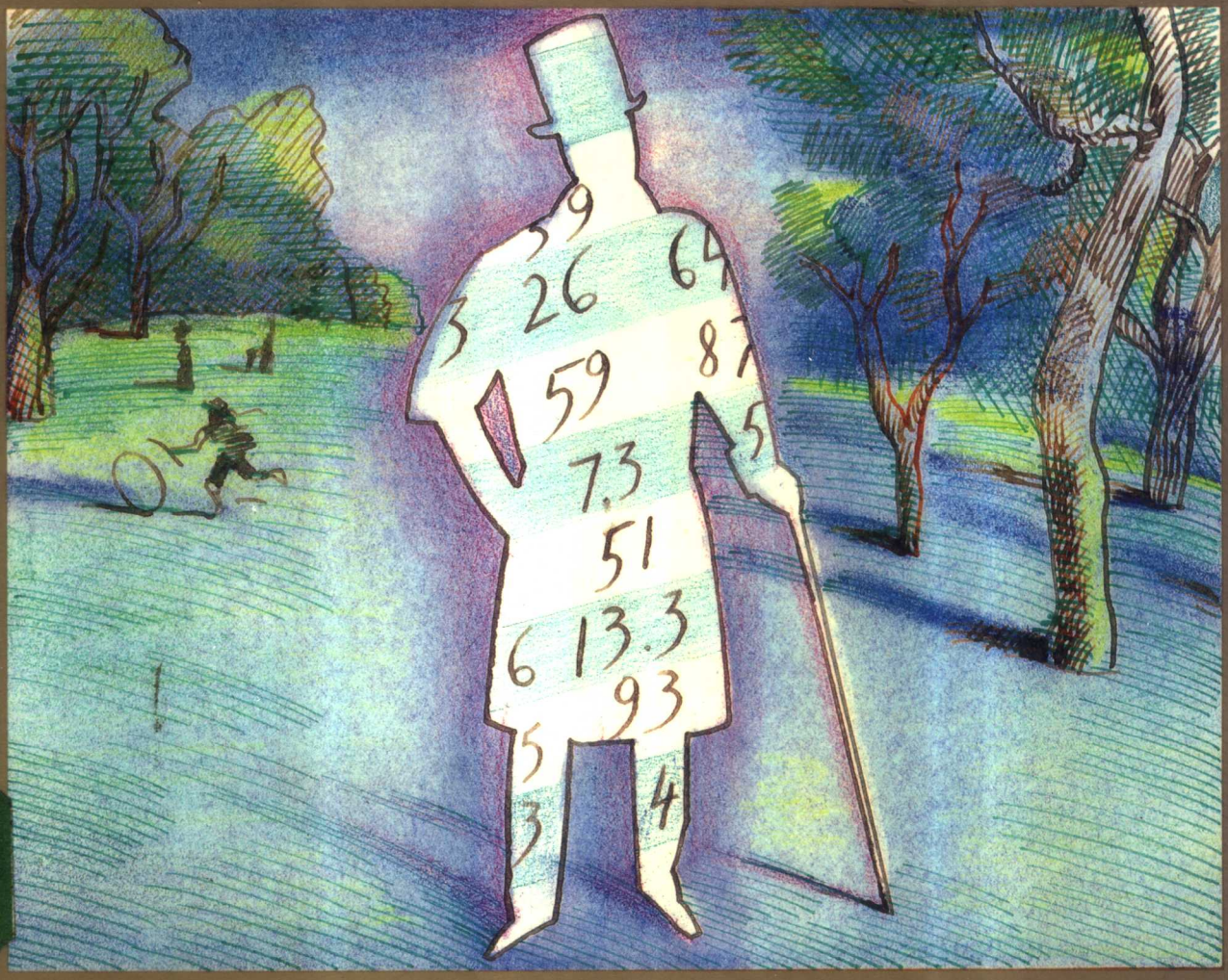
Brady

The Elements of Spreadsheet Style



John M. Nevison

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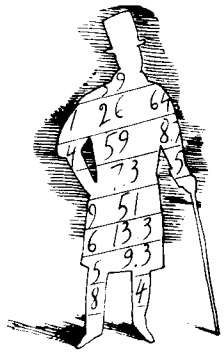

John M. Nevison

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PREFACE

Writing a good spreadsheet requires the kind of careful thought you would devote to writing a good letter. Editing either document demands further patient attention. The purpose of this small book is to help you write and edit a spreadsheet. William Strunk once wrote a book on how to write clear English. E. B. White added a section on style and republished the book as *The Elements of Style*. The present book takes its title and inspiration from their book. The rules are short, the discussion is limited, and the examples are simple in the hope that the ideas will be easy to read and reread.

THE NEED FOR RULES OF STYLE

The need for rules of style extends beyond the technology. A word processor cannot make a good writer, nor can a spreadsheet program make a sound analyst. There is no technological fix for sloppy thought or poor expression. You need to know that writing a good spreadsheet is hard work; that this work can be rewarding and fulfilling, and that the rules of style in this book can help you to do this work well.

These twenty-two rules are not intended to set brittle standards of performance; they are intended to encourage you, the spreadsheet author, to think seriously about the purpose of your work. All spreadsheets must first be correct. If they are to maintain this correctness over time, they must be clear. If they are to maintain this correctness when they are modified by others, they must be clear and well structured.

If these rules help you form the habits of careful spreadsheet construction, of reflection and revision, of precision and focus, they will dramatically enhance your professional productivity.

The examples that accompany the rules show weak and strong versions of the ideas in practice. The terms *weak* and *strong* were chosen to indicate that these are

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merely examples on a continuum: other examples might be worse than the weak or better than the strong. As you work on your spreadsheets, you very well may improve on the examples provided here.

NOVICE READER, EXPERIENCED READER

If you are new to spreadsheets, before you use this book you must learn your particular tool, be it 1-2-3 ™, Excel™, or another of the many spreadsheets available today. You must know how to build and copy formulas, how to move areas about on the spreadsheet, whether your program has a graphics ability, and, if it does, how it works. You may find parts of this book helpful without knowing your tool, but you will want to read the rules again after you have mastered your own particular spreadsheet program. In short, you should know something about your paints and brushes before you begin to explore the problems of composing a picture.

As a novice spreadsheet user, *please follow the rule before you break it*. After you use an apparently inconvenient rule on a few spreadsheets, you may find it has become an absolute necessity. You may also find that because you do not have to unlearn a lot of bad habits your work may quickly achieve a higher standard than that of your more experienced colleagues.

If you are an experienced user of spreadsheets you may have difficulty with some of the rules in this book. However, if you strongly disagree with a rule, it should be for the same reason that the rule was advanced: because there is a better way to build a clear, correct spreadsheet. Few, if any, experienced readers will agree with all of the rules, but every experienced reader will find at least one new rule that will improve his or her spreadsheets. That one rule will repay the cost of the book and the effort of reading it.

As all readers become experienced they should heed the other, unwritten rule: *When you have a good reason, break the rule*. Rules should encourage thoughtful activity, not pigheaded subservience.

PARTICULAR SPREADSHEET PROGRAMS

The spreadsheets in this book are intended to be *generic*, and they will run as shown on almost all spreadsheet programs. Some of the spreadsheets that appear

here were first written in VisiCalc™, many have been written in 1-2-3™, and all were written in Jazz™. Every spreadsheet feature that appears here is available in 1-2-3™ and Excel™. The features that support graphing, macros, and databases will vary from one spreadsheet to the next. You may overcome this variation by applying the idea behind a rule to your own particular examples. The formulas in this book have all been presented in 1-2-3™ format—for example, @SUM instead of SUM—to make them familiar to the broadest possible audience.

NURSERY RHYMES

The nursery rhymes in the book are intended to relieve the somewhat sober nature of the subject. Rhymes that are puzzles introduce some of the chapters. Rhymes about historical personages appear in the text and have dates that loosely correspond to the person about whom the rhyme was written. For example, in the spreadsheet Sixpence, the King is Henry VIII, the Queen is Catherine of Aragon, the maid is Anne Boleyn (who eventually had her head, not just her nose, snapped off), and the blackbird is Cardinal Wolsey; the date is 1536, an arbitrary year during the reign of Henry VIII. Mary, Queen of Scots, figures in several rhymes, and so does Queen Elizabeth I. Other English royalty can be guessed by the dates. For those who like historical puzzles, Humpty Dumpty's spreadsheet contains the only actual historical date in the book. The date on the spreadsheets ascribed to Mother Goose herself (she has no known tie to an historical personage) is 1386, the year when Chaucer is believed to have begun his *Canterbury Tales*.

ACKNOWLEDGEMENTS

The ideas that began the journey toward this book arose in discussions with John Kenower, Tim Stein, and Julie Bingham. These ideas were given their first field tests in courses at CIGNA Corporation and at the Boston Edison Company. Students contributed ideas in other classes taught at Arco, CBS, Chesebrough-Pond's, Coca-Cola, GTE, Gillette, General Electric, Lotus, Mellon Bank, and Westinghouse. The manuscript profited from the careful reading of Jim Chelini, Joe Gwinn, Bill Schillhammer, Steve Shapse, and Tim Stein. Michael Vitale of the Harvard Business School and Ted Standish of the Gillette Company had kind words when they were needed most. Michael O'Brien of Brady gave the manuscript the critical reading it

needed (and a new Rule 12). Milissa Koloski and Terry Anderson, also of Brady, remained patient and good-humored in the face of several delays. My two daughters, Laura and Susannah, made the work more fun by crawling into my lap and providing needed interruptions. My final and largest debt of gratitude is to my wife, Nancy Ross McJennett, who protected my working time so well that I was embarrassed to have no real excuse for procrastination. The mistakes that remain are unavoidably the responsibility of the author.

John M. Nevison
Concord, MA
June 1987

CONTENTS

Preface / xi
The Need for Rules of Style / xi
Novice Reader, Experienced Reader / xii
Particular Spreadsheet Programs / xiv
Nursery Rhymes / xiv
Acknowledgements / xv

1. Introduction: Form Follows Function / 1
A Song of Sixpence / 4

2. The Basic Form / 13
Introduction / 15
1. Make a formal introduction / 15
2. Title to tell / 16
3. Declare the model's purpose / 18
4. Give clear instructions / 20
5. Reference critical ideas / 22
6. Map the contents / 23
The Initial Data Area / 27
7. Identify the data / 27
8. Surface and label every assumption / 32
The Model Area / 34
9. Model to explain / 34
10. Point to the right source / 39
The Dual Role of the Model Area / 40
Using the Basic Form / 40
A Word on Building the Initial Data Area and the Model Area / 42
Spreadsheets That Do Not Have Model Areas / 43

3. The Mind's Eye: Design / 49
11. First design on paper / 51
12. Test and edit / 53
13. Keep it visible / 55
14. Space so the spreadsheet may be easily read / 56
Your Own Reader / 56

4. Other Functions, Other Forms / 57
15. Give a new function a new area / 59
16. Report to your reader / 62
17. Graph to illuminate / 69
18. Import with care / 81
19. Verify critical work / 81
20. Control all macros / 85
21. Focus the model's activity / 91
The Submodel / 94
22. Enter carefully / 95
Submodels and the Reuse of Tools / 100
The Submodel Focuses Attention / 109
Collections of Spreadsheets / 122
Conclusion / 123

5. Examples / 125
The Worked Model PROGRESS / 127
The Model QUEST / 156
The Model LADY / 161
The Model SEASON / 167
The Model TIMELY / 173

6. The Wider World / 179
The Work Group and Its Concerns / 182
The Librarian's Requirements / 183
Final Moves / 185

References / 187

Appendix: Checklists for Action / 189
How to Link Cells / 189
How to Fix an Old Spreadsheet / 190
How to Protect Your Spreadsheet / 191
How to Print a Spreadsheet as Formulas / 192
Note-It Programs / 192
Future Products for Spreadsheets / 193
Index / 195

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1

INTRODUCTION: FORM FOLLOWS FUNCTION

FINGERS AND TOES

Every lady in this land
Has twenty nails, upon each hand
Five, and twenty on hands and feet:
All this is true, without deceit.

A spreadsheet should be of good character. It should be straightforward to build, easy to read, simple to use, receptive to change, and, above all, free of error.

The first step towards achieving this goal is to construct a spreadsheet that has an *appropriate form*. This form is the cornerstone of correctness. When each function is carried out in an appropriate location, its activity can be verified by eye and reviewed by a thoughtful reader. The appropriate form also denies errors a place to hide. When something is out of place, it looks out of place.

Because the appropriate form focuses your attention on the proper detail at the proper place, it is easy to remember and you do not get lost. A user engaged in the small changes of normal use knows where to alter an initial "what if" assumption, where to slip in a new calculation, and where to modify a printed report.

When a spreadsheet must undergo a major overhaul to meet a new need, the appropriate form will suggest where you can make the additions and deletions.

Finally, the appropriate form not only reveals the completed thought, it supports and guides the unfolding thought. A completed spreadsheet often can be reused as a template for subsequent work. Such a template saves a significant amount of start-up time on a new project, ensures that you will not forget an important section of the spreadsheet, and provides a guiding framework for thinking about the problem under examination.

A SONG OF SIXPENCE

To understand what this appropriate form might look like in practice, consider the spreadsheet model below.

	Income	Rent	Tax	Poor tax	Real inc.
King	90000	15000	20700	180	54120
Queen	75000	12000	17250	180	45570
Maid	12000	1000	2760	180	8060
Blackbird	3000	200	690	180	1930
Totals	180000	28200	41400	720	109680

While it is small, it raises several questions. Who wrote it? What is its name? When was it written? What is its purpose? Why is it so hard to read? Is it complete? Is it accurate?

Now take a look at a second version of the same model.

Twopence 10 December 1536 King Henry

To show how income is distributed in the kingdom.

KINGDOM INCOME DISTRIBUTION 1537

Person	Income	Rent	Tax	Poor tax	Real inc.
King	90,000	15,000	20,700	180	54,120
Queen	75,000	12,000	17,250	180	45,570
Maid	12,000	1,000	2,760	180	8,060
Blackbird	3,000	200	690	180	1,930
Totals	180,000	28,200	41,400	720	109,680

Twopence is a clear improvement. You know its name, when it was created, and by whom. You have been thrust into a nursery rhyme kingdom. You know the model's purpose: to show how income is distributed in the kingdom. The results have been laid out in an easy-to-read fashion. You have some idea how this model might be used.

Yet this apparently complete version is not complete. Twopence is hiding information. While you expect a spreadsheet to work with formulas you can't see (for example, the totals row or the real income column), you do not want formulas to contain hidden numbers. Hidden numbers are buried threats. Unknown to the viewer and hard to find for the user, these concealed figures can sabotage the best-intentioned effort. In the case of Twopence the hidden number is the tax rate that is buried in the formulas in the tax column. You are being denied access to important information about this model. The third version reveals this small, but highly significant, detail.

Threepence 10 December 1536 King Henry

To show how income is distributed in the kingdom.

Assumptions: 23% Tax rate
180 Poor tax

Model:

KINGDOM INCOME DISTRIBUTION 1537

Person	Income	Rent	Tax	Poor tax	Real inc.
King	90,000	15,000	20,700	180	54,120
Queen	75,000	12,000	17,250	180	45,570
Maid	12,000	1,000	2,760	180	8,060
Blackbird	3,000	200	690	180	1,930
Totals	180,000	28,200	41,400	720	109,680

Threepence tells you that the tax rate is 23 percent. Now what you see is what you get. All of the information on which the model depends is visible.

Notice that the poor tax appears as an assumption too. While it was visible before, it was repeated four times. Now, by appearing as an assumption and having the four occurrences in the model all tied to the assumption, the poor tax may be changed by changing only one number instead of four.

You can also change the tax rate for the whole model by changing one number, the 23 percent at the top of the model. In addition to making the information

accessible, the visible assumptions allow you to *modify* the program without digging into the formulas.

For many purposes Threepence may be satisfactory. But if King Henry knows he will be off on a quest and wants to leave things in a fashion that will be easy for Queen Jane to handle, he might rearrange the model for another person to use.

Fourpence 10 December 1536 King Henry

To show how income is distributed in the kingdom.

Initial Data:

23%	Tax rate
180	Poor tax

Income	Person	Rent	Dwelling
90000	King	15000	Counting house
75000	Queen	12000	Parlor
12000	Maid	1000	Garden house
3000	Blackbird	200	Garden

Model:

KINGDOM INCOME DISTRIBUTION 1537

Person	Income	Rent	Tax	Poor tax	Real inc.
King	90,000	15,000	20,700	180	54,120
Queen	75,000	12,000	17,250	180	45,570
Maid	12,000	1,000	2,760	180	8,060
Blackbird	3,000	200	690	180	1,930
Totals	180,000	28,200	41,400	720	109,680

Fourpence extracts all the raw numbers from the model, collects them, and labels them in the initial data area near the top of the spreadsheet. Fourpence then changes all the numbers in the model area to formulas. For example, the King's 90,000 income down in the model is no longer a number; it is a one-term formula that refers to the raw value up in the initial data. All the apparent numbers in the model are formulas that refer to the raw values in the initial data

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