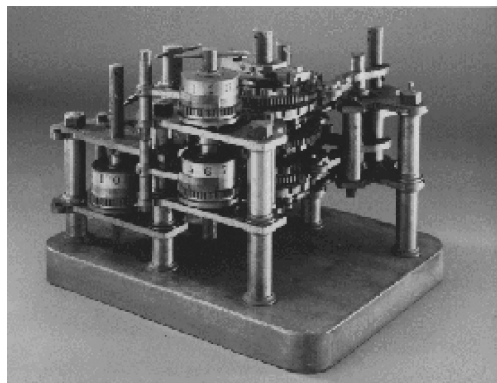


A PIECE OF THE ACTION

A rare relic from the dawn of the computer age - a section of Babbage's Difference Engine No.1 - is expected to set the digits rolling when it is offered in the Fine Instruments sale to be held at Christie's. This is the first opportunity to acquire an object that holds such a significant place in computing history and it is anticipated that the section could raise upwards of £50,000.

Created by Charles Babbage, (1791-1871) to eliminate the errors prevalent in mathematical tables, the computer was designed to function by a process of repeated additions performed by trains of gear wheels. Known as the Difference Engine, it was developed with the support of government money between 1823 and 1833. The designs were never completed and the grant was withdrawn, however the sections built at that date proved that Babbage's design would have worked. The part of the Difference Engine to be sold by Christie's is one of six assembled in 1879 from the remaining components of the original Engine by Babbage's son, Henry. He sent one of these sections to his grandson in New Zealand, where it has remained with the family ever since. It is this section which is offered for sale.

For more information on this particular sale at Christie's, contact: Christopher Proudfoot or Michael Pritchard Christie's South Kensington 85 Old Brompton Road London SW7 3LD Tel: +44 171 581 7611 Fax: +44 171 321 3321 email: babbage@londonmail.co.uk.



A section of Difference Engine No 1

RELATIONSHIP WANTED

Leader of Radical religious sect Sign of Theta is seeking companionship. Must be Ys and seeking f/ship, poss. marriage. Blood sacrifice OK. No X.

PLANE CRASH

An unidentified object was shot down over Roswell, TX late this afternoon. It is believed to have been the coordinate plane.

LOG 'A' RHYTHM

African Drummers appearing yesterday only!

BOOK VIEWS

We would like to give credit to the following sources for material used in this project:

Ada, A Life and a Legacy, Dorothy Stein, The MIT Press, Cambridge, MA 1985.

"Princess of Parallelograms and Her Daughter: Math and Gender in the Nineteenth Century English Aristocracy", Judith S. Lewis, Department of History, University of Oklahoma, from The Ada Project, yale.

Ada, Enchantress of Numbers, ed. Betty A Toole, Strawberry Press, Mill Valley CA, 1992.

Math Equals, Teri Perl, Addison-Wesley, 1978.

A Geometrical Treatise on Conic Sections, 5th ed, 1875.

S. Kovalevskaya Her Life and Work, Great Men of Russian Science, Polubarinova-Kochina, Moscow, 1957.

Mathematics for the Minority, Clements (Ken), Deakin University Press, 1989.

Gender and Mathematics, Leone Burton ed, Cassell Educational, 1990.

Real Girls Don't Do Maths, Sue Willis, Deakin University, 1989.

Introductory Mathematics, Petocz, Petocz and Wood, Thomas Nelson Australia, repr 1993.

Biography of Ada Lovelace written by Kellie Hocking, Class of 1996 (Agnes Scott College) their www site

<http://math.furman.edu/~woodard/maout.html>—Mathematical Quotation Server

<http://aleph0.clarku.edu/~djoyce/mathhist/timeline.html>—History of Mathematics: Timeline

<http://euclid.math.fsu.edu/Science/Library.html>—The World-Wide Web Virtual Library: Mathematics

<http://www.groups.dcs.st-and.ac.uk:80/~history/>—History of Mathematics

<http://www.cs.yale.edu/HTML/YALE/CS/HYP/lans/tap/tap.html>—The Ada Project

<http://www.scottlan.edu/iriddle/women/women.htm>—Women Mathematicians

<http://www.cs.umd.edu/~gibson/wim.html>—Women in Mathematics (WIM) at UMC

<http://tweedledee.ucsb.edu/~kris/WIS.html>—Women in Sciences and Engineering

<http://solution.maths.unsw.edu.au/htdocs/ams/amswelcome.html>—Australian Math Society Welcome Page

<http://www.nag.co.uk—Ada Places>

<http://glwww.epfl.ch/Ada/>—Home of the Brave Ada Programmers

<http://archives.math.utk.edu—Mathematics Archives WWW Server>

<http://www.hal.com/~landman/Hypatia/>

<http://www.cs.yale.edu/HTML/YALE/CS/HYP/lans/tap/past-women.html>—Past Notable Women of Computing

<http://ei.cs.vt.edu/~history/TMTCTW.html>—The Machine That Changed the World

<http://cbi.itdean.umn.edu/cbi/charles.htm—charles.htm>

<http://www.comlab.ox.ac.uk/archive/other/museums/computing.html>—The Virtual Museum of Computing

<http://www.comlab.ox.ac.uk/oucl/ftp://ftp.ee.xt.org/pub/Politics/Feminism/ReadingRoom/HISTORY/Biographies/hypatia-of-alexandria.gzusers/jonathan.bowen/babbage.html>—Babbage.html

<http://www.comlab.ox.ac.uk/oucl/users/jonathan.bowen/babbage.html>—The Babbage Difference Engine

<http://www.londonmail.co.uk/babbage/history.htm>

<http://ftp.etext.org/pub/Politics/Feminism/ReadingRoom/History/Biographies/hypatia-of-alexandria.gz>

<http://www.falls-church.va.us—Lady-Lov.txt>

Of all these, **Math Equals** was our favourite, and many of our examples were constructed only after we understood the way **Math Equals** had explained things.

Oh yes, the ad from Christie's is real and current!

THE LIFE OF THE MIND DESTROYS THE LIFE OF THE BODY

The priest Khryse is quoted as saying this in The Firebrand by Marion Zimmer Bradley (Sphere, 1987) - to Helen of Troy's sister-in-law, Cassandra. From as far back as we have the ability to see, religion and custom have been instruments of ignorance.

We can see from Hypatia's murder that even fifteen centuries ago men were murdering people with enquiring minds, who dared speak out against the ruling order. Totalitarian rule requires blind adherence to patriarchal authority without question. Religious rule requires blind adherence to the spiritual intercession of God's representative. Most societies have been, are, or will be subject to

either one of these régimes.

Mathematics, philosophy and science have always been regarded as the most potentially dangerous kinds of knowledge because they relate to the natural world and the order of things - concepts which are commonly divined to be in the province of some other-than-earthly power.

The cycles described so eloquently in mathematical theorems also apply to the ebb and flow of the art (or science itself), and to those who practice it.

Women have been allocated the label "the weaker sex" through the Christian era, and denial of opportunity has been attached to the perceived frailty of the female body. Ada

Lovelace's even believed that illness was caused by "too much mathematics".

Despite this attempt to discourage people, and particularly women, in maths and sciences, a surprisingly large number of women have succeeded in becoming great mathematicians.. Surprising because as much as all the difficulties and dangers of undertaking this quest for knowledge apply to men, they apply to women doubly.

Women who have succeeded in this field often have wealth and education. Those that do not must be extraordinarily committed to persuade those around them that they must be allowed to continue to learn.

One thing that all successful women in this field have are mentors who support them. Often it is a parent who is a mathematician, like Hypatia, or a lecturer who will smuggle notes out to a girl, like du Châtelet. It is this faith and support, and the unstinting drive of an artist who lives to express their vision - not a difference in spatial perception or statistical advantage or disadvantage - which will ensure we continue to have great mathematicians, both male and female, despite Nitrian monks, Dark Ages, Spanish Inquisitions, witch hunts, intelligentsia purges, McCarthyism and the glass ceiling.

ON ASSIGNMENT - CHICKS IN MATHS

We began as a group of three, each being allocated "a person" to cover, with the objective of meeting up to discuss the other aspects of the project.

Then half way through, one of us dropped out, without a whisper, and - more importantly - without their doing their share of the work! Dismay! Despair! As we watch the class numbers dwindle (and perhaps anxiously watch each other for signs of imminent departure)...

This meant, in effect, that we both worked harder to make up for lost time. Meetings to discuss progress was pretty much confined to class, being just after work for the day shift person, and just before work for the night shift person.

Like Ada, we had most problems - inspiration, missing pages in library books, bits of information missing or thrown out at the last moment, "can I change this?", lack of space! Although there are lots of sources of information, most of them were similar because they all relied on the same sources. So many of them seemed to say the same thing that it was hard to come up with something fresh and still informative.

The absence of written work by Hypatia

makes it more difficult to really understand her work, but accounts of her death certainly show lots of creativity (particularly the one where her flesh was scraped from the bones with oyster shells!)

The uncertainty about Maria Agnesi's end could not be cleared up anywhere. Information on the construction of the curve was also hard to find (thank you Math Equals!).

Ditto the workings of the Difference Engine. The fact that there was (or actually wasn't) one was all over the place. The illustration of how it would work is made up by us, based on the discussion of finite difference, again in Math Equals.

Constructing the Witch, Hypatia's conic sections, and the difference engine illustrations also ensured that even if we did not understand them completely at the beginning, we sure do now. But we still don't know if we really know what a Diophantine Equation is, or whether there are other methods of working them out. Or whether our assessment of how to construct a conic section using the formula was correct! We tried it and it seemed to work... The equation of an ellipse continues to elude us, and I am sure the search will extend past

the due date for this project.

There was simply not enough room left for a detailed discussion on questions 1 and 9 - although both of us feel very strongly that the cyclical nature of the growth and death of philosophy and science, (and indeed the philosophy of science) touched on above does and will continue to govern our knowledge about ourselves and our universe.

It was this aspect of the research which brought the most surprising result. The one of us who had joined the course with the initial idea of pursuing Science discovered a fascination with the philosophical nature of mathematics - its artistic and natural side. And the arts-directed one of us is fascinated by the relationship of the natural rhythms and curves and cycles to mathematical constructs, and wants more mathematical education!

The inspiration for the format came from the Ladies Diary: or, the Woman's ALMANACK, a booklet for the "use and diversion of the fair-sex" published in the eighteenth and nineteenth centuries. It is in a publication of this kind that people such as Mary Somerville read puzzles that inspired their imagination and provided some entertainment as well as elucidation.