

**A Font and a Style for Typesetting Chess using L<sup>A</sup>T<sub>E</sub>X or T<sub>E</sub>X**

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The Berkeley Font Catalogue [3] demonstrates how a chess font in combination with troff can be used to typeset chess diagrams. This article has inspired me to build a chess font with METAFONT from the nice font, see diagram 1, I once bought from Schaakhuis De Haan (Arnhem, The Netherlands). This ‘font’

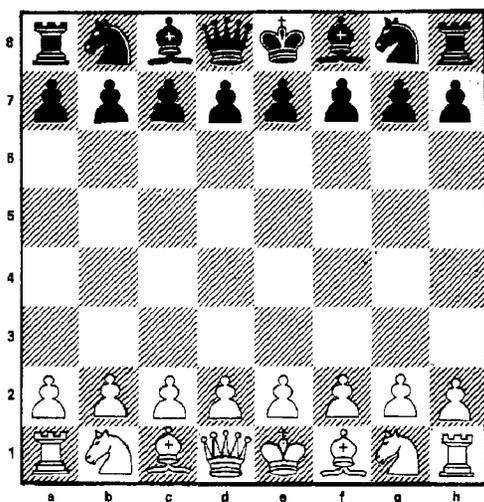


Diagram 1: Original font  
(original size of board 9 × 9 cm)

consists of a set of chess boards and separate sets of chess pieces. The pieces have to be pasted on the board after pulling them from a sheet of paper. This nowadays is still common practice for publishers. Before I used METAFONT I made enlargements of the pieces on graph-paper using my stereo microscope for which I have a drawing prism. This graph-paper makes it easy to read the coordinates of points that need to be given to METAFONT. For the development of the font I have used AmigaMETAFONT which has graphical support. The design of the chess style has been done with AmigaT<sub>E</sub>X. Both programs run comfortably on my private Amiga1000 with 2.5 Megabytes of internal memory.

A chess font consists of 26 characters, with one character for the empty light square and one for the empty dark square. For each chess piece (Pawn, kNight, Bishop, Rook, Queen, King) there are four characters to represent that piece (White, Black) on both squares (light, dark). The troff chess font has also extra characters for the border of the board. These borders are added by the chess diagram macros as horizontal and vertical rules in my

P		O		p		o		O	
N		M		n		m		Z	
B		A		b		a			
R		S		r		s			
Q		L		q		l			
K		J		k		j			

Table 1: Character encodings of chess10

approach. Table 1 shows all characters from font chess10 (the size of a square being 10 points).

There is an extra font chessf10 that contains only the so-called chess figurines (King, Queen, Rook, Bishop, kNight). With this font the move 25. N5×g3, in short algebraic notation, can be typeset as 25. ♖5×g3. In addition to chess10 there are chess20 and chess30. The 20-point version is used in the chess style because the diagrams made with it fit nicely in a twocolumn A4 page. But it would be easy to make another size font by changing only one parameter.

The king has given me the biggest trouble to METAFy. If you compare the original font with my METAimitation, you will see a few differences. For one thing, the chess board has no labels for rows and lines. These can be added to the diagram macros if desired. The pieces in the original font use shadings to get a better contrast with the dark squares. The rest of the differences have to be ascribed to my insufficient knowledge of METAFONT.

I have long hesitated to publish my METACopies of the chess font in TUGboat. I have seriously tried to find the designer or owner of the original font. According to the Dutch firm that has taken over Schaakhuis De Haan, I could safely publish them because the fonts are not sold any longer. I hope this article helps in finding the designer of this very nice chess font and that he is not upset with my METACopy of it.

Having a nice set of chess fonts is one thing; typesetting chess using them is another thing. When I accepted the editorship of our ‘Schaakmaatje’, as my chess club ‘Schaakclub Geldrop’ calls its chess magazine, I used T<sub>E</sub>X and some macros to typeset chess diagrams. After giving the L<sup>A</sup>T<sub>E</sub>X course at our Computer Center, I definitely wanted to move to this macro set. Especially the many available styles, and the need to have a simple macro for typesetting tables, makes L<sup>A</sup>T<sub>E</sub>X a lot simpler to use.

**Chess playing macros**

When some macros to play chess in T<sub>E</sub>X appeared in TUGboat [2], I used the ideas presented to make

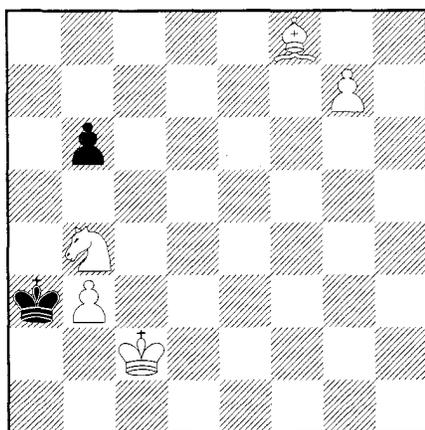


Diagram 2: White mates in three moves

my own chess style. As a typical example of an annotated chess game I have used a part of the game Fischer played against Tal during the Candidates' Tournament of 1959. In this tournament the sixteen year old Fischer lost four times from Tal who by winning this tournament earned the right to meet Botvinnik for the world championship. The game shows a real fight between two very offensive players. The game itself is annotated by Fischer. Both the input and the output are included on page 6.

To typeset the main line with automatic updating of the chess position, `chess.sty` has the macro `\newgame`, which starts a new game, and the environment `position`, to set up a position other than the initial one. The chess position after the 25th move in the game Fischer-Tal (see diagram 3 on page 6) is defined with:

```
\begin{position}
\White(Kh1,Qe6,Re1,a2,b2,c2,g2,h2)
\Black(Kf8,Qb8,Rd7,Rg8,Be7,a6,b4,h7)
\global\Whitetrue\global\movecount=25
\end{position}
```

`\Whitetrue` gives the turn to White; `\Whitefalse` gives it to Black. Setting the move counter is achieved with `\movecount=25`. The `\global` is needed because both commands are used inside an environment.

There exists another macro `\board` for defining a chess position in case automatic updating is not wanted. This macro is used for the mate in three problem (see diagram 2):

```
\board{ * * B * }
      { * * * P }
      { p * * * }
      { * * * * }
      { N * * * }
      { kP * * * }
      { *K * * * }
```

```
{ * * * * }
```

Notice that the user of `chess.sty` doesn't need to know the character encodings from table 1! He only needs to know the abbreviations of pieces (uppercase for White and lowercase for Black) and that empty squares are represented by a `□` (light) or a `*` (dark).

To show the board in either case, one needs to call the macro `\showboard` or `$$\showboard$$` if the board should be centered.

To automatically update a position defined by the `position` environment there are two macros: `\ply` and `\move`. If White's move is not followed by some analysis, the macro `\move` can be used. Otherwise the move has to be broken down into two plies (half moves) with `\ply`. The argument(s) of `\ply` and `\move` contain the from square followed by the to square of the moving piece, or the King in case of castling. A square is represented as a column [a-h] followed by the row [1-8]. In correspondence chess a similar notation is used except for the columns which are also denoted as decimals [1-8]. I think that using letters is less confusing and reflects the way (at least in Europe) chess players think.

If a pawn arrives at its final destination, it becomes a Queen, Rook, Bishop or kNight {Q|R|B|N}. If the promotion piece is omitted a default Queen is taken. Moves can also be commented with things like ! for good moves, ?? for exceptionally bad moves, and so on. So the syntax, in a free style of Extended Backus Naur Form, of an argument for both `\ply` and `\move` can be described as:

```
[a-h] [1-8] [a-h] [1-8] {{Q|R|B|N}comment}
```

The translation of this move representation to long algebraic notation is carried out by the 'invisible' macro `\@ply`. For example: `\@ply g1f3` will result in  $\text{♞g1-f3}$  in case square f3 is empty or  $\text{♞g1} \times \text{f3}$  in case of a capture, `\@ply e1c1` will result in 0-0-0.

To update and query the chess board, represented by 64 macros (`\a1, \a2, ... \h8`), `\@ply` uses the private macros `\@set` and `\@get`. The value of a square can either be empty (letter E), a White piece (Q, R, B, N, P) or a Black piece (q, r, b, n, p). To update the chess position `\@ply g1f3` does a `\@set [g1] (E)` to make the square g1 empty and a `\@set [f3] (N)` to move the kNight to f3. The macro `\@ply` handles castling and the special pawn moves en passant capture and promotion. Because of its length the macro `\@ply` is not included. Basically, it is just a set of nested conditionals to cover all cases. Instead the macros `\@set` and `\@get`, that might be of interest to other TeX applications, are included here, together with `\@showchar` (the macro that maps a square value to the correct character

encoding using `\@get`) and `\@emptyboard` (a macro for clearing the chess board using `\@set`).

```
\def\@set[#1#2](#3){
  %arguments: [a-h1-8](<letter>)
  \expandafter
  \xdef\csname#1#2\endcsname{#3}}

\def\@get#1[#2#3]{%arguments:\cs[a-h1-8]
  \edef#1{\csname#2#3\endcsname}}

\newcount\@c % column
\newcount\@r % row
\newcount\@sum % row+column

\def\@col{\ifcase\@c\or a\or b\or c\or
d\or e\or f\or g\or h\fi}
\def\@showchar{
  \@get\piece[\@col\the\@r]
  \if\piece E \ifodd\@sum 0\else Z\fi\else
  \if\piece P \ifodd\@sum P\else 0\fi\else
  \if\piece p \ifodd\@sum p\else o\fi\else
  \if\piece R \ifodd\@sum R\else S\fi\else
  \if\piece B \ifodd\@sum B\else A\fi\else
  \if\piece N \ifodd\@sum N\else M\fi\else
  \if\piece r \ifodd\@sum r\else s\fi\else
  \if\piece b \ifodd\@sum b\else a\fi\else
  \if\piece n \ifodd\@sum n\else m\fi\else
  \if\piece K \ifodd\@sum K\else J\fi\else
  \if\piece Q \ifodd\@sum Q\else L\fi\else
  \if\piece k \ifodd\@sum k\else j\fi\else
  \if\piece q \ifodd\@sum q\else l\fi\else
  \fi\fi\fi\fi\fi\fi\fi\fi\fi\fi\fi\fi}

% inner loop needs extra { ... }

\def\@emptyboard{
  \@r=1
  \loop
  {\@c=1
  \loop
  \@set[\@col\the\@r](E)
  \ifnum\@c<8 \advance\@c by 1
  \repeat}
  \ifnum\@r<8 \advance\@r by 1
  \repeat
}
```

### Analysis mode

In order to save space tournament bulletins often prefer short algebraic notation. In this notation the from square of a piece is omitted. If a move otherwise would be ambiguous, because another piece can reach the same destination, the letter of the column or the number of the row from the originating square is added. The short and long algebraic notation is also used in analysis mode when we annotate moves from the main line or a variation. To make the typesetting of these move notations easy

and compact, I have introduced a pair of `|...|` to activate the algebraic notation. Unfortunately this character pair cannot be used within arguments of macros. But you can of course use the pair outside the macro like `|\centerline{25. Kf8!}|`. Or if you prefer you can use the `chess`-environment instead. Because  $\text{\LaTeX}$  uses this character in the `tabular` environment to draw vertical rules I have made an environment `nochess` that can be used to prevent the `|` character from activating the analysis mode. Within the `nochess` environment you can use the environment `chess` to get analysis mode again. Here follow some examples to show how short and long algebraic notation can be generated in analysis mode:

input	output
21. Nf3-e5??, 0-0!	21. ♖f3-e5??, 0-0!
21.: Ke8*f8	21. ..., ♔e8×f8
21. Nfe5, K*f8	21. ♖fe5, ♔×f8
21.: f8Q+	21. ..., f8♙+

In the analysis mode some characters have a special meaning. The `*` becomes a `×` to denote a capture, the `-` is mapped to `'` and the `:` is used as an abbreviation for `'...'` as one needs if the analysis starts with a Black move.

The chess macros also have support for different languages thanks to the possibilities of the `babel` package from Johannes Braams [4]. This package can be used within plain  $\text{\TeX}$  and  $\text{\LaTeX}$  in  $\text{\TeX}$ 3.0 or in older versions. The names of the chess pieces can be chosen according to their Dutch abbreviations by specifying the language `dutch` before the `chess` style:

```
\documentstyle[dutch,chess]{...}
```

In Dutch the letters K ('koning'), D ('dame'), T ('toren'), L ('loper') and P ('paard') are used to denote the king, queen, rook, bishop and knight respectively. These letters are used in the macros `\move` and `\ply`, only if you provide a promotion piece, within the analysis mode and in the `position` environment. In the `\board` macro we use the same letters to denote the White pieces and the corresponding lowercase letters to indicate the Black piece. In this macro we need also a letter to represent the pawn. Because both 'pion' (pawn) and 'paard' (knight) start with a 'p' I have chosen the letter 'T' for the 'plon'.

Hopefully the examples above and the extract of the game Fischer–Tal on page 6 are further self explaining.

### Tournament style

To illustrate the tournament style I have included the complete example game of Fischer against Tal

(IA)T <sub>E</sub> X	meaning
±	\wbetter White stands slightly better
≡	\bbetter Black stands slightly better
±	\wupperhand White has the upper hand
≡	\bupperhand Black has the upper hand
+−	\wdecisive White has a decisive advantage
−+	\bdecisive Black has a decisive advantage
→	\withattack with attack
△	\betteris better is
○-○	\seppawns separated pawns

Table 2: Informant symbols

from [5] in the style that is used in the Chess Informant [7]. In this book special symbols are used for often used chess terminology. Table 2 shows the list of the symbols I needed in the Fischer game. In [5] the moves 50... ♖c7 51. ♚b5 are omitted. But this is corrected in his later book [6].

BOBBY FISCHER – MIKHAIL TAL

Belgrade (ct/27) 1959

1. e4 c5 2. ♘f3 d6 3. d4 cd4 4. ♘d4 ♘f6  
5. ♘c3 a6 6. ♙c4 e6 7. ♙b3 [7. 0-0 ♙e7 8.  
♙b3 ♗c7 9. f4 b5 10. f5 b4 11. fe6!? (11. ♘ce2 e5  
12. ♘f3 ♙b7̄) bc3 12. ef7 ♘f8 13. ♙g5 ♘g4! ♗  
b5! [7... ♙e7? 8. f4 0-0 9. ♗f3 ♗c7 10. f5! (10.  
0-0? b5 11. f5 b4! 12. ♘a4 e5 13. ♘e2 ♙b7̄) e5  
11. ♘de2 b5 12. a3 ♙b7 13. g4±→] 8. f4!? b4!  
9. ♘a4 ♘e4 10. 0-0 g6? [←10... ♙b7 ] 11.  
f5! gf5 [11... ef5? 12. ♙d5 ♙a7 13. ♘f5! gf5 14.  
♗d4 ] 12. ♘f5! ♙g8 [←12... d5 13. ♘h6 ♙b6 14.  
♙h6; 12... ef5? 13. ♗d5 ♙a7 14. ♗d4 ] 13. ♙d5!  
♙a7 [13... ed5 14. ♗d5 ♙f5 15. ♙f5 ♙a7 16. ♗e4  
♙e7 17. ♗b4 ♙e2 18. ♙g5! ♙g5 19. ♙g5 ♗g5 20.  
♙b8+−PANOV ] 14. ♙e4? [←14. ♙e3! ♘c5 15.  
♗h5! ♙g6 (15... ♘a4 16. ♙a7 ed5 17. ♙ael) 16.  
♙ael! KEVITZ] ef5 15. ♙f5 ♙e7! 16. ♙c8 ♗c8  
17. ♙f4? [←17. c3! ♗c6 18. ♙f2; 17. ♗d6? ♙g2  
18. ♘g2 ♙e2 19. ♘f3 ♙d6 20. ♘e2 ♗c2+−] ♗c6!  
18. ♗f3 ♗a4 [18... ♗f3 19. ♙f3 ♙e2 20. ♙f2 ♙f2  
21. ♘f2±○] 19. ♙d6 ♗c6! 20. ♙b8 ♗b6 [20...  
♗f3? 21. ♙f3 ♙g7 22. c3+−] 21. ♘h1 ♗b8 22.  
♗c6 [22. ♙ael ♘d8! 23. ♙d1 ♘c7! (23... ♘c8?  
24. ♗c6+−) 24. ♗f4 (24. ♙d4 ♗b7!) ♘b7 25. ♙d6  
♗c7 26. ♗b4 ♘c8 27. ♙a6 ♗b7! 28. ♗b7 ♘b7 29.  
♙af6 ♙g7=; 22... ♙g6? 23. ♗f7 ♘d7 24. ♙d1!  
♙d6 25. ♙d6 ♘d6 26. ♙f6!+−] ♙d7 23. ♙ael  
[23. ♙ad1 ♙d6 24. ♙f7 (24. ♙f6 ♙g6 25. ♙dd6  
♗d6!) ♗c7; 23. ♙f7 ♗d6 ] ♙e7 [23... ♘d8? 24.  
♙f7! ♙e7 25. ♙fe7 ♙e7 26. ♙d1+−] 24. ♙f7 ♘f7  
25. ♗e6 ♘f8! [25... ♘g7? 26. ♗d7+−] 26. ♗d7  
[26. ♙f1? ♘g7 27. ♙f7 ♘h8 (28. ♗d7 ♙d8 29. ♗g4  
♗e5+−) ] ♙d6 27. ♗b7 ♙g6 28. c3! a5 [28...  
bc3 29. ♗c8 ♙d8 30. ♗c3=] 29. ♗c8 [←29. cb4!

♗b4 (29... ab4 30. a3! ba3 31. ba3 ♗a3=) 30. ♗f3  
♘g7 31. ♗e2=] ♘g7 30. ♗c4 ♙d8 31. cb4 ab4  
[31... ♗b4 32. ♗e2=] 32. g3? [32. ♗e4 (32...  
♙c7 33. ♗e7 ♘g8 34. ♗e8 ♗f8 35. ♗e4) ] ♗c6  
33. ♙e4 ♗c4 34. ♙c4 ♙b6! [34... ♙e7? 35. a3!  
] 35. ♘g2 ♙f6 36. ♘f3 ♘e5 37. ♘e3 ♙g5 38.  
♘e2 ♘d5 39. ♘d3 ♙f6 40. ♙c2? ♙e5 41. ♙e2  
♙f6 42. ♙c2 ♙f3 43. ♘e2 ♙f7 44. ♘d3 ♙d4!  
45. a3 [45. b3? ♙f3 46. ♘e2 ♙f2 47. ♗d3 ♙c2 48.  
♘c2 ♘e5+−] b3 46. ♙c8 [46. ♙e2 ♙f3 47. ♘d2  
♙b2; 46. ♙d2 ♙f3 47. ♘e2 ♙f2 ] ♙b2 47. ♙d8  
♘c6 48. ♙b8 ♙f3 49. ♘c4 ♙c3 50. ♘b4 ♘c7  
51. ♙b5 ♙a1 52. a4 b2! [53. ♘c3 b1♗!] ] 0 : 1  
[Fischer]

The L<sup>A</sup>T<sub>E</sub>X input of the above game looks like:

```
% Some macros to improve readability...
\newcommand{\finito}[2]{%
  {\bf\hfill#1\hfill#2}\par}}
\newenvironment{mainline}[2]{\bf
  \newcommand{\result}{#1}%
  \newcommand{\commentator}{#2}%
  \begin{chess}}%
  {\end{chess}\finito{\result}%
  {\commentator}}
\newenvironment{variation}{\begin{group
  \rm\ignorespaces}%
  {\end{group}\ignorespaces}
...
\begin{mainline}{0~:~1}{Fischer}
1. e4 c5 2. Nf3 d6 3. d4 cd4
4. Nd4 Nf6 5. Nc3 a6 6. Bc4 e6
...
13. Bd5! Ra7
  \begin{variation}
13: ed5 14. Qd5 Bf5 15. Rf5 Ra7
16. Qe4 Re7 17. Qb4 Re2
18. Bg5! Rg5 19. Rg5 Qg5
20. Rb8\wdecisive
  \nochess PANOV \endnochess
  \end{variation}
14. Be4?
...
\end{mainline}
```

The mainline is typeset in boldface and the variations in roman. When we need to typeset a name we have to avoid the analysis mode by using the `nochess` environment. The `nochess` environment can be used in L<sup>A</sup>T<sub>E</sub>X style (`\begin{nochess}... \end{nochess}`) or in the shorter T<sub>E</sub>X style (`\nochess... \endnochess`).

Using plain T<sub>E</sub>X

To use `chess.sty` in plain T<sub>E</sub>X you need the following line for including the chess macros:

```
\input chess.sty
```

The `nocness` and `position` environments from `chess.sty` should be replaced by `\nocness ... \endnocness` and `\position ... \endposition` pairs.

### Further wishes

The chess font and the chess style form a good basis for publishing about chess as is demonstrated by [1, 8]. But there are still some wishes to make the writing really enjoyable. My first wish would be a program with a chess board interface on which I can set up a position, play a variation and add text to the computer generated chess moves, go back to the main line, play another variation, and so on. I have seen an X11-based chess interface using hyperbuttons which provides a good starting point to make such a program!

Surely the chess style can be improved and other style conventions added. If anybody does so, please let he send me his improvements.

### Availability

This article, the chess fonts and the corresponding style file with the complete game of Fischer against Tal and other examples can be retrieved (files `chess.tar.Z` and `chess.README`) from the file server `sol.cs.ruu.nl` (131.211.80.5) via anonymous ftp from the directory `TEX`.

### Acknowledgements

I would like to thank Victor Eijkhout for his help and criticism he gave me to improve both the chess style and the readability of this article. My thanks go also to Hugo van der Wolf for polishing my English, and to the `UseNet` users who have sent me bug reports and have reported inconveniences present in version 1.0. Most of them are solved and will be made available in version 1.2.

### References

- [1] *Tournooimagazine van de Halve Finale Ned. Kampioenschap Schaken*, ed. by Anjo Anjowierden, Enschede. 1990.
- [2] *Typesetting Chess*, by Wolfgang Appelt, *TUGboat* 9, no. 3, December 1988.
- [3] *Berkeley Font Catalogue*, Ultrix-32 Supplementary Documents, Digital Equipment Corporation, Merrimack, New Hampshire, 1984.
- [4] *Babel, a multilingual style-option system for use with L<sup>A</sup>T<sub>E</sub>X's standard document styles*, by Johannes Braams, *TUGboat* 12, no. 2, June 1991.
- [5] *My 60 Memorable Games*, by Bobby Fischer, Faber and Faber, London. 1969. ISBN 0-571-09312-4

- [6] *Fischer's Chess Games*, by Bobby Fischer, Oxford University Press, Oxford. 1980. ISBN 0-19-217566-1
- [7] *Chess Informant 51*, ed. by Aleksandar Matanović, Šahovski Informator, Belgrade. 1991. ISBN 86-7297-024-1
- [8] *Dragon, The Bulletin of the Cambridge University Chess Club*, ed. by Steve Rix and John Wilson, December 1991. Cambridge.

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Example of the L<sup>A</sup>T<sub>E</sub>X-input and output of an annotated chess game using chess.sty

```
\begin{position}
\White(Kh1,Qe6,Re1,a2,b2,c2,g2,h2)
\Black(Kf8,Qb8,Rd7,Rg8,Be7,a6,b4,h7)
\global\Whitetrue\global\movecount=25
\end{position}
\begin{figure}
\centerline{Diagram~3: Fischer--Tal
after 25.\ldots, {\Fig K}f8!}
$$\showboard$$
\end{figure}
```

(See diagram~3.)

```
\ply e6d7
Not |26. Rf1+, Kg7; 27. Rf7+, Kh8;
and if 28. Q*d7, Rd8; 29. Qg4, Qe5|
wins.
```

```
\ply b8d6
\move d7b7 g8g6
Within a handful of moves the game
has changed its complexion. Now it
is White who must fight for a draw!
```

```
\ply c2c3!
Black's extra piece means less with
each pawn that's exchanged.
```

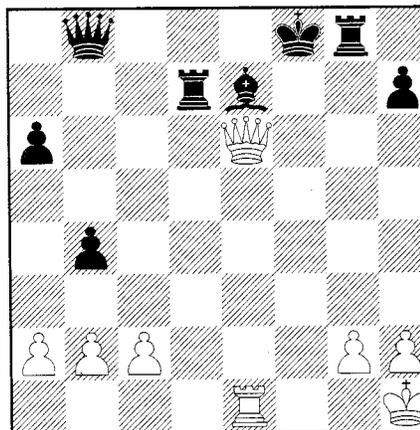
```
\ply a6a5
On |28.: b*c3; 29. Qc8+, Bd8;
30. Q*c3|=.
```

```
\ply b7c8+
On the wrong track. Right is
|29. c*b4!, Q*b4 (if 29.: a*b4;
30. a3!, b*a3; 31. b*a3, Q*a3 draws);
30. Qf3+, Kg7; 31. Qe2| draws, since
Black can't possibly build up a
winning K-side attack and his own
king is too exposed.
```

```
\ply f8g7
\move c8c4 e7d8
\move c3b4 a5b4
On |31.: Q*b4; 32. Qe2| White should
draw with best play.
$$\showboard$$
(See diagram 3.)
```

```
26. ♖e6×d7
Not 26. ♜f1+, ♔g7; 27. ♜f7+, ♔h8; and if 28.
♜×d7, ♜d8; 29. ♜g4, ♜e5 wins.
26. ... ♜b8-d6
```

Diagram 3: Fischer-Tal after 25. . . . , ♔f8!



```
27. ♜d7-b7 ♜g8-g6
Within a handful of moves the game has changed its
complexion. Now it is White who must fight for a
draw!
```

```
28. c2-c3!
Black's extra piece means less with each pawn that's
exchanged.
```

```
29. ... a6-a5
On 28... b×c3; 29. ♜c8+, ♔d8; 30. ♜×c3=.
```

```
29. ♜b7-c8+
On the wrong track. Right is 29. c×b4!, ♜×b4
(if 29... a×b4; 30. a3!, b×a3; 31. b×a3, ♜×a3
draws); 30. ♜f3+, ♔g7; 31. ♜e2 draws, since
Black can't possibly build up a winning K-side attack and
his own king is too exposed.
```

```
29. ... ♔f8-g7
30. ♜c8-c4 ♔e7-d8
31. c3×b4 a5×b4
On 31... ♜×b4; 32. ♜e2 White should draw with
best play.
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