A SHORT ACCOUNT OF SOME WOMEN IN MATHEMATICS,
ENGINEERING AND ASTRONOMY

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Editor's Note: This paper may serve as a greeting to the United Nations Fourth
World Conference on Women to be held in Beijing in September, 1995. It is also the
first paper contributed to the new column "The History of Mechanics" in our journal,
which was set up also at the suggestion of Dr. Johnson.

We will welcome further contributions on that line.

We begin by pointing out that up to 1990 it is not easy to find outstanding women in
the scientific fields embraced by the title above. The writer felt prompted to attempt this
after working on a paper about Newtonianism entering France widely, in the 18th century
and for which MME. du CHATELET (1706-1749), served as a notable vehicle. She was
encouraged by Voltaire to translate Newton's Principia Mathematica, which had first been
published in England in 1687 (the third edition appearing in 1724), after living with him
during the years 1734-1748; her book appeared in 1759, ten years after her death. The
author's aim was to search out other notable women mathematicians and scientists. In
the first instance, he restricted his aim to women of more than about two generations ago,
because there would be now so many to consider in the fields surveyed and because it takes
at least half a century for new distinguished women to emerge and be recognised.

Besides Mme. du Chatellet the author has selected some fourteen other women and
presents a short biography about them and their contributions. It is necessary to identify
and appreciate these women because they are hardly to be distinguished from among very
many men. Once we know the women we can then begin to study them as a class and
perhaps draw generalizations about them and the work they have done and why there are
so few of them. Bringing to the fore the names I have chosen, finds more than one half
who would be on everybody's list charged with the writer's task. A small number I have
included and who they are, will be obvious to the reader, because they have as yet purely
national or local interest. I therefore review all these women in brief but for a fuller account
of each, the reader is referred to the writer's longer paper of the same title in the Journal

By many centuries is HYPATIA OF ALEXANDRIA (c.370-415 A.D.), the earliest
and most prominent female who claims our attention. She was the daughter of the Head of
the famous museum established at Alexandria on the Nile delta, living during the collapse
of the West Roman Empire. She was trained by her father and her major interests were

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astronomy — descriptions of the planetary system, and pure mathematics — conics and arithmetic or the theory of numbers and of reckoning. The Christian church in the 4th century A.D., was in the throes of sectarian conflict and since Hypatia was non-Christian, under Bishop Cyril of Alexandria a mob was incited to attack and kill her. Her story is told by Charles Kingsley in his novel, *Hypatia*, 1853. This ‘Christian’ act is seen by Edward Gibbon in the *Decline and Fall of the Roman Empire*, as a great stain on the history of the early church.

**LAURA BASSI** (1711–1778) was a Professor of Anatomy in the University of Bologna who also lectured mathematics and a kind of experimental physics. She published very little — she had twelve children — but clearly left behind a remarkable reputation so that when wishing to become a member of the Bologna Academy of Sciences, even Voltaire courted her support.

A contemporary of Bassi was **MARIA AGNESI** (1718–1791) who published her two-volume book in 1748, *Instituzioni Analitiche ad uso della Giovane Italiana* (Analytical Principles for the use of Italian Youth). This work, highly acclaimed in Europe, was translated into English by Professor John Colson, a successor to Isaac Newton in the Lucasian chair at Cambridge during the last twenty years of his life. To do this he learned Italian, his purpose being to make available to Cambridge undergraduates reading mathematics much material which was then widely dispersed. The subject matter was mostly analysis and differential equations; it treated of Leibnizian methods of analysis as well as Newtonian fluxions. Unfortunately, the translation — *Analytical Principles for Italian Youth* — lay unpublished until 1802. Pope Benedict XIV, effectively the Head of Bologna University, in recognition of her claim, pronounced Agnesi “an honorary professor of Mathematics and Philosophy”. Agnesi was the daughter of a professor of mathematics in the university, highly precocious but one always drawn to the life of a nun. After her father’s death in 1752 she returned to Milan and thereafter lived the life of a recluse, abandoning mathematics.

One specific item on which Agnesi’s name is imprinted is a cubic equation, \( y = \frac{a^3}{x^2 + a^2} \), which, plotted, has the appearance of a witch’s cloak. This is popularly known as “the Witch of Agnesi” and referred to as such by engineering students of mechanisms. Rather than a ‘Witch’, Agnesi seems to have been a saint. She devoted herself to the welfare of the poor, sick and aged, from 1752 to the end of her life, in a ‘Benedictine’ hospice.

**ELIZABETH CARTER** (1717–1806), a well-educated 18th century English lady is included here more for tradition than originality. She was an accurate translator, widely known for her intelligence, hard work and perseverance. This lady translated from the Italian, Francesco Algarotti’s *Sir Isaac Newton’s Philosophy explained for the use of Ladies in six dialogues on Light and Colour*. It went through six editions between 1739 and 1772. Mrs. Carter received \( £1000 \) for translating this book. She wrote many other items and her conversation made her attractive to such national writers of the day as Bishop Butler, Edmund Burke and Samuel Johnson.

Our next notable French woman is **EMILIE DE BRETIGNY**, Marquise de Chatelet, much of whose relevant biography we have told in our Introduction. As well as her translation of Newton’s *Principia* she produced an influential volume, *Institutions de Physique* (Principles of Physics), many of the ideas here being Leibnizian and contrary to Newtonian attractionist theory. Emilie also had an interest in the nature of Fire and its propagation. She died in 1749, in childbirth.