```
      }%
    }
  } % end \def\RBox

\def\roundBox#1#2{%
  \wtemp=#1\hsize
  \advance\wtemp by-.05\hsize
  \font\cf=circle10
  \RBox{#1\hsize}{\wtemp}{.4pt}{#2}%
  }
\def\RoundBox#1#2{%
  \wtemp=#1\hsize
  \advance\wtemp by-.05\hsize
  \font\cf=circlew10
  \RBox{#1\hsize}{\wtemp}{.8pt}{#2}%
  }

%
% End of RoundBox
%
```

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Printing Annotated Chess Literature in Natural Notation

Zalman Rubinstein

There have been several recent attempts to apply the TEX and METAFONT computer languages to design a chess literature printing package. Appelt [1] suggested a design for printing chessboards, and this author [2] described a simple METAFONT chess font. Based on these results the present note introduces a full TEX macro which approximates the actual requirements of chess printing, namely:

1. Chess moves are printed in the source file in their natural appearance (as, e.g., `Pe2-e4`, `Nc3-e4`) without recourse to control sequence notation (see [1]).
2. Chess moves normally include annotations or comments as to the adjudged value of the move, such as "h7-h6?" for a questionable move, "Bd3-c2!" for a good move. The length of these annotations varies and can include quite a number of symbols, such as +, -, ++, ±, ∓ and others.
3. Chess literature can start a game from its natural starting position or from a ready setup position as necessary.
4. The printed form of a move may vary from the natural appearance of the move. For example, Pe2-e4, moving a pawn from square e2 to square e4, is usually denoted by e2-e4 or even by e4 (we shall comment on this at the end of this note).

The TEX macros to which I refer satisfy the above requirements by using in various ways the category management ability of the TEX language so that the letters `K`, `Q`, `R`, `B`, `N` and `P` denoting the chess pieces play the role of different control sequences at different times. In addition, the end of line character and the paragraph control sequence are redefined for various purposes. The two basic sequences of the macros are:

(a)

```
\ClearBoard
\White Kg1 Qd1 ...
\Black Kg8 Qd8 ...
\ShowBoard (optional)
⟨text⟩ ...
```

and

(b)

```
\BlacksMove \movecounter8
\StartPlay
        Ph7-h6?
```

```
Nc3-e4   Ne7xd5
 :
 :
Bd3-c2!
⟨empty line⟩
\ShowBoard (optional)
⟨text⟩ ...
```

The general notational structure of a chess move is

⟨*piece*⟩⟨*position*⟩⟨*move*⟩⟨*position*⟩⟨*additional info*⟩

where

⟨*piece*⟩ can be any of the chess pieces K, Q, R, B, N, P;

⟨*position*⟩ is a pair consisting of one from each of (abcdefgh) and (12345678) giving the Cartesian coordinates of a chess square;

⟨*move*⟩ is 'x' or '-';

⟨*additional info*⟩ can be any of the optional characters 'Eqrbn!?+' or ⟨*text*⟩. The letter 'E' denotes the *en passant* move and the letters 'qrnb' denote the four possible crowning pieces.

Two control sequences are also included for convenience in setting up chess problems and playing full games. These are:

`\AuthorYear {A. B. Author} 1989`
`\StartPosition` to set up a starting chess game board.

The macro `\Authoryear` puts a heading on chess problems indicating name of author and year of first publication. The macro `\StartPosition` just sets up the chess pieces to begin a game.

Before concluding with a full chess game example, it should be noted that, in order to make the approximation to chess literature practice complete, one would desire to abbreviate chess moves to their destination squares only such as: Pe4 or e4 instead of Pe2-e4 or e2-e4, etc. This seems to require major work, including dealing with certain ambiguous situations in which more than one piece can attain a certain destination, and is not implemented here. Of course, as noted in [1], one would also like to have a TEX checking apparatus to verify the validity and the rule compatibility of all moves made.

An example

```
\input chess.mac % (the chess macro file)
\font\bigbf=cmbx10 scaled 1200
\centerline{\bigbf Spassky-Bronshtein 1960}
\medskip
\centerline{King's Gambit.
            Game won beauty prize.}
\medskip
After the  moves: 1. e4 e5 2. f4 ef 3. Kf3
d5 4. ed Bd6 5. Nc3 Ne7 6. d4 0-0 7. Bd3 Nd7
8. 0-0.
\smallskip
The  position was:

\ClearBoard
\White Kg1 Qd1 Ra1 Rf1 Bc1 Bd3 Nc3 Nf3 %
  Pa2 Pb2 Pc2 Pd4 Pd5 Pg2 Ph2
\Black Kg8 Qd8 Ra8 Rf8 Bc8 Bd6 Nd7 Ne7 %
  Pa7 Pb7 Pc7 Pf4 Pf7 Pg7 Ph7
\ShowBoard
\bigskip
Here Black committed an error
\movecounter8 \BlacksMove
\StartPlay
        Ph7-h6?
Nc3-e4  Ne7xd5
Pc2-c4  Nd5-e3
Bc1xe3  Pf4xe3
Pc4-c5  Bd6-e7
Bd3-c2!

\ShowBoard
\bigskip
A very important move enables White to
launch an attack on Black's King.
\StartPlay
        Rf8-e8
Qd1-d3  Pe3-e2
Ne4-d6!? Nd7-f8?

A decisive mistake allowing a beautiful
combination. Bxd6 was necessary.
\StartPlay
Nd6xf7! Pe2xf1q+

\ShowBoard
\StartPlay
Ra1xf1 Bc8-f5
Qd3xf5 Qd8-d7
Qf5-f4 Be7-f6
Nf3-e5 Qd7-e7
Bc2-b3 Bf6xe5
Nf7xe5+ Kg8-h7
Qf4-e4+ \resigns

\ShowBoard
\bye
```

The resulting printout is on the following page:

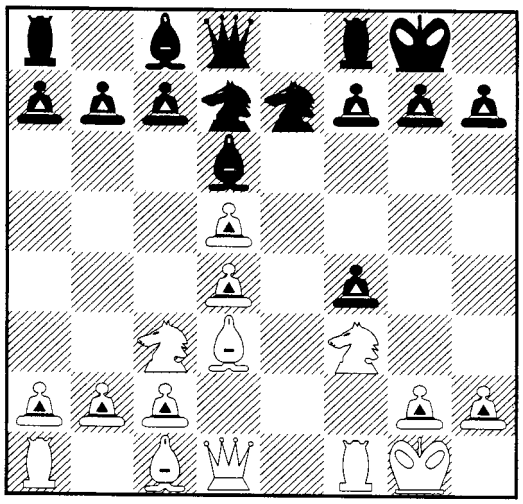
Spassky-Bronshtein 1960

King's Gambit. Game won beauty prize.

After the moves: 1. e4 e5 2. f4 ef 3. Kf3 d5 4. ed Bd6 5. Nc3 Ne7 6. d4 0-0 7. Bd3 Nd7 8. 0-0.

The position was:
White: Kg1 Qd1 Ra1 Rf1 Bc1 Bd3 Nc3 Nf3 Pa2 Pb2 Pc2 Pd4 Pd5 Pg2 Ph2

Black: Kg8 Qd8 Ra8 Rf8 Bc8 Bd6 Nd7 Ne7 Pa7 Pb7 Pc7 Pf4 Pf7 Pg7 Ph7



Here Black committed an error

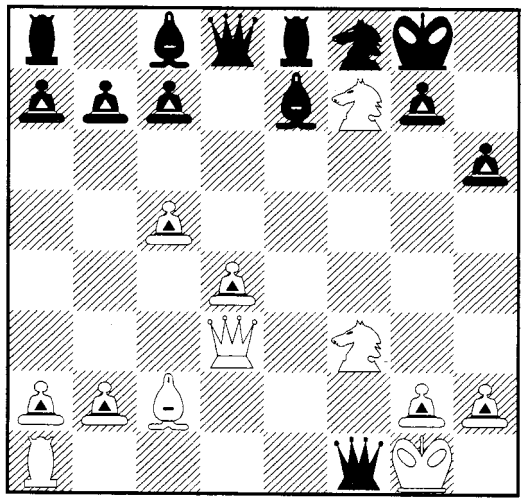
		h7-h6?
9.	**Nc3-e4**	**Ne7xd5**
10.	**c2-c4**	**Nd5-e3**
11.	**Bc1xe3**	**f4xe3**
12.	**c4-c5**	**Bd6-e7**
13.	**Bd3-c2!**	

A very important move enables White to launch an attack on Black's King.

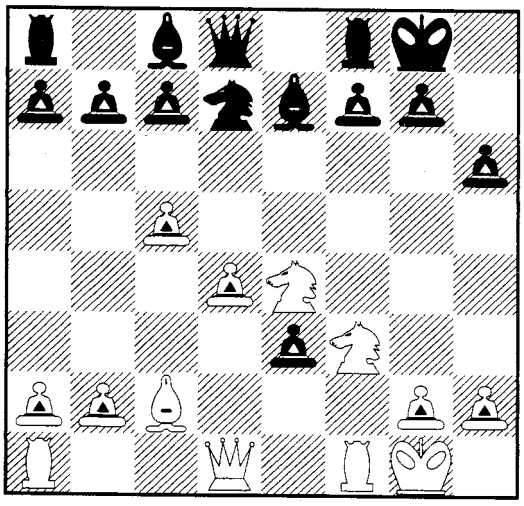
		Rf8-e8
14.	**Qd1-d3**	**e3-e2**
15.	**Ne4-d6!?**	**Nd7-f8?**

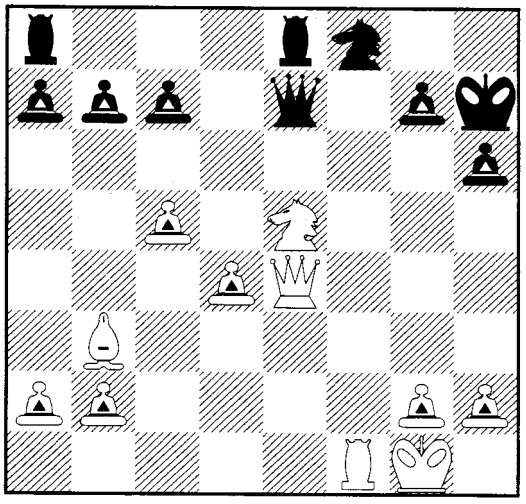
A decisive mistake allowing a beautiful combination. Bxd6 was necessary.

16.	**Nd6xf7!**	**e2xf1q+**



17.	**Ra1xf1**	**Bc8-f5**
18.	**Qd3xf5**	**Qd8-d7**
19.	**Qf5-f4**	**Be7-f6**
20.	**Nf3-e5**	**Qd7-e7**
21.	**Bc2-b3**	**Bf6xe5**
22.	**Nf7xe5+**	**Kg8-h7**
23.	**Qf4-e4+**	**resigns**





References

[1] Appelt, W. (1988): Typesetting Chess. *TUGboat* 9#3, pp. 284–287.

[2] Rubinstein, Z. (1989): Chess Printing via METAFONT and TEX. *TUGboat* 10#2, pp. 170–172.

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Editor's note: This article uses a new METAFONT chess font produced by Prof. Rubinstein and his colleagues.

Bibliographic Citations; or Variations on the Old Shell Game

Lincoln K. Durst

This is the first of several tutorials designed to introduce users to some of the subtler parts of TEX, to show how to construct tools to make TEX do things you might like to have it do for you, and to encourage you to take off on your own with the construction of other tools you would find useful. These pieces are no substitute for reading *The TEXbook*; in fact they may be considered successful if they get you to study parts of some danger zones you may have been reluctant to wander into before.

We describe ways `plain` TEX may be used to perform various clerical functions, useful for authors of papers or books who choose to do their own TEX coding as they create the "manuscript". There exist excellent, finely-tuned, and versatile systems ready to use "off-the-shelf" made by Michael Spivak ($\mathcal{AMS}$-TEX) and Leslie Lamport (LATEX) which do some of the kind of things we shall be discussing (as well as much more). Newcomers to TEX may find parts of $\mathcal{AMS}$-TEX and LATEX code hard reading, especially if they try to make changes in order to adapt them for their own needs. Our task is not to reinvent the "wheel"; rather it is to explore ideas that may help users understand how some parts of such "wheels" might work. Here we confine our attention to plain techniques which are easily modifiable and can be adapted or improved by users to address situations of special interest to them. The code printed here is given in fragments to illustrate underlying ideas one or a few at a time.

In the first of these columns we consider the question of constructing bibliographies and lists of references in mathematical or other articles or books. The objective is to make TEX do as much of the "clerical" work as possible (or reasonable). In particular, the numbering of items will be automated so that, as revisions are made and material is changed, interpolated, deleted, or shifted around, the citations will be adjusted properly when the text is composed.

There are at least three forms for lists of items cited. Chemists and physicists frequently list items in the order cited, as do historians and others, using superior figures in the text in order to refer to them. In these cases, the lists may appear either as endnotes or as a "list of references cited." In mathematical articles and books, on the other hand, references and bibliographies most commonly are listed in alphabetical order by authors' names, and occasionally in chronological order by date of publication. Mathematicians tend to put citations in the text within square brackets [as parenthetical remarks, like this one], treating them as asides to the reader. A bibliography, in contrast to a list of references, may include items not actually cited. See, for example, *Concrete mathematics* by Graham, Knuth, and Patashnik (Addison-Wesley, 1989).

There are some curious, if not notorious, examples in which items are listed in an apparently random order. See, for example, *Mathematics Magazine*, **61**#5 (December 1988), pages 275–281. This interesting article by Ivan Niven is about what it takes to win at twenty questions when the person giving the answers is allowed to lie. (THEOREM: *One lie is worth five extra questions.*) The bibliography (mislabelled "References") surely deserves an award for innovation.

The Chicago Manual of Style, "thirteenth edition" (University of Chicago Press, 1982), contains, in chapters 15–17, exhaustive discussions of endnotes, bibliographies, etc., and serves as a source of information on the kind of results desired, as well as suggestions for avoiding many problems, some of which no longer exist, especially for users of TEX.

The construction of FIGURE 1 provides an example of one way the desired results may be obtained using `plain.tex`, with the numbering of sections, displays, references, etc., done automatically. Prior to running off final copy, the macros