# John Dee

John Dee (July 13, 1527 – December, 1608) was an eminent Elizabethan mathematician, astronomer and geographer. He was a strong advocate of imperialism and the establishment of English maritime supremacy in order to form a British Empire. He was also an astrologer, alchemist and was more than a mere dabbler in magic. He was reputed to be able to "conjure angels," using a special conjuring stone, but he was unsuccessfully prosecuted for sorcery and heresy. He is thought to have been the model for William Shakespeare's Prospero in *The Tempest*. This curious scientist was born in London, the son of a vintner held in high regard by the court of Henry VIII. At the age of 15, Dee entered St. John's College, Cambridge, where he studied mathematics and astronomy. He became a Fellow of St. John's in 1545 and the next year was one of the first Fellows of the newly established Trinity College.
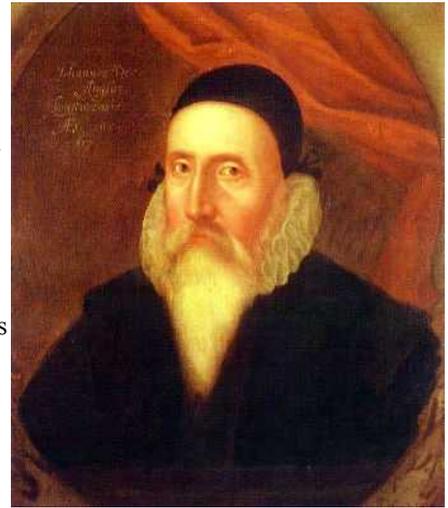
Dee traveled on the Continent (1547-1551), taking courses for two years at the University of Louvain and forming friendships with scholars in Holland and France, including Gerard Mercator, Gemma Frisius, and Jean Fernel. Dee returned to England long enough to receive a Master of Arts degree from Trinity, and brought back with him many astronomical instruments, unknown at the time in England. While in Paris, Dee gave lectures at the Sorbonne on Euclid's *Elements* and the mathematical-magical theory revived by Italian philosopher Marsillio Ficino. In 1551, Dee was offered but declined an appointment as professor of mathematics at the Sorbonne and also refused an offer to become a mathematical lecturer at Oxford. Throughout his life Dee supported himself through patronage, although the amounts he received and the regularity of the pensions were never what he hoped to receive from the English court.

Edward VI granted Dee a yearly pension after the scholar presented the young monarch with two treatises he had written. When the king died at age 16, Dee was once again in dire financial straits. He cast the horoscope for Queen Mary but enemies accused him of using enchantments against the queen's life and he was imprisoned at Hampton Court. Both the Privy Council and the Church absolved Dee of treason and heresy, and he was freed. Things picked up in 1588 when Mary died to be succeeded by her half-sister Elizabeth. Dee was asked to pick a propitious day for Elizabeth's coronation. When she became Queen, Dee became her royal astrologer. Dee was well learned in neoplatonic, kabalistic and hermetic philosophy. He consulted mediums in attempts to communicate with spirits. He thought this might help him find treasure

and ease his financial difficulties. As a practicing Christian, he tried to communicate only with angels, drawing the line at black magic. At the time it was difficult to say where the lines between astronomy, astrology, alchemy and magic were.

In 1571 Dee purchased a mansion at Mortlake on the Thames River. His home contained a well-equipped laboratory and the finest scientific library in England. Dee practiced astrology to make a living and alchemy in hopes of finding the elixir of life and the Philosopher's Stone. He saw a vision of the angel Uriel, who gave him a convex piece of crystal to use in communicating with the spirit world. As it took powerful concentration on his part to call up visions of spirits, it was impossible for him to write down what he saw and heard. A good scientist, he decided he needed an assistant. His partner in crystal gazing was Edward Kelly, a bad tempered Irishman, who began his career as a lawyer and an apothecary but was arrested for forgery and was sentenced to having his ears cut off. The two formed a partnership when Kelly presented Dee with a withered manuscript, which dealt with the Philosopher's Stone and the methods of finding it. Kelly acted as Dee's intermediary, gazing into the crystal and summoning spirits using the secret language Enochian, while Dee took notes. Dee was a scientist seeking knowledge. Kelly sought the elusive formula for turning base elements into gold. In 1585, the pair made a four-year trek across the Continent conducting readings for nobility and royalty. They had a falling-out because of Kelly's explorations of a book called *The Necronomicon*, which frightened both Dee and his family. Later Kelly killed a man in a duel and was imprisoned. While trying to escape he fell and broke his leg, which led to a ghastly amputation. He made another unsuccessful escape attempt and broke his other leg. He died soon after, perhaps at his own hand.

In 1595, while Dee was on the Continent, mobs ransacked his home, stealing and destroying many of his possessions because they believed he was familiar with the Devil. The Queen confiscated his collection of 4000 rare books and 700 manuscripts, many of which are now in the British Museum. After he wrote a letter of self-justification to "her most excellent Maiestie Royall," he was restored to royal favor. Elizabeth gave him 2000 pounds for the damage and made him warden of Christ's College in Manchester with a pension. But Elizabeth died in 1603 and her successor James I opposed magic. Dee, who was married three times and had eight children, was forced to retire to Mortlake without the pension where he died in poverty sometime in December 1608.

Dee made no great discoveries, nor did he leave any seminal idea behind. He organized mathematics and alchemy just before the time of Roger Bacon who changed the rules of how science worked. Dee wrote 79 manuscripts but only a few were published. In 1570, he edited the first English translation of Euclid's *Elements* by Sir Henry Billingsley, who later became Sheriff and High Mayor of London. In the 50-page preface Dee offers a famous justification for studying mathematics. To show how geometry fit into the whole of science, Dee began with a large chart that he called a map of

human knowledge. He divided science into two parts, "Arithmetike" and "Geometrie" Everything else in science flowed from these branches of mathematics. Many suspect that part or all of the translation is actually the work of Dee, who only attributed it to Billingsley in order to win the nobleman's patronage. In 1573, Dee wrote *Parallacticae commentationis praxosque* that contained trigonometric methods for determining parallax of the new star of 1572.

Dee also wrote on navigation, geography and calendar reform. From 1551 to 1583, he was the advisor to English voyages of discovery. For 32 years Dee prepared nautical information, including charts for navigation in the Polar Regions, for the Muscovy Company. It had been formed in 1555 by the navigator and explorer Sebastian Cabot, the son of famed navigator John Cabot, together with a number of London merchants. Some said that one explorer offered Dee all of Canada in exchange for his knowledge of maps.

The Julian calendar had been adopted at the council of Nicaea in A.D. 325. Unfortunately its measure of the year was eleven minutes too long, and by 16th century the error had grown to ten days. The Catholic Church created the Gregorian calendar in 1582 to fix the deficiencies. While the new calendar was accepted in Catholic countries, most Protestant nations rejected it. In England, the Secretary of State asked John Dee to examine the papal bull creating the new calendar and to give his impression of it to the Privy Council. In due course Dee delivered a 62-page treatise on the subject in which he first explained the astronomical concepts involved in producing a calendar and concluded that the Julian calendar was out of whack by not ten days but eleven days if one went back to the time of Jesus Christ. Dee recommended that the elimination of the extra days should not be done all at once but over a period of time, a day or so taken from the ends of the months May to September 1583. He felt this would minimize any disruption of contracts and covenants as well as avoiding changes in the dates of religious holidays. He proposed that the queen should publish a special calendar for 1583 incorporating the adjustments. Dee's recommendations were sent to a panel of judges, each a leading scientific figure in England. They supported Dee's calendar reform, but the Church of England delayed giving its views on the proposal. Finally the bishops reported that since the Bishop of Rome was the Antichrist, England should have nothing to do with anything he proposed. The Church's position on the matter ensured that the bill sent to parliament that gave the queen the "authority to alter and make a calendar, according to the calendar used in other countries" got nowhere.

It is easy from the vantage point of the 21st century to view John Dee as something of a fool or at least an easily deluded fellow for his inquiries into alchemy, magic, crystal gazing, and the like. But his explorations must be commended in a period where the amount of knowledge being produced in England and Europe was rather minimal. In his own way he

demonstrated an early form of the "scientific method" that perhaps readied the path for Roger Bacon's investigations, which are more acceptable to third millennium minds. While Dee's influence on mathematics and science is not great in the long run, it was considerable in his day.

Quotation of the Day: "A marvelous neutrality have these things Mathematical, and also a strange participation between things supernatural, immortal, intellectual, simple, and indivisible, and things natural, mortal, sensible, compounded and divisible." – John Dee