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A Reading List for Undergraduate Mathematics Majors: A Personal View

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This has been a reflective year. Early in September I realized that I was starting my twenty-fifth year of college teaching. Those days and years of teaching were ever present in my mind. One day in class I mentioned a book (I forget which one now) that I thought my students (mathematics majors) should read before graduating. One of them asked for a list of such books—a wonderfully reflective idea!

One list was impossible, but three lists were not. As I thought about the various books I had read and suggested to students over the years I discovered that I could divide them into three, not necessarily mutually exclusive lists. an immediate caveat: I do not claim to have read all possibilities and that these are the winners; there is some bias of ascertainment working here. Moreover, in advance, forgive me if your favorites are not listed. I would love to hear about them.

The three lists are titled: Classics, Bedsides, Larks' Songs.

There are some reasons to the order in each list; I will leave those for you to discover. The lists are annotated here and there.

Classics

1. Alice's Adventures in Wonderland and Through the Looking Glass, Lewis Carroll.
    How could I not start with these two? Martin Gardner's annotated edition will set these in the various contexts you will need.

2. Flatland, Edwin Abbott.
    May I suggest the new edition with Thomas Banchoff's introduction. There are other equally interesting modern books on these ideas, but Abbott's is the classic.

3. Elements, Euclid.
    One does not need to real all the books of the Elements, but do cross the Pons Asinorum until Proposition 29.

4. Science and Hypothesis, Henri Poincare.

5. A Mathematician's Apology, G.H. Hardy.

6. History of Mathematics, Carl Boyer.
    There are perhaps more thorough histories, but for ease of reference and early accessibility for nascent mathematics majors this history is best.

7. History of Calculus, Carl Boyer.
    Students, do not read this until after you have finished your calculus sequence.

8. Adventures of a Mathematician, Stanislaus Ulam.

9. The Mathematical Experience and Descartes' Dream, Philip Davis and Reuben Hersh.

10. Mathematics and the Search for Knowledge, Morris Kline.

11. Infinity and the Mind, Morris Kline.

12. Zen and the Art of Motorcycle Maintenance, Robert Persig.

These last six are classics in their own right.

Bedsides

1. A Wrinkle in Time, Madeleine L'Engle.
    If you have not read this as a child, read it in college.

2. ...And He Built a Crooked House, Robert Heinlein.
    This is just to get you started with short stories. Others that may interest you are The Purloined Letter by Edgar Allen Poe or A Subway Named Möbius by A.J. Deutsch.

3. The Lives of the Cell and The Medusa and the Snail, Lewis Thomas.

4. The Dragons of Eden, Carl Sagan.

5. Other Worlds, Paul Davis.

6. Grammatical Man, Jeremy Campbell.

   These four present views of mathematics and the use of mathematics from outsiders.

7. Breaking the Code, Hugh Whitmore.
   A perfect play for one or two nights of reading about Alan Turing. If you want more, read Alan Turing: The Enigma by Andrew Hodges.

8. What is the Name of This Book, Raymond Smullyan.
   An enjoyable way to learn about Gödel's Theorem.

9. Metamathematical Themes, Douglas Hofstadter.
   Many of the chapters are articles when Hofstadter was serving as the mathematics writer for "Scientific American."

10. Jurassic Park, Michael Crichton.
    The hero is a mathematician. The villain is a computer scientist.

Larks' Songs
   This list could appear without comments, but I will indulge.

1. The Ascent of Man, Jacob Bronowski.
   Although having been around a while, it (the book or films) is not dated. If you can, see the films not the videos. Watching and listening to Bronowski in a darkened room is enthralling. In the same vein is Civilization by Kenneth Clark.

2. The Structure of Scientific Revolutions, Thomas Kuhn.
   Kuhn's book and his ideas are so important to science and the philosophy of science that every mathematics major should know them.

3. The Mind Body Problem, Rebecca Goldstein.
   To many of you this book may be unknown, but what an eye-opener when you read it.

4. Godel, Escher, Bach, Douglas Hofstadter.
   Although some of the information on Artificial Intelligence should be updated, this lark's song is still melodious.

5. The Emperor's New Mind, Roger Penrose.
   Penrose has in one book organized disparate areas into a beautiful whole.

   So there are the lists. Over a four year period (now maybe five) a mathematics major should be able to complete them with ease. You may suggest different entrants to my lists. I would enjoy hearing from you.