

NOTES ON THE HERMETIC ART OF ALCHEMY

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A. Defining Alchemy

Here we plunge at once into deep and thoroughly murky waters. What is alchemy? The conventional wisdom of our present culture has long seen it as a discarded predecessor of chemistry, burdened by primitive theories about the nature of matter, which wasted centuries in an attempt to turn lead into gold through inadequate means. More recently, the acceptance of the theories of Carl Jung in many circles has given rise to a different conventional wisdom, in which alchemy is seen as an early form of depth psychology which the alchemists themselves, through sheer lack of psychological and chemical sophistication, mistakenly projected onto the contents of their retorts and alembics.

The patronizing tone common to both these interpretations is all but universal in modern understandings (or misunderstandings) of ancient systems of knowledge. It rises from an assumption, unspoken but astonishingly pervasive in the present world, that no age before our own was capable of careful observation and clear, reasoned thought about the universe of human experience.

A parallel case can be found in the area of ancient astronomy. For several centuries now, scholars have been noticing that a great many aspects of ancient mythology seem to have something to do with planets, stars, and their movements. The result has been a flurry of single-factor theories reducing all mythology to some one simple scheme - simple enough, one gathers, to be devised by our primitive forebears. One thinks of the "Solar Myth" theory of Max Muller, which dominated far too much of the early days of comparative mythology until it was demonstrated that, seen through his own interpretive filters, Max Muller himself could be shown to be nothing but a solar myth.

By contrast, the complexity of the ancient language of astronomical myth seems to have been no less remarkable than its precision. To quote only one minor example (brought out, like so much of the ancient system, by Giorgio de Santillana and Hertha von Dechend in their tremendous work *Hamlet's Mill*): the warrior-child Kullervo in the *Kalevala*, the national epic of Finland, who measures the sea with a ladle; it comes to just over two ladles full. What is it that measures the Great Deep in just over two units? The warrior-planet Mars, of course, with its orbital period of 2.2 years.

The situation with regard to alchemy is similar. There are any number of theories, those of Jung's followers foremost among them, which seek to reduce alchemy to some single factor simplistic enough to fit our preconceptions of the nature of

ancient and medieval thought. At the same time, for those who are willing to look, there is plenty of evidence that alchemy was far more complex, exact and extensive than these models will admit. Alchemists' attention to precision in weights, measures, temperatures and other such details of the work is well-attested; an early edition of Thomas Norton's Ordinal of Alchemy includes the first-ever depiction of an enclosed scale for measuring precise weights². Alchemical writers on agriculture during the late Renaissance were quite familiar with the role of nitrates and mineral salts in promoting soil fertility, and devised high-quality alchemical fertilizers which could easily find a place in modern organic farming³. Even more startling is the discovery by Joseph Needham, presented in one of the volumes of his massive Science and Civilization in China, that Taoist alchemists had had centuries of experience extracting steroidal sex hormones from human urine for medical purposes - a process not developed by current Western science until the 1950s⁴.

Rather than embracing any of the currently fashionable redefinitions of alchemy, then, it may well be most useful to accept it on its own terms - as the ancient science of nature - and to assume, at least for the sake of discussion, that the complex symbolism that serves as its technical language may communicate valid observations about the natural world.

There's a story current in anthropological circles which may be relevant here. An anthropologist with training in ethology (the study of animal behavior) was doing fieldwork in the Kalahari Desert with a band of !Kung hunters. One day, he and one of his !Kung informants came across some wildebeest tracks. The anthropologist examined them, and (working from his knowledge of the Kalahari's ecology and of wildebeest behavior) figured out where the creature was going.

At the same time, his !Kung informant was also examining the tracks, and told the anthropologist where the wildebeest was going, naming the same place. Startled, the anthropologist asked him how he knew that. "It's simple," said the !Kung hunter. "Wildebeest always quarrel with their mothers-in-law about this time, and go off into the bush to sulk. It happens every year."

Different theoretical models, same conclusion. It probably didn't occur to the anthropologist that his own model was largely based on current Western political and economic notions, in exactly the same way that the !Kung model was based on !Kung ideas of how families and bands interact, and that from another perspective (say, that of an extraterrestrial) both models would tell far more about the cultures that produced them than they would about the actual motivations of the wildebeest. Even the extraterrestrial, though, would likely agree that there was a wildebeest, and that it could probably be found in the place where both anthropologist and hunter had expected it. (No doubt the extraterrestrial, in turn, would have its own explanation for the wildebeest's movements.)

In examining alchemy as an ancient science of nature, we're in a position very similar to that of the anthropologist. The explanations presented to us by those who tracked and hunted the philosopher's stone are couched in unfamiliar language, and make use of models which seem inappropriate to the modern mind. At the same time, if we can get past the confusion this produces, it's possible that we may find ourselves learning a way of approaching nature that is not without value even in a modern context.

B. Jung and Alchemy

It's probably necessary to discuss the relationship of Carl Jung's analytic psychology to alchemical tradition a little more thoroughly at this point, because the Jungian take on alchemy has come to pervade much of modern academic thinking on the subject. There are at least two versions of this approach - Jung's own, which was relatively complex and nuanced, and the highly simplified version of it which has emerged as the current conventional wisdom in scholarly circles, and which was summarized (and, to a certain extent, caricatured) at the beginning of this essay.

Both versions share certain critical limitations, deriving from the nature of Jung's own project, which make them problematic at best as a basis for understanding traditional alchemical thought.

The core of the difficulty is that Jung was a psychologist, not an alchemist, and the system that he devised was a system of psychology and not one of alchemy. It's certainly true that Jung's thought, like modern psychology in general, has certain historical roots in the eighteenth-century Naturphilosophie movement and in German Romanticism, both of which were influenced by late alchemical thought. It's equally true that Jung borrowed some alchemical ideas and imagery for his system - or, rather, found that these formed convenient labels for similar material he encountered as a therapist and researcher in his field. Neither of these factors make his system a kind of alchemy. Nor, critically, does it make alchemy reducible to his system.

As well as not being an alchemist, Jung was not a historian. He saw nothing wrong in taking images completely out of their historical and cultural context, equating them on the basis of simple similarity, and using them to interpret one another from this standpoint. It's quite common to find, in Jung's works, quotes from classical or Arabian alchemists used to explain material from late Renaissance sources like Basil Valentine or vice versa. This is fine, if you're looking for timeless images from the collective unconscious, but it is not fine if you're trying to grasp what was happening in the history of alchemical thought - a history which saw constant development in theory and practice over a period of two and a half millennia, from the

beginnings of recorded alchemy to the final triumph of the "mechanical philosophy" of Descartes and the eclipse of alchemy in the eighteenth century.

It might also be pointed out that Jung was not averse to reading his favorite symbolic structures into alchemical thought, whether they belong there or not. The best example, without a doubt, is his obsession with quaternities. The fourfold symbolism of the elements occurs in alchemical theory, of course, but it plays a far smaller role than the reader of Jung's Collected Works may end up thinking. Ancient and medieval metallic alchemy tended to stress a twofold pattern in which sulfur and mercury held the dominant place; the Paracelsian movement, far and away the most important branch of alchemical thought in the Renaissance, used the threefold system of sulfur, mercury and salt, and relegated the four elements to a minor role in its system; while the late alchemy connected to the seventeenth- and eighteenth-century Rosicrucian movement developed a subtle and complex theory in which niter (saltpeter) and salt are the prime material manifestations of a universal energy moving in constant cycles.

It's almost always a bad sign when a scholar starts criticizing his sources for not supporting his theory as completely as he thinks they should. Some of Jung's comments on the "defective" nature of threefold symbolism in alchemy come very close to this, to say the least.

These problems in Jung's own thought have been amplified by the often clumsy simplifications of that thought used by his less skillful followers, and by the many scholars who have used these simplifications to fill gaps in their own understanding of alchemy. Far too often, the Jungian interpretation of alchemy has become a Procrustean bed into which any text or tradition can be fitted, given enough stretching and sawing. Just as a certain kind of pop Freudianism converts anything longer than its own width into a penis, this sort of pop Jungianism converts anything vaguely circular into a symbol of individuation.

Given categories sufficiently inclusive, anything can be made to mean anything. Much recent Jungian writing on alchemy could easily serve as an illustration of this dictum; the worst excesses of this kind remind one forcefully of the minor economist who proved, to his own satisfaction if no one else's, that Lewis Carroll's *The Hunting of the Snark* is "really" an allegory of the business cycle. One can certainly find Jungian imagery and ideas in any alchemical text, given enough effort and ingenuity, but then one can find them with equal ease in last year's Super Bowl. True, a Jungian analysis of professional football might be interesting, but it would communicate very little about how the game is actually played - and, arguably, not much more about why the game is important to the players, the fans, or the rest of us.

C. The Language of Alchemy

A great deal of trouble has been caused, in the modern study of alchemy, by the somewhat opaque and evasive language used in many alchemical texts. Some of this trouble is inherent in the language itself, but there are several other factors involved, which have less to do with alchemy than with the attitudes of those who interpret it.

One such source of trouble is the patronizing attitude toward ancient science mentioned earlier. One would hardly expect a student to understand a modern chemical term like "oxidative phosphorylation" without instruction; why should the equally technical language of laboratory alchemy be any less opaque to the uninformed? And yet there have been any number of modern savants who have dismissed alchemical texts as gibberish because their meaning is not immediately apparent to the untrained reader.

Another source of trouble has been the tendency of many scholars to construct highly arbitrary interpretive systems - often based on single-factor theories - and impose these on alchemical texts. Jungian writers are far from the only, or the worst, offenders here. One thinks of Mary Ann Atwood's *Suggestive Enquiry into the Hermetic Mystery*⁵, a dizzyingly erudite work which interprets alchemy by way of Mesmerism as a method of spiritual transformation. Along the way, Atwood makes use of Thomas Norton's *Ordinal of Alchemy*, reading his useful and wholly practical chapter on the making of fireproof laboratory crockery as a mystically veiled discussion of the qualities of soul needed in a subject of hypnotic trance. The result is a masterpiece of unintentional humor, but provides little help in understanding what Norton was trying to communicate - which, in this case, was a good recipe for stoneware.

It must be admitted, though, that even without these sources of confusion, traditional alchemical texts can be hard to interpret. The core reason for this provides an instructive lesson in the differences which can exist between cultural contexts of knowledge.

The ideal of free exchange of information which exists in modern academic circles is held so widely, and in many cases so unconsciously, that it can be difficult to remember that this represents a radical break with most of the human past. Most other cultures have seen specialized knowledge as a possession to be guarded and kept secret, transmissible only to worthy candidates under the right conditions. This approach to knowledge can be seen in traditional craft organizations around the world, and in survivals of these such as Freemasonry. It can also be seen, stated clearly and often eloquently, in many alchemical writings. Alchemical knowledge was understood, by its possessors, as a source of power and therefore of danger, and the potentially disastrous results of placing that knowledge in the

wrong hands were held to justify the traditional secrecy of the art. We may disagree with this attitude, from our current standpoint, but it's hardly reasonable to condemn the alchemists for the sin of belonging to their own culture and time.

On the other hand, the meaning of alchemical language isn't made any clearer if it's forgotten that the writers of traditional alchemical texts did belong to their own culture and time, and not ours. This point seems obvious, but it has been lost sight of in some subtle ways. For example, it's been argued that the presence of psychologically powerful imagery in alchemical writings and illustrations proves, or at least gives evidence for, the essentially psychological nature of alchemy. After all, the argument runs, why else would that imagery have been chosen?

The great problem with this argument is precisely that it assumes that modern attitudes and opinions are universally relevant. To a modern eye, the images of alchemy look like archetypes rather than, say, iconic representations of chemical interactions, and therefore they must be archetypal - and must have functioned primarily as archetypal symbols to their original audience.

A look back at the extraordinarily vivid medieval and Renaissance tradition of symbolic imagery might help provide a slightly less naive context for this. Such commonplaces of the time as emblem books and the Art of Memory were based on the use of intensely memorable imagery - much of it, to our eyes, "archetypal" - to assist the recall of purely practical or moral information. One thinks of the ram with huge horns and testicles that comes careening out of the darkness in an example from a medieval memory textbook. It's an amazingly evocative image, and one which easily lends itself to any number of psychological interpretations. The fact remains, however, that in its original context it's used to remember a detail from a law case.

It's also worth noting that, in a significant number of writers, both the opaqueness and the "archetypal" content of the whole body of alchemical writings has been rather exaggerated. One of the factors behind this is that many of the alchemical texts and illustrations which are most famous nowadays came out of a late Renaissance context in which the cult of antiquity had made Classical mythological motifs the preferred medium for a wide range of erudite studies - alchemy among them. It's for this reason that gods, goddesses, monsters and mythic images play so substantial a role in, for example, the alchemical writings of Michael Maier.

The alchemical works of other periods - for example, the fifteenth-century Ordinal of Alchemy mentioned above, or the eighteenth-century Aurea Catena Homeri - are often bare of such "archetypal" material, and present what information their authors were willing to publish in fairly straightforward terms. For instance, it's quite possible to make fireproof laboratory vessels following Norton's instructions in the Ordinal, and much

of his other advice - touching on issues as practical as labor relations with one's lab staff - is equally clear. It's only when he deals with the Great Work itself that Norton retreats behind a veil of hints and generalities, and even so the mythological constructions so common in some other periods of alchemical writing are not in evidence.

Too many modern writers on alchemy have allowed themselves to be misled by a lack of familiarity with the whole corpus of alchemical literature, or - worse - by a purely visual approach which treats alchemical imagery in isolation, without reference to the textual tradition or the philosophical underpinnings of alchemical thought. (It's symptomatic that the recent and otherwise excellent edition of Michael Maier's *Atalanta Fugiens* produced by Phanes Press includes this work's images, music and epigrams, but leaves out the explanatory essays which give these their context.) This difficulty isn't helped, either, by the far too common habit of treating personal free association as though it were a valid method of historical research.

D. The Question of Transmutation

Perhaps the most obvious issue that needs to come up when alchemy is discussed from a modern perspective, though, is the question of its basic validity as a science of nature. That question typically focuses on the claim by alchemists that their art was capable of transmuting base metals into gold. Current scientific theory holds that it's impossible to do this using the technical methods available to the alchemists, and no one has yet proven the theory wrong by publicly producing gold in the laboratory in circumstances which preclude fraud.

This is a valid point, and one that can't simply be dismissed. The debates around alchemy in the early days of the scientific revolution centered on the inability or unwillingness of the alchemists to actually do what they claimed to be able to do. Joseph Needham, in his extensive study of Chinese alchemy, has outlined a plausible scheme whereby the idea of alchemical transmutation could have risen out of the manufacture of fake "gold" - that is, base-metal alloys which resemble gold in outward appearance - in a cultural setting where modern ideas of the immutability of chemical elements didn't yet exist. To use his terminology, the practice of "aurifiction" gave rise to the theory, and the attempted practice, of "aurifaction."⁶

At the same time, it's not entirely justified to say that the transmutation of metals is impossible, simply because current scientific models don't provide a mechanism for it outside of the high-energy processes of nuclear physics. Any scientific theory is an approximation to Nature at best, and theories change, sometimes drastically. (As late as the 1960's, to name only one example, continental drift was discarded as a crackpot notion.)

It's conceivable that the forces holding together atomic nuclei have wrinkles we don't know about yet, and that there are complex chemical or electrochemical processes which can interact with these in ways our present theories of matter don't anticipate.

Complicating the issue is the practice of alchemical secrecy discussed above. The critical ingredients and processes of alchemical transmutation are nowhere described in so many words. It's hard to determine if a process is possible when the nature of the process itself remains largely a mystery. For all we know, the "Secret Fire" referred to in many alchemical texts might have been electricity (generated, perhaps, by simple batteries using metals and vegetable acids) and the process of transmutation thus an analogue of the "cold fusion" phenomenon which caused so much confusion a few years ago. It's all but impossible to say.

None of this, of course, proves the possibility of alchemical transmutation, much less its reality as a historically known process. Still, in the absence of systematic attempts to duplicate the alchemical Great Work in a laboratory setting - attempts which have yet to be made outside of the small and poorly funded alchemical subculture that still labors away on the fringes of Western society - it may be premature to write off the possibility completely.

E. Branches of the Alchemical Tree

At the same time, the idea that alchemy was solely concerned with the production of gold from lead, like most modern notions about alchemy, is a spectacular oversimplification. Alchemy had a vast range of potential purposes, and the transmutation of metals was but one of them. In many senses, it may be best to speak not of alchemy but of alchemies, or of different branches of alchemy, sharing a common set of theoretical assumptions and attitudes but applying them to different fields of experience for different ends.

The alchemy of metals and minerals was certainly one of these, and (at least in the West) seems to have been the oldest. This branch sought to make various specialized mineral products - not merely gold, but also such things as flexible glass - through a mastery of the natural cycles of the mineral realm.

Another branch is the alchemy of medicine, or (as it's usually called) spagyric alchemy. This branch of alchemy dealt with the preparation of medical treatments by means of alchemical processes, using mineral, vegetable and animal substances as raw materials. Closely related to this is the alchemy of life, in which biological processes are understood through alchemical models, related particularly to issues of diet and digestion.

Both of these were central issues in Paracelsian alchemy, in particular, and in much late alchemy in general.

Similar issues on a larger scale gave rise to the alchemy of agriculture, mentioned earlier, which understands the growth of plants as a product of cycles of energy and substance in the soil and the local environment. Related to this are alchemical approaches to geology and meteorology, discussed at length in alchemical texts such as Joseph Kirchweger's *Aurea Catena Homeri*.

The development of alchemical thought also moved in another direction, toward the realm of human awareness. Here we find the closest equivalents to the psychological alchemy postulated by the more thoughtful Jungian writers (Jung himself included). Included here are the spiritual alchemies of Boehme and the Rosicrucian writers, in which alchemical models were used to understand the transformations of the self in interaction with transcendent powers, and also highly secret traditions of internal alchemy - Western as well as Eastern - in which the substance to be transmuted was sexual energy. The writings of Eugenius Philalethes are particularly important in this regard.

There were any number of other directions taken by alchemical thought, including the alchemical economics of Gerrard Winstanley, the chief theoretician of the Diggers during the English Civil War, and the very common alchemical interpretation of Christian theology, in which Christ and the transmuting Stone are identified and the Apocalypse becomes an alchemical fire in which the world will be calcined and purified. The main branches outlined above, though, account for the bulk of traditional writings on alchemy.

The scope of traditional alchemy thus included what we would now term chemistry and metallurgy, biology, physiology and medicine, geology, meteorology and ecology, as well as approaches to the human mind, spirit and subtle body currently (and inadequately) classified under the heading of psychology.

It may be most useful, given this, to think of the word "alchemy" not as a term for a single field of human knowledge and endeavor - equivalent to, say, "chemistry" - but, instead, as a term for an entire class of such fields - equivalent to, say, "science." The latter comparison is fairly precise; like modern science, alchemy represents a specific set of intellectual and practical approaches which can be applied to any field of human experience. Some of these applications will prove useful in practice, others less so - but then the same thing is equally true of the applications of modern scientific thought.

F. The Alchemical Concept of Nature

All these different fields of alchemical work, however, were united by a common approach based on common presuppositions. These are rarely if ever stated in so many words in traditional alchemical writings. Still, this same point is true of most systems of thought and practice in the history of human ideas; it's only in retrospect, in most cases, that the foundations of any given system become clear. A concept which is much in evidence in the writings of the alchemists, though, offers a useful way to approach the core of alchemical thinking. This is the concept of Nature.

Neither the common modern interpretation of Nature (as a collection of inanimate particles obeying natural laws) nor a Jungian interpretation (as a projection of an archetypal feminine image onto the world of outward experience) adequately express what the alchemists meant by this concept.

In the alchemy of the West, the Platonic threefold division of man into soul, spirit and body - the soul being equivalent to what we might call consciousness, the spirit to life, and the body to matter - was also applied to the world of natural phenomena. In addition to the corpus mundi or body of the world, then, alchemists (and natural philosophers in general) spoke of the spiritus mundi or spirit of the world and the anima mundi or soul of the world. The anima mundi can best be understood as the innate intelligence of Nature, and in some ways plays a role in alchemical thought equivalent to the modern concept of natural law. The spiritus mundi, in turn, functions as the executive power of the anima mundi, an all-pervading life present throughout matter and shaping the substance of the world.

To the alchemists, then, the idea of Nature included certain characteristics which were sharply at variance with modern ideas on the subject. First of all, Nature in alchemical thought is organic; it acts as a single living organism, and all things in it participate in its life, just as all the parts of a living creature participate in the broader life of the organism. Organic concepts and organic processes thus dominate alchemical thinking, in the same way that concepts and processes derived from Newtonian physics still dominate much of modern scientific thought.

Nature conceived in organic terms is seen to be a unity composed of many kinds and levels of subordinate unities, in exactly the same way that the human body is a unity composed of different systems, organs, tissues, and so on. An organic understanding of Nature also sees natural processes as necessarily cyclic rather than linear; the symbol of the ouroboros, the serpent devouring its own tail, is the standard icon for this concept in alchemical writings and art.

In addition, Nature in alchemical thought is uniform, in that patterns present in one realm or aspect of the natural world can also be found, *mutatis mutandis*, in any other. The principles

which govern chemical transformations in the crucible, for example, are precise analogies to those which govern developmental changes in the unborn child - or spiritual transformations in the human soul. This aspect of alchemical thought allows single sequences of symbols to stand for corresponding processes in what the modern mind sees as wholly different fields; this process was perhaps taken to its furthest extreme in Chinese alchemy, where a single text could be read and used as a guide to the manufacture of chemical medicines, the practice of meditation, the exercise of moral virtue or the conduct of military strategy - to name only a few of the many available options.

Finally, Nature in alchemical thought is teleological; that is, it seeks specific ends or, in alchemical language, specific perfections. This idea that natural processes are innately directed toward goals is perhaps the sharpest difference between alchemical thinking and modern scientific thought, since the presence of teleological behavior in nature would require a quality of guidance or direction hard to reconcile with the purely material notions of causality required by the philosophy underlying modern science. As a result, a great deal of effort and ingenuity in scientific circles has gone into finding ways to exclude teleology at all costs - even in cases, such as the behavior of living things, where goal-directed action is fairly obviously going on.

To the alchemists, by contrast, the *spiritus mundi* constantly works toward the perfection of all material things, in accordance with the innate patterns of the *anima mundi*. Among things which are living, the *spiritus mundi* seeks perfection by fostering growth and development; among things which are dead, it seeks perfection by putrefaction and disintegration, breaking down the outworn form so that a new form can take shape. Since alchemical thought sees life and death as present in areas of matter we now call inanimate - for example, metallic ores still in the ground are alive, while refined metals have been killed - these general processes have applications which go far beyond their obvious biological ones.

It's important to keep in mind, though, that while the *spiritus mundi* may seek perfection constantly it does not often attain it. The reason for this - again, the Platonic side of Western alchemy is evident here - is the imperfect nature of the material with which these processes of perfection must work. In the alchemical theory of the development of metals, which served as a model for developmental theory in other areas, the perfection of metals, gold, came into being only when the processes of metallic growth combined pure raw materials with the proper amount of heat. Any impurity or variation in temperature led to the creation of one of the lesser metals or minerals, and the presence of such impediments was far more common than their absence.

It was thus an axiom of the alchemists that "Nature unaided fails." To bring about perfection, they held, it was necessary to unite Nature and art, to supplement the ordinary processes of Nature with the extraordinary processes of alchemical practice.

G. The Processes of Alchemy

Just as Nature in alchemical thought is uniform, so the fundamental methods of alchemical practice follow patterns which remain constant through many different realms of application. The "mistie speeche" of the alchemical writers, as we've seen, makes many of the specific processes of traditional alchemical practice hard to decipher. By contrast, these constant patterns are much less obscure, and in certain branches of alchemy - notably the spagyric alchemy of herbs - enough practical details can be determined that it's possible to draw useful connections between pattern and process.

The simplest, and at the same time most important, of these patterns is expressed in the Latin motto *solve et coagula*. "Dissolve and coagulate", "divide and unite", "analyze and synthesize": each of these expresses some part of the multiple meanings of this phrase. In practice, the separation and reunification might make use of any number of specific processes suited to the material in question. In spagyric alchemy, for example, distillation is often used to accomplish the solve half of the equation.

One such process which is used by many modern alchemists starts by steeping herbal material in rectified alcohol. The mixture is then distilled until the alcohol has all come over, carrying with it the herb's "sulfur" or volatile components. Next, the remaining substance, containing the "fixed sulfur" and "salt", is calcined - heated until it becomes white ash - and the ash and the alcohol extract are then combined, producing a pale waxy substance which possesses the medicinal effects of the original herb in an intensified form. Distillation, followed by combination: *solve et coagula*.⁷

This example is one fairly simple use of distillation; more complex uses abounded. In some processes, the distillate is poured back on to the *caput mortuum* or "dead head", the residue left behind in the distillation process; the resulting mixture is distilled again, and these actions may be repeated up to hundreds of times. In others, a specialized retort (a "pelican") is used to return the distillate to the vessel while distillation is proceeding. In still others, complicated devices are used to separate out vapors of different density during the distillation process.

Distillation, however, was only one way of carrying out the first half of the motto. Another, an important element of a great many

specific alchemical processes, is putrefaction. The Aurea Catena Homeri describes putrefaction as "the principal gate or key to Nature," and this judgement is echoed in many other alchemical texts. It was by way of the natural process of putrefaction, the breaking down of old forms into raw materials for new ones, that the alchemists often found their most effective tool for opening up the hidden places of Nature. The organic understanding of Nature in alchemical thought, additionally, led alchemists to use the term "putrefaction" in senses that go beyond the purely biological. The dissolution of metals in acid was seen as a form of putrefaction; so was the experience of spiritual "dryness" brilliantly anatomized by St. John of the Cross in his *The Dark Night of the Soul*.

Putrefaction is also the first stage of what is probably the most famous of the patterns of alchemical practice, the one defined by a sequence of colors. In this pattern putrefaction is the nigredo or black phase, the stage of corruption and disintegration represented iconically by the crow, the skull, and symbols of mortality. The next step, the albedo or white phase, is the stage of purification; it is followed by a complex series of color-transformations, the cauda pavonis or peacock's tail, as the purified material passes through various changes. This results finally in the rubedo or red phase, the stage of energy and the completion of the work.

Other sequences, many of them partly or wholly based on this one, make use of the symbolism of the seven planets or the twelve Zodiacal signs. A good proportion of these are late productions, though, influenced by the Renaissance cult of antiquity mentioned above, and some of these seem to have been complicated by the same love of ornateness for its own sake that appears in much of the art and architecture of the time.

Each of the commonly used sequences has been enriched with a complicated series of icons and symbolic elements, and these in turn have been the basis for a wide range of modern speculations, ranging from the psychological through the mystical to the simply bizarre. It seems probable, though, that the original source of these sequences is to be found in the realities of alchemical practice. The series of colors, for example, probably has its source in actual visual effects which appear during the processes of metallic alchemy. As Betty Jo Teeter Dobbs commented in her important study of Isaac Newton's early alchemical work, it's difficult to know what exactly the alchemists were seeing in their vessels, as the relevant experiments haven't been done in modern times⁸. Still, color changes are hardly uncommon in chemical reactions involving metals and their salts, particularly given conditions of steady heat applied for days or weeks at a time - a commonplace of the alchemy of metals. It seems a little forced to insist on some external source for the color imagery when the alchemists themselves insisted, in places at great length, on the necessity of paying attention to the processes of Nature unfolding before the practitioner.

H. The Work of the Alchemist

The alchemists were students of Nature, intensely concerned with understanding natural processes and phenomena on their own terms. The famous image from Maier's *Atalanta Fugiens* of the alchemist who follows Nature's footsteps through a moonlit landscape expressed a crucial point in alchemical thought. At the same time, this is only part of the story. The alchemists also kept watch for those critical points where human intervention could bring about results which Nature alone would not; they were students of natural processes, but also participants in them. In spagyric alchemy, they provided the additional factors of diet or medicine which allowed Nature to overcome a disease it could not cure on its own; in agricultural alchemy, they enriched the soil to allow Nature to bring forth richer and healthier crops than it could otherwise produce; in metallic alchemy - at least in theory - they brought about the balance of factors which allowed imperfect metals to achieve the perfection of gold.

At the same time, these actions themselves were not seen as taking place outside of nature. The alchemist himself was part of the natural process, and had his equivalents at all levels of the great chain of being; the archeus or vital energy centered in the stomach was seen as the alchemist of the human body, and God himself was imagined as the supreme alchemist, subjecting the entire world to the processes of transmutation until it was ready to pass through the transforming fire into its own perfection.

The modern idea of the scientist as an observer wholly separate from the subject being observed - an idea increasingly difficult to defend even in the hard sciences - has no place in alchemical thought. One of the commonplaces of alchemical thought holds that the state of the alchemist affects the state of the work, and vice versa. It's precisely this factor of mutual influence that opens up the inner dimensions of alchemy.

In modern Jungian approaches to alchemy, this factor is reduced to the notion that the alchemists were simply projecting their subjective unconscious processes onto the material in their vessels. This is highly acceptable in a modern academic context, as it preserves the Cartesian barrier between "subjective" and "objective" worlds, and thus allows alchemy to be interpreted in a way which fits the preconceptions of modern thought. To the alchemists, on the other hand, it was precisely at the point of contact between the artist and the art - between "subjective" and "objective," although neither of these too-rigid categories has a place in alchemical thinking - that alchemy in the true sense of the word took place. A poem attributed to Salomon Trismosin expresses it well:

Study what thou art,
Whereof thou art a part,

What thou knowest of this art,
This is really what thou art.
All that is without thee
Also is within:
Thus wrote Trismosin.⁹

This verse can be interpreted in terms of a subjective, psychological take on alchemy, of course, but only by doing a substantial amount of violence to it. It's not merely "what thou art" that the alchemist is urged to study, but also "of what thou art a part," the whole in which the individual human being finds its place. Furthermore, the claim that "all that is without thee also is within" can't be equated to a claim that it's only the "within" that is of valid importance. Alchemically, it could as well be said that "all that is within thee also is without."

The realm of mutual influences involved here is subtle, but every artist or craftsman knows something about it, and thus in one sense or another about alchemy as well. The blindness of the modern West to these effects may well have a good deal to say about the dehumanizing nature of much current scientific thought, and in turn to the lifeless and soulless sterility which is so constant a feature of modern technology and architecture. And it is this, in turn, which suggests some of the potential relevance alchemy may have to the present day.

I. The Relevance of Alchemy

The patronizing attitude toward past thought mentioned at the beginning of this essay feeds into the habit, a common one, of equating various intellectual fads in the modern West with the major traditions of the past. To some extent, this is simply a marketing scheme, but in some cases it has had an influence on the way older systems of thought are understood. Many people will recall the flurry of books published a few years back about the parallels between quantum physics and "Eastern philosophy" - the latter term meaning, usually, a fairly simplistic amalgam of Hindu, Buddhist and Taoist ideas lifted from secondary sources and thrown together without any attention to context or to the extensive differences between these systems. More recently, the much-hyped subjects of chaos theory and James Lovelock's "Gaia hypothesis" have provided new fields for such endeavors.

It would be extremely easy to do the same thing to alchemy, and no doubt some clever person will catch on to this in the near future. Meanwhile, though, there's a case to be made for a somewhat different project: the pursuit of the study and practice of alchemy on its own terms - not simply as a hook on which to hang current intellectual fashions or a resource to mine in academia's endless quest for new dissertation topics.

Alchemy offers a specific way of approaching the worlds of Nature and human nature, the macrocosm and the microcosm, and of bringing these two into a balanced relationship. The value of that way of approach can't be validly judged by the stereotypes of alchemy in common use nowadays, or by the sometimes invalid or inadequate methods used in some of the practical applications of alchemical thought in the past. More useful, perhaps, might be a look at those modern disciplines which show the influence of alchemical thought in the modern world. These include ecology and systems theory, both of which inherited a substantial body of alchemical attitudes from the philosophical and scientific wing of German Romantic thought. Neither of these disciplines have proved incapable of dealing with significant problems in the modern world.

Ultimately, though - if it's to be anything more than the sort of popularization mentioned above - a revival of alchemy needs to draw its inspiration and its philosophical frameworks from the writings and practice of the alchemists of earlier times, and from the handful of people who have continued to build on the heritage of alchemy in the present.

What might a more fully developed modern alchemy look like in practice? Certainly the alchemical take on Nature would lead to very different kinds of research, stressing careful observation of the natural behavior of whole systems in place of the heavily analytic approach of modern experimental practice, which too often ends up studying nothing more than the effects of its own manipulations. (The behaviorist school of psychology is a case in point: an elaborate theory worked out through immense effort, which successfully predicts the behavior of rats in Skinner cages and, for all practical purposes, nothing else.) The question in all alchemical research is not "what happens when I do this?" but, rather, "what happens naturally?" followed, in time, by "what does this process need to come closer to its perfection?"

The alchemical sense of the uniformity of natural processes also implies a willingness to cross the rather arbitrary barriers between current academic disciplines. In this respect, it has features in common with modern interdisciplinary studies.

From alchemical research comes, in turn, practical applications of alchemy, and here there are a wide range of possibilities. One of the most obvious is a revival of the long tradition of alchemical healing. Epidemic greed and arrogance in our present medical system have turned many of the successes of scientific medicine into practical failures; it's not an accident that a recent study showed more American health care "consumers" (a term which is a comment all by itself) turning to alternative providers or self-care than to M.D.'s. Much of Chinese traditional medicine is deeply intertwined with alchemy, and some Western alternative health care modalities, including homeopathy and herbal medicine, also have substantial alchemical roots. The art of preparing alchemical extracts from medicinal herbs is one

of the few branches of alchemical practice clearly explained in the old texts, and modern alchemists have not been slow to notice this; there are at least two good modern books on herbal spagyric alchemy in print at the present time¹⁰. These might easily form the foundation for the emergence of a new spagyric tradition, making use of the many valid insights of scientific medicine while avoiding the pitfalls of the latter's extreme reductionism and reliance on mechanistic models.

Other possibilities open to alchemical practice might include revivals of the agricultural alchemy of the late Renaissance, which could easily find a place within the growing spectrum of organic farming techniques, and related methods of restoring wild ecosystems based on an alchemical understanding of energy and nutrient flows. The same principles applied to human communities might give rise to alchemical approaches to architecture and urban design. There is also the possibility that research into the alchemy of metals and minerals may turn up useful substances or even whole technologies; imagine, for example, the possible applications of the flexible glass described in some of the old texts. On a less pragmatic level, there are the inner alchemies of the West, which offer the possibility of anchoring spirituality in personal experience rather than dogmatic belief.

One could easily go spinning off into a kind of alchemical science fiction from here, but that is hardly relevant to the present task, or to the present moment.

What is relevant?

That alchemy cannot validly be dismissed either as an overly superstitious approach to chemistry or as psychology suffering from a case of mistaken identity. That alchemy is not limited to gold-making, or for that matter to psychotherapy, but embraces many different fields of study and application within a coherent methodology. That this methodology, and at least some of the directions in which it has been taken, can be usefully applied to at least some of the needs of the modern world.

The alchemist of the future, if such a creature exists, will have to combine traditional perspectives with the useful elements of new systems of thought, and - where appropriate - draw on the logical and practical methods of modern science as well. He or she will have to unite the patience and precision needed for close observation of Nature with the intuitive grasp and insight needed to relate the results to the wider world around. He or she will have to recognize, as well, the dance of macrocosm and microcosm as the observer and the observed, the worker and the work shape and are shaped by each other, and he or she will have to factor this in at every moment. In the hands of such an alchemist, the tools of the ancient tradition - applied to any field imaginable - will indeed make gold.

1. Giorgio de Santillana and Hertha von Dechend, *Hamlet's Mill* (Boston: David R. Godine, 1977)
2. The illustration is shown in (source).
3. See, for example, Adam McLean, "Alchemical Agriculture", *The Hermetic Journal* (1991), pp. 141-144.
4. Joseph Needham, *Science and Civilization in China*, Vol. 5 Part x (Cambridge: Cambridge UP, 19xx).
5. M. A. Atwood, *A Suggestive Inquiry into the Hermetic Mystery* (Belfast: William Tait, 1918). The discussion of Norton's stoneware recipe in on pp. 443-4.
6. Needham, op. cit., pp. xxx-xxx.
7. This process is discussed in more detail in Frater Albertus (Albert Reidel), *Alchemist's Handbook* (NY: Samuel Weiser, 1974), and Manfred Junius, *Practical Handbook of Plant Alchemy* (NY: Inner Traditions, 1985).
8. Betty Jo Teeter Dobbs, *The Foundations of Newton's Alchemy* (stuff), p. xx.
9. from Salomon Trismosin, *Splendor Solis*, tr. J. K. (London: Kegan Paul, n.d.), p. 88.
10. These are the books listed in note 7.