Appendix A1

## 6000 BC to 1899 AD

6000 B.C. [ca]:  Ishango bone type of tally stick in use. (w)

4000-1200 B.C.:  Inhabitants of the first known civilization in Sumer keep records of commercial transactions on clay tablets. (e)

3000 B.C.:  The abacus is invented in Babylonia. (e)

1800 B.C.:  Well-developed additive number system in use in Egypt. (w)

1300 B.C.:  Direct evidence exists as to the Chinese using a positional number system. (w)

600 B.C. [ca.]: Major developments start to take place in Chinese arithmetic. (w)

250-230 B.C.:  The Sieve of Eratosthenes is used to determine prime numbers. (e)

213 B.C.:  Chi-Hwang-ti orders all books in China to be burned and scholars to be put to death. (w)

79 A.D. [ca.]:  "Antikythera Device," when set correctly according to latitude and day of the week, gives alternating 29- and 30-day lunar months. (e)

800 [ca.]:  Chinese start to use a zero, probably introduced from India. (w)

850 [ca.]:  Al-Khowarizmi publishes his "Arithmetic." (w)

1000 [ca.]:  Gerbert describes an abacus using apices. (w)

1120:  Adelard of Bath publishes "Dixit Algorismi," his translation of Al-Khowarizmi's "Arithmetic." (w)

1200:  First minted jetons appear in Italy. (w)

1202:  Fibonacci publishes his "Liber Abaci." (w)

1220:  Alexander De Villa Dei publishes "Carmen de Algorismo." (w)

1250:  Sacrobosco publishes his "Algorismus Vulgaris." (w)

1300 [ca.]:  Modern wire-and-bead abacus replaces the older Chinese calculating rods. (e,w)

1392:  Geoffrey Chaucer publishes the first English-language description on the uses of an astrolabe. (w)

1500 [ca.]:  Inca quipu reaches its highest form of development.  Use of quadrant gaining popularity in Europe. (w)

1542:  Robert Record publishes his English-language book on arithmetic. (w)

1600 [ca.]:  Modern wire-and-bead abacus first recorded in use in Japan. (w)

1612-1614:  John Napier uses the printed decimal point, devises logarithms, and uses numbered sticks, or Napier's Bones, for calculating. (e)

1614:  John Napier publishes his "Cannon of Logarithms." (w)

1617:  John Napier publishes "Rabdologia" describing Napier's bones and Multipicationis Promptuarium. (w)

1620 [ca.]:  Use of sector gaining popularity in Europe. (w)

1620:  Robert Napier publishes John Napier's work "Constructio." (w)

1622: William Oughtred invents the circular slide rule on the basis of Napier's logarithms. (e)

1623: William (Wilhelm) Schickard designs a "calculating clock" with a gear-driven carry mechanism to aid in multiplication of multi-digit numbers. It is believed to be the first true mechanical calculating machine. (e,w)

1623: "The Works of that Famous Mathematician Mr. Edmund Gunter" published. (w)

1624: Henry Briggs publishes the first set of modern logarithms. (w)

1628: Adrian Vlacq publishes the first complete set of modern logarithms. (w)

1642-1643: Blaise Pascal creates a gear-driven adding machine called the "Pascalene," the first mechanical adding machine. (e)

1650 [ca.]: Sliding stick form of the slide rule developed. (w)

1666: In England, Samuel Morland produces a mechanical calculator that can add and subtract. (e)

1666: Gaspard Schott publishes "Organum Mathematicum." (w)

1672: Samuel Morland publishes "The Description and Use of Two Arithmetic Instruments." (w)

1673: Rene Grillet describes the general form of his adding machine. (w)

1674: Gottfried Leibniz builds the "Stepped Reckoner," a calculator using a stepped cylinder gear. (e)

1774: Philipp-Matthaus Hahn builds and sells a small number of calculating machines precise to 12 digits. (e)

1777: The third Earl of Stanhope invents the multiplying calculator. (e)

1786: J.H. Mueller envisions a "difference engine" but cannot get the funds to build it. (e,w)

1801: A linked sequence of punched cards controls the weaving patterns in Joseph-Marie Jacquard's loom. (e)

1811: Luddites destroy machinery that threatens to eliminate jobs. (e)

1820: A prototype of the Thomas Arithmometer, based on Leibniz' stepped-drum principle, is demonstrated to the French Academy of Science. (e)

1822 [ca.]: Thomas de Colmar places his Arithmometer into production. It becomes the first mass-produced calculator and sells for many years. (e,w)

1822: Charles Babbage begins to design and build the Difference Engine. (e,w)

1826: Use of tally sticks abolished in England. Charles Babbage publishes his tables of logarithms. (w)

1829: William Austin Burt patents an awkward but workable typewriter, the first writing machine in America. (e)

1832: Babbage and Joseph Clement produce a portion of the Difference Engine. (e)

1834-35: Babbage shifts his focus to designing the Analytical Engine. (e,w)

1838: In January, Samuel Morse and Alfred Vail demonstrate elements of the telegraph system. (e)

1842-43: Augusta Ada, Countess of Lovelace, translates Luigi Menabrea's pamphlet on the Analytical Engine, adding her own commentary. (e)

1842: British government abandons support for the construction of Babbage's Difference Engine. (w)

1844: Samuel Morse sends a telegraph message from Washington to Baltimore. (e)

1847-49: Babbage completes 21 drawings for the second version of the Difference Engine but does not complete construction. (e)

1850: Amedee Mannheim creates the Mannheim Slide Rule. (w)

1853: The Scheutz team produce the world's first automatic difference engine. (w)

1854: George Boole publishes "An Investigation of the Laws of Thought," describing a system for symbolic and logical reasoning that will become the basis for computer design. (e)

1858: A telegraph cable spans the Atlantic Ocean for the first time and provides service for a few days. (e)

1861:  A transcontinental telegraph line connects the Atlantic and Pacific coasts. (e)

1876:  Alexander Graham Bell invents and patents the telephone. (e)

1876-78:  Baron Kelvin builds a harmonic analyzer and tide predictor. (e)

1880 [ca.]:  True variable-toothed gear invented. (w)

1882:  William S. Burroughs leaves his bank clerk's job determined to invent an adding machine. (e)

1886:  Dorr E. Felt completes his first production comptometer. (w)

1889:  Herman Hollerith's Electric Tabulating System outperforms the competition and in the fall is selected for use in the 1890 census. (e)

1890 [ca.]:  Mechanical disk-sphere-cylinder integrators developed to a usable state. (w)

1891:  Genaille-Lucas rulers described.

1893:  The first four-function calculator is invented by ........... (e)      <<< Who invented this calculator?? >>>

1895:  Guglielmo Marconi transmits a radio signal. (e)

1896:  Hollerith establishes the Tabulating Machine Company, later to become IBM.. (e,p)