



By Grace Tiao

Tis true without lying, certain & most true... as all things have been & arose from one by ye mediation of one: so all things have their birth from this one thing by adaptation. The Sun is its father, the moon its mother, the wind bath carried it in its belly, the earth is its nurse. The father of all perfection in ye whole world is here. Its force or power is entire if it be converted into earth. Separate thou ye earth from ye fire, ye subtil from the gross sweetly wth great industry. It ascends from ye earth to ye heaven & again it descends to ye earth & receives ye force of things superior & inferior. By this means you shall have ye glory of ye whole world & thereby all obscurity shall ... fly from you. — Isaac Newton, “Hermes” (2)

Mercury 4pts sublimes wth 9pts of distilled salt of [symbol for antimony] & requires a dark red heat to raise it. It sublimes into a white heavy saline substance, apt to emit strong fumes after sublimation upon opening ye vessel, & grow moist in the air. Upon [symbol for iron ore] I, [symbol for antimony ore] I, sublimatum & praecipitatum metallorum I, sal metallorum 3 digested 2 days I poured this salt gradually 6pts & it fermented long & much & sent up a thick white fume & volatized a good part of ye retort in a running form, & that matter wch after ye operation was ended remained below was tastles & fusible

on a red hot iron & volatile in good measure & would not work upon ye net. — Isaac Newton, “Experiments & observations Dec. 1692 & Jan. 1692/3” (2)

Popularized grade-school introductions to the person of Isaac Newton, scientist par excellence and founding father of modern science, usually include some version of the gravity story: while he was sitting under a tree some late fall afternoon during the 1680s, an apple fell from the branches above Newton’s head, and the seeming spontaneity of its motion inspired his articulation of the law of gravity. Variants differ as to whether the apple struck him directly on the head or not; regardless, for all its mythic and religious motifs – the apple, the fall, and the enlightenment – the story is meant primarily to point to the triumph of rationalism, skepticism, observation, and reasoning – emblematic scientific characteristics – in the action of unveiling truth. And in the years of schooling that follow this introduction, we study in great detail the fruits of those attributed qualities: Newton’s theoretical work on optics, mechanics, celestial motion, the calculus.

Less well-known – in fact, almost

completely foreign to the popular conception of Newton the intellectual – is his lifelong preoccupation with matters “occult”: astrology, numerology, alchemical experimentation and speculation, ancient lore and historiography of arcana. In fact, as Newtonian scholar and historian Betty Jo Teeter Dobbs observes, “Newton’s studies in astronomy, optics, and mathematics only occupied a small portion of his time... most of his great powers were poured out upon church history, theology, ‘the chronology of ancient kingdoms,’ prophecy, and alchemy” (1). His record of alchemical experimenta-

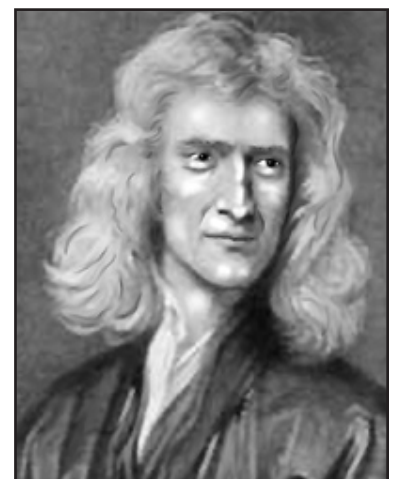


Figure 1. Issac Newton.

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tion spans almost his entire career, with the first foray into esoteric chemistry in 1669 (a brief and speculative alchemical proposition) to his last formal treatise, "Praxis," in the mid 1690s (2).

That this rather important aspect of Newton's life and his scientific activity is so rarely discussed is perhaps a symptom of fear, distaste, and our own philosophical prejudices: the muttered words of Galileo after his Church-mandated recantation of his heliocentric model of the solar system – "and yet, the earth moves" – still ring in our ears; and it seems impossible these days to open the newspaper without encountering a new episode in the seemingly endless and starkly typecast ideological battles between religious and scientific interests – battles over evolution, the origins of life, and the origins of the universe. All these things seem to point to an intrinsic incompatibility between the two, manifested in competing claims and, most importantly, competing philosophies. We assume that Newton's religious persuasion and mystical investigations could not be real or reconcilable to his more well-known work if his calculus or his mechanics were real and true as well. A religious scientist is not actually a scientist: the ethos of religion automatically tosses objectivity, skepticism, and rationalism – those essential tools of the scientist – out the window.

Yet it is clear that Newton labored under a highly aesthetic, if not fully-blown theological framework. In the General Scholium of his *Philosophiæ naturalis Principia Mathematica*, the text in which he establishes the laws of classical mechanics and universal gravitation, Newton observes after a long passage

detailing the movements of heavenly bodies:

This most beautiful system of the sun, planets, and comets, could only proceed from the counsel and dominion of an intelligent and power Being.... This Being governs all things, not as the soul of the world, but as Lord over all; and on account of his dominion he is wont to be called Lord God (3).

In short, as Henry Guerlac noted, "there is little doubt that Newton believed that God, directly or indirectly, was the cause of motion, as of everything else" (4). This is not to say that Newton allowed his firm religious beliefs to obstruct his pursuit of truth: no data was fudged, no observation was facilely explained away, and there was no fashioning or distorting of science under teleological religious stipulations. In this respect Newton was the consummate objective scientist. Rather, for him, faith constructed the seminal *why* of science – the motivation, the rationale, the intrinsic value of the pursuit of science that cannot be assigned or

articulated from within the discipline. Science, at best, achieves and sustains with its knowledge a certain level of self-consistency, and, much in the way that Gödel's incompleteness theorems showed that certain truths implied by a given system of logic (in this case, science) could not also be conclusively proven by the internal logical structures of that very system (but instead required external verification), Newton's philosophy of science held that another element was needed to pin that self-consistency down into stationary, unchanging Truth. That other element, for Newton, was God.

Newton's pursuit of science as an access to Truth required a kind of partnership between rationalism and intuition, reason and faith, objective judgment and subjective evaluation so that, viewed in a historical light, the seeming bifurcation [of Newton's mind] may be more of a modern optical illusion than an actuality. Newton's mind was equipped with a certain fundamental assumption, common to his age, from which his various lines of investigation flowed naturally: the assumption of the unity of Truth. True knowledge was all in some sense a knowledge of God; Truth was one, its unity guaranteed by the unity of God. Reason and revelation were not in conflict but were supplementary (2).

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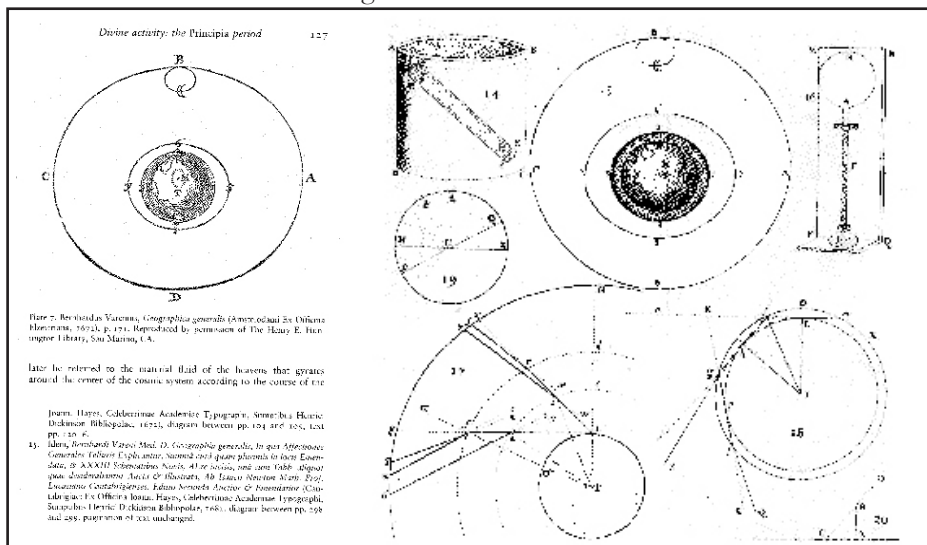


Figure 2. Examples of cosmological models of the time and the geometric manner in which it was expressed.

Famed economist John Maynard Keynes' rather quirkiest assessment of the mind of Newton went further in postulating the intellectual construction under which reason and revelation could coexist harmoniously:

Newton was not the first of the age of reason. He was the last of the magicians, the last of the Babylonians and Sumerians, the last great mind which looked out on the visible and intellectual world with the same eyes as those who began to build our intellectual inheritance rather less than 10,000 years ago... Why do I call him a magician? Because he looked on the whole universe and all that is in it as a riddle, as a secret which could be read by applying pure thought to certain evidence, certain mystic clues which God had laid about the world to allow a sort of philosopher's treasure hunt to the esoteric brotherhood... He regarded the universe as a cryptogram set by the Almighty (5).

Solving a puzzle of this complexity and importance – a puzzle constructed by God, no less – would require of the scientist both rigor and inspiration, discipline and sensitivity. His alchemical writings bear witness to that belief. Ever the meticulous observer and note-taker, Newton's experimental notes contain exhaustive detail (see epigraph); they, too, possess a kind of inscrutable mysticism and lyricism: "It ascends from ye earth to ye heaven & again it descends to ye earth & receives ye force of things superior & inferior. By this means you shall have ye glory of ye whole world & thereby all obscurity shall ... fly from you" (2).

Newton's example in some respects remains a curiosity of his age – a time and place in which a program of study in "physics" could include a survey of the entire natural world, organic and inorganic, as well as the heavenly realms of spiritual beings – a place in which a scientist was known simply as a philosopher. What could be more

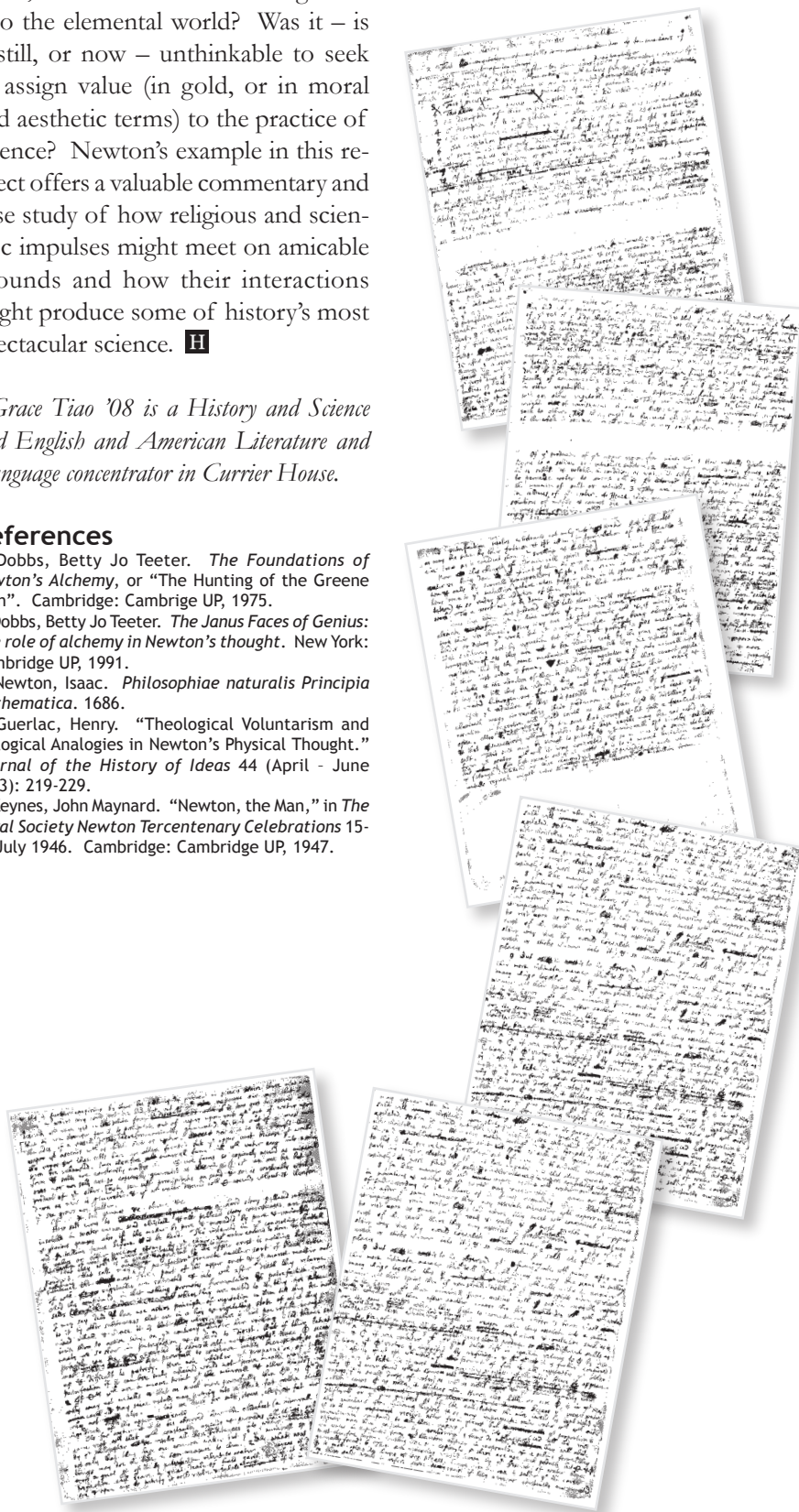
natural than to pursue, in alchemical and occult research, the philosopher's stone, the culmination of investigations into the elemental world? Was it – is it still, or now – unthinkable to seek to assign value (in gold, or in moral and aesthetic terms) to the practice of science? Newton's example in this respect offers a valuable commentary and case study of how religious and scientific impulses might meet on amicable grounds and how their interactions might produce some of history's most spectacular science. **H**

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Newton Manuscripts



credit: Betty Jo Teeter Dobbs, *Alchemical Death and Resurrection* (Washington, D.C.: Smithsonian Institution Libraries, 1990).