[[1]](#footnote-1)

Playing by ear beyond 100:

A continuing case study

Eleanor Selfridge-Field

*Abstract*—The subject ME, introduced at the age of 95 in a study presented at ICMPC 11, retains performance abilities at 101 that astound many listeners. Vascular dementia accounts for a loss of memory for biographical detail and some spatial-recognition tasks. Her performance of musical tasks and her ability to learn new music on aural exposure have survived a recent stroke and other physical maladies largely intact. This update provides additional data on trends in her performances over the past six years.

*Keywords*—dementia (non-Alzheimer’s), xx, yy, zz

# INTRODUCTION

T

He continuing survival of the subject ME, introduced in “Playing by Ear at 95” (ICMPC 11), has enabled us to collect six years of data pertinent to the preservation of her performance abilities. Whether the fundamental dependency is on musical memory may be a questionable supposition. Playing by ear requires a strong semantic relationship to the structure of the piece being performed. Further consideration appears in the discussion.

ME was born into a high-achieving family in eastern Tennessee in 1914. Further investigation of her background has fleshed out the portrait provided earlier. At the end of the First World War (1918) her family moved to the Atlanta area, where one set of grandparents lived. In their home ME was impressed by the piano-playing of a 6-year-old cousin and soon tried to emulate it. She attributes to this cousin the explanation she still gives today to explain how she plays by ear. (Her simplification is typical of the southern charm that ME still exudes at the age of 101.) She soon started formal piano and violin lessons. Soon after the birth of another girl (*c*. 1928) her family returned to Tennessee, settling in the Chattanooga area. There she was enrolled in a music school started by a Czech immigrant in 1909. It offered classes, ensembles, and individual lessons. ME studied a number of instruments, was involved in ensembles of various kinds, and sometimes assisted younger children. She entered college in Murphreesboro (a predessor of Middle Tennessee University) and then entered the school of music at Vanderbilt, where she earned the equivalent of the master’s degree in music education. Emerging in the depths of the depression, she failed to find a teaching position nearby. After a brief stint as a rural social worker, she found a position in the women’s orchestra in Nashville. There she played the viola.

ME was married in 1940. Two sons were born over the next decades. In 1946 the family moved to Jacksonville (FL). Although she engaged in no formal musical activities until she was in her nineties, she has been surrounded by music of one kind or another throughout her life. She had had a TIA in her eighties, but its effects were slight enough that no extensive medical examination was conducted. Only when she developed signs of dementia in her early nineties did her sons enter her into a senior residence in Florida. There a kindly director, discovering that she played the piano, encouraged her to give short programs.

Her California son and daughter-in-law soon set up a rotating schedule for her appearances monthly in three assisted-living facilities. In all them she entertains “seniors” who are on balance much younger than her. The pianos are not well maintained and suffer from various kinds of abuse. ME is undeterred by background noise and occasional inappropriate remarks, but she accepts requests and rarely fails to provide the number called for,.

The latest chapter in this saga results from the fact that she had a stroke (December 4, 2013), four months after she marked her century. Music in its aftermath is discussed below.

# Resources

## Repertory

ME’s Florida son compiled a list of pieces she knew to enable the residence director to steer her in a productive direction. It has been maintained in California. It currently contains about 400 pieces, but it is clear that ME can potentially play many hundreds more. She is rarely given a request for anything for which she cannot recall the music.

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The SI unit for magnetic field strength *H* is A/m. However, if you wish to use units of T, either refer to magnetic flux density *B* or magnetic field strength symbolized as µ0*H*. Use the center dot to separate compound units, e.g., “A·m2.”

# Helpful Hints

## Figures and Tables

Large figures and tables may span both columns. Place figure captions below the figures; place table titles above the tables. If your figure has two parts, include the labels “(a)” and “(b)” as part of the artwork. Please verify that the figures and tables you mention in the text actually exist. **Please do not include captions as part of the figures. Do not put captions in “text boxes” linked to the figures. Do not put borders around the outside of your figures.** Use the abbreviation “Fig.” even at the beginning of a sentence. Do not abbreviate “Table.” Tables are numbered with Roman numerals.

Figure axis labels are often a source of confusion. Use words rather than symbols. As an example, write the quantity “Magnetization,” or “Magnetization *M*,” not just “*M*.” Put units in parentheses. Do not label axes only with units. As in Fig. 1, for example, write “Magnetization (A/m)” or “Magnetization (Am−1),” not just “A/m.” Do not label axes with a ratio of quantities and units. For example, write “Temperature (K),” not “Temperature/K.”

Multipliers can be especially confusing. Write “Magnetization (kA/m)” or “Magnetization (103 A/m).” Do not write “Magnetization (A/m) × 1000” because the reader would not know whether the top axis label in Fig. 1 meant 16000 A/m or 0.016 A/m. Figure labels should be legible, approximately 8 to 12 point type.



Fig. 3 Mapping nonlinear data to a higher dimensional feature space

## References

Number citations consecutively in square brackets [1]. The sentence punctuation follows the brackets [2]. Multiple references [2], [3] are each numbered with separate brackets [1]–[3]. When citing a section in a book, please give the relevant page numbers [2]. In sentences, refer simply to the reference number, as in [3]. Do not use “Ref. [3]” or “reference [3]” except at the beginning of a sentence: “Reference [3] shows ....”.

Number footnotes separately in superscripts (Insert | Footnote).[[2]](#footnote-2) Place the actual footnote at the bottom of the column in which it is cited; do not put footnotes in the reference list (endnotes). Use letters for table footnotes (see Table I).

TABLE I

Units for Magnetic Properties

|  |  |  |
| --- | --- | --- |
| Symbol | Quantity | Conversion from Gaussian and  CGS EMU to SI a |
| Φ | magnetic flux | 1 Mx → 10−8 Wb = 10−8 V·s |
| *B* | magnetic flux density,  magnetic induction | 1 G → 10−4 T = 10−4 Wb/m2 |
| *H* | magnetic field strength | 1 Oe → 103/(4π) A/m |
| *m* | magnetic moment | 1 erg/G = 1 emu  → 10−3 A·m2 = 10−3 J/T |
| *M* | magnetization | 1 erg/(G·cm3) = 1 emu/cm3  → 103 A/m |
| 4π*M* | magnetization | 1 G → 103/(4π) A/m |
| σ | specific magnetization | 1 erg/(G·g) = 1 emu/g → 1 A·m2/kg |
| *j* | magnetic dipole  moment | 1 erg/G = 1 emu  → 4π × 10−10 Wb·m |
| *J* | magnetic polarization | 1 erg/(G·cm3) = 1 emu/cm3  → 4π × 10−4 T |
| χ*,* κ | susceptibility | 1 → 4π |
| χρ | mass susceptibility | 1 cm3/g → 4π × 10−3 m3/kg |
| μ | permeability | 1 → 4π × 10−7 H/m  = 4π × 10−7 Wb/(A·m) |
| μr | relative permeability | μ → μr |
| *w, W* | energy density | 1 erg/cm3 → 10−1 J/m3 |
| *N, D* | demagnetizing factor | 1 → 1/(4π) |

No vertical lines in table. Statements that serve as captions for the entire table do not need footnote letters.

aGaussian units are the same as cgs emu for magnetostatics; Mx = maxwell, G = gauss, Oe = oersted; Wb = weber, V = volt, s = second, T = tesla, m = meter, A = ampere, J = joule, kg = kilogram, H = henry.

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Capitalize only the first word in a paper title, except for proper nouns and element symbols. For papers published in translation journals, please give the English citation first, followed by the original foreign-language citation [8].

## Abbreviations and Acronyms

Define abbreviations and acronyms the first time they are used in the text, even after they have already been defined in the abstract. Abbreviations such as IES, SI, ac, and dc do not have to be defined. Abbreviations that incorporate periods should not have spaces: write “C.N.R.S.,” not “C. N. R. S.” Do not use abbreviations in the title unless they are unavoidable.

## Equations

Number equations consecutively with equation numbers in parentheses flush with the right margin, as in (1). First use the equation editor to create the equation. Then select the “Equation” markup style. Press the tab key and write the equation number in parentheses. To make your equations more compact, you may use the solidus ( / ), the exp function, or appropriate exponents. Use parentheses to avoid ambiguities in denominators. Punctuate equations when they are part of a sentence, as in

 (1)

Be sure that the symbols in your equation have been defined before the equation appears or immediately following. Italicize symbols (*T* might refer to temperature, but T is the unit tesla). Refer to “(1),” not “Eq. (1)” or “equation (1),” except at the beginning of a sentence: “Equation (1) is ... .”

## Other Recommendations

Use one space after periods and colons. Hyphenate complex modifiers: “zero-field-cooled magnetization.” Avoid dangling participles, such as, “Using (1), the potential was calculated.” [It is not clear who or what used (1).] Write instead, “The potential was calculated by using (1),” or “Using (1), we calculated the potential.”

Use a zero before decimal points: “0.25,” not “.25.” Use “cm3,” not “cc.” Indicate sample dimensions as “0.1 cm × 0.2 cm,” not “0.1 × 0.2 cm2.” The abbreviation for “seconds” is “s,” not “sec.” Do not mix complete spellings and abbreviations of units: use “Wb/m2” or “webers per square meter,” not “webers/m2.” When expressing a range of values, write “7 to 9” or “7-9,” not “7~9.”

A parenthetical statement at the end of a sentence is punctuated outside of the closing parenthesis (like this). (A parenthetical sentence is punctuated within the parentheses.) In American English, periods and commas are within quotation marks, like “this period.” Other punctuation is “outside”! Avoid contractions; for example, write “do not” instead of “don’t.” The serial comma is preferred: “A, B, and C” instead of “A, B and C.”

If you wish, you may write in the first person singular or plural and use the active voice (“I observed that ...” or “We observed that ...” instead of “It was observed that ...”). Remember to check spelling. **If your native language is not English, please get a native English-speaking colleague to proofread your paper.**

# Some Common Mistakes

The word “data” is plural, not singular. The subscript for the permeability of vacuum µ0 is zero, not a lowercase letter “o.” The term for residual magnetization is “remanence”; the adjective is “remanent”; do not write “remnance” or “remnant.” Use the word “micrometer” instead of “micron.” A graph within a graph is an “inset,” not an “insert.” The word “alternatively” is preferred to the word “alternately” (unless you really mean something that alternates). Use the word “whereas” instead of “while” (unless you are referring to simultaneous events). Do not use the word “essentially” to mean “approximately” or “effectively.” Do not use the word “issue” as a euphemism for “problem.” When compositions are not specified, separate chemical symbols by en-dashes; for example, “NiMn” indicates the intermetallic compound Ni0.5Mn0.5 whereas “Ni–Mn” indicates an alloy of some composition NixMn1-x.

Be aware of the different meanings of the homophones “affect” (usually a verb) and “effect” (usually a noun), “complement” and “compliment,” “discreet” and “discrete,” “principal” (e.g., “principal investigator”) and “principle” (e.g., “principle of measurement”). Do not confuse “imply” and “infer.”

Prefixes such as “non,” “sub,” “micro,” “multi,” and “"ultra” are not independent words; they should be joined to the words they modify, usually without a hyphen. There is no period after the “et” in the Latin abbreviation “*et al.*” (it is also italicized). The abbreviation “i.e.,” means “that is,” and the abbreviation “e.g.,” means “for example” (these abbreviations are not italicized).

An excellent style manual and source of information for science writers is [9].

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# Conclusion

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Appendix

Appendixes, if needed, appear before the acknowledgment.

Acknowledgment

This longitudinal study has been facilitated principally by ME’s sons and daughter-in-law, who have provided repeated access to the subject and have recorded and/or videotaped many of her performances. Craig Sapp has provided considerable technical support. The collection of peer data has been enabled by sundry friends, acquaintances, activities directors, and most recently by a genetics researcher, Dang Vu-Phan (of the Singapore Genome Institute) with an interest in a cross-cultural study of musical improvisation in very elderly subjects.

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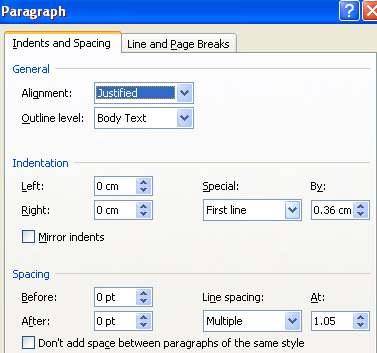


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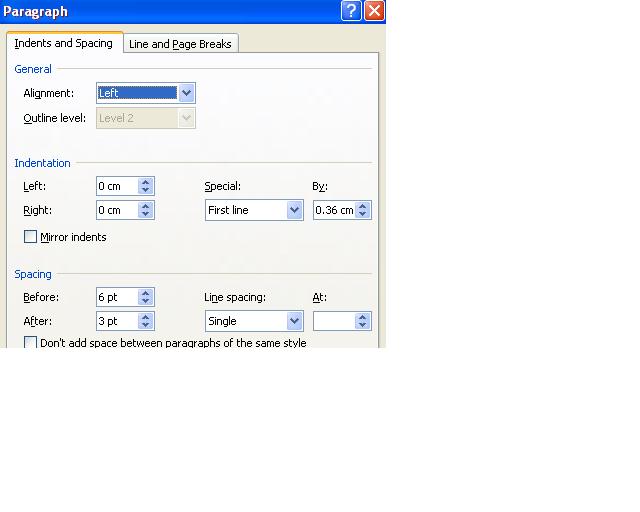


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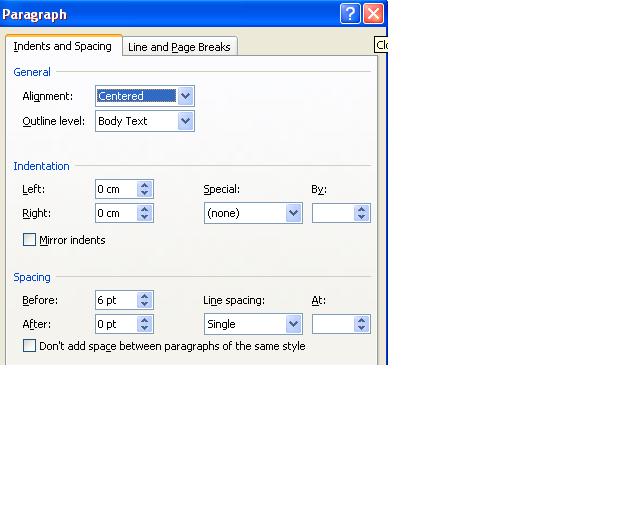


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TABLE I

Units for Magnetic Properties

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1. Eleanor Selfridge-Field is a consulting professor of music at Stanford University, Braun Music Center #130, 541 Lasuen Mall, Stanford, CA 94305-3076, USA ([esfield@stanford.edu](mailto:esfield@stanford.edu)). She conducts digital research at the Center for Computer Assisted Research in the Humanities, an affiliate of the Packard Humanities Institute (Los Altos, CA 94022).

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