



*The North Texas*

# Skeptic

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## Alchemy to Chemistry: Pseudoscience to Science

### Part II

by Kristine Danowski

*In Part I we explored the history, concepts, and goals of alchemy. In Part II we examine some alchemical texts, some famous alchemists, the development of chemistry, and modern alchemy.*

Through the ages alchemy captured popular imagination. Numerous paintings depicted the alchemist both as part of daily life while performing her/his processes. For example, *The Alchemist's Experiment Takes Fire* (1687, oil on canvas) by Dutch artist Hendrick Heerschop is both allegorical and realistic. An androgynous alchemist is at work in her/his home laboratory when an experiment explodes. In the background is a woman cleaning an infant's backside. The explosion warns of danger; the infant's backside was a popular symbol of humanity. In addition, in Dutch the latter image is a scatological pun. *Al-ghemist* in Dutch means "all is lost" or "all is excrement." Philips Galle, another Dutch artist, engraved *The Alchemist* in 1558. In this work the alchemist is depicted in a variety of roles - as a scholar reading a thick book, as a metallurgist using a bellows, and a chemist conducting a laboratory experiment. In the background a hungry family search in vain for food; eventually the unsuccessful alchemist and family are led to the poorhouse. The words on the engraving are *Alge Mist*, another Dutch pun on "all is lost" or "all is excrement." Figure 1 shows this engraving. The Greek myth of Atalanta was extremely important symbolism in alchemical literature. Michael Maier's 1618 book *Atalanta Fugiens* used musical scores, engravings, and poetry to depict the processes involved in attaining the Philosopher's Stone. The true message in *Atalanta Fugiens* would only be apparent to another alchemist.

Called the fundamental treatise of alchemy, the *Corpus Hermeticum* contains three volumes attributed to the mythical Hermes Trismegistus. The first volume, *Tabula Smaragdina* ("The Emerald Tablet"), was probably written ca. 100 CE. It contains the proverb "as above, so below;" its original phrasing is "that which is above is like that which is below." In the second volume, *Poimandres*, or "The Mind of the

### EVENTS CALENDAR

#### August Program

Saturday 11 August 2007,  
at 2 p.m.

Center for Nonprofit  
Management, 2900 Live Oak  
Street in Dallas

#### Out of Body

No, this is not about a slump in the mortuary business. Kristine Danowski will give a talk about this bizarre belief. People think they have left their bodies and (presumably) returned.

#### NTS Social Dinner

Saturday 18 August 2007,  
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Sovereignty,” all Creation is revealed to Hermes Trismegistus as part of the Divinity. Trismegistus vows to help others attain union with the Divine. In the third volume, *Asclepius*, the author describes humans as *magnum miraculum*, a great miracle. It reiterates the idea that humans are part of the Divine and claims that everything that exists has a single cause and origin, the *Prima Materia*.

*The Twelve Keys of Basil Valentine* appeared in 1667 CE. Its author claimed to be one Basil Valentine (“Valiant King”), a Benedictine clerical monk allegedly born in 1394 CE. However, most scholars accept that Basil, like Hermes Trismegistus, never existed and instead attribute his works to publisher Johann Thölde. Thölde wrote *The Triumphal Chariot of Antimony* in 1604 and is known to have “improved” other allegedly ancient manuscripts. A common practice in the Middle Ages was to attribute one’s own writings to a famous historical person to give them legitimacy. The older an idea was, the more credibility it had. Thus we have the curious phenomenon of centuries-dead writers producing posthumous new works. This practice was not limited to alchemy.

*The Triumphal Chariot of Antimony* extolled antimony as the Philosopher’s Stone, or a major component of the Stone, based on the element’s chemical properties. *The Twelve Keys of Basil Valentine* described twelve steps, or Keys, to attaining the Philosopher’s Stone. It delineated the processes involved in attaining the Stone, under which zodiacal sign they should be performed, and their symbolic and allegorical significance. Lavishly illustrated, this text was quite popular among alchemists. The illustrations reveal the underlying chemical processes only to an alchemist. A non-alchemist saw *The Twelve Keys of Basil Valentine* as a picture book. Thus texts like it and *Atalanta Fugiens* “hid a secret openly.”

Alchemy celebrated opposites, such as hot-cold, wet-dry, and female-male. Because the female principle (Sophic Mercury) was necessary to attain the Philosopher’s Stone, women were equal and



Figure 1. *The Alchemist* by Philips Galle

active alchemists with men. In fact, alchemy was probably the only intellectual endeavor open to women for centuries. The alchemist in the center of Figure 1 (*The Alchemist*) appears to be a woman, and the central alchemist in *The Alchemist's Experiment Takes Fire* appears androgynous. Unfortunately, if a woman alchemist was exposed, she risked being charged and executed for witchcraft, especially during the Burning Times. Male alchemists were regarded as fools, charlatans, confidence tricksters, and occasionally heretics. They did not face the same risks as women unless they conned a patron.

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One of the most famous historical alchemists was Maria Prophetissa, also called Maria the Jewess. Called "The Mother of Alchemy," Maria lived in the first century BCE. She invented the water bath or double boiler (still called a *bain-marie*) and the alembic or distillation still. She is credited with discovering both hydrochloric and nitric acids. Some scholars credit Maria as the author of *Corpus Hermeticum*.

Ca. 300 CE, brother and sister alchemists Zosimos and Theosebeia of Panopolis practiced. Together they wrote *Cheirokmeta*, an alchemical encyclopedia. They emphasized spiritual goals and alchemical numerology; however, they also delineated real chemical processes.

During the Dark Ages in Europe, science and technology declined. Arabs revived them and exported them to their lands. Jabir ibn Hayyan, known as "Geber" in Europe, lived from 721-815? CE. Jabir is regarded as the greatest Islamic alchemist. He used a scientific method, wrote treatises on alchemy, numerology, astronomy, logic, medicine, philosophy, and warfare. His followers compiled his works into *Summa Perfectionis*. Jabir also translated Greek and Latin alchemical texts into Arabic, which was essential for the Arte to flourish under the Arabs. Jabir proposed that all metals are generated by the interaction of sulfur and mercury and grew in the Earth under planetary influences. Amazingly, the great alchemist and learned scholar posthumously wrote influential alchemical texts 300 years after his death.

Ibn Sina, (known as "Avicenna" in the West) is regarded as the greatest medieval Islamic physician. He lived from 980-1037 CE. Ibn Sina wrote *The Canon of Medicine*, a medical encyclopedia containing all medicine known at that time. This text was so renowned that it was used until the 1600s CE. Ibn Sina was the first person to attempt to relate drug dosages to

their physiological effects. He also proposed experimental procedures for studying the effects of drugs. He challenged Aristotle's ideas and although he was an alchemist he did not believe that transmutation was possible.

Back in Europe, Albertus Magnus ("Albert the Great"), 1193-1280 CE, was a Dominican monk and *Doctor Universalis* who excelled in all branches of learning. Regarded as the greatest scholar of his day, Magnus taught theology to St. Thomas Aquinas. As an alchemist, Magnus discovered the element arsenic in 1250 CE, the first new element discovered in millennia.

Magnus' contemporary Roger Bacon, 1214-1294 CE, invented the Gregorian calendar system and drew one of the earliest maps of the world. Bacon wrote treatises on alchemy, botany, medicine, optics, mathematics, and theology. He re-translated the Christian bible into Latin and Greek. Like Magnus, Bacon also practiced alchemy.

One rather curious character is Nicholas Flamel, 1330?-1417 CE. Nicholas and his wife Perenelle were indigent alchemists. However, on April 25, 1382, they suddenly began to acquire great wealth. Putting their wealth to good use, they founded 14 hospitals in Paris alone. Rumors spread rapidly that Nicholas and Perenelle had discovered the Philosopher's Stone. After their deaths, their home and tombs were ransacked but were found empty; apparently Nicholas and Perenelle carried

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the secret of the Philosopher's Stone with them in death. Scholars regard their wealth not as a result of their alchemy but as a result of their miserliness. Modern alchemists, however, believe that the Flamels in fact attained the elusive Philosopher's Stone.

Philippus Aureolus Theophrastus Bombastus von Hohenheim called himself Paracelsus (1493-1541 CE). The name Paracelsus means "above Celsus," a rival physician. Paracelsus was a successful physician who used alchemy solely for medicinal purposes. He did not attempt to make gold. He founded the science of medicinal chemistry (iatrochemistry) by alchemically synthesizing new compounds to treat disease. His success as a physician came from these treatments. By today's standards they were primitive and had horrible side effects, but Paracelsus achieved superior results to other contemporary physicians whose repertoire was limited to bleeding the patient,

purging, using emetics, and praying. Using his successful treatments, Paracelsus was the first person to suggest one cure for one illness. He was also the first person to propose that some diseases are contagious and that these differed from non-contagious diseases. Paracelsus also founded the science of toxicology and coined the maxim “the dose makes the poison.” Centuries before Harvey, Paracelsus recognized that blood circulates through the body in veins and arteries. Alchemically, besides preparing medicinal compounds Paracelsus recognized the modern concept of a chemical reaction, and as we saw in Part I he thoroughly rejected Aristotle’s ideas and advanced his own. Challenging Aristotle was tantamount to heresy, but Paracelsus escaped censure because of his fame as a physician.

Until the late 1600s CE, the words “alchemy” and “chemistry” were synonymous. Scholars regard the discovery of phosphorous in 1669 as the demarcation between alchemy and chemistry. Alchemist Hennig Brandt of Hamburg isolated phosphorus from human urine and, because of the element’s unusual properties, naturally considered it to be The

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Philosopher’s Stone. The discovery of phosphorus encouraged many other alchemists to investigate the element systematically and scientifically. Practitioners became professionalized, founded scientific societies, publicly disseminated their discoveries in comprehensible language, and valued empiricism and analysis instead of synthesis. In fact, many prominent scientists and chemists were also alchemists. Some tried to make gold, while others developed many useful commodities such as medicines, dyes, paints, alloys, and glasses. The latter alchemists did create gold from other materials, but not in the way they intended.

Sir Francis Bacon, 1561-1626 CE, originally trained as an attorney. He delineated a true scientific method. Science should be based on facts, facts develop into hypotheses that should be tested, and theories should be evidence-based. He recommended the establishment of a national scientific institution, but this recommendation took about a century to be accepted; King Charles II created the Royal Society in 1660. Bacon also attacked Aristotle’s views. However, in his own time he was influential but not revolutionary.



*Part II is continued in the September issue of the North Texas Skeptic.*

## Listening to God

by John Blanton

**S**keptics, this isn’t fun anymore.

Last month I wrote about plans to test Rosemary Hunter for the NTS Paranormal Challenge.<sup>1</sup> Earlier Rosemary contacted us by e-mail and claimed she could win our \$12,000 award for a demonstration of paranormal abilities. Among other things, she claimed that God spoke to her mind and would enable her to know what words I might write on a piece of paper. Naturally we were skeptical.

Rosemary was eager to come to Dallas for a preliminary test, which we require before we will engage in a formal test for the prize. We do this so we don’t have the experience of setting up carefully-controlled test and writing out a \$12,000 check in advance, only to have a claimant show up empty handed.

This precaution has proved beneficial in the past. Readers will recall that four years ago Russell Shipp told us he could move small objects with his mind.<sup>2</sup> Russell lived in New Braunfels, Texas, a 250-mile drive from Dallas, but he was willing to come up to Dallas, twice, to show his stuff. He attended one of our monthly meetings and gave us a quite unconvincing demonstration. A compact disk (CD) suspended by a thread didn’t seem to us to obey his mental commands. We arranged a more controlled test for a later date, and Russell returned for a follow-up. This time the results were more conclusive. A CD suspended by a thread, but also enclosed in a transparent container to allow viewing but to block air currents, did not move at all. If only the stock market were that stable. Based on this test we dismissed Russell from further consideration for the prize.

Evaluating Rosemary promised to be more daunting. She lives in Cleveland, Ohio, more than a 250-mile drive, for sure. Even so, she was eager to trip on down to Dallas and test for the prize. To make matters more challenging, I’m not in Dallas. I’m out in Salt Lake City on an extended business trip, making it problematic for me to meet Rosemary in Dallas.

No problem. Rosemary agreed to come to Salt Lake City for a test. It turns out she already had plans to come this way. She was also scheduling a test with James Underdown of the Center for Inquiry-West in Los Angeles, and we planned on having her stop over for a few hours in Salt Lake City.

Rosemary originally proposed that I write ten words on paper. She would then speak the words in sentences. Call me



skeptical, but this proposal seemed suspicious. If Rosemary spoke the words to me, then she could judge my reaction and possible home in on the correct choice of words. My counter proposal was for Rosemary to write her guesses on paper outside my view. So, the deal was struck. Rosemary's flight would stop over in Salt Lake City, and we would meet at a McDonalds restaurant. Then I had time to consider.

What could possibly go wrong? Maybe this was an elaborate hoax, and "Rosemary" didn't really exist. For a long time following we would endure Rosemary's boasts on the Internet and elsewhere. The headlines would be something like, "Stupid skeptics fall for the old 'Your shoe's untied' scam."

It could be worse. Rosemary could be a skilled magician set to fool an unwary skeptic with a standard mind reading trick. Or she could be completely unhinged and prone to violence against evil skeptics when she does not get her way.

The day of destiny arrived, and I prepared for the worst.

Apparently I have become too cynical in my old age, because Rosemary turned out to be a refreshing surprise. Rather than a scheming sharpie set to scam us of the prize, she is a pleasant, unpretentious woman of 35, and she honestly believes in her powers, which she says come from God. Sitting with Rosemary at a McDonald's booth, I briefly probed her for her beliefs and motivations.

Did she "try this at home" before coming all the way to Utah?

She had, and she had been completely successful. She had no concerns about her abilities. She was 100% accurate.

It occurred to me to run a simple test before I got down to writing ten words on a piece of paper. Rosemary was agreeable, so I got out my pen and cupped my hand over my pad of paper. This would not be an ultimate test, because it

provided the greatest opportunity for defeat by a skilled magician. I gave it the college try.

As Rosemary watched, I poised my pen behind my free hand and wrote. Knowing a little about some magician's tricks, I pretended to write more letters than I actually wrote. That's OK. The rules didn't prohibit it. When I finished I had written "WALK." Then I clapped my hand down on the word and kept it there. For as long as it took.



Rosemary Hunter came from Cleveland to test for the NTS Paranormal Challenge. John Blanton is on the right.

Rosemary took her pen and paper pad and concentrated. While she concentrated I fixed my gaze elsewhere—anywhere besides toward where Rosemary was writing.

Skeptics, I have to say I got very familiar with the rental company's sign outside McDonald's window.

Finally, Rosemary was done, and she showed me. She had written "McDonald's."

What made her think of "McDonald's" I will never figure out. Anyhow, she had showed me hers, so I showed her mine.

She was dumbfounded. Obviously this was completely unsuspected, and she told me so. She said she had never experienced a failure in this kind of demonstration.

Two times is a charm, so I offered her another chance, and she agreed. I went through the same process, this time writing "OCEAN." We skeptics like to keep it simple.

Once again Rosemary concentrated and wrote, and I began to fall in love with the rental company sign.

Rosemary finished her word, and I showed her mine. She scratched out her word and wrote on the pad "I Can Not Believe This." I could.

At that point Rosemary conceded defeat completely. No, she did not want to waste my time doing a test with ten words. She was done and she apologized for wasting my time.

Actually, Rosemary did not waste my time. I reminded her this is what we do in the NTS. Members, including the Challenge underwriters, readily commit themselves to considerable time and expense exploring issues relating to the “paranormal.” She was the one who made the ultimate commitment by flying out to Utah (and California) to work with us skeptics.

We had some time to kill, so I used the opportunity to get behind her story.

She said she had done this test back in Cleveland. And she had 100% success.

Who did she work with before? Were these friends or relatives?

Two friends—people she has known for about a year and a half. No they did not go to the same church. Rosemary attended the Word Church, a “spiritual” church back in Cleveland, and her friends were spiritual, but they did not necessarily attend a church.

Cynic that I am, a concern began to form in my mind. How could she have complete success with her two “friends” but fail equally completely under real-world conditions.

Delicately, I inquired, did her friends see Rosemary’s words before they showed her their “responses.” It’s possible that’s how it went. I envisioned a hoax too cruel for words. Would two otherwise civilized people employ tricks to convince an acquaintance she had paranormal powers? Would two such people be in for a real butt-kicking afterward?

Rosemary and I parted, and she continued on to Los Angeles. I later contacted James Underdown to inquire about her test with him. He finally got back to me. Rosemary went to Los Angeles, but something came up, and she had to skip out on the test. I’m thinking she has gone back to Cleveland to look up some old friends.



#### References

- 1 *Challenge activity* in The North Texas Skeptic, July 2007. <http://www.ntskeptics.org/2007/2007july/july2007.htm#challenge>
- 2 *Mind over matter* in The North Texas Skeptic, May 2003. <http://www.ntskeptics.org/2003/2003may/may2003.htm#mind>

### Future Meeting Dates

August 11, 2007

November 10, 2007

September 8, 2007

December 8, 2007

October 13, 2007

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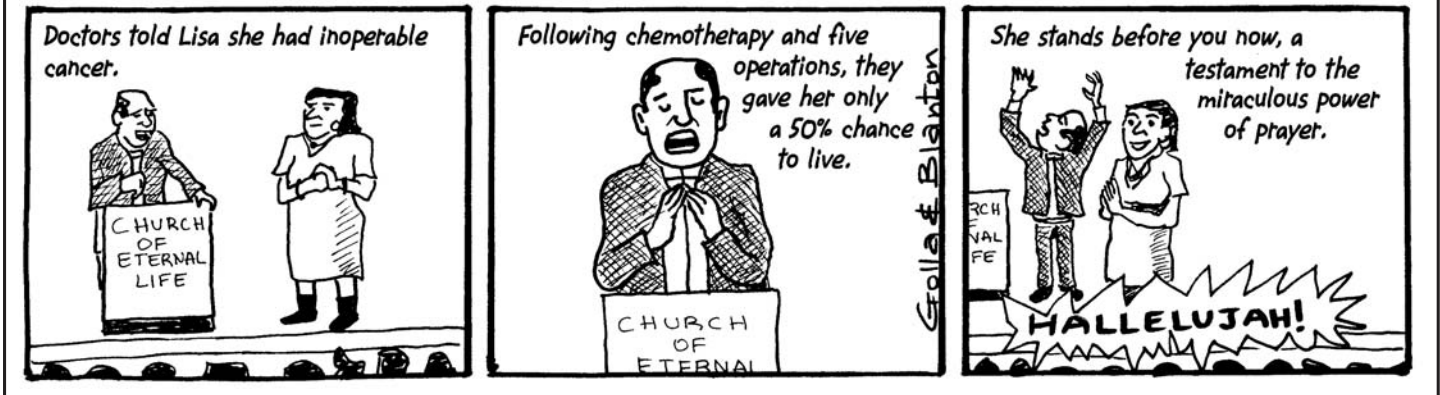
encourages the critical investigation of paranormal and fringe-science claims from a responsible, scientific point of view and disseminates factual information about the results of such inquiries to the scientific community, the media, and the public. It also promotes science and scientific inquiry, critical thinking, science education, and the use of reason in examining important issues.

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## Skeptic Ink

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## Editorial

### The Measure of a Man

by Mel White

They say that a picture is worth a thousand words, and in the wars of evidence and counter-evidence over the fossil record, one of the most striking images for some religious people is the illustration from a Jack Chick tract mocking the evolution of humanity and presenting the startling conclusion: the fossil *Australopithecus* named “Lucy” was not actually human, but a deformed chimp. The accompanying picture shows an ordinary man being trailed by a line of brute-like and cartoonized cave-men. Bringing up the rear is a cartoonish dancing chimp labeled “Lucy.” It seems a persuasive caricature of our understanding - the rise from something chimp-like through a semi-ape sort of human labeled “Cro Magnon” and onward to humans. But how accurate is it, and just how “chimp-like” was Lucy? The answers are “not very” and “not very.”

Let’s focus on the start of that line and the most controversial figure, “Lucy.” She has been identified as a member of the species *Australopithecus afarensis*, and scientists say she’s one of our ancestors. But to non-anthropologists confronted with the cartoon, the image raises some questions: how did we determine she was human, and how could the average person tell that “Lucy” really isn’t some sort of deformed gorilla or ape?

For anyone trying to deal with this argument, the best way to approach it is not to look at scientific arguments, but to look at the bones themselves. When images of the skeletons of

Lucy and a chimpanzee or gorilla and a human are placed next to one another, the differences soon become apparent – even when the skeletons are fragmentary, as is the case with Lucy.

The most obvious difference deals with the way the hips and legs are shaped. Chimps and gorillas have a long and narrow pelvis, with the ileum rising high toward the ribs. The human pelvis is shallow and only extends up to the 5<sup>th</sup> lumbar vertebra. It’s wider than the ape pelvis and in female humans it’s slightly “cupped” to support a growing fetus as well as support the internal organs of a creature that walks upright. What remains of Lucy’s pelvic bones are the same shape as humans’ and clearly very different from those of a chimp or gorilla.

The next most obvious difference is in the proportion of the long bones of the limbs. Chimp arm bones are much longer and thicker than humans’, and their legs are much shorter. When they stand, they prefer to lean forward so that those long arms can support the body. Like Lucy, our arm bones are much shorter and it’s not possible for us to stand comfortably on all fours.

The lower jaw bone remains, and we find here another marker that shows Lucy was indeed human. One feature that’s found on all human molars is a “Y” shaped valley that separates the grinding surfaces of the molar. No other animal has this kind of tooth; it’s unique to humans. Lucy’s molars show this same “Y” shaped valley.

Lucy, of course, is a single individual, and over half her skeleton is missing. Since her discovery, other members of this species have been found that add more depth and detail to the information given by her bones. And for all these cases, the verdict is still clear – they are closer to modern humans in shape and bone structure than they are to any modern or ancient ape.

Although a picture is said to be “worth a thousand words,” those words may not necessarily be words of truth. The direct evidence of the bones puts a clear stamp of “lie” on the “deformed chimpanzee” canard – but only for those who take the time to look at the original bones. □

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