 Use \texttt{depth} instead of \texttt{height} in \texttt{var_delimiter}. [Later, both were used.]

169 Skew the accents according to the font \texttt{slant}. [Soon retracted.]

• At this point I think nearly all the math routines have been exercised.

• Tomorrow they should work!

• Eight hours debugging today.

22 Mar 1978

• (Wednesday, but actually Thursday: I began at midnight because I was proofreading a paper.)

• I checked out the font access tables, slowly (i.e., all the \texttt{\mathcode} and special-character name entries were catalogued).

169 \rightarrow 170 \textbf{Do not} consider slants after all in the math accent routine, since slanted math letters are put differently into fonts.

171 Don’t use \char for two different things simultaneously in \texttt{make_mathAccent}.

172 Fix bug in \texttt{compact_list} (I forgot to advance the loop variable). [This procedure became unnecessary in \TeX82.]

173 Avoid conflict between \texttt{var_delimiter} and \texttt{mlist_to_hlist}, which want to use \texttt{temp_head} simultaneously.

174 Fix bad typo in \texttt{overbar} routine (b for p).

• Finally \TeX got to after_math after dealing with that hairy formula...

175 Fix another bad typo: p for b this time.

176 Insert more parentheses (twice) because of ‘\texttt{lsh}’ precedence in \texttt{SAIL}.

36 \rightarrow 177 Use the new hanging-indentation conventions when formatting displayed equations.

178 Recompute penalties so that break is allowed after \texttt{punct_noads}.
Center the large delimiters vertically. §749 F
180 Round all rule sizes (up) before drawing them. §589 Q
181 Provide more space over \(\sqrt{x}\), and more space atop vincula. §705, 737 Q
182 Make large delimiters large enough to cover formula height (important for subscripts, superscripts). §762 Q
183 Insert /\texttt{ntn}=33 on XGP prompt message so that complex math won’t blow the device driver. [See #84.] I

184 Update the comment about the meaning of \texttt{\char}, since it can be used in math mode. §208 P

• Six hours today.

23 Mar 1978

• 11pm, Maundy Thursday.

104 → 185 Make \texttt{\tracing} and \texttt{\jpar} follow block structure. §283 C

• It took me two hours to enter yesterday’s corrections, because the changes were so numerous.

186 Fix bad call on \texttt{begin_token_list} when marks are to be scanned. §396 M

• Now the formula looks like it should, modulo problems in fonts.

187 Prevent an exponent from going below baseline + 4xheight. §758 Q

188 Change \texttt{quad} to \texttt{math_quad} when finishing a display (several places). §1199 B

189 Don’t use \texttt{append_to_elist} when putting an \texttt{\eqno} box on a separate line, because the page shouldn’t break at glue there. [Later, the \texttt{append} will be used but preceded by an infinite penalty.] §1205 A

190 Increase the input \texttt{stack_size}; \TeX{} may need to back up a lot. §11 S

191 Don’t assume that \(p\) always points to a glue node when a page is broken. §1017 A

192 Use \texttt{epsilon} in \texttt{scan_spec} (I had used a different small constant). [This was a kludge to avoid the extra parameter later called \texttt{exactly} or \texttt{additional}.] §645 A

193 Introduce a new procedure \texttt{scan_positive_length}, to prevent negative or zero lengths in \texttt{scan_rule_spec}. [This restrictive rule will be “overruled” later.] §463 R

194 Fix ridiculous bug in the leaders routine of \texttt{elist_out}: I had the initialization inside the loop! §635 B

195 Eliminate confusion between the two temp variables named \(h\); one is \texttt{real} and the other is \texttt{integer}. §629 L

196 Include forgotten case (\texttt{leader_node}) in \texttt{hlist_out}. [Type \texttt{leader_node} will be absorbed into \texttt{glue_node} in \TeX{82}.] §622 F

197 Don’t forget to compute \(x0\) in variable horizontal rules. §624 F

• Seven and a half hours today.

• \TeX{} seems to be ready to tackle my test file based on Volume 2.

198 Calculate \(y0\) in horizontal rules as an integer number of pixels from the baseline, so that the baseline doesn’t jump. §589 S

25 Mar 1978

• 2am Saturday. (Might as well drop Friday.)

185 → 199 Make \texttt{def_code} consistent with the new \texttt{\tracing} conventions. [Many tracing options are packed into a single parameter called \texttt{\tracing}.] §1233 D

185 → 200 Don’t allow users to change nonexistent things like \texttt{\catcode1000}. §1232 R

110 → 201 Reset \texttt{align_state} at beginning of \texttt{init_align}. §774 F

202 Don’t forget \texttt{scan_left_brace} after \texttt{\noalign}. §785 F

110 → 203 Set \texttt{cur_cs} ← 0 in \texttt{get_next}, after \texttt{\cr} causes a switch to the \texttt{(v)} template. §342 F

• Ouch, that was a big bad bug, which took me three hours to find (since I thought \TeX{}’s low-level scanning mechanism was working).
Note to myself: I knew it would be cleaner to define get_next so that it sets cur_cs to zero every time it begins [i.e., in §341, where this change will in fact be made in TeX82]. But I had avoided this on grounds of efficiency in the inner loop. Well, now I have earned this tiny bit of efficiency.

Prohibit the first word of an unavailable node from becoming negative. [The storage allocator of TeX78 uses a negative value to signify a node that is available, just as 'link = max_halfword' will signal availability in TeX82.] §124 D

That was another bad one, it’s not my night.

At least I’m developing more subtle diagnostic techniques.

Remember to un-negate the top save_stack entry when handle_right_brace finishes an insert_group. [This routine was completely revised in TeX82.] §1100 M

Initialize \par [i.e., tolerance]. §240 F

Correct the display of insertion nodes by show_node_list. §188 B

Prevent show_token_list from generating really long strings when in a loop. §292 R

Increase the reference count of bot_mark when \package finds it. [This was later the job of fire_up.] §1016 D

Remember that the tokenlist for a mark ends with a \}. §1101 M

Don’t let \package lose the top insert. (It fails when the very first item is a \topinsert.) §1014 D

And when that stupid code is corrected, make it handle insertions first-in-first-out.

Seven hours today.

26 Mar 1978

Easter Sunday, will work till sunrise.

Add an ‘i’ feature to the error recovery routine. §87 I

Include a prompt. §87 I

Ignore space after \noalign{...}. §1133 C

• Otherwise, things are going well tonight; I’m finding more bugs in my test program than in TeX.
• The ‘i’ feature is proving to be very helpful.
• I increased the size of \mem (now \lo \mem = 3500, \mem = 10000).
• In fact I just needed to increase it again (now \lo \mem = 4500, \mem = 11000).

Make INITEX output \mem_top for consistency checking. §1307 R

Calculate the size of delimiters by considering the enclosed formula’s distance from the axis, not from the baseline.

I’m having trouble with a SAIL compiler bug; I must rearrange the program, more or less at random, until it compiles correctly. I hope the bug isn’t more severe than it appears.

Don’t put a new group on save_stack if a null mark is expanded. [TeX82 will remove the ‘}’ from the mark text.]

• I had to redo the typewriter-style font since its width tables were wrong.
• And I increased low-memory size again to 5500, then 6500.
• Finally the entire test program was TeXed. Happy Easter! Six hours today.

27 Mar 1978

Beginning at 2:30am.

Move \vcenter processing to the first pass of mlst_to_hlist; otherwise the height, depth, subscripts, etc., are way off.

Omit space after closing $$.

Spacing is wrong in the formula \( Y_1 + \cdots + Y_k \); I have to rethink the use of three dots.
221 Make conditional thin space available to user as $\backslash \<$. [Later will retract this.] §226 G
222 Introduce $\backslash \text{dispaskip}$ and $\backslash \text{dispbaskip}$ [later called $\backslash \text{aboveplayshortskip}$ and $\backslash \text{belowplayshortskip}$]. §226 G

- Reminder: I need to test line-breaking with embedded math formulas.

223 Make sure that $\text{interaction} \neq \text{error\_stop\_node}$ in the ‘\whoa’ error \texttt{fata\_error}. §393 I

224 Fix a big mistake in the \texttt{style\_node} routine (which points to a glue spec, not to glue itself); somehow this didn’t cause trouble yesterday. [In \TeX78, style nodes double as placeholders for math glue like thin spaces.] §732 B

225 Make $\text{\fntfam}$ obey group structure. [\TeX78's $\text{\fntfam}$ operation is a combination of \TeX82's $\text{\textfont}$, $\text{\scriptfont}$, and $\text{\scriptscriptfont}$]. §1234 C

- At this point the test routine for Volume 2 works perfectly.
- But I will change the page width in order to check harder cases.

226 Represent italic corrections as boxes, not glue, so that they won’t be broken. [The $\textbackslash \kern$ command doesn’t exist yet.] §1113 S

- Eight hours today.

227 Fix a bug that just clobbered the memory: Call $\text{\free\_avail}$, not $\text{\free\_node}$, in the \texttt{ins\_node} case of \texttt{vpackage}. [This logic will change completely in \TeX82.] §1019 B

228 Disable automatic line breaks after punctuation in math (e.g., consider $f(x,y)$). §761 Q

229 Install an infinite penalty feature, which positively suppresses breaks; use it in displayed formulas whose $\text\eqno$ doesn’t fit. §1205 G

230 Represent italic corrections as boxes, not glue, so that they won’t be broken.

- Although the test program gives correct output, it generates 46 locations of variable-size memory and 280 of one-word memory that are not freed.

231 Call $\text{\build\_page}$ after finishing a display; and don’t go to the \texttt{\noindent} routine because of the next remark. §1200 F

232 Put $\text{\parskip}$ glue just before a paragraph, not just after (since it interferes with a penalty after). §1091 S

- This solved the other mystery. I had never noticed that my test output was actually wrong: $p\backslash \text{choose} k$ came out as ‘k’.
- After these corrections, the test routine worked... I feel that \TeX is now pretty well debugged (except perhaps for error recovery)—it’s time to celebrate!

1 Apr 1978

233 Extend $\text{\search\_mem}$ to search \texttt{eqtb} also. §255 I

234 Fix bug when deleting space at end of paragraph: $\text{\delete\_glue\_ref} (\text{cur\_node})$ not $\text{\delete\_glue\_ref} (\text{value} (\text{cur\_node}))$. §816 M

- This solved the other mystery. I had never noticed that my test output was actually wrong: $p\backslash \text{choose} k$ came out as ‘k’.
- After these corrections, the test routine worked... I feel that \TeX is now pretty well debugged (except perhaps for error recovery)—it’s time to celebrate!

1 Apr 1978

235 Don’t quit after file lookup fails. §530 I

2 Apr 1978

236 Add $\TeX\_font\_area$, so that it’s easier to change the default library area associated with a device. §514 P
3 Apr 1978

240 Insert parentheses again, to cope with the precedence of \lsh when packing data. (See \#55 and \#176.)

\* I had never tried hmode + discretionary before!

241 Remember that back_error requires cur_tok to be set. (Problem can arise during error recovery on parameter \#n with \#n out of range.)

§1114 L

4 Apr 1978

242 Add a deletion feature to the error routine.

§88 I

5 Apr 1978

243 Reset space_factor after \sqrt [this was later rescinded] and after math in text.

§1196 Q

10 Apr 1978

104 \→ 244 Replace \jpar and \tracing by a new primitive \chpar for parameters. It allows a user to change those quantities as well as the penalties for hyphens, relations, binary ops, widows.

§209 G

14 May 1978

\* Beginning to typeset a real book (Volume 2, second edition), not just a test.

245 Make math in text end with spacing as if it were followed by punctuation. [This rule will soon be rescinded.]

§760 Q

246 Insert \times into the hash table; I left it out by mistake. [It will eventually move into plain.tex.]

F

247 Change the names of Scandinavian accents from \o, \oslash, \Oslash to \a, \o, \O. [This will also move to plain.]

C

17 May 1978

248 Fix a silly bug that hasn’t been tweaked until today: \halign to size’ [obsolete in \TeX82] used vsize instead of hsize.

§645 B

19 May 1978

249 Add a \topbaseline feature [later called \topskip].

§1001 G

250 Subtract the math spacing change of May 14.

§760 Q

251 Skip past blanks in the scan_math procedure. [This blank-skipping will eventually go into scan_left_brace.]

§403 A

252 Introduce a missing_brace routine [later generalized] to improve error recovery in mmode + math_shift, when the top of save_stack isn’t a math_shift_group.

§1065 I

253 Adjust the math spacing between closing parentheses and Ord, Op, Open, Punct.

§764 Q

254 Make the underline go further under.

§735 Q

96 \→ 255 Compute the proper natural width when a displayed equation follows a paragraph whose fillglue has been deleted by line_break.

§1146 S

20 May 1978

256 Fix the spurious value of prev_depth inside alignments.

§775 A

257 Consider (and defeat) the following scenario: The u and \v lists are built in init_align using temp_head; then while scanning \tabskip 2pt\rt\{…\} the macro \rt is expanded, clobbering temp_head.

\* That bug was more subtle than usual.

§779 S

258 Add the parameter num3, so that the positioning of \atop can be different from that for fractions.

§700 Q

259 Add new parameters delim1 and delim2, so that \comb can use fixed size delimiters, not computed as with \left.

§748 Q

22 May 1978

221 \→ 260 Change \< to \< and introduce \< as the negative of \>. [Later obsolete.]

§226 C
THE ERRORS OF TeX

261 Fix the display of negative penalty nodes; \textit{show_node_list} is confused when a negative value has been packed into the middle of a word. \S 194 L

- Memory overflow just occurred with \textit{lo_mem_max} = 7500 and \textit{mem_max} = 16384. So I have to go to 15-bit pointers. (A problem on 32-bit machines?)

23 May 1978

262 Add a new parameter \texttt{big_op_spacing5}, for extra space above and below limits of big displayed operators. § 751 Q

263 Initialize \texttt{incompleat_node} in $$\halign{...}$$.

- That was another heretofore-untested operation. How much of the code has not yet been exercised?

§ 751 Q

25 May 1978

264 Close the file when doing lookup-failure recovery. § 27 F

265 Improve the error recovery for \texttt{Extra \&}. § 792 S

266 The top piece must be calculated mod 128 in \texttt{var_delimiter}, to guarantee a valid subscript range. [Obsolete in \texttt{TeX82}.]

§ 546 R

252 \mapsto 267 Fix a blunder in new \texttt{missing_brace} code. § 1065 B

262 \mapsto 268 Fix a blunder in new code for limits on display operators. § 751 B

26 May 1978

269 Don’t insert a new penalty after an explicit penalty in math mode. § 767 Q

- The hash table overflowed; I ought to make it much bigger.

110 \mapsto 270 Avoid possible bad memory references in alignment when there is erroneous input after \texttt{\cr}. [Instead of \texttt{extra_info}, the value of \texttt{cur_align} in \texttt{TeX78} is negated, because we need only distinguish \texttt{\cr} from \texttt{&}.] § 789 R

271 Make the dimension parameters like \texttt{\hsize} all global, so that they can be set in the \texttt{output} routine.

- This led to major simplifications, also to major surgery.

- [But it was a kludgy decision, overruled in \texttt{TeX82}.]

§ 279 S

94 \mapsto 272 Don’t forget to set the type of the new null box in the \texttt{\end} routine. § 1054 D

27 May 1978

- The data overflowed memory again, both low and high, doing Section 3.3.2.

184 \mapsto 273 Mask off extra bits of \texttt{\char} in math mode, to avoid bad memory references. § 1151 R

274 Zero out the negative \texttt{\medmuskip} in script styles. § 732 B

29 May 1978

275 Be prepared to handle an undefined control sequence during \texttt{get_c_token}. (Can fix this by brute force, using \texttt{get_token} instead of \texttt{get_next}.) § 380 S

276 Correct the superscript shift when a single character is raised. § 758 D

184 \mapsto 277 Mask off all but 7 bits in \texttt{\char} routine, to avoid space-factor index out of range.

- More memory capacity overflows.

22 \mapsto 278 Fix \TeX's overflow stop so that I don’t have to wait for loading of the \texttt{BAIL} debug routines. [System dependent.]

§ 93 E

279 Remember to adjust the page number when a file page ends in mid-macro. [System dependent.]

§ 306 F

5 Jun 1978

280 Make sure that the arguments of positioning commands don’t overflow their field size. § 610 R

281 Report the excess amount when giving an overfull box warning. § 666, 677 I

7 Jun 1978

282 Use $\geq$ instead of $>$ as termination criterion in \texttt{var_delimiter}.

§ 714 Q

283 Disallow \texttt{\eject} in math mode. [In \TeX78, \texttt{\eject} is distinct from \texttt{\break}; in horizontal mode it includes \TeX82's \texttt{\vadjust{\break}}.]

§ 1102 R
Don’t put too much clearance above \sqrt in text style.

9 Jun 1978

Make align_state an integer variable, not boolean, so that \eqalign can be within another \eqalign.

§ 737 Q

A \mark should expand its input.

§ 1101 C

10 Jun 1978

Provide for preloading of fonts.

§ 1320 E

Close the output file before switching to edit the input file with the ‘e’ option.

§ 284

Return adjustments found by hpack to free storage if they’re not used. [Later, hpack will detach them only when they’re used.]

§ 655 E

Strive for consistency between make_under and make_over.

§ 735 Q

18 Jun 1978

Fix a serious error in rebox (‘b’ instead of ‘list_ptr(b)’).

§ 715 B

Strange that such a bug would now surface for the first time!

19 Jun 1978

Introduce the ‘no_new_control_sequence’ switch. Among other things, this will prevent an undefined control sequence following scan_math from clobbering the save stack.

§ 259 S

Change the badness test ‘glue ≤ 0.0’ to ‘glue ≤ 0.0001’. [\TeX82 will avoid such problems by calculating badness without floating point arithmetic.]

§ 99 L

Force badness to be at most 10^{19}.

§ 108 R

Add end_template for better error recovery in alignments.

§ 375 I

Move the declaration of mem to the semantics module, so that the object code will be more efficient. [System dependent. The code of \TeX78 was divided into separately compiled modules for syntax, semantics, output, extensions, and general organization.]

19 Jul 1978

Disallow \input except in vertical mode. [I will change this in \TeX82, treating \input as a case of expansion.]

§ 378 C

Add error recovery for endv and par_end occurring in math mode.

§ 1047 I

Generalize \ifT to \if T.

§ 506 G

22 Jun 1978

Preload the \bullet [later done by plain.tex].

F

Get the correct prev_depth at the beginning of an alignment.

§ 775 D

Change \eject so that it ejects only once.

§ 1000 C

14 Jul 1978

Look in standard area if a file isn’t found in the user’s area.

§ 537 I

Echo all online inputs in the transcript file.

§ 71 I

19 Jul 1978

Equalize spacing when only one of numerator/denominator is big.

§ 745 Q

Prevent subscript from getting too high above baseline.

§ 757 Q
311 Avoid infinite loop when stack overflows: *push_input* should say ‘if \input_ptr \geq stack_size \land interaction = error_stop_mode’.

22 Jul 1978

312 Make \quad meaningful outside math mode. (All fonts must be generated again!) §558 C

313 Show the nesting level at the end of show_activities. [But I decided not to do this in \TeX{}82.] §218 I

314 Put in \(\rbrack\) [namely, \texttt{\char\mkern-4mu\medmuskip\char} \TeX{}78 already has \(\lbrack\), for conditional \texttt{\char\mkern-4mu\thinmuskip\char}, as well as the negative amounts \(\langle\), \(\rangle\). Change the name of vector accent from \(\rbrack\) to \(\vect\). [Math spacing operators will become much more general in \TeX{}82.]

25 Jul 1978

94 \mapsto 315 Give the correct \hspace and \vspace to the null boxes created at \end. §1054 Q

94 \mapsto 316 And don’t “append” them. [Later this was changed, so that it would work better with generalized output routines.]

297 \mapsto 317 Remove the control sequence \endv, since error recovery is now better. §375 I

318 Define another mode of tracing: It says ‘\OK\’ and stops after \showlists. §1298 I

244 \mapsto 319 Give better defaults to parameters. [Later done by \texttt{plain.tex}.] §209 Q

320 Allow more bits in the packed representation of \showboxdepth. §238 I

321 Scan past delimiters and/or dimensions when recovering from ambiguous fractions. §1183 I

322 Reduce accent numbers modulo 128 or 512, depending on the mode. §1165 R

323 Include a warning, ‘(\end occurred on level ...\)’. §1335 I

28 Jul 1978

- *(I’m writing Chapter 27 of the manual: ‘Recovery From Errors’.)

324 Improve the error message in scan_digit. [This procedure will change its name to scan_eight_bit_int, when the number of registers increases from 10 to 256.] §433 I

325 Don’t report overfull boxes if they’re less than .1 point over. §666, 677 I

326 Give the user extra chances to define the font, if \texttt{read_font_info} is unsuccessful. §560 I

327 Change default recovery for bad parameter number from \#1 to \#, since \#1 won’t always work and since \#\# is probably intended. §479 I

328 Omit the “Negative?” message on things like scan_char_num. §435 I

329 Improve error recovery when a large delimiter isn’t in family 3. [Obsolete.] I

330 Give a more appropriate error message when the input is ‘$\right\rangle’. §1192 I

- Currently \TeX{} says ‘Missing $’.

331 Call \texttt{back_input} before the error message in \texttt{back_error}, not afterwards. §327 I

1 Aug 1978

332 Give an appropriate warning when there’s no input file and the user types ‘e’. §84 I

333 Increase the system pushdownlist size so that the manual will compile. [Procedures \texttt{hlist_out} and \texttt{vlist_out} can recurse deeply.]

- Yesterday I distributed 45 preliminary copies of the manual; today I took out the “debugging hooks” and put \TeX{} up as a system program.

2 Aug 1978

- I’m typing Volume 2 again (currently in Section 4.2.2). Culture shock!

334 Introduce a \texttt{\ragged} parameter, to indicate a degree of raggedness. [Previously, ragged-right setting was performed when the \texttt{\tolerance}/100 was odd! Eventually a better approach, with \texttt{\rightskip} and such things, will be discovered.] §886 G

335 Omit the ‘widow penalty’ in one-line paragraphs. §890 Q
§ 236 G

Update align_state when recovering from ‘Missing {’ and ‘Extra }’ errors.

§ 1069, 1127 D

Show “runaway” tokens, making it easier to pinpoint an error.

§ 306 I

22 Aug 1978

Add \predisplaypenalty.

§ 1203 G

Clarify error messages; they should indicate when something has been inserted, etc.

§ 1064 I

23 Aug 1978

Substitute ‘Extra }’ for the losing ‘Missing \cr’ error message.

§ 1069 I

Go past online insertions in show_context.

§ 311 I

Exact no penalty for breaking one line before a display.

§ 1145 Q

Check for runaways at end of file.

§ 362 I

Give error message when a macro argument begins with {).

§ 395 I

24 Aug 1978

Remove extra line-feed in show_context after printing insertions. [System dependent.]

§ 318 L

25 Aug 1978

Leave no glue at top of page, even after \eject.

§ 997 Q

27 Aug 1978

Adopt Guy Steele’s new version of the T\TeX source files. [He has recently made a copy and modified it by introducing compile-time switches for MIT conventions as an alternative to SUAI. This is the first time that \TeX is being ported to another site; additional switches for PARC, TENEX, TOPS10, and TOPS20 will be added later, using the Steele style.]

P

1 Sep 1978

Don’t pass over leader nodes in the try_break background computation. [At this time, leaders have not yet been unified with glue.]

§ 837 Q

82 \rightarrow 350 Prune away all penalties at the top of a page.

§ 997 Q

4 Sep 1978

Include ‘\’ in error message about a runaway argument.

§ 306 I

8 Sep 1978

I just remade all the fonts, with increased ligature field size.

§ 997 B

350 \rightarrow 352 Insert a necessary goto statement in the first branch of the new penalty routine within build_page.

338 \rightarrow 353 Make the token list for runaway arguments meaningful outside of macro_call. (I just had a runaway argument ending with ‘\lcm’, which turned out to be the control sequence in hashtable location 0.)

§ 371 M

354 Avoid infinite loop when recovering from $$ in restricted horizontal mode.

§ 1138 R

Fix two hyphenation bugs related to -ages, -ers. [A completely new algorithm for hyphenation will go into T\TeX82.]

L

356 Add -est to hyphenation routine; also disable puzzled and rattled, etc.

Q

4 Oct 1978

357 Add new primitive \vtop.

§ 1087 G

358 Treat implicit kerns properly after discretionary hyphens have been inserted.

§ 914 Q
4 Nov 1978
359 Forget the half quad originally required at left and right when centering displayed equations without equation numbers. §1202 Q

11 Nov 1978
360 Don’t let the postamble come out empty. [This could occur if no fonts were selected.] §642 R

15 Nov 1978
361 Allow optional space after digit in scan_int routine. §444 C

17 Nov 1978
362 Make the check_mem procedure slightly more robust. §167 R

20 Nov 1978
363 Make the \par in a \def match the \par that comes automatically with a blank line. (Suggested by Terry Winograd.) §351 C
364 Add new parameter \mathsurround for spacing before and after math in text. §1196 G
365 Extend \advance to allow increase by other than unity. [At this time it applies only to the ten \count registers, and it is called \advcount.] §1238 G

25 Nov 1978
366 Add a new primitive: \unskip. §1105 G
367 Add new primitives \uppercase and \lowercase. §1288 G

28 Nov 1978
368 Don’t let \mark and macro_call interfere with each other’s scanner_status. §306 M
369 Omit extra } after show_node_list shows a \mark, since the right brace is already there. (See #210.) §176 M
370 Add a new primitive suggested by Terry Winograd: \xdef. §1218 G

29 Nov 1978
371 Delete a space following \else{...} also in the false case. [\TeX78 uses braces, not \fi, for conditionals.] S
372 Make \tracing set \showboxbreadth as advertised. §198 D
373 Account properly for kerns in width calculations of line_break. §866 F
364 \rightarrow 374 Delete a math_node at the beginning of a line.
339 \rightarrow 375 Guarantee that \predisplaypenalty=10000 will suppress page breaking before a display. §1005 A

6 Dec 1978
376 Change the file opening statement to allow lines up to 150 characters long. [System dependent.] L

16 Jan 1979
365 \rightarrow 377 Initialize negative properly in the \advance routine with a \count as argument. §440 F

20 Jan 1979
378 Try to keep complex, buggy preambles of alignments from crashing the program. §789 R

17 Feb 1979
376 \rightarrow 379 Give more detailed information when warning about a long line being broken. [System dependent; the buffer size in \TeX78 is very limited.] I
380 Declare p local to try_break, for the “rare” case code. [My original program included the following comment: “This case can arise only in weird circumstances due to changing line lengths, and the code may in fact never be executed.” Later Michael Plass will discover that variable line lengths require an entirely different algorithm, using last_special_line.] §847 L
Don’t omit the raggedness correction when the last line of paragraph has to shrink. [Obsolete in \TeX\textsc{82}.]

22 Feb 1979

Don’t forget to return from get\_x\_token after finding \texttt{par}.

\texttt{Don’t omit the raggedness correction when the last line of paragraph has to shrink. [Obsolete in \TeX\textsc{82}.]} F

363 → 382 Add a new parameter: \texttt{lineskiplimit}.

$\$367$ Q

\texttt{Don’t forget to return from get\_x\_token after finding \texttt{par}.} F

384 Change the syntactic sugar: ‘\texttt{hbox par}’ replaces ‘\texttt{hjust to ...{overfull}}’. [This vastly improves on the old idea (see \#40), but there still is no internal vertical mode.]

C

385 Introduce new names \texttt{hbox} and \texttt{vbox} for \texttt{hjust} and \texttt{vjust}.

$\$1071$ C

386 Add a new condition: \texttt{\ifpos}.

$\$513$ G

\texttt{It will later be generalized to \texttt{ifnum} and \texttt{ifdim}.} C

387 Add \texttt{vu} and \texttt{varunit}.

$\$453$ G

\texttt{[\TeX\textsc{82} will eventually allow arbitrary internal dimensions as units of measure.]} F

388 Add an \texttt{en} unit.

$\$455$ G

389 Legalize \texttt{hbox spread} (negative dimension) [since \texttt{scan\_spec} no longer uses the sign as a flag].

$\$645$ C

10 Mar 1979

Make \texttt{scan\_toks} expand \texttt{\textbackslash count} during \texttt{\textbackslash xdef}. [This will change later when \texttt{\the} and \texttt{\number} are introduced.]

\texttt{Add an \texttt{en} unit.} C

370 → 390 Put only 100000 pt stretch at the end of a paragraph instead of 10000000000 pt. [In \TeX\textsc{78}, “infinite” glue is actually finite but large; in the language of \TeX\textsc{82} we would say that \texttt{\parfillskip}, which is not yet user-settable, is being changed to be like \texttt{\hfill} instead of like \texttt{\hfil}.]

391 $\$816$ Q

\texttt{Treat the last line of a paragraph more consistently with the other lines (e.g., when \texttt{\hfil} appears in mid-paragraph), by effectively inserting inf\_penalty at the end.} Q

312 → 390 Ensure that penalty nodes aren’t wiped out, in weird cases where breaks occur at penalties that normally disappear.

$\$879$ S

23 Mar 1979

Correct the page number count when files begin with an empty page. [System dependent.]

A

394 Allow the \texttt{math\_code} table to be changeable via \texttt{\chcode}. [In \TeX\textsc{82}, \texttt{\chcode} will split into \texttt{\mathcode} and \texttt{\catcode}.]

322 → 396 Don’t accept ‘e’ after an error message if not inputting from a file.

$\$84$ I

27 Apr 1979

Don’t call \texttt{end\_file\_reading} if you haven’t already invoked \texttt{begin\_file\_reading}; this could happen when trying to recover from an error in \texttt{start\_input}. [System dependent.]

397 $\$537$ F

7 Jun 1979

Be sure to eject two pages, when \texttt{\textbackslash eject} comes just at the time another break is preferable (e.g., when the page has just become too full).

306 → 398 $\$1005$ A

27 Jun 1979

Don’t say ‘\texttt{You can\’t do that in math mode}’ when the user says ‘\$\$’ in restricted horizontal mode!

354 → 399 $\$1138$ I

30 Jun 1979

Add \texttt{wd}, \texttt{dp}, \texttt{ht} dimension units.

400 $\$545$ G

307 → 401 Don’t try the system area for file names whose area is explicitly indicated.

$\$537$ I
1 Jul 1979
402 Allow letters as (ASCII) numbers [without the ‘ marker introduced later].  §442 G

2 Jul 1979
403 Fix a \gdef bug: If the control sequence was never defined before [this later became the restore_zero option], don’t remove it at group end.  §282 F

16 Jul 1979
320 → 404 Update show_node_list to be like show_node_list. [The two routines, originally separate, will be merged in \TeX82.]  §238 I

18 Jul 1979
405 Extend capacity from 32 fonts to 64 fonts if desired.  §134 G
406 Add new extra_space parameter to all text fonts (requested by Frances Yao).  §558 Q
407 Make each node_noad print properly in show_node_list.  §183 F
408 Make \jpar allow any break if it is 1000000 or more. [In \TeX82, a \tolerance of 10000 or more allows any break.]  §851 Q

23 Jul 1979
409 Introduce new primitives \hfil, \vfil, \hfilneg, \vfilneg.  §1058 E
410 Add \ifmmode.  §501 G
411 Add \firstmark.  §1012, 1016 G
412 Allow break at leaders (horizontal mode only).  §149 C

25 Jul 1979
213 → 413 Revise error so that online insertions work properly after end-of-file errors.  §336 I
411 → 414 Change ‘if first_mark ≠ 0’ to ‘if first_mark ≥ 0’ [because −1 is used to indicate ‘not yet given a value’].  §1012 B

28 Jul 1979
370 → 415 Stop \xdef from expanding control sequences after \def’s. [This decision will be rescinded later, after several more years of experience with macro expansion will suggest better ways to cure the problem.]  §366 C
416 Change symbolic printout for control symbols. [System dependent.]  §49 I
308 → 417 Avoid linefeeds in the transcript file. [System dependent.]  L
370 → 418 Expand \topmark, etc., in \xdef.  §366 C

4 Aug 1979
413 → 419 Fix an error introduced recently: \par was suddenly omitted at end of page. [System dependent.]  B

11 Aug 1979
420 Change error messages that use SAIL characters not in standard ASCII.  §360 P

28 Aug 1979
411 → 421 Move the command ‘first_mark ← −1’ from vpackage to fire_up.  §1012 D
403 → 422 Correct a serious \gdef bug: Control sequences don’t obey a last-in-first-out discipline, so \TeX loses things from the hash table when deleting a control sequence.

• To fix this, I either need to restrict \TeX (so that \gdef can be used inside a group only for control sequences already defined on the outer level) or need to change the hash table algorithm. Although all applications of \TeX known to me will agree to the former restriction, I’ve chosen the latter alternative, because it gives me a chance to improve the language: Control sequences of arbitrary length will now be recognized.
423 Make sure that \unsave cannot call eq_destroy with a value from the upper part of eqtb.  §282 D
• I noticed this long-standing bug while fixing #422. It had very low probability of causing damage (e.g., it required a certain field of a floating-point number to have a certain value), but it would have been devastating on the day it first showed up!

29 Aug 1979
424 Call eq_destroy when a control sequence is \def'ed after being \def'ed.
§283 F
418 ↔ 425 Treat the first token consistently when \topmark and its cousins are expanded in scan_toks.
§477 F
• Now I’ve checked things pretty carefully and I think TeX is “fully debugged.”

25 Jan 1980
338 ↔ 426 Display runaway alignment preambles.
§306 I
427 Introduce active characters (one-stroke control sequences). [I don’t yet go all the way: The meanings of ‘x’ and ‘\x’ have to be identical.]
§444 G
7 Feb 1980
314 ↔ 428 Fix a glaring omission: Op space \> was never implemented in math mode!
§716 F
25 Feb 1980
429 Add a new dimension ‘ex’ (for units of xheight).
§455 G

3 Mar 1980
427 ↔ 430 Allow the control sequence \: to be redefined [it was the ‘select font’ operator]; this allows the character : to be active. [Obsolescent.]

23 Mar 1980
• An extend-T\TeX-for-the-eighties party:
431 Add a new \copy feature.
§204 G
432 Add a new \unbox feature.
§1110 G
433 Add a new \open feature [later \openout].
§1351 G
434 Add a new \send feature [later \write].
§1352 G
435 Add a new \leqno feature, requested by MDS.
§1204 G
436 Add a new \ifdimen feature [later \ifdim].
§513 G
437 Make \(\text{space}\) in vertical mode begin a paragraph.
§1090 C
438 Add a new \font feature [replacing the silly previous convention that a font must be defined when it is first selected].
§1256 G
439 Add new \parval and \codeval features [later \the ⟨whatever⟩].
§413 G
427 ↔ 440 Don’t let active characters gobble the following space.
§344 C
208 ↔ 441 Add a new parameter to govern amount of token list dumped. [Obsolescent.]
§295 G
442 Add a new \linebreak feature [later replaced by \break].
§831 G

25 Mar 1980
• (Still working on the above, also thought of more.)
443 Add a new \nskip feature.
§716 G
444 Add a new \newname feature (soon changed to \let).
§1221 G
430 ↔ 445 Allow any control sequence to be redefined.
§275 G
446 Send the output to the user’s current file area, even when input comes from elsewhere.
§532 I

27 Mar 1980
447 Compute the xheight for accents in math mode from family 1, not family 3. [Obsolescent.]
Q

28 Mar 1980
448 Increase minimum clearance between subscript and superscript.
§759 Q

29 Mar 1980
222 ↔ 449 When a display follows a display, the second should have the ‘shortskip’ glue. §1146 Q
THE ERRORS OF \TeX

4 Apr 1980
445 \rightarrow 450 Look at current token meanings when trying to recognize \texttt{\textbackslash tabskip} in alignment preambles. §782 A

23 Apr 1980
451 Estimate the length of printed output, for the new priority feature on our XGP device driver. [System dependent.] I
434 \rightarrow 452 Break long \texttt{\textbackslash send} lines into pieces so that the file can be read in again. [System dependent.] C

19 May 1980
182 \rightarrow 453 Don’t make \texttt{\textbackslash left} and \texttt{\textbackslash right} delimiters too large; they need to be only 90% of the enclosed size. [This eventually became \texttt{\textbackslash delimiterfactor}.] §762 Q

21 May 1980
454 Add a new \texttt{\textbackslash pagebreak} feature [later \texttt{\textbackslash vadjust\{\textbackslash break\}]. §655 G

13 Jun 1980
\begin{itemize}
\item Today I’m beginning to overhaul the line-breaking routine, and I’ll also install miscellaneous goodies.
\end{itemize}
455 Allow a radical sign to be in different font positions. §737 G
456 Clear empty tokenlists off input stacks to allow deeper recursions (suggested by Jim Boyce’s macros for chess positions). §325 E
457 Make \texttt{\textbackslash spaceskip} and \texttt{\textbackslash parfillskip} changeable. §1228 G
458 Add a new parameter \texttt{\textbackslash rafudge} (per request of Zippel) [later \texttt{\textbackslash mag}]. §288 G
459 Add a new parameter \texttt{\textbackslash loose} [later \texttt{\textbackslash looseness}]; now parameters are allowed to take negative values. §875 G
460 Remove the variable \texttt{just-par}. [Obsolete; it was the real equivalent of an integer]. E

14 Jun 1980
461 Install new line-breaking routines, including \texttt{\textbackslash parshape}. (These major changes are introduced as Michael Plass and I write our article.) §813 Q
462 Add a new parameter \texttt{\textbackslash exhyf} [later \texttt{\textbackslash exhyphenpenalty}]. §869 G

16 Jun 1980
444 \rightarrow 463 Change conventions in \texttt{eqtb} so that glue is distinguishable from other equivalents. §275 S
444 \rightarrow 464 Don’t expand \texttt{\textbackslash b} in \texttt{\textbackslash def{\textbackslash b(\ldots)}} after \texttt{\textbackslash let\{\textbackslash d\textbackslash def}. [Obsolete.] A
444 \rightarrow 465 Avoid creating dead storage when doing \texttt{\textbackslash unsave} in certain regions. §275 D

17 Jun 1980
466 Allow negative dimensions in rules. §138 C

19 Jun 1980
463 \rightarrow 467 Make the new test for glue at the outer level of \texttt{show\_eqtb}. §252 B

27 Jun 1980
453 \rightarrow 468 Don’t let \texttt{\textbackslash left} and \texttt{\textbackslash right} become too small for big matrices. [This eventually became \texttt{\textbackslash delimitersshortfall}.] §762 Q

3 Aug 1980
469 Don’t move extra-wide, numbered equations flush left unless they begin with glue. §1202 Q

15 Sep 1980
461 \rightarrow 470 Say ‘$\geq f_2$’ instead of ‘$> f_2$’ in the pre-hyphenation routine; I’d forgotten my definition of $f_2$ [a variable used to test for a sequence of lowercase letters in the same font]. §897 M
395 \rightarrow 471 Check the range of the index in \texttt{\textbackslash chcode} before saving the old value. §1232 R
Don’t forget to increase the reference count to \parfillskip, or it will mysteriously vanish.

Make leaders break like glue in both horizontal and vertical modes.

Make \mathsurround break properly at left and right end of lines.

Remove spurious overfull boxes generated when the looseness criterion fails.

Redesign the iteration for looseness; breakpoints were not chosen optimally.

Avoid storing a lot of breakpoints when they are dominated by others.

Prefer the oldest break to the youngest break when two break nodes have the same total demerits.

Don’t make badness too big for floating-point calculations, when forced to make an overfull box.

Make it impossible to get unmatched ‘\'} in a delimited macro argument.

Add new \topsep and \botsep features. [These are \TeX78’s way to put space at the edge of inserts, replaced in \TeX82 by the \skip register corresponding to an \insert class.]

Install new routines for reading the font metrics, using Ramshaw’s TFM files instead of TFX files.

Abort after reporting 100 errors, if not pausing on errors.

Add new \spacefactor and \specskip and \skip primitives. [At this time we write \('\text{\specskip3}=10\text{pt}'\) and \('\text{\skip3}=10\text{pt}'\) for what will become \('\text{\skip3}=10\text{pt}'\) and \('\text{\skip\skip3}=10\text{pt}'\) in \TeX82.]

Add the dimension \cc for European users.

Prune away glue and penalties at top of page after marks, sends, inserts.

Allow \mark in horizontal mode. [Later it will be \vadjust{\mark...}].
Allow optional space before a required left brace, e.g., \if AA {...}. [See #251.]

Issue an incomplete \if error, to help catch a bad \if. §403 C

17 Mar 1981

Omit the warning message at end of a file page unless the nesting level has changed on that page. [System dependent.] I

Fix the spacing when there is a very tall subscript with a superscript. §759 Q

20 Mar 1981

Make space-eating after \else fully consistent between the true and false cases. [Obsolete.] S

24 Mar 1981

Change glue_spec_size to ins_spec_size in vpackage [where insertions are done]. [Obsolete.] B

5 Apr 1981

Fix a typo ('+' instead of '-') in the new subscript code; this shifted certain subscripts down instead of up. §759 B

18 Apr 1981

Make leaders with rules of specified size act like variable rules. §626, 635 G

29 Apr 1981

Don’t consider badness > threshold at a line \break except in an emergency. §854 A

13 Jul 1981

Allow other characters as numbers. §442 C

Avoid dead storage if a no_new_control_sequence error occurs. [Obsolete.] §259 R

Add a new \ifx feature. §507 G

Add new features \xleaders and \cleaders. §626, 635 G

14 Jul 1981

Amend the new code for constants; the '.' in '.5' is thought to mean '056'! §442 S

And fix an egregious blunder in that code: New commands at the end of a procedure are ignored when earlier statements exit via return. §442 L

4 Aug 1981

Accept alphabetic codes for all online error recovery options, instead of insisting on control codes like line feed or form feed. [The original error-recovery codes were suggested by the conventions of the SAIL compiler.] §84 P

Add a new \thebox feature [later \lastbox]. §1079 G

7 Aug 1981

Add fill, filll, and fillll as units for glue stretching or shrinking. §454 G

Suppress the overfull box error when shrinkage amount is negative. §664 I

9 Aug 1981

Let unset boxes inherit the size of their parent in alignments. §810 Q

12 Apr 1982

Make INITEX dump out the font_dsize array needed by the new DVI output module. §1322 F

1 May 1982

Fix clean_box so that mlist_to_hlist cannot make link(q) = 0 and type(q) = glue_node. §720 S

[That was the historic final change to \TeX78. All subsequent entries in this log refer to \TeX82.]
15 Jul 1982

- Finished draft of test program and began debugging about 1430 [2:30 pm].
  Taking my time.

X1 Change $eqth[cur\_font]$ to $eqth[cur\_font,loc]$.

- Not logging changes to the exposition.
- Compile time is about 2 minutes CPU, times 5 for time-sharing; add another
  half minute for linking and loading.
- Hash table and get\_next seem to be working, with no changes needed!
- Time out 1630–1815 for Jill’s birthday party.

X2 Insert begin ... end around dump\_int macro.

X3 Print two blank spaces before date in open\_log\_file.

X4 Update $x$ and cur\_used outside the for loop.

X5 Change if = to if $\neq$ as loop exit condition.

X6 Insert begin ... end around statistics output.

X7 Must get\_x\_token when scanning a number.

X8 Interactive debug\_help needs to print a newline.

X9 Include ignore\_spaces and math\_accent in print\_cmd\_char cases.

X10 Don’t call conf\_ision when print\_cmd\_char sees unknown code.

- Compiler bug causes stack overflow. Retiring for the night at 2145.

16 Jul 1982

- Starting at 0700; DRF has fixed the compiler.

X11 Allow arbitrary integer parameters in diagnostic print routines.

X12 Say cur\_tok, not cur\_val, when you mean cur\_tok.

X13 Make pause effective also on first line of a file.

X14 Show context after online deletion.

X15 Bypass reference count when debug\_help shows a token list.

X16 Change ‘case p ’ to ‘case type(p)’.

X17 Fix timing of print\_ln when scrolling help messages.

X18 Make other\_char the default category for ASCII control codes too.

X19 Use special scanning method for font number in new\_font.

- Eating lunch, 1020–1035, while the machine slowly recompiles everything.

X20 Don’t forget to increase $k$ in the while loop.

X21 Adjust limit properly after line changed when pausing.

X22 Remember to return a value in new\_spec and new\_penalty.

- Now stepping through line\_break in simple case.

X23 Don’t prune unwanted nodes if cur\_p = null.

X24 Print a closing parenthesis when displaying glue nodes.

X25 Use last, not limit, in term\_input; else error prompt causes trouble when
  state = token\_list.

X26 Set first = limit + 1 after init\_terminal.

X27 Make sure set\_trick\_count is always performed.

17 Jul 1982

X28 Add new diagnostic feature \tracingcommands.

- Debugging of system-dependent code not shown in this log.
- Tangle\_\TeX now takes 1.75 minutes; about 75K bytes, 108K tokens.
- Redundant semicolon sends Pascal compiler into infinite loop!

X29 Initialize passive = null.

X30 Fix pseudoprinting when the line is empty.

X31 Merge adjacent free areas of dynamic memory before dumping.

X32 Print the word node in print\_mode.
X33  Improve message and help in case of weird error. §415 I
X34  Allow optional space after \texttt{def} and similar constructions. §473 G
X35  Declare \texttt{alpha} to be integer in \texttt{read_font_info}. §500 M
X36  Fix timing of \texttt{back_input} in \texttt{scan_dimen}. §448 A
X37  Back up after missing number error. §446 I
X38  Show the \texttt{at} size that is considered improper. §1259 I
X39  Streamline the dialog in \texttt{debug_help}. §1338 I
X40  Take output of \texttt{the_toks} from the advertised place. §467, 1297 M
X41  Say \texttt{true_fix(a)}, not \texttt{true_fix(p)}. §959 T
X42  Decrease low limit of \texttt{error_count} to $-1$. §76 S

18 Jul 1982

X43  Clear initial reference count of macro definitions. §473 F
X44  Fix timing of \texttt{back_input} in \texttt{scan_glue}. §461 A
X45  Use \texttt{cur_val_level}, not \texttt{cur_val}, when checking levels. §461 B
X46  Multiply \texttt{fil} units by $2^n$ for correct scaling. §454 B
X47  Don’t confuse \texttt{glue_base} with \texttt{skip_base}. §1237 B
X48  Fix \texttt{print_scaled} so that 0.01 doesn’t come out 0.1. §103 A
X49  Show mode changes when tracing commands. §299 I
X50  Don’t say if \texttt{(n = 0) \lor ( \ldots \texttt{div} n)} in Pascal. §105 L
X51  Don’t confuse \texttt{box_flag} with \texttt{box_code}. §1075 B
X52  Reset \texttt{offset} on \texttt{print_in} even in \texttt{no_print} mode. §57 S
X53  Fix restarting of interrupts after \texttt{big_switch}. §1031 S
X54  Don’t loop for $k \leftarrow a \to b - 1$ when $b = 0$ if $k$ is declared nonnegative. L
X55  Put \texttt{’=} sign into the \texttt{format_ident}. §1328 I
X56  Allow \texttt{r} to be any integer in \texttt{get_node}. §125 S
X57  Don’t put the output of \texttt{print_file_name} in quotes. §518 I
X58  Say \texttt{’dumped} after dumping. §1311 I
X59  Eliminate unnecessary initialization code. §1322 E
X60  Get the file reading started right when beginning to undump. §1308 L
X61  Give forlorn message if format file can’t be loaded. §1303 I
X62  Assign value to \texttt{cur_val} after glue arithmetic. §1239, 1240 F

19 Jul 1982

X63  Don’t say if \texttt{p > max} \lor \texttt{free[p]} in Pascal. §169 L
X64  Fix memory-undump logic; loops are out of phase with input. §1312 A
X65  Undump \texttt{hyph_word[j]}, not \texttt{hyph_word[k]}. §1325 B
X66  Remove assignment of array to array, not allowed by IBM Pascal (Susan Plaass). §167 P
X67  Simplify an expression that’s too big for IBM Pascal (Susan Plaass). §1009 P
X68  Go to \texttt{contribute}, not \texttt{done}, after insertions. §1009 A
X69  Decrease \texttt{depth_threshold} if there’s not enough string space. §198 I
X70  Show rules as \texttt{’i} in short displays. §175 S
X71  Don’t show null glue in short displays. §175 I
X72  Set \texttt{job_name} $\leftarrow 0$ as part of output initialization. §528 S
X73  Don’t complain of infinite shrinkage on \texttt{opt minus 0fil}. §825, 976, 1009 S
X74  Use different prompt at beginning when accepting a file name. §37 I
X75  Reset \texttt{last_glue} on nonglue nodes. §996 F
X76  Remember to call \texttt{error} after printing \texttt{OK}. §1293 B
X77  Insert \texttt{begin . . . end} around program text of section. §1025 L
X78  Define the \texttt{\@hipout} primitive. §1071, 1073 F
X79  Introduce \texttt{write_loc} analogous to \texttt{par_loc}. §1344, 1371 A
X80  Dump and undump \texttt{par_loc} and \texttt{write_loc}. §1313, 1314 F

25
X81 Allow the in scan_the [later scan_something_internal]. §413 F
X82 Interchange command codes the :=: number [later convert]. §210 E
X83 Don’t confuse breadth with depth. §236 B
X84 Add string printing feature to debug_help. §1339 I
X85 Set state ← mid_line in begin_file_reading.
   • Time out 2105–2200 to pick up Jenny from driving lesson.
X86 Keep c ≤ 127 when deleting 99 tokens. §88 L
X87 Don’t check for str_room error when selector = new_string. §1328 S

21 Jul 1982
X88 Gather more statistics: String usage, font info, hyphen exceptions, stacks. §1334 I
X79  Consider write_loc from cur_val, not from cs_ptr.
X90  Remember to pack file name for \open.
X34  Defuse \outer test before scanning optional space after ‘\’.
X92  Don’t allow prepare_mag to cause errors after jump_out.
   • The first page of DVI output is perfect! Pause to play piano.
X93  Don’t confuse dimen_base with scaled_base.
X94  Initialize link(page_head) ← null when beginning a page.
X95  Correct cur_height more often, since max_depth might be negative. §972, 973 S
X96  Calculate page dimensions properly after vertical kerns. §973 A
X97  Install new page_contents logic to handle interaction between insertions and
   \topskip. §987, 1008 S
X98  Allow top_skip glue to be a valid breakpoint.
X99  Don’t forget to count dyn_used in inner loop [erroneous analysis retracted later].
   §1034 F
X100 Set p ← q after migration step.
X101 Clear prev_graf to zero at start of paragraph.
X102 Put parens into negated leader_flag macro.
   • Time out 1720–1920 for John’s birthday dinner.
X103 Scale best_height when adjusting page_goal.
X104 Simplify logic of split insertions; three states become two. §981, 1019, 1020 A
X105 Don’t omit first character when showing a macro argument.
X106 Prevent clobberage if macros have too many parameters.
   §390 R

22 Jul 1982
X107 Tell how many DVI bytes were output. §642 I
X88  Adjust for singular or plural statistics. §1320, 1334 I
X98  Consider page_head a glue node, to inhibit unwanted break.
X109 Introduce new_skip_param to keep reference counts updated. §679, 969, 1001 D
X110 Introduce new skip_param to keep reference counts updated.
X111 Record the correct size of new insertion after it’s split.
X112 Use free_node, not flush_node_list, when recycling insertion nodes.
X113 Make online insertions work after get_next is interrupted.
   §87, 324, 343 S
X114 Print newline on interruption stop.
   §98 B
X34  Put space before end_write_token.
   §1371 S
X116 Don’t confuse glue_order with stretch_order.
X117 Set max_dimen ← 7777777777, not 7777777777.
X118 Make \global\textfont legal.
X119 Fetch \the\textfont with equiv, not fam_font.
X120 Call new_ligature(f, l, . . .) not (f, c, . . .).
X121 Make show_box work on random garbage.
   §174, 177 R
X122 Count reference to zero glue from cond_math_glue.
   §1171 D


23 Jul 1982

X123 Allow avail = null when undumping. §1312 R

X110 \rightarrow X124 Set width(glue_ptr(p)), not width(p). §679 B

X125 Put begin_file_reading inside the start_input loop. §537 A

X116 \rightarrow X126 Don’t confuse glue_stretch with stretch_order [the previous fix went only half-

way]. §838 B

X127 Negate x when calculating badness of shrinkage. §667, 678 B

X121 \rightarrow X128 Remove dangling else that parses wrong. §174 L

X28 \rightarrow X129 Print newline before \{, not after \}, when tracing commands. §290 I

X130 Remove colon from overfull box messages. §663, 675 I

X97 \rightarrow X131 Compute page_goal properly when the first box arrives after inserts. §1001 D

X132 Don’t confuse page_size [now page_goal] with best_size. §1017 B

X133 Put heldover insertions at front of contribution list. §1023 A

X88 \rightarrow X134 Output stats before closing DVI file, since the latter decreases font_ptr. §1333 S

X135 Don’t call a \vbox an \hbox. §674 T

X136 Fix misplaced end caused by editing error. §675 T

24 Jul 1982

X137 Don’t eq_destroy any paragraph shape when par_shape is null. §275 D

X138 Omit blank before \message at the beginning of a line. §1280 I

X104 \rightarrow X139 Don’t try to split an insertion when best_node isn’t the split one. §1021 A

X140 Correct another case of ‘if x \& y’ misunderstood by Pascal. §1021 L

X141 Provide diagnostic info about insertions via \showlists. §986 I

X142 Add ‘inside a group’ to clarify a warning message. §1335 I

X143 Report prev_depth on a separate line in \showlists. §219 I

X144 Back up input to avoid unexpected clobberage of cur_tok. §1090 S

* Wow what a bug; new_graf calls build_page, which invokes the output routine, after which ‘goto reswitch’ is a disaster.

X145 Add insertion glue to page_so_far instead of subtracting it from the goal. §1009 D

X146 Put extra blank line before overfull box warning. §660 I

X147 Define break at kern consistently between horizontal and vertical lists. §973, 1000 C

X148 Renumber so that math nodes are nondiscardable. §147 D

X149 Correct the char kern macro: \#, not f. §557 T

X150 Decrease l after reconstituting discretionary break. §916 F

X151 Simplify the hyphen routine, knowing that link(s) = null. §918 E

X152 Initialize r ← q in discretionary destruction routine. §883 F

25 Jul 1982

X153 Don’t add interline penalty after last line of paragraph. §890 A

X154 Adjust spacing in diagnostic messages. §245 I

X155 Avoid simultaneous use of temp_head by prune_page_top and the page builder. §1017 D

X156 Clear the post_break field of simple discretionary. §916 F

X157 Split offset into independent variables term_offset, file_offset. §54, 57, 58 A

* Am freezing current program as version –0.25; a week of TUG lectures begins tomorrow.

5 Aug 1982

X158 The ‘.err’ file should be ‘.log’ instead. §534 I

X159 Allow \special strings to contain more than 256 bytes. §585, 1368 G

X99 \rightarrow X160 Undo “correction” to a non-bug. §1034 M

X161 Suggest \& in help message for unexpected \&. §1128 I

X162 Make ‘E’ a standard option for exiting. §84 G

X163 Restore the use of dead cycles à la \TeX78. §1024, 1054 G

* The previous six changes were suggested during discussions with \TeX82 class.
X164  Fix global variable conflict between open_log_file and new_font.  §1257 S
X165  Allow optional ‘w’ when assign to font parameter.         §1253 C
X166  Set cur_val after increasing the number of font parameters. §580 F
X167  Set hash_brace when matching ‘c’.                         §476 D
X88   → X168 Clarify meaning of statistics printed.             §1334 I
X169  Change DVI format to include design size.                 §602,1260 G
X170  Introduce def_ref for runaway messages.                   §306 D
X171  Restore cur_es before calling scan_toks.                   §1226 M
X157  → X172 Update print_cmd to dual offset conventions.       §502 A
X163  → X173 Move endgame logic inside main_control, because the output routine becomes active. §1054 A

6 Aug 1982

X174  Allow INITEX to load format files.                          §1337 C
X175  Conserve input stack space by deleting finished token lists. §435 E
X74   → X176 Print the opening ‘**’ in the transcript file.       §534 I

•  Now ready to try breaking new ground in TRIP.

X177  Preserve align_state from tokens deleted online.            §88 S
X178  Set i in all branches of scan_toks.                         §473 D
X179  Change ‘cur_endd < right_brace’ to ‘cur_tok ≤ right_brace_limit’; otherwise \relax gets through.  §477 S
X180  Allow optional * when setting \spacefactor; disallow zero.  §1243 C
X181  Change vpackage (head) to vpackage (link(head)).             §796 B

•  Shades of 1978!

X182  Insert missing begin . . . end.                             §798 L

7 Aug 1982

X183  Keep triex_max declared in non-INITEX [later rescinded].   §950 L
X184  Watch out for empty token list when copying.                §466 D
X185  Free unused reference count slot when defining \everypar.    §1226 D
X163  → X186 Introduce maxdeadcycles.                            §1012 G

•  I believe the line_break routine has passed its test perfectly.
X187  Don’t put discretionary after ← inside a discretionary.      §1039 S
X188  Change ‘minus’ to ‘minusthe’ [this feature retracted later].  §413 C
X189  Change cur_p to r (three places).                           §875 B
X190  Increase range of hc to halfword; otherwise end-of-word mark might match a vacant entry in the trie. §892 A
X191  Initialize b in shift_case routine.                         §1288 F
X192  Don’t back up if a space follows a decimal fraction.         §452 E
X193  Don’t confuse glue_base with dimen_base.                    §1145 B
X194  Guard against anomalous floating-point values in glue display. §186 L

8 Aug 1982

X195  Avoid infinite loop when \outer leads to runaways.          §339 S

•  I worked on that problem about two hours before fixing it.
X196  Move final debug_help to succumb, except in batch mode.    §93 I
X197  Insert kern after spanned box, to defeat access to floating point. §808 R

9 Aug 1982

X198  Include \leftskip and \rightskip in displayed equations [rescinded later]. §1199 C
X199  Trace line-break computations if tracing_stats > 2.           §846,856 I
X200  Keep prec_p up to date when passing a string.                §867 D

•  Now stepping through math stuff; a lot is working.
X201  Set link(p) ← z when making a fraction.                     §747 D
X202  Don’t reset space factor when beginning \align.               §775 C
X203 Don’t show glue setting if glue_sign = normal. §186 I
X204 Clear glue_stretch and glue_shrink when creating an unset box. §801 D
X205 Do @secondpass in hmode and vice versa when aligning. §804 B
X206 Remove fallacious call to confusion after alignment in display. §1206 A
X207 Don’t test mode = vmode in display, test nest_ptr = 1. §1145 A
X208 Show an inner_road as well as the other types. §690, 696 F
X209 Renumber mu_glue and cond_math_glue so that the glue display logic works. §149 D
X210 Don’t confuse cur_size with cur_style. §703 B
X211 Advance p ← q during second pass over mlist. §761 F
X212 Add helpful hint about \tracingonlinelast1. §1293 I
X213 Delete spurious statement left from sloppy editing. §710 T
X214 Change the subtype when @skip becomes hskip. §732 D
X215 Don’t forget to use the remainder when computing math glue. §716 F

X199 → X216 Improve paragraph diagnostics using short_display. §857 I
X199 → X217 Introduce artificial_badness for better diagnostics. §854, 856 I

11 Aug 1982

X218 Introduce char_box subroutine so that var_delimiter adds italic correction. §709 A
X219 Save font and char in local variables of make_mathAccent, since it can be recursive. §738 S
X220 Call error after decrying an invalid character. §346 F

12 Aug 1982

X199 → X221 Install new format for showing break nodes. §846 I
  • I have been testing line_break and I think it’s working fine.
X222 Change q to p, in order to catch empty alignments. §812, 1206 B
X223 Disallow third part of discretionary in math mode. §1120 S
X224 Don’t change tail if discretionary third part is empty. §1120 D
X225 Say nonscript, not non_script. §189 I
X226 Inhibit math if \scriptfont3 is improper. §1195 S

X199 → X227 Introduce @firstpass and @secondpass comments. §863 I
X228 Change p to r when you mean r. §1204 T
X108 → X229 Say page, not pages, if there’s only 1. §642 I
X230 Insert space before \ on truncated \showlists. §182 I

28 Aug 1982

• Back from vacation after having looked at hardcopy listing of TRIP test.
X231 Allow dm as a unit [later .5dm1 will be .5\dimen1]. §455 G
X108 → X232 Singularize prevgraf 1 lines. §219 I
X233 Omit trailing zero count registers when showing completed page numbers. §638 I
X234 Avoid clobbering a by introducing a new local variable t. §986 L
X216 → X235 Fix diagnostic printing of discretionaries. §858 D
X236 Don’t show unset stretch/shrink that’s zero. §185 I
X198 → X237 Make \halign in displays consistent with other displays. (Namely, ignore \leftskip and \rightskip in nonaligned displays; respect the paragraph shape in aligned displays.) §800, 1199 C
X238 Parenthesize ‘If you’re confused ...’. §403 I
X239 Say \textit{fraction}, not \textit{xabove}. §697 I
X240 Remember to return when you should. §1153 F
X241 Use absolute value to make sure div is unambiguous. §737 P

X218 → X242 Don’t confuse depth with height. §709 B
X243 Use delta – height, not height – delta. §736 B
X244 Increase shift_down to increase the clearance. §745 B
X245 Don’t back up after improper use of \the. §428 I
X246 Don’t give 0pt as the default result when looking for tok_eal. §428 I
X247 Initialize second_indent in the easy case. §848 F
X248 Package the equation number. §1204 F
X249 Don’t resort to \max_dimen when glue doesn’t stretch or shrink. §1148 Q
X250 Insert newline before showing current \botmark. I
X251 Call error after giving error message. §784 F
X252 Change implementation of \number; it should scan_int, not something internal. §471 A
X253 Introduce symbolic constants like \format_area_length. §524 P
X254 Change quit to \jump_out, since some compilers treat quit as a reserved word. §81 P
X255 Add more parentheses to get proper parsing. §1260 L
X256 Say please in order to be friendly (or at least polite). §360 I
X257 Don’t confuse \cur_vcmd with \cur_chr. §508 B
X258 Use & instead of ! to specify a preloaded format. §1337 I

X177 \rightarrow X259
Correct a3 to a4. §88 T
X260 Introduce new primitive \mathchardef, to save space and time. §1224 G
X261 Use the \[ convention for noads as well as nodes. §692 C
X262 Correct spelling in call to primitive: \xatopx should be \xoverx [later renamed, thank goodness]. §1178 T

30 Aug 1982
X263 Don’t fetch \link{null} in malformed list. §175 R
X264 Initialize align_state at a better time so that align_peek doesn’t see & or \span. §785, 791 S
X265 Outlaw preamble interfering with align_state = 0. §789 S
X266 Add level of grouping to alignment to tabskip locality. §774 C
X267 Check align_state when scanning \langle u_i \rangle. §783 F
X268 Move ‘unsave; new_save_level’ from main_control into fin_col. §791, 1131 A

X180 \rightarrow X269
Remember \cur_chr when you’re looking for optional ‘=’. §1243 S
X270 Change q to r [in code now obsolete]. §804 T
X271 Disable interrupts during back_error so that help messages aren’t clobbered. §327 I
X272 Introduce slow_print for printing control sequences. §60 S
X273 Initialize \del_code(".") ← 0 for error recovery. §240 I
X274 Call end_file_reading before calling check_outer_validity. §362 S
X275 Don’t delete an extra ‘}’ when \par will help find a runaway. §395 I

31 Aug 1982
X276 Don’t confuse \thin_muskip with \thin_muskip_code. §413 B
X266 \rightarrow X277
Recover from error if new align_group ends abnormally. §1132 F
X278 Recover from error if \par occurs when align_state < 0. §1094 I
X279 Make \hskip, \the\thinmuskip and \muskip in \mathchardef \mathchardef \baselineskip \muskip \mathchardef \textbf \baselineskip \mathchardef \textbf erroneous. §413 C
X280 Add \muskip and \setmuskip analogs to \skip and \setskip. §413, 1228 G
X281 Don’t output pop right after push.
- The TRIP test looks right; now to test for wasted memory.
- When memory should be empty I find \dyn_used = 18, \var_used = 267.

1 Sep 1982
- Made special MEMTEX program, designed to track all memory allocation.
X282 Delete reference to last_glue when a page is packaged. §1017 D
X283 Include save_stack in the search_mem debugging routine. §285 I
X284 Disallow \vfill in restricted horizontal mode. §1095 C
- Most of the memory locations I thought were wasted were actually in good use.
- Total 192 hours (approx) debugging time so far since July 15.
THE ERRORS OF \TeX

2 Sep 1982

• Now looking at all zero counts in profile and extending TRIP.
X285 Simplify the creation of vtop boxes. §1087 E
X286 Set space_factor ← 1000 after \hbox.
X287 Introduce preamble into DVI format.
X288 Give special chr_code to \relax.
X289 Don’t show ‘(null)’ when token list is null, just show nothing.
X290 Delete the procedure write_name_string, which is never used.
X291 Rename \xabovex to \abovewithdelims; do the same for \xatopx and \xoverx.

X292 Improve clean_box so that it recognizes cleanliness better. §720 Q
X293 Report a Missing delimiter more meaningfully. §1161 I
X294 Give end_token a chr code of 128 so that it will end a file name.
X295 Test present of math fonts after parsing an mlist, not before. §1138, 1195 R
X296 Omit ‘recent contributions’ and/or ‘current page’ when they are empty. §218, 986 I
X297 Display what \TeX \ has deleted after improper discretionary list has arisen. §1121 I
X298 Show what math character was undefined. §723 I
X299 Improve the Incompatible magnification error; break it into two lines. §288 I
X300 Put new cases into flush_node_list, to recycle mlist noads. §698 D

6 Sep 1982

X300 ↔ X301 Insert a necessary ‘goto done’ in that new material. §698 F

• It took two hours to diagnose that goto problem.
X295 ↔ X302 Change ‘2’ to ‘3’ in help message for extension fonts. §1195 T
X303 Add a special note if material is being held over for the next output. §986 I
X304 Divide before multiplying in make_left_right, to avoid overflow. §762 R
X305 Introduce the box_error routine. §992 I
X306 Clear arith_error after overflow has been reported. §460 F
X249 ↔ X307 Don’t confuse stretch with glue_stretch. §1148 B
X308 Set glue_sign ← normal when packaging with glue ratio zero. §558, 664 D
X309 Test for overflow before attaching the sign. §448 A

• That all worked! Now trying min_quarterword negative.
X310 Take absolute value before applying mod in new_trie_op. §944 L
X311 Say qi(c), not c, when testing TFM flags [now obsolete]. §573 L
X312 Initialize token_ref_count(def_ref) to null, not zero. §473 L
X313 Change the type of split parameter n from quarterword to eight_bits. §977 L
X314 Initialize null_delimiter different form null_character. §685 L
X315 Insert qi twice in scan_delimiter. §1160 L
X316 Insert qi in scan_math. §1151 F
X317 Insert qo in fetch. §722, 723 F
X318 Insert qi in set_math_char. §1155 F
X319 Insert qi in math_ac. §1165 F
X320 Insert qo in mlst_to_hlist. §755 F
X321 Use brackets around 8-bit characters in print_ASCII. §68 I
X322 Include hyph_list in the search_mem debugging routine. §933 I

• Now compiling non-INITEX to try an industrial-strength version.
X323 Add return to final_cleanup, because some Pascal compilers insist that each
label be used. §1335 L
X324 Compute par_token when undumping. §1314 D
<table>
<thead>
<tr>
<th>Date</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>11 Sep 1982</td>
<td><strong>X325</strong> Emit newline before file name, if near end of line.</td>
</tr>
<tr>
<td></td>
<td><strong>X326</strong> Define <code>\ifx</code> for arbitrary tokens.</td>
</tr>
<tr>
<td>12 Sep 1982</td>
<td><strong>X327</strong> Don’t ask users to type <code>x</code> twice before exiting.</td>
</tr>
<tr>
<td></td>
<td><strong>X328</strong> Install new features <code>\openin, \read, \ifeof, \closein;</code> rename existing <code>\open, </code></td>
</tr>
<tr>
<td></td>
<td><code>\send, \close</code> to be <code>\openout, \write, \closeout.</code></td>
</tr>
<tr>
<td></td>
<td><strong>X329</strong> Install new feature <code>\expandafter</code>.</td>
</tr>
<tr>
<td></td>
<td><strong>X330</strong> Change the default file area from ‘&lt;TeX&gt;’ to ‘TeXinputs:’.</td>
</tr>
<tr>
<td>13 Sep 1982</td>
<td><strong>X331</strong> Install new feature <code>\string</code>.</td>
</tr>
<tr>
<td></td>
<td><strong>X332</strong> Remove spurious space printed by <code>\sprint</code>,.</td>
</tr>
<tr>
<td></td>
<td>• All tests passed now! But when I played with the system I found another bug (undetected by TRIP):</td>
</tr>
<tr>
<td></td>
<td><strong>X333</strong> Set <code>r ← s</code> after matching macro parameter tokens.</td>
</tr>
<tr>
<td>16 Sep 1982</td>
<td><strong>X199 → X334</strong> Introduce serial numbers in line-break records, improving readability and independence.</td>
</tr>
<tr>
<td></td>
<td><strong>X335</strong> Don’t abort when <code>file_name_size</code> is exceeded.</td>
</tr>
<tr>
<td>17 Sep 1982</td>
<td><strong>X336</strong> Remove unwanted period from font capacity message.</td>
</tr>
<tr>
<td>18 Sep 1982</td>
<td><strong>X329 → X337</strong> Make <code>\expandafter</code> more powerful by moving it from semantics to syntax [i.e., from stomach to mouth].</td>
</tr>
<tr>
<td>19 Sep 1982</td>
<td><strong>X338</strong> Improve error recovery for ‘Missing number’.</td>
</tr>
<tr>
<td>22 Sep 1982</td>
<td><strong>X339</strong> Suppress italic correction between letters in math mode except in math fonts.</td>
</tr>
<tr>
<td>24 Sep 1982</td>
<td><strong>X340</strong> Define <code>null = mem_bot</code>, not <code>min_halfword</code>, because there’s a reference to <code>link(null)</code> in <code>try_break</code>.</td>
</tr>
<tr>
<td></td>
<td><strong>X341</strong> Initialize <code>str_start[0] ← 0</code>.</td>
</tr>
<tr>
<td></td>
<td><strong>X342</strong> Avoid blank space at beginning of line.</td>
</tr>
<tr>
<td></td>
<td><strong>X343</strong> Set type of new box in math mode to <code>ord_noad</code>, not <code>inner_noad</code>.</td>
</tr>
<tr>
<td>28 Sep 1982</td>
<td>• Here are the first changes made to the preliminary listing of TeX82 that was published by the TeX project earlier this month.</td>
</tr>
<tr>
<td></td>
<td><strong>520</strong> Insert the missing cases <code>letter</code> and <code>other_char</code> after <code>x_token</code> looks ahead.</td>
</tr>
<tr>
<td></td>
<td><strong>521</strong> Change <code>\pause</code> to <code>\pausing</code>.</td>
</tr>
<tr>
<td></td>
<td><strong>522</strong> Reset overfull_rule when determining tabskip glue.</td>
</tr>
<tr>
<td></td>
<td><strong>523</strong> Fix the logic for scanning <code>\ifcase</code> [in obsolete syntax—everything is still done with braces since <code>\fi</code> doesn’t exist yet].</td>
</tr>
<tr>
<td>30 Sep 1982</td>
<td><strong>524</strong> Change &quot;0.0&quot; to &quot;?.?&quot; (suggested by DRF).</td>
</tr>
<tr>
<td>2 Oct 1982</td>
<td><strong>525</strong> Use conditional thin spacing next to ‘Inner’ noads.</td>
</tr>
<tr>
<td></td>
<td><strong>526</strong> Make thick spaces conditional.</td>
</tr>
</tbody>
</table>
4 Oct 1982

527 Increase \texttt{trie\textunderscore size} from 7000 to 8000, because of Frank Liang’s improved (but longer) hyphenation patterns. §11 P

6 Oct 1982

X330 → 528 Change the string lengths to match the new \texttt{\LaTeX\textunderscore format\_default}. §520 F

- Version 0 of \LaTeX{} is being released today!

8 Oct 1982

529 Fix a blunder: I decreased \texttt{h mod a quarterword} when it should have been decreased mod \texttt{trie\_op\_hash\_size} (HWT). §944 B

9 Oct 1982

X258 → 530 Fix a typo (’!’ not ’&’) in the \texttt{WEB} documentation. §524 P

531 Remember to call \texttt{initialize} if a different format was preloaded (Max Díaz). §1337 F

- Version 0.1 incorporates the above changes.

12 Oct 1982

532 Add the \texttt{\textbackslash immediate} feature, by popular request. §1375 G

- Version 0.2 incorporates this (somewhat extensive) change.

13 Oct 1982

533 Introduce new \texttt{WEB} macros so that \texttt{glue\_ratio} is more easily changed. §109 P

- I began writing The \texttt{\LaTeX}{}book today: edited the old preface and searched in the library for quotations.

14 Oct 1982

534 Change the type of \texttt{hd} to \texttt{eight\_bits}; it’s not a \texttt{quarterword} (HWT). §649 B

X281 → 535 Revise the optimization of \texttt{DVI} commands: It’s not always safe to eliminate \texttt{pop} when the preceding byte is \texttt{push}, since \texttt{DVI} commands have variable length! (Embarrassing oversight caught by DRF.) §601 S

15 Oct 1982

536 Test \texttt{\texttt{\textbackslash prev\_depth} > \texttt{ignore\_depth}}, not \texttt{\neq}. §679 C

- Version 0.3 incorporates the above changes.

16 Oct 1982

537 Omit definition of \texttt{align\_size}; it’s never used (Bill Scherlis). §11 P

538 Inhibit error messages when packaging box 255. §1017 I

21 Oct 1982

X145 → 539 Subtract \texttt{width(q)} from \texttt{page\_goal}, don’t add it to \texttt{page\_so\_far}[1]. §1009 A

- Version 0.4 incorporates the above changes.

22 Oct 1982

540 Increase the amount of lower (variable-size) memory from 12000 to 13000, since the \LaTeX{} program listing now needs about 11500. [At this time there still is a fixed boundary between upper and lower memory.] §12 P

541 Add a new parameter \texttt{\textbackslash box\_max\_depth}. §1086 G

- Version 0.5 incorporates the above changes.

26 Oct 1982

542 Fix an off-by-one error caught by Gabi Kuper and HWT. (I forgot \texttt{‘+1’}). §1317 B

543 Fix the spacing of displayed control sequences: \texttt{print\_cs} should base its decision on \texttt{cat\_code}($p - \texttt{single\_base}$), not \texttt{cat\_code}(p). §262 B

- The \texttt{TRIP} test detected this bug, but I didn’t notice.

27 Oct 1982

544 Set \texttt{math\_type} before saying \texttt{fetch(nucleus(q))}, since fetching can have a side effect. §752 S
28 Oct 1982
545 Install a major change: Fonts now have identifiers instead of code letters. Eliminate the ‘\:’ primitive, and give corresponding new features to ‘\the’. §209 G
• Actually I began making these changes on October 26, but I needed two days to debug them and to put Humpty Dumpty together again.
• At this time I’m also drafting macros for typesetting The \TeX book.
• The above changes have been incorporated into Version 0.6.

30 Oct 1982
• After years of searching, I’ve finally found a definitive definition of the printer’s point; and (unfortunately) my previous conjecture was wrong. The truth is that 83 pc = 35 cm, exactly; so I am changing \TeX to conform.

546 Revise unit definitions for the ‘real’ printer’s point. §458, 617 C
• Actually I began making these changes on October 26, but I needed two days to debug them and to put Humpty Dumpty together again.
• At this time I’m also drafting macros for typesetting The \TeX book.
• The above changes have been incorporated into Version 0.6.

1 Nov 1982
• Oops! Retract error #546, and retract \TeX Version 0.7; the source of my information about points was flaky after all. My original suppositions were correct, as confirmed by NBS Circular 570.

4 Nov 1982
547 Revise the definition of \dd, conforming to the definitive value shown me by Chuck Bigelow. §458 C
545→548 Introduce “frozen” copies of font identifiers, to be returned by \the\font, so that font manipulation is more robust. §1257 R

5 Nov 1982
549 Reset looseness and paragraph shape when beginning a \vbox. §1083 R

6 Nov 1982
550 De-update align_state when braces are in constants. §442 D
551 Improve error recovery for bad alignments. §1127 I
• Today I wrapped up Chapters 4 and 5.

8 Nov 1982
555 Save a bit of buffer space by declaring pool_file only in INITEX. §50 E
552 Give more power to \let: the right-hand side needn’t be a control sequence. §1221 G
553 Amend show_context to say ‘(base_ptr = input_ptr) ∨ ’; otherwise undefined control sequences can be invisible in unusual cases (John Hobby). §312 I
554 Compute demerits more suitably by adding a penalty squared, instead of adding penalties before squaring.
• Previously a slightly loose hyphenated line followed by a decent line was considered worse than a decent hyphenated line followed by a quite loose line.

10 Nov 1982
555 Save a bit of buffer space by declaring pool_file only in INITEX. §50 E

11 Nov 1982
556 Introduce a new context indicator to clarify \TeX’s scanning state: A special type called backed-up is distinguished from other kinds of inserted lists; it is called ‘recently read’ or ‘to be read again’, while others are called ‘inserted’. §314 I
557 Append a comment, ‘treated as zero’, to the missing-number message. §446 I
558 Ignore the settings of \hfuzz or \vfuzz if \hbadness or \vbadness is less than 100. §666, 677 I

13 Nov 1982
• Major surgery on the program is planned for today, because of new ideas suggested by correspondence with MDS and other macro writers.
559 Introduce a new \tokens register; this will be useful and easy to add, since \TeX already can handle \everypar and \output. §1227 G
X34 → **560** Change `get_x_token` to `get_token` when scanning an optional space; then a construction like `\def\foo{...}\foo` won’t complain that `\foo` is undefined. §443 C

- This change was retracted when it was being debugged, because it could cause `ende` to abort the job. Then it was re-established again when I found that `ende` needed to be more robust anyway. [But it was eventually rescinded again.]

**561** Make `\span` mean ‘expand’ in a preamble. §782 G

**562** Use three separate `if` tests instead of ‘\&’ in the inner loop of `get_next`, to gain efficiency. §342 E

**563** Introduce `get_x_token` so that assignments have uniform error messages and so that frozen equivalents cannot be changed. §1215 R

- *I gave a few variables more mnemonic names as I made these changes.*

**564** Move conditional statements from the semantics (‘stomach’) part of \TeX to the syntax (‘mouth’) part, by introducing `\fi`. Also introduce `\cname` and `\endcname`.

- *This makes macros much more predictable and logical, but it is by far the most drastic change ever made to \TeX. The program began to come back to life only after three days of solid hacking.*

- *Several other things were cleaned up as part of this change because it is now more natural to handle them differently. For example, a null control sequence has now become more logical.*

- *The result of all this is called Version 0.8.*

18 Nov 1982

- *Today I resumed writing Chapter 8. Tomorrow I’m 214 days old!*

21 Nov 1982

**565** Declare `c` as a local variable for hyphenation (DRF). §912 F

**566** Omit the “first pass” and try hyphenations immediately, if `\pretolerance` is negative (suggested by DRF). §863 E

**567** Don’t ship out incredibly huge pages; they might foul up DVI files. §641 R

2 Dec 1982

**568** Add new features `\everymath` and `\everydisplay`. §1139, 1145 G

**569** Add a new feature `\futurelet`. §1221 G

- *The changes above have been incorporated into Version 0.9 of \TeX.*

7 Dec 1982

**570** Add a new `\endinput` primitive (suggested by FY). §362, 378 G

8 Dec 1982

**571** Try `off_save`, if `\par` occurs in restricted horizontal mode. (This avoids embarrassment if \TeX says ‘type a command or say `\end`, then when you type `\end` it says you can’t!’) [However, I soon retracted this change.]

**21 Dec 1982**

**572** Redefine `\relax` so that its `chr` field exceeds 127. (This facilitates the test for end in `scan_file_name`.) §265 A

566 → **573** Call `begin_diagnostic` when omitting the first pass of line breaking. §863 F

**574** Fix the logic of glue scanning: In `\hskip-1pt plus2pt` the minus should apply only to the 1pt. §461 A

23 Dec 1982

**575** Renumber the decimal codes in paragraph statistics for loose and tight lines; they were ordered backwards. §817 I

**576** Treat a paragraph that ends with leaders like a paragraph that ends with glue. §816 C

**577** Allow commas as alternates to radix points, for Europeans. §438 C
Change `\hangindent` to a normal dimension parameter. [It had been a combination of `\hangindent` and `\hangafter`, with special syntax.] §247 C

Make `\prevgraf` accessible to users. §422, 1244 G

Split `\clubpenalty` off from `\widowpenalty`. §890 G

• I’m typing Chapter 14 while making these changes.

24 Dec 1982

Use `back_input` instead of `goto reswitch` when inserting `\par`, because `\par` may have changed. §1095 S

It’s 10pm after a very Merry Christmas!

25 Dec 1982

Don’t prompt for a new file name if `\openin` doesn’t find a file. §1275 I

Add a new `\jobname` primitive. §472 G

Give the user a way to delete the dollar sign, when \TeX decides to insert one. §1047 I

Allow optional equals after `\parshape`, and implement `\the\parshape`. §423, 1248 C

26 Dec 1982

Add an `\ifline_field` to the condition stack entries, so that more informative error messages can be given. §489 I

Introduce a `normal_paragraph` procedure, since initialization is needed also within `\insert`, `\vadjust`, `\valign`, `\output`. §1070 D

27 Dec 1982

Give users access to `\pagetotal` and `\pagegoal`. (Analogous to #679 and #585, but simpler.) §1245 G

X199 → 589 Introduce `\tracingpages`, allowing users to see page-optimization calculations.

Also split `\tracingparagraphs` off from `\tracingstats`. §987, 1005, 1011 I

• The changes above have been incorporated into Version 0.91 of \TeX.

31 Dec 1982

Break the `build_page` procedure into two parts, by extracting the section now called `fire_up`. [This is necessary because some Pascal compilers, notably for IBM mainframes, cannot deal with large procedures.] §1012 P

Make `\ifodd1\else` legal by introducing `\if_code`. §489 S

Improve alignments when columns don’t occur: Don’t append null boxes for columns missing before `\cr`, and zero out the tabskip glue after nonpresent columns. §802 Q

Make the error message about overfull alignment more intelligible. §801, 804 I

• The changes above have been incorporated into Version 0.92 of \TeXX, which was the last version of 1982, completed at 11:59pm on December 31.

3 Jan 1983

Today I’m beginning to write Chapter 15, and planning the `\output` routine of plain.tex.

X186 → 594 Change the logic of `its_all_over`; use `max_dead_cycles` here too, instead of the fixed constant 100. §1054 C

X34 → 595 Don’t forget to `pop_nest` when an insert is empty. Also disallow optional space after `\insert n{...}`. §1100 F

4 Jan 1983

Use the `\boxmaxdepth` that’s declared inside a `\vbox` when packaging it. §1086 C

Rename `\groupbegin` and `\groupend` as `\begingroup` and `\endgroup`. §265 C

Make `\deadcycles` accessible to users. §1246 G

Base the split insertions on natural height plus depth, not on `\delta`. §1010 Q

• The changes above have been incorporated into Version 0.93.
6 Jan 1983
600  Add push_math to handle a case where I forgot to clear incompleat_noad. (This
long-standing bug was unearthed today by Phyllis Winkler.) §1136 D

588 → 601  Add \pageshrink, etc., too. §1245 G

602  Introduce new parameters \floatingpenalty, \insertpenalties. Also adopt
a new internal representation of insertion nodes, so that \floatingpenalty,
\splittopskip and \splitmaxdepth can be stored with each insertion. §140, 1008 G

7 Jan 1983
603  Improve the rules for entering new_line, in particular when the end-of-line
character is active. §343 Q

9 Jan 1983
604  Distinguish between implicit and explicit kerns. §155, 896 Q
605  Change the name \ignorespace to \ignorespaces. §265 C

560 → 606  Don’t omit a blank space after \def, \message, \mark, etc.; the previous hodge-
podge of rules is impossible to learn. §473 C
• The above changes appear in Version 0.94.

12 Jan 1983
• Beginning to write the chapters on math today.
607  Add a new feature: active characters in math mode. §1151 G

15 Jan 1983
608  Fix a surprise bug: ‘$1-$’ treated the - as binary. §729 A
609  Initialize space_factor inside discretionaries. §1117 D

16 Jan 1983
610  Fix an incredibly embarrassing bug: I forgot to update spotless in the error
routine!
• While fixing this, I decided to change spotless to a more general history vari-
able, as suggested by IBMers who want a return code. §76, 82, 1335
611  Replace two calls of confusion by attempts at error recovery, in places where
‘This can’t happen’ could actually happen. §1027, 1372 I

18 Jan 1983
612  Introduce the normalize_selector routine to protect against startup anomalies
when the transcript file isn’t open. Also make open_log_file terminate in some
cases. §92, 535 R

591 → 613  Insert \relax, not a blank space, to cure infinite loop like \ifeof\fi (LL). §510 R
614  Change the old \limitswitch to \limits, \nolimits, and \displaylimits.
Incidentally, this fixes a bug in the former positioning of integral signs. §682, 749 G
615  Give a \char in math mode its inherited \mathcode. §1151 C

525 → 616  Make underline, overline, radical, vcenter, accent noads and {...} all revert
to type Ord instead of type Inner. Introduce a new primitive \mathinner.
(This fixes the spacing, which got worse in some ways after change #525.) §761 Q
• I’m working on Appendix G today.

19 Jan 1983
617  Introduce a \mathchoice primitive. §1174 G
618  Move \input from the stomach to the mouth. §378 C
X260 → 619  Introduce \chardef, analogous to \mathchardef. §1038, 1224 C
620  Change \unbox to \unhbox and \unvbox; also add \unhcopy. §1110 G
621  Consider \spacefactor, \pagetotal, etc., as part of prefixed_command, even
though they are always global. §1211 C
20 Jan 1983

622 Switch modes when \hrule occurs in horizontal mode or \vrule in vertical.
§1090, 1094 C

623 Add a new \globaldefs feature.
§1211 G

21 Jan 1983

624 Optimize the code, in places where it’s important (based on frequency counts
of TeX usage accumulated during the past week): Introduce fast_get_avail and
fast_store_new_token; reduce procedure-call overhead in begin_token_list, end_token_list, back_input, flush_node_list; change some tests from ‘if a \& b’
to ‘if a then if b’.
§122, 371 E

22 Jan 1983

625 Save space in math lists: Don’t insert penalties within restricted horizontal
mode; simplify trivial boxes.
§721, 1196 E

626 Fix a surprising oversight in the rebox routine: Ensure that b isn’t a vbox.
§715 S

545 → 627 Make \nullfont a primitive, so that car_font always has a value. (This is a
dramatic improvement over TeX78, where a missing font was a fatal error
called ‘Whoa’!)
§552 C

24 Jan 1983

586 → 628 List all incomplete \if’s when the job ends.
§1335 I

29 Jan 1983

552 → 629 Change initialization of align_state so that \halign\bgroup works.
§777 C

30 Jan 1983

625 → 630 Be sure to test ‘is_char_node(q)’ when checking for a trivial box.
§721 D

• By extraordinary coincidence, this bug was caught when somebody used font
number 11 (= kern_node) in the second character of a list of length 2!
X168 → 631 Improve format for stats at end of run, as suggested by DRF.
§1334 I

632 Don’t ignore the space after a control symbol (except ‘\’).
§354 C

633 Remove all trailing spaces at the right of input lines, so that there’s perfect
compatibility with IBM systems that extend short lines with spaces.
§31 P

3 Feb 1983

634 Assume that a math_accent was intended, after giving an error message in the
case mmode + accent.
§1165 I

635 Add new primitives \iftrue and \iffalse.
§488 G

6 Feb 1983

X304 → 636 Improve the accuracy of fixed-point arithmetic when calculating sizes for \left
and \right. (I had started by dividing delimiter_factor, not delta1, by 500.) §762 A

12 Feb 1983

637 Change the name \delimiterlimit to \delimitershortfall.
§248 C

638 Make \abovewithdelims.. equivalent to \above; change the order of operands
so that delimiters precede the dimension.
§1182 C

607 → 639 Remove the kludgy math codes introduced earlier; make \fam a normal integer
parameter and allow mathcode to equal 2^{15}.
§1233 C

640 Don’t let \spacefactor become more than 2^{15}.
§1233, 1243 R

• I finished drafting Chapter 17 today.

14 Feb 1983

639 → 641 Replace octal output (print_octal) by hexadecimal (print_hex) so that math
codes are clearer.
§67 I

619 → 642 Don’t forget char_given in the math_accent routine.
§1124 F
THE ERRORS OF \TeX

17 Feb 1983
622 \rightarrow 643 Switch modes when \texttt{\textbackslash halign} occurs in horizontal mode, or \texttt{\textbackslash valign} in vertical mode. \textsection{1090, 1094} C

18 Feb 1983
644 Add a new feature \texttt{\textbackslash tracingrestores}. This requires a new procedure called \texttt{\textbackslash show_eqtb}, whose code can be interspersed with the \texttt{eqtb} definitions. \textsection{252} I

25 Feb 1983
622 \rightarrow 645 Suggest using \texttt{\textbackslash leaders} when the user tries a horizontal rule in restricted horizontal mode. \textsection{1095} I

27 Feb 1983
646 Specify the range of source lines, when giving warning messages for underfull or overfull boxes in alignments.

\begin{itemize}
\item Why did it take me all day to type the middle part of Chapter 18?
\end{itemize}

4 Mar 1983
647 Introduce a new feature \texttt{\textbackslash xcr} (suggested by LL). [Changed later to \texttt{\textbackslash crcr}]. \textsection{785} G
631 \rightarrow 648 Subtract out \TeX's own string requirements from the stats. \textsection{1334} I

6 Mar 1983
649 Add new features \texttt{\textbackslash everyhbox} and \texttt{\textbackslash everyvbox}. \textsection{1083, 1167} G

9 Mar 1983
X295 \rightarrow 650 Avoid accessing \texttt{math_quad} when the symbol fonts aren't known to be present. \textsection{1199} R
533 \rightarrow 651 Introduce \texttt{float} and \texttt{unfloat} macros to aid portability (HWT). \textsection{109} P
652 Introduce new names \texttt{\textbackslash abovedisplayskip} and \texttt{\textbackslash belowdisplayskip} for the old \texttt{\textbackslash dispaskip}; also \texttt{\textbackslash abovedisplayshortskip} and \texttt{\textbackslash belowdisplayshortskip} for the old \texttt{\textbackslash dispaskip} and \texttt{\textbackslash dispbskip}. \textsection{226} C

10 Mar 1983
653 Unbundle \texttt{\textbackslash romannumeral} from \texttt{\textbackslash number} (suggested by FY). \textsection{468} C

12 Mar 1983
654 Ignore leading spaces in \texttt{scan_keyword}. \textsection{407} C

14 Mar 1983
631 \rightarrow 655 Use \texttt{write} and \texttt{write_in} directly when printing stats. \textsection{1334} E

16 Mar 1983
602 \rightarrow 656 Refine the page-break cost function (introducing 'deplorable', which is not quite 'awful_bad'), after suggestion by LL. \textsection{974, 1005} Q

\begin{itemize}
\item The changes above have been incorporated into Version 0.96.
\end{itemize}

18 Mar 1983
657 Add a new feature \texttt{\textbackslash everyjob} suggested by FY. \textsection{1030} G

19 Mar 1983
658 Don’t treat left braces specially when showing macros. \textsection{294} I
659 Ignore blanks that would otherwise become undelimited arguments. \textsection{393} C

21 Mar 1983
X280 \rightarrow 660 Make \texttt{\textbackslash lastskip} handle \texttt{mu_glue} as well as ordinary glue. \textsection{424} F
561 \rightarrow 661 Expand only one level in a preamble \texttt{\textbackslash span}. \textsection{782} C

22 Mar 1983
662 Let a single \# suffice in \texttt{\textbackslash tokens}, \texttt{\textbackslash message}, etc. (The previous rule, in which ## was always required as in macros, was a loser especially in \texttt{\textbackslash write} where you had to say ####!) \textsection{477} C
X328 → 663 Require the keyword ‘to’ in \read. (This will avoid the common error of an incomplete constant when no space appears before the \cs.) Also allow terminal I/O as a default when a stream number is out of range. §482, 1225, 1370 C

26 Mar 1983
664 Replace \ifeven(countnumber) by \ifodd(number), for better consistency of language. §504 C
564 → 665 Introduce the change if limit, to overcome a big surprise bug relating to \if if aabc\ifi.  
• Such examples show that cur_if might not be current, in my original implementation.

28 Mar 1983
666 Tolerate non-characters as arguments to \if and \ifcat. §506 G
667 Change ‘absent’ to ‘void’, a better word. §487 C
668 Clear the shift_amount in \lastbox, since I don’t want to figure out what it means in all cases. §1081 C

29 Mar 1983
669 Wake up the terminal before giving an error message. (This means a special print_err procedure is introduced.) (Suggested by DRF.) §34, 73 I

1 Apr 1983
• Today I finished Chapter 21 (boxes) and began to draft Chapter 22 (alignments).
670 Allow periodic preambles in alignments. §793 G
671 Make \leaders line up according to the smallest enclosing box. §627, 636 C
672 Allow hyphenation after whatsis (e.g., after items for an index). §896 Q

2 Apr 1983
673 Call build_page when \par occurs in vertical mode. §1094 Q
674 Clear aux in inst_row, for tidyness. §786 C

4 Apr 1983
675 Let digits switch families in math mode. §232 C

7 Apr 1983
676 Refine the test for not splitting an insertion. §1008 Q

8 Apr 1983
677 Rename \xcr as \crcr, at LL’s request. §780 C

9 Apr 1983
• Took a day off and had a chance to help print a sample page on a 150-year-old letterpress in Murphys, California.

11 Apr 1983
678 Recover more sensibly after a runaway preamble. §339 I

12 Apr 1983
X328 → 679 Make \read span several input lines, if necessary to get balanced braces. §482 C

14 Apr 1983
680 Fix a subtle bug found by JS: §§82 can make q a char_node, so we need to test ‘if ~is_char_node(q)’. [Actually I discovered much later that the real bug was to omit ‘else’ at this point.] §881 S

15 Apr 1983
681 Make \uppercase and \lowercase apply to all characters, regardless of category. §1289 C
7:30am. After working all night, I completed a draft of the manual thru Chapter 22, for distribution to volunteer readers.

5pm. The changes above have been incorporated into Version 0.97.

17 Apr 1983

682 Change ‘small_number’ to ‘0...65’ in the hyphenation routine (DRF).

683 Flush patterns in the input when the user tries \patterns outside of INITEX (suggested by DRF).

Tomorrow I fly to England, where I’ll lecture and write a paper about ‘Literate Programming’ [Comp. J. 27 (1984), 97–111].

14 May 1983

663 → 684 Improve the behavior of \read from terminal (suggested by Todd Allen at Yale). [I’d forgotten to implement the extended stream numbers in #663. Also, the prompt is now omitted if n < 0.]

18 May 1983

685 Restrict \write n to the transcript file only, if n < 0.

686 Unify the syntax for registers and internal quantities. (Remove primitives called ‘\instehe’ and ‘\minusthe’; rename scan_the to scan_something_internal, and change its interface accordingly; clean up command codes generally.)

24 May 1983

688 Introduce a new parameter \everycr (suggested by MDS).

Many macro writers and preliminary-manual readers have been requesting new features; I’ll try to keep the language as concise and consistent as possible.

25 May 1983

689 Introduce \countdef, \dimendef, etc. (suggested by DRF long ago, easy now in view of #686).

690 Introduce \advance, \multiply, \divide (suggested by FY).

691 Introduce \hyphenchar: this requires a new command assign_font_int, plus minor changes to about 15 modules.

692 Introduce \skewchar (easy because of #691).

693 Introduce \noexpand. (I had difficulty thinking of how to implement this one!)

694 Introduce \meaning.

X231 → 695 Remove ‘dm’ and ‘vu’; allow the more general ‘.5\hsize’.

696 Change ‘\texinfo f n’ to ‘\fontdimen n f’.

27 May 1983

697 Add a new feature \afterassignment (suggested by ARK).

619 → 698 Adjust the timing so that commands like ‘\chardef xx=5\xx’ behave sensibly.

28 May 1983

699 Ignore ‘\relax’ as if it were a space, in math mode and in a few other places where \relax would otherwise be erroneous.

700 Improve \mathaccent spacing with respect to subscripts and superscripts (suggested by HWT).

30 May 1983

598 → 701 Terminate a job only when dead_cycles = 0.

The changes above constitute Version 0.98.

3 Jun 1983

I finished the draft of Chapter 23 (output routines) today.
Allow \texttt{mark} and \texttt{\protect\insert} and \texttt{\protect\vadjust} in restricted horizontal mode, and also in math mode. (This is a comparatively big change, triggered by the fact that \texttt{mark} in a display presently causes \TeX{} to crash with 'This can't happen'!) The global variable \texttt{\protect\adjust\_tail} is introduced.

\textbf{6 Jun 1983}

Replace (and generalize) the previous uses of \texttt{\ht}, \texttt{\wd}, and \texttt{\dp} in dimensions by introducing the new control sequences \texttt{\ht{}}, \texttt{\wd{}}, and \texttt{\dp{}}.

Display sub-parts of noads with the symbols ^ and _ instead of ( and [.

Allow \texttt{A..F} in hex constants to be other char as well as letter.

\textbf{7 Jun 1983}

Remove an instance of \texttt{\langle Scan optional space\rangle}, since it's now redundant.

Legalize \texttt{\protect\mkern\thinmuskip} and \texttt{\protect\mkern5\thinmuskip}.

Display sub-parts of noads with the symbols ^ and _ instead of ( and [.

Allow \texttt{\indent} in math mode; also make \texttt{\valign} in math mode produce the 'Missing $' error.

Remove redundant code: There's no need to check \texttt{cur\_group} or call \texttt{off\_save} when starting alignments or equation numbers in displays.

\textbf{8 Jun 1983}

Disallow \texttt{\openout-1} and \texttt{\closeout-1}.

Disallow \texttt{\texttt{\protect\lastbox}} in math mode.

\textbf{9 Jun 1983}

Call \texttt{back\_error}, not \texttt{error}, when \texttt{\leaders} aren't followed by proper glue.

Initialize for a possible paragraph, after \texttt{\noalign} in a \texttt{\valign}.

\textbf{10 Jun 1983}

Expand the optional space after an ASCII constant.

Set \texttt{space\_factor} ← 1000 after a rule or a constructed accent.

Correct a serious blunder: Set \texttt{disc\_width} ← 0 before testing if \texttt{s} is null (caught by JS).

This is a real bug that existed since the beginning! It showed up on page 37 of the Version 0 \TeX{} manual, but I didn't notice the problem.

Make optional spaces after \texttt{\dimen} like those after \texttt{\number}.

Insert every \texttt{\protect\display} before calling \texttt{\protect\build\_page}.

Report \TeX{}'s capacity on overflow errors in a way that's fully consistent with other statistical reports.

\textbf{12 Jun 1983}

Make all \texttt{\tracing} decisions on the basis of ≥ versus <, not ≠ versus =.

Today I finished the draft of Chapter 27 (the last chapter)!

The changes above were released as Version 0.99 on June 19, 1983.
THE ERRORS OF \TeX

20 Jun 1983
727 Set \catcode'\%=14 in INITEX. §232 C
587 → 728 Call normal_paragraph when \par occurs in vertical mode. §1094 C
  • Once again I’m retiring about 8am and awaking about 4pm.

21 Jun 1983
558 → 729 Don’t append an overfull rule solely because of \hbadness. §666 C
730 Don’t allow the glue-ratio of shrinking to be less than −1. §810, 811 R

22 Jun 1983
653 → 731 Declare the parameter to print_roman_int to be of type integer, instead of
  nonnegative_integer (found by Debby Clark). §69 B
690 → 732 Make the keyword ‘by’ optional (suggested by LL). §1236 C

24 Jun 1983
733 Say ‘preloaded’ when announcing format_ident. §1328 I

25 Jun 1983
734 Add extra boxes and glue to the output of alignment. [This thwarts possible
  attempts at trickery by which system-dependent glue set values computed
  by \span could have gotten into \TeX’s registers by things like \align and
  \vsplit. It also has the advantage of perfect accuracy in alignment of vertical
  rules.] §809 R
735 Make leaders affect the height or width of the enclosing boxes. §656, 671 C
  • Today I’m mainly installing a much-improved format for change files in \WEB
    programs (suggested by DRF).

28 Jun 1983
736 Permit \unskip in vertical mode when we know that it does nothing. §1106 C

1 Jul 1983
700 → 737 Avoid redundant boxes when things like ‘\bf A’ occur in math. §1186 E
738 Add a ‘scaled’ feature to \font input. §1258 G
700 → 739 Remember to correct delta when an accented box changes. §742 D

2 Jul 1983
740 Introduce bypass_colon, to remove anomalous behavior on input files of length 1.
  (Suggested by DRF after the problem was discovered by LL). §31 R

4 Jul 1983
741 Allow codes like ^^b as well as ^^B. §352, 355 G
742 Introduce new parameters \escapechar, \endlinechar, \defaulthyphenchar, and
  \defaultskewchar, to make \TeX less dependent on the character set.
  (This affects many modules, since a lot of error messages must be broken up
  so that they use print_esc.) G

7 Jul 1983
743 Use a system-dependent function erstat when opening or closing files (suggested
  by DRF). §27 P
  • The computer is back up after more than 50 hours down time (due to air
    conditioning failure).

11 Jul 1983
744 Show total glue in the output of \tracingpages. §985 I
745 Guard against insertion into an hbox. §993 R
746 Legalize the assignment \{tokenvar\}={\tokenvar}. §1227 C
747 Introduce a new parameter \errhelp. §1283 I
623 → 748 Don’t forget to check global_def when \tabskip is changed. §782 F
12 Jul 1983

749 Allow an \outer macro to appear after \string, \noexpand, and \meaning (Todd Allen). §369, 471 C

750 Make ‘the’ an expandable control sequence (i.e., move it from the stomach to the throat); this cleans up several annoying glitches. §367 C

620 → 751 Allow \unhbox and \unhcopy in math mode if the box is void. §1110 C

13 Jul 1983

• I lectured for four hours at the TUG meeting today after very little sleep!

16 Jul 1983

• The following were suggested by TUG meeting discussions.

752 Round the value of default_rule more properly: It should be 26215. §463 L

700 → 753 Fix \mathaccent again; it’s still not right! The final height should be the maximum of the height of accented letter without superscript and the height of unaccented letter with superscript. §742 Q

754 Add a new feature \newlinechar. §59 G

755 Allow boxes and rules in discretionaries (suggested by somebody from Hewlett-Packard). §1121 G

X28 → 756 Show all token expansions, not just macros, when \tracingcommands. §367 I

757 Allow \char in a \hyphenation list. §935 C

758 Introduce a new feature \aftergroup; it can be implemented with save_stack. §326 G

759 Run the running dimensions to alignment boundaries (suggested by ARK). §806 C

17 Jul 1983

760 Zero out hyf values at the edges, so that weird pattern data cannot lead to Pascal range checks. §965 R

X190 → 761 Decrease the hc codes for hyphenation, so that code 127 cannot possibly be matched. §937, 962 R

672 → 762 Allow whatstirs after hyphenatable words. §899 C

604 → 763 Represent an italic correction as an explicit kern. §1113 C

18 Jul 1983

764 Allow lowercase letters in file names. §519 C

765 Change the message ‘No output file’ to: ‘No pages of output’. §642 I

766 Confirm that a quiet mode is being entered, when error interaction ends with Q, R, or S (suggested by ARK). §86 I

• Version 0.999 was finally installed today; a new program listing has been printed.

• From now on, I plan to keep all section numbers unchanged.

• I’m done writing Appendix H; beginning to revise Chapter 20.

25 Jul 1983

663 → 767 Allow space after ‘to’ in the \read command (FY). §1215 C

• To bed at 1pm today.

27 Jul 1983

665 → 768 Stack the current type of \if; this precaution is necessary in general (FY). §498 S

• To bed at 2pm today.

29 Jul 1983

769 Avoid putting a control sequence in the hash table when it occurs after \ifx. (Requested by Math Reviews people.) §507 E

• Finished a version of The \TeXbook lacking only Appendices D, E, and I, for distribution to interested readers.

• To bed at 10:30pm, planning to arise regularly at 6am for a change.
31 Jul 1983

766 → 770 Call update_terminal when going quiet (HWT).

1 Aug 1983

771 Don’t put an empty line at the end of an \input file! (This simplifies the rules and the program, and also gets around a bug that occurred at the end of files with end_line_char < 0.)

* The changes above went into Version 0.9999, which was widely distributed.

16 Aug 1983

665 → 772 Rectify a ridiculous gaffe: I initialized q every time the loop of change_if_limit was performed! (Found by FY.)

648 → 773 Distinguish ‘string’ from ‘strings’ when reporting statistics.

774 Introduce \xleader, to correct a bug in \xleader computations (found by FY).

20 Aug 1983

775 Don’t forget to apply \slash to ligatures.

* Today I began to read all previous issues of TUGboat, in preparation for Appendix D.

27 Aug 1983

776 Add debugging hack number 16, to help catch subtle data structure bugs.

777 Remove redundant setting and resetting of name_in_progress.

618 → 778 Suppress \input during a font size spec; otherwise cur_name is clobbered (found by MDS).

779 Introduce new conditionalslifhbox and lifvbox.

29 Aug 1983

750 → 780 Test for an empty list, if emptiness will mess up the data structure. (Found by Todd Allen.)

624 → 781 Use fast_store_new_token in another place for efficiency.

782 Say ‘has only’ instead of ‘has’.

* These changes yield Version 0.99999, used only at Stanford.

30 Aug 1983

783 Make funny blank spaces showable.

31 Aug 1983

754 → 784 Make \newlinechar affect print_char, not just print.

4 Sep 1983

785 Add new features \lastkern, \lastpenalty, \unkern, \unpenalty. §424, 996, 1105

* OK, Appendix D is finished!!

* The above changes have been installed in Version 0.99999.

17 Sep 1983

548 → 786 Don’t bother making duplicate font identifiers; that was overkill, not really needed.

* Will this be the historic last change to TeX?

18 Sep 1983

787 Correct a minor inconsistency, ‘display’ not ‘displayed’.

20 Sep 1983

604 → 788 Treat the kerns inserted for accents as explicit kerns.

26 Sep 1983

789 Change ‘log’ to ‘transcript’ in several messages.

* The index was finished today; I mailed the entire TeXbook to Massachusetts for final proofreading before publication.
1 Oct 1983

790 Prevent uninitialized trie positions in case of overflow (found by Bernd Schulze). §944 D

7 Oct 1983

• Henceforth our weekly ‘\TeX lunch’ meetings will be called ‘\METAFONT lunch’.
• \DRF begins to produce \TeXbook on our APS phototypesetter.

14 Oct 1983

633 \mapsto 791 Ignore spaces at the ends of lines also in \texttt{TEX.POOL} (found by DRF). §52 P
610 \mapsto 792 Initialize the \texttt{history} variable at \texttt{start\_here} (DRF). §1332 D

18 Oct 1983

793 Extend \texttt{runaway} to catch runaway text (suggested by FY). §306 I
794 Reset \texttt{cur\_cs} after \texttt{back\_input}, not after scanning the ‘=’ (found by FY). §1226 D

24 Oct 1983

638 \mapsto 795 Change the error recovery for bad delimiters, in accordance with the changed syntax. (Found by Barry Smith.) §1183 I

9 Nov 1983

796 Optimize the code a bit more, based on empirical frequency data gathered during September and October: In §45, use the fact that the result is almost always true. In §380, delete \texttt{\_while true \_do} since many compilers implement that badly. Rewrite §852 to avoid calling \texttt{badness} in the most common case. §45, 380, 852 E

3 Dec 1983

797 Don’t forget to call \texttt{error} after the message has been given (noticed by Gabi Kuper). §500 F

• Version 1.0 released today incorporates all of the above.

9 Dec 1983

• Dinner party with 36 guests to celebrate $\TeX$’s coming of age.

2 Feb 1984

786 \mapsto 798 Reinstall $\font$ precautions that I thought were unnecessary. I overlooked many problematic possibilities, like ‘$\font\a=x \global\a \the\font$’ and ‘$\font\a=x \font\b=x \let\b=\undefined \the\a$’, etc. (Found by Mike Urban.) The new remedy involves removal of the \texttt{font\_ident} array and putting the identifiers into a frozen part of the hash table; so there’s a sprinkling of corrections in lots of modules. But basically the change is quite conservative, so it shouldn’t spawn any new bugs (it says here). §222, 267, 1257 S

9 Feb 1984

799 Remove the possibility of double interrupt, in a scenario found by Clint Cuzzo. §1031 S

12 Feb 1984

800 Improve spacing in a formula like $(\texttt{A},<)$. §764 Q

13 Feb 1984

801 Avoid a bad \texttt{goto}, as diagnosed by Clint Cuzzo and George O’Connor. (Must not go directly to \texttt{switch}.) §346 A
802 Conserve string pool space by not storing file name in two guises (suggested by DRF). §537 E

26 Feb 1984

803 Make scaled output look cleaner by printing fewer decimals whenever this involves no loss of accuracy. (Suggested by \METAFONT development.) §103 I
2 Mar 1984

804 Maintain 17-digit accuracy, not 16; now constants like `0.00000762939453126pt'
will round correctly. §452 R

16 Mar 1984

805 Plug a loophole that permitted recursion in `get_next', by disallowing deletions
in `check_outer_validity'. §336 R

24 Mar 1984

806 Open the terminal before trying to wake it up, when the program starts bad. §1332 I

27 Mar 1984

807 Check that $k < 63$, to avoid the `{\patterns{xxx...xxxdxxxdxxx}} anomaly
found by Jacques Désarménien. §962 R

11 Apr 1984

808 Supply code for the missing case `adjust_node' in `copy_node_list'. §206 F

809 Initialize `char_base', etc., for `null_font'. (Found by Nick Briggs.) §552 D

810 Clear the `buffer' array initially (Briggs). §331 R

21 Jun 1984

811 Look ahead for ligature or kern after a `{\chardef}'d item (Désarménien). §1038 C

4 Jul 1984

812 Make the quarterword constraint explicit with a new `'bad' case (19). §111 R

7 Jul 1984

813 Optimize `firm_up_the_line' slightly, to be consistent with the `METAFONT' pro-
gram. §363 E

8 Jul 1984

814 Give additional diagnostics when `{\tracingmacros}>1'. §323 I

815 * The changes above were incorporated in Version 1.1, released July 9, 1984.

27 Jul 1984

20 Oct 1984

816 Allow `'0' in response to error prompts. §84 I

817 Don’t forget to check for `null' before looking at subfields of a node. (This was
“dirty Pascal,” with two quarterword `0's read as a halfword.) §846 R

818 Ditto in another place! §939 R

819 Remove the fixed-at-compile-time partition between lower and upper memory. §116, 125, 162 E

*S This major change in memory management completes Version 1.3, which was
published in preliminary looseleaf form as `\TeX: The Program'.

20 Dec 1984

820 Keep the `node_size' field from overflowing if the lower part of memory is too
large. §125 R

821 Improve the missing-format-file error (DRF). §524 I

5 Jan 1985
7 Jan 1985
822 Update the terminal right away so that the welcoming message will appear as soon as possible (DRF).

23 Jan 1985
823 Convey more uncertainty in the help message at times of confusion.
824 Improve the history logic in the warning issued case.

18 Feb 1985
810 → 825 Stick to standard Pascal: Don’t use first in a for loop. [Some procedures “threaten” it globally, according to British Standard 6192, section 6.8.3.9.] (Pointed out by CET.)

11 Apr 1985
826 Prevent nonexistent characters from being output by unusual combinations of ligatures and hyphenation.

15 Apr 1985
819 → 827 Compute memory usage correctly in INITEX; the previous number was wrong because of a WEB text macro without parentheses (DRF).

16 Apr 1985
828 Speed up flush_list by not calling free_avail (DRF).

17 Apr 1985
788 → 829 Introduce a special kind of kern for accent positioning; it must not disappear after a line break.

18 Apr 1985
755 → 830 Prevent \lastbox and \unkern from removing discretionary replacements.

• That completes Version 1.4.

26 Apr 1985
831 Don’t try \TeX_area if a nonstandard file area has been specified (DRF).
• That was #401 in \TeX78: I never learn!

30 Apr 1985
754 → 832 Eliminate the limitation on \write length; the reason for it has disappeared (Nancy Tuma).

8 May 1985
819 → 833 Allocate two words for the head of the active list (CET).

11 May 1985
834 Change wterm to wterm_in after a bad beginning (Bill Gropp).
806 → 835 Don’t open the terminal twice (CET).

22 May 1985
836 Test for batch_mode after trying to open the transcript file, not before (DRF).
837 Be prepared for string pool overflow while reading the command line! (This bug was first found in METAFONT, when it could occur more easily.)

7 Aug 1985
838 Fix a bug in \edef{foo}{\iffalse\fi\the\toks0}: \TeX should stay in the loop when expanding non-\the. (Found by Dan Brotsky.)
• The above changes were incorporated in Version 1.5.

27 Nov 1985
764 → 839 Make ‘plain’ a lowercase name, for consistency with the manual.
669 → 840 Wake up the terminal for \show commands.
• The above changes were incorporated in Version 2.0, which was published as Volume B of the Computers & Typesetting series.

15 Dec 1986

841 Punctuate the Poirot help message more carefully. §1283 I

28 Jan 1987

842 Make sure that max_in_open doesn’t exceed 127 (DRF). §14 R

843 Don’t allow a \kern to be clobbered at the end of a pre-break list when a discretionary break is taken. (A missing ‘else’ was the source of the error, diagnosed incorrectly before.) §881 D

844 Take account of discarded nodes when computing the background width after a discretionary. §840 D

• That was the first really serious bug detected for more than 17 months! I found it while experimenting with right-to-left extensions.

• Version 2.1 was released on January 26, 1987.

5 Feb 1987

845 Remove cases in shorthand_def that cannot occur (found by Pat Monardo). §1224 E

14 Apr 1987

846 Improve robustness of data structure display when debugging (Ronaldo Amá). §174, 182 R

21 Apr 1987

847 Make the storage allocation algorithm more elegant and efficient. §127 E

22 Apr 1987

848 Calculate the empty-line condition properly when end_line_char is absent. §300 A

• The previous three changes were found while I was teaching a class based on Volume B; they led to Version 2.2.

28 Apr 1987

849 Avoid closing a file when TeX knows that it isn’t open (JS). §560 E

3 Aug 1987

850 Clean up unfinished output if it’s necessary to jump_out (Klaus Guntermann). §642 S

• That makes Version 2.3; subsequent version numbers won’t be logged here.

19 Aug 1987

851 Indent rules properly in cases like \hangindent=1pt$\halign{...\cr noalign{\hrule}}$$.

20 Aug 1987

852 Introduce co_backup because of cases like \hskip 0pt plus 1fil\ife< (Alan Guth). §366 S

9 Nov 1987

853 Change the calculation for number of leader boxes, so that it won’t be too sensitive to roundoff error near exact multiples (M. F. Bridgland). §626 S

17 Nov 1987

854 Replace my stupid algorithm for fixed-point multiplication of negatives (WGS). §572 A

12 Dec 1987

855 Fix a typo in the initialization of hyphenation tables (PB).

• That error was almost completely harmless, thus undetectable, except if some \lccode is 1 and no \patterns are given.

23 Dec 1987

564 → 856 Be more cautious when “relaxing” a previously undefined \csname; you might be inside a group (CET). §372 S
20 Apr 1988
857 Make sure \texttt{temp\_head} is well-formed whenever it can be printed in a “runaway” message: Consider constructions like \texttt{\textbackslash{}outer\textbackslash{}def\textbackslash{}a\text{\textbackslash{}eqno}0\textbackslash{}a\textbackslash{}a} (Silvio Levy). §391 S

24 Apr 1988
618 $\mapsto$ 858 Avoid conflicting use of the string pool in constructions like \texttt{\textbackslash{}def\textbackslash{}\textbackslash{}#1\textbackslash{}input a\textbackslash{}\textbackslash{}\textbackslash{}z} (Robert Messer). §260 S

10 May 1988
859 Amend the \texttt{\textbackslash{}patterns} data structure when \texttt{trie\_min} = 0 (PB). §951, 953 R

25 May 1988
860 Guarantee that \texttt{trie\_pointer} cannot be out of range. §923 R

618 $\mapsto$ 861 Avoid additional bugs like \#858 in constructions like \texttt{\textbackslash{}input a\textbackslash{}\texttt{\textbackslash{}roman\textbackslash{}numeral1}}. etc. §464, 465, 470 S

618 $\mapsto$ 862 Prevent similar string pool confusion that could occur during the processing of \texttt{**\textbackslash{}input\textbackslash{}roman\textbackslash{}numeral6}. §525 R

19 Jun 1988
819 $\mapsto$ 863 Prevent a negative dividend from rounding upward, causing a loop (CET). §126 S
819 $\mapsto$ 864 Adopt a smoother allocation strategy when memory is nearly gone (CET). §126 E

20 Jun 1988
852 $\mapsto$ 865 Initialize \texttt{cur\_order}, now that it’s being backed up (Tsunetoshi Hayashi). §439 D

6 Nov 1988
612 $\mapsto$ 866 Disable \texttt{fatal\_error} in \texttt{prompt\_input}, so that \texttt{open\_log\_file} can use it safely (Tim Morgan). §71 S

836 $\mapsto$ 867 Force terminal output whenever \texttt{open\_log\_file} fails. §535 S

14 Dec 1988
866 $\mapsto$ 868 Restore \texttt{fatal\_error} in \texttt{prompt\_input}, but don’t let it be unsafe for \texttt{open\_log\_file}. §92, 534 P

23 Jan 1989
869 Give \texttt{q} a legal value when recovering from “infinite shrinkage” error. §976, 1004 D

17 Feb 1989
758 $\mapsto$ 870 Avoid spurious error message for \texttt{\textbackslash{}aftergroup\textbackslash{}relax\textbackslash{}dump} by avoiding inaccessible \texttt{\textbackslash{}aftergroup} tokens (FM and Rainer Schöpf). §280 D

20 Mar 1989
871 Don’t refer to \texttt{link(null)} even when it “can’t happen” (PB). §791 R

7 Jun 1989
872 Avoid confusion from \texttt{$\textbackslash{}$begingroup\textbackslash{}halign(\#\textbackslash{}cr)$\textbackslash{}$} (FM). §1130 S

20 Jun 1989
873 Put fraction digits into dynamic memory, not the global \texttt{dig} array, because of constructions like \texttt{.5\textbackslash{}ifdim.6} (FM). §452 S

17 Jul 1989
874 Prevent embarrassing attempts to report errors before the string mechanism has been fully initialized, for example when the command line exceeds the buffer size (WGS). §31 S

16 Aug 1989
875 Allow integer products to be 31 bits long (FM). §105 M

31 Aug 1989
441 $\mapsto$ 876 Increase the number of tokens shown by \texttt{token\_show} (J. Lavagnino). §295 C
877 Avoid confusion from \texttt{$\textbackslash{}$begingroup\textbackslash{}eqno$\textbackslash{}$} (FM). §1140 S
The recent TUG meeting turned out to be an extend-TeX-for-the-nineties party! I agreed that some extensions for non-English languages ought to be made while I still knew how to do them. (In other words, I broke my firm commitment to keeping TeX completely stable; but in this case nobody objected.) The following eleven changes were coded during the month of September.

30 Sep 1989

878 Install major change allowing general 8-bit code input. §38, 352 G
879 Install major change allowing multiple hyphenation tables (M. Ferguson). §923 G
880 Introduce new parameters \lefthyphenmin and \righthyphenmin. §923 G
881 Introduce major new ligature capabilities including implicit boundary characters. §908, 1037 G
882 Install new \inputlineno feature suggested by MDS. §424 G
883 Install new \holdinginserts feature suggested by FM. §1014 G
884 Install new \badness feature. §424, 664 G
885 Install new \emergencyystretch feature. §863 G
886 Install new \errorcontextlines feature suggested by FM. §311 G
887 Recover from anomaly when hyphenation char_warning clobbers old_setting. §863 S
888 Make it easier to change the format extension (Don Hosek). §520, 1328 P

16 Oct 1989

889 Avoid range check in null font with bc=256 (PB). §565 R

22 Nov 1989

856 → 890 Prevent save_stack conflicts in \hbox\expandafter{\csname\endcsname} and similar constructions (WGS). §645, 1117 S
858 → 891 System-dependent parts of file names must be addressed relatively, not absolutely (FM and Rainer Schöpf). §516, 517 S

3 Dec 1989

880 → 892 Allow different hyphenmins in the same paragraph (M. Ferguson). §1376 G
893 Distinguish \par from characters on \if tests. (MVL). §334 S
378 → 894 Alignments need to be more robust against malicious attacks (MVL). §782 S
895 Don’t let kerns in discretionaries disappear at breaks (MVL). §869 C
881 → 896 Make the new hyphenation reconstruction procedure less cautious, so that it doesn’t lose hyphens found by the old method. §914 Q

11 Dec 1989

879 → 897 Make an undumped trie dumpable again (PB). §1325 D

18 Dec 1989

588 → 898 Allow access to page totals in \output routines (FM and Chris Rowley). §421 G

22 Jan 1990

611 → 899 Recognize more cases of unbalanced \output (CET). §1026 R

29 Jan 1990

758 → 900 Make \aftergroup work properly after \eqno (Michael Downes). §1194 S

1 Feb 1990

878 → 901 Fix one more case of end_line_char_inactive (WGS). §360 S

22 Feb 1990

902 Don’t lose the last active node when total demerits are very high (FM). §836, 854 R

13 Mar 1990

903 Doublecheck math fonts after making equation number (MVL). §1194 D
904 Don’t forget to rule out charnodes before testing type (MVL). §805, 1202 D
23 Mar 1990

881 → 905  Don’t change the font of punctuation preceding a hyphenated word (Scott C. Allendorf).

906  Balance the parentheses shown on the terminal during normal runs. §903  F

907  Optimize \ifx\p\q after \let\p=q (MVL). §1335  I

908  Treat migration properly in displays (MVL).

• We’re now up to Version 3.0; I sincerely hope all bugs have been found.

11 May 1990

881 → 909  Initialize \nullfont ligature parameters (Lance Carnes).

§552  F

22 July 1990

579 → 910  Treat \prevgraf as zero within \write (Boguslaw Jackowski).

§422  S

26 July 1990

911  Report ‘1.1’ when first line of file overflows buffer (George Russell).

§538  S

5 December 1990

878 → 912  Translate unprintable characters in font identifiers (WGS).

§63  S

28 December 1990

913  Avoid range check when there are 65536 or more pages (Eberhard Mattes).

§642  R

20 September 1991

878 → 914  Improve error message for \mathchar out of range.

§436  I

878 → 915  Retain unprintable internal strings in 8-bit form (FM).

§59  S

881 → 916  Retain right punctuation context for ligature reconstruction (problem found by Brian Hamilton Kelly).

§903  S

10 January 1992

881 → 917  Also avoid producing a double kern at boundary (CET).

§897  S

918  Disallow \setbox where it doesn’t work (Robert Hunt).

§1241,1270  S

919  Robustify \mskip and \mkern in presence of negative quad (WGS).

§716,717  S

679 → 920  Defend against \textstyle in \read (Michael Downes).

§483  S

798 → 921  Save string memory if font occurs repeatedly (Boguslaw Jackowski).

§1260  E

784 → 922  Don’t let \newlinechar interrupt unprintable expansion (Bernd Raichle).

§59,60  S

7 February 1992

881 → 923  Restore cur_l properly when boundary character doesn’t exist (Mattes and Raichle).

§1036  D

17 July 1992

892 → 924  Use current language at beginning of horizontal mode (Rainer Schöpf and CET).

§1091,1200  C

17 December 1992

879 → 925  Avoid (harmless) range errors (Philip Taylor and CET).

§934,960  R

25 February 1993

881 → 926  Protect kerns inserted by boundary characters (William Baxter).

§837,866  C

917 → 927  Don’t let boundary kern disappear after hyphenation.

§897  S

26 June 1993

668 → 928  Avoid potential future bug (Peter Breitenlohner).

§628,637  R

17 December 1993

881 → 929  Boundary character representation shouldn’t depend on the font memory size (Berthold Horn).

§549,1323  S

10 March 1994

930  Huge font parameter number may exceed array bound (CET).

§549  R
THE ERRORS OF \TeX

4 September 1994

\texttt{\textbackslash kerns} are explicit (Walter Carlip). §717 F

Avoid \texttt{\textbackslash integer} conversion. §625, 634 R

19 March 1995

Avoid spurious reference counts in format files (PB). §1335 R

23 November 1998

Make sure that \TeX\ is certifiably Y2K-safe. §1328 R

12 July 1999

\texttt{\textbackslashleaders} often drops the final box (Hirosi Nakashima). §627, 636 A

30 August 2001

Don’t allow a million unbalanced braces followed by \texttt{\textbackslash cr} outside of any alignment (Ralf Roth). §789 R

Don’t allow end-template except at end of template (Roth). §325, 1131 R

30 September 2002

Improve rounding of glue during output (M. F. Bridgland). §625, 634 Q

18 March 2008

Forgot to goto the proper error recovery (DRF). §395 F

Avoid a case of dirty \texttt{\textbackslash glue} in format file (DRF). §1035 E

Forget reference to \texttt{\textbackslash last\_glue} in format file (DRF). §1335 R

Glue reference not updated after overflow error (DRF). §1236 R

\texttt{\leaders} had wrong units; now disallowed (DRF). §1078 B

Speedup of ligatures and kerns at end of a word (DRF). §1039 E

Another sanity check of TFM files for security (DRF). §565 R

Give better size data for unmagnified insertions. §986 I

6 January 2014

Space after \texttt{\csname endcsname} to match other spaces. (Oleg Bulatov) §262 C

15 January 2021

Don’t pause on errors when tracing paragraphs (Udo Wermuth). §826 I

Don’t try to interact when in \texttt{\textbackslash batchmode} (Xiaosa Zhang). §83 S

Don’t try to edit when no file is active (Xiaosa Zhang). §84 S

Take date and time sometimes from system, not user (Udo Wermuth). §241, 536 R

Don’t allow implicit left brace after \# (Udo Wermuth). §476 B

After nine parameters, must delete offending tokens (Bruno Le Floch). §476 R

Garbage visible in buffer after file ends prematurely (DRF). §486 D

Force nonexistent characters to have null specs (DRF). §722 R

Don’t mark fraction noads as temporarily Inner (DRF). §761 C

Reset \texttt{\newlinechar} before logging the stats (Udo Wermuth). §1333, 1335 Q

List of abbreviated names:

DRF: David Fuchs
HWT: Howard Trickey
FY: Frank Yellin
LL: Leslie Lamport
JS: Jim Sterken
ARK: Arthur Keller
CET: Chris Thompson
FM: Frank Mittelbach
PB: Peter Breitenlohner
WGS: Wayne G. Sullivan
MVL: Marc van Leeuwen
MDS: Michael D. Spivak