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Secrets

"Margaritae ad porcos"

In the Gospel according to Matthew (7: 6), Jesus says: "Do not give dogs what is holy, and do not throw your pearls before swine, lest they trample them under foot and turn to attack you." For centuries, scholars interpreted this to mean that what was precious was select, and that truths should be kept secret for their spread could be dangerous.

The idea that there was a secret knowledge of essential things – the spread of which would be disastrous – for centuries formed a dominant paradigm in European culture. Only the spread of this paradigm of secrecy, and its persistence and historical continuity, could explain the controversial force found in so many of the theories advanced by the so-called founders of the modern world: they unanimously rejected the idea upon which this secrecy was founded; namely, the difference between the learned few, or "true men," and the *promiscuum hominum genus*, or ignorant masses.

Hermetic Knowledge

The communication and spread of knowledge, and public discussion of theories (both common practices today) have not always been considered values. Rather, they have *become* values. From the beginning of European intellectual history, the importance of communicating ideas has always clashed with the belief that the mysteries of knowledge should be available only to an elite few.

The *Secreta secretorum* (which was attributed to Aristotle) was widely known in the Middle Ages. Written as a series of letters to his disciple,

Alexander the Great, the philosopher reveals the secrets of medicine, astrology, physiognomy, alchemy, and magic that were reserved for his closest followers. More than 500 manuscripts of what Lynn Thorndike has described as "the most popular book of the Middle Ages" have been identified in European libraries. Though this secret literature remained outside the medieval universities, it was widely read by the greatest figures of the new intellectual culture. At the end of the thirteenth century, Roger Bacon proposed a *scientia experimentalis* which Lynn Thorndike accurately describes as two-thirds Hermetic and not transmittable to the ignorant masses: "The wise [. . .] have either omitted these topics from their writing, or have veiled them in figurative language [. . .]. Hence according to the view of Aristotle in his book of secrets, and his master Socrates, the secrets of science are not written on the skins of goats and sheep so that they may be discovered by the multitude" (Eamon, 1990: 336).

The Hermetic view of the world and of history was strongly tied to the Gnostic and Avveroistic notion that there were two kinds of people: the simple, ignorant masses and an elect few capable of discerning truths concealed in words and symbols and so privy to the sacred mysteries. This view was clearly articulated in the *Corpus Hermeticum*, 14 treatises from the second century AD that were translated by Marsilio Ficino (1433–99) between 1463 and 1464. The texts had already circulated widely in manuscript form before their publication in sixteen editions between 1471 and the sixteenth century. Ficino attributed the treatises to Hermes Trismegistus (an attribution which persisted throughout the sixteenth and early seventeenth centuries), a legendary Egyptian god who lived at the time of Moses and was the indirect teacher of Pythagoras and Plato. The treatises rekindled an interest in magic in the late fifteenth and sixteenth centuries, and continued to influence European culture through the middle of the seventeenth century. The *Corpus* placed the great legacy of ancient and medieval magical and astrological knowledge into a broad, organic Platonic–Hermetic scheme. A search for the Unity that underlies differences characterizes the text; the desire to reconcile differences; the need for complete pacification in the One-All.

To the men of that day, there was a fine and fleeting line between natural philosophy and mystic knowledge; between a man who knows and experiments with nature and a man like Faust, who sells his soul to the devil for knowledge of the natural world and power over it. *Nature*, in the magical tradition, was not just a continuous and homogeneous matter that filled space; it was animated by a soul, a source of internal and spontaneous activity. That soul-substance was, for the Ionic thinkers of the fifth century BC, "full of gods and monsters." Every object overflowed with occult sympathies that connected it to the All. Matter

was impregnated with the divine. The stars were living divine creatures. The world was the image or reflection of God and man was the image or the reflection of the world. Things in the greater world or *macrocosm* corresponded precisely to things in the miniature world or *microcosm* (of which man himself was a prime example and reference). The plants and forests were the hair and fur of the world, the rocks its bones, and subterranean waters its veins and blood. And man, at the center of the world, represented its heart. Insofar as he was the reflection of the universe, man was capable of revealing and grasping those secret relationships. Magicians and sorcerers were figures able to penetrate the infinitely complex reality of a system of similarities and Chinese nesting boxes that led to the All and enclosed it. The sorcerer was privy to the chain of connections that flowed from the top down, and – through invocation, numbers, images, names, sounds, chords, and talismans – knew how to construct an unbroken chain of ascending links. Love was the *nodus* or *copula* that firmly bound one part of the world to the other, and which Ficino saw as "connected one to the other by a sort of reciprocal charity, [. . .] limbs of a single creature, united one to the other by the communion of a single nature." Vitalism, animism, organicism, and anthropomorphism were components of Hermetic thought, the focus of which – as Freud and Cassirer clearly saw – was the idea of an identification between the self and the world and the "omnipotence of thought."

The magical sphere was compact and totalitarian; neither easily undermined nor open to repudiation. And the wonderful deeds performed by the sorcerer confirmed that he belonged to the rank of the elect. The distinction between the elect and the masses was a necessity of secret knowledge, in which truths must remain concealed to the point of seeming unknowable. For its methods were so difficult that most men were incapable of understanding them, and its terminology was necessarily ambiguous and allusive because the procedures were so complicated, and born of the need to restrict that knowledge to the few. The fact that comprehension of the truth was achieved despite language rather than through language further confirmed that truth belonged to a select few.

It has often been observed that magic resembles both psychology and religion; yet it is neither psychology nor religion nor for that matter mysticism. Just as astrology embodied sophisticated calculations and anthropomorphic vitalism, magic and alchemy embodied mysticism as well as experimentalism. Renaissance books about magic today appear to be a strange combination of subjects. A single manual includes pages on optics, mechanics and chemistry, formulas for medicinal cures, technical instructions on how to build machines and mechanical games, secret codes, recipes for food as well as rat poison, advice to fishermen, hunters, housewives, and prestidigitators, information on hygiene, aphrodisiacs and sex,

and references to metaphysics, mystical theology, traditional Egyptian wisdom, the Bible and classical and medieval philosophy. Moreover, magic – as associated with Giordano Bruno, Cornelius Agrippa, and Tommaso Campanella – was deeply tied to ideas of cultural reform, millenarianism, and hopes for radical political renewal.

The language of alchemy and magic was ambiguous and allusive precisely because the idea that secret knowledge could ever be expressed clearly and simply was incomprehensible. Language was structurally and deliberately full of semantic twists and turns, metaphor, analogy, and allusion. For instance, the alchemist Bono of Ferrara wrote that "no ancient could ever achieve the divine subject of this art through his natural intellect, nor according to natural reason alone, nor according to experience because it – like a divine mystery – is above reason and experience" (Bono of Ferrara, 1602: 123).

The alchemist did not write about gold and sulfur in a concrete state. An object was never simply itself; it was also the symbol of something else, receptacle of a transcendent reality. For this reason, a chemist who today reads a paper on alchemy "has something of the same experience as a mason hoping to learn something practical from a work of freemasonry" (Taylor, 1949: 110). By virtue of their understanding the secrets of Art, initiates "prove that they belong to the group of the enlightened." Lovers of Art, wrote Bono of Ferrara, "understand one another as if speaking a common language that is incomprehensible to others and known only to themselves" (Bono of Ferrara, 1602: 132). In *Magia adamica*, Thomas Vaughan stated that knowledge is made up of visions and revelations, and only through divine enlightenment can man reach a complete understanding of the universe (Vaughan, 1888: 103).

The distinction between *homo animalis* and *homo spiritualis*, the separation of the simple from the wise, became the identification of the ends of knowledge with salvation and individual perfection. Science corresponded to the purification of the soul and became a means for escaping one's destiny on earth. Intuitive knowledge was superior to rational knowledge; an occult knowledge of things was equated with freedom from evil: "I have written this work for you, sons of knowledge. Read it carefully and reap the wisdom that has been scattered throughout. What may have been concealed in one part has been made manifest in another [. . .]. I have written this for you alone of pure spirit and chaste mind, whose uncorrupted faith fears and honors God [. . .]. You alone will find that which I have meant for you alone to find. The secrets cloaked in mystery cannot be revealed without occult intelligence, so all of magical science will course through you as will the virtues of Hermes, Zoroaster, Apollonius, and the other practitioners of wondrous things" (Agrippa, 1550: I, 498).

Ad laudem et gloriam altissimi et omnipotentis Dei, cuius est revelare suis praedestinatis secreta scientarum (For the promise and glory of almighty God, who reveals to the elect the secrets of knowledge): The theme of secrecy occurs in the opening pages of the *Picatrix* and continues throughout. Philosophers skillfully hid magic behind secret words, and this they did for altruistic motives: *si haec scientia hominibus esset discoperta, confunderent universum* (If this knowledge were revealed to all men, it would confound the universe). Science had two sides; one open and the other closed. The obscure science was profound, for the very words that described the natural order were those given to Adam by God, and comprehensible to only a select few (Perrone Compagni, 1975: 298).

What is striking about the idea of secrecy is not the formulas themselves, but their immutability. The same authors, citations, and examples recur in occult texts through different periods in history. Cornelius Agrippa, for example, tells us that Plato forbade the disclosure of the mysteries, Pythagoras and Porphyry bound their disciples to secrecy, Orpheus as well as Tertullian demanded vows of silence, and Theodotus was blinded because he tried to penetrate the mysteries of Hebrew scripture. Indians, Ethiopians, Persians, and Egyptians spoke through riddles. Plotinus, Origen, and Ammonius' other disciples vowed never to reveal their teacher's dogma. Christ himself obscured his words in such a way that only his most trusted disciples could understand them, and he explicitly prohibited giving consecrated meat to dogs and pearls to swine. "Every magical experience abhors the public and wants to remain hidden; it is fortified by silence and destroyed when declared" (Agrippa, 1550: I, 498).

Truth was transmitted personally by "the whispers of tradition and oral discourse." Direct communication between teacher and disciple was privileged: "Without a trusted and expert teacher, I do not know if it is possible to divine understanding simply by the reading of a text [. . .]. These things are not entrusted to letters or written with the pen, but infused from spirit to spirit through sacred words" (ibid.: II, 904).

Public Knowledge

For a thousand years (or the ten centuries of the Middle Ages) the dominant figures in western culture were the saint, the priest, the doctor, the university professor, the soldier, the craftsman, and the sorcerer. Later, the humanist and courtier took their places alongside these figures, and then between the mid-sixteenth and mid-seventeenth centuries new ones were added: the *mechanic*, the *natural philosopher*, and the *virtuoso*, or

free experimenter, individuals who did not seek after sanctity or literary immortality, nor the production of miracles to enthrall the masses. Scientific knowledge developed in a climate of bitter controversy with monastic, scholastic, humanistic, and scholarly learning. John Hall, in a 1649 motion to Parliament, charged that universities did not teach chemistry, anatomy, languages or experiments, and students were like mummies who had been taught science 3,000 years ago in hieroglyphics awakening from a long sleep. The occult knowledge of sorcerers and alchemists had been fiercely contested by mechanics and engineers even before philosophers opposed it. In the *Pirotechnia* (1540), Vanoccio Biringuccio accused alchemists of not being able to *codify their methods* and concentrating only on ends, offering "authoritative testimony rather than possible reasons of demonstrable effects. Some cite Hermes, Brother Arnoldo, or Raymond, others Geber, Ockham, Craterius, or the saintly Thomas Aquinas, and even a certain Franciscan brother Elias; these authors, invoking the dignity or even sacredness of their philosophical knowledge, expect a sort of respectful faith of their readers or that their listeners either remain silent like ignoramuses or else confirm whatever they say" (Biringuccio, 1558: 5r). Unlike Biringuccio, Georg Agricola (Georg Bauer) was very well read. *De re metallica* (1556) – a text that was kept chained to the altars of New World churches as a universal manual – forcefully addressed questions of secret knowledge that are, in principle, impossible to decode "because the writers upon these things use strange names, which do not properly belong to the metals, and because some of them employ now one name, and now another, invented by themselves, though the thing itself changes not" (Agricola, 1563: 4–5).

Later on, a series of social and economic events reinforced the value of "secrecy" in the world of mechanics as well. Many Renaissance artisans and engineers insisted upon the right to keep their own inventions secret, but their motivations were purely financial and unrelated to any idea that the masses were unworthy. The first patents date back to the early fifteenth century; and their use increased dramatically in the sixteenth century (see Eamon, 1990; Maldonado, 1991).

During the tumult of the religious wars in Europe, the men who first called themselves "natural philosophers" constructed smaller and more tolerant societies within the greater societies in which they lived. "When I lived in London," wrote John Wallis in 1645, "I had the opportunity to meet some people who were working on what we today call new or experimental philosophy. We excluded theology from our discourse, and were more interested in physics, anatomy, geometry, statics, magnetism, chemistry, mechanics, and natural experiments."

The members of the first Academies wanted to protect themselves primarily from two things: politics and the intrusiveness of theology and the

Church. The Accademia dei Lincei "has in particular banned from their subjects of study any argument outside the natural and mathematical, and eliminated political issues." The Royal Society requests "a close, naked, natural way of speaking and clear senses [. . .]: and preferring the language of artisans, countrymen, and merchants before that of wits or scholars" (Sprat, 1667: 113).

With regard to scientific academies and societies, several points should be emphasized. First, the meetings of learned men were governed by a code of conduct, and it was a point of principle to exercise a critical attitude towards all statements. Truth was not bound to the authority of the person who declared it, but only to the proof of the experiment and force of the demonstration.

Secondly, it should be remembered that all adepts of the new science favored linguistic rigor and non-allusive terminology. This position went hand-in-hand with the refusal to make any basic distinction between scholars and laymen. Theories had to be fully communicable and experiments continually repeatable. According to William Gilbert, "sometimes we use new words. Though not to obscure like the alchemists do, but so that hidden things can be fully understood" (Gilbert, 1958: Praefatio). In the celebrated opening of *Discourse on method*, Descartes claimed that good sense "is the best thing the world has given us." The ability to judge what is good and distinguish what is true from what is false (which constitutes reason) "is by nature equal in all men." In addition, reason, which makes us different from animals, "is whole in each of us." The method pursued by Hobbes that leads to science and truth is made for all men: "If you would like," he says to the reader in the preface to *De corpore*, "you too can use it." Bacon also believed that scientific method tended to diminish the differences between men and make their intelligence equal.

Ritual magic, wrote Bacon, goes against the divine commandment that men earn their bread by the sweat of their brow, and "proposes that by following a few simple and easy steps man can achieve the noble ends that God demands he acquire only by his own labor." Inventions, he continues, "are cultivated by few and in absolute and almost religious silence." All who criticized and opposed magic emphasized the "priestly" nature of magical knowledge and the commingling of science and religion that characterized the Hermetic tradition.

Father Mersenne asked himself why followers of alchemy were not willing to study the results of their discoveries "without mystery and secrets?" (Mersenne, 1625: 105). Francis Bacon's high opinion of the intellectual courage shown by Galileo in his astronomical discoveries included praise of his intellectual honesty: "men of this sort have continued to account for every single point of their research in a honest and perspicuous manner" (Bacon, 1887–92: III, 736). Those who get lost following unusual paths, wrote Descartes, are less readily excused than those who err in the company of others. In this "darkness of life," believed Leibniz, it was necessary to walk together because scientific method was more important than individual genius and the goal of philosophy was not to improve the intellect of the individual but that of all men. Leibniz, Hartlib and Comenius, each in his own way, referred to the ideal of the "advancement of learning" or the development and spread of knowledge. To the author of the *Pansophiae prodromus*, "the people's desire for schools" was characteristic of this new age. He believed that this desire produced "the great increase of books in every language and every nation so that even children and women could become familiar with them [. . .]. Now finally there emerges the steady drive of some people to perfect the method of learning to such a degree that anything worth learning can be easily instilled into minds. If this effort (as I hope) is successful, we shall find the sought-for path of rapidly teaching everything to everybody" (Comenius, 1974: 491).

It was inevitable that over the course of the seventeenth century the battle in favor of a universal knowledge that could be comprehended by everyone because it could be communicated and constructed by everyone shifted from the level of the ideas and projects of the intellectual to those of the institution. Sprat had this to say about the membership of the Royal Society: "As for what belongs to the Members themselves, that are to constitute the Society: it is to be noted that they have freely admitted men of different religions, countries, and professions of life. [. . .] For they openly profess not to lay the foundation of an English, Scotch, Irish, Popish, or Protestant philosophy; but a philosophy of mankind." About the design of the organization he wrote: "They have tried to put it into a condition of perpetual increasing; by fettling an inviolable correspondence between the hand and the brain. They have studied to make it not only an Enterprise of one season, or of some lucky opportunity, but a business of time; a steady, lasting, popular, and uninterrupted work. They have attempted to free it from the artifice, and humors, and passions of sects; to render it an instrument, whereby mankind may obtain a dominion over *things* and not only over one another's *judgments*. And lastly, they have begun to establish these reformations in philosophy, not so much by any solemnity of laws, or ostentation of ceremonies, as by solid practice and examples: not by a glorious pomp of words; but by the silent, effectual, and unanswerable arguments of real productions" (Sprat, 1667: 63, 62).

The Hermetic Tradition and the Scientific Revolution

Scholarship in the last half century has increasingly revealed that the Hermetic–magical tradition had an important influence on many of the leading exponents of the Scientific Revolution. In early modern Europe, magic and science formed a web not so easily unraveled. Today, the Enlightenment-era positivist image of scientific knowledge marching triumphantly through the darkness and superstition of magic has definitively been laid to rest.

In defending heliocentricity, Copernicus appealed to the authority of Hermes Trismegistus. William Gilbert invoked Hermes and Zoroaster when he linked his theory of earthly magnetism to that of a totally animate universe. Francis Bacon's doctrine of *forms* was strongly affected by the language and the models used by alchemists. Kepler was well acquainted with the *Corpus Hermeticum*, and both his belief in a mystic harmony between geometrical structures and the universe and his theory of the celestial music of the planets were deeply imbued with Pythagorean mysticism. Tycho Brahe saw astrology as a legitimate application of his scientific work. Descartes, whose philosophy was considered the symbol of rational clarity by moderns, as a young man preferred the products of the imagination to those of reason. Like many sixteenth-century sorcerers he took pleasure in constructing self-moving mechanisms and "shadow gardens"; like many exponents of magical Lullism, he insisted on the unity and harmony of the cosmos. These are themes that also recur, albeit differently, in the work of Leibniz, whose ideas derive in part from the tradition of Hermetic and cabalistic Lullism. In fact, the Leibnizian notion of harmony was based on a passionate reading of texts that could hardly be thought of as "scientific." William Harvey's *De motu cordis*, which praises the heart as the "sun of our microcosm," reflects Hermetic and sun worship themes of the fifteenth and sixteenth centuries. There is a precise relationship between Harvey's definition of *ovum* or egg (neither fully alive nor entirely void of vitality) and Ficino's (as well as other alchemists and Paracelsians) definition of *astral body*. Even the Newtonian concept of space as a *sensorium Dei* revealed the influence of Neoplatonic currents and the Jewish Cabala. Newton not only read and summarized texts on alchemy, but he devoted many hours of his life to research that was alchemistic in nature. His written work also revealed his faith in a *prisca theologia* (the central theme of Hermeticism), the truth of which could be "proven" through new experimental science.

What caused "sorcerers" and "scientists" to finally part company in the late sixteenth and early seventeenth century is more complex than a simple appeal to experience or revolt against *auctoritates*. Gerolamo Cardano, for example, was a successful mathematician and Giambattista della Porta an important contributor to the history of optics. Certainly the calculations made by many astrologers were much less questionable than the mathematical digressions of Hobbes and Paracelsus, and less "scholastic" than those of Descartes.

For Bacon, to humbly leaf through the great book of nature meant to renounce the building of entire systems of natural philosophy on too-fragile conceptual and experimental bases. Francesco Patrizi and Peter Sørensen (Severinus), Bernardino Telesio, Giordano Bruno, Tommaso Campanella, and William Gilbert were, in his opinion, a series of philosophers who arbitrarily defined the subjects of their worlds. On the other hand, he believed the Veronese physician Girolamo Fracastoro (1483–1553) to have been a man of honest and free judgment. In *De symphathia et antipathia rerum* (1546), Fracastoro addressed a series of common problems (e.g., why the magnet points north, how the remora or sucking fish stops a ship, etc.), but underlying his study of contagions was an inquiry into "sympathy and antipathy." Fracastoro observed that contagions had till then been interpreted as manifestations of occult properties. Rather than investigate the principles of contagion, how it occurs, the differences in severity of contagious diseases, and the difference between a contagious diseases and poisoning, mysterious causes had generally been invoked. Philosophers had dedicated themselves to explaining "universal causes" while neglecting the study of "specific and particular causes" (Fracastoro, 1574: 57–76). "Sympathy" was better explained as a *force* rather than in terms of the mysterious *nature* of bodies, and this theoretical shift made Aristotelian theory useless. Citing Democritus, Epicurus, and Lucretius, Fracastoro accepted the idea that the *effluxiones* of bodies hold the principle of attraction. The attraction between two bodies was the result of the reciprocal transmission of minute particles from body A to body B. The sum of these particles formed a whole but one that varied across space: the particles next to the two bodies and those located between them do not have the same density and rarefaction. Therefore, movements that tend to achieve equilibrium or the maximum consent of the parts with the whole are produced in the "cloud of atoms." These adjusting movements cause the two bodies to move toward each other, and in some cases, unite.

In the sixth chapter of *De contagionibus et contagiosis morbis* (1546), Fracastoro declared that "contagion that occurs at a distance cannot be attributed to occult properties" (Fracastoro, 1574: 77–110). Some contagion occurs through simple contact (scabies and leprosy); others by means of a vehicle, such as bedsheets or clothing; yet others are spread from a distance by invisible "seeds." Fracastoro – also known for his

famous poem in Latin *Syphilis sive de morbo gallico* (1553) – showed other signs of a break with the occult in his pamphlet entitled *De causis criticorum diebus*. The critical days or "crises" for illnesses definitely occur on particular days, though they are impossible to establish by means of strict numerical relationships (as the "Pythagorean philosophers" suggest) or on the basis of a cause–effect relationship with the motion of the planets (as astrologers do). Doctors have been mistaken in not conducting painstaking experimental research into these questions, and in "letting themselves be seduced by the ideas of astrologers" (ibid.: 48–56).

In the more general philosophical context, there were however differing views on the solidarity between things, and on sympathy and antipathy. The notions could be *applied* differently, linking them to either a mystical vision of reality or using them as criteria or hypotheses for an "experimental" inquiry into nature.

Secrets and Public Knowledge

To fully understand the seemingly obvious difference between Renaissance *magic* and modern *science*, one must consider not only content and method, but also the image of knowledge and of the *scholar*. We certainly still live in a world full of secrets, and there are many who study and practice the *imperii arcana*. There are also many charlatans, and they too have their place in the history of science. Nevertheless, it should be pointed out that after the first Scientific Revolution, there was not, nor could there have been, *praise* for or a positive view of dissimulation in the scientific literature or literature about science (an observation which, for example, still does not apply to the world of politics). To dissimulate, or not make public one's own opinions, simply implies trickery or betrayal. Scientists working as a community may indeed pledge secrecy, but the pledge is usually imposed upon them. And when such restrictions are imposed, scientists inevitably protest against them or, as has occurred in more recent times, rebel outright. The fact that "Kepler's laws" are called "Kepler's" has nothing to do with possession, and simply serves to perpetuate the memory of a great figure. For science itself, and within the scientific world, secrecy became a liability.