10 Mar 1978

1 Rename a few external variables to make their first six letters unique.

2 Initialize escape_char to −1, not 0 [it will be set to the first character input]. §240

3 Fix bug: The test ‘id < 200’ was supposed to distinguish one-letter identifiers from longer (packed) ones, but negative values of id also pass this test. §356

4 Fix bug: I wrote ‘while \(\alpha \land (\beta \lor \gamma)\)’ when I meant ‘while \((\alpha \land \beta) \lor \gamma\)’. §259

5 Initialize the input routines in INITEX [at this time a short, separate program not under user control], in case errors occur. §1337

6 Don’t initialize mem in INITEX, it wastes time. §164

7 Change ‘new_line’ [which denotes a lexical scanning state] to ‘next_line’ [which denotes carriage_return and line_feed] in print commands. B

8 Include additional test ‘mem[p] \neq 0 \land’ in check_mem. §168

9 Fix inconsistency between the eq_level conventions of macro_def and eq_define. §277

• About six hours of debugging time today.
• INITEX appears to work, and the test routine got through start_input, chcode [the \TeX{}78 command for assigning a cat_code], get_next, and back_input the first time.

11 Mar 1978

10 Insert space before ‘(’ on terminal when opening a new file. §537

11 Put ‘p ← link(p)’ into the loop of show_token_list, so that it doesn’t loop forever. §292

12 Shift the last item found by scan_toks into the info field. [With SAIL all packing of fields was done by arithmetic operations, not by the compiler.] §474

12 \mapsto 13 Fix the previous bugfix: I shifted by the wrong amount. §474

14 Add a feature that prints a warning when the end of a file page occurs within a macro definition or call. [System dependent.] §336

• Unintended bugs in my test routine [a format intended eventually to typeset The Art of Computer Programming] helped check out the error recovery mechanisms. For example, I had ‘\lft\{#\}’ instead of ‘\lft\{##\}’ inside a macro, and three cases of improper { and } nesting.

15 Add the forgotten case ‘set_font:’ to eq_destroy. §275

16 Change \texttt{\textbackslash require to \textbackslash input.}} §376

17 Add code for the case cur_cmd = 0 [later known as the case ‘t \geq cs_token_flag’] when scanning a tokenlist.

• That’s the first “big” error I’ve spotted so far.

18 Introduce a ‘d’ option in the error routine, to facilitate debugging. §84

19 Assign a floating-point constant ignore_depth to prev_depth, instead of assigning the integer constant flag [since prev_depth is type real in \TeX{}78]. §215

20 Improve the readability and spacing of show_node_list output. §182, 187

21 Set the variable v before using the case construction in show_node_list, because there’s one case where v didn’t receive a value [as part of the field unpacking]. §182

• About seven hours today.

12 Mar 1978

• One hour to enter yesterday’s corrections and recompile.

• At this point \TeX{} correctly located further unintended syntax errors in acphdr [the test file].

22 Insert debug_help into succumb, giving a chance to look at memory before the system dies. §93

23 Use eq_destroy wherever necessary in unsave. §283
Change $t \leftarrow (t - 1) \mod 8$ to $t \leftarrow (t - 1) \land 7$ in idname, since SAIL has $-1 \mod 8 = -1$. [At this time, idname is a routine that unpacks control sequence names, according to a scheme that will become obsolete after change #422.]

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

Remove unwanted line feed after getting a carriage return in response to in_chr_w [a system routine for input from the terminal].

Delete spurious call to flush_list in end_token_list.

• Why did I make such a silly mistake?

Fix bug in get_x_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.

Fix bug in scan_spec (while instead of repeat).

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

Disable unforeseen coercion: When scan_spec put hsize on save_stack, the value changed from real to integer.

Use ‘*’ instead of ‘-1.0’ for running dimensions of rules in show_node_list.

Clear mem[head] to null in push_nest [in TEx82, this will be done by get_avail].

• A vrule link got clobbered because I forgot to do this.

Translate ASCII control codes to special form when displaying them.

• Ligatures work, but show_node_list showed them funny.

Remember to clear parameters off save_stack in package routine.

• About eight hours today.

Introduce a new variable hang_first [later the sign of hang_after].

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.)

Spruce up the comments in the line_break routine, which appears to be almost working.

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.]

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.]

Also initialize tail in that case.

Also put the result of line-breaking into the correct list.

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

Fix bug: post_line_break forgot to set adjust_tail.

Update act_width properly when looking for end of word while line breaking.

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.]
THE ERRORS OF TeX

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 \neq 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

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

• 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 \geq not \leq). §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 ‘\leq str[k]’ not ‘\leq 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

• The first word of a paragraph won’t be hyphenated . . . so be it!
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 \mapsto
67 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 \texttt{\textbackslash end} maneuver; the present code doesn’t end the job, since I forgot that \texttt{back_input} uses \texttt{cur_token}. \\
71 Add a parameter to \texttt{\textbackslash try_break}, since the width is different at a discretionary hyphen. [This problem will be solved differently in \TeX82, when discretionary becomes much more general.] \\
72 Bypass kern nodes in pre-hyphenation. \\
73 Supply code for the forgotten case ‘< “a”’ in pre-hyphenation. [This case was later generalized to a test of \texttt{lc_code}.

\begin{itemize}
\item (Such blunders. Am I getting feeble-minded?)
\item Add a parameter to \texttt{\textbackslash try_break}, since the width is different at a discretionary hyphen. [This problem will be solved differently in \TeX82, when discretionaries become much more general.] \\
\item Supply kern nodes in pre-hyphenation. \\
\item Bypass kern nodes in pre-hyphenation. \\
\item Change \texttt{mem}[q] to \texttt{prev_break}(q) in the reverse-linking loop. \\
\item (Such blunders. Am I getting feeble-minded?) \\
\item Introduce special logic for \texttt{eject_penalty}; I was wrong to think that forced ejection was exactly like an infinitely negative penalty. \\
\item Use \((1 + b)^2 - p^2\) when computing demerits with \(p < 0\). \\
\item 6:30am. \textbf{The line-breaking algorithm appears to be working fine and efficiently.}\[6pt]
On small measures (about 20 characters per line), it gives overfull boxes instead of spaced out ones. Surprising but satisfactory.
\end{itemize}

\textbf{16 Mar 1978}

\begin{itemize}
\item 9pm. The plan for tonight is to test page breaking and more paragraphing. \\
\item Insert ‘\texttt{topskip}’ glue at beginning of page. \\
\item Add ‘\texttt{pausing}’ feature. \\
\item Fix discrepancy: In \texttt{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 \TeX82 will be different.] \\
\item I checked for other lapses like that. Result: 14 calls OK, 12 NG. \\
\item 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.] \\
\item 11:30pm. The machine is tied up again.
\item Write code to handle charnodes in vlists; I forgot that I’d decided to allow them. [Later I prohibited them again!] \\
\item Combine the page lists before pruning off glue in \texttt{fire_up}; otherwise the pruning doesn’t go far enough. \\
\item Fix typo where line-breaking starts: ‘\texttt{fill_glue}’ should be ‘\texttt{new_glue(fill_glue)}’. \\
\item 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.] \\
\item Don’t write a form feed after the last page of output. \\
\item To fix this, I reorganized \texttt{ship_out}, and it became simpler. \\
\item Correct a typo (‘+’ for ‘+’) in the vlist_node case within \texttt{list_out}. [The output routines were quite different at this time, because output went directly to the XGP.] \\
\item Change the message ‘\texttt{completed page}’ to ‘\texttt{Completed for page}’. \\
\item Fix yet another typo in the computation of \texttt{page_total}: My original code said \texttt{stretch}(p) instead of \texttt{stretch}(q) (terrible). \\
\item Document the dirty trick about \texttt{bot_mark}’s reference count. [That trick is, fortunately, no longer useful.] \\
\item Rethink the algorithm for contributing an insertion: The original code tests for a page break after incrementing the totals but before the \texttt{contrib_list} is updated. [\TeX78 handles insertions in a hardwired manner that will be greatly generalized in \TeX82.]
\end{itemize}
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. \cite{125} F

- I spent several hours tracking down that data structure bug!

92 Change \texttt{new\_line} to \texttt{next\_line} in yet another print command (see #7). \cite{851} A

#75 Amend the line-breaking algorithm: \texttt{\break} in paragraph doesn’t work with really bad breaks.

- 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.

- Seven hours tonight.

17 Mar 1978

94 Introduce \texttt{dead\_cycles} to keep \texttt{\end} active until \texttt{ship\_out} occurs. \cite{1054} G

95 Don’t call \texttt{line\_break} with an empty list. \cite{1096} E

96 Take proper account of the (infinite) fillglue when computing the width of a paragraph line preceding a display. \cite{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.] \cite{868} L

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

- 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.

99 Make \texttt{show\_node\_list} and \texttt{show\_token\_list} more robust in the presence of software bugs. \cite{182} R

97 \mapsto 100 Do not remove nodes with \texttt{eject\_penalty}, when the new parameter to \texttt{hpack} is \texttt{true}. \cite{102} D

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

- 2am. I have to go to bed “early” tonight.

18 Mar 1978

- 3:30pm. (Saturday)

102 Add a parameter to \texttt{check\_mem} (to suppress display unless needed). \cite{167} I

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

- I realized the need for \texttt{\maxdepth} while fixing insertions (see #90). \cite{668} G

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

105 Reclaim the \texttt{eject\_penalty} nodes removed during line-breaking. \cite{879} D

- (Those were the 13 extra nodes reported on Thursday.)

- The \texttt{init\_align} procedure worked right the first time!

- Also \texttt{init\_row}, \texttt{init\_col}. But then . . .

106 Rethink the command codes: \texttt{endv} in a token list has too high a code for the assumptions of \texttt{get\_next}. \cite{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 \TeX82, and \texttt{rbrace\_ptr} will take on a similar function.] \cite{400} A

108 Make the \texttt{get\_next} routine intercept \& and \texttt{\textbackslash cr} tokens.

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

109 Make more error checks on \texttt{endv}; e.g., it must not occur in a macro definition or call. \cite{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., \( \texttt{\textbackslash halign{\textbackslash u\#\textbackslash v...}} \) when \texttt{\textbackslash u} and \texttt{\textbackslash v} are defined to include \texttt{&}'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 \textbackslash cr.
- (Namely, to consider a special kind of \texttt{\textbackslash def} whose parameters don't interrupt on \&'s and \texttt{\textbackslash cr}'s.)
- But replaced this by a much better idea (to introduce \texttt{align_state}).

11:30pm. Began to use computer. Performed major surgery (inserting \texttt{align_state} and updating the associated routines and documentation).

11:40pm. Fixed a (newly inserted) typo in \texttt{show_context}.

Set \texttt{align_state} false when a live \& or \texttt{\textbackslash cr} is found. [Originally \texttt{align_state} was of type \texttt{boolean}.]

Insert \texttt{\textbackslash cr} when '}' occurs prematurely in an alignment.

Remember to record \texttt{glue_stretch} when packaging an unset node.

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

Omit the reference count node when displaying a mark.

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

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

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

Remember to increment \texttt{cur_level} in error corrections by \texttt{handle_right_brace}. [A better procedure will be adopted later.]

Fix a typo: ('\{' instead of '\}') in error message for \texttt{mmode + math_shift}.

Make \texttt{show_node_list} more robust and more like the new \texttt{show_node_list}. [The routines will be combined in \TeX{}82.]

Fix a typo in \texttt{char_box}: should say \texttt{font_info_real}. [In \TeX{}78 a single array is used for both \texttt{real} and \texttt{integer}; in \TeX{}82 things will be scaled.]

Fix typos in the definitions of \texttt{default_rule_thickness} and \texttt{big_op_spacing}; they shouldn't start at \texttt{matheX}(7).

Reverse the \texttt{before} and \texttt{after} conventions in math nodes.
- I had them backwards; this turned hyphenation on just before math, and off just after it!
- Seven and a half hours debugging today. Got through the test program a little more. But \TeX{} blew up on '\$Y+1$'; tomorrow I hope to find out why.
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. §995 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 finodelist, 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.

78 \rightarrow 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 incomplet_noad case of show_activities.

- 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.
- 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.]

143 Fix the bug that makes rebox bomb out: value(p) should be value(mem[p]). §715 A
- 6am; ten hours today. \TeX\ didn’t do $$\pi \over 2$$ 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.
- (To do this, I need to face the rebox problem anyway.) §721 E

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.
- Unwittingly using the global p was a disaster.

147 Don’t show the amount of glue_set when it’s zero. §186 I

142 \rightarrow 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.]

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

152 Use the new clean_box to avoid a bug in \sqrt{\raise...}. §720 P

§737 D
Change the definition of \texttt{\textbackslash not} so that it’s a relation (which will butt against the following relation). [All math symbols and Greek letters are defined in \textsc{INITEX} at this time, not in a changeable format definition.]

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

Change the use of \texttt{p} in \texttt{var delimiter}; it isn’t always set when I say \texttt{goto found}.§706

Don’t forget to set \texttt{type(b)} in all relevant cases of \texttt{var delimiter}.§708

Fix two typos in the \texttt{space table} (* for 0).§703

Initialize \texttt{cur size} everywhere (I forgot it in two places).§705

Reset \texttt{op noad} before resetting \texttt{bin noad}.§728

Treat \texttt{display style} + \texttt{cramped} the same as \texttt{display style} inside \texttt{make op}.§749

Shift the character correctly in the non-\texttt{displaystyle} case of \texttt{make op}.§749

Still another font problem: The italic corrections are wrong because the corresponding array was declared real in proto-\textsc{METAFONT} (and italic corrections were used in nonstandard way in \textsc{mathex}).§741

Use \texttt{depth} instead of \texttt{height} in \texttt{var delimiter}. [Later, both were used.]§714

Skew the accents according to the font \texttt{slant}. [Soon retracted.]§741

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 proof-reading a paper.)

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

Do not consider slants after all in the math accent routine, since slanted math letters are put differently into fonts. §741

Don’t use \texttt{q} for two different things simultaneously in \texttt{make math accent}. §738

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

Avoid conflict between \texttt{var delimiter} and \texttt{mlist to hlist}, which want to use \texttt{temp head} simultaneously. §713

Fix bad typo in \texttt{overbar} routine (b for p). §705

Finally \TeX got to \texttt{after math} after dealing with that hairy formula...

Fix another bad typo: \texttt{p} for \texttt{b} this time. §1199

Insert more parentheses (twice) because of ‘lsh’ precedence in SAIL. §1199

Use the new hanging-indentation conventions when formatting displayed equations. §1199

Recompute penalties so that break is allowed after \texttt{punct noads}.§761
179  Center the large delimiters vertically. §749 F
180  Round all rule sizes (up) before drawing them. §589 Q
181  Provide more space over $x$ in $\sqrt{x}$, 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 /n skimage 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 \char, since it can be used in math mode. §208 P

23 Mar 1978

• Six hours today.

104  Make \tracing and \jpar follow block structure. §283 C

185  Make \tracing and \jpar follow block structure.

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

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

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

190  Increase the input 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 epsilon in scan_spec (I had used a different small constant). [This was a kludge to avoid the extra parameter later called exactly or additional.] §645 A

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

194  Fix ridiculous bug in the leaders routine of vlist_out: I had the initialization inside the loop! §635 B

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

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

200  Don’t allow users to change nonexistent things like \catcode1000. §1232 R

201  Reset align_state at beginning of init_align. §774 F

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

203  Set cur_cs ← 0 in get_next, after \cr causes a switch to the \langle v_j \rangle 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.

204 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 \texttt{link = max_halfword} will signal availability in \TeX82.]

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

185 \mapsto 206 Initialize \texttt{\jpar} [i.e., \texttt{\tolerance}].

207 Correct the display of insertion nodes by \texttt{show_node_list}.

208 Prevent \texttt{show_token_list} from generating really long strings when in a loop.

209 Increase the reference count of \emph{bot_mark} when \texttt{vpackage} finds it. [This was later the job of \texttt{fire_up}.]

210 Remember that the tokenlist for a mark ends with a \texttt{)}.

211 Don’t let \texttt{vpackage} lose the top insert. (It fails when the very first item is a \texttt{\topinsert}.)

212 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.

213 Add an ‘i’ feature to the \texttt{error} recovery routine.

214 Include a prompt.

215 Ignore space after \texttt{\noalign{...}}.

• 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 \texttt{mem} (now \texttt{lo_mem_max = 3500}, \texttt{mem_max = 10000}).

• In fact I just needed to increase it again (now \texttt{lo_mem_max = 4500}, \texttt{mem_max = 11000}).

216 Make \texttt{INITEX} output \texttt{mem_top} for consistency checking.

217 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.

210 \mapsto 218 Don’t put a new group on \texttt{save_stack} if a null mark is expanded. [\TeX82 will remove the ‘\texttt{)}’ 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.

219 Move \texttt{\vcenter} processing to the first pass of \texttt{mlist_to_hlist}; otherwise the height, depth, subscripts, etc., are way off.

220 Omit space after closing \texttt{$\$}.

• 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 \<. [Later will retract this.]

222 Introduce \dispaskip and \pskip [later called \abovedisplayshortskip and \belowdisplayshortskip].

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

223 Make sure that interaction ≠ error_stop_mode in the ‘Whoa’ error [fatal_error].

224 Fix a big mistake in the 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.]

225 Make \fntfam obey group structure. [\TeX78’s \fntfam operation is a combination of \TeX82’s \textfont, \scriptfont, and \scriptscriptfont.]

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

178 \mapsto 226 Disable automatic line breaks after punctuation in math (e.g., consider \(f(x,y)\)).

227 Represent italic corrections as boxes, not glue, so that they won’t be broken. [The \kern command doesn’t exist yet.]

- Eight hours today.

228 Fix a bug that just clobbered the memory: Call \texttt{free avail}, not \texttt{free node}, in the \texttt{ins node} case of \texttt{vpackage}. [This logic will change completely in \TeX82.]

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**29 Mar 1978**

- (Wednesday) Again beginning at 2:30am.

229 Put still more space above and below fraction lines in displayed formulas.

189 \mapsto 230 Install an infinite penalty feature, which positively suppresses breaks; use it in displayed formulas whose \texttt{eqno} doesn’t fit.

231 Call \texttt{build_page} after finishing a display; and don’t go to the \texttt{noindent} routine because of the next remark.

232 Put \texttt{parskip} glue just before a paragraph, not just after (since it interferes with a penalty after).

- 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.

233 Recycle the ulists and vlists in \texttt{fin_align}.

25 \mapsto 234 Fix bug when deleting space at end of paragraph: \texttt{delete_glue_ref(cur_node)} not \texttt{delete_glue_ref(value(cur_node))}.

- There’s also a more mysterious type of uncollected garbage, a \texttt{fraction_node} corresponding to \(\frac{p}{k}\), an incompleat_node not completed.
- Couldn’t find that one, so I recompiled with #233 and #234 corrected.
- Now it gains just 10 locations of variable-size memory and 7 of the other kind.

235 Extend \texttt{search_mem} to search \texttt{eqtb} also.

---

**1 Apr 1978**

- Don’t quit after file lookup fails.

**2 Apr 1978**

239 Add \texttt{\TeX_font_area}, so that it’s easier to change the default library area associated with a device.
3 Apr 1978
240 Insert parentheses again, to cope with the precedence of `lsh when packing data. (See #55 and #176.) §1114 L
   • *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.) §476 M

4 Apr 1978
242 Add a deletion feature to the error routine. §88 I

5 Apr 1978
243 Reset space_factor after `/ [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
   • *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

14 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

17 May 1978
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{\ldots}’ the macro \rt is expanded, clobbering temp_head. §779 S
   • *That bug was more subtle than usual.*
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
260 Change \leq to \geq and introduce \leq as the negative of \geq. [Later obsolete.] §226 C
261 Fix the display of negative penalty nodes; show_node_list is confused when a negative value has been packed into the middle of a word. §194 L

- Memory overflow just occurred with lo_mem_max = 7500 and 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 big_op_spacing5, for extra space above and below limits of big displayed operators. §751 Q

263 Initialize incompleat_noad in $$\halign{...}$$.

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

238 → 264 Close the file when doing lookup-failure recovery. §27 F

265 Improve the error recovery for ‘Extra &’.

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

252 → 267 Fix a blunder in new missing_brace code.

262 → 268 Fix a blunder in new code for limits on display operators.

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 → 270 Avoid possible bad memory references in alignment when there is erroneous input after \cr. [Instead of extra_info, the value of cur_align in \TeX82 is negated, because we need only distinguish \cr from &.]

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

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

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

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

27 May 1978

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

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

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

29 May 1978

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

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

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

- More memory capacity overflows.

22 → 278 Fix \TeX’s overflow stop so that I don’t have to wait for loading of the 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 var_delimiter. §714 Q

283 Disallow \eject in math mode. [In \TeX78, \eject is distinct from \break; in horizontal mode it includes \TeX82’s ‘\vadjust{\break}’.] §1102 R
284 Don’t put too much clearance above \sqrt in text style. §737 Q

9 Jun 1978

110 → 285 Make align_state an integer variable, not boolean, so that \eqalign can be within another \eqalign. §309 G

286 A \mark should expand its input. §1101 C

10 Jun 1978

287 Provide for preloading of fonts. §1320 E

288 Close the output file before switching to edit the input file with the ‘e’ option. §84 L

289 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

290 Strive for consistency between make_under and make_over. §735 Q

18 Jun 1978

236 → 291 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!

292 Remove \deg from INITEX, since macros suffice. C

293 Add an extra hyphenation penalty for two hyphenated lines in a row. §859 Q

19 Jun 1978

294 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

20 Jun 1978

295 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

296 Force badness to be at most 10^{19}. §108 R

297 Add end_template for better error recovery in alignments. §375 I

287 → 298 Make INITEX more like the real \TeX; my simple scheme for font preloading was no good because it left thousands of ‘dead’ words in memory. §8 E

299 Economize disk space by using internal arrays in load modules that aren’t being reinitialized. [System dependent.] E

300 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.] E

21 Jun 1978

• Today I’m working on the user manual.

301 Disallow \input except in vertical mode. [I will change this in \TeX82, treating \input as a case of expansion.] §378 C

302 Add error recovery for endv and par_end occurring in math mode. §1047 I

303 Generalize \ifT to \if T. §506 G

22 Jun 1978

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

256 → 305 Get the correct \prev_depth at the beginning of an alignment. §775 D

306 Change \eject so that it ejects only once. §1000 C

14 Jul 1978

307 Look in standard area if a file isn’t found in the user’s area. §537 I

308 Echo all online inputs in the transcript file. §71 I

19 Jul 1978

309 Equalize spacing when only one of numerator/denominator is big. §745 Q

310 Prevent subscript from getting too high above baseline. §757 Q
311 Avoid infinite loop when stack overflows: `if input_ptr \geq stack_size \land interaction = error_stop_mode'. §321 R

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 \TeX82.] §218 I

314 Put in \(\mapsto\) [namely, \mskip\medmuskip; \TeX78 already has \(\leq\), for conditional \thimmuskip, as well as the negative amounts \(\leq\), \(\geq\)]. Change the name of vector accent from \(\mapsto\) to \(\mapsto\). [Math spacing operators will become much more general in \TeX82.] §716 C

25 Jul 1978

94 \mapsto 315 Give the correct \hsize and \vsize 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.] §1054 A

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 ...)’.

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 \texttt{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 \texttt{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'’. §1192 I

• Currently \TeX says ‘Missing $’!

331 Call \texttt{back\_input} before the error message in \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.] L

• 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
5 Aug 1978

336 Generalize \pageno to \count⟨digit⟩. §236 G

285 → 337 Update align_state when recovering from ‘Missing {’ and ‘Extra }’ errors. §1069, 1127 D

338 Show “runaway” tokens, making it easier to pinpoint an error. §306 I

22 Aug 1978

339 Add \predisplaypenalty. §1203 G
340 Clarify error messages; they should indicate when something has been inserted, etc. §1064 I

23 Aug 1978

114 → 341 Substitute ‘Extra }’ for the losing ‘Missing \cr’ error message. §1069 I
213 → 342 Go past online insertions in show_context. §311 I
343 Exact no penalty for breaking one line before a display. §1145 Q

338 → 344 Check for runaways at end of file. §362 I
345 Give error message when a macro argument begins with }. §395 I

24 Aug 1978

213 → 346 Remove extra line-feed in show_context after printing insertions. [System dependent.] §318 L

25 Aug 1978

347 Leave no glue at top of page, even after \eject. §997 Q

27 Aug 1978

348 Adopt Guy Steele’s new version of the \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

349 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 → 350 Prune away all penalties at the top of a page. §997 Q

4 Sep 1978

338 → 351 Include ‘\’ in error message about a runaway argument. §306 I

8 Sep 1978

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

350 → 352 Insert a necessary goto statement in the first branch of the new penalty routine within build_page. §997 B

30 Sep 1978

338 → 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
355 Fix two hyphenation bugs related to -ages, -ers. [A completely new algorithm for hyphenation will go into \TeX82.] L
356 Add -est to hyphenation routine; also disable puz-zled and rat-tled, 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
374 Delete a math_node at the beginning of a line. §148 Q
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

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

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
334 \mapsto 381 Don’t omit the raggedness correction when the last line of paragraph has to shrink. [Obsolete in \TeX82.]

\textbf{22 Feb 1979}

363 \mapsto 382 Don’t forget to return from \texttt{get_x_token} after finding \texttt{\par}.

383 Add a new parameter: \texttt{\lineskiplimit}.

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.]

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

386 Add a new condition: \texttt{\ifpos}. [It will later be generalized to \texttt{\ifnum} and \texttt{\ifdim}.]

387 Add \texttt{vu} and \texttt{\varunit}. [\TeX82 will eventually allow arbitrary internal dimensions as units of measure.]

312 \mapsto 388 Add an \texttt{em} unit.

389 Legalize \texttt{\hbox spread} ⟨negative dimension⟩ [since \texttt{scan_spec} no longer uses the sign as a flag].

\textbf{10 Mar 1979}

370 \mapsto 390 Make \texttt{scan_toks} expand \texttt{\count} during \texttt{\xdef}. [This will change later when \texttt{\the} and \texttt{\number} are introduced.]  

\textbf{23 Mar 1979}

391 Put only 100000 pt stretch at the end of a paragraph instead of 10000000000 pt. [In \TeX78, “infinite” glue is actually finite but large; in the language of \TeX82 we would say that \texttt{\parfillskip}, which is not yet user-settable, is being changed to be like \texttt{\hfil} instead of like \texttt{\hfill}.]

392 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 \texttt{inf_penalty} at the end.

\textbf{31 Mar 1979}

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

\textbf{27 Apr 1979}

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

395 Allow the \texttt{math_code} table to be changeable via \texttt{\chcode}. [In \TeX82, \texttt{\chcode} will split into \texttt{\mathcode} and \texttt{\catcode}.]

332 \mapsto 396 Don’t accept ‘e’ after an error message if not inputting from a file.

\textbf{29 May 1979}

397 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}.

\textbf{7 Jun 1979}

306 \mapsto 398 Be sure to eject two pages, when \texttt{\eject} comes just at the time another break is preferable (e.g., when the page has just become too full).

\textbf{27 Jun 1979}

354 \mapsto 399 Don’t say ‘You \texttt{can’t do that in math mode}’ when the user says ‘$\$$’ in restricted horizontal mode!

\textbf{30 Jun 1979}

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

307 \mapsto 401 Don’t try the system area for file names whose area is explicitly indicated.
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_noad_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_noad_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 \texttt{eq.destroy} when a control sequence is \texttt{\gdef}’ed after being \texttt{\def}’ed. \S 283 F

418 \rightarrow 425 Treat the first token consistently when \texttt{\topmark} and its cousins are expanded in \texttt{scan_toks}. \S 477 F

• Now I’ve checked things pretty carefully and I think \texttt{\TeX} is “fully debugged.”

25 Jan 1980

338 \rightarrow 426 Display runaway alignment preambles. \S 306 I

427 Introduce active characters (one-stroke control sequences). [I don’t yet go all the way: The meanings of ‘x’ and ‘\texttt{x}’ have to be identical.] \S 344 G

7 Feb 1980

314 \rightarrow 428 Fix a glaring omission: Op space \texttt{\textgreater} was never implemented in math mode! \S 716 F

25 Feb 1980

429 Add a new dimension ‘ex’ (for units of xheight). \S 455 G

3 Mar 1980

427 \rightarrow 430 Allow the control sequence \texttt{\textbackslash}: to be redefined [it was the ‘select font’ operator]; this allows the character : to be active. [Obsolete.] C

23 Mar 1980

• An extend-\texttt{\TeX} for-the-eighties party:

431 Add a new \texttt{\copy} feature. \S 204 G

432 Add a new \texttt{\unbox} feature. \S 1110 G

433 Add a new \texttt{\open} feature [later \texttt{\openout}]. \S 1351 G

434 Add a new \texttt{\send} feature [later \texttt{\write}]. \S 1352 G

435 Add a new \texttt{\leqno} feature, requested by MDS. \S 1204 G

436 Add a new \texttt{\ifdimen} feature [later \texttt{\ifdim}]. \S 513 G

437 Make \texttt{\langle space\rangle} in vertical mode begin a paragraph. \S 1090 C

438 Add a new \texttt{\font} feature [replacing the silly previous convention that a font must be defined when it is first selected]. \S 1256 G

439 Add new \texttt{\parval} and \texttt{\codeval} features [later \texttt{\the⟨whatever⟩}]. \S 413 G

427 \rightarrow 440 Don’t let active characters gobble the following space. \S 344 C

208 \rightarrow 441 Add a new parameter to govern amount of token list dumped. [Obsolete.] \S 295 G

442 Add a new \texttt{\mskip} feature [later replaced by \texttt{\break}]. \S 831 G

25 Mar 1980

• (Still working on the above, also thought of more.)

443 Add a new \texttt{\mskip} feature. \S 716 G

444 Add a new \texttt{\newname} feature (soon changed to \texttt{\let}). \S 1221 G

430 \rightarrow 445 Allow any control sequence to be redefined. \S 275 G

446 Send the output to the user’s current file area, even when input comes from elsewhere. \S 532 I

27 Mar 1980

447 Compute the xheight for accents in math mode from family 1, not family 3. [Obsolete.] Q

28 Mar 1980

448 Increase minimum clearance between subscript and superscript. \S 759 Q

29 Mar 1980

222 \rightarrow 449 When a display follows a display, the second should have the ‘shortskip’ glue. \S 1146 Q
4 Apr 1980
445 \rightarrow 450 Look at current token meanings when trying to recognize \texttt{\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
• Today I’m beginning to overhaul the line-breaking routine, and I’ll also install miscellaneous goodies.
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{\spaceskip} and \texttt{\parfillskip} changeable. §1228 G
458 Add a new parameter \texttt{\textbackslash rfudge} (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{\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 xdef\{\textbackslash d\textbackslash b\{...\}\}} after \texttt{\textbackslash let\textbackslash d=\textbackslash def}. [Obsolete.] A
444 \rightarrow 465 Avoid creating dead storage when doing \texttt{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 delimitershortfall}.] §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 ‘≥ fz’ instead of ‘> fz’ in the pre-hyphenation routine; I’d forgotten my definition of \texttt{fz} [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
18 Sep 1980

457 → 472 Don’t forget to increase the reference count to \parfillskip, or it will mysteriously vanish. §816 D

19 Sep 1980

412 → 473 Make leaders break like glue in both horizontal and vertical modes. §149 C
364 → 474 Make \mathsurround break properly at left and right end of lines. §879 Q

13 Oct 1980

461 → 475 Remove spurious overfull boxes generated when the looseness criterion fails. [Obsolete.] I
461 → 476 Redesign the iteration for looseness; breakpoints were not chosen optimally. §875 A
461 → 477 Avoid storing a lot of breakpoints when they are dominated by others. §836 E
366 → 478 Don’t say ‘cur_node’ when you mean ‘mem[cur_node]’. §1105 B
461 → 479 Prefer the oldest break to the youngest break when two break nodes have the same total demerits. §836 Q
461 → 480 Don’t make badness too big for floating-point calculations, when forced to make an overfull box. [Obsolete.] L

10 Dec 1980

481 Make it impossible to get unmatched ‘}’ in a delimited macro argument. §392 R
482 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.] §1009 G

6 Jan 1981

483 Install new routines for reading the font metrics, using Ramshaw’s TFM files instead of TFX files. §539 P
484 Abort after reporting 100 errors, if not pausing on errors. §82 I
485 Add new \spacefactor and \specskip and \skip primitives. [At this time we write ‘\specskip3=10pt’ and ‘\skip3’ for what will become ‘\skip3=10pt’ and ‘\hskip\skip3’ in \TeX82.] §1060 G
366 → 486 \unskip is now allowed in internal vertical mode. §1105 G

26 Jan 1981

482 → 487 Don’t say ‘mem[q]’ when you mean ‘q’. (See #143 and #478.) §1009 G

27 Feb 1981

417 → 488 Put some linefeeds back into the transcript file, in order to prevent overprinting in listings. [System dependent.] I
489 Add a new \penalty feature [later \postdisplaypenalty]. §1205 G
490 Add the dimension cc for European users. §458 G
491 Make \scan_keyword match uppercase letters as alternatives to lowercase ones (suggested by Barbara Beeton’s experiments with \uppercase). §407 C
492 Add nonstop mode so that overnight batch processing is possible. §73 I

2 Mar 1981

422 → 493 Fix a still more serious \gdef bug: The generality of \gdef almost makes it a crime to forget any control sequence names, ever! (The previous bug was only the tip of an iceberg.) §259 S
494 Issue warning message at the end of a file page if nesting level isn’t zero. [System dependent.] I

5 Mar 1981

495 Keep track of maximum memory usage, for statistical reporting. [Obsolete.] §125 I
350 → 496 Prune away glue and penalties at top of page after marks, sends, inserts. §1000 Q
497 Allow \mark in horizontal mode. [Later it will be \vadjust{\mark...}]. §655 G
498 Allow optional space before a required left brace, e.g., \if AA {...}. [See #251.]

499 Issue an incomplete \if error, to help catch a bad \if.

§403 C

17 Mar 1981

494 \mapsto 500 Omit the warning message at end of a file page unless the nesting level has changed on that page. [System dependent.]

310 \mapsto 501 Fix the spacing when there is a very tall subscript with a superscript.

20 Mar 1981

371 \mapsto 502 Make space-eating after \else fully consistent between the true and false cases.

§336 I

24 Mar 1981

496 \mapsto 503 Change glue_spec_size to ins_spec_size in vpackage [where insertions are done].

§759 Q

5 Apr 1981

501 \mapsto 504 Fix a typo (‘+’ instead of ‘−’) in the new subscript code; this shifted certain subscripts down instead of up.

§759 B

18 Apr 1981

505 Make leaders with rules of specified size act like variable rules.

§626, 635 G

29 Apr 1981

461 \mapsto 506 Don’t consider badness > threshold at a line \break except in an emergency.

§854 A

13 Jul 1981

402 \mapsto 507 Allow other characters as numbers.

§442 C

294 \mapsto 508 Avoid dead storage if a no_new_control_sequence error occurs. [Obsolete.]

509 Add a new \ifx feature.

§507 R

510 Add new features \xleaders and \cleaders.

§626, 635 G

14 Jul 1981

507 \mapsto 511 Amend the new code for constants; the ‘.’ in ‘.5’ is thought to mean ‘056’!

507 \mapsto 512 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 S

4 Aug 1981

513 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

514 Add a new \thebox feature [later \lastbox].

§1079 G

7 Aug 1981

515 Add fill, filll, and fillll as units for glue stretching or shrinking.

§454 G

516 Suppress the overfull box error when shrinkage amount is negative.

§664 I

9 Aug 1981

517 Let unset boxes inherit the size of their parent in alignments.

§810 Q

12 Apr 1982

518 Make INITEX dump out the font_dsize array needed by the new DVI output module.

§1322 F

1 May 1982

151 \mapsto 519 Fix clean_box so that mlist_to_hlist cannot make link(q) = 0 and type(q) = glue_node.

• [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 \texttt{eqtb[\texttt{cur\_font}]} to \texttt{eqtb[\texttt{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 \texttt{get\_next} seem to be working, with no changes needed!
- Time out 1630–1815 for Jill’s birthday party.

X2 Insert \texttt{begin . . . end} around \texttt{dump\_int} macro.
X3 Print two blank spaces before date in \texttt{open\_log\_file}.
X4 Update \texttt{x} and \texttt{var\_used} outside the \texttt{for} loop.
X5 Change \texttt{if} = to \texttt{if \neq} as loop exit condition.

X6 Insert \texttt{begin . . . end} around statistics output.
X7 Must \texttt{get\_x\_token} when scanning a number.
X8 Interactive \texttt{debug\_help} needs to print a newline.
X9 Include \texttt{ignore\_spaces} and \texttt{math\_accent} in \texttt{print\_cmd\_char} cases.
X10 Don’t call \texttt{confusion} when \texttt{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 \texttt{cur\_tok}, not \texttt{cur\_val}, when you mean \texttt{cur\_tok}.
X13 Make \texttt{\_pause} effective also on first line of a file.
X14 Show context after online deletion.
X15 Bypass reference count when \texttt{debug\_help} shows a token list.
X16 Change \texttt{`case p'} to \texttt{`case type(p)'}.
X17 Fix timing of \texttt{print\_ln} when scrolling help messages.
X18 Make \texttt{other\_char} the default category for ASCII control codes too.
X19 Use special scanning method for font number in \texttt{new\_font}.

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

X20 Don’t forget to increase \texttt{k} in the \texttt{while} loop.
X21 Adjust \texttt{limit} properly after line changed when pausing.
X22 Remember to return a value in \texttt{new\_spec} and \texttt{new\_penalty}.
X23 Don’t prune unwanted nodes if \texttt{cur\_p = null}.
X24 Print a closing parenthesis when displaying glue nodes.
X25 Use \texttt{last}, not \texttt{limit}, in \texttt{term\_input}; else error prompt causes trouble when \texttt{state = token\_list}.
X26 Set \texttt{first \leftarrow limit + 1} after \texttt{init\_terminal}.
X27 Make sure \texttt{set\_trick\_count} is always performed.

17 Jul 1982

X28 Add new diagnostic feature \texttt{\_tracing\_commands}.

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

X29 Initialize \texttt{passive \leftarrow null}.
X30 Fix pseudoprinting when the line is empty.
X31 Merge adjacent free areas of dynamic memory before dumping.
X32 Print the word \texttt{mode} in \texttt{print\_mode}.
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X33 Improve message and help in case of weird error. §415 I
X34 Allow optional space after \def and similar constructions. §473 G
X35 Declare alpha to be integer in read_font_info. §560 M
X36 Fix timing of back_input in scan_dimen. §448 A
X37 Back up after missing number error. §446 I
X38 Show the ‘at’ size that is considered improper. §1259 I
X39 Streamline the dialog in debug_help. §1338 I
X40 Take output of the_lks from the advertised place. §467, 1297 M
X41 Say trie_fix(q), not trie_fix(p). §959 T
X42 Decrease low limit of error_count to −1. §76 S

18 Jul 1982

X43 Clear initial reference count of macro definitions. §473 F
X44 Fix timing of back_input in scan_glue. §461 A
X45 Use cur_val_level, not cur_val, when checking levels. §461 B
X46 Multiply fil units by 2^{16} for correct scaling. §454 B
X47 Don’t confuse glue_base with skip_base. §1237 B
X48 Fix print_scaled so that 0.01 doesn’t come out 0.1. §103 A

X28 \rightarrow X49 Show mode changes when tracing commands. §299 I
X50 Don’t say if (n = 0) ∨ (... div n) in Pascal. §105 L
X51 Don’t confuse box_flag with box_code. §1075 B
X52 Reset offset on print_ln even in no_print mode. §57 S
X53 Fix restarting of interrupts after big_switch. §1031 S
X54 Don’t loop for k ← a to b − 1 when k is declared nonnegative. L
X55 Put ‘=’ sign into the formal_ident. §1328 I
X56 Allow r to be any integer in get_node. §125 S
X57 Don’t put the output of print_file_name in quotes. §518 I
X58 Say ‘dumped’ after dumping. §1311 I
X59 Eliminate unnecessary initialization code. §1332 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 cur_val after glue arithmetic. §1239, 1240 F

19 Jul 1982

X63 Don’t say if p > max ∨ free[p] in Pascal. §169 L
X64 Fix memory-undump logic; loops are out of phase with input. §1312 A
X65 Undump hyph_word[j], not hyph_word[k]. §1325 B

- At last trip.fmt loads without bombing out.

X66 Remove assignment of array to array, not allowed by IBM Pascal (Susan Plass). §167 P
X67 Simplify an expression that’s too big for IBM Pascal (Susan Plass). §1009 P
X68 Go to contribute, not done, after insertions. §1000 A
X69 Decrease depth_threshold if there’s not enough string space. §198 I
X70 Show rules as ‘|’ in short displays. §175 I
X71 Don’t show null glue in short displays. §175 I
X72 Set job_name ← 0 as part of output initialization. §528 S
X73 Don’t complain of infinite shrinkage on Opt minus 0fil. §825, 976, 1009 S
X74 Use different prompt at beginning when accepting a file name. §37 I
X75 Reset last_glue on nonglue nodes. §996 F
X76 Remember to call error after printing OK. §1293 B
X77 Insert begin ... end around program text of section. §1025 L
X78 Define the \shipout primitive. §1071, 1073 F
X79 Introduce write_loc analogous to par_loc. §1344, 1371 A
X80 Dump and undump par_loc and write_loc. §1313, 1314 F
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. §328 F
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 Initialize write_loc from cur_val, not from cs_ptr. §1344 D
X90 Remember to pack file name for \open. §1374 F
X34 Defuse \outer test before scanning optional space after ‘Y’. §473 S
X92 Don’t allow prepare_mag to cause errors after jump_out. §84 S
   • The first page of DVI output is perfect! Pause to play piano.
X93 Don’t confuse dimen_base with scaled_base. §1237 B
X94 Initialize link(page_head) ← null when beginning a page. §991 D
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. §1001 S
X99 Don’t forget to count dyn_used in inner loop [erroneous analysis retracted later]. §1034 F

X100 Set p ← q after migration step. §655 F
X101 Clear prev_graf to zero at start of paragraph. §1091 F
X102 Put parens into negated leader_flag macro. §1078 L
   • Time out 1720–1920 for John’s birthday dinner.
X103 Scale best_height when adjusting page_goal. §1010 D
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. §400 M
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 Initialize page_head a glue node, to inhibit unwanted break. §988 S
X109 Introduce new_skip_param to keep reference counts updated. §679,969,1001 D
X110 Record the correct size of new insertion after it’s split. §1010 D
X111 Use free_node, not flush_node_list, when recycling insertion nodes. §1022 D
X112 Make online insertions work after get_next is interrupted. §87,324,343 S
X113 Print newline on interruption stop. §98 B
X114 Put space before end_write_token. §1371 S
X115 Don’t confuse glue_order with stretch_order. §838 B
X116 Set max_dimen ← ’77777777’, not ’777777777’. §421 T
X117 Make \global\textfont legal. §1211 M
X118 Fetch \the\textfont with equiv, not fam_font. §415 B
X119 Call new_ligature(f,l,...) not (f,c,...). §1035 B
X120 Make show_box work on random garbage. §174,177 R
X121 Count reference to zero_glue from cond_math_glue. §1171 D
23 Jul 1982

X123 Allow \texttt{avail} = \texttt{null} when undumping. \S312 R
X110 \rightarrow X124 Set \textit{width} \pbox{\texttt{\texttt{glue_ptr(p)}}}, not \textit{width}\pbox{\texttt{(p)}}. \S679 B
X125 Put \textit{begin_file\_reading} inside the \textit{start_input} loop. \S573 A
X116 \rightarrow X126 Don’t confuse \textit{\texttt{glue\_stretch}} with \textit{\texttt{stretch\_order}} [the previous fix went only half-way]. \S838 B
X127 Negate \texttt{x} when calculating badness of shrinkage. \S667,678 B
X121 \rightarrow X128 Remove dangling \textbf{else} that parses wrong. \S174 L
X28 \rightarrow X129 Print newline before \{, not after \}, when tracing commands. \S299 I
X130 Remove colon from overfull box messages. \S663,675 I
X97 \rightarrow X131 Compute \textit{page\_goal} properly when the first box arrives after inserts. \S1001 D
X132 Don’t confuse \textit{page\_size} [now \textit{page\_goal}] with \textit{best\_size}. \S1017 B
X133 Put heldover insertions at front of contribution list. \S1023 A
X88 \rightarrow X134 Output stats before closing \texttt{DVI} file, since the latter decreases \texttt{font\_ptr}. \S1333 S
X135 Don’t call a \texttt{\texttt{vbox}} an \texttt{\texttt{hbox}}. \S674 T
X136 Fix misplaced \textbf{end} caused by editing error. \S675 T

24 Jul 1982

X137 Don’t \texttt{eg\_destroy} any paragraph shape when \texttt{par\_shape} is null. \S275 D
X138 Omit blank before \texttt{\texttt{message}} at the beginning of a line. \S1280 I
X104 \rightarrow X139 Don’t try to split an insertion when \texttt{best\_node} isn’t the split one. \S1021 A
X140 Correct another case of ‘if \texttt{x} \& \texttt{y}’ misunderstood by Pascal. \S1021 L
X141 Provide diagnostic info about insertions via \texttt{\texttt{showlists}}. \S986 I
X142 Add ‘\textit{\texttt{inside a group}}’ to clarify a warning message. \S1335 I
X143 Report \texttt{prev\_depth} on a separate line in \texttt{\texttt{showlists}}. \S219 I
X144 Back up input to avoid unexpected clobberage of \texttt{cur\_tok}. \S1090 S

\begin{itemize}
  \item Wow what a bug: \texttt{new\_graf} calls \texttt{build\_page}, which invokes the \texttt{output} routine, after which \texttt{\texttt{goto reswitch}} is a disaster.
\end{itemize}

X145 Add insertion glue to \textit{\texttt{page\_so\_far}} instead of subtracting it from it. \S1009 D
X146 Put extra blank line before overfull box warning. \S660 I
X147 Define break at kern consistently between horizontal and vertical lists. \S973,1000 C
X148 Renumber so that math nodes are nondiscardable. \S147 D
X149 Correct the \texttt{\texttt{char\_kern}} macro: \#, not \texttt{f}. \S557 T
X150 Decrease \texttt{l} after reconstituting discretionary break. \S916 F
X151 Simplify the hyphen routine, knowing that \texttt{\texttt{link(s)}} = \texttt{null}. \S918 E
X152 Initialize \texttt{r} \leftarrow \texttt{q} in discretionary destruction routine. \S883 F

25 Jul 1982

X153 Don’t add interline penalty after last line of paragraph. \S890 A
X154 Adjust spacing in diagnostic messages. \S245 I
X155 Avoid simultaneous use of \texttt{temp\_head} by \texttt{prune\_page\_top} and the page builder. \S1017 D
X156 Clear the \textit{post\_break} field of simple discretionaries. \S916 F
X157 Split \texttt{\texttt{offset}} into independent variables \texttt{term\_offset}, \texttt{file\_offset}. \S54,57,58 A

\begin{itemize}
  \item Am freezing current program as version –0.25; a week of TUG lectures begins tomorrow.
\end{itemize}

5 Aug 1982

X158 The ‘\texttt{.err}’ file should be ‘\texttt{.log}’ instead. \S534 I
X159 Allow \texttt{\texttt{special}} strings to contain more than 256 bytes. \S585,1368 G
X99 \rightarrow X160 Undo “correction” to a non-bug. \S1034 M
X161 Suggest \& in help message for unexpected \&. \S1128 I
X162 Make ‘E’ a standard option for exiting. \S84 G
X163 Restore the use of dead cycles à la \TeX78. \S1024,1054 G

\begin{itemize}
  \item The previous six changes were suggested during discussions with \TeX82 class.
\end{itemize}
X164 Fix global variable conflict between open_log_file and new_font. §1257 S
X165 Allow optional ‘=’ 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 ‘{’. §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_cs before calling scan_toks. §1226 M

X157 ➔ X172 Update print_nl to dual offset conventions. §62 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. §325 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 t in all branches of scan_toks. §473 D
X179 Change ‘cur_cmd ≤ 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 trie_max declared in non-INTEX [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 \minus the [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. §840, 856 I
X200 Keep prev_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 \valign. §775 C
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X203 Don’t show glue setting if \texttt{glue\_sign = normal}. §186 I
X204 Clear \texttt{glue\_stretch} and \texttt{glue\_shrink} when creating an unset box. §801 D
X205 Do \texttt{vpack} in hmode and vice versa when aligning. §804 B
X206 Remove fallacious call to \texttt{confusion} after alignment in display. §1206 A
X207 Don’t test \texttt{mode = vmode} in display, test \texttt{nest\_ptr = 1}. §1145 A
X208 Show an \texttt{inner\_noad} as well as the other types. §690,696 F
X209 Renumber \texttt{mu\_glue} and \texttt{cond\_math\_glue} so that the glue display logic works. §149 D
X210 Don’t confuse \texttt{cur\_size} with \texttt{cur\_style}. §703 B
X211 Advance \texttt{p \leftarrow q} during second pass over \texttt{mlist}. §761 F
X212 Add helpful hint about \texttt{\textbackslash{tracingonline}=1}. §1293 I
X213 Delete spurious statement left from sloppy editing. §710 T
X214 Change the subtype when \texttt{mskip} becomes \texttt{hskip}. §732 D
X215 Don’t forget to use the remainder when computing math glue. §716 F

\textbf{11 Aug 1982}

X218 Introduce \texttt{char\_box} subroutine so that \texttt{var\_delimiter} adds italic correction. §709 A
X219 Save font and char in local variables of \texttt{make\_math\_accent}, since it can be recursive. §738 S
X220 Call \texttt{error} after decrying an invalid character. §346 F

\textbf{12 Aug 1982}

X199 \Leftrightarrow X221 Install new format for showing break nodes. §846 I
  \textbullet{} \textit{I have been testing \texttt{line\_break} and I think it’s working fine.}
X222 Change \texttt{q to p}, in order to catch empty alignments. §812,1206 B
X223Disallow third part of discretionary in math mode. §1120 S
X224 Don’t change \texttt{tail} if discretionary third part is empty. §1120 D
X225 Say \texttt{nonscript}, not \texttt{non\_script}. §189 I
X226 Inhibit math if \texttt{\textbackslash{scriptfont3}} is improper. §1195 S
X199 \Leftrightarrow X227 Introduce \texttt{@firstpass} and \texttt{@secondpass} comments. §863 I
X228 Change \texttt{p to r} when you mean \texttt{r}. §1204 T

\textbf{X108 \Leftrightarrow X229 Say \texttt{page}, not \texttt{pages}, if there’s only 1.}
X230 Insert space before [] on truncated \textbackslash{showlists}. §182 I

\textbf{28 Aug 1982}

\textbullet{} \textit{Back from vacation after having looked at hardcopy listing of TRIP test.}
X231 Allow \texttt{dm} as a unit [later .5\texttt{dm}1 will be .5\textbackslash{dimen1}]. §455 G

\textbf{X108 \Leftrightarrow X232 Singularize \texttt{prevgraf 1 lines}.} §219 I
X233 Omit trailing zero count registers when showing completed page numbers. §638 I
X234 Avoid clobbering \texttt{a} by introducing a new local variable \texttt{t}. §986 L
X216 \Leftrightarrow X235 Fix diagnostic printing of discretionary. §858 D
X236 Don’t show unset stretch/shrink that’s zero. §185 I

\textbf{X198 \Leftrightarrow X237 Make \textbackslash{halign} in displays consistent with other displays. (Namely, ignore \textbackslash{leftskip} and \textbackslash{rightskip} in nonaligned displays; respect the paragraph shape in aligned displays.)} §800,1199 C
X238 Parenthesize ‘If you’re confused …’. §403 I
X239 Say ‘\texttt{\textbackslash{fraction}}, not \texttt{\textbackslash{xabovex}}. §697 I
X240 Remember to \texttt{return} when you should. §1153 F
X241 Use absolute value to make sure \texttt{div} is unambiguous. §737 P

\textbf{X218 \Leftrightarrow X242 Don’t confuse depth with height.} §709 B
X243 Use \texttt{delta \textendash height}, not \texttt{height \textendash delta}. §736 B
X244 Increase \texttt{shift\_down} to increase the clearance. §745 B
X245 Don’t back up after improper use of \texttt{\the}. §428 I
Don’t give \opt as the default result when looking for \tok.val. \§428 I

Initialize second_indent in the easy case. \§848 F

Package the equation number. \§1204 F

Don’t resort to \v → \max_dimen when glue doesn’t stretch or shrink. \§1148 Q

Insert newline before showing current \botmark. \I

Call \err after giving error message. \§784 F

Change implementation of \number; it should \scan_int, not something internal. \§471 A

Introduce symbolic constants like \format_area_length. \§524 P

Change \quit to \jump_out, since some compilers treat \quit as a reserved word. \§81 P

Add more parentheses to get proper parsing. \§1260 L

Say \please in order to be friendly (or at least polite). \§360 I

Don’t confuse \cur_vcmd with \cur_chr. \§508 B

Use \& instead of ! to specify a preloaded format. \§1337 I

Correct s3 to s4. \§88 T

Introduce new primitive \mathchardef, to save space and time. \§1224 G

Use the \[] convention for noads as well as nodes. \§692 C

Correct spelling in call to \primitive: \xatopx should be \xoverx [later renamed, thank goodness]. \§1178 T

30 Aug 1982

Don’t fetch \link(null) in malformed list. \§175 R

Initialize \align_state at a better time so that \align_peek doesn’t see \& or \span. \§785, 791 S

Outlaw preamble interfering with \align_state = 0. \§789 S

Add level of grouping to alignment to tabskip locality. \§774 C

Check \align_state when scanning \(\langle u_j \rangle\). \§783 F

Move ‘\unsave; new_save_level’ from \main_control into \fin_col. \§791, 1131 A

Remember \cur_chr when you’re looking for optional ‘\textquoteleft’. \§1243 S

Change q to r [in code now obsolete]. \§804 T

Disable interrupts during \back_error so that help messages aren’t clobbered. \§327 I

Introduce \slow_print for printing control sequences. \§60 S

Initialize \del_code(".",") ← 0 for error recovery. \§240 I

Call \end_file_reading before calling \check_outer_validity. \§362 S

Don’t delete an extra ‘\textquoteleft’ when \par will help find a runaway. \§395 I

31 Aug 1982

Don’t confuse \thin_muskip with \thin_muskip_code. \§413 B

Recover from error if new \align_group ends abnormally. \§1132 F

Recover from error if \par occurs when \align_state < 0. \§1094 I

Make \\hskip\the\thinmuskip and \\hskip\the\baselineskip erroneous. \§413 C

Add \muskip and \setmuskip analogs to \skip and \setskip. \§413, 1228 G

Don’t output \pop right after \push. \§601 E

• 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.

Delete reference to \last_glue when a page is packaged. \§1017 D

Include \save_stack when a page is packaged. \§285 I

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.
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 \xatopx to \xatopwithdelims; do the same for \xatopx and \xoverx.

X292 Improve clean_box so that it recognizes cleanliness better.
X293 Report a Missing delimiter more meaningfully.
X294 Give endv_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.
X296 Omit ‘recent contributions’ and/or ‘current page’ when they are empty.

X297 Display what T\TeX has deleted after improper discretionary list has arisen.
X298 Show what math character was undefined.
X299 Improve the Incompatible magnification error; break it into two lines.
X300 Put new cases into flush_node_list, to recycle mlist noads.

6 Sep 1982

X300 X301 Insert a necessary ‘goto done’ in that new material.
- It took two hours to diagnose that goto problem.

X295 X302 Change ‘2’ to ‘3’ in help message for extension fonts.
X303 Add a special note if material is being held over for the next output.
X304 Divide before multiplying in make_left_right, to avoid overflow.
X305 Introduce the box_error routine.
X306 Clear arith_error after overflow has been reported.

X249 X307 Don’t confuse stretch with glue_stretch.
X308 Set glue_sign ← normal when packaging with glue ratio zero.
X309 Test for overflow before attaching the sign.
- That all worked! Now trying min_quarterword negative.

X310 Take absolute value before applying mod in new_trie_op.
X311 Say qi(c), not c, when testing TFM flags [now obsolete].
X312 Initialize token_ref_count(def_ref) to null, not zero.
X313 Change the type of usplit parameter n from quarterword to eight_bits.
X314 Initialize null_delimiter different form null_character.
X315 Insert qi twice in scan_delimiter.
X316 Insert qi in scan_math.
X317 Insert go in fetch.
X318 Insert qi in set_math_char.
X319 Insert qi in math_ac.
X320 Insert go in mlist_to_hlist.
X321 Use brackets around 8-bit characters in print.ASCII.
X322 Include hyph_list in the search_mem debugging routine.
- Now compiling list non-IniTeX to try an industrial-strength version.
X323 Add return to final_cleanup, because some Pascal compilers insist that each
label be used.
X324 Compute par_token when undumping.
11 Sep 1982
X325 Emit newline before file name, if near end of line. §537 I
X326 Define \ifx for arbitrary tokens. §507 C

12 Sep 1982
X327 Don’t ask users to type x twice before exiting. §84 I
X328 Install new features openin, \read, \ifeof, \closein; rename existing open,
   send, close to be openout, write, closeout. §209, 313, 1275 G
X329 Install new feature \expandafter. §368 G
X330 Change the default file area from ‘<TeX>’ to ‘\TeXinputs;’. §574 P

13 Sep 1982
X331 Install new feature \string. §472 G
X332 Remove spurious space printed by sprint.cs.
   • All tests passed now! But when I played with the system I found another bug
     (undetected by TRIP):
X333 Set r ← s after matching macro parameter tokens. §397 F

16 Sep 1982
X199 X334 Introduce serial numbers in line-break records, improving readability and in-
   dependence. §846 I
X335 Don’t abort when file_name_size is exceeded. §519 I

17 Sep 1982
X336 Remove unwanted period from font capacity message. §567 I

18 Sep 1982
X329 X337 Make \expandafter more powerful by moving it from semantics to syntax [i.e.,
   from stomach to mouth]. §368 G

19 Sep 1982
X338 Improve error recovery for ‘Missing number’. §415 I

22 Sep 1982
X339 Suppress italic correction between letters in math mode except in math fonts. §752 Q

24 Sep 1982
X340 Define null = mem_bot, not min_halfword, because there’s a reference to
   link(null) in try_break. §115 P
X341 Initialize str_start[0] ← 0. §47 D
X342 Avoid blank space at beginning of line. §638 I
X343 Set type of new box in math mode to ord_noad, not inner_noad. §1076 D

28 Sep 1982
• Here are the first changes made to the preliminary listing of \TeX82 that was
   published by the \TeX project earlier this month.
520 Insert the missing cases letter and other_char after x_token looks ahead. §1038 F
521 Change ‘\pause’ to ‘\pausing’. §236 C
522 Reset overfull_rule when determining tabskip glue. §804 D
523 Fix the logic for scanning \ifcase [in obsolete syntax—everything is still done
   with braces since ‘\fi’ doesn’t exist yet]. §509 A

30 Sep 1982
524 Change "0.0" to "?.?" (suggested by DRF). §186 I

2 Oct 1982
525 Use conditional thin spacing next to ‘Inner’ noads. §764 Q
526 Make thick spaces conditional. §766 Q
4 Oct 1982
527 Increase trie_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 \TeX/.format.default. §520 F
• Version 0 of \TeX is being released today!

8 Oct 1982
529 Fix a blunder: I decreased h mod a quarterword when it should have been decreased mod trie_op_hash_size (HWT). §944 B

9 Oct 1982
X258 → 530 Fix a typo (’!’ not ‘&’) in the WEB documentation. §524 P
531 Remember to call initialize if a different format was preloaded (Max Díaz). §1337 F
• Version 0.1 incorporates the above changes.

12 Oct 1982
532 Add the ‘\immediate’ feature, by popular request. §1375 G
• Version 0.2 incorporates this (somewhat extensive) change.

13 Oct 1982
533 Introduce new WEB macros so that glue_ratio is more easily changed. §109 P
• I began writing The \TeX.book today: edited the old preface and searched in the library for quotations.

14 Oct 1982
534 Change the type of hd to eight_bits; it’s not a quarterword (HWT). §649 B
X281 → 535 Revise the optimization of DVI commands: It’s not always safe to eliminate pop when the preceding byte is push, since DVI commands have variable length! (Embarrassing oversight caught by DRF.) §601 S

15 Oct 1982
536 Test ‘prev_depth > ignore_depth’, not ‘\neq’. §679 C
• Version 0.3 incorporates the above changes.

16 Oct 1982
537 Omit definition of 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 width(q) from page_goal, don’t add it to 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 \TeX 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 \boxmaxdepth. §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 ‘+ 1’). §1317 B
543 Fix the spacing of displayed control sequences: print_cs should base its decision on cat_code(p − single_base), not cat_code(p). §262 B
• The TRIP test detected this bug, but I didn’t notice.

27 Oct 1982
544 Set math_type before saying 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 \TeXbook.
- 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 \(83\) \(\text{pc} = 35\) \(\text{cm}\), exactly; so I am changing \TeX to conform.

546 Revise unit definitions for the ‘real’ printer’s point. §458, 617 C
- Version 0.7 incorporates the above.

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 \(\text{dd}\), 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 D

6 Nov 1982
550 De-update ‘\align_state’ when braces are in constants. §442 D

X294 → 551 Improve error recovery for bad alignments. §1127 I
- Today I wrapped up Chapters 4 and 5.

8 Nov 1982
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) \lor’; 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. §859 A
- 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
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.

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

Make `\span` mean ‘expand’ in a preamble.

Use three separate `if` tests instead of `\&` in the inner loop of `get_next`, to gain efficiency.

Introduce `get_r_token` so that assignments have uniform error messages and so that frozen equivalents cannot be changed.

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

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

- 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 2^{14} days old!

21 Nov 1982

Declare `c` as a local variable for hyphenation (DRF).

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

Don’t ship out incredibly huge pages; they might foul up DVI files.

2 Dec 1982

Add new features `\everymath` and `\everydisplay`.

Add a new feature `\futurelet`.

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

7 Dec 1982

Add a new `\endinput` primitive (suggested by FY).

8 Dec 1982

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

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

566 Call `begin_diagnostic` when omitting the first pass of line breaking.

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

23 Dec 1982

Renumber the decimal codes in paragraph statistics for loose and tight lines; they were ordered backwards.

Treat a paragraph that ends with leaders like a paragraph that ends with glue.

Allow commas as alternates to radix points, for Europeans.
578 Change \texttt{\hangindent} to a normal dimension parameter. [It had been a combination of \texttt{\hangindent} and \texttt{\hangafter}, with special syntax.] §247 C
579 Make \texttt{\prevgraf} accessible to users. §422, 1244 G
580 Split \texttt{\clubpenalty} off from \texttt{\widowpenalty}. §890 G
   • I’m typing Chapter 14 while making these changes.

24 Dec 1982
581 Use \texttt{\backinput} instead of \texttt{\goto \reswitch} when inserting \texttt{\par}, because \texttt{\par} may have changed. §1095 S

25 Dec 1982
  • It’s 10pm after a very Merry Christmas!

X328 → 582 Don’t prompt for a new file name if \texttt{\openin} doesn’t find a file. §1275 I
583 Add a new \texttt{\jobname} primitive. §472 I
584 Give the user a way to delete the dollar sign, when T\TeX\ decides to insert one. §1047 I
585 Allow optional equals after \texttt{\parshape}, and implement \texttt{\the\parshape}. §423, 1248 C

26 Dec 1982
586 Add an \texttt{\if_line_field} to the condition stack entries, so that more informative error messages can be given. §489 I

549 → 587 Introduce a \texttt{\normal_paragraph} procedure, since initialization is needed also within \texttt{\insert}, \texttt{\vadjust}, \texttt{\valign}, \texttt{\output}. §1070 D

27 Dec 1982
588 Give users access to \texttt{\pagetotal} and \texttt{\pagegoal}. (Analogous to \#679 and \#585, but simpler.) §1245 G
X199 → 589 Introduce \texttt{\tracingpages}, allowing users to see page-optimization calculations.
   Also split \texttt{\tracingparagraphs} off from \texttt{\tracingstats}. §987, 1005, 1011 I
   • The changes above have been incorporated into Version 0.91 of T\TeX.

31 Dec 1982
590 Break the \texttt{\buildpage} procedure into two parts, by extracting the section now called \texttt{\fireup}. [This is necessary because some Pascal compilers, notably for IBM mainframes, cannot deal with large procedures.] §1012 P
564 → 591 Make \texttt{\ifodd1\else} legal by introducing \texttt{\if\code}.
   §489 S
592 Improve alignments when columns don’t occur: Don’t append null boxes for columns missing before \texttt{\cr}, and zero out the tabskip glue after nonpresent columns. §802 Q
593 Make the error message about overfull alignment more intelligible. §801, 804 I
   • The changes above have been incorporated into Version 0.92 of T\TeX\82, 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 \texttt{\output} routine of \texttt{plain.tex}.

X186 → 594 Change the logic of \texttt{\itsho\_all\_over}; use \texttt{\max\_dead\_cycles} here too, instead of the fixed constant 100. §1054 C
X34 → 595 Don’t forget to \texttt{\pop\_nest} when an insert is empty. Also disallow optional space after \texttt{\insert n{...}}. §1100 F

4 Jan 1983
541 → 596 Use the \texttt{\box\max\_depth} that’s declared inside a \texttt{\vbox} when packaging it. §1086 C
597 Rename \texttt{\groupbegin} and \texttt{\groupend} as \texttt{\begingroup} and \texttt{\endgroup}. §265 C
594 → 598 Make \texttt{\deadcycles} accessible to users. §1246 G
599 Base the split insertions on natural height plus depth, not on \texttt{\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 hodgepodge 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 discretionary. §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` variable, 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 \texttt{fast_get_avail} and \texttt{fast_store_new_token}; reduce procedure-call overhead in \texttt{begin_token_list, end_token_list, back_input, flush_node_list}; change some tests from 'if \texttt{a \& b}' to 'if \texttt{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 \texttt{rebox} routine: Ensure that \texttt{b} isn’t a vbox. §715 S
545 ⇒ 627 Make \nullfont a primitive, so that \texttt{cur_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 \texttt{if’s} when the job ends. §1335 I

29 Jan 1983
552 ⇒ 629 Change initialization of \texttt{align_state} so that \texttt{align\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 (= \texttt{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
  • The changes above have been incorporated into Version 0.95.
632 Don’t ignore the space after a control symbol (except ‘\ ’).
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 \texttt{math_accent} was intended, after giving an error message in the case \texttt{mmode + accent}. §1165 I
635 Add new primitives \texttt{iftrue} and \texttt{iffalse}. §488 G

6 Feb 1983
X304 ⇒ 636 Improve the accuracy of fixed-point arithmetic when calculating sizes for \texttt{\left} and \texttt{\right}. (I had started by dividing \texttt{delimiter_factor}, not \texttt{delta1}, by 500.) §762 A

12 Feb 1983
637 Change the name \texttt{delimiterlimit} to \texttt{delimitershortfall}. §248 C
638 Make \texttt{abovewithdelims}.. equivalent to \texttt{above}; change the order of operands so that delimiters precede the dimension. §1182 C
607 ⇒ 639 Remove the kludgy math codes introduced earlier; make \texttt{fam} a normal integer parameter and allow \texttt{mathcode} to equal $2^{15}$. §1233 C
640 Don’t let \texttt{spacefactor} become more than $2^{15}$. §1233, 1243 R
  • I finished drafting Chapter 17 today.

14 Feb 1983
639 ⇒ 641 Replace octal output (\texttt{print_octal}) by hexadecimal (\texttt{print_hex}) so that math codes are clearer. §67 I
619 ⇒ 642 Don’t forget \texttt{char_given} in the \texttt{math_accent} routine. §1124 F
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17 Feb 1983
622 \mapsto 643 Switch modes when \texttt{\textbackslash halign} occurs in horizontal mode, or \texttt{\textbackslash valign} in vertical mode. \S\texttt{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. \S\texttt{252} I

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

27 Feb 1983
646 Specify the range of source lines, when giving warning messages for underfull or overfull boxes in alignments. \S\texttt{662, 675} I

\quad • Why did it take me all day to type the middle part of Chapter 18?

4 Mar 1983
647 Introduce a new feature \texttt{\textbackslash xcr} (suggested by LL). [Changed later to \texttt{\textbackslash crcr}]. \S\texttt{785} G

631 \mapsto 648 Subtract out \TeX\!'s own string requirements from the stats. \S\texttt{1334} I

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

9 Mar 1983
X295 \mapsto 650 Avoid accessing \texttt{math\_quad} when the symbol fonts aren't known to be present. \S\texttt{1199} R

533 \mapsto 651 Introduce \texttt{float} and \texttt{unfloat} macros to aid portability (HWT). \S\texttt{109} P

652 Introduce new names \texttt{\above\displayskip} and \texttt{\below\displayskip} for the old \texttt{\dispskip}; also \texttt{\above\displayshortskip} and \texttt{\below\displayshortskip} for the old \texttt{\dispskip} and \texttt{\dispbk}. \S\texttt{226} C

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

12 Mar 1983
654 Ignore leading spaces in \texttt{\textbackslash scan\_keyword}. \S\texttt{407} C

14 Mar 1983
631 \mapsto 655 Use \texttt{\textbackslash write} and \texttt{\textbackslash write\_ln} directly when printing stats. \S\texttt{1334} E

16 Mar 1983
602 \mapsto 656 Refine the page-break cost function (introducing \texttt{\emph{deplorable}}, which is not quite \texttt{awful\_bad}), after suggestion by LL. \S\texttt{974, 1005} Q

\quad • The changes above have been incorporated into Version 0.96.

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

19 Mar 1983
658 Don't treat left braces specially when showing macros. \S\texttt{294} I

659 Ignore blanks that would otherwise become undelimited arguments. \S\texttt{393} C

21 Mar 1983
X280 \mapsto 660 Make \texttt{\textbackslash last\_skip} handle \texttt{mu\_\textbackslash glue} as well as ordinary glue. \S\texttt{424} F

561 \mapsto 661 Expand only one level in a preamble \texttt{\span}. \S\texttt{782} C

22 Mar 1983
662 Let a single \# suffice in \texttt{\tokens, \message}, etc. (The previous rule, in which \#\# was always required as in macros, was a loser especially in \texttt{\write} where you had to say \####!\) \S\texttt{477} C
X328 \rightarrow 663\hspace{1em} Require the keyword ‘to’ in \texttt{\read}. (This will avoid the common error of an incomplete constant when no space appears before the \texttt{\cs}.) Also allow terminal I/O as a default when a stream number is out of range. §482, 1225, 1370 \hspace{1em} C

26 Mar 1983

664 Replace \texttt{\if\even(countnumber)} by \texttt{\if\odd(number)}, for better consistency of language. \hspace{1em} §504 \hspace{1em} C

564 \rightarrow 665\hspace{1em} Introduce the \texttt{change_if_limit}, to overcome a big surprise bug relating to \texttt{\if\if\aabc\fi}. \hspace{1em} §497 \hspace{1em} S

\hspace{1em} - \hspace{1em} \textit{Such examples show that cur_if might not be current, in my original implementation.}

28 Mar 1983

X326 \rightarrow 666\hspace{1em} Tolerate non-characters as arguments to \texttt{\if} and \texttt{\ifcat}. \hspace{1em} §506 \hspace{1em} G

667 Change ‘\texttt{absent}’ to ‘\texttt{void},’ a better word. \hspace{1em} §487 \hspace{1em} C

668 Clear the \texttt{shift_amount} in \texttt{\lastbox}, since I don’t want to figure out what it means in all cases. \hspace{1em} §1081 \hspace{1em} C

29 Mar 1983

669 Wake up the terminal before giving an error message. (This means a special \texttt{print_err} procedure is introduced.) (Suggested by DRF.) \hspace{1em} §34, 73 \hspace{1em} I

1 Apr 1983

\hspace{1em} - \hspace{1em} \textit{Today I finished Chapter 21 (boxes) and began to draft Chapter 22 (alignments).}

670 Allow periodic preambles in alignments. \hspace{1em} §793 \hspace{1em} G

671 Make \texttt{\leaders} line up according to the smallest enclosing box. \hspace{1em} §627, 636 \hspace{1em} C

672 Allow hyphenation after whatssits (e.g., after items for an index). \hspace{1em} §896 \hspace{1em} Q

2 Apr 1983

673 Call \texttt{build_page} when \texttt{\par} occurs in vertical mode. \hspace{1em} §1094 \hspace{1em} Q

674 Clear \texttt{aux} in \texttt{init_row}, for tidyness. \hspace{1em} §786 \hspace{1em} Q

4 Apr 1983

675 Let digits switch families in math mode. \hspace{1em} §232 \hspace{1em} C

7 Apr 1983

602 \rightarrow 676\hspace{1em} Refine the test for not splitting an insertion. \hspace{1em} §1008 \hspace{1em} Q

8 Apr 1983

647 \rightarrow 677\hspace{1em} Rename \texttt{\xcr} as \texttt{\crr}, at LL’s request. \hspace{1em} §780 \hspace{1em} C

9 Apr 1983

\hspace{1em} - \hspace{1em} \textit{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. \hspace{1em} §339 \hspace{1em} I

12 Apr 1983

X328 \rightarrow 679\hspace{1em} Make \texttt{\read} span several input lines, if necessary to get balanced braces. \hspace{1em} §482 \hspace{1em} C

14 Apr 1983

680 Fix a subtle bug found by JS: §882 can make \texttt{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.] \hspace{1em} §881 \hspace{1em} S

15 Apr 1983

681 Make \texttt{\uppercase} and \texttt{\lowercase} apply to all characters, regardless of category. \hspace{1em} §1289 \hspace{1em} 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). §901 R
683 Flush patterns in the input when the user tries \patterns outside of INITEX (suggested by DRF). §1252 I

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 \rightarrow 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.] §484 I

18 May 1983
685 Restrict \write n to the transcript file only, if n < 0. §1350 I

X188 \rightarrow X186 Unify the syntax for registers and internal quantities. (Remove primitives called ‘\insthe’ and ‘\minusthe’; rename scan_the to scan_something_internal, and change its interface accordingly; clean up command codes generally.) §209,413 C

24 May 1983
687 Introduce new parameters \hoffset, \voffset. §617 G

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). §1224 G
690 Introduce \advance, \multiply, \divide (suggested by FY). §1240 G
691 Introduce \hyphenchar; this requires a new command assign_font_int, plus minor changes to about 15 modules. §915 G
692 Introduce \skewchar (easy because of #691). §741 G
693 Introduce \noexpand. (I had difficulty thinking of how to implement this one!) §358,369 G
694 Introduce \meaning. §296 G

X231 \rightarrow X232 Remove ‘dm’ and ‘vu’; allow the more general ‘.5\hsize’. §455 G
696 Change ‘\texinfo f n’ to ‘\fontdimen n f’. §578 C

27 May 1983
697 Add a new feature \afterassignment (suggested by ARK). §1269 G
619 \rightarrow 698 Adjust the timing so that commands like ‘\chardef\xx=5\xx’ behave sensibly. §1224 C

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. §404 C
700 Improve \mathaccent spacing with respect to subscripts and superscripts (suggested by HWT). §742 Q

30 May 1983
598 \rightarrow 701 Terminate a job only when dead_cycles = 0. §1054 C

The changes above constitute Version 0.98.

3 Jun 1983

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

6 Jun 1983

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

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

Allow A..F in hex constants to be other_char as well as letter.

7 Jun 1983

Remove an instance of ⟨Scan optional space⟩, since it’s now redundant.

Legalize \makebox and \makebox in math mode.

Clean up the treatment of optional spaces in numerical specifications.

I’m obviously working on Chapter 24 today.

8 Jun 1983

Don’t make \gdef global when global_defs < 0.

Produce zero_glue as the outcome of \advance\spaceskip by\-\spaceskip.

Make \show do something appropriate for every possible token.

Replace the (single) \tokens parameter by an array of 256 token registers.

Make \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.
20 Jun 1983

727 Set \catcode`\%=14 in INITEX. §232 C

587 \rightarrow 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 \rightarrow 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 \text{-1}. §810, 811 R

22 Jun 1983

653 \rightarrow 731 Declare the parameter to print_roman_int to be of type integer, instead of nonnegative_integer (found by Debby Clark). §69 B

690 \rightarrow 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 \valign 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 \text{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 \rightarrow 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 \rightarrow 739 Remember to correct delta when an accented box changes. §742 D

2 Jul 1983

740 Introduce bypass_coln, 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

11 Jul 1983

- The computer is back up after more than 50 hours down time (due to air conditioning failure).

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 \rightarrow 748 Don’t forget to check \text{global_defs} when \text{\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 Q

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 I

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 whatsits 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.

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

648 $\rightarrow$ 773 Distinguish ‘string’ from ‘strings’ when reporting statistics.

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

20 Aug 1983

775 Don’t forget to apply \ 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 $\rightarrow$ 778 Suppress \input during a font size spec; otherwise cur_name is clobbered (found by MDS).

779 Introduce new conditionals \ifhbox and \ifvbox.

29 Aug 1983

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

624 $\rightarrow$ 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 $\rightarrow$ 784 Make \newlinechar affect print_char, not just print.

4 Sep 1983

785 Add new features \lastkern, \lastpenalty, \unkern, \unpenalty.

- OK, Appendix D is finished!!

- The above changes have been installed in Version 0.999999.

17 Sep 1983

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

- Will this be the historic last change to T\TeX?

18 Sep 1983

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

20 Sep 1983

604 $\rightarrow$ 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 ‘META\FONT lunch’.
• DRF begins to produce The Te\TeXbook on our APS phototypesetter.

14 Oct 1983
633 \(\mapsto\) 791 Ignore spaces at the ends of lines also in \TeXPOOL (found by DRF). §52 P
610 \(\mapsto\) 792 Initialize the history variable at start\_here (DRF). §1332 D

18 Oct 1983
793 Extend runaway to catch runaway text (suggested by FY). §306 I
794 Reset cur\_cs after 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 ‘while true do’ since many compilers implement that badly. Rewrite §852 to avoid calling badness in the most common case. §45, 380, 852 E

3 Dec 1983
797 Don’t forget to call error after the message has been given (noticed by Gabi Kuper).
• Version 1.0 released today incorporates all of the above. §500 F

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 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 $(A,*)_$. §764 Q

13 Feb 1984
801 Avoid a bad goto, as diagnosed by Clint Cuzzo and George O’Connor. (Must not go directly to 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 META\FONT development.) §103 I
2 Mar 1984

804  Maintain 17-digit accuracy, not 16; now constants like ‘.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...xxxxdxxxxdxxxx} anomaly found by Jacques Désarménien. §962 R

11 Apr 1984

808  Supply code for the missing case adjust_node in copy_node_list.

• Yoicks, how could serious bugs like that have escaped detection?

11 Jun 1984

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 program. §363 E

8 Jul 1984

814  Give additional diagnostics when \tracingmacros>1.

• The changes above were incorporated in Version 1.1, released July 9, 1984. §323 I

27 Jul 1984

815  Say ‘see the transcript file’ after handling offline \show commands. (Suggested by METAFONT.) §1298 I

20 Oct 1984

816  Allow ‘0’ in response to error prompts.

• Those two changes led to Version 1.2.

25 Nov 1984

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.) §84 I

818  Ditto in another place! §846 R

819  Remove the fixed-at-compile-time partition between lower and upper memory.

• This major change in memory management completes Version 1.3, which was published in preliminary looseleaf form as ‘T\TeX: The Program’. §116, 125, 162 E

20 Dec 1984

820  Keep the node_size field from overflowing if the lower part of memory is too large.

• That was another bug in existence from the beginning! §125 R

5 Jan 1985

821  Improve the missing-format-file error (DRF). §524 I
Update the terminal right away so that the welcoming message will appear as soon as possible (DRF).

Convey more uncertainty in the help message at times of confusion.

Improve the history logic in the warning_issued case.

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.)

Prevent nonexistent characters from being output by unusual combinations of ligatures and hyphenation.

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

Speed up flush_list by not calling free_avail (DRF).

Introduce a special kind of kern for accent positioning; it must not disappear after a line break.

Prevent \lastbox and \unkern from removing discretionary replacements.

Don’t try TEX_area if a nonstandard file area has been specified (DRF).

Eliminate the limitation on \write length; the reason for it has disappeared (Nancy Tuma).

Allocate two words for the head of the active list (CET).

Change uterm to uterm_ln after a bad beginning (Bill Gropp).

Test for batch_mode after trying to open the transcript file, not before (DRF).

Be prepared for string pool overflow while reading the command line! (This bug was first found in METAFONT, when it could occur more easily.)

Fix a bug in \edef\foo{\iffalse\fi\the\toks0}: TEX should stay in the loop when expanding non-\the. (Found by Dan Brotsky.)

Make ‘plain’ a lowercase name, for consistency with the manual.

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 \maxinopen 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.

• 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 Amà). §174, 182 R

21 Apr 1987

847 Make the storage allocation algorithm more elegant and efficient. §127 E

22 Apr 1987

742 ⇒ 848 Calculate the empty-line condition properly when \endlinechar is absent. §360 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 Gunterman). §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$$\halign{\ldots\cr\noalign{\hrule}}$$.$$ §806 A

20 Aug 1987

852 Introduce co_backup because of cases like \hskip 0pt plus 1fil\ifdim (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. §952 B

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 temp_head is well-formed whenever it can be printed in a “runaway” message: Consider constructions like \outer\def\a0{}\a\a (Silvio Levy). §391 S

24 Apr 1988

618 ↔ 858 Avoid conflicting use of the string pool in constructions like \def\#1{}\input a\\z (Robert Messer). §260 S

10 May 1988

859 Amend the \patterns data structure when trie_min = 0 (PB). §951, 953 R

25 May 1988

860 Guarantee that trie_pointer cannot be out of range. §923 R

618 ↔ 861 Avoid additional bugs like #858 in constructions like \input a\romannumeral1, etc. §464, 465, 470 S

618 ↔ 862 Prevent similar string pool confusion that could occur during the processing of **\input\romannumeral6. §525 R

19 Jun 1988

819 ↔ 863 Prevent a negative dividend from rounding upward, causing a loop (CET). §126 S

819 ↔ 864 Adopt a smoother allocation strategy when memory is nearly gone (CET). §126 E

20 Jun 1988

852 ↔ 865 Initialize cur_order, now that it’s being backed up (Tsunetoshi Hayashi). §439 D

6 Nov 1988

612 ↔ 866 Disable fatal_error in prompt_input, so that open_log_file can use it safely (Tim Morgan). §71 S

836 ↔ 867 Force terminal output whenever open_log_file fails. §535 S

14 Dec 1988

866 ↔ 868 Restore fatal_error in prompt_input, but don’t let it be unsafe for open_log_file. §92, 534 P

23 Jan 1989

869 Give q a legal value when recovering from “infinite shrinkage” error. §976, 1004 D

17 Feb 1989

758 ↔ 870 Avoid spurious error message for \aftergroup\relax\dump by avoiding inaccessible \aftergroup tokens (FM and Rainer Schöpf). §280 D

20 Mar 1989

871 Don’t refer to link(null) even when it “can’t happen” (PB). §791 R

7 Jun 1989

872 Avoid confusion from $$\begingroup\halign{#cr}$$ (FM). §1130 S

20 Jun 1989

873 Put fraction digits into dynamic memory, not the global dig array, because of constructions like .5\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 ↔ 876 Increase the number of tokens shown by token_show (J. Lavagnino). §295 C

877 Avoid confusion from $$\begingroup\eqno$$ (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 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 \emergencystretch 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 \rightarrow 890 Prevent save_stack conflicts in \{hbox\expandafter{\csname\endcsname}\} and similar constructions (WGS). §645, 1117 S
858 \rightarrow 891 System-dependent parts of file names must be addressed relatively, not absolutely (FM and Rainer Schöpf). §516, 517 S

3 Dec 1989

880 \rightarrow 892 Allow different hyphenmins in the same paragraph (M. Ferguson). §1376 G
893 Distinguish \par from characters on \if tests. (MVL). §334 S
378 \rightarrow 894 Alignments need to be more robust against malicious attacks (MVL). §782 S
895 Don’t let kerns in discretionary angles appear at breaks (MVL). §869 C
881 \rightarrow 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 \rightarrow 897 Make an undumped trie dumpable again (PB). §1325 D

18 Dec 1989

588 \rightarrow 898 Allow access to page totals in \output routines (FM and Chris Rowley). §421 G

22 Jan 1990

611 \rightarrow 899 Recognize more cases of unbalanced \output (CET). §1026 R

29 Jan 1990

758 \rightarrow 900 Make \aftergroup work properly after \eqno (Michael Downes). §1194 S

1 Feb 1990

878 \rightarrow 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.

907 Optimize \ifx\p\q after \let\p=q (MVL).

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).

22 July 1990

579 → 910 Treat \prevgraf as zero within \write (Bogusław Jackowski).

26 July 1990

911 Report ‘1.1’ when first line of file overflows buffer (George Russell).

5 December 1990

878 → 912 Translate unprintable characters in font identifiers (WGS).

28 December 1990

913 Avoid range check when there are 65536 or more pages (Eberhard Mattes).

20 September 1991

878 → 914 Improve error message for \mathchar out of range.
878 → 915 Retain unprintable internal strings in 8-bit form (FM).
881 → 916 Retain right punctuation context for ligature reconstruction (problem found by Brian Hamilton Kelly).

10 January 1992

881 → 917 Also avoid producing a double kern at boundary (CET).
918 Disallow \setbox where it doesn’t work (Robert Hunt).
919 Robustify \mskip and \mkern in presence of negative quad (WGS).

679 → 920 Defend against ‘\‘ in \read (Michael Downes).
798 → 921 Save string memory if font occurs repeatedly (Boguslaw Jackowski).
784 → 922 Don’t let \newlinechar interrupt unprintable expansion (Bernd Raichle).

7 February 1992

881 → 923 Restore cur_l properly when boundary character doesn’t exist (Mattes and Raichle).

17 July 1992

892 → 924 Use current language at beginning of horizontal mode (Rainer Schöpf and CET).

17 December 1992

879 → 925 Avoid (harmless) range errors (Philip Taylor and CET).

25 February 1993

881 → 926 Protect kerns inserted by boundary characters (William Baxter).
917 → 927 Don’t let boundary kern disappear after hyphenation.

26 June 1993

668 → 928 Avoid potential future bug (Peter Breitenlohner).

17 December 1993

881 → 929 Boundary character representation shouldn’t depend on the font memory size (Berthold Horn).

10 March 1994

930 Huge font parameter number may exceed array bound (CET).
4 September 1994
926 → 931 Math kerns are explicit (Walter Carlip). §717 F
932 Avoid overflow on huge real-to-integer conversion. §625, 634 R

19 March 1995
933 Avoid spurious reference counts in format files (PB). §1335 R

23 November 1998
934 Make sure that TeX is certifiably Y2K-safe. §1328 R

12 July 1999
255 → 935 \xleaders often drops the final box (Hiroshi Nakashima). §627, 636 A

30 August 2001
936 Don’t allow a million unbalanced braces followed by \cr outside of any align- §789 R
937 ment (Ralf Roth).
938 Don’t allow end-template except at end of template (Roth). §325, 1131 R

30 September 2002
938 Improve rounding of glue during output (M. F. Bridgland). §625, 634 Q

18 March 2008
939 Forgot to goto the proper error recovery (DRF). §395 F
940 Avoid a case of dirty Pascal and speed up inner loop. §1035 E
941 Forget reference to last_glue in format file (DRF). §1335 R
942 Glue reference not updated after overflow error (DRF). §1236 R
943 Muglue in \leaders had wrong units; now disallowed (DRF). §1078 B
944 Speedup of ligatures and kerns at end of a word (DRF). §1039 E
945 Another sanity check of TFM files for security (DRF). §365 R
946 Give better size data for unmagnified insertions. §986 I

6 January 2014
947 Space after \csname\endcsname to match other spaces. (Oleg Bulatov) §262 C