10 Mar 1978

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

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

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 L

4 Fix bug: I wrote '**while** $\alpha \wedge (\beta \vee \gamma)$' when I meant '**while** $(\alpha \wedge \beta) \vee \gamma$'. §259 B

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

6 Don't initialize *mem* in INITEX, it wastes time. §164 E

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*] ≠ 0 ∧' in *check_mem*. §168 F

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

• *About six hours of debugging time today.*

• *INITEX appears to work, and the test routine got through start_input, chcode [the TEX78 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 I

11 Put '$p \leftarrow link(p)$' into the loop of *show_token_list*, so that it doesn't loop forever. §292 F

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 L

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

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 I

• *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 F

16 Change \require to \input. §376 C

17 Add code for the case *cur_cmd* = 0 [later known as the case '$t \geq cs\_token\_flag$'] when scanning a tokenlist. §357 F

• *That's the first "big" error I've spotted so far.*

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

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 TEX78]. §215 L

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

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 F

• *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 I

23 Use *eq_destroy* wherever necessary in *unsave*. §283 D

24 Change '$t \leftarrow (t-1) \bmod 8$' to '$t \leftarrow (t-1)$ land 7' in *id_name*, since `SAIL` has $-1 \bmod 8 = -1$. [At this time, *id_name* is a routine that unpacks control sequence names, according to a scheme that will become obsolete after change #422.]   L

25 Remove the space that appears at end of paragraph. (I hadn't anticipated that.)   §816 S

26 Throw away unwanted *line_feed* after getting a *carriage_return* in response to *in_chr_w* [a system routine for input from the terminal].   §83 L

27 Delete spurious call to *flush_list* in *end_token_list*.   §324 B

• *Why did I make such a silly mistake?*

28 Fix bug in *get_x_token*: I forgot to say '*macro_call*' (which is the main point of that routine)!   §380 F

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

• *Also TEX correctly caught an error* `0p` *for* `0pt`.

29 Fix bug in *scan_spec* (**while** instead of **repeat**).   §404 L

30 Make the table entries for `\hfill` and `\hskip` consistent with the program conventions.   §1058 M

31 Disable unforeseen coercion: When *scan_spec* put *hsize* on *save_stack*, the value changed from *real* to *integer*.   §645 L

32 Use '`*`' instead of '`-1.0`' for running dimensions of rules in *show_node_list*. §176 I

33 Clear *mem*[*head*] to null in *push_nest* [in TEX82, this will be done by *get_avail*]. §216 D

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

34 Translate ASCII control codes to special form when displaying them.   §48, 68 I

• *Ligatures work, but show_node_list showed them funny.*

35 Remember to clear parameters off *save_stack* in *package* routine.   §1086 F

• *About eight hours today.*

13 Mar 1978

36 Introduce a new variable *hang_first* [later the sign of *hang_after*].   §849 D

$36 \mapsto$ **37** Simplify the new code, realizing that if *hang_indent* $= 0$ then *hang_first* is irrelevant.   §848 E

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

• *I'm not counting this as debugging time!*

• *(Came back in the evening.)*

38 Spruce up the comments in the *line_break* routine, which appears to be almost working.   §813 P

39 Rethink the setting of *best_line*; it's 1 too high in many cases. [The final line of a paragraph was handled in a treacherous way.]   §874 D

40 Compute proper initialization for *prev_depth* when beginning an `\hbox` with a paragraph inside. [This refers to a special 'paragraph box' construction, used when an hbox of specified size becomes overfull; TEX78 doesn't have the concept of internal vertical mode.]   §1083 D

41 Also initialize *tail* in that case.   §1083 D

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

43 Fix a typo in the *free_node* routine ('*link*' not '*llink*'); by strange chance it had been harmless until today.   §130 T

44 Fix bug: *post_line_break* forgot to set *adjust_tail*.   §889 F

45 Update *act_width* properly when looking for end of word while line breaking. §866 D

46 Repair the "tricky" part of *get_node*: I used the *info* field when I meant to say *llink*.   §127 B

• *Now the* `\corners` *macro of* `acphdr` *works! [See* `\setcornerrules` *in The TEXbook, page 417.]*

47 Reset *contrib_tail* properly in *build_page*. §995 D

48 Fix typo (`-` for `+`) in computation of *page_total*. §1004 T

49 Change the page-breaking logic: TEX reached *fire_up* with *best_page_break* =
null in one case, since the badness was too bad. §1005 S

50 Perform the operation *delete_token_ref*(*top_mark*) only when *top_mark* ≠ 0. §1012 M

51 Make *scan_toks* omit the initial `{` of an `\output` routine. §473 F

52 Insert a comma to make memory usage statistics look better. §639 I

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

14 Mar 1978

- *(Came in evening after sleeping most of day, to get computer at better time.)*
- *(Some day we will have personal computers and will live more normally.)*
- *8:30pm, began to enter corrections to yesterday's problems.*

53 Issue an error message for non-character in filename or in font name. §771 I

54 Display '…' for omitted stuff in *show_context* routine. §643 I

55 Watch out for the `SAIL` syntax '$\alpha + \beta$ lsh γ'; it doesn't shift $\alpha + \beta$ left (only β). §464 L

- *That error was very hard to track down; it created a spurious link field and sent hash[0] = \beta to the scanner!*
- *I could have found this bug an hour sooner if I had looked at the correct stack entries for name and token_type.*

56 Show the correct page number when tracing pages before output is shipped. §638 D

57 Remember to nullify a box after using it. §1079 F

58 Issue an error message if `\box255` isn't consumed by the output routine. §1015 I

- *I'm having trouble with the `BAIL` debugger; it makes an illegal memory reference and dies, when single-stepping past the entry to recursive procedures hlist_out and vlist_out. So I have to reload and be careful to go thru these procedures at high speed.*

59 Fix bug in comment (memory parameter description said ≥ not ≤). §11 P

60 Fix typo in definition of rule output (said x, y not $x0, y0$). [This part of the
code went away when `DVI` files were introduced.] B

61 Correct the embarrassing bug in shellsort, where I said '≤ *str*[k]' not '≤ t'.
[The first TEX had to sort all output by vertical position on page.] B

62 Make *start_input* set up *job_name* in the form needed by *shipout*; it uses obsolete conventions. §532, 537 M

63 Insert `(` and `)` into the `SAIL` macro definition of *new_string*. [This macro was
for pre-`DVI` output.] L

64 Unscramble the parameters of *out_rule*: The declaration was $(x0, y0, x1, y1)$
while the call was $(x0, x1, y0, y1)$. M

- *4:30am, TEX's first page is successfully output!*
- *(It was '`\titlepage\setcpage1\corners\eject\end`'.)*

15 Mar 1978

- *10:30pm. Today I'm instrumenting the line-breaking routine and putting it through a bunch of tests.*
- *(The inserted instrumentation had bugs that won't be mentioned here.)*

65 Don't abort the job when *eq_destroy* redefines a TEX control sequence. §275 C

- *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 ↦ **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 `\end` maneuver; the present code doesn't end the job, since I forgot
   that *back_input* uses *cur_tok*.   §1054 M

71 Add a parameter to *try_break*, since the width is different at a discretionary hy-
   phen. [This problem will be solved differently in TeX82, when discretionaries
   become much more general.]   §840 A

72 Bypass kern nodes in pre-hyphenation.   §896 F

73 Supply code for the forgotten case '< `"a"`' in pre-hyphenation. [This case was
   later generalized to a test of *lc_code*.]   §897 F

74 Change *mem*[*q*] to *prev_break*(*q*) in the reverse-linking loop.   §878 B

   • *(Such blunders. Am I getting feeble-minded?)*

75 Introduce special logic for *eject_penalty*; I was wrong to think that forced ejec-
   tion was exactly like an infinitely negative penalty.   §851 A

76 Use $(1 + b)^2 - p^2$ when computing demerits with $p < 0$.   §859 A

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

16 Mar 1978

   • *9pm. The plan for tonight is to test page breaking and more paragraphing.*

77 Insert '`\topskip`' glue at beginning of page.   §1001 G

78 Add '`\pausing`' feature.   §363 I

79 Fix discrepancy: In *make_accent* I called *vpackage* with a pointer to the first
   list item, but *vpackage* itself assumes that the parameter is a pointer to that
   pointer. [The *vpackage* of TeX82 will be different.]   §668 M

   • *I checked for other lapses like that. Result: 14 calls OK, 12 NG.*

80 Create a new temporary list head location, *hold_head*, since there's a case
   where *vpackage* is improperly called with parameter *temp_head*. [At this
   time *vpackage* uses *temp_head* to make a list of all insertions found.] §1014 M

   • *11:30pm. The machine is tied up again.*

81 Write code to handle charnodes in vlists; I forgot that I'd decided to allow
   them. [Later I prohibited them again!]   §669 F

82 Combine the page lists before pruning off glue in *fire_up*; otherwise the pruning
   doesn't go far enough.   §1017 F

25 ↦ **83** Fix typo where line-breaking starts: '*fill_glue*' should be '*new_glue*(*fill_glue*)'. §816 B

84 Add `/q` to xspool command (cosmetic change). [This changes a system com-
   mand that causes TeX output to be printed on the Xerox Graphics Printer
   (XGP), the progenitor of future laser printers; the `/q` option says that the
   queue of printing requests should be displayed on the user's terminal.] §642 I

85 Don't write a form feed after the last page of output.   §642 E

   • *To fix this, I reorganized ship_out, and it became simpler.*

86 Correct a typo ('↤' for '+') in the *vlist_node* case within *hlist_out*. [The output
   routines were quite different at this time, because output went directly to
   the XGP.]   §622 T

87 Change the message '`completed page`' to '`Completed for page`'.   §638 I

48 ↦ **88** Fix yet another typo in the computation of *page_total*: My original code said
   stretch(*p*) instead of *stretch*(*q*) (terrible).   §1004 B

89 Document the dirty trick about *bot_mark*'s reference count. [That trick is,
   fortunately, no longer useful.]   §1016 P

90 Rethink the algorithm for contributing an insertion: The original code tests
   for a page break after incrementing the totals but before the *contrib_list*
   is updated. [TeX78 handles insertions in a hardwired manner that will be
   greatly generalized in TeX82.]   A

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

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

92 Change *new_line* to *next_line* in yet another print command (see #7). B

75 ↦ **93** Amend the line-breaking algorithm: `\break` in paragraph doesn't work with
really bad breaks. §851 A

- *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 *dead_cycles* to keep `\end` active until *ship_out* occurs. §1054 G

95 Don't call *line_break* with an empty list. §1096 E

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

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

98 Give a warning message if there's an `\hfill` in the middle of a paragraph;
fillglue upsets the line breaker, because floating-point calculations don't have
sufficient accuracy. §868 L

- *I spent an hour looking for another bug in TₑX, but the following one was in
  METAFONT: The xgp_height data in fonts had been supplied wrong.*
- *It took two hours to recompile 32 fonts with proto-METAFONT.*

99 Make *show_node_list* and *show_token_list* more robust in the presence of soft-
ware bugs. §182 R

97 ↦ **100** Do not remove nodes with *eject_penalty*, when the new parameter to *hpack* is
true. D

97 ↦ **101** Put a fast exit into *hpack*; e.g., at glue nodes, test 'if *paragraphing* ∧ ⟨current
width is large⟩'. E

- *2am. I have to go to bed "early" tonight.*

18 Mar 1978

- *3:30pm. (Saturday)*

102 Add a parameter to *check_mem* (to suppress display unless needed). §167 I

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

- *I realized the need for `\maxdepth` while fixing insertions (see #90).*

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

105 Reclaim the *eject_penalty* nodes removed during line-breaking. §879 D

- *(Those were the 13 extra nodes reported on Thursday.)*
- *The init_align procedure worked right the first time!*
- *Also init_row, init_col. But then...*

106 Rethink the command codes: *endv* in a token list has too high a code for the
assumptions of *get_next*. §207 S

107 Add a *prev_cmd* variable for processing delimited macro parameters; the origi-
nal algorithm loses track of braces. [The rules will change slightly in TₑX82,
and *rbrace_ptr* will take on a similar function.] §400 A

108 Make the *get_next* routine intercept `&` and `\cr` tokens. §342 S

- *I'd thought I could just put `&` and `\cr` into big_switch [i.e., in the stomach of
  TₑX, not the eyes]; that was a great big mistake.*

109 Make more error checks on *endv*; e.g., it must not occur in a macro definition
or call. §780 R

108 ↦ **110** No, rethink alignments again; the new program still fails!   §768 S
- *For the first time I can glimpse the hairiness of alignment in general (e.g., '*`\halign{\u#\v&...`*' when* `\u` *and* `\v` *are defined to include* `&`*'s and possible alignments themselves).*
- *I think there's a "simple" solution, by considering only whether an alignment is currently active [in §342].*
- *11:30pm. Went to bed.*

19 Mar 1978
- *Woke up with "better" idea on how to handle* `&` *and* `\cr`*.*
- *(Namely, to consider a special kind of* `\def` *whose parameters don't interrupt on* `&`*'s and* `\cr`*'s.)*
- *But replaced this by a much better idea (to introduce align_state).*
- *11pm. Began to use computer. Performed major surgery (inserting align_state and updating the associated routines and documentation).*

111 Pop the alignment stacks in *fin_align*.   §800 D
110 ↦ **112** Fix a (newly inserted) typo in *show_context*.   §314 T
110 ↦ **113** Set *align_state* false when a live `&` or `\cr` is found. [Originally *align_state* was of type *boolean*.]   §789 D
114 Insert `\cr` when '}' occurs prematurely in an alignment.   §1132 I
115 Remember to record *glue_stretch* when packaging an unset node.   §796 M
- *I had a mistake in* `acphdr` *definition of* `\quoteformat`*; also extra spaces.*
- *My first test programs, used before today, were contrived to test macro expansion, line-breaking, and page layout.*
- *Next I'm using a test program based on Volume 2.*

116 Make carriage-return, space, and tab equivalent for macro matching.   §348 C
117 Omit the reference count node when displaying a mark.   §176 F
118 Correct a silly slip: I wrote '*type_displacement*' instead of '*value_displacement*' when packing data in a penalty node.   §158 B
119 Don't go to *build_page* after seeing `\noindent`; TeX isn't ready for that. [In the original program, this was an instance of a bad **goto**.]   §1091 M
- *I had undesired spaces coming thru the scanner in my macro definitions of* `\tenpoint` *[see The TeXbook, page 414].*
- *4am. TeX now knows enough to typeset page 1 of Volume 2!*
- *Also it did its first "math formula" (namely '*`$X$`*') without crucial error.*
- *(Except that the italic correction was missing for some reason.)*

120 Remember to decrement *cur_level* in *fin_align*. [The routines will eventually become more general and use *unsave* here.]   §800 D
121 Remember to increment *cur_level* in error corrections by *handle_right_brace*. [A better procedure will be adopted later.]   §1069 D
122 Fix a typo: ('{' instead of '}') in error message for *mmode + math_shift*.   §1065 T
99 ↦ **123** Make *show_noad_list* more robust and more like the new *show_node_list*. [The routines will be combined in TeX82.]   §690 R
124 Fix a typo in *char_box*: should say *font_info_real*. [In TeX78 a single array is used for both *real* and *integer*; in TeX82 things will be *scaled*.]   §554 L
125 Fix typos in the definitions of *default_rule_thickness* and *big_op_spacing*; they shouldn't start at *mathex*(7).   §701 B
126 Reverse the *before* and *after* conventions in math nodes.   §1196 B
- *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 *fin_mlist*, because '\left(...\above...\right)' doesn't parse correctly; the \left goes into the numerator, the \right into the denominator. §1184 A

137 Correct the use of *depth_threshold* in *print_subsidiary_data*: Simple fields get shown while others look empty. §692 B

78 ↦ **138** Return the carriage before showing the first line of a new file when pausing. §538 I

139 Fix bug: The call *show_noad_list*(*mem*[..]) should be *show_noad_list*(..), in the *incompleat_noad* case of *show_activities*. §219 M

- *3am. The whole messy formula has been parsed correctly into a tree.*
- *The easy part is done, now comes the harder part.*

140 Don't shift single characters down in *make_op*. §749 F

141 Make *clean_box* return a box (as its name implies), not an hlist. §720 D

- *Font info still isn't quite right, it has the wrong value of quad.*

142 Retain the italic correction when doing *rebox*; can make *glue_set* ≠ 0 a flag for this. [A better solution will be adopted later.] §715 A

143 Fix the bug that makes *rebox* bomb out: *value*(*p*) should be *value*(*mem*[*p*]). §715 B

- *6am; ten hours today. TEX didn't do $\pi\over2$ correctly, but was close.*
- *I found that the rebox problem (#142) went away when I fixed the clean_box problem (#141); but I will leave the extra stuff about glue_set ≠ 0 in the program anyway, just for weird cases.*

144 Omit extra levels of boxing when possible in *clean_box*. §721 E

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

21 Mar 1978

- *10pm. The computer is rather heavily loaded tonight.*

145 Don't forget *thickness* when making a square-root sign (see #131). [The rule thickness will later be derived from the character height.] §737 F

146 Define *p* local to the *make_fraction* routine. §743 L

- *Unwittingly using the global p was a disaster.*

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

142 ↦ **148** Make *glue_set* nonzero in the result of *var_delimiter*. §706 D

149 Fix bug: The *math_glue* function didn't return any result. §716 F

150 Fix typo in *char_box* (*c* not *w*); this caused a subscripted *P* to come out the same width as an unsubscripted *P*. [Later changes in the rules will move this computation to §755.] §709 T

144 ↦ **151** Revise *clean_box* to do operations that are needed often because of the *rebox* change. §720 P

152 Use the new *clean_box* to avoid a bug in \sqrt{\raise...}. §737 D

153 Change the definition of `\not` so that it's a relation (which will butt against the following relation). [All math symbols and Greek letters are defined in `INITEX` at this time, not in a changeable format definition.]   Q

154 Give error message '`Large delimiter must be in mathex font`', instead of calling *confusion*, since the error can occur. [This particular error is impossible in TEX82.]   §706 I

155 Change the use of p in *var_delimiter*; it isn't always set when I say **goto** *found*.   §706 F
- *Another font problem now surfaced: The mathex meta-font didn't compute TEX info in a machine-independent way. (It took two hours to correct this.)*

156 Don't forget to set *type*(*b*) in all relevant cases of *var_delimiter*.   §708 D

157 Use the correct sign convention for *shift_amount* in *hpackage*.   §653 B

158 Always kern by *delta* when there's no superscript.   §755 F

159 Declare *space_table* to be $[0 . . 6, 0 . . 6]$ not $[0 . . 7, 0 . . 7]$; otherwise its entries are preloaded into the wrong positions. [The *space_table* in TEX78 is 7×7; it will become 8×8 in TEX82, represented as a string called *math_spacing*.]   §764 M

160 Use a negative value, not zero, to represent a null delimiter. [Actually zero will come back again later.]   §685 C

$127 \mapsto$ **161** Change `\cc` to `\char`.   §265 C

162 Don't use tricky subtraction on packed data when changing q to an *ord_noad* in *mlist_to_hlist*; subtraction isn't always safe.   §729 L

163 Fix two typos in the *space_table* (`*` for `0`).   §764 B

164 Initialize *cur_size* everywhere (I forgot it in two places).   §703 F

165 Reset *op_noad* before resetting *bin_noad*.   §728 A

166 Treat *display_style* + *cramped* the same as *display_style* inside *make_op*.   §749 F

167 Shift the character correctly in the non-`\displaystyle` case of *make_op*.   §749 B
- *Still another font problem: The italic corrections are wrong because the corresponding array was declared* real *in proto-*METAFONT *(and italic corrections were used in nonstandard way in* `mathex`*).*

168 Use *depth* instead of *height* in *var_delimiter*. [Later, both were used.]   §714 B

169 Skew the accents according to the font *slant*. [Soon retracted.]   §741 Q
- *At this point I think nearly all the math routines have been exercised.*
- *Tomorrow they should work!*
- *Eight hours debugging today.*

22 Mar 1978

- *(Wednesday, but actually Thursday: I began at midnight because I was proofreading a paper.)*
- *I checked out the font access tables, slowly (i.e., all the* `\mathcode` *and special-character name entries were catalogued).*

$169 \mapsto$ **170** Do **not** consider slants after all in the math accent routine, since slanted math letters are put differently into fonts.   §741 Q

171 Don't use q for two different things simultaneously in *make_math_accent*.   §738 B

172 Fix bug in *compact_list* (I forgot to advance the loop variable). [This procedure became unnecessary in TEX82.]   F

173 Avoid conflict between *var_delimiter* and *mlist_to_hlist*, which want to use *temp_head* simultaneously.   §713 M

174 Fix bad typo in *overbar* routine (*b* for *p*).   §705 T
- *Finally TEX got to* after_math *after dealing with that hairy formula . . .*

175 Fix another bad typo: p for b this time.   §1199 T

176 Insert more parentheses (twice) because of '`lsh`' precedence in `SAIL`.   §1199 L

$36 \mapsto$ **177** Use the new hanging-indentation conventions when formatting displayed equations.   §1199 M

178 Recompute penalties so that break is allowed after *punct_noad*s.   §761 Q

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 /ntn=33 on XGP prompt message so that complex math won't blow the device driver. [See #84.] I

161 ↦ **184** Update the comment about the meaning of \char, since it can be used in math mode. §208 P

- *Six hours today.*

23 Mar 1978

- *11pm, Maundy Thursday.*

104 ↦ **185** Make \tracing and \jpar follow block structure. §283 C

- *It took me two hours to enter yesterday's corrections, because the changes were so numerous.*

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

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

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

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

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

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

195 Eliminate confusion between the two temp variables named h; one is *real* and the other is *integer*. §629 L

196 Include forgotten case (*leader_node*) in *hlist_out*. [Type *leader_node* will be absorbed into *glue_node* in TEX82.] §622 F

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

- *Seven and a half hours today.*
- *TEX seems to be ready to tackle my test file based on Volume 2.*

198 Calculate $y00$ in horizontal rules as an integer number of pixels from the baseline, so that the baseline doesn't jump. §589 S

25 Mar 1978

- *2am Saturday. (Might as well drop Friday.)*

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

185 ↦ **200** Don't allow users to change nonexistent things like \catcode1000. §1232 R

110 ↦ **201** Reset *align_state* at beginning of *init_align*. §774 F

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

110 ↦ **203** Set $cur\_cs \leftarrow 0$ 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 'link = max_halfword' will signal availability in TeX82.] §124 D

- *That was another bad one, it's not my night.*
- *At least I'm developing more subtle diagnostic techniques.*

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

185 ↦ **206** Initialize `\jpar` [i.e., `\tolerance`]. §240 F

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

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

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

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

211 Don't let *vpackage* lose the top insert. (It fails when the very first item is a `\topinsert`.) §1014 D

212 And when that stupid code is corrected, make it handle insertions first-in-first-out. §1018 A

- *Seven hours today.*

26 Mar 1978

- *Easter Sunday, will work till sunrise.*

213 Add an 'i' feature to the *error* recovery routine. §87 I

214 Include a prompt. §87 I

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

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

216 Make `INITEX` output *mem_top* for consistency checking. §1307 R

217 Calculate the size of delimiters by considering the enclosed formula's distance from the axis, not from the baseline. §762 A

- *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 ↦ **218** Don't put a new group on *save_stack* if a null mark is expanded. [TeX82 will remove the '}' from the mark text.] §386 D

- *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 `\vcenter` processing to the first pass of *mlist_to_hlist*; otherwise the height, depth, subscripts, etc., are way off. §733 A

220 Omit space after closing `$$`. §1200 C

- *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.]   §226 G

222 Introduce `\dispaskip` and `\dispbskip` [later called `\abovedisplayshortskip` and `\belowdisplayshortskip`].   §226 Q

 • *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*].   §93 I

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.]   §732 B

225 Make `\fntfam` obey group structure. [TEX78's `\fntfam` operation is a combination of TEX82's `\textfont`, `\scriptfont`, and `\scriptscriptfont`.]   §1234 C

 • *At this point the test routine for Volume 2 works perfectly.*

 • *But I will change the page width in order to check harder cases.*

178 ↦ **226** Disable automatic line breaks after punctuation in math (e.g., consider $f(x, y)$). §761 Q

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

 • *Eight hours today.*

228 Fix a bug that just clobbered the memory: Call *free_avail*, not *free_node*, in the *ins_node* case of *vpackage*. [This logic will change completely in TEX82.] §1019 B

29 Mar 1978

 • *(Wednesday) Again beginning at 2:30am.*

229 Put still more space above and below fraction lines in displayed formulas.   §746 Q

189 ↦ **230** Install an infinite penalty feature, which positively suppresses breaks; use it in displayed formulas whose `\eqno` doesn't fit.   §1205 G

231 Call *build_page* after finishing a display; and don't go to the `\noindent` routine because of the next remark.   §1200 F

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

 • *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 *fin_align*.   §801 F

25 ↦ **234** Fix bug when deleting space at end of paragraph: *delete_glue_ref*(*cur_node*) not *delete_glue_ref*(*value*(*cur_node*)).   §816 M

 • *There's also a more mysterious type of uncollected garbage, a fraction_noad corresponding to `$p\choose$`, an incompleat_noad 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 *search_mem* to search *eqtb* also.   §255 I

143 ↦ **236** Fix bug in *rebox* when *list_ptr*(*b*) = 0.   §715 D

 • *The seven one-word nodes were generated by this bug; rebox put them onto a linked list starting with mem*[0], *growing at the far end!*

237 Remember to complete each *incompleat_noad*.   §1184 D

 • *This solved the other mystery. I had never noticed that my test output was actually wrong: `$p\choose k$` came out as 'k'.*

 • *After these corrections, the test routine worked . . . I feel that TEX is now pretty well debugged (except perhaps for error recovery)—it's time to celebrate!*

1 Apr 1978

238 Don't quit after file lookup fails.   §530 I

2 Apr 1978

239 Add *TEX_font_area*, so that it's easier to change the default library area associated with a device.   §514 P

3 Apr 1978

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

14 May 1978

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

245 Make math in text end with spacing as if it were followed by punctuation. [This
rule will soon be rescinded.] §760 Q

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

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

17 May 1978

248 Fix a silly bug that hasn't been tweaked until today: '`\halign to size`'
[obsolete in TEX82] used *vsize* instead of *hsize*. §645 B

19 May 1978

249 Add a `\topbaseline` feature [later called `\topskip`]. §1001 G

245 ↦ **250** Subtract the math spacing change of May 14. §760 Q

251 Skip past blanks in the *scan_math* procedure. [This blank-skipping will even-
tually go into *scan_left_brace*.] §403 A

252 Introduce a *missing_brace* routine [later generalized] to improve error recovery
in *mmode + math_shift*, when the top of *save_stack* isn't a *math_shift_group*. §1065 I

253 Adjust the math spacing between closing parentheses and Ord, Op, Open,
Punct. §764 Q

254 Make the underline go further under. §735 Q

96 ↦ **255** Compute the proper natural width when a displayed equation follows a para-
graph whose fillglue has been deleted by *line_break*. §1146 S

20 May 1978

256 Fix the spurious value of *prev_depth* inside alignments. §775 A

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

221 ↦ **260** Change `\≤` to `\≥` and introduce `\≤` as the negative of `\≥`. [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 `$$\halign{...}$$`. §775 F

- *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 &'. §792 I

266 The top piece must be calculated mod 128 in *var_delimiter*, to guarantee a valid subscript range. [Obsolete in TEX82.] §546 R

252 ↦ **267** Fix a blunder in new *missing_brace* code. §1065 B

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

26 May 1978

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

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

110 ↦ **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 TEX78 is negated, because we need only distinguish `\cr` from `&`.] §789 R

271 Make the dimension parameters like `\hsize` all global, so that they can be set in the `\output` routine. §279 S

- *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. §435 R

- *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 ≥ 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: *push_input* should say '**if** *input_ptr* $\geq$ *stack_size* $\wedge$ *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 `\>` [namely, `\mskip\medmuskip`; TEX78 already has `\≳`, for conditional `\thinmuskip`, as well as the negative amounts `\<`, `\≲`]. Change the name of vector accent from `\>` to `\b`. [Math spacing operators will become much more general in TEX82.]   §716 C

25 Jul 1978

94 ↦ **315** Give the correct `\hsize` and `\vsize` to the null boxes created at `\end`.   §1054 Q

94 ↦ **316** And don't "append" them. [Later this was changed, so that it would work better with generalized output routines.]   §1054 A

297 ↦ **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 ↦ **319** Give better defaults to parameters. [Later done by `plain.tex`.]   §209 Q

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

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

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

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

28 Jul 1978

• *(I'm writing Chapter 27 of the manual: 'Recovery From Errors'.)*

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

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

326 Give the user extra chances to define the font, if *read_font_info* is unsuccessful. §560 I

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

328 Omit the `"Negative?"` message on things like *scan_char_num*.   §435 I

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

330 Give a more appropriate error message when the input is '`$\right`'.   §1192 I

• *Currently TEX says '`Missing $`'!*

331 Call *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 *hlist_out* and *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 `\ragged` parameter, to indicate a degree of raggedness. [Previously, ragged-right setting was performed when the `\tolerance`/100 was odd! Eventually a better approach, with `\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 de-
              pendent.]   §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

338 ↦ **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

320 ↦ **372** Make \tracing set \showboxbreadth as advertised.   §198 D

373 Account properly for kerns in width calculations of *line_break*.   §866 F

364 ↦ **374** Delete a *math_node* at the beginning of a line.   §148 Q

339 ↦ **375** Guarantee that \predisplaypenalty=10000 will suppress page breaking before a display.   §1005 A

6 Dec 1978

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

16 Jan 1979

365 ↦ **377** Initialize *negative* properly in the \advance routine with a \count as argument. §440 F

20 Jan 1979

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

17 Feb 1979

376 ↦ **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.]   F

22 Feb 1979

$363 \mapsto$ **382** Don't forget to return from *get_x_token* after finding \par.   §351   F

383 Add a new parameter: \lineskiplimit.   §679   Q

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

385 Introduce new names \hbox and \vbox for \hjust and \vjust.   §1071 C

386 Add a new condition: \ifpos. [It will later be generalized to \ifnum and \ifdim.]   §513   G

387 Add vu and \varunit. [TeX82 will eventually allow arbitrary internal dimensions as units of measure.]   §453   G

$312 \mapsto$ **388** Add an em unit.   §455   G

389 Legalize \hbox spread ⟨negative dimension⟩ [since *scan_spec* no longer uses the sign as a flag].   §645   C

10 Mar 1979

$370 \mapsto$ **390** Make *scan_toks* expand \count during \xdef. [This will change later when \the and \number are introduced.]   §367   C

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 \parfillskip, which is not yet user-settable, is being changed to be like \hfil instead of like \hfill.]   §816   Q

392 Treat the last line of a paragraph more consistently with the other lines (e.g., when \hfil appears in mid-paragraph), by effectively inserting *inf_penalty* at the end.   §816   Q

31 Mar 1979

393 Ensure that penalty nodes aren't wiped out, in weird cases where breaks occur at penalties that normally disappear.   §879   S

27 Apr 1979

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

395 Allow the *math_code* table to be changeable via \chcode. [In TeX82, \chcode will split into \mathcode and \catcode.]   §1232 G

$332 \mapsto$ **396** Don't accept 'e' after an error message if not inputting from a file.   §84   I

29 May 1979

397 Don't call *end_file_reading* if you haven't already invoked *begin_file_reading*; this could happen when trying to recover from an error in *start_input*. §537   F

7 Jun 1979

$306 \mapsto$ **398** Be sure to eject two pages, when \eject comes just at the time another break is preferable (e.g., when the page has just become too full).   §1005 A

27 Jun 1979

$354 \mapsto$ **399** Don't say 'You can't do that in math mode' when the user says '$$' in restricted horizontal mode!   §1138 I

30 Jun 1979

400 Add wd, dp, ht dimension units.   §455   G

$307 \mapsto$ **401** Don't try the system area for file names whose area is explicitly indicated. §537   I

1 Jul 1979

402 Allow letters as (ASCII) numbers [without the ' marker introduced later].   §442 G

2 Jul 1979

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

16 Jul 1979

320 ↦ **404** Update *show_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.   §259 S

- *To fix this, I either need to restrict TₑX (so that \gdef can be used inside a group only for control sequences already defined on the outer level) or need to change the hash table algorithm. Although all applications of TₑX known to me will agree to the former restriction, I've chosen the latter alternative, because it gives me a chance to improve the language: Control sequences of arbitrary length will now be recognized.*

423 Make sure that *unsave* cannot call *eq_destroy* with a value from the upper part of *eqtb*.   §282 D

- *I noticed this long-standing bug while fixing #422. It had very low probability of causing damage (e.g., it required a certain field of a floating-point number to have a certain value), but it would have been devastating on the day it first showed up!*

29 Aug 1979

424 Call *eq_destroy* when a control sequence is \gdef'ed after being \def'ed.   §283 F

418 ↦ **425** Treat the first token consistently when \topmark and its cousins are expanded in *scan_toks*.   §477 F

- *Now I've checked things pretty carefully and I think TEX is "fully debugged."*

25 Jan 1980

338 ↦ **426** Display runaway alignment preambles.   §306 I

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

7 Feb 1980

314 ↦ **428** Fix a glaring omission: Op space \> was never implemented in math mode!   §716 F

25 Feb 1980

429 Add a new dimension 'ex' (for units of xheight).   §455 G

3 Mar 1980

427 ↦ **430** Allow the control sequence \: to be redefined [it was the 'select font' operator]; this allows the character : to be active. [Obsolete.]   C

23 Mar 1980

- *An extend-TEX-for-the-eighties party:*

431 Add a new \copy feature.   §204 G

432 Add a new \unbox feature.   §1110 G

433 Add a new \open feature [later \openout].   §1351 G

434 Add a new \send feature [later \write].   §1352 G

435 Add a new \leqno feature, requested by MDS.   §1204 G

436 Add a new \ifdimen feature [later \ifdim].   §513 G

437 Make \⟨space⟩ in vertical mode begin a paragraph.   §1090 C

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

439 Add new \parval and \codeval features [later \the ⟨whatever⟩].   §413 G

427 ↦ **440** Don't let active characters gobble the following space.   §344 C

208 ↦ **441** Add a new parameter to govern amount of token list dumped. [Obsolete.]   §295 G

442 Add a new \linebreak feature [later replaced by \break].   §831 G

25 Mar 1980

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

443 Add a new \mskip feature.   §716 G

444 Add a new \newname feature (soon changed to \let).   §1221 G

430 ↦ **445** Allow any control sequence to be redefined.   §275 G

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

27 Mar 1980

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

28 Mar 1980

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

29 Mar 1980

222 ↦ **449** When a display follows a display, the second should have the 'shortskip' glue. §1146 Q

4 Apr 1980

445 ↦ **450** Look at current token meanings when trying to recognize \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 ↦ **452** Break long \send lines into pieces so that the file can be read in again. [System dependent.]   C

19 May 1980

182 ↦ **453** Don't make \left and \right delimiters too large; they need to be only 90% of the enclosed size. [This eventually became \delimiterfactor.]   §762 Q

21 May 1980

454 Add a new \pagebreak feature [later \vadjust{\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 \spaceskip and \parfillskip changeable.   §1228 G

458 Add a new parameter \rfudge (per request of Zippel) [later \mag].   §288 G

459 Add a new parameter \loose [later \looseness]; now parameters are allowed to take negative values.   §875 G

460 Remove the variable *just_par*. [Obsolete; it was the *real* equivalent of an *integer*].   E

14 Jun 1980

461 Install new line-breaking routines, including \parshape. (These major changes are introduced as Michael Plass and I write our article.)   §813 Q

462 Add a new parameter \exhyf [later \exhyphenpenalty].   §869 G

16 Jun 1980

444 ↦ **463** Change conventions in *eqtb* so that glue is distinguishable from other equivalents.   §275 S

444 ↦ **464** Don't expand \b in \xdef{\d\b{...}} after \let\d=\def. [Obsolete.]   A

444 ↦ **465** Avoid creating dead storage when doing *unsave* in certain regions.   §275 D

17 Jun 1980

466 Allow negative dimensions in rules.   §138 C

19 Jun 1980

463 ↦ **467** Make the new test for glue at the outer level of *show_eqtb*.   §252 B

27 Jun 1980

453 ↦ **468** Don't let \left and \right become too small for big matrices. [This eventually became \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 ↦ **470** Say '$\geq fz$' instead of '$> fz$' in the pre-hyphenation routine; I'd forgotten my definition of fz [a variable used to test for a sequence of lowercase letters in the same font].   §897 M

395 ↦ **471** Check the range of the index in \chcode before saving the old value.   §1232 R

18 Sep 1980

$457 \mapsto$ **472** Don't forget to increase the reference count to `\parfillskip`, or it will myste- riously vanish.   §816 D

19 Sep 1980

$412 \mapsto$ **473** Make leaders break like glue in both horizontal and vertical modes.   §149 C

$364 \mapsto$ **474** Make `\mathsurround` break properly at left and right end of lines.   §879 Q

13 Oct 1980

$461 \mapsto$ **475** Remove spurious overfull boxes generated when the looseness criterion fails. [Obsolete.]   I

$461 \mapsto$ **476** Redesign the iteration for looseness; breakpoints were not chosen optimally. §875 A

$461 \mapsto$ **477** Avoid storing a lot of breakpoints when they are dominated by others.   §836 E

$366 \mapsto$ **478** Don't say 'cur_node' when you mean '$mem[cur\_node]$'.   §1105 B

$461 \mapsto$ **479** Prefer the oldest break to the youngest break when two break nodes have the same total demerits.   §836 Q

$461 \mapsto$ **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

$366 \mapsto$ **486** `\unskip` is now allowed in internal vertical mode.   §1105 G

26 Jan 1981

$482 \mapsto$ **487** Don't say '$mem[q]$' when you mean 'q'. (See #143 and #478.)   §1009 B

27 Feb 1981

$417 \mapsto$ **488** Put some linefeeds back into the transcript file, in order to prevent overprinting in listings. [System dependent.]   I

489 Add a new `\dpenalty` 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

$422 \mapsto$ **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

$350 \mapsto$ **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.] §403 C

499 Issue an incomplete `\if` error, to help catch a bad `\if`. §336 I

17 Mar 1981

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

310 ↦ **501** Fix the spacing when there is a very tall subscript with a superscript. §759 Q

20 Mar 1981

371 ↦ **502** Make space-eating after `\else` fully consistent between the true and false cases. [Obsolete.] S

24 Mar 1981

496 ↦ **503** Change *glue_spec_size* to *ins_spec_size* in *vpackage* [where insertions are done]. [Obsolete.] B

5 Apr 1981

501 ↦ **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 ↦ **506** Don't consider *badness > threshold* at a line `\break` except in an emergency. §854 A

13 Jul 1981

402 ↦ **507** Allow other characters as numbers. §442 C

294 ↦ **508** Avoid dead storage if a *no_new_control_sequence* error occurs. [Obsolete.] §259 R

509 Add a new `\ifx` feature. §507 G

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

14 Jul 1981

507 ↦ **511** Amend the new code for constants; the '.' in '.5' is thought to mean ´056! §442 S

507 ↦ **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 L

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 `fil`, `fill`, and `filll` 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 ↦ **519** Fix *clean_box* so that *mlist_to_hlist* cannot make *link(q) = 0* and *type(q) = glue_node*. §720 S

- *[That was the historic final change to TEX78. All subsequent entries in this log refer to TEX82.]*

15 Jul 1982

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

X1 Change $eqtb[cur\_font]$ to $eqtb[cur\_font\_loc]$. §232 B

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

X2 Insert **begin** ... **end** around *dump_int* macro. §1305 L
X3 Print two blank spaces before date in *open_log_file*. §536 I
X4 Update x and *var_used* outside the **for** loop. §1311 A
X5 Change **if** = to **if** ≠ as loop exit condition. §1315, 1316 B

- *The* `TRIP` *test should preload more fonts.*

X6 Insert **begin** ... **end** around statistics output. §1334 L
X7 Must *get_x_token* when scanning a number. §445 F
X8 Interactive *debug_help* needs to print a newline. §1338 I
X9 Include *ignore_spaces* and *math_accent* in *print_cmd_char* cases. §266 F
X10 Don't call *confusion* when *print_cmd_char* sees unknown code. §298 I

- *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. §237, 699 R
X12 Say *cur_tok*, not *cur_val*, when you mean *cur_tok*. §440 T
X13 Make \pause effective also on first line of a file. §538 F
X14 Show context after online deletion. §88 F
X15 Bypass reference count when *debug_help* shows a token list. §1339 I
X16 Change 'case p' to 'case $type(p)$'. §1000 B
X17 Fix timing of *print_ln* when scrolling help messages. §90 F
X18 Make *other_char* the default category for ASCII control codes too. §232 P
X19 Use special scanning method for font number in *new_font*. §1257 A

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

X20 Don't forget to increase k in the **while** loop. §355 F
X21 Adjust *limit* properly after line changed when pausing. §363 D
X22 Remember to return a value in *new_spec* and *new_penalty*. §151, 158 F

- *Now stepping through line_break in simple case.*

X23 Don't prune unwanted nodes if $cur\_p = null$. §877 A
X24 Print a closing parenthesis when displaying glue nodes. §189 F
X25 Use *last*, not *limit*, in *term_input*; else error prompt causes trouble when $state = token\_list$. §71, 87 S
X26 Set $first \leftarrow limit + 1$ after *init_terminal*. §331 D
X27 Make sure *set_trick_count* is always performed. §317 D

17 Jul 1982

X28 Add new diagnostic feature \tracingcommands. §299, 1031 I

- *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 $passive \leftarrow null$. §864 F
X30 Fix pseudoprinting when the line is empty. §318 A
X31 Merge adjacent free areas of dynamic memory before dumping. §131 E
X32 Print the word mode in *print_mode*. §211 F

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_toks* 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 ↦ **X49** Show mode changes when tracing commands. §299 I
X50 Don't say **if** $(n = 0) \vee (\ldots \mathbf{div}\ n)$ 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** $k \leftarrow a$ **to** $b - 1$ when $b = 0$ if k is declared nonnegative. L
X55 Put '`=`' sign into the *format_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** $p > max \vee free[p]$ 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 `0pt 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*.   §328 F
  • *Time out 2105–2200 to pick up Jenny from driving lesson.*
X86 Keep $c \leq 127$ 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 ↦ **X89** Initialize *write_loc* from *cur_val*, not from *cs_ptr*.   §1344 D
X90 Remember to pack file name for \open.   §1374 F
X34 ↦ **X91** Defuse \outer test before scanning optional space after '}'.   §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 $p \leftarrow q$ 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 ↦ **X108** Adjust for singular or plural statistics.   §1320, 1334 I
X98 ↦ **X109** Consider *page_head* a glue node, to inhibit unwanted break.   §988 S
X110 Introduce *new_skip_param* to keep reference counts updated.   §679, 969, 1001 D
X111 Record the correct size of new insertion after it's split.   §1010 D
X112 Use *free_node*, not *flush_node_list*, when recycling insertion nodes.   §1022 D
X113 Make online insertions work after *get_next* is interrupted.   §87, 324, 343 S
X114 Print newline on interruption stop.   §98 B
X34 ↦ **X115** Put space before *end_write_token*.   §1371 S
X116 Don't confuse *glue_order* with *stretch_order*.   §838 B
X117 Set *max_dimen* ← '7777777777, not '777777777.   §421 T
X118 Make \global\textfont legal.   §1211 M
X119 Fetch \the\textfont with *equiv*, not *fam_font*.   §415 B
X120 Call *new_ligature*($f, l, \ldots$) not ($f, c, \ldots$).   §1035 B
X121 Make *show_box* work on random garbage.   §174, 177 R
X122 Count reference to *zero_glue* from *cond_math_glue*.   §1171 D

23 Jul 1982

	X123 Allow *avail* = *null* when undumping.	§1312	R
X110 ↦	**X124** Set *width*(*glue_ptr*(*p*)), not *width*(*p*).	§679	B
	X125 Put *begin_file_reading* inside the *start_input* loop.	§537	A
X116 ↦	**X126** Don't confuse *glue_stretch* with *stretch_order* [the previous fix went only half-way].	§838	B
	X127 Negate *x* when calculating badness of shrinkage.	§667, 678	B
X121 ↦	**X128** Remove dangling **else** that parses wrong.	§174	L
X28 ↦	**X129** Print newline before {, not after }, when tracing commands.	§299	I
	X130 Remove colon from overfull box messages.	§663, 675	I
X97 ↦	**X131** Compute *page_goal* properly when the first box arrives after inserts.	§1001	D
	X132 Don't confuse *page_size* [now *page_goal*] with *best_size*.	§1017	B
	X133 Put heldover insertions at front of contribution list.	§1023	A
X88 ↦	**X134** Output stats before closing DVI file, since the latter decreases *font_ptr*.	§1333	S
	X135 Don't call a \vbox an \hbox.	§674	T
	X136 Fix misplaced **end** caused by editing error.	§675	T

24 Jul 1982

	X137 Don't *eq_destroy* any paragraph shape when *par_shape* is null.	§275	D
	X138 Omit blank before \message at the beginning of a line.	§1280	I
X104 ↦	**X139** Don't try to split an insertion when *best_node* isn't the split one.	§1021	A
	X140 Correct another case of '**if** *x* ∧ *y*' misunderstood by Pascal.	§1021	L
	X141 Provide diagnostic info about insertions via \showlists.	§986	I
	X142 Add 'inside a group' to clarify a warning message.	§1335	I
	X143 Report *prev_depth* on a separate line in \showlists.	§219	I
	X144 Back up input to avoid unexpected clobberage of *cur_tok*.	§1090	S

- *Wow what a bug: new_graf calls build_page, which invokes the output routine, after which 'goto reswitch' is a disaster.*

	X145 Add insertion glue to *page_so_far* instead of subtracting it from the goal.	§1009	D
	X146 Put extra blank line before overfull box warning.	§660	I
	X147 Define break at kern consistently between horizontal and vertical lists.	§973, 1000	C
	X148 Renumber so that math nodes are nondiscardable.	§147	D
	X149 Correct the *char_kern* macro: #, not *f*.	§557	T
	X150 Decrease *l* after reconstituting discretionary break.	§916	F
	X151 Simplify the hyphen routine, knowing that *link*(*s*) = *null*.	§918	E
	X152 Initialize *r* ← *q* in discretionary destruction routine.	§883	F

25 Jul 1982

	X153 Don't add interline penalty after last line of paragraph.	§890	A
	X154 Adjust spacing in diagnostic messages.	§245	I
	X155 Avoid simultaneous use of *temp_head* by *prune_page_top* and the page builder.	§1017	D
	X156 Clear the *post_break* field of simple discretionaries.	§916	F
	X157 Split *offset* into independent variables *term_offset*, *file_offset*.	§54, 57, 58	A

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

5 Aug 1982

	X158 The '.err' file should be '.log' instead.	§534	I
	X159 Allow \special strings to contain more than 256 bytes.	§585, 1368	G
X99 ↦	**X160** Undo "correction" to a non-bug.	§1034	M
	X161 Suggest \& in help message for unexpected &.	§1128	I
	X162 Make 'E' a standard option for exiting.	§84	G
	X163 Restore the use of dead cycles à la TEX78.	§1024, 1054	G

- *The previous six changes were suggested during discussions with TEX82 class.*

X164 Fix global variable conflict between *open_log_file* and *new_font*. §1257 S
X165 Allow optional '=' 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-INITEX [later rescinded]. §950 L
X184 Watch out for empty token list when copying. §466 D
X185 Free unused reference count slot when defining \everypar. §1226 D
X163 ↦ **X186** Introduce \maxdeadcycles. §1012 G
 • *I believe the line_break routine has passed its test perfectly.*
X187 Don't put discretionary after - inside a discretionary. §1039 S
X188 Change '\minus' to '\minusthe' [this feature retracted later]. §413 C
X189 Change *cur_p* to *r* (three places). §875 B
X190 Increase range of *hc* to *halfword*; otherwise end-of-word mark might match a vacant entry in the trie. §892 A
X191 Initialize *b* in *shift_case* routine. §1288 F
X192 Don't back up if a space follows a decimal fraction. §452 E
X193 Don't confuse *glue_base* with *dimen_base*. §1145 B
X194 Guard against anomalous floating-point values in glue display. §186 L

8 Aug 1982

X195 Avoid infinite loop when \outer leads to runaways. §339 S
 • *I worked on that problem about two hours before fixing it.*
X196 Move final *debug_help* to *succumb*, except in batch mode. §93 I
X197 Insert kern after spanned box, to defeat access to floating point. §808 R

9 Aug 1982

X198 Include \leftskip and \rightskip in displayed equations [rescinded later]. §1199 C
X199 Trace line-break computations if *tracing_stats* > 2. §846, 856 I
X200 Keep *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

X203 Don't show glue setting if *glue_sign* = *normal*. §186 I
X204 Clear *glue_stretch* and *glue_shrink* when creating an unset box. §801 D
X205 Do *vpack* in hmode and vice versa when aligning. §804 B
X206 Remove fallacious call to *confusion* after alignment in display. §1206 A
X207 Don't test *mode* = *vmode* in display, test *nest_ptr* = 1. §1145 A
X208 Show an *inner_noad* as well as the other types. §690, 696 F
X209 Renumber *mu_glue* and *cond_math_glue* so that the glue display logic works. §149 D
X210 Don't confuse *cur_size* with *cur_style*. §703 B
X211 Advance $p \leftarrow q$ during second pass over mlist. §761 F
X212 Add helpful hint about `\tracingonline=1`. §1293 I
X213 Delete spurious statement left from sloppy editing. §710 T
X214 Change the subtype when *mskip* becomes *hskip*. §732 D
X215 Don't forget to use the remainder when computing math glue. §716 F
X199 ↦ X216 Improve paragraph diagnostics using *short_display*. §857 I
X199 ↦ X217 Introduce *artificial_badness* for better diagnostics. §854, 856 I

11 Aug 1982

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

12 Aug 1982

X199 ↦ X221 Install new format for showing break nodes. §846 I
● *I have been testing* line_break *and I think it's working fine.*
X222 Change q to p, in order to catch empty alignments. §812, 1206 B
X223 Disallow third part of discretionary in math mode. §1120 S
X224 Don't change *tail* if discretionary third part is empty. §1120 D
X225 Say `nonscript`, not `non_script`. §189 I
X226 Inhibit math if `\scriptfont3` is improper. §1195 S
X199 ↦ X227 Introduce `@firstpass` and `@secondpass` comments. §863 I
X228 Change p to r when you mean r. §1204 T
X108 ↦ X229 Say `page`, not `pages`, if there's only `1`. §642 I
X230 Insert space before [] on truncated `\showlists`. §182 I

28 Aug 1982

● *Back from vacation after having looked at hardcopy listing of* TRIP *test.*
X231 Allow `dm` as a unit [later `.5dm1` will be `.5\dimen1`]. §455 G
X108 ↦ X232 Singularize `prevgraf 1 lines`. §219 I
X233 Omit trailing zero count registers when showing completed page numbers. §638 I
X234 Avoid clobbering a by introducing a new local variable t. §986 L
X216 ↦ X235 Fix diagnostic printing of discretionaries. §858 D
X236 Don't show unset stretch/shrink that's zero. §185 I
X198 ↦ X237 Make `\halign` in displays consistent with other displays. (Namely, ignore `\leftskip` and `\rightskip` in nonaligned displays; respect the paragraph shape in aligned displays.) §800, 1199 C
X238 Parenthesize 'If you're confused ...'. §403 I
X239 Say '`\fraction`', not '`\xabovex`'. §697 I
X240 Remember to **return** when you should. §1153 F
X241 Use absolute value to make sure **div** is unambiguous. §737 P
X218 ↦ X242 Don't confuse depth with height. §709 B
X243 Use $delta - height$, not $height - delta$. §736 B
X244 Increase *shift_down* to increase the clearance. §745 B
X245 Don't back up after improper use of `\the`. §428 I

X246 Don't give 0pt as the default result when looking for *tok_val*. §428 I

X247 Initialize *second_indent* in the easy case. §848 F

X248 Package the equation number. §1204 F

X249 Don't resort to $v \leftarrow max\_dimen$ when glue doesn't stretch or shrink. §1148 Q

X250 Insert newline before showing current \botmark. I

X251 Call *error* after giving error message. §784 F

X252 Change implementation of \number; it should *scan_int*, not something internal. §471 A

X253 Introduce symbolic constants like *format_area_length*. §524 P

X254 Change *quit* to *jump_out*, since some compilers treat *quit* as a reserved word. §81 P

X255 Add more parentheses to get proper parsing. §1260 L

X256 Say please in order to be friendly (or at least polite). §360 I

X257 Don't confuse *cur_vcmd* with *cur_chr*. §508 B

X258 Use & instead of ! to specify a preloaded format. §1337 I

X177 ↦ **X259** Correct s3 to s4. §88 T

X260 Introduce new primitive \mathchardef, to save space and time. §1224 G

X261 Use the [] convention for noads as well as nodes. §692 C

X262 Correct spelling in call to *primitive*: \xatopx should be \xoverx [later renamed, thank goodness]. §1178 T

30 Aug 1982

X263 Don't fetch *link*(*null*) in malformed list. §175 R

X264 Initialize *align_state* at a better time so that *align_peek* doesn't see & or \span. §785, 791 S

X265 Outlaw preamble interfering with *align_state* = 0. §789 S

X266 Add level of grouping to alignment to tabskip locality. §774 C

X267 Check *align_state* when scanning ⟨u_j⟩. §783 F

X268 Move '*unsave*; *new_save_level*' from *main_control* into *fin_col*. §791, 1131 A

X180 ↦ **X269** Remember *cur_chr* when you're looking for optional '='. §1243 S

X270 Change q to r [in code now obsolete]. §804 T

X271 Disable interrupts during *back_error* so that help messages aren't clobbered. §327 I

X272 Introduce *slow_print* for printing control sequences. §60 S

X273 Initialize *del_code*(".") $\leftarrow 0$ for error recovery. §240 I

X274 Call *end_file_reading* before calling *check_outer_validity*. §362 S

X275 Don't delete an extra '}' when \par will help find a runaway. §395 I

31 Aug 1982

X276 Don't confuse *thin_muskip* with *thin_muskip_code*. §413 B

X266 ↦ **X277** Recover from error if new *align_group* ends abnormally. §1132 F

X278 Recover from error if \par occurs when *align_state* < 0. §1094 I

X279 Make \hskip\the\thinmuskip and \mskip\the\baselineskip erroneous. §413 C

X280 Add \muskip and \setmuskip analogs to skip and \setskip. §413, 1228 G

X281 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.*

X282 Delete reference to *last_glue* when a page is packaged. §1017 D

X283 Include *save_stack* in the *search_mem* debugging routine. §285 I

X284 Disallow \vfill in restricted horizontal mode. §1095 C

- *Most of the memory locations I thought were wasted were actually in good use.*
- *Total 192 hours (approx) debugging time so far since July 15.*

2 Sep 1982

- *Now looking at all zero counts in profile and extending* `TRIP`.

X285 Simplify the creation of `vtop` boxes.   §1087 E

X286 Set *space_factor* ← 1000 after `\hbox`.   §1076 C

X287 Introduce preamble into `DVI` format.   §617 P

X288 Give special *chr_code* to `\relax`.   §265 S

X289 Don't show '`(null)`' when token list is null, just show nothing.   §295 I

X290 Delete the procedure *write_name_string*, which is never used.   E

X291 Rename `\xabovex` to `\abovewithdelims`; do the same for `\xatopx` and `\xoverx`.
                                                                                   §1178 C

X292 Improve *clean_box* so that it recognizes cleanliness better.   §720 Q

X293 Report a `Missing delimiter` more meaningfully.   §1161 I

X294 Give *endv_token* a *chr* code of 128 so that it will end a file name.   §289 R

X295 Test present of math fonts *after* parsing an mlist, not before.   §1138, 1195 R

X296 Omit '`recent contributions`' and/or '`current page`' when they are empty.
                                                                              §218, 986 I

X297 Display what TEX has deleted after improper discretionary list has arisen. §1121 I

X298 Show what math character was undefined.   §723 I

X299 Improve the `Incompatible magnification` error; break it into two lines. §288 I

X300 Put new cases into *flush_node_list*, to recycle mlist noads.   §698 D

6 Sep 1982

X300 ↦ **X301** Insert a necessary '**goto** *done*' in that new material.   §698 F

- *It took two hours to diagnose that* **goto** *problem.*

X295 ↦ **X302** Change '2' to '3' in help message for extension fonts.   §1195 T

X303 Add a special note if material is being held over for the next output.   §986 I

X304 Divide before multiplying in *make_left_right*, to avoid overflow.   §762 R

X305 Introduce the *box_error* routine.   §992 I

X306 Clear *arith_error* after overflow has been reported.   §460 F

X249 ↦ **X307** Don't confuse *stretch* with *glue_stretch*.   §1148 B

X308 Set *glue_sign* ← *normal* when packaging with glue ratio zero.   §558, 664 D

X309 Test for overflow before attaching the sign.   §448 A

- *That all worked! Now trying* `min_quarterword` *negative.*

X310 Take absolute value before applying **mod** in *new_trie_op*.   §944 L

X311 Say $qi(c)$, not c, when testing `TFM` flags [now obsolete].   §573 L

X312 Initialize *token_ref_count*(*def_ref*) to *null*, not zero.   §473 L

X313 Change the type of *vsplit* parameter n from *quarterword* to *eight_bits*. §977 L

X314 Initialize *null-delimiter* different form *null_character*.   §685 L

X315 Insert qi twice in *scan_delimiter*.   §1160 L

X316 Insert qi in *scan_math*.   §1151 F

X317 Insert qo in *fetch*.   §722, 723 F

X318 Insert qi in *set_math_char*.   §1155 F

X319 Insert qi in *math_ac*.   §1165 F

X320 Insert qo in *mlist_to_hlist*.   §755 F

X321 Use brackets around 8-bit characters in *print_ASCII*.   §68 I

X322 Include *hyph_list* in the *search_mem* debugging routine.   §933 I

- *Now compiling non-*`INITEX` *to try an industrial-strength version.*

X323 Add **return** to *final_cleanup*, because some Pascal compilers insist that each
          label be used.   §1335 L

X324 Compute *par_token* when undumping.   §1314 D

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*.   §263 A
  • *All tests passed now! But when I played with the system I found another bug
    (undetected by* TRIP*):*

X333 Set $r \leftarrow s$ 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 TEXbook 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 '≠'. §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 pc = 35 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 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 '($base\_ptr = input\_ptr$) ∨ '; 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

X34 ↦ **560** Change *get_x_token* to *get_token* when scanning an optional space; then a construction like `\def\foo{...}\foo` won't complain that `\foo` is undefined. §443 C

- *This change was retracted when it was being debugged, because it could cause 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.]*

561 Make `\span` mean 'expand' in a preamble. §782 G

562 Use three separate **if** tests instead of '∧' in the inner loop of *get_next*, to gain efficiency. §342 E

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

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

564 Move conditional statements from the semantics ('stomach') part of TEX to the syntax ('mouth') part, by introducing '`\fi`'. Also introduce `\csname` and `\endcsname`. §372, 489–500 C

- *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

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

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

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

2 Dec 1982

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

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

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

7 Dec 1982

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

8 Dec 1982

571 Try *off_save*, if `\par` occurs in restricted horizontal mode. (This avoids embarrassment if TEX says 'type a command or say `\end`', then when you type `\end` it says you can't!) [However, I soon retracted this change.] §1094 I

21 Dec 1982

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

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

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

23 Dec 1982

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

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

577 Allow commas as alternates to radix points, for Europeans. §438 C

578 Change `\hangindent` to a normal dimension parameter. [It had been a combination of `\hangindent` and `\hangafter`, with special syntax.]   §247 C

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

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

- *I'm typing Chapter 14 while making these changes.*

24 Dec 1982

581 Use *back_input* instead of **goto** *reswitch* when inserting `\par`, because `\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 `\openin` doesn't find a file.   §1275 I

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

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

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

26 Dec 1982

586 Add an *if_line_field* to the condition stack entries, so that more informative error messages can be given.   §489 I

549 ↦ **587** Introduce a *normal_paragraph* procedure, since initialization is needed also within `\insert`, `\vadjust`, `\valign`, `\output`.   §1070 D

27 Dec 1982

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

X199 ↦ **589** Introduce `\tracingpages`, allowing users to see page-optimization calculations. Also split `\tracingparagraphs` off from `\tracingstats`.   §987, 1005, 1011 I

- *The changes above have been incorporated into Version 0.91 of TEX.*

31 Dec 1982

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

564 ↦ **591** Make `\ifodd1\else` legal by introducing *if_code*.   §489 S

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

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

- *The changes above have been incorporated into Version 0.92 of TEX82, which was the last version of 1982, completed at 11:59pm on December 31.*

3 Jan 1983

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

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

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

4 Jan 1983

541 ↦ **596** Use the `\boxmaxdepth` that's declared inside a `\vbox` when packaging it.   §1086 C

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

594 ↦ **598** Make `\deadcycles` accessible to users.   §1246 G

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

- *The changes above have been incorporated into Version 0.93.*

6 Jan 1983

600 Add *push_math* to handle a case where I forgot to clear *incompleat_noad*. (This long-standing bug was unearthed today by Phyllis Winkler.)   §1136 D

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

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

7 Jan 1983

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

9 Jan 1983

604 Distinguish between implicit and explicit kerns.   §155, 896 Q

605 Change the name \ignorespace to \ignorespaces.   §265 C

560 ↦ **606** Don't omit a blank space after \def, \message, \mark, etc.; the previous hodge-podge of rules is impossible to learn.   §473 C

- *The above changes appear in Version 0.94.*

12 Jan 1983

- *Beginning to write the chapters on math today.*

607 Add a new feature: active characters in math mode.   §1151 G

15 Jan 1983

608 Fix a surprise bug: '$1-$' treated the - as binary.   §729 A

609 Initialize *space_factor* inside discretionaries.   §1117 D

16 Jan 1983

610 Fix an incredibly embarrassing bug: I forgot to update *spotless* in the *error* routine!   F

- *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 *fast_get_avail* and *fast_store_new_token*; reduce procedure-call overhead in *begin_token_list*, *end_token_list*, *back_input*, *flush_node_list*; change some tests from 'if $a \wedge b$' to 'if a then if b'.   §122, 371 E

22 Jan 1983

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

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

545 ↦ **627** Make \nullfont a primitive, so that *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 \if's when the job ends.   §1335 I

29 Jan 1983

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

30 Jan 1983

625 ↦ **630** Be sure to test '*is_char_node*(*q*)' when checking for a trivial box.   §721 D
 • *By extraordinary coincidence, this bug was caught when somebody used font number 11 (= kern_node) in the second character of a list of length 2!*

X168 ↦ **631** Improve format for stats at end of run, as suggested by DRF.   §1334 I
 • *The changes above have been incorporated into Version 0.95.*

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

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

3 Feb 1983

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

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

6 Feb 1983

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

12 Feb 1983

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

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

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

640 Don't let \spacefactor become more than 2^{15}.   §1233, 1243 R
 • *I finished drafting Chapter 17 today.*

14 Feb 1983

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

619 ↦ **642** Don't forget *char_given* in the *math_accent* routine.   §1124 F

17 Feb 1983

622 ↦ **643** Switch modes when \halign occurs in horizontal mode, or \valign in vertical
mode.   §1090, 1094 C

18 Feb 1983

644 Add a new feature \tracingrestores. This requires a new procedure called
show_eqtb, whose code can be interspersed with the *eqtb* definitions.   §252 I

25 Feb 1983

622 ↦ **645** Suggest using \leaders when the user tries a horizontal rule in restricted hor-
izontal mode.   §1095 I

27 Feb 1983

646 Specify the range of source lines, when giving warning messages for underfull
or overfull boxes in alignments.   §662, 675 I

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

4 Mar 1983

647 Introduce a new feature \xcr (suggested by LL). [Changed later to '\crcr'.]   §785 G

631 ↦ **648** Subtract out TEX's own string requirements from the stats.   §1334 I

6 Mar 1983

649 Add new features \everyhbox and \everyvbox.   §1083, 1167 G

9 Mar 1983

X295 ↦ **650** Avoid accessing *math_quad* when the symbol fonts aren't known to be present. §1199 R

533 ↦ **651** Introduce *float* and *unfloat* macros to aid portability (HWT).   §109 P

652 Introduce new names \abovedisplayskip and \belowdisplayskip for the old
\dispskip; also \abovedisplayshortskip and \belowdisplayshortskip for
the old \dispaskip and \dispbskip.   §226 C

10 Mar 1983

653 Unbundle \romannumeral from \number (suggested by FY).   §468 C

12 Mar 1983

654 Ignore leading spaces in *scan_keyword*.   §407 C

14 Mar 1983

631 ↦ **655** Use *write* and *write_ln* directly when printing stats.   §1334 E

16 Mar 1983

602 ↦ **656** Refine the page-break cost function (introducing '*deplorable*', which is not quite
'*awful_bad*'), after suggestion by LL.   §974, 1005 Q

• *The changes above have been incorporated into Version 0.96.*

18 Mar 1983

657 Add a new feature \everyjob suggested by FY.   §1030 G

19 Mar 1983

658 Don't treat left braces specially when showing macros.   §294 I

659 Ignore blanks that would otherwise become undelimited arguments.   §393 C

21 Mar 1983

X280 ↦ **660** Make \lastskip handle *mu_glue* as well as ordinary glue.   §424 F

561 ↦ **661** Expand only one level in a preamble \span.   §782 C

22 Mar 1983

662 Let a single # suffice in \tokens, \message, etc. (The previous rule, in which
was always required as in macros, was a loser especially in \write where
you had to say ####!)   §477 C

X328 ↦ **663** Require the keyword 'to' in \read. (This will avoid the common error of an incomplete constant when no space appears before the \cs.) Also allow terminal I/O as a default when a stream number is out of range. §482, 1225, 1370 C

26 Mar 1983

664 Replace \ifeven⟨countnumber⟩ by \ifodd⟨number⟩, for better consistency of language.   §504 C

564 ↦ **665** Introduce the *change_if_limit*, to overcome a big surprise bug relating to \if\if aabc\fi.   §497 S

- *Such examples show that cur_if might not be current, in my original implementation.*

28 Mar 1983

X326 ↦ **666** Tolerate non-characters as arguments to \if and \ifcat.   §506 G

667 Change 'absent' to 'void', a better word.   §487 C

668 Clear the *shift_amount* in \lastbox, since I don't want to figure out what it means in all cases.   §1081 C

29 Mar 1983

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

1 Apr 1983

- *Today I finished Chapter 21 (boxes) and began to draft Chapter 22 (alignments).*

670 Allow periodic preambles in alignments.   §793 G

671 Make \leaders line up according to the smallest enclosing box.   §627, 636 C

672 Allow hyphenation after whatsits (e.g., after items for an index).   §896 Q

2 Apr 1983

673 Call *build_page* when \par occurs in vertical mode.   §1094 Q

674 Clear *aux* in *init_row*, for tidyness.   §786 C

4 Apr 1983

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

7 Apr 1983

602 ↦ **676** Refine the test for not splitting an insertion.   §1008 Q

8 Apr 1983

647 ↦ **677** Rename \xcr as \crcr, at LL's request.   §780 C

9 Apr 1983

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

11 Apr 1983

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

12 Apr 1983

X328 ↦ **679** Make \read span several input lines, if necessary to get balanced braces. §482 C

14 Apr 1983

680 Fix a subtle bug found by JS: §882 can make *q* a *char_node*, so we need to test '**if** ¬*is_char_node*(*q*)'. [Actually I discovered much later that the real bug was to omit '**else**' at this point.]   §881 S

15 Apr 1983

681 Make \uppercase and \lowercase apply to all characters, regardless of category.   §1289 C

- *7:30am. After working all night, I completed a draft of the manual thru Chapter 22, for distribution to volunteer readers.*
- *5pm. The changes above have been incorporated into Version 0.97.*

17 Apr 1983

682 Change '*small_number*' to '$0 \ldots 65$' 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 ↦ **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 ↦ **686** 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

687 Introduce new parameters `\hoffset`, `\voffset`. §617 G

24 May 1983

688 Introduce a new parameter `\everycr` (suggested by MDS). §774, 799 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 ↦ **695** 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 ↦ **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 ↦ **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.*

702 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.   §796, 888, 1085 G

<center>**6 Jun 1983**</center>

695 ↦ **703** Replace (and generalize) the previous uses of ht, wd, and dp in dimensions by introducing the new control sequences \ht, \wd, and \dp.   §1247 G

704 Display sub-parts of noads with the symbols ^ and _ instead of (and [.   §696 I

694 ↦ **705** Allow A..F in hex constants to be *other_char* as well as *letter*.   §445 C

<center>**7 Jun 1983**</center>

654 ↦ **706** Remove an instance of ⟨Scan optional space⟩, since it's now redundant.   §457 E

707 Legalize \mkern\thinmuskip and \mkern5\thinmuskip.   §456 C

708 Clean up the treatment of optional spaces in numerical specifications.   §455 C

- *A construction like 2.5\space\space\dimen0 was previously valid after 'plus' or 'minus' only!*
- *I'm obviously working on Chapter 24 today.*

545 ↦ **709** Allow '\font' as a ⟨font identifier⟩ for the current font.   §577 C

623 ↦ **710** Don't make \gdef global when *global_defs* < 0.   §1218 C

711 Produce *zero_glue* as the outcome of \advance\spaceskip by-\spaceskip.   §1229 E

712 Make \show do something appropriate for every possible token.   §1294 I

559 ↦ **713** Replace the (single) \tokens parameter by an array of 256 token registers.   §230 G

714 Allow \indent in math mode; also make \valign in math mode produce the 'Missing $' error.   §1046, 1093 C

715 Remove redundant code: There's no need to check *cur_group* or call *off_save* when starting alignments or equation numbers in displays.   §1130, 1142 E

<center>**8 Jun 1983**</center>

716 Disallow \openout-1 and \closeout-1.   §1350 C

717 Disallow \lastbox in math mode.   §1080 C

<center>**9 Jun 1983**</center>

718 Call *back_error*, not *error*, when \leaders aren't followed by proper glue.   §1078 I

719 Initialize for a possible paragraph, after \noalign in a \valign.   §785 D

<center>**10 Jun 1983**</center>

708 ↦ **720** Expand the optional space after an ASCII constant.   §442 C

<center>**12 Jun 1983**</center>

721 Set *space_factor* ← 1000 after a rule or a constructed accent.   §1056, 1123 C

<center>**14 Jun 1983**</center>

722 Correct a serious blunder: Set *disc_width* ← 0 before testing if *s* is null (caught by JS).   §869 D

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

708 ↦ **723** Make optional spaces after ⟨dimen⟩ like those after ⟨number⟩.   §448 C

568 ↦ **724** Insert *every_display* before calling *build_page*.   §1145 C

648 ↦ **725** Report TeX's capacity on overflow errors in a way that's fully consistent with other statistical reports.   §42 I

<center>**17 Jun 1983**</center>

726 Make all \tracing decisions on the basis of ≥ versus <, not ≠ versus =.   §581 C

- *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 ↦ **728** Call *normal_paragraph* when \par occurs in vertical mode.   §1094 C

 • *Once again I'm retiring about 8am and awaking about 4pm.*

21 Jun 1983

558 ↦ **729** Don't append an overfull rule solely because of \hbadness.   §666 C

730 Don't allow the glue-ratio of shrinking to be less than −1.   §810, 811 R

22 Jun 1983

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

690 ↦ **732** Make the keyword 'by' optional (suggested by LL).   §1236 C

24 Jun 1983

733 Say 'preloaded' when announcing *format_ident*.   §1328 I

25 Jun 1983

734 Add extra boxes and glue to the output of alignment. [This thwarts possible
         attempts at trickery by which system-dependent glue set values computed
         by \span could have gotten into TEX's registers by things like \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* WEB
   programs (suggested by DRF).

28 Jun 1983

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

1 Jul 1983

700 ↦ **737** Avoid redundant boxes when things like '{\bf A}' occur in math.   §1186 E

738 Add a 'scaled' feature to \font input.   §1258 G

700 ↦ **739** Remember to correct *delta* when an accented box changes.   §742 D

2 Jul 1983

740 Introduce *bypass_eoln*, 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 ↦ **748** Don't forget to check *global_defs* when \tabskip is changed.   §782 F

12 Jul 1983

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

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

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

13 Jul 1983

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

16 Jul 1983

• *The following were suggested by TUG meeting discussions.*

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

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

754 Add a new feature \newlinechar.   §59 G

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

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

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

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

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

17 Jul 1983

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

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

672 ↦ **762** Allow 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.*

25 Jul 1983

663 ↦ **767** Allow space after 'to' in the \read command (FY).   §1215 C

• *To bed at 1pm today.*

27 Jul 1983

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

• *To bed at 2pm today.*

29 Jul 1983

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

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

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

31 Jul 1983

766 ↦ **770** Call *update_terminal* when going quiet (HWT).   §86   I

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.)   §362   C

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

16 Aug 1983

665 ↦ **772** Rectify a ridiculous gaffe: I initialized *q* every time the loop of *change_if_limit*
was performed! (Found by FY.)   §497   B

648 ↦ **773** Distinguish 'string' from 'strings' when reporting statistics.   §1334   I

774 Introduce *lx*, to correct a bug in \xleader computations (found by FY).   §627   A

20 Aug 1983

775 Don't forget to apply \/ to ligatures.   §1113   F

- *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.   §1339   I

777 Remove redundant setting and resetting of *name_in_progress*.   §531   E

618 ↦ **778** Suppress \input during a font size spec; otherwise *cur_name* is clobbered
(found by MDS).   §1258   S

779 Introduce new conditionals \ifhbox and \ifvbox.   §505   G

29 Aug 1983

750 ↦ **780** Test for an empty list, if emptiness will mess up the data structure. (Found by
Todd Allen.)   §478   D

624 ↦ **781** Use *fast_store_new_token* in another place for efficiency.   §466   E

782 Say 'has only' instead of 'has'.   §579   I

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

30 Aug 1983

783 Make funny blank spaces showable.   §298   C

31 Aug 1983

754 ↦ **784** Make \newlinechar affect *print_char*, not just *print*.   §58   C

4 Sep 1983

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

- *OK, Appendix D is finished!!*
- *The above changes have been installed in Version 0.999999.*

17 Sep 1983

548 ↦ **786** Don't bother making duplicate font identifiers; that was overkill, not really
needed.   §1258   P

- *Will this be the historic last change to TEX?*

18 Sep 1983

787 Correct a minor inconsistency, 'display' not 'displayed'.   §211   I

20 Sep 1983

604 ↦ **788** Treat the kerns inserted for accents as explicit kerns.   §1125   C

26 Sep 1983

789 Change 'log' to 'transcript' in several messages.   §535, 1335   I

- *The index was finished today; I mailed the entire TEXbook to Massachusetts
for final proofreading before publication.*

1 Oct 1983

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

7 Oct 1983

- *Henceforth our weekly 'TEX lunch' meetings will be called 'METAFONT lunch'.*
- *DRF begins to produce The TEXbook on our APS phototypesetter.*

14 Oct 1983

633 ↦ **791** Ignore spaces at the ends of lines also in TEX.POOL (found by DRF). §52 P

610 ↦ **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 ↦ **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). §500 F

- *Version 1.0 released today incorporates all of the above.*

9 Dec 1983

- *Dinner party with 36 guests to celebrate TEX's coming of age.*

2 Feb 1984

786 ↦ **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 METAFONT 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...xxxdxxxdxxx} anomaly
found by Jacques Désarménien.   §962 R

11 Apr 1984

808 Supply code for the missing case *adjust_node* in *copy_node_list*.   §206 F
 • *Yoicks, how could serious bugs like that have escaped detection?*

11 Jun 1984

627 ↦ **809** Initialize *char_base*, etc., for *null_font*. (Found by Nick Briggs.)   §552 D
810 Clear the *buffer* array initially (Briggs).   §331 R

21 Jun 1984

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

4 Jul 1984

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

7 Jul 1984

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

8 Jul 1984

814 Give additional diagnostics when \tracingmacros>1.   §323 I
 • *The changes above were incorporated in Version 1.1, released July 9, 1984.*

27 Jul 1984

815 Say 'see the transcript file' after handling offline \show commands. (Sug-
gested by METAFONT.)   §1298 I

20 Oct 1984

816 Allow '0' in response to error prompts.   §84 I
 • *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.)   §846 R
818 Ditto in another place!   §939 R
819 Remove the fixed-at-compile-time partition between lower and upper memory.
§116, 125, 162 E
 • *This major change in memory management completes Version 1.3, which was
published in preliminary looseleaf form as 'TeX: The Program'.*

20 Dec 1984

820 Keep the *node_size* field from overflowing if the lower part of memory is too
large.   §125 R
 • *That was another bug in existence from the beginning!*

5 Jan 1985

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

7 Jan 1985

822 Update the terminal right away so that the welcoming message will appear as
soon as possible (DRF). §61 I

23 Jan 1985

823 Convey more uncertainty in the help message at times of *confusion*. §95 I

610 ↦ **824** Improve the *history* logic in the *warning_issued* case. §245 I

18 Feb 1985

810 ↦ **825** Stick to standard Pascal: Don't use *first* in a **for** loop. [Some procedures
"threaten" it globally, according to British Standard 6192, section 6.8.3.9.]
(Pointed out by CET.) §331 P

11 Apr 1985

826 Prevent nonexistent characters from being output by unusual combinations of
ligatures and hyphenation. §915 S

15 Apr 1985

819 ↦ **827** Compute memory usage correctly in INITEX; the previous number was wrong
because of a WEB text macro without parentheses (DRF). §164 L

16 Apr 1985

828 Speed up *flush_list* by not calling *free_avail* (DRF). §123 E

17 Apr 1985

788 ↦ **829** Introduce a special kind of kern for accent positioning; it must not disappear
after a line break. §837, 879, 1125 A

18 Apr 1985

755 ↦ **830** Prevent \lastbox and \unkern from removing discretionary replacements.
§1081, 1105 R

• *That completes Version 1.4.*

26 Apr 1985

831 Don't try T_EX_area if a nonstandard file area has been specified (DRF). §537 C
• *That was #401 in T_EX78; I never learn!*

30 Apr 1985

754 ↦ **832** Eliminate the limitation on \write length; the reason for it has disappeared
(Nancy Tuma). §1370 C

8 May 1985

819 ↦ **833** Allocate two words for the head of the *active* list (CET). §162 D

11 May 1985

834 Change *wterm* to *wterm_ln* after a bad beginning (Bill Gropp). §1332 I

806 ↦ **835** Don't open the terminal twice (CET). §1332 E

22 May 1985

836 Test for *batch_mode* after trying to open the transcript file, not before (DRF). §92 R

837 Be prepared for string pool overflow while reading the command line! (This
bug was first found in METAFONT, when it could occur more easily.) §525 R

7 Aug 1985

838 Fix a bug in \edef\foo{\iffalse\fi\the\toks0}: T_EX should stay in the
loop when expanding non-\the. (Found by Dan Brotsky.) §478 A
• *The above changes were incorporated in Version 1.5.*

27 Nov 1985

764 ↦ **839** Make 'plain' a lowercase name, for consistency with the manual. §521 C

669 ↦ **840** Wake up the terminal for \show commands. §1294, 1297 I

- *The above changes were incorporated in Version 2.0, which was published as Volume B of the Computers & Typesetting series.*

15 Dec 1986
841 Punctuate the Poirot help message more carefully.   §1283 I

28 Jan 1987
842 Make sure that *max_in_open* doesn't exceed 127 (DRF).   §14 R

680 ↦ **843** Don't allow a \kern to be clobbered at the end of a pre-break list when a discretionary break is taken. (A missing '**else**' was the source of the error, diagnosed incorrectly before.)   §881 D

844 Take account of discarded nodes when computing the background width after a discretionary.   §840 D

- *That was the first really serious bug detected for more than 17 months! I found it while experimenting with right-to-left extensions.*
- *Version 2.1 was released on January 26, 1987.*

5 Feb 1987
845 Remove cases in *shorthand_def* that cannot occur (found by Pat Monardo).   §1224 E

14 Apr 1987
846 Improve robustness of data structure display when debugging (Ronaldo Amá).
                §174, 182 R

21 Apr 1987
847 Make the storage allocation algorithm more elegant and efficient.   §127 E

22 Apr 1987
742 ↦ **848** Calculate the empty-line condition properly when *end_line_char* 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$$\halign{...\cr\noalign{\hrule}}$$.   §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).   §952 B

- *That error was almost completely harmless, thus undetectable, except if some \lccode is 1 and no \patterns are given.*

23 Dec 1987
564 ↦ **856** Be more cautious when "relaxing" a previously undefined \csname; you might be inside a group (CET).   §372 S

20 Apr 1988

857 Make sure *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 major new ligature capabilities including implicit boundary characters. §908, 1037 G
882 Install new \inputlineno feature suggested by MDS. §424 G
883 Install new \holdinginserts feature suggested by FM. §1014 G
884 Install new \badness feature. §424, 664 G
885 Install new \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 ↦ **890** Prevent *save_stack* conflicts in {\hbox\expandafter{\csname\endcsname}} and similar constructions (WGS). §645, 1117 S
858 ↦ **891** System-dependent parts of file names must be addressed relatively, not absolutely (FM and Rainer Schöpf). §516, 517 S

3 Dec 1989

880 ↦ **892** Allow different hyphenmins in the same paragraph (M. Ferguson). §1376 G
893 Distinguish \par from characters on \if tests. (MVL). §334 S
378 ↦ **894** Alignments need to be more robust against malicious attacks (MVL). §782 S
895 Don't let kerns in discretionaries disappear at breaks (MVL). §869 C
881 ↦ **896** Make the new hyphenation reconstruction procedure less cautious, so that it doesn't lose hyphens found by the old method. §914 Q

11 Dec 1989

879 ↦ **897** Make an undumped trie dumpable again (PB). §1325 D

18 Dec 1989

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

22 Jan 1990

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

29 Jan 1990

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

1 Feb 1990

878 ↦ **901** Fix one more case of *end_line_char_inactive* (WGS). §360 S

22 Feb 1990

902 Don't lose the last active node when total demerits are very high (FM). §836, 854 R

13 Mar 1990

903 Doublecheck math fonts after making equation number (MVL). §1194 D
904 Don't forget to rule out charnodes before testing *type* (MVL). §805, 1202 D

23 Mar 1990

$881 \mapsto$ **905** Don't change the font of punctuation preceding a hyphenated word (Scott C. Allendorf). §903 F

906 Balance the parentheses shown on the terminal during normal runs. §1335 I

907 Optimize `\ifx\p\q` after `\let\p=\q` (MVL). §508 E

908 Treat migration properly in displays (MVL). §1199, 1205 S

- *We're now up to Version 3.0; I sincerely hope all bugs have been found.*

11 May 1990

$881 \mapsto$ **909** Initialize `\nullfont` ligature parameters (Lance Carnes). §552 F

22 July 1990

$579 \mapsto$ **910** Treat `\prevgraf` as zero within `\write` (Bogusław Jackowski). §422 S

26 July 1990

911 Report '1.1' when first line of file overflows buffer (George Russell). §538 S

5 December 1990

$878 \mapsto$ **912** Translate unprintable characters in font identifiers (WGS). §63 S

28 December 1990

913 Avoid range check when there are 65536 or more pages (Eberhard Mattes). §642 R

20 September 1991

$878 \mapsto$ **914** Improve error message for `\mathchar` out of range. §436 I

$878 \mapsto$ **915** Retain unprintable internal strings in 8-bit form (FM). §59 S

$881 \mapsto$ **916** Retain right punctuation context for ligature reconstruction (problem found by Brian Hamilton Kelly). §903 S

10 January 1992

$881 \mapsto$ **917** Also avoid producing a double kern at boundary (CET). §897 S

918 Disallow `\setbox` where it doesn't work (Robert Hunt). §1241, 1270 S

919 Robustify `\mskip` and `\mkern` in presence of negative quad (WGS). §716, 717 S

$679 \mapsto$ **920** Defend against '}{' in `\read` (Michael Downes). §483 S

$798 \mapsto$ **921** Save string memory if font occurs repeatedly (Bogusław Jackowski). §1260 E

$784 \mapsto$ **922** Don't let `\newlinechar` interrupt unprintable expansion (Bernd Raichle). §59, 60 S

7 February 1992

$881 \mapsto$ **923** Restore `cur_l` properly when boundary character doesn't exist (Mattes and Raichle). §1036 D

17 July 1992

$892 \mapsto$ **924** Use current language at beginning of horizontal mode (Rainer Schöpf and CET). §1091, 1200 C

17 December 1992

$879 \mapsto$ **925** Avoid (harmless) range errors (Philip Taylor and CET). §934, 960 R

25 February 1993

$881 \mapsto$ **926** Protect kerns inserted by boundary characters (William Baxter). §837, 866 C

$917 \mapsto$ **927** Don't let boundary kern disappear after hyphenation. §897 S

26 June 1993

$668 \mapsto$ **928** Avoid potential future bug (Peter Breitenlohner). §628, 637 R

17 December 1993

$881 \mapsto$ **929** Boundary character representation shouldn't depend on the font memory size (Berthold Horn). §549, 1323 S

10 March 1994

930 Huge font parameter number may exceed array bound (CET). §549 R

4 September 1994

$926 \mapsto$ **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

$255 \mapsto$ **935** \xleaders often drops the final box (Hiroshi Nakashima).   §627, 636 A

30 August 2001

789 Don't allow a million unbalanced braces followed by \cr outside of any align-
ment (Ralf Roth).   §789 R

790 Don't allow end-template except at end of template (Roth).   §325, 1131 R

30 September 2002

791 Improve rounding of glue during output (M. F. Bridgland).   §625, 634 Q