Historical sketch of Women in STEM Disciplines and Careers
with a focus on three disciplines: chemistry, mathematics, and computer science

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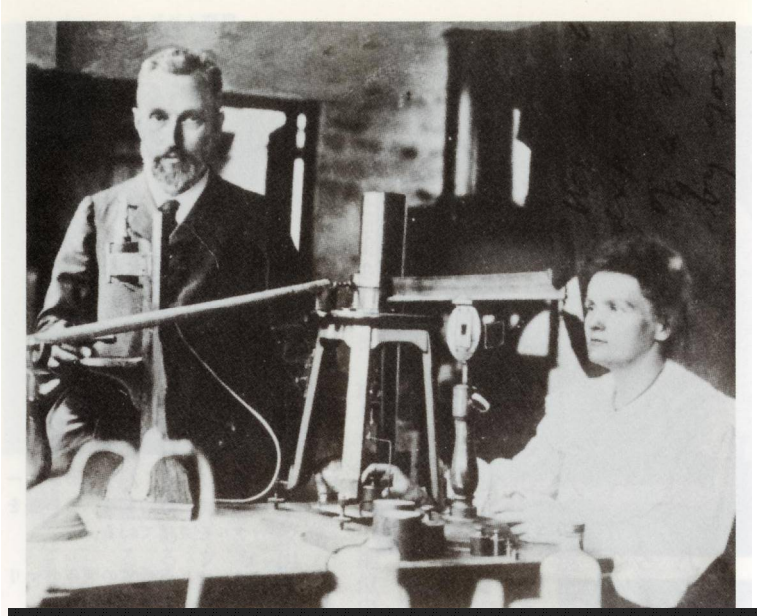
Women in Chemistry

2011 is the International Year of Chemistry. It is due to the Nobel Prize in Chemistry by Marie Curie in 1911, which was her second Nobel Prize following in Physics in 1903.

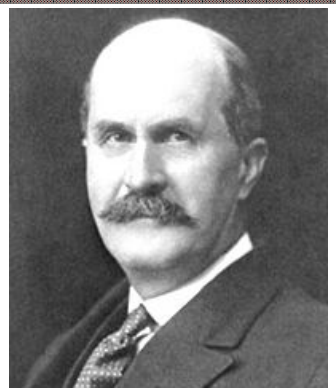
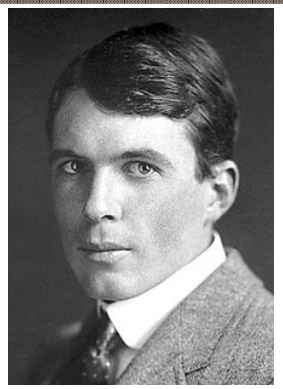


The most famous dual-career academic couple in the world

- As in H. Etzkowitz's recent idea of a "Vanishing Box" highly-trained women who disappeared from academic bench science have reappeared at the interface between science and economy.
- Female students who major in chemistry are not so few now, but female chemists were few in the past. **WHY?**

Laboratory work is hard for women to continue their research

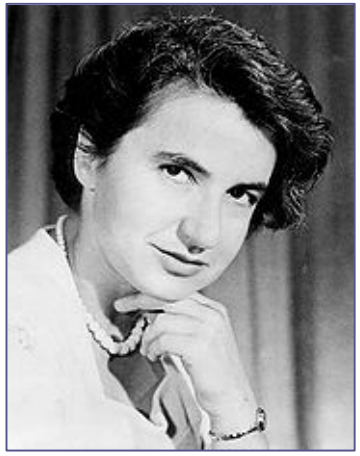
- Many chemists are engaged in laboratory work.
- It is hard to do experiments without belonging to an organization.
- Doing research at the individual level is difficult in chemistry.
- Cf. women who were interested in mathematics can do research at home. See *Ladies Diary*.
- Higher education and access to the lab are essential for women to continue their careers.

W. H. Bragg and his son raised many female crystallographers.

Kathleen Lonsdale (1903–1971)
She was the first woman elected a Fellow of the Royal Society and the first woman president of the BAAS.

Rosalind Franklin 1920-58
She was an expert of X-ray crystallography. Her X-ray photography was crucial for determining the structure of DNA.



Most prominent three chemists

The English chemist Dorothy Crowfoot Hodgkin 1910-94 was awarded the Nobel prize for chemistry in 1964

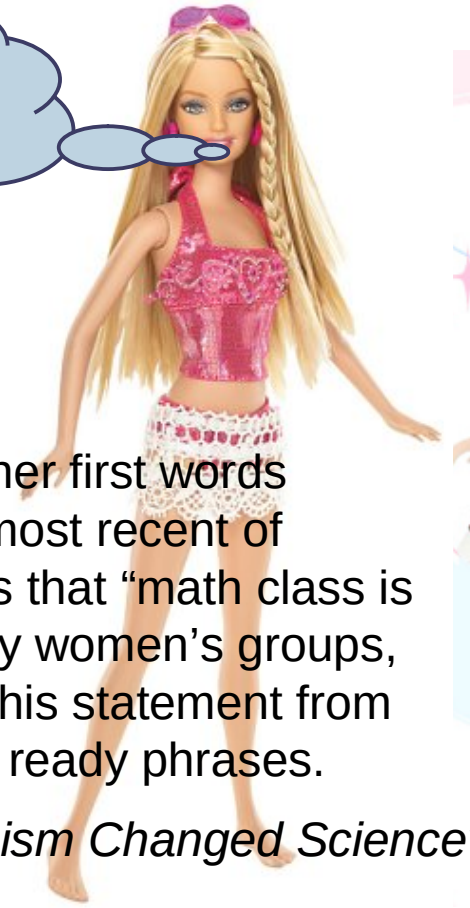
Environment & Encouragement

What is a common characteristic of popular dolls?

Barbie

Most popular doll in the world

Math class is tough !



When Barbie uttered her first words in 1992, she told the most recent of her 800 million owners that “math class is tough.” After protest by women’s groups, the makers removed this statement from the doll’s repertoire of ready phrases.

Schiebinger, *Has Feminism Changed Science?*

Licca

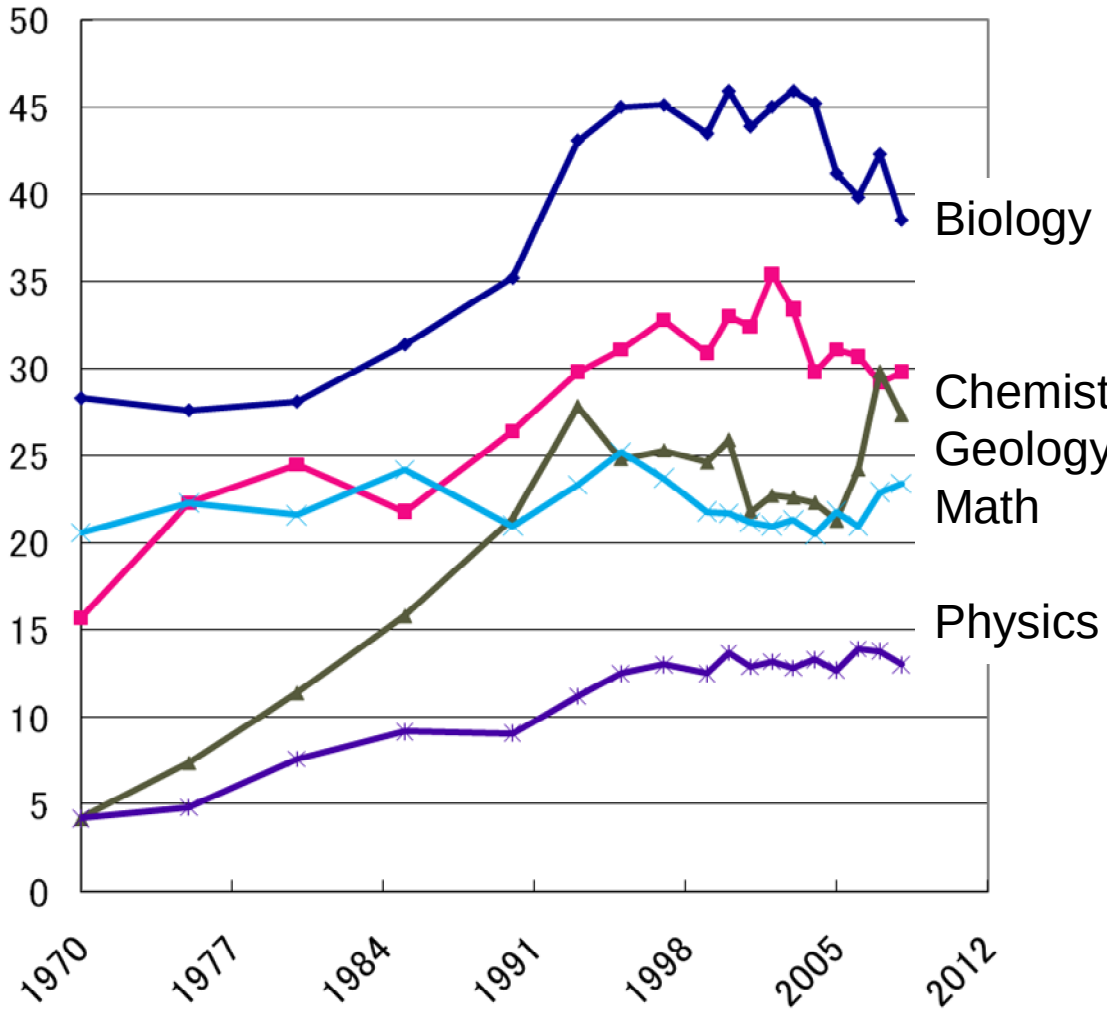
Most popular doll in Japan

Born in 1967

Dad: French musician
Mom: Japanese designer and boutique owner

She is good at art and music, but poor at math.

Horizontal segregation in Japan



Proportion of Female Students in Sciences

In spite of the modern Math myth (a deep-rooted prejudice that women are poor at Math), there are many women who like Math.

And we can find in the history not a few women who were good at mathematics.

Women in Mathematics

Hypatia
About A.D. 360-A.D. 415

the first notable woman in mathematics

Planet-facts,com/hypatia

Maria Gaetana Agnesi
(1718-1799) Italy

She is “the first important woman mathematician since Hypatia”.

From Wikipedia

Émilie du Châtelet 1706-1749

A lover of Voltaire
Her best achievement is her translation and commentary on Isaac Newton’s work *Principia Mathematica.*

From Wikipedia

The Ladies Diary


The LADIES Diary:
OR, THE
Woman's ALMANACK,
For the Year of our LORD, 1725.
Being the First Year after LEAP-YEAR.
Containing many Delightful and Entertaining *Particulars*,
Peculiarly Adapted for the *Use* and *Diversion* of the
FAIR-SEX.
Being the Twenty second ALMANACK ever Publish'd of that kind.
1. HAIL! happy LADIES of the *BRITISH* Isle.
Or whom the GRACES and the MUSES smile,
2. LONG had your lovely *Shape*, and matchless *Mein*,
The Wonder of our Neighbouring Nations been;
3. NATURE to make your *Triumph* more compleat,
To peerless CHARMS has added peerless WIT.
4. NO [illegible] HOST,
Nor their SEMIRAMIS th' *Assyrian's* boast:
WIT joyn'd to BEAUTY, *Fame* shall now record;
Which lead more Captive than the Conquring Sword
Printed by *A. Wilde*, for the Company of *Stationers*, 1725.

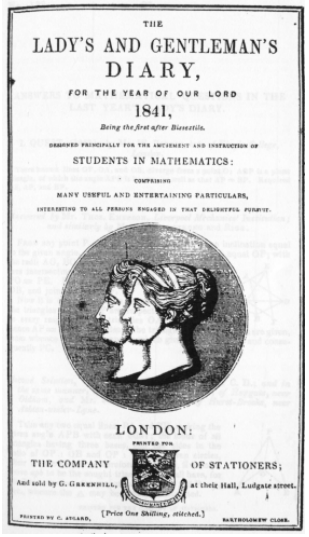
1725

1807


THE LADIES' DIARY:
OR,
WOMAN'S ALMANACK,
FOR THE YEAR OF OUR LORD 1807;
Containing New Improvements in ARTS and SCIENCES, and many entertaining PARTICULARS:
DESIGNED FOR THE USE AND DIVERSION OF THE
FAIR SEX.
The Hundred-&-fourth Almanack published of this Kind.
LONDON:
PRINTED FOR THE COMPANY OF STATIONERS,
And sold by G. GREENHILL, Treasurer, at their Hall, Ludgate-Street.
[Price, Stitched, One Shilling and Ten Pence.]


THE LADIES' DIARY,
FOR THE YEAR OF OUR LORD
1840,
FAIR SEX.
The Hundred and Thirty-seventh Almanack published of this Kind.
LONDON:
THE COMPANY OF STATIONERS;
[Price One Shilling, stitched.]

1840


THE
LADY'S AND GENTLEMAN'S
DIARY,
FOR THE YEAR OF OUR LORD
1841,
STUDENTS IN MATHEMATICS:
LONDON:
THE COMPANY OF STATIONERS;
[Price One Shilling, stitched.]

1841

- In the 18th and 19th centuries, women enjoy solving mathematical problems for a contest in England.
- Designed specifically for the amusement and entertainment of women with an appendix of curious and valuable mathematical papers for the use of students.

Philippa Fawcett 1868-1948

He who achieved the highest mark in mathematics of the University of Cambridge, 1748-1909 was called a Senior Wrangler. Phillipa Fawcett was the first woman to be the top performer in mathematics in 1890. At the time, women were not officially ranked, although they were told how they had done compared to the male candidates, so she was ranked "above the Senior Wrangler". Besides her, there were some female Wranglers, but not senior nor second.

From Wikipedia

Charlotte Angas Scott 1858-1931

She completed her Cambridge Mathematical Tripos exams, and Obtained her Ph.D, from the University of London

Mac Tutor History of Math Archive

Grace Chisholm Young 1868-1944

She marked almost equivalent to a Senior Wrangler. She received her Ph.D., magna cum laude, from Göttingen in 1874.

Isabel Maddison 1869-1950

She passed the Cambridge Tripos in 1892.
She received her Ph.D. from Bryn Mawr in 1896.

Who are world famous female mathematicians？

Sofia Kovaleskaia
1850-1891 【Russia】
Prof. Stockholm University

Emmy Noether
1882-1935
【Germany】
Bryn Mawr College

Julia Robinson 1919-1985
【US】Prof. at Berkeley

professor and director of research at the Institut de mathématiques de Jussieu at the University of Paris VI

Dr. Claire Voisin
【France】

Women in Computer Science

Running COBOL on a UNVACII

The first programmer

Countess Lovelace 1815-52

Lord Byron's daughter, Ada


From Wikipedia

Grace Hopper 1906-92

She worked for the U.S. Navy, and was engaged in the development of the first BINAC and later UNIVAC,

She was mainly involved in designing software for digital computers.

www.computerhistory.org/timeline/?year=1952

Mary Kenneth Keller unknown-1985

She is believed to be one of the first women who received a Ph.D. in computer science in the U.S.

She became professor in computer science at the University of California.

Historical Presence of Women – Pre the 1960s

- Women's status in Chemistry has been limited. Laboratory work has made it difficult for women to continue their research while maintaining their private life.
- Women's status in Mathematics has not been as problematic as Chemistry historically. But the mathematical myth (that women can't do math) needs to be overcome.
- Women's status in Computer Science was emergent because this was a new field for both sexes. Non-dependence of working location could have enabled women's participation.

Global Issues (message from Huyer)

- Much literature is from Western Europe & North America. → Need to engage with multilingual literature for broader global coverage.
- Developing countries – still new in science, so information difficult to locate.
- Colonial past and path to independence → implications for women's participation in science.
- Chemical industry – capital-intensive & mobile, so new labor forces developed as capital moves. Need to consider the interaction of gender within contexts.