Adept Alchemy

by

Robert A. NELSON

Acknowledgements & Thanks : Hal Robins ~ William van Doren ~ Hans Nintzl ~ Manly P. Hall ~ Adam McLean

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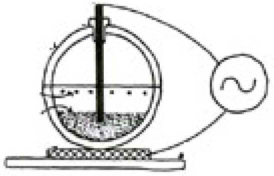

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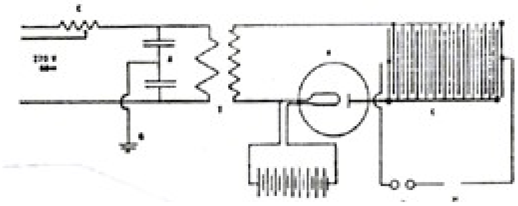

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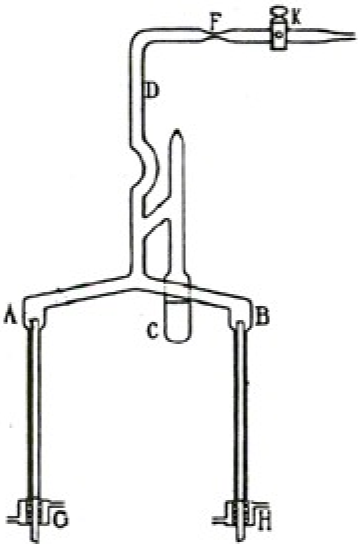

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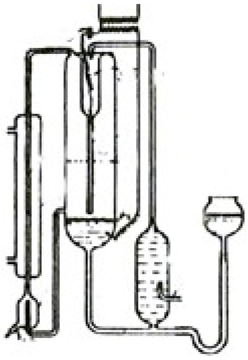

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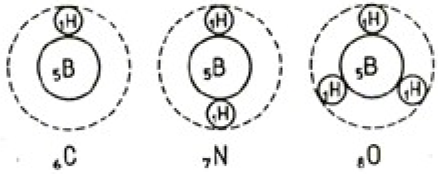

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Adept Alchemy

By Robert A. Nelson

Part II

Modern Transmutations

Chapter 1

Transmutations of Silver

Gold can be manufactured from other elements by several methods. The transmutation of silver to gold is the least difficult to accomplish. The methods developed by Francois Jollivet-Castelot offer a good chance of success, albeit with great danger due to the use of arsenic. The penultimate means of transmutation is the Philosophers' Stone of any degree, but that is another matter altogether.

Fulcanelli and others Adepts, however, affirm that experiments such as these are not Alchemy, but rather "hyper-chemistry" or "archymy". The following procedures are included in this collection in order to afford a wider perspective to all inquirers, and to console those who fail to complete the Ars Magna.

Most of the 19th and 20th century experimenters in this genre used a variety of "wet" techniques (refluxing with nitric acid, etc.), or "dry" transmutations with alloys in the furnace. Dr. Stephen Emmens used high-pressure hammering (500 tons/sq. in.) of silver at low temperature, followed by fluxing, granulation, more hammering, treatment with "modified nitric acid", and refining.

(1) Martin Rulandus ~ *A Lexicon of Alchemy*

Gold --- Its Artificial Production ~ It is not only by the common operations of mining and digging in the profundities of the earth that it is possible to obtain Gold. It is quite within the powers of Art to imitate Nature in this matter, for Art perfects Nature in this as in many other things. We propose to provide in this place an account of a formal experiment, the worth of which has been tested over and over again, and has in fact become little less than familiar among operators in the pursuit of the Grand Work. In order to perform it a large crucible must be provided, and it must be of such a quality as will be able to resist the action of intense heat. This crucible must be set over a burning furnace, and at the bottom of the vessel there must be strewn Powder of Colophony (a kind of resin) to about the thickness of the little finger. Above this undermost layer there must be another layer of Fine Powder of Iron --- that is, the Finest Iron Filings --- which shall be of the same thickness. Subsequently, the filings must be covered with a little Red Sulphur. Then the fire in the furnace must be increased till the iron filings have passed into a liquid condition. The next operation is to throw in Borax --- that kind which is made use of by goldsmiths for melting gold. To this must be added a like quantity of Red Arsenic, and as much Pure Silver as will be equivalent to the weight of the Iron Filings. Let the entire composition undergo coction by driving the furnace, taking care at the same time not to inhale the steam, on account of the arsenic in the vessel. Take then another crucible into which, by inclining the first vessel, you must pour the cocted matter, having previously stirred it effectually with an iron spatula. Proceed in such a manner that the composition will flow into the second crucible in a purified state, and devoid of recremental matter. By means of the Water of Separation, the Gold will be precipitated to the bottom. When it has been collected, let it be melted in a crucible, and the result will be good Gold, which will repay all pains and expense which have been devoted to its production. This chemical secret is contained in the ‘Hermetic Cabinet’, and the facility with which the experiment can be performed has led many persons to undertake it. The authority cited in support of it is no less than that of the most learned Basil Valentine, who also affirms that the operation of the Grand Work of the Philosophers can be performed in less than three or four days, that the cost should not exceed three or four florins, and a few earthen vessels are sufficient for the whole experiment.

(2) Theodore Tiffereau

Between 1854-55, Theodore Tiffereau submitted six memoirs to the French Academie des Sciences concerning transmutations of silver to gold. He published a compilation of the papers (*Les Metaux sont des Corps Composes*) in 1855.**(25-27)**

Tiffereau conducted his experiments at considerable expense while supporting himself making daguerotypes in Mexico. Tiffereau claimed that Mexican silver possesses peculiar qualities that lend to its augmentation as gold (Dr. Emmens also used Mexican silver in his work). While he claimed success in principle, he made no capital gains. Tiffereau demonstrated his process at the French Mint in Paris before the assayer M. Levol, but the results were unsatisfactory.

Tiffereau attempted many modifications of his techniques, and claimed that certain experimental conditions influence the transmutation of silver to gold:

1) Pure silver filings were used, sometimes mixed with pure copper filings (Ag 9:1 Cu) and traces of zinc, iron, alumina and silica;

2) Trace amounts of gold catalyze the reaction;

3) The silver was refluxed with concentrated nitric acid, hyponitrous acid, and nitrogen protozide or deuteroxide;

4) Concentrated sulfuric acid was used at times;

5) The acids were exposed to sunlight to "solarize" them. Tiffereau complained that the French sun was not so effective as the Mexican;

6) Halides and sulfur in the presence of oxides of nitrogen improved the reaction, and so did ozone;

7) Prolonged reaction time increased yields.

Tiffereau attributed the production of gold in the earth to the action of the "microbe of gold". This was confirmed in the 1980s by the discovery that placer gold nuggets form around a nucleus of *bacillus cereus*.

The following experiment is typical of Tiffereau's general methods:

"After having exposed, over two days, pure nitric acid to the action of solar rays, I added pure silver filings with pure copper filings in the proportions of the alloy of money (9:1). A lively reaction manifested, accompanied with a very abundant deposit of intact filings agglomerated in a mass.

"The disengagement of nitrous gas continued without interruption, and I left the liquid as is over twelve days. I noted that the aggregate deposit was augmented sensibly in volume. I then added a little water to the dissolution in which the product had precipitated, and again abandoned the liquid to rest five days. During this time, new vapors unceasingly disengaged.

"The five days having passed, I raised the liquid just to ebullition, which I maintained until the nitrous vapors ceased disengagement, after which I evaporated it to dryness.

"The matter obtained from the dessication is dry, dull, blackish-green; it did not offer an appearance of crystallization...

"Placing the matter again in pure nitric acid and boiling six hours, I saw the matter become clear green without ceasing to aggregate in small masses. I added a new quantity of pure concentrated nitric acid and boiled it anew; it is then that I finally saw the disaggregated matter take the brilliance of natural gold...

[The third test in this series] "presented an extraordinary phenomenon to be noted: the quantity of the alloy that I used experienced a transformation entirely to pure gold."

Carey Lea suggested that Tiffereau and other experimenters had merely prepared a gold-colored form of allotropic silver.

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(3) R. M. Hunter

In 1908, Sir Henry Baskerville made mention of a contemporary claim to the production of artificial gold:

"Among the many communications reaching the writer, one is of more than passing interest. Mr. R.M. Hunter, of Philadelphia, has written concerning 'synthetic gold' as follows:

"I have so perfected the process that in my judgment, based on my actual experience, gold may be manufactured at enormous profit, and to this end I have designed a plant to be erected in Philadelphia and am at this moment negotiating for $500,000 capital for its erection. I realize that the public and most scientific men are adverse to the belief in the possibility of such an enterprise, but I know what I am doing and can afford to allow public sentiment to follow its own course.

"Enclosed with the letter was an affirmative affadavit. On request, Mr. Hunter promptly forwarded me samples of silver in which the gold is 'growing' and some 'grown-up' gold, said to have been produced by his secret process. I have not made analyses of the samples." **(5)**

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(4) Arthur E. Waite

The eminent occultist Arthur E. Waite wrote *A Collection of Alchymical Processes* which includes a segment entitled "Silver Transmuted Into Gold By The Action Of Light":

"In the focus of a Burning-Glass, 12 inches in diameter, place a glass Flask, 2 inches in diameter, containing Nitric Acid, diluted with its own volume of water:

"Pour into the Nitric Acid, alternately, small quantities of a Solution of Nitrate of Silver and of Muriatic acid, the object being to cause the Chloride of Silver to form a minutely divided state, so as to produce a milky fluid, into the interior of which the brilliant convergent cone may pass, and the currents generated in the Flask by the Heat may so drift all the Chloride through the Light.

"The Chloride, if otherwise exposed to the Sun, merely blackens on the surface, the interior parts undergoing no change: This difficulty, therefore, has to be avoided. The Burning-Glass promptly brings on a decomposition of the salt, evolving, on the one hand, Chlorine, and disengaging a metal on the other. Supposing the experiment to last two or three entire hours, the effect will then be equal to a continuous midday sun of some 72 hours. The Metal becomes disengaged very well. But what is it? It cannot be silver, since Nitric acid has no action on it. It burnishes in an Agate Mortar, but its reflection is not like that of silver, for it is yellowish, like that of Gold.

"The Light must therefore have so transmuted the original silver as to enable it to exist in the presence of Nitric Acid." **(28)**

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(5) Fulcanelli

The renowned master Fulcanelli published this transmutation of silver in *Les Demeures Philosophales*:

"The simplest alchemic procedure consists in utilizing the effect of violent reactions --- those of acids on the bases --- to provoke in the midst of the effervesence the reunion of pure parts, their new arrangement being irreducible. In this manner, starting from a metal close to gold --- preferably silver --- it is possible to produce a small quantity of the precious metal. Here is, in this order of research, an elementary operation whose success we guarantee, providing the instructions are carefully followed.

"Empty into a glass retort, tall and tubular, one-third of its capacity in pure nitric acid. Adapt to the receiver an escape tube and arrange the apparatus in a sand bath.

"Gently heat the apparatus short of reaching the boiling point for the acid (83^{o} C). Turn off the fire, open the tube, and introduce a small portion of virgin silver, or of cupel, free from gold traces. When the emission of peroxide of azote has stopped and when the effervesence has quieted, let drop into the liquor a second portion of pure silver. Repeat introducing metal, with no hurry, until the boiling and issuing of red vapors manifest little energy, which is indicative of the property of saturation. Add nothing more. Let it rest for half an hour, then cautiously decant your clear solution into a beaker while it is still warm. You will find a thin deposit in the form of black sand. Wash this with lukewarm water, and let it fall into a small porcelain capsule. You will recognize by making the assays that the precipitate is insoluble in hydrochloric acid, just as it also is in nitric acid. Aqua regia will dissolve it and yields a magnificent yellow solution, exactly like gold trichloride. Use distilled water to dilute this liquor; precipitate from a zinc blade. An amorphous powder will be obtained, very fine, matte, of reddish brown coloration, identical to that given by natural gold reduced in the same manner. Wash well and dessicate this pulvurent precipitate. By compression on a sheet of glass or marble, it will give you a brilliant, coherent lamina with a beautiful yellow sheen by reflection, green by transparence, having the look and superficial characteristics of the purest gold.

"To increase with a new quantity this miniscule deposit, you may repeat the operation as many times as you please. In this case, take up again the clear solution of silver nitrate diluted from the first washing water; reduce the metal with zinc or copper. Decant this silver into a powder and use it for your second dissolution." **(14)**

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(6) Francois Jollivet-Castelot

Francois Jollivet-Castelot was the Secretary General (and later President) of the Alchemical Society of France (founded in 1896). He also edited the Society's journal *L'Hyperchemie*, and served as a special delegate of the Supreme Council of Martinists. He authored several books and articles on alchemy and "hyperchemistry", a system of non-occult chemical methods of transmutation. **(17-20)**

Jollivet-Castelot began experimenting with transmutations of silver in 1908. In 1920, he published *La Fabrication Chimique de L'Or* to report his successes using both "wet" and "dry" methods of transmutation:

"By means of catalytic action I have succeeded in manufacturing gold chemically by acting on silver with arsenic and antimony sulfides, tellurium, and tin.

"This process gives a very high yield which has already been confirmed by several chemists, in particular by Mr. Ballandras, Chemical Engineer of Lyons, and Mr. Outon, Chemical Engineer of Buenos Aires...

"The object of the present leaflet is to enable chemists to repeat and check my experiments in their turn...

"I made a mixture composed of 3 gr of chemically pure silver and 1 gr of chemically pure orpiment and placed it in 36^o nitric acid for several months cold and then brought it to ebullition. The liquid was kept at the boiling point for several days. A small quantity of the material became detached at this moment and formed a pulvurent black deposit. When no further action took place, I decanted off the solution and collected the insoluble residue. This residue was attacked by aqua regia at the boiling point until it was almost completely dissolved; the liquor when decanted and filtered was analyzed and gave all the characteristic reactions for gold.... [December 1925]

"I acted on 22 gr of chemically pure silver ... and on 3.5 gr of chemically pure orpiment... The mixture was heated to about 1600^o C In a metal smelting furnace for about three quarters of an hour. The residue obtained was again melted with the addition of orpiment. After having hammered for half an hour and remelted with the addition of small quantities of orpiment every ten minutes, it was withdrawn.

"After cooling and the addition of chemically pure antimony sulfide, it was again put back into the furnace, small quantities of orpiment being thrown in every five minutes. The residue obtained had a dark metallic tint. After hammering it became slightly golden.

"The residue dissolved in chemically pure 36^o nitric acid first cold and then hot, gave an abundant pulvurent deposit. This deposit after being washed and treated with ammonia to dissolve the arsenic and antimony salts was completely dissolved in aqua regia. The liquor then being chlorinated and filtered was subjected to the reagents of platinum and gold. Mr. Andre Vandenberghe who was acting as preparator for this experiment, had thought that in accordance with the law of the evolution of matter, the transmutation of bodies into gold should be preceded or accompanied by their transmutation into platinum...

"The reactions of gold were quite characteristic; the reactions of platinum also seemed to reveal its presence.

"The quantity of gold obtained in this experiment was about one gramme.

"I submit the hypothesis that the arsenic acts as a catalyst and the sulfur as a ferment in this transmutation." (December 1925; Douai, France)...

"As a sequel to my previous work on the artificial synthesis of gold, I have introduced tin into these new tests as it is also often associated with gold in Nature. The following is a description of this new process, thanks to which the percentage of gold obtained destroys all the objections that are raised with regard to impurities.

"I made an intimate mixture of 6 gr of chemically pure silver... 2 gr of antimony sulfide, 1 gr of orpiment, and one gr of tin... I then added the usual fluxes and then heated the whole in a crucible in the furnace to about 1100° C for about one hour, twice adding a small quantity of SbS.

"The residue obtained was treated for a long time in 36° nitric acid, first cold and then at the boiling point; the insoluble residue was next washed with distilled water, treated with ammonia, washed again and finally treated for a long time with boiling aqua regia.

"The liquor when filtered and subjected to the reagents of gold showed the presence of this metal in the form of abundant deposits which may be estimated at 0.05 gr in all, which is very high considering the 6 gr of silver employed. The deposits when collected and dried had a yellow green metallic color and possessed all the characteristics of gold...

"The addition of tin to the other bodies has certainly facilitated the reactions of the gold and increased the yield of this metal which can be manufactured artificially by my process, i.e., by synthesis and in measurable quantities.

"It would be very easy to show that, given the respective prices of gold and of the other substances that are used in my process to produce it, a profit could be obtained if the process were worked industrially, all the more so as the greater part of the silver employed can be recovered at each test..

"I believe I now hold the key to the regular and even industrial manufacture of gold.

"But the industrial question is voluntarily put aside from my thoughts, for my only object is the search for pure scientific truth."

In a correspondence to Jollivet-Castelot, Mr. Ballandras reported on "How I Succeeded In Making Gold According To The Process of Mr. Jollivet-Castelot: Dosage of gold obtained by the second method":

"From a mixture of 10 gr silver, 3 gr of tin, 3 gr of arsenic sulfide, and 3 gr of antimony sulfide, the residue which had been obtained was crushed as much as possible and subjected to a treatment of pure chloric acid like in the first method. However, in order to completely eliminate the silver and the tin employed, I scrupled to begin again the indicated treatments, that is as much to say that the powder which was obtained having been subdued first to the action of azotic acid, then washed with distilled water, then subdued to the action of chloric acid, then washed with distilled water, then once more washed with distilled water, and these different operations were begun once again with another portion of pure chloric acid... The insoluble residue was subdued to the prolonged action of aqua regia...

"It must be noted that this thing happened during the ebullition. The washed residue contained the slighter part of gold; this thing would be found dissolved in the last liquor which I obtained.

"After 18 hours of digestion at about 25^o, I subdued the mixture to ebullition during 3 hours. After refrigeration, I filtered on glass wool and I looked if parts were not drawn along in suspense. I found nothing. Then, I decided to proceed to a circumstantial analysis of the liquor which I obtained...

"The quantity of gold which was obtained was 0.476 gr for 10 gr of silver employed, or 0.0476 gr of gold per gram of silver."

Jollivet-Castelot read this memorandum to the Academie Royal des Sciences (Belgium) on June 6, 1926:

"*A Recent Experiment In Transmutation* --- All my research work on transmutation since 1908 has started from the fact that gold is found in nature associated with antimony and arsenic sulfides as well as with tellurium, which is considered as a mineralizer of gold. I therefore considered that it was logical to introduce tellurium into the artificial combination of silver and arsenic and antimony sulfides that I make...

"I prepared a mixture composed of 6 gr of silver, 1 gr of native orpiment free of gold, 1 gr of antimony sulfide and 2 gr of tellurium... I added pure silica to the usual fluxes. This mixture was heated in the furnace in the usual way for one hour at about 1100^o C. The residue obtained was of a blackish-grey color with violet reflections. It weighed 6.42 grams.

"When subjected to the action of nitric acid, the residue was attacked with difficulty and greenish metallic particles become detached. The solution was then decanted and a greenish-yellow residue remained which was kept at the boiling point of nitric acid for several hours. After decanting off the liquor once again, the residue, which had not changed, was washed, treated with ammonia and then subjected to the action of boiling aqua regia in which it was entirely dissolved after boiling for several hours.

"[The solution was chlorinated and subjected to the reagents of gold with positive results, although] a certain amount of gold was certainly lost in this test just as in all my previous tests, for it is known that arsenic, antimony, and tellurium entrain gold in their fusion and their volatilization.

"In order to obviate this disadvantage, I had thought of making the vapors of arsenic acid and antimony sulfides and of tellurium act on the silver in fusion in a closed vessel by means of a special device...

"I consider it certain that if the vapors were allowed to bubble through the melted silver, a much higher yield of gold would be obtained than that I have obtained hitherto by an imperfect and too rapid contact of the bodies in presence, while it is undoubtedly necessary to make them react on one another in the vapor state in a closed vessel."

Mr. Louis Outon, a pharmaceutical chemist in Buenos Aires, reported to Jollivet-Castelot in a letter (July 26, 1927):

"Dear Sir... I have repeated the experiments... in my laboratory and am amazed at the results. For the moment, it is only the scientific side which interests me, since the cost of the gold obtained is often greater than the value of the metal..."

Mr. A. Ballandras also replicated the experiments and reported the results:

"I will not conceal the fact that I have often heard ironical remarks aboutprocesses by which he succeeded in manufacturing gold. I determined to check his tests with the greatest possible accuracy...

"In a new quartz crucible, I placed 15 gr silver, 6 gr arsenic sulfide, 6 gr antimony sulfide. The crucible was heated at a temperature of 500° C and then for one hour and a half at 1100° C. At this moment the mass was fairly liquid... The crucible was then allowed to cool down. The reddish-brown residue obtained weighed exactly 23.742 gr, or a loss of 3.258 grams.

"I allowed this residue to cool in pure nitric acid in which the greater part was dissolved fairly easily. After prolonged boiling the liquor was filtered on a new glass wool. The resultant liquor was very clear and absolutely free of any particles.

"The glass wool was then macerated in aqua regia rich in hydrochloric; after 18 hours maceration, the whole was boiled for 3 hours. I again filtered on glass wool in order to separate any traces of the filter from the liquor... Any gold that might have been obtained would necessarily be found in the last liquor... It was of importance to prove its existence qualitatively at least.

"For this purpose, I tried the various standard reagents, the results being the following: 1) Oxalic acid: flakey precipitate; 2) Iron sulfate: glossy metallic black; 3) Tin chloride: peach pink precipitate; 4) Formol: rather light bluish coloration; 5) Sodium carbonate, potassium carbonate: light coloration after boiling; 6) Sodium hydroxide, potassium hydroxide: yellowish coloration, cloudy.

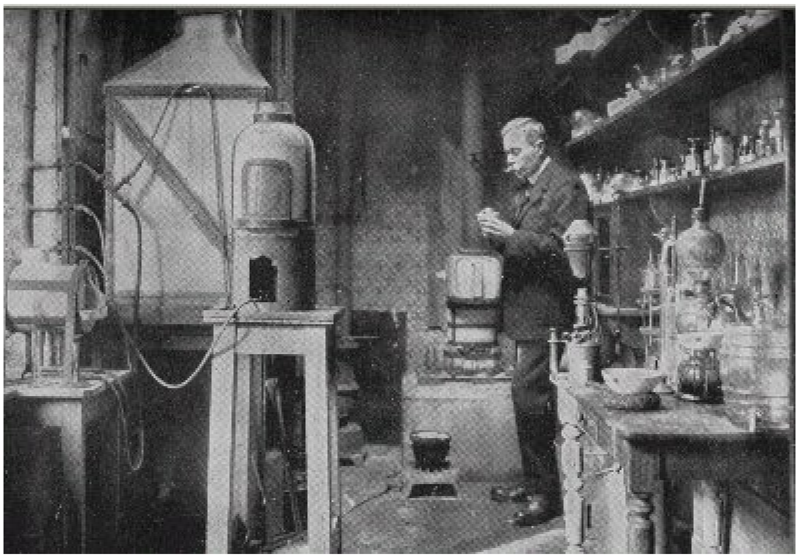
"These reactions are sufficiently characteristic and clearly prove the existence in the last liquor of a metal which, even if it is not gold, must nevertheless be placed very close to the latter... the metal obtained and gold must be perfectly isotopic.

"I have repeated this test several times and I have observed: 1) That the production of gold is a function of the rapidity with which the necessary heat is obtained; 2) That it is also a function of the degree of tightness of the crucible. A crucible that is closed as tightly as possible gives better results; 3) That the amount of gold obtained was not always uniform; some of the tests were absolutely sterile and I inferred that this was due to some defect in the mounting.

"I think there must be a certain temperature that should not be exceeded and that the external conditions of pressure and electricity must be of considerable importance."

In another experiment, Ballandras used silver (10 gr), tin (3 gr), orpiment (3 gr), and antimony sulfide (3 gr):

"After having operated as previously, I obtained a quantity of gold corresponding to 0.05 gr per gram of silver employed... This I consider to be a highly interesting result."



Francois Jollivet-Castelot

(7) Dr. Stephen Emmens

Early in 1897, the British chemist Stephen H. Emmens, then residing in New York, announced the discovery of a new element which fills the "vacant space existing in the sub-group of Group I", and which he thought to be the intermediate matter from which silver and gold are formed. Dr. Emmens said:

"Our claim is that the element in question is therefore neither silver nor gold, but which may, by our new physical methods, be converted into gold." **(14)**

In 1897, Dr. Emmens' Argentaurum Laboratory on Staten Island produced over 660 ounces of gold from silver and sold it to the U.S. Assay Office. He revealed a few historical and technical details of his transmutation process in his book, *Argentaurum Papers #1: Some Remarks Concerning Gravitation:*

"Our work, which converts silver into gold, had its origin in the course of certain investigations which I undertook for the purpose of preparing chemically pure nickel... in 1892. In attempting to prepare these pure metals [nickel and iron], a certain product was obtained which seemed to differ from anything recorded in the textbooks. The same product was subsequently found when the investigation was extended to the case of metallic cobalt... The phenomena observed afforded indications of the existence of some substance common to the whole of the elements in what is known as Series 4 of Group 8 of the classification of Chemical Elements... It appeared to us almost self-evident that if we were right in supposing a common substance to be present in any single series of elements, the same would hold good for each group.

"And as Group I of the classification contains the precious metals --- gold and silver ~ it was obvious that our time and attention should be directed to these metals rather than to any other...

"Our starting point, so far as silver and gold were concerned, was afforded by the remarkable discoveries of Mr. Carey Lea with regard to [colloidal silver]... It was found that... this subdivision of metallic silver was attended by very considerable changes in the physical properties of the substance...By certain physical methods and by the aid of a certain apparatus, we succeeded in bringing about a further subdivision of the silver. We were not surprised to find that the substance obtained differed so far from ordinary silver that it could no longer be regarded as the same elementary substance. It seemed to require a new name and a new chemical symbol. Inasmuch, therefore, as our theory was that this substance was common to both gold and silver, and in reality was the raw material out of which both gold and silver were constructed by the hand of nature, we named the substance Argentaurum...

"The next step was to ascertain whether this substance could be so treated as to be grouped into molecules of greater density than those of silver... We found that... Argentaurum can be aggregated into molecules having a density considerably superior to that of ordinary gold molecules. Whether we are right as to this or not, the condensed Argentaurum presents the appearance and is endowed with the properties of ordinary metallic gold...

"We do not consume any chemicals and other costly materials in our process; what we use is mainly energy in some of its various forms, such as heat, electricity, magnetism, gravity, cohesion, chemical affinity, x-rays and the like... Our chief source of expense is the time required for bringing about the desired molecular changes... One ounce of silver will produce three-quarters of an ounce of gold..." **(6)**

Herbert Fyfe reported that Dr. Emmens' process comprised five stages: 1) mechanical treatment; 2) fluxing and granulation; 3) mechanical treatment; 4) treatment with a "modified nitric acid", and 5) refining. Dr. Emmens said:

"I regard the mechanical treatment as the *causa causans*. The fluxing and granulation serve, I think, merely to render the molecular aggregate susceptible of displacement and rearrangement." **(15)**

The mechanical treatment was accomplished by means of Dr. Emmens' "Force Engine", which exerted pressures in excess of 500 tons/in^2 at very low temperatures. Step 4, using "modified nitric acid", contradicts the statement made elsewhere, that "we do not consume any chemicals... in our process." **(4, 7-12, 15, 16, 23)**

Dr. Emmens included a sample of Argentaurum and these instructions in a letter (21 May 1897) to Sir William Crookes:

"Take a Mexican dollar and dispose it in an apparatus which will prevent expansion or flow. Then subject it to heavy, rapid, and continuous beating under conditions of cold such as to prevent even a temporary rise of temperature when the blows are struck. Test the material from hour to hour, and at length you will find more than the trace (less than one part in 10,000) of gold which the dollar originally contained."

Sir Crookes was unable to replicate the experiment to his satisfaction. He reported:

"A specimen of Argentaurum sent me by Dr. Emmens has been examined with the spectrograph. It consists of gold with a fair proportion of silver and a little copper. No lines belonging to any other known elements, and no unknown lines, were detected."

This analysis resembles that of ordinary bullion gold, which contains silver and copper to make it harder and more fusible than pure gold.

In a rejoinder, Dr. Emmens noted:

"I have received a letter from a very eminent Fellow of the Royal Society informing me that he has performed the crucial experiment suggested in my letter of May 21, 1897, to Sir William Crookes. The gold contained in the Mexican dollar after 40 hours of intense cold and continuous hammering was found to be 20.9% more than the quantity of gold contained in the same dollar before the test."

In 1898, Emmens floated the Argentaurum Company, a syndicate which promised that for one ounce of silver (then worth about 50 cents) entrusted with payment of $4.50 per ounce for conversion costs, the investor would be repaid with 3/5 ounce of gold (then worth about $11). Dr. Emmens' application for a patent on his process was refused, however, so production never began, since he would not have been able to protect his methods from unscrupulous competitors. **(24, 29, 30)**

Dr. Emmens was issued several U.S. Patents for inventions; at least two of them may be related to his process: #501,996 (25 July 1893), Electrolytic bath; and #501,997 (25 July 1893), Apparatus for Electrolytic Extraction of Metals. Dr. Emmens' Force Engine produced hammering pressures in excess of 500 tons/in^2 at very low temperatures. These effects can be achieved by a variety of modern methods.

Semantic ambiguities in Dr. Emmens' writings confuse the understanding of the process. At times, Argentaurum refers to a new element, or to the gold produced from it, or to Lea's intermediate allotropic silver.

(8) Carey Lea

Carey Lea discovered the preparation of so-called "allotropic" and "intermediate" silver in 1889 while he was studying reductions of silver nitrate. "Allotropic" is a misnomer, however. In 1925, Dr. Richard Zsigmondy, Professor of Chemistry at the University of Göttingen, received the Nobel Prize in Chemistry for his study of Lea's "allotropic" silver under the ultramicrosope. Dr. Zsigmondy found that such silver actually was a monoatomic colloid of ordinary silver, not another isotope.

Lea determined that silver occurs in "allotropic", "intermediate", and ordinary forms. Ordinary silver is protean in nature. The aqueous solutions are colloidal monoatoms, and give perfectly clear solutions. The several forms of "allotropic" silver (a-Ag) dry with their particles in optical contact with each other, thus forming continuous films that are beautifully colored, perfect mirrors. Strong acids and pressure will convert a-Ag to the normal form. There are three forms of a-Ag, and all are unstable. **(21, 22)**

There is also a very stable "intermediate form" of silver (i-Ag) which is easy to prepare. It occurs as bright gold-yellow or green crystals with a metallic luster. Treatment with a very dilute solution of ferric chloride will enhance the appearance of its foliar structure, interpenetrating with plant-like ramifications, or fine acicular crystals up to 1 inch long.

Intermediate silver is hard, tough, and unaffected by pressure. It is nearly as indifferent to oxidizing and chlorizing agents as is normal silver. Intermediate silver can be formed from the allotropic varieties by light, heat, or chemical action. The simplest preparation is as follows:

"It has long been known that golden-yellow specks would occasionally show themselves in silver solutions, but could not be obtained at will and the quantity thus appearing was infinitesimal. Probably this phenomenon has often led to a supposition that silver might be transmuted into gold. This yellow product, however, is only an allotropic form of silver, but it has all the color and brilliancy of gold, a fact which was apparent even in the minute specks hitherto obtained...

"It is a little curious that its permanency seems to depend entirely on details in the mode of preparation. I have found many ways of obtaining it, but in a few months the specimens preserved changed spontaneously, to normal silver... The normal silver produced in this way is exquisitely beautiful. It has a pure and perfect white color like the finest frosted jewelers' silver, almost in fact exceeding the jeweler's best products. I found, however, one process by which a quite permanent result could be obtained... the following proportions give good results:

"Two mixtures are required: No. 1 containing 200 cc of a 10% solution of silver nitrate, 200 cc of 20% solution of Rochelle Salt [Sodium potassium tartrate] and 800 cc of distilled water. No. 2, containing 107 cc of a 30% solution of ferrous sulfate, 200 cc of a 20% solution of Rochelle salt and 800 cc of distilled water. The second solution (which must be mixed immediately before using only) is poured into the first with constant stirring. A powder, at first glittering red, then changing back to black, falls, which on the filter has a beautiful bronze appearance. After washing it should be removed whilst in a pasty condition and spread over watch glasses or flat basins and allowed to dry spontaneously. It will be seen that this is a reduction of silver nitrate by ferrous sulfate...

"Although the gold-colored silver (into which the nitrate used is wholly converted) is very permanent when dry, it is less so when wet. In washing, the filter must be kept always full of water; this is essential. It dries into lumps exactly resembling highly polished gold...

"If we coat a chemically clean glass plate with a film of gold-colored allotropic silver, let it dry, first in the air, then for an hour or two in a stove at 100^o C, and then heat the middle of the plate carefully over a spirit lamp, we shall obtain with sufficient heat a circle of whitish gray with a bright, lustrous golden ring round it, somewhat lighter and brighter than the portion of the plate that has not been changed by heat. This ring consists of what I propose to call the "intermediate form"...

"With sulfuric acid diluted with four times its bulk of water and allowed to cool, an immersion of one or two seconds converts a film on glass or on pure paper wholly to the intermediate form...

"Its properties are better seen by using a film formed on pure paper, one end of which is heated over a spirit lamp to a temperature just below that at which paper scorches. The change is sudden and passes over the heated portion of the surface like a flash. Examining the changed part, we find:

1st. That it has changed from a deep gold to a bright yellow gold color.

2nd. When subjected to a shearing stress *it does not whiten or change color in the slightest degree*.

3rd. It is much harder, as is readily perceived in burnishing it.

4th. It no longer shows the color reaction with potassium ferricyanide and ferric chloride, changing only by a slight deepening of color.

"Of these characteristic changes the second is the most remarkable. The gold-colored silver in its original condition changes with singular facility to white silver; almost any touch, any friction, effects the conversion...

The intermediate form is distinguished from normal silver almost solely by its bright yellow color and its higher luster."

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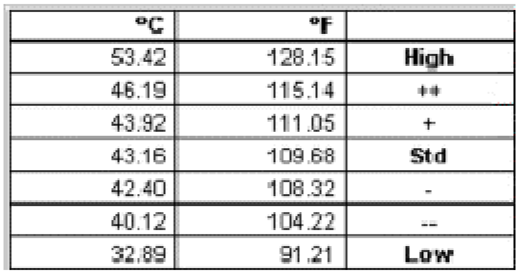
(9) Joe Champion

In 2004, Joe Champion presented a non-toxic method to convert microscopic amounts of silver to gold by the action of phonons:

"In the formation of Ag (or other elements) from a dimensional reaction, the conversion will occur without excess energies or nuclear signatures. By heating Ag to a temperature of 43.2° C. The principle is straightforward and simple without toxicity, by utilizing a heat source that is stable and capable of heating in the range of 100-120° C. Allow the temperature of the silver to stabilize at 43.2° C. It is important that you measure the temperature of the silver and not that of the sand. The function of the sand is to provide an even influx of temperature to the entire area of the silver and it provides an excellent insulator.

"The temperature of 43.2° C is optimum under ideal conditions. It is, however, possible that the temperature may vary within the statistical limits shown in Table 1. When the temperature is exact for the reaction the silver with become endothermic. This means that the temperature will be slightly greater than that of the surrounding sand. A point of interest - this reaction is the same as observed in the working Cold Fusion cells of the past. The scientists were not observing a low energy nuclear event; rather, they were observing an inter-dimensional phenomenon.



°C	°F	
53.42	128.15	**High**
46.19	115.14	++
43.92	111.05	+
43.16	109.68	**Std**
42.40	108.32	-
40.12	104.22	--
32.89	91.21	**Low**

"Achievement of the maximum conversion of Ag to Au will depend on the dwell time at resonance temperature. Conversion of Ag to Au can ocur in as little as six hours; 2% conversion takes up to 24 hours.

Theory ~ "The conversion of one element (specifically one isotope) to another through a dimensional reaction occurs under select conditions of phonon resonance. Dimensional phonon resonance occurs when the space occupied by one isotope is exactly the same as that of another isotope in its rest state. This event only occur under the following two conditions: (1) the expansion of an isotope by heating; or, (2) the contraction of an isotope by cooling.

"Due to the natural characteristics of elemental properties, this event is extremely rare and one can only force the event under select conditions. To determine the phonon resonance of an isotope, it is necessary to apply the following formula:

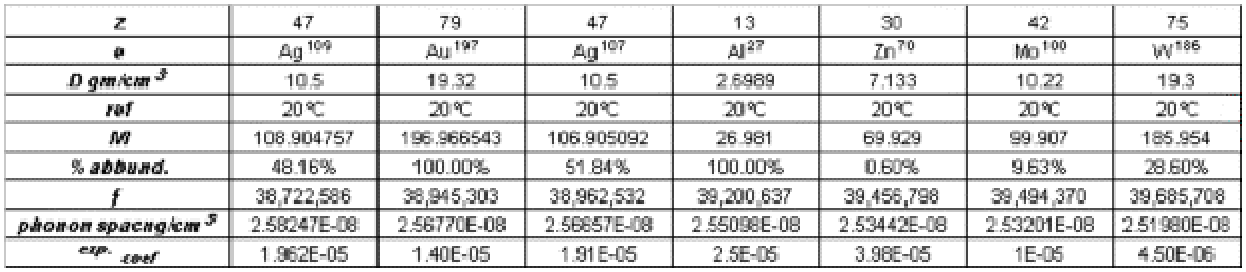
$$\text{Phonon Resonance (Hz / Cm)} = \sqrt[3]{\frac{d \times Na}{m}}$$

where *d* is Density in gm/cm^3 ,
Na is Avogadro's Constant, and
m is mass.

"By determining the inverse, one will observe the linear atomic spacing.

$$\text{Linerar Atomic Spacing (cm)} = \frac{1}{\sqrt[3]{\frac{d \times Na}{m}}}$$

"Since the resonance frequency and spacing is required for all isotopes, the calculations for most isotopes may be determined:



z	47	79	47	13	30	42	75
e	Ag^{109}	Au^{197}	Ag^{107}	Al^{27}	Zn^{70}	Mo^{100}	W^{186}
D gm/cm^3	10.5	19.32	10.5	2.6989	7.133	10.22	19.3
ref	20°C	20°C	20°C	20°C	20°C	20°C	20°C
M	108.904757	196.966543	106.905092	26.981	69.929	99.907	185.954
% abbund.	48.16%	100.00%	51.84%	100.00%	0.60%	9.63%	28.60%
f	38,722,586	38,945,303	38,962,532	39,200,637	39,456,798	39,494,370	39,685,708
phonon spacng/cm^3	2.58247E-08	2.56770E-08	2.56657E-08	2.55098E-08	2.53442E-08	2.53201E-08	2.51980E-08
exp. coef	1.962E-05	1.40E-05	1.91E-05	2.5E-05	3.98E-05	1E-05	4.50E-06

"When an element is heated or cooled, the atomic spacing will change proportionally to the cube of the product of the temperature (increase/decrease) and the expansion coefficient. To understand, following is the mathematical model for determining the linear spacing in reference to temperature:

$$\text{Phonon Resonance} = \left(\frac{1}{\sqrt[3]{\frac{d \times Na}{m}}} \right) e^{((t - St)Ec)}$$

where *t* is the temperature increase,
St is the standardized temperature, and
Ec is the expansion coefficient

"To place this in perspective, to determine the exacting temperature for a dimensional phonon reaction to occur, requires knowing the starting element (specifically the isotope of the starting element if more than one) and the element to be produced. Once this is known, you can apply the following formula:

$$\text{Resonant Temp } {}^{\circ}C = \frac{Ln\left(\dfrac{f(starting)}{f(target)}\right)}{Ec} + St$$

"This will provide the temperature required within statistical probabilities. A statistical probability deals with the least significant digit (LSD) of each variable. In the case of phonon resonance, this is limited to the density. For example, the density of Ag is 10.50 gm/cm3. Taking that the accuracy is ±1 LSD, we can establish a variable range by applying the following:

$$\frac{1}{1050}$$

Or, +/- 0.0009524

"To place the mathematics in perspective, following is the calculations for the conversion of Ag^{107} to Au:

$$\text{Ag107 Phonon Resonance (Hz / Cm)} = \sqrt[3]{\frac{10.50\times(6.0221\times 10^{23})}{106.905092}}$$

$$= \quad 38{,}962{,}532$$

$$\text{Au197 Phonon Resonance (Hz / Cm)} = \sqrt[3]{\frac{19.32\times(6.0221\times 10^{23})}{196.966543}}$$

$$= \quad 38{,}945{,}303$$

$$\text{Resonant Temp } {}^{\circ}C = \frac{Ln\left(\dfrac{f(38{,}962{,}532)}{f(38{,}945{,}303)}\right)}{1.91\times 10^{-5}} + 20$$

$$\text{Resonant Temp } {}^{\circ}C = 43.16$$

$$\text{Resonant Temp } {}^{\circ}F = 109.688$$

"To find the most logical profile requires determining the basic phonon frequencies of all of the stable isotopes.

Conversion of Al to Au ~ "The conversion of Al to Au is an absolute application of dimensional science. In this reaction, gold is produced in its ultra-pure state on a continuous basis. This procedure may be utilized for most elements. The basis of this dimensional occurs in the collection of atomic size particles that form near the resonant metal (in this case aluminum). Due to the size of the particles they appear in what normal chemistry would consider a gas phase. The targeted element (isotope) forms in its singular state and due to the lack of energies present. There are insufficient energies to bind the atoms into a colloidal state.

"In the production of gold from aluminum, the ideal temperature is 302.9° C. These temperatures are optimum for the Al (the Al must be allowed to come into equilibrium with the furnace). Once resonance is established, production is continuous. The Au is captured in water as it is removed from a negative pressure applied to the furnace established by the vacuum pump. However, please be aware that Al will also convert to Ag^{107} at a temperature of 283.7° C. To understand this, the following chart is supplied:

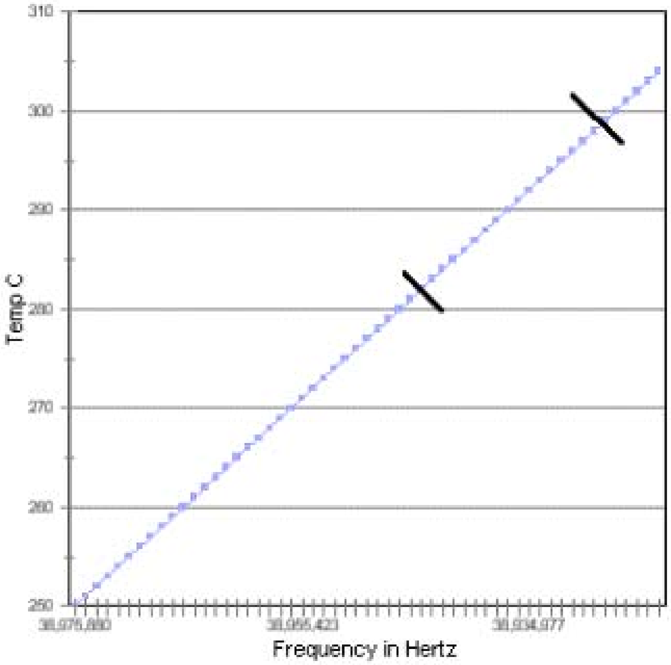
"The aluminum reaches the phonon resonance of Au it passes through the resonance of Ag. Due to the atomic spacing, Al will not form any other element near this temperature range.

"All of the procedures listed were confirmed by independent laboratory testing..

"At the time of printing the Phonon Conversion of Ag to Au, the genesis mapping of elements was not complete. Based on the above, the following allows the other potential formation patterns for Ag and Au:

z ~ e ~ D gm/cm^3 ~ M ~ % abundance ~ Hz ~ phonon spacing/cm^3
13 ~ Al27 ~ 2.6989 ~ 26.981 ~ 100.00% ~ 39,200,637 ~ 2.55098E-08
47 ~ Ag109 ~ 10.5 ~ 108.904 ~ 48.16% ~ 38,722,676 ~ 2.58247E-08
47 ~ Ag107 ~ 10.49 ~ 106.905 ~ 51.84% ~ 38,950,170 ~ 2.56738E-08
79 ~ Au197 ~ 19.3 ~ 196.967 ~ 100.00% ~ 38,931,830 ~ 2.56859E-08

"This procedure is nondescript. As easily as zinc, aluminum, titanium or silver converts into gold, so does gold convert into titanium and silver."



In 1997, Champion reported the replication of one of his transmutation experiments by a 16-year old high school student for a science fair project. The original experiment was performed by Dr Bockris at Texas A.M. University (www.transmutation.com/tamu.htm). The ingredients of the experimental formula were:

300 gr Carbon; 900 gr Potassium Nitrate; 80 gr Sulfur; 100 gr Iron Sulphate; 30 gr Cadmium; 100 gr Mercury Chloride; 50 g r Litharge (PbO); 5 gr Silver (Ag); 30 gr Calcium Oxide. The ingredients were mixed, placed in a coffee can, and ignited with a torch. The silver increased from 5 to 8.7 grams, and a small amount of gold also was produced. X-ray flourescence and mass spectrometry examinations were made of the materials before and after the ignition.

Joe Champion

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Adept Alchemy

by
Robert A. Nelson

Internet Edition

Part II: Modern Arcana

Chapter 2

Transmutation of Ores

The synthesis of elements by high-energy bombardment of other elements is common knowledge and practice among nuclear physicists. In their fashion, modern physicists also have accomplished one of the goals of alchemy: the production of artificial gold. The yields are low, however, and the product is unstable and very expensive. Such nuclides find only limited use in medicine and chemistry.

For example, R. Sherr, *et al*., reported the "Transmutation of Mercury by Fast Neutrons" of lithium and deuterium. These formed three radioactive isotopes of gold by the n-p reaction, and three isotopes of platinum. **(11)**

In 1980, a group of researchers at Lawrence Berkeley Laboratory (Glen T. Seaborg, *et al*.) reported the production of a few billion atoms of gold as the "trivial result" of an experiment with a Bevalac accelerator. A bismuth target was bombarded with a "relativistic projectile" that chipped some protons from the Bi nuclei, forming gold. The experiment produced less than one-billionth of a cent worth of gold. **(1, 6, 12)**

Andrew Melchanov published this notice in 1980, but nothing has been reported about it since then: "Soviet physicists at a nuclear research facility near Lake Baikal in Siberia accidentally discovered a fusion reaction for turning lead into gold [in 1972] when they found the lead shielding of one of their experimental reactors had changed to gold." **(8)**

Several researchers in the 20th century have reported their methods of producing profitable amounts of values from base metals and low-grade ores without the use of nuclear reactors. Some of the methods are genuine low-energy alchemical transmutations.

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(1) Thomas H. Moray ~

The Moray process is a prime example of what is possible. In 1950, Thomas H. Moray was approached with a request to investigate the possibility of improving the extraction of uranium ores. As a matter of course, the Moray Research Institute (MRI) proceeded by bombarding the ore in an "environment" with x-rays as high as 24 MeV before attempting to extract the values. The average ore contained 0.23% uranium oxide. After irradiation, the ore yielded from 7-75% uranium oxide!

In 1953 the MRI proposed that the Atomic Energy Commission (AEC) investigate such a project for the "aging" of atomic ores by a "breeding type reaction with high-energy particles or x-rays in the presence of a proper environment." The AEC declined to grant a contract.**(7, 9, 10)**

In 1958, the MRI adapted its process to the augmentation of precious metal ores. the Moray process uses three main categories of ores, containing traces to a few hundredth of an ounce of gold and silver per ton: 1) low-grade unprocessed gold ore; 2) mill tailings --- especially advantageous; this material costs very little, is ground already, and yields excellent results. High grade ores seem to be less adaptable to this process; they yield much less of an increase in values than do low grade ores:

"Early tests gave yields of 50-100 oz. gold/ton ore. While virtually no gold or silver values can be determined in the raw ore, after irradiation and drying the gold and silver can be identified by standard fire assay or any other normal determination methods...

"Metals not otherwise detected are freed for a separation by normal separating processes. This process does not purport to be a separation process in any way in that upon completion of irradiation the samples will have to be disposed of expediently." **(9)**

The Moray process utilizes an "environmental solution", developed in 1949. Aging became a problem as chemical reactions continued to take place due to hydration and temperature changes. By 1961, the MRI had refined several formulas of solutions, one or more of which work well with most ore types and do not require any aging. They can be used immediately after mixing and can be stored without adverse effects. Their cost is approximately $50/100 gallons (the volume of solution required to process one ton of ore). The solution is heated to an unspecified "elevated temperature" during irradiation.

In a telephone interview with Ken Jones (September 1981), John Moray said:

"The environmental material consists of a combination of chemicals whose atomic numbers add up to the atomic number of silver or gold and yield silver and gold upon irradiation [The formulas include arseno- and iron-pyrites in alkaline solution]. Antimony has peculiar properties -- it has floating electrons which come in very handy. It is believed that this environment furnishes particles similar to the cosmic ray reaction on the atmosphere. Research work indicates that the radiation must be composed of both high-speed electrons and x-rays. Consistent results under controlled methods were obtained with the addition of a catalyst (a flux or reduction agent, an environment) combined with bombardment of the material ... by an energy bombardment tube developed for the Research Institute."

The "bombardment tube" may be a preferred embodiment of Dr. T.H. Moray's "Electro-Therapeutic Apparatus" (US Patent #2,460,707) The invention is described as follows in the patent abstract:

"An apparatus for applying radiant energy therapeutically, comprising means for producing high potential, high frequency electricity; a high capacity sparking condensor; and a treatment electrode connected in circuit with the foregoing...

"The invention has been described in the foregoing with sole reference to its use for therapeutic purposes. It should be noted, however, that inorganic matter may also be treated to advantage pursuant to the methods and with the apparatus... It has been found that metals, for example, lead, have changed physical properties after treatment in accordance with the above..."

T.R. Dolph published an article about the Moray process (*Fate,* February 1976), in which he stated:

"Dr. Moray engaged my father-in-law, attorney Victor G. Sagers, Midvale, Utah, to represent him in offering the device to the US Government... Transmutation of metals (yes, turning lead into gold) was demonstrated several times; the government supplied the lead and kept the gold."**(5)**

John Moray commented on this in a letter to Ken Jones (18 January 1982):

"The article by T.R. Dolph, Garland, TX, is one of those articles written by a crackpot that has in fact mixed together a number of unrelated facts. There is no such device as described in *Fate* magazine... The bombardment tube does exist. However, this has nothing to do with the recovery of minerals from low grade ore. The bombardment tube is a part of the therapy device.

"The story of gold and lead supplied by the US Government is a complete fabrication. My father and I always detested liars, and this man Dolph is a compulsive liar. His father-in-law, Vick Sagers, would never have said anything similar to what this man has said."

John Moray added this note in a later letter to Ken Jones (11 February 1982):

"The bombardment tube is electrotherapy and does not apply to the mining or mineral recovery process, regardless of how you interpret the patent.

"The patent application is speaking of a "method" and has to do with an individual trained in the art of that "method" which is all the law requires, and therefore, changing the physical properties of lead, i.e., making it possible to be alloyed with copper or developing a lead semi-conductor has nothing to do with the mineral process again."

The services of the eminent physicist W.J. Hooper (Prof. EmEritus, Principia College) and other scientists were solicited in an effort to discover what was producing such results. It appeared to be caused by "a rapid buildup of atoms of relatively low atomic weights to those of much higher atomic weights" such as silver, gold, and platinum.

In a progress report at the 68th National Western Mining Conference (Denver, CO; Feb. 4, 1965), Dr. Hooper announced:

"First of all, I will cite one of several tests carried out in an effort to ascertain whether the modus operandi was actually one of transmutation from elements of low atomic weights to those of the noble metals. A solution was prepared --- made up of Baker’s reagent quality chemicals of the highest purity and water, distilled by boiling. These bottled chemicals list the trace materials which might be existent in them. Gold did not appear on any of these lists even in trace amounts. No atoms of higher atomic number than 19 (K) were present in quantity in this solution. Silver has the atomic number of 47, and gold 79. This prepared solution of pure chemicals in glass containers is irradiated by high energy photons for about one minute and then by evaporation the residue was dried and sent to an independent assayer for analysis... It reads 939.76 oz gold/ton and 113.04 oz silver per ton...

"A point of great interest in the experimental test I have described is that the specks of gold found in the residue of the solutions reveal a marked crystal structure under microscopic examination. It is a coincidence that Miethe, back around 1925, found his formation of gold to be in small crystals also... The process we have described is in reality a crystal growing bath activated by irradiation. As the gold atoms come into being by transmutation, they become gregarious, which results in the crystal formation.

"From this observation there is every reason to suspect that low grade ores and mining tailings provide, not only the seed for crystal growth, but also a nuclei environment which is well advanced or uniquely favorable, for the formation of the precious metals by transmutation."

Dr. Hooper contended that the process is one of nuclear reaction. Dr. Hans Frauenfelde (Univ. Illinois) opined that the energy levels were too much of a departure from the accepted standards to verify this point. Another theory proposes that colloidal gold, lost in the dilution of ore in the environmental solution, is concentrated by the bombardment. The MRI insists that is not the case.

In 1963, MRI conducted experiments with a linear accelerator at the Electronized Chemicals Corporation (Rockford, IL) at energy levels of 11.4-20 meV with doses of 1 megarad. The average yields were

8-9% gold! It was estimated that a production rate of 5 tons of ore per day was possible with the available equipment. Computerized risk analysis indicated that yields over 11.5 oz Au/ton ore could be expected with 99.5% certainty. A higher average (15 oz Au/ton) could be expected in mass production under optimum conditions. Other experiments showed even more promise, yielding 100-200 oz Au/ton (128 oz Au/ton average):

"The standard deviation of yields was rather high due to the constant modification of experimental conditions."

MRI rented time on the Varian Associates’ 8 MeV LINAC in order to test parameters such as dose, dose rate, slurry depth, shield material, electron volt setting, shield height, and the distance of the target from the irradiation source. The shield was a thin sheet of unspecified material placed over the sample while irradiating it:

"In main effects, only electron-voltage setting showed up as significant, with high-voltage setting being better than the low. In addition, several interactions between variables showed up as being significant. An interaction between two variables means that when either variable is changed singly, a significant difference results. Some interactions between three variables, or perhaps even more may be present. The following interactions seemed to be significant ones and seem to indicate that a higher voltage would give much better results: 1) Shield height/Voltage; 2) Dose rate/Voltage; 3) Dose/Voltage; 4) Distance of sample from radiation source/Shield height; 5) Solution depth/Shield material; 6) Slurry depth/Voltage.

"X-rays perform photo-disintegration, and the electrons furnish the energy and amperage to the reaction. It is suspected that because the escaping electrons have a certain amount of energy, a certain amount of x-rays will be produced in the material by the electrons' reactions (Compton Effect). The ideal reaction, it is indicated, is for the x-ray to be produced at a target located somewhere outside the accelerator tube where losses of energy would be minimal. This reaction is dependent on the following factors:

"1) The isomers of the isotopes reacted upon must be present in the ore before the ore will react to the reaction; 2) These reactions are dependent upon the type target in order to control the frequency of the quantum energy level; 3) High-energy electrons must be present in the ore as well as x-rays; 4) The composition of the environmental solution furnishes other particles that are freed by the action of the resonant frequency of the x-rays and the electrons produced by the particle accelerator; 5) The reaction is a dose-rate reaction and not dependent upon velocity. The velocity of the original particles will determine the depth and time of the reaction only. Over-radiation gives a deterioration rate and loss of values reported...

"As the size of the sample varies, the reaction varies on an inverse lineal level wherein doubling the size of the sample would cut the total reaction in half."

Radiation dosages of 0.16, 0.5, and 2.0 Megarads/minute gave peaks on the dosage curve. Four Megarads/minute gives the highest yield. Irradiation lasted one minute. The reaction also is wattage-dependent. The minimum wattage required is 200 watt-seconds per gram of ore:

"The process has to be adjusted to the characteristics of different ores. The chemical formulas and the resonant energy levels must be established for each ore."

Consistency was achieved in 1970 by adding to the process a control resonant chamber (Magnetic Undulator) which acts to bring all variables into phase, or into a resonant relationship, with the radiation source, to a point where a consistency was obtained higher than any obtained prior to that time. There are definite peaks at which each ore that is of value with this process, releases the metals found within it. There are peaks for each metal ion within the ore.

The Magnetic Undulator establishes non-propagating, resonant standing waves with the x-ray diffraction wavelength of gold (2.042 Angstroms) in the environmental solution. The chemicals (in copper pans) were bombarded from above. Each bombardment increased the amount of gold 9-fold, but the yield later diminished to only three times the original amount. Consistently high, stable yields were obtained by first irradiating the trays from below and then applying x-rays from overhead. The yields increased 9-fold and remained at that level without deteriorating. The process as developed produces little increase in platinum values, probably due to: a) the energy level of the irradiation source; b) the chemical composition of the environmental solution; c) target type. The silver produced in this process assayed as high as 426 oz/ton. According to the report, the following conditions also apply:

"The reaction is sensitive to interference from nearly every material other than glass or porcelain. Plastics cannot be used, nor stainless steel, and most varieties of rubber or brass. Copper can be used if it is in one continuous piece. Indications are that interference is due to electrostatic charge or particle position in the solution."

Better results also would be obtained with suction pumping of the slurry in an all-glass system, rather than the makeshift conveyer belt/copper pan system used by MRI.

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(2) Dunikovski ~

In 1931, a Polish engineer named Dunikovski announced that he could produce artificial gold by the action of "Z-rays" on a mixture of silica and feldspar melted in bronze crucibles under the influence of 110 kilovolts. Dunikovski claimed to have perfected a process he inherited from his father and grandfather who had developed it. Dunikovski theorized that all minerals contain "embryonal atoms" or "mineralites" that can be artificially matured in minutes.

Several French investors syndicated and subscribed 2,000,000 francs which Dunikovski used to build a laboratory in Paris. But no gold was produced, and he was charged with fraud. He demonstrated his process to the court, but the results were ambiguous and insufficient to prove his innocence. Dunikovski was sentenced to four years imprisonment, but his attorney secured his release after two years. Dunikovski relocated to San Remo and renewed his experiments. He improved the process, gaining significant increases in yields.

His attorney (Jean Legrand) visited Dunikovski with the eminent chemist Albert Bonn to investigate the new situation. M. Bonn witnessed and replicated the process. One type of sand, which contained 11 grams Au/ton before treatment, assayed 859 grams/ton after treatment with the improved apparatus.

Dunikovski later established "Metallex, Societe Anonyme" with Belgian stockholders and established a factory on Lake Neuchatel. Nothing more is known about the affair because all subsequent proceeding were kept secret. **(4)**

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(3) Adalbert Klobasa ~

About 1937, an Austrian chemist named Adalbert Klobasa claimed to have produced gold using an electromagnet and induction coil with which he treated a mixture of titanium-potassium-oxalate (36 gr), ferrous sulfate (84 gr), copper sulfate (50 gr), sodium sulfide (50 gr), ammonium chloride (100 gr), ammonia (250 ml), sodium silicate (20 cc) and silica (440 gr). The reaction was catalyzed with 100 mg of silver. Two hours of treatment afforded a 1% yield of gold which appeared as brown-red scales. Klobasa claimed that gold is built up from iron, titanium, and sodium. He declined to enter into business with his synthesis:

" I am too old, and not fit enough to worry myself chasing around after capitalists.**"(4)**

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(4) David Hudson ~

In the 1980s, David R. Hudson discovered the existence of ORMEs (Orbitally Rearranged Monoatomic Elements), which are virtually undetectable by conventional means (except for a distinguishing IR doublet located between about 1400 and 1600 cm^{-1}) because they lack a *d*-orbital electron. Hudson and associates developed a method to recover ORMEs and convert them into their metallic forms. While it is not a transmutation of one element into another (but rather, the conversion of an allotrope into the common visible form of the elements), the extraction and conversion of ORMEs to metal may explain the claims of some other experimenters. Certain ores, particularly sodic and calcidic plagioclase, contain large amounts of ORMEs which can be extracted by Hudson's process, as described in his British Patent # 2,219,995 for "Non-Metallic, Monoatomic Forms of Transitional Elements" (Dec. 28, 1989):

"300 gr of dried material assayed by conventional techniques to show no gold present, ground to less than 200 mesh, is placed in a 1-gallon vessel, fitted with electrodes, with 120 gr NaCl, 10 gr KBr, and 2 liters of tap water.

"The anode consists of a pair of 3/8" x 12" carbon welding rods wrapped together with No.10 copper wire. The cathode consists of 1-5/8" ID x 14" glass tube with a medium porosity glass frit with a 1" x 14" x 1/16" stainless steel strip inside in a solution of 36 gr/liter NaCl (approx. 500 ml). Both electrodes are placed into the sample vessel and supported by clamps extending about 5" into the sample solution.

"The sample is placed on a roller table at approx. 10 rpm. The electrodes are connected to a (120 V) power supply in conjunction with a 2-3 amp 400-600 PIV rectifier. A 100 W light bulb and the electrodes are hooked in series. The rectifier load is connected to the anode since the rectifier filters out all negative voltage and only passes positive voltage.

"The sample is kept under load for a period of 6-1/2 hours. The final pH is in the range of 3-6.5. The voltage across the electrode is 5 volts. After disconnecting the load, the sample was allowed to settle and the solution over the settled out material was removed by decantation...

"800 ml of the sample was placed in a 1000 ml beaker and 20 ml concentrated sulfuric acid was added to the solution. With stirring, the solution was boiled down slowly on a hotplate until the solution was just dry (not baked). The just dry salt contains sodium gold chloride. The just dry salt was taken up in 400 ml deionized water and again boiled down to the just dry condition. There should be no discoloration at this point, i.e., a clear solution is formed.

"The just dry salt was then taken up in 400 ml 6M HCl, and thereafter boiled down to the just dry condition. The dilution and boiling down step was repeated four times, alternating with deionized water and a 6M HCl wash, with the sequence controlled to that the last washing was with 6M HCl. The purpose is to remove all traces of hypochlorite oxidant.

"The just dry salts are taken up in 400 ml anhydrous ethanol and stirred for approximately 10 minutes. This step is to dissolve the gold chloride salt, to remove the sodium chloride. After stirring, the slurry was filtered through #42 paper on a Buchner funnel.

"5 ml of concentrated sulfuric acid was slowly added to the filtrate, mixed, and the filtrate was then allowed to sit for approximately 1 hour. The filtrate was filtered through #42 paper on a Buchner funnel, hand then passed through a filter of 0.5 micron Teflon. The sulfuric acid precipitates out any calcium. Filtration removes the precipitant and a light yellow filtrate is recovered, with all traces of calcium sulfate removed.

"The light yellow solution was again boiled down to just dry, taking care to avoid any charring. At this point there should be no further evaporation of ethanol and the just dry residue should be free of color. The residue should have a sweet smell similar to burnt sugar.

The occurrence of the sweet smell indicates the end point of the boil-down.

"The just dry residue is taken up in 600 ml deionized water to provide a water-soluble gold form which is the gold auride. If desired, the G-ORME can be recovered at this stage or converted into metallic gold. For gold recovery, the solution is put into a 1000 ml beaker and an electrolysis unit was set up... The anode is a gold electrode, 2 cm^2 in size, upon which gold solution will plate out. The cathode comprises a 6.8 cm^2 platinum electrode contained in a Nafion 117 chamber... Inside the Nafion chamber is 200 ml of electrolyte solution containing 5 ml sulfuric acid per 600 ml of electrolyte solution. It is important to keep the Nafion chamber wet at all times. The potential was measured across the electrodes and then an additional -2.2 volts potential was applied and maintained for a period of 2 hours.

"After the two hours, the potential was raised to 3.0 volts and maintained for approximately 18 hours. Bubbles formed on both the gold and platinum electrodes. A black material formed on the gold electrode after 3-4 hours. The gold electrode was removed from solution while voltage was still being applied. The electrode was dried in a vacuum oven overnight at 115^o C. The electrode was weighed before and after the plating to determine the amount of gold collected.

"The metallic gold is, therefore, produced from a naturally occurring ore which, when subjected to conventional assaying, does not test positive for gold."

The ORMEs are produced from sodium gold chloride, which is reduced to sodium auride:

"Continued aquation results in dissociation of the gold atom from the sodium and the eventual formation of a protonated auride of gold as a grey precipitate. Subsequent annealing produces the Gold-ORME. The G-ORME has an electron arrangement whereby it acquires *d*-orbital hole or holes which share energy with an electron or electrons. This pairing occurs under the influence of a magnetic field external to the field of the electron.

"G-ORMEs are stable [as] demonstrated by unique thermal and chemical properties. The white salt-like material that is formed when G-ORMES are treated with fuming $HClO_4$ or fuming H_2SO_4 are dissimilar from the transition (T) metal or its salts. The G-ORME will not react with cyanide, will not be dissolved by aqua regia, and will not wet or amalgamate with mercury... The G-ORMEs remain as a powder at 1200°C...

"G-ORMEs can be reconverted to metallic gold from which they were formed. This reconversion is accomplished by an oxidative rearrangement which removes all paired valence electrons together with their vacancy pair electrons, with a subsequent refilling of the *d* and *s* orbitals with unpaired electrons until the proper configuration is reached for the T-metal.

"This oxidative rearrangement is effected by subjecting the G-ORME to a large negative potential in the presence of an electron-donating element, such as carbon, thus forming a metallic element-carbon chemical bond. For that metal-carbon bond to occur the carbon must provide for the horizontal removal of the *d* orbital vacancy of the ORME. The carbon acts as a chemical fulcrum. When the element-carbon bond is reduced by way of further decreasing the potential, the carbon receives a reducing electron and subsequently vertically inserts that reducing electron below the *s* orbitals of the element, thus forming metallic gold.

"The above description for the preparation of G-ORME from commercially available metallic gold is applicable equally for the preparation of the remaining ORMEs, except for the specific potential energy required and the use of nascent nitrogen rather than carbon to convert the other ORMEs to their constituent metallic forms. The specific energies range between -1.8 V and -2.5 V depending on the particular element. Alternatively this arrangement can be achieved chemically by reacting NO gas with the T-metal ORMEs other than gold. Nitric oxide is unique in that it possesses the necessary chemical potential as well as the single unpaired electron."

(5) Joe Champion ~

In the 1990s, Joe Champion announced a variety of methods of transmutations of black sands by thermal burns, melts and kinetic methods. He was convicted of fraud in Arizona after being accused by an irate investor who failed to achieve satisfactory results. Other researchers (including the physicists Bockris and Sundaresan, 1994) validated his processes, however, so the question remains open for experiment.

The process was developed from a method of "growing gold" in an electrolytic cell that was originally developed by Dr. Walter Lussage, a Czechoslovakian geologist (d. 1977). Dr. Lussage revealed his process to Mr. Jack Keller, who taught it to Joe Champion in 1989. Champion subsequently developed the method further.

The original formula is quite simple: black sand (90 gr), charcoal (90 gr), and sodium nitrate (270 gr), pulverized to 200 mesh and mixed thoroughly. The reagents must be pulverized separately to avoid ignition. The mixture is ignited with a torch; it burns about 90 seconds, reaching a temperature of about 700^{o} C. In one assay, the mixture contained 0.18 mg Au and 1.35 mg Ag before ignition; after ignition it contained 212.7 mg Au and 856.8 mg Ag.

Black sand typically is composed of 40% magnetite (Fe_3O_4), hematite (Fe_2O_3), or chalcopyrite ($CuFeS_2$). The necessary parental isotopes (cobalt, iron, manganese, nickel, and calcium) must be present, according to the formula:

$Co^{59} + Ca^{40\text{-}44} = Ag^{99\text{-}103}$
$Ni^{60\text{-}64} + Ca^{44} = Cd^{104\text{-}108}$

The addition of a molar proportion of lead enabled the atoms of gold to be collected as they formed, and served as an absorptive shield for radioactivity released in the reaction.

Another formula for the thermal burn process was carbon (300 gr), potassium nitrate (900 gr), sulfur (80 gr), silica (120 gr), ferrous sulfate (100 gr), cadmium (30 gr), mercury chloride (100 gr), lead oxide (50 gr), silver (5 gr), and calcium oxide (30 gr).

In one test that Champion described, the thermal melt process was accomplished in a gas-fired or inductively heated furnace, vented to release gases liberated in the process. A mixture of black sands (1 kg), mineral coal (1 kg), sodium nitrate (3 kg), lead (300 gr), silver (200 gr), and mercury chloride ($HgCl_2$, 1 kg) in a graphite crucible yielded 44 gr gold, 6 gr platinum, and 35 gr rhodium.

Another gas-fired mixture tested by Champion was composed of black sands (100 gr), charcoal (300 gr), sodium nitrate (900 gr) and powered silver (500 gr). When an inductive furnace was employed, the formula needed to be modified: black sands (100 gr), charcoal (350 gr), sodium nitrate (150 gr), silver (50 gr), and copper powder (50 gr).

The gas or electricity was reduced during the ignition period. After the ignition was completed, the temperature was raised to 2000^o C for 90 minutes. If necessary, borax or potassium nitrate was added to maintain fluidity of the mixture. When there was no more apparent reaction, the mixture was poured into a mold to cool, and the slag removed. Both the reaction mixture and the slag should be assayed.

Another method was discovered in 1993, utilizing the kinetic energy of a ball mill with 40 kg of carbon steel balls. The liner must be made of iron-coated steel and the reagents must be thoroughly dry for this method to work properly. The ball mill also must have an airtight seal. 24% of the mineral weight should be ferric oxygen, which is required for the kinetic excitation transmutation to occur.

One of Champion's research associates, Greg Iseman (Mesa AZ), used a microwave digestion process to perform analyses of the formula; this method also produced transmutations.

"If the reaction mixture exceeds 15 kg, the yield is reduced because the transmutation cycle is too long and begins to produce base elements instead of precious metals. It was found necessary to add traces of the target elements to the starting mixture in order for the resonance of those elements (i.e., Au) to act as a "stopping agent".

Champion also noted:

"The following reagents were required to produce synthetic precious metals by this process: silica, ferrous sulfate, lead oxide, calcium oxide, mercury sulfide, and cadmium. The mixture was combined with carbon, sodium or potassium nitrate, sulfur, mercury chloride, and silver. The formula produced synthetic gold, iridium, platinum, palladium, and rhodium...

"When the chemical mixture is properly prepared, it has a reproductive factor of over 60%. This was later increased to 90-plus percent when an error was determined in the crystalline structure of the ferrous sulfate. The differences dealt with a magnetic susceptibility at high temperature, i.e., greater than 750^o C...

"The coincidence factor is extremely important in determining the effectiveness of any nuclear occurrence... The following parameters must be weighed:

1. Natural occurrence (%) of parental isotopes; 2. Percent relationship of parental isotopes to total mass; 3. Composition of

total mass; 4. Thermal nuclear cross section of parental isotopes; 5. Magnetic susceptibility of nuclear moment; 6. Type and length of energy excitation; 7. Parental isotopes' complacency with additives...

"The coincidence factor is also related to the "treeing effect": it is a nuclear reaction, such as caused by low energy transmutation situations, where a parental element has multiple isotopes, but when combined with 10 a and (10 a + a^{o}), produce more daughter isotopes than parents. If charted, this would resemble limbs on a tree... "

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Adept Alchemy

By Robert A. Nelson
Part II

Modern Arcana

Chapter 3

Transmutation of Carbon

Nuclear physicists bombard targets with high-energy particles in order (or chaos) to prove the schematic of their mindset with appropriate experimental results. In recent years, however, the discovery of cold fusion has quite upset the world view of conventional physicists, who generally deny the possibility that Nature allows for other means of transmutation. Yet, there is considerable historical evidence that many types of transmutations have been accomplished without particle accelerators, long before Pons and Fleischman announced their discovery of cold fusion. There is so much credible documentation of low-energy transmutation that, in the words of Rupert Gould, "did it relate to any more probable event, we should be compelled either to accept it or cease putting any faith in recorded testimony."

Among the many examples that can be cited, "biological transmutation" is the best developed and well known. About forty years ago, Dr. Louis Kervran presented the idea that sodium, potassium, and dozens of other elements change into each other under certain natural conditions in the mineral, vegetable, and animal kingdoms. Biological transmutations have been demonstrated, crucial experiments replicated, and the theoretical principles verified by many scientists who are finding new industrial, medical and agricultural applications of the discoveries.

(1) George Ohsawa & Michio Kushi

Inspired by the pioneering work of Dr. Kervran, Dr. George Ohsawa sought to transmute sodium into potassium *in vitro*. The method revealed itself to him in a symbolic dream. Thus inspired, Dr. Ohsawa and Michio Kushi, *et al*., constructed an experimental electric discharge tube with copper (Yin) and iron (Yang) electrodes and a valve through which to draw a vacuum or admit oxygen (Fig. 3.1). The first transmutation with this equipment was achieved on June 21, 1964. After applying 60 watts of electricity for 30 minutes to heat sodium to a plasma, a molar equivalent of oxygen was introduced. Viewed with a spectroscope, the orange band of sodium gave way to the blue of potassium, according to the formula:

$Na^{23} + O^{16} = K^{39}$

Analysis of the reaction product confirmed the result and revealed an unexpected extra: a trace of gold was produced by the combination of Na, O, and K with the Cu and Fe electrodes. Several different metals were tested as electrode materials. Neon and argon atmospheres were found to enhance the yield of potassium and other elements. External heating of the reaction tube also served to ionize the sodium.

Dr. Louis Kervran noted these experiments in his book *Transmutations A Faible Energie*:

"Professor [Masashiro] Torii, on a circuit designed by Prof. Sakurazawa, and under the control of Prof. Odagiri, observed in the spectroscope the passage of sodium to potassium upon the adjunction of a small quantity of oxygen to sodium vapor...

"Prof. Torii [of Musashino Institute of Technology, Tokyo] has informed me of having observed on 21 June 1963, in the spectroscope, the passage of sodium to potassium, the disappearance of the yellow line of sodium being replaced by the red-violet ray of 7699 A^o potassium; the experiment was repeated June 22 before five scientists...

"In the production of steel in electric furnaces, the incomprehensible appearance of boron [has been observed]. We see now that we cannot exclude, under the effect of a powerful electric field and of the high temperature of these furnaces, the 'reduction' of carbon from the loss of hydrogen and in keeping with: C - H = B...

"The experience is simple to realize, as it suffices to take a plate of steel --- or of iron -- an anode of magnesium, place them in a jar containing distilled water rendered conductive by a salt of magnesium --- in order not to introduce any metallic ion other than magnesium, and these two electrodes are reunited by a metal wire, to the exterior of the jar; thus they realize (in part) a battery with magnesium at the negative, iron as positive; through the production of hydrogen at the electrode, magnesium is at a potential of 1.9 volts more negative than iron. Leave it for two or three months; from time to time add a little distilled water in order to compensate for evaporation. On analysis, calcium is obtained... in an operation in which calcium was not introduced!"

The calcium (as oxide) accumulates in scales on the cathode.

Kushi and Ohsawa, *et al*., proceeded to develop their process for industrial-scale production. They estimated that potassium could be manufactured for 1% of the current price. In a correspondence to Ken Jones (12 October 1980), Michio Kushi stated:

"After George Ohsawa and myself succeeded in producing K out of Na and O... we presented the experiment to several chemical corporations. At that time, Pfizer International became most actively interested. We had conferences on several occasions; however, soon after we decided not to become involved with these corporations, as a result of the considerations of the vast effects this would have on the industry."

The researchers also had no patent with which to protect their interests. Ohsawa and Kushi then turned their attention to the manufacture of steel by transmutation of carbon and oxygen according to the formula:

$2\ (C^{12} + O^{16}) = 2\ Si^{28} = Ni^{56} = Fe^{56}$

The experimental arrangements worked as predicted, and produced several other elements from combinations of C and O with atmospheric nitrogen, etc:

"The Fe produced by this transmutation is stainless; it does not rust easily. Also it reacts much less to heat than does ordinary Fe... All results of the transmutation for Fe have been carefully examined and analyzed by several methods, as: (1) magnetic inspection, (2) spectroscopic analysis, (3) chemical analysis, (4) examination by reagents, etc, and confirmed by authoritative testing agencies.

"The new form of iron was called GOS (George Ohsawa Steel). The experimental method is as follows:

"Method 1: Transmutation in Air [Fig. 3.2] --- Two graphite crucibles (approx 2.5" x 5") cover each other top and bottom. The upper crucible has a 10 mm Hole, surrounded by a ceramic ring, which acts as an insulator. Into this hole a carbon rod (0.25" diam) is inserted until it reaches the 2 or 3 grams of carbon powder placed at the bottom of the lower crucible, which has one or two small holes at the lower part of its side wall for circulation of air. An iron base placed under the lower crucible acts as another electric pole. As the carbon rod approaches the powder, the electric arc arises. Continuing the operation for 20 to 30 minutes, the carbon powder changes to iron. In this experiment, the applied electricity is about 35 to 50 volts/8 to 18 amps, either AC or DC.

"Method 2: Transmutation in Water --- Using two carbon rods (0.25" diam.), create an electric arc between them, striking them on one another in water. This operation is performed for 1 to 5 seconds. Then, brown-black metallic powder (which contains iron) falls down to the bottom of the water.

"Method 3: Transmutation in Air --- Carbon powder is placed on a copper plate, approximately 12" long, 6" wide, and 0.5" thick. This plate works as an electrical ground. A carbon rod (0.25" diam.) used as the other electrical pole, is struck repeatedly to the carbon powder on the plate, producing an electric arc. The carbon powder changes into iron.

"During the process of this transmutation, nickel is temporarily produced as a short-lived radioactive isotope. The degree of transmutation from C and O is approximately 5% to 20% immediately, with a larger percent of transmutation occurring gradually in the air, which has the effect of cooling the metallic powder to below room temperature."

In another experimental configuration (Fig. 3.3), the reaction was cooled by dry ice. When sparked with carbon rods, the CO_2 vapors also yielded iron, etc.

In 1994, R. Sundaresan and J.Bockris (Texas A&M) reported that they had observed "Anomalous Reactions During Arcing Between Carbon Rods In Water:

"Spectroscopically pure carbon rods were subjected to a carbon arc in highly purified water. The arc current varied from 20 to 25 A and was passed intermittently for several hours. The original carbon contained ~ 2 ppm Fe. The C rods remained cool to the touch at >2 cm from their tips. Adsorption of iron from water or the surrounding atmosphere was established as not being the cause of the increase of iron. There is a weak correlation between the iron formed and the time of passage of current.

"When dissolved O_2 was replaced by N_2 in the solution, no iron was formed. Hence, the mechanism

$$2\ {}_{6}C^{12} + 2\ {}_{8}O^{18}\text{Þ}{}_{26}Fe^{56} + {}_{2}He^{4}$$

was suggested as the origin of the iron. The increase in temperature of the solution was consistent with expectation based on this reaction."

Also in 1994, another group of researchers (M. Singh, *et al.*) at the Bhabha Atomic Research Centre (Bombay) reported their "Verification of the G. Ohsawa Experiment for Anomalous Production of Iron from Carbon Arc in Water:

"A direct current arc was run between ultrapure graphite electrodes dipped in ultrapure water for 1-20 hours. The graphite residue collected at the bottom of the water trough was analyzed for Fe content by a conventional spectrographic method... The Fe content was fairly high, depending on the duration of the arcing... The results showed large variations in Fe content (50 to 2000 ppm) in the C residue. In the second series of experiments... with the water trough fully covered, the amount of Fe in the carbon residue decreased significantly (20-100 ppm). Here also there were large variations in the iron concentration in the residue, although the experiments were performed under identical conditions. Whether Fe is really being synthesized through transmutation from C and O as suggested by George Ohsawa or is getting concentrated to different degrees through some other phenomenon is not currently clear. The Fe in the C residue was also analyzed by mass spectroscopy for the abundance of various isotopes... Besides Fe, the presence of other elements like Si, Ni, Al, and Cr was also determined in the C residue, and it was found that the variation of their concentrations followed the same pattern as that of Fe."

In 1996, Kenjin Sasaki reported his successful experimental replication of the carbon arc production of iron. He used a 99.9999% pure graphite crucible and rod with a 100V/10A electric welder. The crucible was cooled. The arc (8-10A) struck high-purity carbon powder 4 times for 1 minute each time. The yield of iron was recovered with a magnet. Further experiments conducted by C. Akbar (Kushi Research Institute) "indicate that voltage potential and current density are important in the formation of iron in chemically pure carbon."

Toby Grotz also conducted this experiment and reported the results in detail in 1996. He tested activated charcoal, activated carbon, and coal. No iron was produced from charcoal, but activated carbon did yield magnetic material. Tests were performed with copper and aluminum plates and rods to eliminate the possibility that the carbon rod and copper plate might be releasing iron:

"This amount [0.22 gr] of iron is an order of magnitude less than that which occurs naturally in the sample... The excess weight appears to be due to magnetic material that is part of or encased in particles of carbon... There is a point at which no more magnetic material may be removed from the sample using the arc discharge process. It is proposed here that the high current density of the arc discharge magnetizes magnetic material that exists within the particles of the activated carbon. This then allows separation of the magnetic material from the sample using a magnet..."

J. Bockris and associates replicated the experiment using the underwater arcing method, and found only microgram amounts of iron after 24 hours. When the experiment was repeated with the reaction vessel covered to exclude air, no iron was found.

Those results suggest that at least some of the reported yields of iron might be due to the arc coagulating ORMEs (Orbitally Rearranged Monoatomic Elements) existing in the Earth's atmosphere. ORMEs are virtually undetectable by all conventional methods except infrared analysis, which can distinguish a certain characteristic doublet. As David Hudson discovered in the 1980s, ORMEs can be converted to metallic form by certain processes involving carbon or nitrogen, which are used to insert an electron in the *d* orbital shell of the atoms. The complete process is described in his Australian patent.

Dr. Joseph McKibben has published his suggestion that the transmutative production of iron from carbon may be due to what he calls a subquark particle, which has a mass of about 1.15 nucleons:

"The subquark, when attached the ^{4}He seemed to me to be an ideal candidate for an ideal catalytic agent."

In the 1980s, Michio Kushi resumed his experiments with the "aim of finding methods of mass production":

"At that time I shall be able to consider how to present to the world the transmutation of the atom using the principles of Yin and Yang for the future world industry.

"The transmutation of the atom can be achieved if elements are changed into the state of plasma, and if these elements are well understood in their antagonistic and complementary relations to other elements, according to the principles of Yin and Yang.

"The atomic number, mass, density, and gravity, physical reaction to temperature such as melting and boiling points, chemical reactions to other elements, reactions to specific environmental factors, such as ultraviolet and infrared wavelengths applied to the elements, as well as spectroscopic color analysis --- all of these characteristics of the atom can contribute to classify the atom into the Yin group or Yang group...

"Nothing is solely Yin or Yang: everything involves polarity. There is nothing neuter. Either Yin or Yang is in excess in every occurrence. Large Yin attracts small Yin; larger Yang attracts small Yang. At extremes, Yin produces Yang, and Yang produces Yin. All physical forms and objects are Yang at the center and Yin at the surface."

"Hydrogen, the center of the atomic spiral, is Yang. It gathers particles to itself, forming the first octave of creation. The conditions become apparent upon studying the melting and boiling points of the first eight elements.

"Within the first octave, the greatest attraction is between carbon and oxygen, which represent Yin and Yang respectively. It is the fugate interaction of these two that form the other elements. Carbon is often replaced by boron. In terms of Yin and Yang, these are like brothers in that they react in similar ways in forming new elements."

Since George Ohsawa and Michio Kushi conducted their initial experiments in the 1970s, several other researchers have reported the same results and more, thanks to modern analytical equipment, computers, and communication. The worlds of low-energy transmutations have become much more accessible to us. New discoveries are being reported at an increasing rate in the scientific literature, particularly cold fusion and biological transmutations. Perhaps within a few decades we shall see the mass production of elements on demand. **(1, 7, 10-18, 22, 23)**

The Fugate of Carbon

1 (C + O) =
Si 5 (C +
O) = Ce
2 (C + O) =
Fe 6 (C +
O) = Er
3 (C + O) =
Kr 7 (C +
O) = Pt
4 (C + O) = Cd After
Pt the elements become increasingly Yin

Classification	Yin	Yang
Tendency	Expansion	Contraction
Position	Outward	Inward
Structure	Space	Time
Color	Purple	Red
Temperature	Cold	Hot
Weight	Light	Heavy
Catalyst	Water	Fire
Atomic	Electron	Proton
Elements	K, O, P, Ca, N	H, As, Cl, Na, C

(2) Milorad Jovitschitsch

In 1908, Milorad Z. Jovivitsch (Bergau-Akademie in Belgrad) published two unique articles in the journal *Monatschrift fur Chemie*, describing "The Mysterious Deficiency of Carbon in the Condensation Products from Ethylene and Acetylene."

Jovivitsch had been experimenting with electrical discharges in these gases, following the methods used by Berthelot.The latter had shown that the action of a silent electric discharge upon saturated or unsaturated hydrocarbons will split off hydrogen and produce condensation products. **(4, 6, 12)**

Jovivitsch introduced pure dry ethylene or acetylene and oxygen into an ozonizer containing copper oxide, and electrified the mixture with 100 volts/3 amps for 3 days and 2 nights. His analysis of the resulting compounds showed a deficiency in the theoretical amount of carbon and hydrogen, and an excess of oxygen. Several determinations of the carbon and hydrogen taken together indicated a 7% deficiency in the ethylene reaction product, and a 22% deficiency in the case of acetylene.

Berthelot had accounted for these losses by attributing them to oxygen absorption from the atmosphere. Jovivitsch excluded that possibility by employing pure gases, and he immediately preserved the products in hermetically sealed tubes. There was practically no possibility of absorbing any significant amount of atmospheric oxygen. He also determined that the condensed ethylene loses no carbon on exposure to air, and that the condensed acetylene remains unchanged after many weeks. Comparative analysis of the reaction products preserved in tubes and those exposed to air showed them to be in close agreement.

Jovivitsch attempted to explain the scientific riddle of this chemical anomaly by attributing it either to experimental error or the transformation of elements. Because he took great care and made very precise analyses, Jovivitsch was convinced that a transmutation had occurred. His opinion was reinforced by the fact that the condensation products were radioactive.

---

(3) M. E. De Boismenu

In 1913, the French engineer M.E. De Boismenu, the director of an electric carbide furnace plant in Paris, announced the issuance of his patent for a very easy new method to produce artificial diamonds in an electric furnace. The largest specimens produced at that time was 2-1/2 millimeters in diameter; it was "cut with 32 facets with remarkable dexterity."

The furnace was built of refractory brick and had two carbon electrodes (6-1/2" diam.), one of which could be adjusted manually. The bed was packed with a mixture of powdered lime and carbon; this was found to be the best way to support a trough, made of fused calcium carbide (CaC), in which the carbon electrodes operated. The trough was filled with 8 lb of CaC fragments and melted (34 V/800 A /6 hr). More CaC was piled on the trough, and the whole was covered with more of the lime-carbon mixture, and finally with refractory bricks. The furnace was run for another 12 hours. The negative pole became covered with a black carbonaceous deposit weighing about 700 gr. The mass was soaked in water and the diamonds were picked out; their size varied from 1/2 to 2-1/2 mm diameter. The last reported run of the furnace (12 hr @ 700-800 A/24-25 V) produced over a dozen diamonds, some as large as 1/10 inch diameter. They were indistinguishable from natural diamonds. **(21)**

A similar method was developed by Felix Sebba, a chemical engineer at the Virginia Polytechnic Institute & State University (Blacksburg, VA). He improved on the technique developed by Charles V. Burton in 1905 (C dissolved in molten Pb-Ca, then cooled). Sebba dissolved calcium carbide in molten lead. Steam at 550^o C was passed over the melt and reacted with the Ca (but not the Pb), forming calcium hydroxide which forms a slag on the surface. Some of the carbon crystallizes as diamonds.Although these methods are not transmutations, they certainly are most interesting allotropisms. **(5, 19)**

Lea Potts was featured in *Life* magazine (March 1993) for his production of diamonds with a blowtorch.

(4) J. B. Hannay

In 1880, J.B. Hannay of Glasgow made diamonds from Dippel's Oil, catalyzed bylithium metal in thick iron tubes at red heat. The minute yield (14 mg) of Type B blue diamonds exhibited all the characteristics and properties of natural diamonds. Hannay was attempting to produce nascent carbon. He found that when carbon is liberated from a nitrogenous hydrocarbon in the presence of Li, Na, Mg or K at red heat and high pressure, the metal hydride is formed, and the carbon reacts with (or is stabilized by) the nitrogen and assumes diamond form. No diamonds were found in experiments without N. **(8, 9)**

Dippel's Oil is a nitrogenous by-product of the dry distillation manufacture of bone char. The principal N-ingredient is pyridine. The iron tubes were 20" x 4" o.d. x 1/2" i.d.. Most of them ruptured during the experiments.

The largest yield was obtained from a mixture of "paraffin spirit boiling at 75^o [a mixture of light paraffins], 90%, together with 10% of carefully rectified bone-oil [Dippel's Oil, bp $115\text{-}150^o$]; these were placed with metallic Li (4 gr) in an iron tube" (20" x 4" o.d. x 1/2" i.d.) which was heated to redness for 14 hours. The tubes usually exploded, or the vapors escaped through the porous iron, or combined with it. Only 4 experiments (out of 34) were successful.

In his Bakerian Lecture for 1918, Sir Charles Parsons reported that he had repeated Hannay's experiments without success. He doubted that Hannay had made genuine diamonds. Bannister and Lonsdale, however, obtained samples of Hannay's diamonds from the British Museum; X-ray analysis showed they are genuine. **(2, 3, 20)**

Hannay's approach to diamonds is interesting, but it is not feasible for industrial application.Several other methods of manufacturing diamonds have been developed since then, but none are so simple as the technique developed by De Boismenu.

(5) Dr. Samuel Brown

Dr. Samuel Brown presented a report to the Royal Society of Edinburg in May 1841 concerning his "Experimental Researches on the Producton of Silicon from Paracyanogen":

"I venture to announce, as the result of my inquiries, that carbon and silicon are isomeric bodies, and that the former element may be converted into a substance presenting all the properties of the latter."

Dr. Brown prepared paracyanogen and reacted it in various ways to yield residues of silica. The experiments were replicated by Dr George Wilson and John C. Brown in August 1843. Although they obtained residues of silica in several runs (8.4 gr in one test), it was probably a contaminant in the potassium ferrocyanide. They stated:

"We tried the greater number of Dr Brown's processes, and rejected them one after another, without pursuing their investigation farther, on finding they would not yield quantitative proofs of the conversion of carbon into silicon... In conclusion we need scarcely say, that we have been unable to supply any proof of the transmutability of carbon into silicon."

Prof Liebig also reported negative results:

"We have repeated all the experiments of Dr Brown on the production of silicon from paracyanogen, but we have not been able to confirm one of his results. What our experiments prove is, that paracyanogen is decomposed by a strong heat into nitrogen gas, and a residue of charcoal, which is exceedingly difficult of combustion." **(24)**

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Figure II.3.1

The Ohsawa-Kushi Transmutation of Carbon

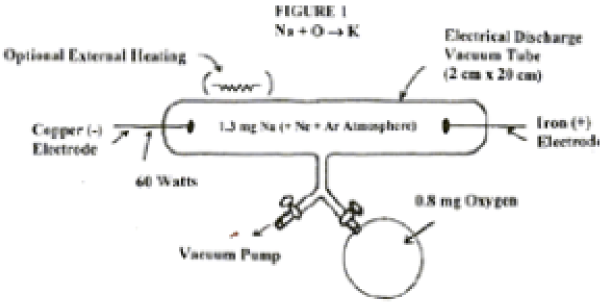


Figure 3.2
$2\,(C + O) \Rightarrow Fe$

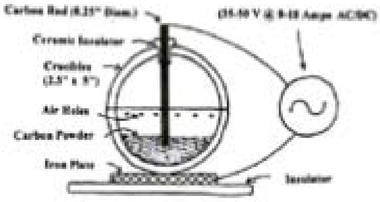
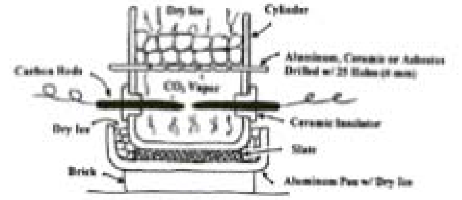


Figure 3.3
$2\,(C + O) \Rightarrow Fe$



Reaction Time: 15-30 Minutes

(15-30 Volts DC @ 17-20 Amps)

Adept Alchemy

by Robert A. Nelson
Part II

Modern Arcana

Chapter 4

Decomposition of Tungsten to Helium

---

(1) Gerald Wendt & Clarence Irion

Gerald L. Wendt and Clarence E. Irion (University of Chicago) reported their "Experimental Attempts to Decompose Tungsten at High Temperatures" to a meeting of the American Chemical Society in Illinois in April 1922. **(4, 5)**

Wendt and Irion claimed to have completely disintegrated tungsten wire into helium by means of a high-voltage discharge in glass bulbs. In the mean of 21 experiments, 1.01 cc of helium was obtained from a wire length of 39.62 mm with a weight of 0.713 mg, exploded with 29.6 kilovolts. The procedure consisted of charging a condensor to 100 Kv and discharging it at high speed through an extremely fine wire. The resulting explosion generated a pressure of about 1,000 lb/in^2 and a temperature over 50,000^o F. The method introduced as much as a coulomb of electricity into the tungsten wire within 1/300,000th of a second. The accompanying flash of light was about 200 times as bright as sunlight, and lasted less than 1/100,000 of a second. No smoke or other residue was ever found after the explosions.

Wendt and Irion described the electrical circuit and bulb (Fig. 4.1, 4.2) as follows:

"The primary circuit of the transformer, T, operates on a 220-volt alternating current power line through an inductive resistance, E. In order to prevent a destructive back-pulse into the power line should the charged condenser accidentally be discharged through the secondary circuit of the transformer, 2 condensers of 1 microfarad capacity each are bridged across the primary circuit with a ground connection, as shown at A. The primary circuit was heavy enough to carry 40 amperes during the brief period necessary to charge the large condenser; the secondary circuit furnished 100,000 volts though ordinarily only some 30,000 were used. The secondary circuit was connected to the two sides of the large condenser, C, one side leading through the hot cathode 'kenotron' rectifier, R, which was especially designed for heavy service and a large factor of safety. Its cathode filament was heated by the battery of dry cells, B. The discharge circuit led from the two sides of the condenser and contained only the spark gap, S, and the wire to be exploded, H. This discharge circuit was made as short and compact as possible, of heavy copper strip, in order to reduce resistance and inductance to a minimum and thus allow a rapid and non-oscillating discharge through the wire in the minimum time, thus concentrating the energy input and giving the maximum temperature in the material to the wire. To give maximum capacity and hold maximum voltage the condenser was built of 100 glass plates 60 by 75 cm covered with heavy tin foil and cast into solid paraffin with a gap of 5 mm between plates. The condenser showed brushing at the edges of the plates at 30,000 volts but held 45,000 volts without puncturing. The capacity was about 0.1 microfarad. The spark gap consisted of two 2 cm brass spheres, their separation adjustable to the maximum voltage of the condenser. Its use is important since it is the only means for protecting the condenser from excessive charge by the transformer, and for insuring a complete and sharp discharge at the proper moment.

"Tungsten was chosen for the material of the wire to be exploded chiefly because its high atomic weight made its decomposition probable on the hypothesis adopted, and also because it is hard enough to allow convenient manipulation and support even in excessively thin wires. The wires were 0.035 mm in diameter, about 4 cm long and weighed 0.5 to 0.7 mg. They had sufficient strength to be sprung into place between the larger electrodes shown in Fig. [4.2] without welding or clamping.

"The construction of the explosion bulb is shown in Fig. [4.2]. It has a volume of about 300 cc, and was constructed of heavy Pyrex glass without strain and in good spherical form, for it was required to withstand momentarily a tremendous outward pressure. Thick bulbs invariably broke during the explosion because of insufficient elasticity. Thin bulbs may be used is the bulb is immersed in a vessel of water, which gives sufficient support together with elasticity. The large side-tube is the neck at which the bulb was sealed from the pump system after evacuation, and through which the wire was sprung into place between the electrodes by means of pincers. The smaller side tube contained a third sealed-in electrode, and served for the spectroscopic examination of the gas within, one of the electrodes being used for the other terminal of the exciting induction coil.

"The three electrodes were constructed as is shown in detail in Fig. [4.2]. B was the electrode itself, made of... # 20 tungsten wire. This was firmly sealed directly through the Pyrex walls in the manner shown, for mechanical strength. The entire surface of the electrodes was first covered with a thick layer of Pyrex glass, A. The tip was then carefully ground off until the tungsten was exposed. Then a hole, C, was drilled in the end with a # 80 drill, 0.343 mm in diameter, the hole being less than 0.76 mm deep, to receive the fine wire for explosion. The electrodes were then sealed into the bulb. This method of sealing in the electrodes had the two purposes of excluding the chance of leakage of air inward through the seal after evacuation and of preventing the liberation of gas from these electrodes by the heating effect of the explosion itself. With such electrodes only the surfaces of the three small holes were exposed to the effects of the explosions, and one of these, in the spectroscopic capillary, was far removed from the scene of the explosion. In some of the early explosions brass electrodes were used welded to a tungsten wire sealed through the glass.

[This paragraph consists of some direct and indirect quotes] "The bulb was vacuum-evacuated for 15 hours by a mechanical pump and two mercury-vapor diffusion pumps in series with a liquid-air trap to capture any mercury vapor. The bulb was supported in a furnace and heated to above 350° C to drive off any gases contained in the glass, and out-gassed coconut charcoal (immersed in liquid air) was employed inline to absorb gases just prior to sealing the bulb. In addition, about 0.2 amperes from a battery was passed through the electrodes and the filament to heat them above 2000° Cfor 15 hours to drive off any other absorbed gases. Bulbs prepared in this manner showed no spectrum, florescence, or conductance."

After the wire was exploded, spectroscopic analysis of the gas revealed the strong yellow line of helium, and the faint green line of mercury. Other faint lines were detected but not identified: two red, one bright blue, and one pale violet. On some occasions, two unidentified faint yellow lines and a second violet line were detected. Hydrogen and neon were absent. Wendt and Irion commented:

"The appearance of helium and the absence of hydrogen is interesting for two reasons. In the first place, it seems to dispose of the objection that the helium arose from gas remaining in the wire, for in that case hydrogen should also have been visible, for it was probably originally present in the wire in much larger quantity than was helium. In the second place, if the helium does arise from a decomposition of the tungsten atoms, the absence of hydrogen is also interesting because the atomic weight of tungsten is exactly 46 times the atomic weight of helium, and Rutherford was also unable to detect hydrogen from the bombardment with a-rays of carbon, oxygen, magnesium, silicon, and sulfur, whose weights are multiples of 4, though he did detect it with boron, nitrogen, fluorine, sodium, phosphorus and aluminum, whose weights are not such multiples." **(2, 3)**

The possibility that helium could have been present in the tungsten could have been excluded by exploding the wire using a greater inductance to obtain a slower explosion at a lower temperature, giving complete vaporization without decomposition. However, there was not enough time available to conduct such tests. The vacuum method of preparing the tubes rigorously excluded contamination, but did not allow the collection, measurement and analysis of the gas produced. Therefore, Wendt and Irion also conducted explosions in carbon dioxide at atmospheric pressure in slightly modified bulbs; this enabled them to study the helium they produced. The carbon dioxide was carefully purified and blank-tested. This method also excluded the possibility of contamination from leakage of air into the bulbs, or by the release of gas from the glass bulb or the electrodes, because the explosion was too rapid to liberate any helium from those sources by heat from the tungsten vapor. The brief duration of the high temperature could not cause the carbon dioxide to decompose into carbon monoxide and oxygen, and the scientists performed pertinent tests to prove the point.

Unfortunately, the Associated Press widely published an exaggerated account of the "transmutation" experiment, based on the oral presentation which Wendt and Irion had made to the American Chemical Society in April, 1922. In a footnote to their article published in the *Journal* of the ACS (September 1922), they emphasized that, "this report is preliminary, and that nothing is proved beyond the importance of the problem and the promise of this method... For the sake of clarity it is suggested that the term *disintegration* be reserved for the spontaneous processes of radio-activity, that *decomposition* be applied to the splitting of complex atoms into simpler parts, and that *transmutation* be understood to imply some degree of synthesis of atomic nuclei."

Wendt and Irion planned a compete analysis of the gas they collected, but the sample was lost in an accident. "Then the work was stopped by the failure of health of the senior author..." Two years later, S.K. Allison and William Harkins reported inconclusive negative results from their version of the experiment. *Scientific American* magazine, however, sponsored a test of the experiment and published the successful results! The issue remains unresolved to this day. **(1)**

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Figure II. 4. 1

Electrical Circuit

C = Condenser – S = Spark Gap – W = Wire – B = Battery – R = Rectifier – T = Transformer
A = Small Condensers – G = Ground – E = Resistance

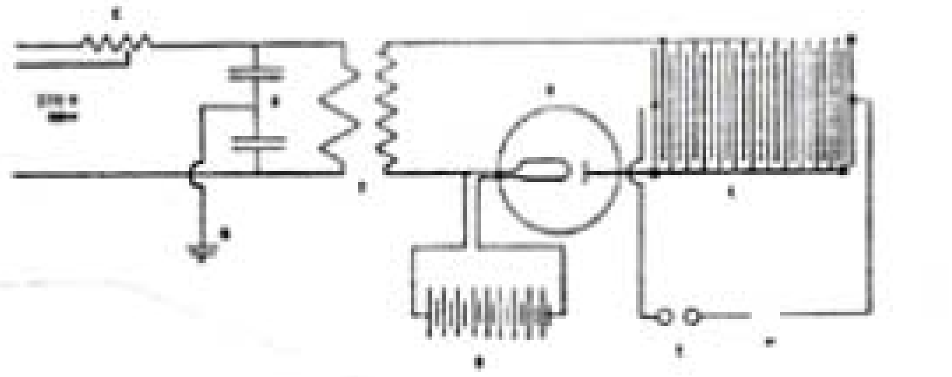
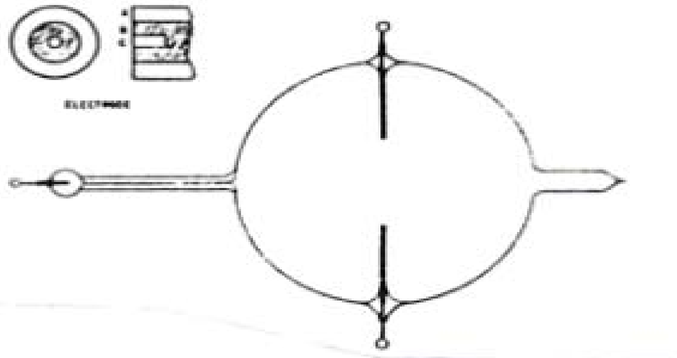


Figure II. 4. 2

Figure 4.2
Explosion Chamber



Adept Alchemy

by Robert A. Nelson
Part II

Modern Arcana

Chapter 5

Transmutation of Lead

(1) Arthur Smits & A. Karssen

Prof. Arthur Smits and Dr. A. Karssen (Univ. of Amsterdam) published reports of their alleged transmutation of lead into mercury and thallium in 1924. Their work was inspired by that of Prof. Miethe, who claimed to have transformed mercury into gold in a modified Jaenicke mercury ultraviolet lamp. **(4, 5)**

The lamp was constructed of lead quartz. Two legs (A, B), ending in narrow tubes, contain two steel electrodes cemented with sealing wax. The electrodes were inserted in two small removable copper water coolers (G, H). Pure liquid lead was poured into storage vessel C, after which the open end was sealed off. The lead was kept liquid at 350° C by an electric furnace around C. Tube D contained capillary F and terminated in stopcock K, which was connected to a mercury diffusion pump (Fig. 5.1).

When a high vacuum was attained, vessel C was further heated with a Bunsen burner to dissociate all the oxide and gases. Stopcock K was then closed and disconnected from the pump. The apparatus was tilted so the liquid lead ran into the two legs (A, B) of the lamp. The legs of the lamp were heated to redness to drive off the gases from the electrodes, and the lamp was evacuated again. Then copper water coolers were placed around the legs, and the lamp was ready to use. At the end of the experiment, the liquid lead was returned to vessel C, which was continuously heated. The lead was specially prepared and purified by the firm of Kahlbaum of Berlin to prevent every contamination, especially mercury.

The experiment was monitored with a quartz spectroscope. After a current of 30-35 amperes/8 volts was passed through the system for 6 hours, a few mercury lines began to appear in the spectrum. After 10 hours, the entire series of lines of mercury, plus those of thallium, were apparent in the visible and ultraviolet spectrum.

In 1926, Smits and Karssen reported further developments of their experimental protocol. The lamp was redesigned, and the mercury diffusion pump was replaced by a mechanical pump to eliminate the possibility of contamination from that source. The use of a mercury manometer was avoided by employing a glass spring manometer. All the equipment was examined with a spectroscope to make certain it was free from mercury and thallium. They described their method as follows:

"After filling the storage vessel, the lamp and the lead were heated in high vacuum to redness. The lead oxide being dissociated, the liquid lead was as brilliant as mercury. Then the lead was brought into the lamp, and after ignition the spectrum was observed at 25 V/36 A, by a Hilger quartz-spectrograph. Further, the spectrum of a quartz mercury lamp was observed, and also the scale in such a way that, to facilitate comparison, the different spectra were adjacent. Thus we obtained the spectrum of the lead in its initial state. After that we burned the lamp at 40 A/80 V for 10 hours. After having done this the lead was poured into the storage vessel to obtain thorough mixing; the lead was then brought into the lamp again, and after ignition the spectrum was observed at 25 V/36 A. The result was that, whilst initially the lead spectrum showed only very weakly the mercury line 2536 in the ultra-violet, after 10 hours' burning the strongest mercury lines had appeared in the visible as well as in the ultra-violet part of the spectrum, and also the most characteristic thallium line, indicating a transmutation of lead into mercury and thallium.

"Since our experiments showed that a high current density is very favourable to this transformation, we used currents up to 60 A, but that seemed to be dangerous, because only by intensive air cooling could melting of the quartz-lamp be prevented.

"We thought it better, therefore, to change our method a little, by applying not a continuous electrical current but sparks of high current densities... While the lamp was kept oscillating by a mechanical arrangement... a current of high-density [60-100 A] was breaking and making... This method was very successful... After 9-1/4 hours' sparking all mercury lines, even the very weak ones, were present...

"This, however, does not yet prove the transmutation to be strong, as it is known that a relatively strong quantity of mercury can cause the spectrum of another element to disappear. But at all events our spectra show in a very convincing way the transmutation of lead into mercury..."

The researchers also conducted experiments with a nitrogen atmosphere at various pressures and a liquid dielectric (carbon disulfide) with 100kv/2 milliamperes for 12 hours. The mercury was chemically detected as the iodide. Similar results were obtained with 160 kv/10-20 milliamps. In six such experiments, 0.1-0.2 mg of mercury was recovered. The researchers suspected that the CS_2 had contained a trace of some organic mercury compound. Positive results were still obtained, however, even after it had been thoroughly purified.

Smits offered this explanation for the transmutations:

"In the case of the transmutation of lead into mercury, the inactive isotopes having the atomic weights 206, 208 and 210, we may assume, for example, that the isotope 206 suffers a transmutation giving an isotope of mercury:

$\mathrm{Pb} - a = \mathrm{Hg}$

201 - 4 = 202

82 - 2 = 80

"But we may also assume that the other isotopes 208 and 210 undergo a transmutation. In that case we obtain:

$\mathrm{Pb} - 2a - 2q = \mathrm{Hg}$

208 - 4 = 202

82 - 2 = 80, and:

$\mathrm{Pb} - 2a - 2q = \mathrm{Hg}$

208 - 8 = 200

82 - 4 + 2 = 80

"In the case of the transmutation of lead into thallium we can assume, for example, the following process:

Pb - a - q = Tl

208 - 4 = 204

82 - 2 + 1 = 81

"We see that of the different transmutation possibilities, [the first] is most simple. Moreover, I suspected this process could be expected first, as lead is the end-product of the spontaneous radioactive transformations... The best method of learning the nature of the transmutation is to examine spectroscopically whether the process is accompanied by the formation of helium or hydrogen, and to determine the atomic weights of the heavier products...

"While using the old quartz-lead lamp, negative results were obtained only if the current strength was lower than 15 amperes, but now, with our new lamps... spectroscopically negative results were found even using 60 amperes. The lamp showed distinctly different properties in burning and sparking. This proves that the phenomena taking place in the quartz-lead lamp depend on influences unknown until now, so that transmutation in the quartz-lead lamp is not so easy to reproduce as we expected." **(2)**

In 1926, A.C. Davies and Frank Horton reported that they had been unsuccessful in their attempts to replicate the Smits-Karssen experiments. They offered these speculations:

"In the case of the transmutation of lead (82) into mercury (80), the change may occur either by the intermediate production of thallium by one of the processes already suggested [viz, "the entry of an electron into, or by the removal of a proton from, the nucleus of the mercury atom."], and the subsequent conversion of the thallium into mercury by a second similar process, or it can occur as a one-stage change by the ejection from the lead nucleus of either one doubly charged positive particle (presumably an a-particle) or two singly charged positive particles (presumably protons) simultaneously. If the process occurs by the intermediate production of thallium, one would expect to find evidence of a relatively large amount of thallium compared with the amount of mercury produced. Prof. Smits does not seem to have found such an effect, for he records stronger evidence of the production of mercury than of the production of thallium...

"When atoms are bombarded by electrons, it is possible that in a few instances an electron penetrates within the *K* shell of extra-nuclear electrons, though it is certainly surprising that this is possible in the circumstances of these experiments. When such a penetration does occur, the electron will be attracted towards the nucleus and may possibly be absorbed by it. Even so, in some cases the absorption of an electron by the nucleus may render the latter unstable and disruption may occur with the ejection of a proton and an electron, either separately or together, in which case the final chemical state of the disturbed atom will be the same as if the electron had been absorbed by the nucleus and a stable condition attained."

For some unknown reason, these explorations were not continued, and the issue disappeared from the scientific literature after 1928. This line of research remains open to exploration, since the questions it raised remain unanswered to this day.

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Part II

Modern Arcana

Chapter 6

Transmutation of Hydrogen

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(1) William Ramsay, *et al.*

Dozens of scientific papers were published between 1905 and 1927 concerning the mysterious appearance of hydrogen, helium and neon in vacuum tubes. The matter has not been resolved.

The first such report, written by Clarence Skinner, was published in *The Physical Review* in July 1905:

"While making an experimental study of the cathode fall of various metals in helium it was observed that no matter how carefully the gas was purified the hydrogen radiation, tested spectroscopically, persistently appeared in the cathode glow..."

Skinner eventually located its source in the cathode. **(26)**

In 1912, Sir William Ramsay reported "The Presence of Helium in the Gas from the Interior of an X-Ray Tube", and J.J. Thomson published an article "On the Appearance of Helium and Neon in Vacuum Tubes" in 1913. Thomson was investigating a new gas called X_3 (atomic weight 3: tritium), a polymerized form of hydrogen. He used the positive ray method to detect the helium and neon because it is more sensitive than spectral analysis and provides much more definite data. There was no apparent connection between the type of gas used to fill the tubes and the appearance of the new gases (X_3 line 3 in H, N, He, O, and air; Ne line 20 in H, N, O, HCl, and air). Another line often appeared corresponding to atomic weight 10; it is probably due to neon with two charges of electricity, but brighter than expected. **(22, 23, 29, 30)**

The experimental apparatus was a large glass bulb fitted with aluminum electrodes; the discharge was produced by an induction coil. Thomson described it as follows:

"The positive rays for the analysis of the gases were produced in a vessel containing gases at a low pressure. I shall call this the testing vessel; the vessel in which the various processes for generating X_3, were tried (the experimenting chamber) was sealed on to the testing vessel, but separated from it by a tap. Thus the pressure in the experimenting chamber was not restricted to being the same as that in the testing vessel, but might have the value which seemed most appropriate for any particular type of experiment. After these experiments were over, the tap was turned and some of the gas from the experimenting chamber let into the testing vessel; a photograph was then taken, and by comparing it with one taken before turning on the tap the new gases present in the experiment chamber could be detected."

Thomson finally determined that the gases were being occluded by the electrodes. He concluded:

"These gases are present in the metal independently of the bombardment, and are liberated by the action of the kathode rays.

"I would also like to direct attention to the analogy between the effects just described and an everyday experience with discharge tubes --- I mean the difficulty of getting these tubes free from hydrogen when the test is made by a sensitive method like that of the positive rays. Though you may heat the glass of the tube to melting point, may dry the gases by liquid air or cooled charcoal, and free the gases you let into the tube as carefully as you will from hydrogen, you will still get the hydrogen lines by the positive ray method, even when the bulb has been running several hours a day for nearly a year. The only exception is when oxygen is kept continuously running through the tube, and this, I think, is due, not to lack of liberation of hydrogen, but to the oxygen combining with the small quantity of hydrogen liberated, just as it combines with the mercury vapor and causes the disappearance of the mercury lines. I think this production of hydrogen in the tube is quite analogous to the production of X_3, of helium, and of neon." **(31)**

Prof. N.J. Collie and H. Patterson conducted the early stages of their work independently and from different points of view. They began collaborating when they learned they were getting the same results. Patterson was interested in the pure physics of the electron, and had developed a hypothesis that "by doubling the electrical charge on hydrogen atoms, it might be possible to convert this into an a particle, and so into helium." He got neon instead. The experimenters took all due precautions against error, yet they repeatedly obtained traces of helium and neon. The tubes were surrounded by an exterior vessel which was evacuated, or contained neon or helium; the same results were obtained. In one such experiment, Prof. Collie tested the vacuum-evacuated exterior vessel and found helium with neon. Patterson replicated the experiment, and then repeated it with an oxygen atmosphere in the exterior tube. Neon was found therein. It appeared that neon was formed by a union of helium and oxygen. They also performed numerous blank experiments to exclude the possibility of contamination from various sources. **(4, 9, 21)**

R.J. Strutt and other workers found no helium in their experiments. **(11, 15, 27)**

In 1914, Collie reported his "Attempts to Produce the Rare Gases by Electric Discharge." Finely powdered, heated uranium was placed in a cathode discharge bombardment tube; the equipment was carefully purged in several ways. 1-2 hours of electrical treatment yielded traces of helium and neon in 11 experiments. Collie concluded:

"If the neon and helium found were due to an air leak, it is difficult to account for the disappearance of the argon, which should have been present to the extent of one thousand times as much as the neon and helium found. The amount of argon present, however, was too little to be measured, as it made no difference in the volume of neon and helium... The presence of the nitrogen is probably due to a nitride of uranium... That comparatively large amounts of neon and helium should come off from uranium by bombardment with the cathode rays, and not by heating, is a matter of interest; also that in one experiment a change of coil should affect the result is an observation that must if possible be repeated...

"That the presence of neon and helium in vacuum tubes, after the electric discharge has been passed, is due to an air leak seems most improbable. Where the gases come from has yet to be proved. They have been found by Sir J.J. Thomson, by Sir William Ramsay, by Mr. G. Winchester, and by the author [J. N. Collie], Mr. Hubert S. Patterson, and Mr. Irvine Masson... Whatever the source may be, it is only by further experiments that the question will be resolved..."

Collie, Patterson, and Masson described the electrical circuit, discharge tubes and testing apparatus, precautions and controls, bombardment experiments, results, and possible sources of the gases in the *Proceedings of the Royal Society of London* (1914).

"The coils gave 12-inch sparks with either a mercury or a hammer interrupter. The nature of the break has some influence on the result of the experiment; in the case of a mercury break, better results were obtained with a rectifier. The current in the secondary circuit averaged a few millamperes. The form of the discharge tubes varied from simple spectrum bulbs with disc electrodes to elaborate jacketed designs. The gases employed were generated by chemical and electrical methods and were tested for purity." **(7)**

The testing apparatus was either directly connected to the discharge tube, or the gases were transferred by means of an inverted siphon over mercury after being pumped from the reaction vessel. Hydrogen was removed by exploding it with oxygen in a burette or in the collection tube, which had platinum wires sealed in it. In some designs, the hydrogen was removed by copper oxide and phosphorus pentoxide. Oxygen and moisture were removed by cooled charcoal, liquid air, and Na-K alloy. The He and Ne were collected in a fine capillary tube with a fine platinum wire sealed through the top:

"It is found that the minimum quantity of neon detectable probably equals that contained in a few cubic millimeters of atmospheric air. If, owing to defective working, the neon actually was atmospheric, the accompanying argon would be very easily seen (as the ratio Ar:Ne in air is about 700:1) when the particular method used was such as might have eliminated nitrogen beforehand; in the apparatus depicted, nitrogen naturally made its presence at once evident if a very small part of a cubic millimeter of air was present... In many of the experiments, the total volume of gas used was so small that even if it had been all atmospheric air, it could not have accounted for the quantities of the neon, and still less for those of the helium, which were obtained... We wish to point out that a great many of our experiments have yielded negative results, for as yet unexplained reasons."

The electrodes were made of Pd, Cu, Pb, Tl, Li, Na, K, Al, and Mg. Some bombardment experiments were conducted with anticathodes of Pt, Tl, U, KF, KCl, KI, RbCl, Cs_2CO_3, CaO, and BeO. **(14)**

Besides the several precautions against air-leaks, Collie, *et al*., tested for nitrogen; The ratio of N_2:Ne in air is about 80,000:1; therefore:

"If the Ne detected in an experiment came from air, the nitrogen accompanying it would be found in relatively overwhelming quantity...

"If atmospheric contamination occurs at any point after the run, nitrogen must infallibly be detected during the examination. If any contamination occurs before the run, it would likewise instantly be made manifest on the first passage of the discharge through the experimental tube. It is only when an infinitesimally slow leak goes on during the run that it is possible that no nitrogen could be seen at any time; and to provide against this contingency an additional control is necessary, namely the absence of argon from the gas... The argon test is in reality superfluously delicate as a control; nevertheless it was used.

"In all experiments where helium was the chief product, atmospheric contamination is *ipso facto* excluded... contamination seems to be thoroughly excluded in all the experiments."

Two hypotheses remained to explain the origin of the He and Ne: permeation through the walls of the tubes, and previous occlusion from them. Since positive results were obtained with electrodeless tubes, the electrodes can be eliminated as a source. In addition, when Al and other metals were melted *in vacuo*, no gases were occluded, but did so when the metals were bombarded; no He pre-existed in the metals. When Al was dissolved in KOH solution, no He or Ne was liberated. Melting the glass tubes *in vacuo* yielded no He or Ne. Two specimens of old glass (one Egyptian, approximately 1500 years old; another, Kien-lung Chinese) were examined; neither yielded He or Ne.

The authors closed their report with this note:

"We have endeavored to put the facts of the case as fully as possible, without reference to any preconceived theory. It is not our view that our experiments rigidly exclude all the possibilities which have been mentioned; but it is evident that the trend of the results is toward conclusions which, if they turn out to be true, would be of very obvious importance."

The issue then lay dormant for several years, but research was resumed after World War One. In 1926, Prof. Fritz Paneth and Dr. K. Peters determined that palladium had effected the transmutation of hydrogen to helium in their experiments. Paneth and Peters absorbed H in colloidal Pd (sponge, black, or palladinised charcoal) for 12 hours, after which time they detected the main spectral lines of He. No He production was observed with Pd preparations that had not absorbed hydrogen. Preparations of Pd stored at room temperature should therefore produce He; this was found to be the case. After the He had been removed, the sample was stored again, then examined; more helium was obtained. The experiment was repeated three times with the same results. **(17-20)**

The authors excluded all the possible sources of error in their experiments, such as the ingress of atmospheric He, absorption in glass or electrodes, preferential absorption of He by Pd, and the possibility of He being formed as a product of radioactive disintegration of Pd. No trace was detected of any energy liberated during the transformation, either as heat or radiation.

It would seem worthwhile and desirable to replicate these experiments with modern equipment and techniques.

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Chapter 7

Transmutations of Mercury

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(1) Hantaro Nagaoka ~ Adolf Miethe ~ Hans Stammreich

Prof. Hantaro Nagaoka

In March 1924, Prof. Hantaro Nagaoka, *et al.* (Tokyo Imperial University), described their studies on satellites of the spectral lines of isotopes of mercury and bismuth, in which they detected gold. In May 1925, they reported some of the technical details: Nagaoka and his co-workers discharged about 15 x 10^4 volts/cm for 4 hours between tungsten and mercury terminals under a dielectric layer of paraffin oil. They used the Purple of Cassius test to detect gold in the viscous residue of C, Hg, etc. The black mass was purified *in vacuo*, then by combustion with oxygen and extraction with HCl to yield Au, either in aqua regia solution or as ruby-red spots in the glassware. Microscopic films of Au were found on occasion. (19, 22)

Nagaoka stated that when a discharge was passed through drops of Hg falling between iron electrodes, the formation of silver and other elements was observed. Another run of the Hg lamp for more than 200 hours at 226 volts produced a milligram of gold, plus some platinum. He noted that it was essential to distill the mercury repeatedly below 200°C to ensure success of the experiment.

Considerations of the satellites of the spectral lines of Hg led Nagaoka to the conclusion that a proton is "slightly detached" from the nucleus of Hg, and it can be removed:

"If the above assumption as to the Hg nucleus is valid, we can perhaps realize the dream of alchemists by striking out a hydrogen-proton from the nucleus by a-rays, or by some other powerful methods of disruption [to produce Au from Hg]." (21, 26)

At about the same time, Professor Adolf Miethe of the Photochemical Department at the Berlin Technical High School found that the mercury vapor lamps used as a source for ultra-violet rays ceased to work after a time because of a sooty deposit that formed in the quartz tubes. Miethe tested these deposits and detected gold. Subsequently, Dr. Miethe and Dr. Hans Stammreich were issued German Patent Specification #233,715 (8 May 1924) for "Improvements in or Relating to the Extraction of Precious Metals":

"An electric arc is formed between mercury poles, in the same way as is done in mercury quartz lamps. With sufficient difference in potential, gold is then produced in the mercury. It is advisable to condense again the evaporated mercury. The quantity of gold produced depends, all other conditions being equal, on the quantity of current and also, among others, on the vapor pressure of the mercury or on the difference of potential in the arc. The difference of potential in the arc must therefore be sufficiently great. If it drops to excessively small amounts, the efficiency will be greatly reduced. If the difference of potential is increased, the quantity of gold formed will be considerably increased, beginning with a certain difference of potential." (12)

In July of 1924, Drs. Miethe and Stammreich announced that they had changed mercury into gold in a high-tension mercury vapor lamp. The experiment produced $1 of gold at a cost of $60,000, equivalent to over $2 million (gold then sold for $330/lb). Miethe used a potential of 170 volts applied for 20-200 hours. The lamp consumed 400-2,000 watts. A minimum potential difference is necessary. The yield of gold was minute: 0.1-0.01 mg. The mercury and the electrodes were analyzed and determined to be free of gold before the experiments. Miethe was not able to attempt to prove the production of alpha or beta rays, hydrogen or helium. (22)

O. Honigschmid and E. Zintl determined the atomic weight of Miethe's mercuric Au, using potentiometric titration of auric salt with $TiCl_2$. It was found to be 197.26, which is heavier than ordinary Au (197.2). They emphasized the need for a mass spectrographic analysis. (10)

Frederick Soddy suggested that such a change might be effected by attaching an electron to the mercury nucleus:

"Consider the collision of high-speed electrons with mercury atoms. A small proportion of these electrons must be directed upon the nucleus. If they possess sufficient energy to penetrate the external levels of electrons in the mercury atom, they must reach the positively charged nucleus and be captured by it. Since the loss of an electron (as a b-ray) by the nucleus of an element results in the atomic number of the element in question being increased by one, the gain of an electron by an atomic nucleus must result in the diminution of the atomic number by one. This is quite general. In the case of an isotope of mercury of atomic number 80, the product will be an isotope of gold of atomic number 79. Upon existing knowledge it is simply a question of (1) the potential sufficient to drive the electron through the outer levels of electrons surrounding the mercury nucleus until it comes within the sphere of attraction of the powerfully charged nucleus; (2) whether the exceedingly small fraction of direct collisions with the nucleus that is to be anticipated will be sufficient to enable the gold produced to be detected.

"As regards the first, it may be expected that the repulsion of the external shell of mercury electrons will diminish rather than prevent altogether the chance of the radiant electron reaching the nucleus; for once the shell is penetrated, the resultant force on the radiant electron must be on the average an attraction... The chemical detection of the gold produced would probably be the more formidable experimental difficulty." (30)

A.S. Russell offered this opinion:

"The experiments on the transformation of Hg into Au suggest the possibility of the transformation of a nucleus into that of the element next below it by the absorption of one electron when both nuclei are stable. This occurs most obviously as an isobare. The possibility of the existence of two isobares of odd mass-number, Tl 205 and Au 199, among non-radioactive elements may be inferred from experimental work... Aston has shown the existence of the Hg isotope 199... This type of transformation may occur in the two pairs of elements Pb and Tl, Hg and Au... The masses of the Tl and Au produced are 205 and 199 respectively".

Aston advanced strong arguments against the probability of the alleged Hg-Au transmutation. Conceivably it could be effected by the addition of an electron to the nucleus of Hg, or by removing a proton from it, but the chance of an electron hitting a nucleus is extremely remote, and its weight would not make a significant contribution. Theoretically, a Hg isotope of atomic weight 197 could absorb an electron and produce common Au, but none of the six Hg isotopes (198, 199, 201, 202, 204, 209) identified by Aston have that weight. According to Aston, the removal of a proton from the nucleus by Miethe's method is untenable:

"The forces employed are ludicruously inadequate." (1, 22)

The process can be shown as:

Hg - a - q = Au

At. wt. 201 - 4 = 197

80 - 2 + 1 = 79 , or:

Hg - 4H - 3q = Au

At. wt. 201 - 4 = 197

80 - 4 + 3 = 79

In December 1924, the journal *Scientific American* announced that it would arrange for a comprehensive and exact test of the Miethe experiment. It was conducted at New York University by Prof. H.H. Sheldon and Roger Estey. They used a quartz lamp that contained no gold, and pure tungsten wires were sealed into the quartz to provide electrical contacts. The mercury was tested for purity. Three runs were made lasting from 30-50 hours each, at about 170 volts/13 amperes. The mercury was removed and tested:

"In no instance was any trace of gold detected... According to Prof. Miethe's reports, taken in connection with the theoretical interpretation of Prof. Soddy, this experiment should have produced a substantial quantity of gold; at least ten times as much as could easily have been detected by the analytical methods used. The negative result of the three experiments established, therefore, a strong probability that the transmutation announced by Prof. Miethe could not be confirmed. "(27)

The researchers procured from the manufacturers in Germany a replica of the lamp used by Miethe, and repeated the exact technique described by him. The final run lasted 172 hours, at 165-174 volts/12 amps, depending upon the temperature of the lamp:

"After the run the most careful analytical tests failed to show any trace whatsoever of the precious metal. It is necessary to conclude, therefore, that the experiment described by Prof. Miethe does not always result in the transmutation of mercury atoms into gold atoms. The experiments recorded by Prof. Miethe and our on experiments, conducted as far as humanly possible in exactly the method described by Prof. Miethe, are entirely discordant with each other.

"It would be improper to assert on the basis of these results alone, that Prof. Miethe's experiments have been proved to be definitely wrong. All that is proper to say is that a careful, competent, and long continued effort to confirm the German results has resulted in an entire failure to do so."

The *Scientific American* offered a suggestion:

"One very vital possibility of mistake in experiments of this character lies in the accidental presence of a small impurity of gold in the mercury employed... It is at least possible that such was the case... Perhaps it will be discovered that some minor and unnoticed detail in the arrangements or in the conduct of the experiment was really responsible for a successful transmutation in Prof. Miethe's case... We must confess, however, that we do not believe that this will prove to be the case. On the basis of all the evidence now available, including the experiments of Dr. Sheldon and Mr. Estey... it is our belief that a transmutation of mercury atoms into gold atoms does not occur and will not occur under the conditions which have been described by Prof. Miethe.

"It is to be freely admitted, of course, that a transmutation of mercury atoms into gold atoms is a theoretical possibility. The internal structures of the two atoms are similar. The removal of one unit of positive electric charge from the nucleus of a mercury atom, or the insertion of one additional electron into this atomic nucleus would result, it is believed, in the conversion of the mercury atom into an atom indistinguishable from the ordinary atoms of gold. Quite aside from the failure to confirm the results of Prof. Miethe, it remains entirely possible that one of these changes of atomic structure can be accomplished by some physical or chemical method yet to be discovered...

"Gold can be extracted from mercury, but mercury cannot be transmuted into gold."

Sheldon and Estey also commented:

"The suggested explanation of a change of the number of electrons in the nucleus changing mercury to gold seems good in theory, but incredible in fact, for the potential drop per mean free path of a Hg molecule is only about 0.1 volt in these arcs." (28)

Scientific American published another report of "More Mercuric Gold from Germany" in April 1926, announcing that a 10,000-fold increase in yield had been obtained in the production of mercuric-gold process. In his first experiments, Miethe found1 part Au per 100 million parts Hg. The Siemens Works in Berlin bombarded Hg with electrons in extremely high vacuum, and obtained 100 mg Au from 1 kg of Hg. (27)

Siemens & Halske Akt.-Ges. registered their German Patent Specification (#243,670) in June 1925 for "Treating Mercury" with spark discharges, cathode rays, and canal rays. The difference of potential could be between 100-150,000 volts; capacitance was adjustable. Paraffin, ether, or carbon tetrachloride were used as dielectrics. (29)

Other researchers were not so optimistic. Erich Tiede, *et al.*, reported "The transmutation of Hg into Au is considered theoretically possible but all experiments carried out under strict control of the original Hg proved to be failures. When the Hg, which was purified according to Miethe and Stammreich, was distilled in an all-glass apparatus similar to the one used by Bronsted and von Hevesey to separate the isotopes of Hg, it showed still up to 10^{-9}% Au. Optical detection is not sufficiently accurate, so they considered it necessary to melt the Au granule, which still held Hg, and weigh it on a microbalance. (32)

Milan Garrett (Clarendon Lab, Oxford) published completely negative results of his repeated attempts to reproduce the Hg-Au transmutation experiment by several methods. Garrett also attempted to prepare indium from tin, and scandium from titanium by X-ray bombardment, also without success. (5)

Erich Tiede, *et al*., reported the negative results of their experiments:

"Mercury distilled according to Miethe still had 0.3 mg Au per kg Hg. After two high-vacuum distillations, no more Au could be detected. With this preparation the experiments of Miethe were repeated in several forms; no resultant Au formation was observed in any case."

E. Duhme and A. Lotz confirmed this negative finding. Duhme and Lotz also conducted numerous experiments with the initial cooperation of Miethe and Stammreich. They used very large arcs carrying 10 kw at 40 kv/800 A/cm^2 through Hg vapor. Gold was found in some instances, such as when a sufficiently powerful current was passed between electrodes dipped in mercury, but those experiments were rejected because there had been too much contact with foreign metals. They found that Au will escape detection if certain impurities are present, producing an inhomogenous distribution of Au that becomes detectable only after the arc treatment has coagulated it. (3, 4, 31)

Prof. Fritz Haber, *et al*., made careful attempts to repeat the work of Nagaoka and Miethe. Mercury in which no Au could be detected was subjected to six different treatments, but no Au was formed. In some cases, Au was found, but only in amounts smaller than what could have come from the materials, or from contamination. Nor could the yield be increased at will. The applied treatments were made with liquid and solid dielectrics with high-tension discharges, arcs in low, normal and high pressures, and high-vacuum electron bombardments.

The extraordinary sensitivity of their detection methods was exemplified by the instance of a co-worker who suddenly found traces of gold in some material he was analyzing. No one else could detect Au in the other samples. It was found that the chemist habitually removed his gold frame eyeglasses before making an observation; on this occasion, he had removed the glasses and then picked up a strip of ultra-pure lead to perform an analysis. Another incident occurred when a lab worker was melting some Au; soon afterwards, another worker in the next room found Au in material which previously had none in it. The authors proved "merely that no method has yet been published whereby analytically detectable amounts of Au can be formed in Hg." (8)

Scientific American (April 1926) reported on a recent meeting of the German Chemical Society, at which positive results were announced:

"Prof. Haber, who previously cherished the greatest doubt as to the accuracy of the experiments, congratulated Prof. Miethe and related... that he himself could confirm the results by repetition of the experiment."

Haber apparently made the comment before he had completed his analyses of the electrodes, etc, and determined them to be the source of the Au.

Most of the criticism of Miethe, Stammreich, and Nagaoka's experimental work focused on the questionable purity of the mercury they used. Their Hg had been purified by distillation and by dissolving it in nitric acid (1:4) and fusing the residue with borax (0.1 gr). The resulting bead of Au, if any, was examined under the microscope. Usually they distilled the Hg twice, but in some cases as many as 15 times. Other researchers showed that no matter how carefully or often Hg was distilled, Au could be detected.

Miethe and Stammreich showed that the formation of Au from Hg depends on the application of intermittent electrical discharges. No gold forms when Hg is exposed to direct current. They also described a Hg-turbine which allowed 2,000 breaks/minute with a potential of 110 volts; the current varied from 1-12 amps. The experiments showed a linear proportionality between the yield of Au and the product of wattage and time. The average yield of gold was 0.0004 mg/amp/hour. The production of Au was facilitated by high-pressure. When the discharge was passed between Hg poles in a paraffin dielectric, the gold was found dispersed along the line of discharge, but not in the Hg poles. (15)

Alois Gaschler attempted to reverse the Miethe-Nagaoka experiment by treating gold with high-speed hydrogen nuclei. He assumed that one of them might penetrate deeply into the electron shells of Au, be held by the innermost shells as a "paranucleus", and form a "Tiefenverbindung". After 30 hours bombardment, the spectrum of the tube began to show Hg lines that steadily increased in intensity. Gaschler postulated that Hg is a gold hydrogen compound, similar to Manley's "Hg-Helide". (6, 7, 13)

The scientific community gave a fair and thorough review of the claims of Miethe, Stammreich and Nagaoka, who also skillfully managed the criticism. The entire issue, however, was never definitively resolved. These experiments ought to be repeated with modern equipment and analytical techniques.

The "conventional" transmutation of Hg by fast neutrons (Li + D) was first accomplished by R. Sherr, *et al.,* at Harvard University in 1941; three short-lived radioactive isotopes were formed.

(2) Franz Tausend

The German alchemist Franz Tausend began to produce gold from mercury in the 1920s under the auspices of General Ludendorff. His work was based on a circular table of 180 elements arranged according to a system of harmonic frequencies and atomic weights.

The ingredients of Tausend's formula are known to be: (Part 1) --- $PbCl_2$ (111 gr), KOH (60 gr) and (Part 2) --- K (76 gr), Na (55 gr) amalgamated with Hg (131 and 365 gr) melted under paraffin. Reaction of Part 1 (17.4 gr) with Part 2 (5.4 gr) yielded 5.4 gr Au.

Tausend also employed other reagents, but it is not known how or why they were used: ammonium carbonate, lime, potassium nitrate, soda, borax, sulfuric acid, and potassium cyanide, oxalic acid, uranyl nitrate, aluminum chloride, potassium arsenide, lead sulfate, tin oxide, silica, and asbestos.

(3) Roger Caro & Kamala-Jnana

The French alchemical school of the Temple of Ajunta published a few small hermetic texts (*Pleiade Alchimique*, *Concordances Alchimiques*, etc) in the 1960s*. The Complete Great Work Photographed* includes 40 photographs of the Ars Magna as it was performed by Kamala-Jnana and Roger Caro.

The method is described in classical alchemical language, but most of the materials and methods are clearly described. Mercury was used to produce a species of Philosophers' Stone. The process can be described in chemical terms as follows: Prepare (1) b-meta-cinnabarite (a-cinnabarite will not produce the same results, in my experience), (2) a concentrated solution of a mixture of lime and potash and (3) sulfureted potash (potassium polysulfide). Saturate the cinnabarite with the lime-potash mixture solution, then dry it. Repeat several times until albedo appears. Then saturate with a concentrated solution of potassium polysulfide, and strip the solvent (methyl or ethyl alcohol also can be used). Repeat this step until white needles appear (the Dragon's Teeth). The color changes from yellow to orange to red. The Stone is multiplied by grinding it to powder and repeating (7x) the wash with lime-potash. At this point, the Stone emits lights --- probably from the calcium sulfide byproduct of the reaction mixture. Further elaboration and transmutation of lead to gold can be accomplished according to the skill of the Artist.

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Fig. 1

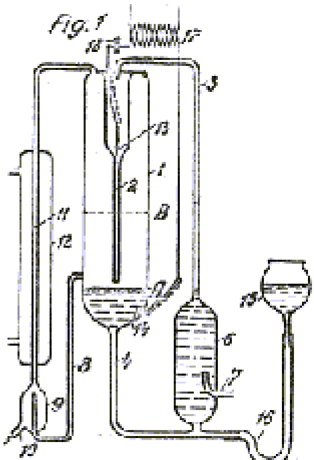


Fig. 3

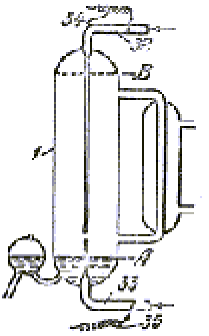


Fig. 2.

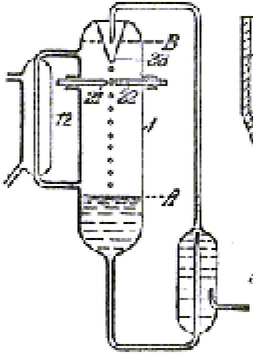


Fig. 4

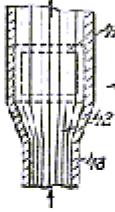


Fig. 5

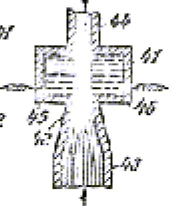
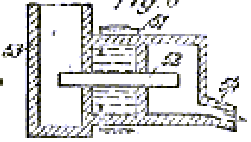


Fig. 6



Adept Alchemy

By Robert A. Nelson
Part II

Modern Arcana

Chapter 8

Biological Transmutations

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(1) Early Experimenters

Long before the discovery of "cold fusion" by Pons and Fleischman, other scientists had variously found phenomenal evidence of non-radioactive, low-energy transmutation of light elements in plant, animals and minerals. These reactions have come to be known as "biological transmutations" or "nuclido-biological reactions". This class of nuclear reactions is of great importance to the progress of human knowledge in the fields of physics, cosmology, biology, geology, ecology, medicine, nutrition and agriculture. The exact mechanisms of biological transmutations remain unknown, though a few theories have been proposed to explain them. Biological transmutations exist and cannot be denied; they are the very core of living nature, which could not function without them.

The study of biological transmutation can be said to have begun in the 17th century with the famous experiment by von Helmont, who grew a willow tree in a clay vase with 200 pounds of soil. After 5 years, he dried the soil and found that its weight had decreased by only 2 ounces: "Water alone had, therefore, been sufficient to produce 160 pounds of wood, bark and roots" (plus fallen leaves which he did not weigh). Presumably, there were some minerals in the water he fed to the tree. Nowadays we know that plants form carbohydrates from atmospheric carbon dioxide, but their mineral content is derived from soil, not air. It may be possible, however, that the ORMEs (Orbitally Rearranged Monoatomic Elements), discovered by David Hudson in the 1980s, exist in the atmosphere and are utilized by plants.

In 1799, the French chemist Vauquelin became intrigued by the quantity of lime which hens excrete every day. He isolated a hen and fed it a pound of oats that was analyzed for lime (CaO). Vauquelin analyzed the eggs and feces and found five times more Ca was excreted than was consumed. He concluded that lime had been created, but could not figure out how it happened.

In 1822, the English physiologist Prout studied the increase of calcium carbonate inside incubating chicken eggs, and was able to show that it was not contributed by the shell.

In 1831, Choubard germinated watercress seeds in clean glass vessels and showed that the sprouts contained minerals which did not previously exist in the seeds.

In 1844, Vogel also found evidence of biological transmutation. J.J. Berzelius reported the experiment in his *Treatise on Mineral, Plant and Animal Chemistry* (1849):

"He sprouted seeds of cress... in crushed glass deprived of sulfate or of any other sulfurous compound; he watered them with distilled water, covered them with a glass cloche and analyzed the air of the room, so as to determine the sulfur... A few months later, the adult plants with ripe seeds, were dried and burnt with a mixture of potassium nitrate and potassium carbonate; the result was that a quantity of sulfuric acid double that which was contained in the seeds was produced. These experiments demonstrate that either sulfur is not a simple element or that the source which produced the sulfur has remained unknown, despite all the care which had been taken to discover it..." **(1)**

Circa 1850, Lauwes and Gilbert observed an inexplicable variation in the amount of magnesium in the ashes of plants.

From 1875-1883, von Herzeele conducted 500 analyses that verified an increase in weight in the ashes of plants grown without soil in a controlled medium. He concluded that, "Plants are capable of effecting the transmutation of elements". His publications so outraged the scientific community of the time, that they were removed from libraries. His writings were lost for more than 50 years until a collection was found in Berlin by Dr. Hauscka, who subsequently published von Herzeele's findings.

M. Baranger (Ecole Polytechnique, Paris) became intrigued with Von Herzeele's experiments, but he thought that the number of trials had been too limited and the precautions against error were insufficient. Baranger decided to repeat the experiments with all possible precautions and a very large number of cases that would allow a statistical study. His research project lasted four years and involved thousands of analyses. Baranger verified the content of P, K, and Ca of vetch seeds before and after germination in twice-distilled water to which pure calcium chloride was/was not added. Hundreds of lots of 7-10 grams each were selected, weighed to 1/100th milligram, and graded, then germinated in a controlled environment. Baranger found a significant decrease in P in the Ca-series of tests. Non-germinated seeds and seeds germinated in the distilled water showed no significant change in their levels of K. Those seeds treated with $CaCl_2$ showed a 10% increase in their K content.

None of the specialists who examined Baranger's work were able to find any experimental errors. Baranger concluded:

"These results, obtained by taking all possible precautions, confirm the general conclusions proposed by V. Herzeele and lead one to think that under certain conditions the plants are capable of forming elements which did not exist before in the external environment.

"[The practical consequences] cannot be underestimated... Certain plants would bring to the soil some elements useful for the growth of other plants; this would lead us especially to define and revise the current notions on fallows, rotations, mixed crop, fertilizers and the manuring of infertile soils. Nothing prevents us from thinking that certain plants are capable of producing rare elements of industrial importance....

"In the sub-atomic field, the plant supplies us with an example of transformation which we are not capable of performing in the laboratory without bringing into action particles of high-energy... It seems that the theoretical consequences in the field of sub-atomic physics are not negligible."

In 1946, Henri Spindler, (Director of the Laboratoire Maritime de Dinard) investigated the origin of iodine in seaweed, and found that the algae *Laminaria* manufactured iodine out of water which contained none of the element. **(16)**

Prof. Perrault (Paris University) found that the hormone aldosterone provoked a transmutation of Na to K, which could be fatal to a patient; heart failure occurs when blood plasma K reaches approximately 350 mg/liter.

In 1959, Dr. Julien (Univ. of Besancon) proved that if tenches are put in water containing 14% NaCl, their production of KCl increases 36% within 4 hours. **(5)**

(2) Louis Kervran

Louis Kervran (Univ. of Paris) was the most avid researcher of biological transmutation, and his work in the field earned him a nomination for the Nobel Prize. Kervran elucidated several of these nuclear reactions and verified them:

The vital phenomenon is not of a chemical order... The nucleus of the atom in light elements is quite different from what nuclear physics regards as the average type, the latter having value only for the heavy elements... Nature moves particles from one nucleus to another --- particles such as hydrogen and oxygen nuclei and, in some cases, the nuclei of carbon and lithium. There is thus a transmutation... Biological transmutation is a phenomenon completely different from the atomic fissions or fusions of physics... it reveals a property of matter not seen prior to this work. **(4, 7-13)**

Kervran found that in nuclido-biological reactions, oxygen is always in the form of O, never O_2; reactions with nitrogen occur only with N_2, insofar as is known. The following reactions (shown in simplistic form) have been observed:

$Na_{23} + H_1 = Mg_{24}$ $Na_{23} + O_{16} = K_{39}$ $Na_{23} - O_{16} = Li_7$

$Na_{23} = Li_7 + O_{16}$ $K_{39} + H_1 = Ca_{40}$ $Mg_{24} + Li_7 = P_{31}$

$Mg_{24} + O_{16} = Ca_{40}$ $F_{19} + O_{16} = Cl_{35}$ $C_{12} + Li_7 = F_{19}$

$Cl_{35} = C_{12} + Na_{23}$ $Fe_{56} - H_1 = Mn_{55}$ $2\ O_{16} - H_1 = P_{31}$

$O_{16} + O_{16} = S_{32}$ $2\ N_{14} = C_{12} + O_{16}$ $N_{14} + Mg_{12} = K_{19}$

$Si_{28} + C_{12} = Ca_{40}$ $Si_{28} + C_{12} =Ca_{40}$ $P_{31} + H_1 = S_{32}$

Costa de Beauregard (Research Director, Centre Nationale de la Recherche Scientifique, Paris) learned of Kervran's work in 1962 and began to correspond and meet with him. He offered the following observations and explanation for the processes:

"All transmutations proposed by Kervran have two traits in common: (1) The initial and final nuclei differ by the addition or subtraction of a piece of matter, e.g., a proton (a hydrogen nucleus...), an alpha particle (a helium nucleus), a nucleus of oxygen or one of its isotopes, or perhaps some other familiar nuclei; (2) There is an energy excess or deficit in the order of 0.01 atomic mass units (a.m.u.)... or 20 electron masses, or 10 MeV, or 1.6×10^{-12} joules. The mass equivalent of this energy gap is of course needed in order to have the Lavoisier principle safe... This energy gap is very much larger than those occurring in chemical reactions. For example, if ... hens are indeed transmuting potassium into calcium (which is an exo-energetic reaction), the power they are radiating is so huge that it would, if in the luminous (electromagnetic) form, set everything on fire all around! [In energetic terms, such flux would be equal to 10^{15} MeV/cm^2/second, or 160 watts/cm^2] Can we then imagine some sort of quasi-occult form into which the 'Kervran power gap' may be radiated (or from which it may be absorbed in the case of endo-energetic reactions)? No reasonable answer was available until... a bold theoretical assumption, due to Weinberg in 1967, turned out as experimentally true. Due to this 'neutral current hypothesis' we are allowed to write such nuclear reactions as:

$$p + v \text{ « } p' + v' \text{ ; or: } p + \underline{v}\text{« } p' + \underline{v}' \text{ ; or: } p \text{ « } p' + v + \underline{v}$$

where p denotes a proton, v a neutrino, and$\underline{v}$ the anti-neutrino. We even have two sorts of neutrinos to play with: the electronic and the muonic one.

"With this we can in principle handle the proton type of Kervran's reactions (and also the other one in analogous fashion. One of the two protons in the reaction would be a quasi-free one, that is, one with only the trivial, chemical binding. The other one would be bound inside the nucleus. Of course we then have the problem of getting the proton, with its electric charge, through the potential barrier of the nucleus, by the so-called 'tunnel effect' (a typical effect of wave mechanics). But this is part of a problem already mentioned: Life playing the information game, the field being the nucleus, and the rules being those of the wavelike probability calculus... If the Kervran hen does radiate the power gap in the form of neutrinos and/or anti-neutrino, this will be done in the quietest fashion, and go on completely unnoticed.

"Can we also handle in this way the endo-energetic reactions? Fortunately Nature provides us with an appropriate supply, because there are quite a few neutrinos and anti-neutrinos flying around us as part of the so-called cosmic rays. By another chance the upper limit of the energy per cosmic particle is so high that the 0.01 a.m.u. Kervran needs are very easily available.

"Finally, like the proton or the a-particle, the neutrino or anti-neutrino is something abundantly available... which makes it convenient for use by Life.

"On the other hand, the extremely 'weak interaction' of the neutrino with other particles, which we have just found so convenient for avoiding the adverse effects of the Kervran power gap, now... faces us with great hostility. For how are we to reconcile this with the hypothesis that the hen is a furious neutrino source...? How can we simultaneously explain that the poultry keeper, and indeed the hen itself, do not feel the neutrino Niagara and that the source of it is inside the egg factory of the hen?

"This is the very Gordian knot of the information game problem, the nuclear physics analogon, if you like, of the so-called catalysis problem of ordinary biochemistry. The only tentative answer that I can think of, one I deem quite acceptable in principle, is that what looks like a flat self-contradiction in the physical realm of 'blind statistical prediction', retarded waves and causality, is no more a contradiction at all if we assume that Life is playing with finality, advanced waves, and 'blind statistical retrodiction'... Life knows how to... induce probability decreasing processes." **(2)**

Kervran commented on that opinion in an unpublished manuscript:

"For Costa de Beauregard, the apparent discordance with the postulate of the equivalence between mass and energy can be replaced by the postulate of emission-absorption of an occult mass bound to a particle of complete spin; it is thus that the neutrino with a 1/2 spin was invented... you would need a particle of complete spin with normally very weak interactions with matter, but 'catalyzed' biologically; it would not displease me, within this perspective, to try the classic 'graviton' with spins 2 or 0, or a non-classical neo-graviton with spins 2, 1, and 0...

"Simply put, if an occult particle is emitted or absorbed in Kervran-type reactions, the conservation of angular momentum would require that it have a complete spin."

In letters to de Beauregard (20 January and 17 October 1873), Kervran noted:

"This particle seems to have a mass of 0.011 a.m.u. or 1.8 x 10^{-26} gram in reactions with $\underline{+}\,H^{+}$...

"I had not been speaking of energy, for here it was a question of an equivalence, not an identity... I prefer to hold to the notion, as measured at the mass spectrometer, of a difference of masses, for the problem of energy, in my reactions, can be written only in a very simplistic way by application to Einstein's law. There is certainly something else here, and therein lies the whole problem."

De Beauregard later noted:

"In the terrestrial atmosphere there exists a particle in abundance with a rest mass m, and a maupertusien mass (or kinetic mass)... which is more than sufficient to assure the Kervran balances: the mu meson of cosmic rays...

"It is quite admissible to conceive of it as absorbed, then, re-emitted during the course of a nuclear transition of the Kervran type which, moreover, implies a 'virtual neutrino' (emitted, then reabsorbed)."

He also offered the logical possibility of a reaction with ${}^{i}N + {}^{1}H +$ nu = ${}^{p}N$ + nu'. In a letter of 31 December 1973, de Beauregard wrote:

"There is a second important problem to solve. To get the H to fuse with the N there is an enormous barrier of repulsing electric potential to pass through. Evidently this is by the tunnel effect. The theory which I am working up ... thus unites aspects of the theory of beta disintegration... and the theory of alpha disintegration... Like you, I believe that the configuration of an atomic or molecular electron cloud has a real word to say on the subject."

In his response (7 January 1974), Kervran attributed the transmutations in plants in part to the power of enzymes:

"In a Petri dish 9 cm. in diameter I started germinating 50 oat seeds. The culture continued for 6 weeks or 3.6 million seconds give or take a few ten thousands of seconds... The area of 'cosmic interaction' was 63 cm^3... During this time on this surface 3.9 mg of K were transmuted into Ca; this must be ~ 6 x 10^{19} atoms of K transmuted in 3.6 x 10^6 seconds or 1.8 x 10^{13} atoms per second or 2.6 x 10^{11} per cm^2/second. The proportion of K transmuted was ~ 46% in 6 weeks. This integration of results for the phenomenon is not constant: it is imperceptible during the first days when one witnesses the synthesis of enzymes which will provoke the transmutations; even at the end of a week the effect is hardly to be noticed. It develops rapidly during the 2nd and 3rd weeks, then slows down during the 4th week... The phenomenon seems to be asymptotic and at the end of the 6th week transmutation progresses only very slowly.. Which demonstrates yet once again that the action of the ambient is insufficient, that there is an energy regulated by the metabolism of the germination and growth which is at the origin of these transmutations... Obviously this calculation was one for a macro-section and not for the effective section... Moreover, there is in biology an important phenomenon which must not be overlooked: some molecules assemble in helix shapes (DNA and RNA for example). There are also some oriented assemblages which polarize light, most often to the left. These oriented constructions have an oriented electromagnetic field, and a molecule such as DNA can be compared to a solenoid in which charged particles (mu^- for example) are somehow partly channeled in the interior, and thus concentrated..."

De Beauregard made a suggestion:

"The microorganisms responsible for the phenomenon would find in the natural radiation a sufficient store of neutrinos of 10 MeV and more than they need... A diminution of this alimentation would consist of an equal numerical flux of neutrinos of very low energy to be put in the free interstices of the natural distribution. It is a problem of the symmetric information... in which (in thermodynamic terms) the difference between the 'heat' gained from the hot source (high energy neutrinos) and that given to the cold source (low energy neutrinos) is converted not into work, but into internal energy, or into the rest mass of the machine, which is not cyclical... Analogous comments apply to the case... implying an absorption of a pair, neutrino and anti-neutrino, of an average energy of 5 MeV... [The reactions] avail themselves of an abundant hot source like a geyser (the neutrinos of average energy of the cosmic radiation within the atmosphere) and of an immense cold source like an ocean, 'Fermi's lake' of very low energy neutrinos."

Kervran also proposed a revolutionary theory about the genesis of coal and oil:

"Coal comes from schists, fabricated *in situ*, by high compression that produced the reactions: Si = C + O. If O could not escape, and was compressed as well, one would have O + O = S, from which one gets sulfurous coals. If there was no deformation, the coal remains mixed with argil to produce ampelite."

The presence of carbon in metamorphic and silicate rocks, formed long before there was any vegetation on Earth, is a clear demonstration:

"Graphite cannot be of vegetal origin, in which case another origin must be found for it, and I propose the silicium of these Archaean rocks. As for diamonds... here, too, one observes the presence of silicates, thus of silicon... In this way one can explain why all coal deposits contain silicon (up to 20%, or even 40%, and more) which form 'ashes'. The great amounts of silicon might be an indication that the transmutation from Si to C + O was imperfect, incomplete."

Kervran claimed that petroleum was not formed from flesh or plants, but from the reaction Mg = C + C at great depth. If water is present, the hydrogen combines with carbon, and the oxygen forms sulfur (O + O = S), giving sulfurous oil. The Mg can come from a pocket of saline water when Na + H = Mg. Otherwise, Mg also can come from Ca or from adjacent layers of dolomitic rock. Oil deposits in the Sahara have been found in pre-Carboniferous rocks (Devonian and Cambrian-Ordovician) and in dolomite. Usually there is no communication between layers of petroleum deposits of different composition that are widely separated by hundreds of meters of impermeable rock. Kervran concluded:

"The whole problem of prospection should be thought out all over again."

(3) Other Modern Experiments

In 1965, H. Komaki (Prof. of applied microbiology, Mukogawa Univ., Japan), published the results of his research, and suggested the probable occurrence of a nuclear reaction in the cells of *Aspergillus niger*, *Penicillium chrys*., *Saccromyces cerv*., and *Torula utilis* grown in potassium-deficient medium. His experiments revealed that P can be formed through the pathway: N + O in some two dozen strains of microorganisms cultured in P-deficient medium. **(14)**

In 1971, the Laboratory of the French Society of Agriculture sprouted rye seeds under controlled conditions, with these results:

Total Input in Seeds & Water | Output | Difference

Mg :13.34 mg3.20-10.14 (-335%)

K:7.3616.67+9.31(+133%)

In 1971, J.E. Zundel studied the utilization of Ca by germinating grains and observed 54-616% augmentation of Ca. In another experiment, he grew 150 grains of oats in a controlled environment for 6 weeks. 1243 sprouts were analyzed by atomic absorption spectrophotometry for Mg and Ca. Potassium was analyzed by flame emission. The K was deficient by 0.033%, the Ca was 0.032% in excess, and Mg was 0.007% deficient. The variation of Mg was not significant, but the decrease in K equaled the increase of Ca. The increase in Ca was far greater than the margin of experimental error. **(17)**

In February 1977, Prof. J.A. Jungerman (Univ. of California, Davis) reported the results of an experiment with 4 growths of oat seedlings under carefully controlled conditions. Random samples of germinated seeds were analyzed by atomic absorption and X-ray fluorescence for Ca and K. He found no evidence of transmutation.

In 1978, Carolyn E. Damon (U.S. Customs Tech. Service Div.) ran tests for biological transmutation with *Aspergillus terreus* and *Rhizopus nigricans*, with negative results.

In 1978, Solomon Goldfein (U.S. Army Material Tech. Lab, Ft. Belvoir) studied the biological transmutation of ^{39}K + ^{1}H ^{40}Ca. His analysis of thousands of references led him to conclude that the most promising approach to testing the theory ofbiological transmutation would involve an organic molecule with a central metal atom: the chelate Magnesium Adenosine Triphosphate (Mg-ATP). Goldfein postulated a conformational structure of a stack of Mg-ATP molecules forming a helical chain. The Mg-ATP chelate produces oscillating electrical currents that act as a micromini-cyclotron that accelerates hydrogen ions to relativistic speeds with sufficient potential to transmute an element to the next higher number. **(3)**

Dr Hisaloki Komaki (The Biological and Agricultural Research Institute, Japan) worked with Dr Louis Kervran to develop "An approach to the probable mechanism of the non-radioactive biological cold fusion..." In 1996, Komaki reported the results of a recent experiment in which he determined the amounts of K, Mg, Fe and Ca in strains of *Aspergillus niger* IFO 4066, *Penicillium chrysogenum*IFO 4689, *Saccaromyas carevisae* IFO 0308, and *Torulopsis* IFO0396, cultured in normal media and in media deficient in those elements. The results showed that the molds apparently performed biological transmutations to produce useful quantities of the missing elements.

In 1999, Panos T. Papas published an article suggesting that biological transmutation occurs as a form of cold fusion in the cellular membrane sodium-potassium pump (SPP). According to Pappas, the ions are not pumped back and forth through the membrane, but instead transmute back and forth between Na and K. **(15)**

Research into the phenomenon of biological transmutation continues in obscurity, practically unknown to most scientists. Yet inevitably, the subject will become established as a fertile field of research yielding harvests of valuable practical knowledge.

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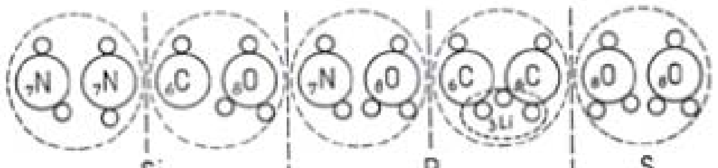
Figure II. 8. 1
Atoms According to Kervran

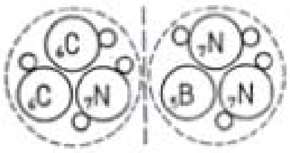
PLANCHE II



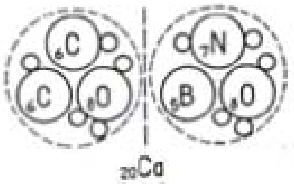
$_{14}$Si
Silicium
2 variantes

$_{15}$P
Phosphore
2 variantes

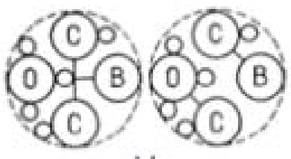
$_{16}$S
Soufre



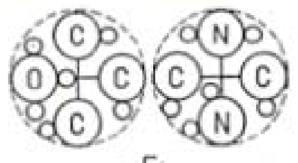
$_{19}$K
Potassium
2 variantes



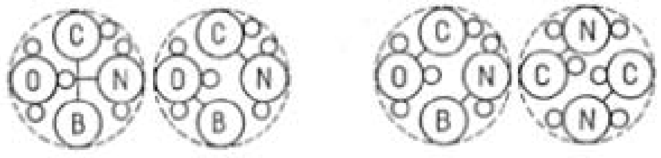
$_{20}$Ca
Calcium
2 variantes
(il y a un proton de plus à droite qu'à gauche)



$_{25}$Mn
Manganèse



$_{26}$Fe
Fer
(il y a à droite un proton de plus qu'à gauche)



Fe: *variantes des liaisons internes*
(ce n'est que le déplacement interne d'un proton)

Figure II. 8. 2

Atoms According to L. Kervran

PLANCHE IV

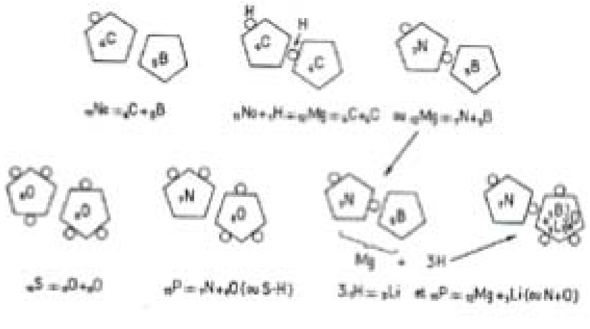


PLANCHE V

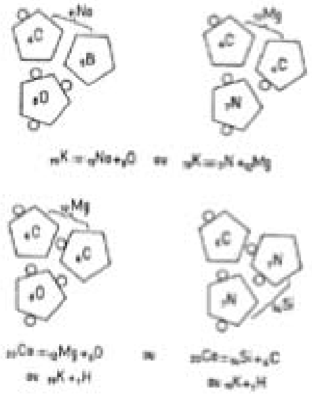
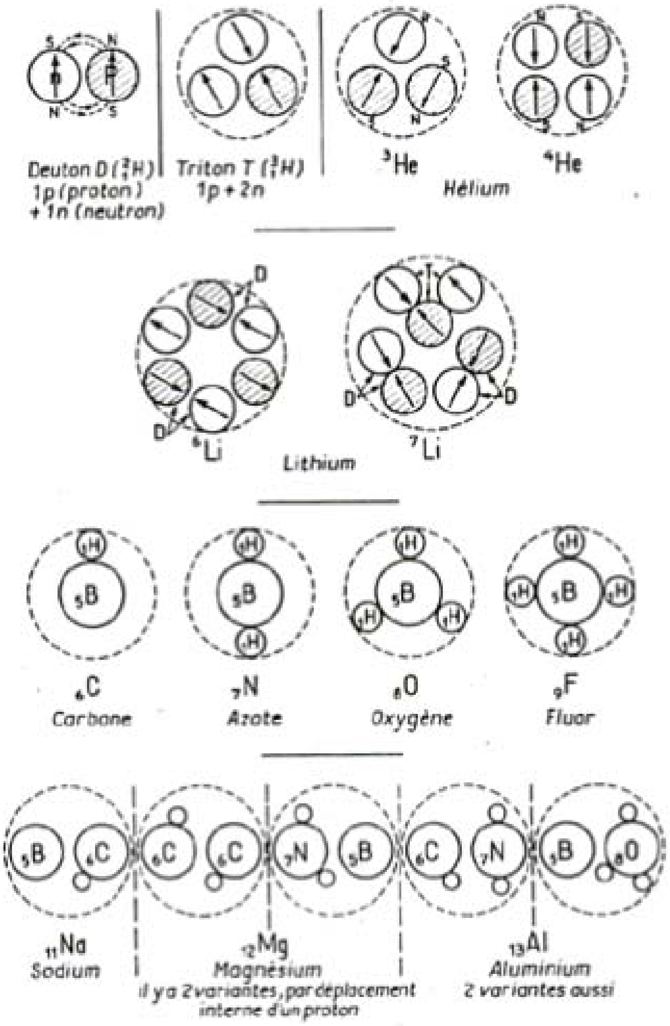


Figure II. 8. 3
Atoms According to L. Kervran



Adept Alchemy

By Robert A. Nelson

Part II

Modern Arcana

Chapter 9

Cold Fusion

(1) Cold Fusion Transmutations

Soon after the phenomena of Cold Fusion (CF, discovered by B. Stanley Pons and Martin Fleischman in 1989) became widely replicated, researchers began to announce the anomalous production of elements, beginning with helium and tritium and continuing into the heavy atoms. By 1995 about 120 papers had reported the production of tritium in experiments with palladium. For example, several papers on Low-Energy Transmutation (LET) were presented at a conference held at Texas A & M University on June 19, 1995, as described below:

Dr. Thomas Passell (Electric Power Research Institute, Palo Alto CA) gave an "Overview of the EPRI Program in Deuterided Metals" in which he noted:

"After completion of the experiment, the three 6 mm diameter by 60 mm Pd cathodes were found to be mildly radioactive. Upon analysis it was found that all three cathodes contained about 100 billion atoms of Ag, Pd, Rh, and (in one cathode) Ru isotopes having ratios unlike ratios that could have been obtained from bombardment by high energy deuteron or proton beams..." **(6, 7)**

Dr. T. Ohmori (Hokkaido Univ.) announced "Iron formation in gold and palladium cathodes", with the formation of Fe being a function of the excess heat produced. The ratio of Fe_{57} to Fe_{54} was much larger than is natural.

Dr. John Dash (Portland State Univ.) made a "Microanalysis of Pd cathodes after electrolysis in aqueous acids" and found silver and cadmium in the active areas, plus concentrations of gold in spikes that protruded from the Pd electrodes. Cr, Fe and Ca were found in experiments with a Ti cathode.

Dr Robert Bush (Cal Poly) reported the "Electrolytically stimulated cold nuclear synthesis of strontium from rubidium" by proton capture that he accomplished with Prof. Robert Eagleton. The natural abundance ratio of Sr_{86} to Sr_{88} was changed by a factor of almost 22 times. **(4)**

Dr Reiko Notoya (Catalyst Research Center, Hokkaido) described her light-water experiments in which some of the K in the electrolyte was converted to Ca, and Na_{23} became Na_{24}.

T. Mizuno, *et al*., confirmed that reaction products with mass number ranging from 39 to 81, 104 to 136, and 177 to 208 were produced by one month of high amperage electrolysis (0.2 to 0.6 A/cm^2) with Pd cathodes in a heavy water solution at high pressure and high temperature. Isotopic distributions differed radically from the natural order. For example, the copper found in the cathode was 100% Cu^{63}; no Cu^{65} was detected. Natural isotopic distribution varies by less than 0.001% for copper (70% Cu^{63}, and 30% Cu^{65}). In general, heavy isotopes increased compared to the natural ratio, and light isotopes decreased in comparison. The phenomenon is highly reproducible; different isotope distributions are obtained, depending amperage. Even all impurities were accumulated in the cathode, the amount would be 10 to 100 times smaller than the total amount detected by Mizuno, *et al.* The shifts in the isotopic distribution cannot be explained away:

"It must be concluded that some novel reactions occurred, resulting in the reactants which were found abundant in the electrolyte and electrode material. We assume that the cathode palladium was the starting point for these reactions, but is possible that impurities and other cell components such as Li, D_2O, Pd, Pt, K, Na, Ca, B, C, Ag and Fe may have provided the starting material for the nuclear reactions..."

In another report on their research, Mizuno, *et al.,* wrote:

"It was confirmed by several analytical methods that reaction products with mass numbers ranging from 6 to 220 are deposited on palladium cathodes subjected to electrolysis in a heavy water solution at high pressure, high temperature, and high current density for one month. These masses were composed of many elements ranging from hydrogen to lead. Isotopic distributions for the produced elements (Pt, Cr, Fe, Cu, Ze, Br, Xe, Pd, Cd, Hf, Pt, Ir, Hg, O, C, Ca, Na, Mg and Al) were radically different from the natural ones." **(13, 14)**

T. Mizuno *et al.* also observed the "Formation of ^{197}Pt radioisotopes in solid state electrolyte treated by high temperature electrolysis in D_2 gas":

"A proton conductor, a solid state electrolyte made from oxide of strontium, cerium, niobium, and ytrrium, was charged in a hot D_2 atmosphere. Anomalous radioisotopes were detected in all samples charged with an alternating current with voltages ranging from 5 V to 45 V, at temperatures ranging from 400 to 700^o C. No radioisotopes were observed in samples charged in a hot H_2 atmosphere."

In 1996, T. Clayton, D. Jackson, and D. Tuggle of Los Alamos National Laboratory announced "Tritium production from a low voltage deuterium discharge on Palladium and other metals":

"Over the past year we have been able to demonstrate that a plasma loading method produces an exciting and unexpected amount of tritium from small palladium wires. In contrast to electrochemical hydrogen or deuterium loading of palladium, this method yields a reproducible tritium generation rate when various electrical and physical conditions are met. Small diameter wires (100-250 microns) have been used with gas pressures above 200 torr at voltages and currents of about 2000 V at 3-5 A. By carefully controlling the sputtering rate of the wire, runs have been extended to hundreds of hours allowing a significant amount (>10's nCi) of tritium to accumulate... Tritium generation rates for deuterium-palladium foreground runs are up to 25 times larger than hydrogen-palladium control experiments using materials from the same batch...

"We have found that the tritium output depends on the temperature, pressure and current applied to the cells. Yet, the tritium yield is most sensitive to the purity and metallurgical condition of palladium used in the experiments... CO_2 additions had a remarkable effect on the production of tritium... The effect seems to be related to an enhancement of the hydriding of the palladium..." **(5)**

At the 3rd Russian Conference on Cold Fusion and Nuclear Transmutation in October 1995, Dr. Yuri N. Bazhutov announced the surprising discovery of C_{14} in the water used in the vortex cavitation machine (YUSMAR) invented by Dr. Yuri S. Potapov (Kishinev, Moldova)

In 1997, A. Yoshiraki and Y-C. Zhang reported these results of their long experiments:

"In a series of studies, a significantly large amount of helium($^4He/D_2 \sim (1\sim0.2) \times 10^{-2}$ and $^4He/^3He$ »4, D_2: "fuel" helium: "ash") was clearly detected with a quadrupole mass spectrometer (QMS) as the deuterium nuclear reaction product ("ash") released from the highly deuterated palladium host-solid (Pd-black distributed 0.02 ~ 0.06 [m]: average 0.04 [m]) that had produced large amounts of excess energy (200-500 [MJ/cm^3]) through long periods such as 5000 hours...

"A deuterium nuclear reaction was continuously generated inside a highly deuterated solid by showing both the excess energy and corresponding amount of helium as the reaction product generated simultaneously..."

George Miley and James Patterson found evidence of nuclear transmutations in thin-film nickel coatings in their electrolytic experiments:

"Experiments using 1-mm plastic and glass microspheres coated with single and multilayers of thin films of various metals such as palladium and nickel, used in a packed bed electrolytic cell (Patterson Power Cell) configuration, typically employing Pd and heavy or light water with various electrolytes such as Na_2CO_3 and LiOH), have apparently produced a variety of nuclear reaction products... Following a two week electrolytic run, the Ni film was found to contain Fe, Ag, Cu, Mg, and Cr, in concentrations exceeding 2 atom % each, plus a number of additional trace elements. These elements were at the most, only present in the initial film and the electrolyte plus other accessible cell components in much smaller amounts. That fact, combined with other data, such as deviations from natural isotope abundances, seemingly eliminate the alternate explanation of impurities concentrating in the film." **(12)**

R. Kopacek and J. Dash experimented with Pd and Ti cathodes in their cold fusion heavy water electrolysis cell and produced heat (1.2 watts) and transmutations which produced S, K, Ca, V, Cr, Fe, Ni, and Zn. **(10)**

Ohmori, T., *et al*, found anomalies in the "Isotopic distributions of heavy metal elements produced during the light water electrolysis on gold electrodes" in 0.5 M light water solutions of sodium sulfate and sodium carbonate for 3-4 weeks at 300 mA/cm^3. The isotopic distributions deviated from their natural abundance. **(16)**

Cold Fusion Patents

John Dash: USP Appln. # 2005/0276366 --- Low Temperature Nuclear Fusion.
Heinrich Hora & George Miley: USP Application # 2003/202623 --- Method and Arrangement for Nuclear Reactions at Low Temperatures.
John Kelly: German Patent # 4,123,995 --- Cold Nuclear Fusion Generation.
Heinrich Hora: German Patent # 4,027,784 --- Cold Fusion Device for Energy Generation - with Metal Layers Forming Interfaces.
Heinrich Hora: German Patent # 4,009,604 --- Cold Fusion Energy Generating Source for Nuclear Reaction Control.
Heinrich Hora & George Miley: German Patent # 3,910,806 --- Method and Arrangement for Nuclear Reactions at Low Temperatures.
George Miley: USP Application # 2003/230481 --- Flake-Resistant Multilayer Thin-Film Electrodes and Electrolytic Cells Incorporating Same.
George Miley: US Patent Application # 2003/159922 --- Electrical Cells, Components and Methods.
James Patterson & George Miley: WO # 9919881 --- Low Temperature Electrolytic Nuclear Transmutation.
James Patterson & George Miley: WO # 9803699 --- Nuclear Transmuted Elements Having Unnatural Isotopic Distributions by Electrolysis & Method of Production.
James Patterson & George Miley: WO # 9740211 --- Electrolytic Cell & Method for Producing Excess Heat & for Transmutation by Electrolysis.
Heinrich Hora, et al.: USP # 4,027,784 --- Cold Fusion Device for

Energy Generation - with Metal Layers Forming Interfaces.
Heinrich Hora & George Miley: German Patent # 3,910,806 --- Method and Arrangement for Nuclear Reactions at Low Temperatures.
Reiko Notoya: Japan Patent # 6,317,686 --- Low Temperature Nuclear Fusion Method.
Reiko Notoya: Japan Patent # 10039096 --- Production of Positron Emission Isotope.
Reiko Notoya: Japan Patent # 9,197,077 --- Electrode for Cold Nuclear Fusion & Method for Manufacturing Radioactive & Nonradioactive Element...
Reiko Notoya: Japan Patent # 6,317,686 --- Low Temperature Nuclear Fusion Method.
Reiko Notoya & Masyuki Kobayashi: Japan Patent # 2,094,364 --- Electrode for Oxygen Electrode Reaction & Manufacture Thereof.
Reiko Notoya & Tatsumi Nagayama: USP # 4,917,972 --- Electrode for Use in Oxygen Electrode Reaction.
Reiko Notoya: Japan Patent # 7,174,878 --- Negative Electrode for Ordinary Temperature Nuclear Fusion Chain Reaction.

(2) Nuclear Waste Remediation

The disposition of nuclear waste is one of the most serious technical challenges facing humanity. Long-term storage is not acceptable, yet it is all that we can do with the mess at this time. Meanwhile, many physicists are developing methods to render nuclear waste inactive by various forms of transmutation.

The rapid transmutation of radioactive elements to stable daughter elements can be accomplished in several ways. The first such method was proposed by Dr. Radha Roy (Physics Dept, Arizona State Univ.) in 1979. He used a linear accelerator to generate x-rays that knocked nuclei from the target elements (Cesium-137 and Strontium-90), resulting in short-lived isotopes. His work received notice in the *New York Times* in 1982 (April 6 & 13). Only 20 year later, the Los Alamos National Laboratory is developing a project for "Accelerator Transmutation of Waste". A prototype plant will be constructed within five years. Two US Patents have been granted for the transmutation of nuclear waste with thermal neutron flux: #5,160,696 and #4,721,596 to Charles Bowman and Richard Marriott, *et al*., respectively.

Scientists at Europe's CERN facility also are experimenting with 'sub-critical" nuclear reactions (they cease when not being triggered by a linear accelerator) that curtail radioactivity. The proposed European system has been named "Energy Amplifier" by Carlo Rubbia, the Nobel Prize winning physicist who designed it. The CERN website offers this explanation for their efforts:

Intense linear accelerators would allow transmutation of long-lived nuclear waste which rapidly decays to become harmless or alternatively provide the beam which drives the Energy Amplifier, a failsafe form of nuclear reactor using relatively innocuous thorium as its fuel.

The CERN Energy Amplifier would work by inserting tubes of radioactive isotopes into a block of lead. Protons fired into the lead by a linear accelerator would generate high-energy neutrons that would fission the target waste. When the neutrons pass through the resonant energy levels of the target isotopes, they trigger transmutation reactions. The molten lead also would serve to cool the system by its passage through a heat exchanger, and the waste heat could be used to generate electricity. The corrosive lead will be bubbled with oxygen to allow the formation of a protective coat of oxide on the reactor walls. The system has been criticized as too complex, and to date the researchers have only performed simulations and conducted a few experiments on isolated aspects of the system. For example, the CERN scientists have transmuted Technetium-99 in a lead block.

The Americans and Europeans refuse to cooperate on the project; each group claims the other has copied their ideas. Fortunately, there are several other, simpler ways to solve the problem.

In the early 1990s, physicist Kenneth Shoulders received five US Patents for his High Density Charge Cluster (HDCC), "a relatively discrete, self-contained, negatively charged, high density state of matter... [a bundle of electrons that] appears to be produced by the application of a high electrical field between a cathode and an anode" (i.e., 2-10 kv at the tip of a sharply pointed electrode). It can also be described as "a spherical monopole oscillator". Shoulders has given it the name "Electrum Validum" (EV), meaning "strong electron", from the Greek "elektron" (electronic charge) and the Latin "valere" (to be strong, having power to unite). EVs have been credited with accomplishing the aforementioned cold fusion transmutations. **(19)**

Shoulders also invented a method of Plasma-Injected Transmutation for the remediation of nuclear waste by EVs. They apparently function as a collective accelerator with sufficient energy to inject a large group of nuclei into a target and promote nuclear cluster reactions. The composition of EVs allowsfor the inclusion of some 10^5 nuclides. Ions can be added to EVs until the net charge becomes positive. Such EVs are called NEVs (Nuclide-EVs). Shoulders states:

"The NEV acts as an ultra-massive, negative ion with high charge-to-mass ratio. This provides the function of a simple nuclear accelerator. Such nuclear reactions are fundamentally an event involving large numbers and not one of widely isolated events working at an atomic level."

NEVs can be produced by mechanical energy that is stored in and released from a brittle metal lattice by fracto-emission of electrons. In the case of acoustic/aqueous systems, they are generated by charge separation in a collapsing bubble. Analysis of palladium foils after they were struck by NEVs has revealed increased quantities of Mg, Ca, Si, Ga and Au. Locally produced fracto-emission induced by NEV strikes contribute a considerable amount of energy to the reactions and can initiate a "wildfire" propagation of energy which either triggers or fuels the events. These events occur within a few tenths of a picosecond. The first step is a loading process that renders the material brittle. Then a very rapid fracture generates a NEV, compression-loaded with available nucleons (i.e., 100,000 deuterons in an electrolytic cold fusion cell). The NEV is accelerated into the parent material by the applied voltage which, though it is only in the kilovolt range, has a velocity equivalent to megavolts due to the mechanism of the acceleration in the fracture. Shoulders offers an *ad hoc* explanation of these results as being "due largely to a *nuclear cluster reaction* having an unknown form of coherence." Ken Shoulders has demonstrated the complete elimination of radioactivity in high-level nuclear material. **(14, 20)**

Other researchers (Rod Neal, Stan Gleeson, "The Cincinatti Group", William Barker, etc.) also applied for patents on similar applications. The Neal-Gleeson Process has been shown to stabilize naturally radioactive solutions of thorium and uranium compounds up to 70% within a few hours in an electrochemical reactor. Thorium can be fissioned into mercury and neon. Valve metals (whose oxides emit electron) can be excited to produce galvano-luminescence in aqueous solution. When the charge gradient exceeds a critical threshold (i.e., 1 million volts), sparks are produced in the form of charge clusters that are believed to be the active mechanism in this method of transmutation.

In their reports of the experimental results, Neel and Gleeson, *et al*., noted:

"Because there is a close agreement between the reduction in thorium and the reduction of radioactivity of the thorium daughter products, it is assumed that the Neal-Gleeson Process has about the same capability to change both thorium nuclei and the nuclei of the daughter products into other elements which are not radioactive...

"A process which can cause the higher atomic number elements to be split into smaller elements appears to be a desirable method by which certain radioactive elements can be handled. It is highly desirable to be able to select process-control parameters so that only stable daughter nuclei of the parent elements are produced. In this way, the radioactivity of today's highly radioactive slurries can be ameliorated."

Hal Fox and Atul Bhadkamkar reviewed the technology and concluded:

"Sparking at the electrode is necessary but not sufficient for the production of nuclear events. Apparently a charge can produce an observed spark but fails to have sufficient energy to promote a nuclear reaction... The charge cluster must carry piggyback positive charges and must achieve a critical energy level to promote nuclear reactions.

"The molarity (and the resulting conductivity of the electrolyte) may be an important operational parameter. The charge cluster must be able to persist for some short time period and energetically impact a nucleus in the electrolyte to be able to produce a nuclear reaction.... The potential gradient between the electrodes must be kept at some critical value for nuclear reactions to be favored. A lower field gradient (higher conductivity) in the electrolyte may lead only to Joule heating and not to the desired level of nuclear reactions.

"Experimental evidence suggests that the hydrogen and oxygen nuclei are involved in the sometimes multiple or sequential nuclear impacts that result in the nuclear reactions..." **(3, 21)**

The Australian inventor Yull Brown developed a novel method of electrolyzing water to produce a compressed (up to 100 psi) stoichometric mixture of hydrogen and oxygen ions (popularly known as "Brown's gas") that is burned in a 2:1 ration. Since the early 1980s, long before cold fusion was discovered, Yull Brown claimed to be able to transmute radioactive material into inert forms by fusing it in the flame produced by his form of hyfuel. His 1977 patent mentions that, "The invention also relates to *atomic* welding..." (US Patents #4,014,777; see also # 4,081,656).

Yull Brown's first successful experiment with Co_{60} radionuclides reduced the activity by about 50% in 10 minutes. The process was replicated by the Baotou Nuclear Institute (China) in 1991.

In a demonstration witnessed by US Congressman Berkeley Bedell, the radioactivity of Americium was quickly reduced by 2500% with Brown's Gas torch. The Geiger counter reading registered 16,000 curies/minute before, and less than 100 curies/minute afterwards. Congressman Bedell said:

"It has been my good pleasure to witness experiments done by Prof. Yull Brown in which it appeared to me that he significantly reduced the radioactivity in several nuclear materials. Under the circumstances, I believe it is very important for our federal government to completely investigate Dr. Yull Brown's accomplishments in this area."

If the US government is completely investigating Brown's Gas, it is doing so secretly.

In August 1992, Yull Brown made another demonstration before several members of the Department of Energy and Hon. Dan Haley at the request of Congressman Bedell. The geiger counter reading from Co_{60} was reduced to 0.04% of the original level.

Another demonstration was conducted for a group of Japanese nuclear scientists, at which time Co_{60} was reduced from 24,000 mR/hr to 12,000 mR/hr with one brief treatment. **(2, 8, 17)**

Dr. Paul Brown (Nuclear Solutions, Aurora CO) has developed a novel method to remediate nuclear waste by photonuclear reaction with gamma rays. The technology utilizes principles of physics --- giant dipole resonance --- that have been overlooked in their possible application in treatment of nuclear waste. Brown states:

"Photonuclear reactions induced by gamma ray absorption by the nucleus, do not suffer the shortcomings of neutron reactions. Simply stated, the process is gamma irradiation with energies greater than the binding energy of the neutron to the nucleus. That is, a gamma photon of an energy equal to or greater than the binding energy which comes close to the nucleus is absorbed through giant dipole resonance resulting in the emission of a neutron. This well-known nuclear reaction has dramatic application to waste remediation...

"The neutrons produced by the processing may in turn be used for neutron transmutation by the processes... For many fission products the neutron capture cross sections in a thermal spectrum can give substantial transmutation rates..."

Brown has proposed another application of giant dipole resonance in a theoretical"Photon Reactor" that would produce power by burning nuclear waste:

"A linear accelerator, preferably of the monochromatic type, accelerates electrons which are directed onto a high Z target such as tungsten to generate gamma rays about 9 MeV, which are directed onto the fuel material such as U-238 which results in the... reaction, thus releasing about 200 MeV. A reactor built according to this principle requiring an accelerator driven by 1 MeV will develop about 20 MW of power. The reaction is not self-sustaining and stops when the beam is turned off. This accelerator driven reactor may be used to burn up spent fuel from fission reactors, if simply operated at 10 MeV. The photo-fission results in typical spent fuel waste products such as Cs^{137} and Sr^{90}, which undergo photodisintegration... resulting in short-lived or stable products. Chemical separation of the spent fuel isotopes is not necessary..."

Gerardo International, Inc. is developing an Accelerated Decay Energy Converter (ADEC). The system utilizes stimulated radioactive decay to extract electrical energy directly from the atom:

"ADEC does not change the mechanism of spontaneous radioactive decay; it changes the probability of which atoms will undergo decay and when the decay will occur. As atoms exhibit no statistical memory, the event of a neighboring atom's spontaneous decay in no way influence the likelihood or unlikelihood of decay of a selected atom. As the extraction of power from the nuclear is accelerated, the material's natural emissive lifetime will be exhausted in direct relation."

Ronald Brightson (Clustron Sciences) has presented theoretical and experimental evidence for the validity of his own "Nucleon Cluster Model" (NCM), which predicts that a relatively low-energy photon can promote a nuclear reaction under certain specific conditions. Brightson analyzed the periodicities and systematics of atomic numbers and masses and deduced that all b-stable nuclides are composed of deuterons (NP clusters), tritons (NPN), and He_3(PNP) nuclei.

Brighton's patent application includes a method of remediating nuclear waste by the induction of fission in the radioactive isotopes. The imposition of an external magnetic field that is in resonance with the magnetic moment of a particular nucleon cluster (NP, NPN, PNP) can excite the select cluster (without disturbing other clusters in the target) to burst from the nucleus and perform a transmutation to daughter products of smaller mass and greater stability.

A catalytic process for transmutative remediation of nuclear waste was invented by Jack Keller in 1993.

Roberto Monti (Burns Development Ltd.) announced a method of transmutation to neutralize radioactive material at a congress on low-energy transmutation (ICCF-5 in Monaco) in 1996. He utilized ignition methods such as those developed by Joe Champion. When applied to radioactive materials, the radioactivity was greatly reduced after the ignition.

In their analysis of the "energy gain and nuclear transmutation by low energy *p*- or *d*-reactions in metal lattices", Heinrich Hora, George Miley, and J. Kelly offered hope for the "programmed transmutation of added nuclides, especially long-lived nuclear waste and plutonium":

"One can actively incorporate nuclides into the surface area of the active metals or nearby. These additional nuclides can then be subject to low-energy nuclear transmutation...

"One application of the mentioned transmutation is the long-lived nuclear waste from nuclear fission reactors... It is an important aim to make plutonium fully extinct by nuclear transmutation into chemically different nuclei... These kinds of nuclear transmutations are indeed possible by using ion beams... of more than 10 MeV per nucleon or spallation processes with up to 10 GeV protons. In view of the very expensive accelerators needed for this purpose, and [because] the ion currents are very small, there is no economic possibility in sight from this method. The invention described in this (Clean Energy Technology) patent [for] the low-energy transmutation by protons provides a low cost method for converting the long-lived waste nuclides and plutonium into harmless non-radioactive elements." **(9)**

Beginning in 1958, Russian geophysicist Dr. Georgiy S. Rabzi developed methods of transmutation that combined geo-electric and artificial fields and temperature control to direct transmutation in solids and liquids. For example, a 99.5% Pb was treated at 650° C to yield up to 3% Ag, plus Cd and Ge (15 March 1994). No radioactivity was observed in any of the experiments. At the ICCF-5 meeting, Dr Rabzi claimed that his "natural cold fission" is a safe method with which to stabilize nuclear waste.

Numerous reports in the literature of physics describe deviations (from 0.1 to 5%) from the standard constant decay rates of natural radioactivity, some by extra-nuclear influences (including the human mind). Physicists Elizabeth Rauscher, Glen Rein, and associates have investigated the interactions of Co_{60} with non-Hertzian energies such as the scalar fields generated by the "Smith Coil" (a Caduceus-wound coil invented by Canadian engineer Wilbur B. Smith in the 1960s). When energized (3 mA/5 W), The non-inductive Smith Coil (8.2 ohms) reduced the background radiation by 97% (from 0.5 mR/hr to 0.0015 mR/hr). Yet when applied to Co_{60}, the radioactivity <u>increased</u> from 150 to 250 mR/hr! **(11, 18)**

Other possibilities may exist for the transmutation of nuclear waste. For example, it is reasonable to hope that the legendary Philosophers' Stone is capable of performing this feat, but the Stone remains a gift of God, who determines when and to whom it is bestowed (despite the objections of conventional physicists). A few exotic human technologies are immediately available for research and development, such as the radionic transmutations demonstrated by the amazing DeLaWarr Camera. Tom Beardon and others have recommended the use of scalar interferometry to extract energy from the nucleus in a gentle manner, or by outright dematerialization.

The radioactivity of elements also can be <u>increased</u> by relatively simple means. The German Dr. Alois Gaschler applied for a British patent in 1925 (Specification 239,509) for the enrichment of uranium:

"This invention relates to a process of and means for transforming elementary atoms particularly of uranium and thorium with a view to hasten their spontaneous disintegration and to increase their radioactivity, and the invention consists in subjecting small quantitites of the metal in a vaporizing chamber to very high pressure and temperature and in subjecting the vaporized metal vapour to the electrostatic or electrolytic effect of strong, preferably direct electric currents.

"Successful experiments have been made with an electric energy of about 100 kilowatt-seconds per gramme of uranium or thorium. The electric current can be used for the heating of the metal as weall as for the electric splitting up of the atoms.

"In order to generate a very high pressure during the heating of the metal and to obviate heat and light radiation as far as possible, a thin filament of metal, weighing about 1 gramme, is placed in a duct in a massive block of quartz or granite or other refractory mineral insulating substance. The two ends of the filament are extended through the block and clamped between two thick metal plates which at the same time act as closures for the duct. Terminals are provided on the metal plate for connection to the electric circuit. The duration of the individual electric shocks is generally about 1-2 seconds. After the conclusion of the process, the evaporated metal is recovered mechanically or chemically and will be found to be much more radioactive than the original substance.

"The more the separated metal vapour comes into contact with the pole surfaces and the higher the electric pressure, the greater is the transformation effect. It is advisable, therefore, to employ a heating circuit of low voltage and high amperage, and a separate electrolyzing circuit of relatively low amperage and high voltage. For this purpose a pair of electrodes having a large surface is arranged in the vaporizing chamber and connected to the high-pressure circuit which, in order to produce a high resistance, includes a Crooke's or Geissler tube.

"When artificial metals are to be produced on a large scale, the use of a filament is not practicable as it requires too frequent replacement. It is therefore better to supply metallic vapour through a valve into the space containing the electric arc and to withdraw it therefrom in the same way."

Dr. Gaschler gave more details of his process in an article published in the journal *Nature*:

"The behavior of uranium and thorium and their salts in the electric arc and in the glow discharge has been examined. In no case could there be observed an alteration in the radioactivity or in the chemical activity. A perceptible transmutation effect was, however, unexpectedly found when strong rushes of momentary high-tension currents were sent through a narrow fused quartz tube provided with tungsten electrodes and containing mercury and uranium oxide. The tube was fixed vertically in a stand, so that the mercury filled the lower part of the tube and one tungsten electrode was completely covered by it. On the surface of the mercury was a relatively thin coating of uranium oxide which had been carefully freed from radioactive by-products, especially from uranium-X, before it was introduced into the quartz tube. The sparking distance between the tungsten electrode and the mercury-uranium oxide electrode was about 15 cm. The intensity of the electric discharge varied between 0.3 and 0.4 amps.

"Under the influence of repeated electric discharges during about 30 hours, relatively strong and increasing radioactivity [b and l rays] showed itself. The b and l ray activity varied between 1.4 and 20 times the radioactivity of an equally large amount of uranium oxide in equilibrium with its decay products, and increased proportionally to the energy applied and to the time.

"One obtains an even greater proportion of uranium X if one makes the electric discharges pass within a thick-sided quartz or porcelain vessel between a tungsten point and mercury covered with a thin coat of vaseline and uranium oxide. This coating possesses such a high electric resistance that, even when applying the highest tensions which can be obtained, one is obliged to diminish greatly the sparking distance in order to obtain a discharge. This proceeding offers the advantage that the energy is concentrated into a very small space. Consequently one can show, after half an hour’s work, the production of relatively large quantities of uranium X.

"The production of uranium X considerably in excess of that produced by spontaneous decay is to be explained only by the fact that, under the influence of the electric force, an acceleration of the radioactive transmutation of uranium takes place." **(23)**

In the 1950s, Thomas H. Moray developed a method for enriching uranium by high-energy bombardment. He proceeded by treating the ore (in a chemical solution) with x-rays (up to 24 MeV). The average ore contained 0.23% uranium oxide. After irradiation, the ore yielded from 7-75% uranium oxide! In 1953, Moray proposed that the Atomic Energy Commission investigate the "aging" of atomic ores by a "breeding type reaction with high-energy particles or x-rays in the presence of a proper environment." The AEC declined to grant a contract.

Fortunately, the technologies invented by Gaschler and Moray are dormant. Meanwhile, it is imperative that we develop every possible pathway to the deactivation of nuclear waste and weapons.

Nuclear Waste Remediation/Transmutation Patents

Paul M. Brown: USP Application # 2002169351--- Remediation of Radioactive Waste by Stimulated Radioactive Decay.
Ronald Brightsen, et al.: WO Patent # 9,403,906 --- Methods for Manufacturing & Producing Products.
John Dash: WO 03/098640 --- Processing Radioactive Materials with Hydrogen Isotope Nuclei
Heinrich Hora: German Patent # 19803629 --- Transmutation of Isotopes with Long Half Life.
Reiko Notoya: Japan Patent # 9,197,077 --- Electrode for Cold Nuclear Fusion.
William Barker: US Patent # 5,076,971 --- Method for Enhancing Alpha Decay in Radioactive Materials.
V.S. Buttsev, et al.: Russian Patent # 2,169,405 --- Method for Transmutation of Long-Living Radioactive Isotopes into Short-Living or Stable Ones.
Sidney Soloway: US Patent Appln. # 2002186805 --- Accelerated Radioactivity Reduction.
Vladimirovich, Kinderevich, et al.: US Patent Appln. 20040238366 --- Method & System for Acceleration of Activity Decrease and Radioactive Material Deactivation.

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Adept Alchemy

By Robert A. Nelson

Part II

Modern Arcana

Chapter 10

Esoterica

Alchemy has taken several novel forms in modern times. Some researchers are pioneering the arcana of physical alchemy in cold fusion and biological transmutation, nuclear waste remediation, etc. Others continue to rediscover traditional methods and philosophy, and to transmit revelation. There is considerable overlapping of domains, such as acoustic manipulation of force fields (Quabbalah, John Keely's discoveries and inventions, cymatics, acoustic refrigeration, sonochemistry, sonoluminesence, &c), Astrochemy (Aether, phlogiston, gur, Wilhelm Reich's orgone, orene &c), Astrobiochemy (Reich's bions, Andrew Crosse's abiogenesis of acari, homeopathy, spagyry, &c), and Magnetism (Nuclear magnetic resonance, para- & dia-magnetism, &c). Alchemy also figures in future history, according to Michel Nostradamus and other prophets.

1. QBL & Magic

Quabbalah and Alchemy are concomitant and even inseparable in some regards. The *Aesch Mezareph* ("Purifying Fire") is the classic text in this field. *The Jewish Alchemists* by Raphael Patai is the definitive review of the genre. **(11)**

Franz Bardon ~

Practical quabbalah (causality engineering) comprises the combination of specific colors, frequencies, elements (fire, air, water, earth & akasa; O, N, H, Si, C) and geometries to produce specific effects in akasa and in the mental, astral and physical worlds. This form of quabbalah (based on the *Sephir* Zohar, Short Version) is taught by the great Hermetic adept Franz Bardon in his *Key to the True Quabbalah*, excerpted here:

C [Tone: D... Color: Vermilion... Element: Fire/Air... #: 3... Organ: Stomach]

Material: "By the "C" oscillation, the quabbalist learns to enliven the whole of the matter and to equip it with mental as well as with astral virtues, powers, etc. By this letter, he also learns to impregnate quabbalistically any material form at will. Furthermore, the true **quabbalistic alchemy** is also influenced by this letter oscillation. By the term "quabbalistic alchemy" the "modification of matter by the word" is to be understood, which is equivalent to giving it another quality."

OE [Tone: D# ~ Color: Orange ~ Element: Akasa/Earth ~ Organ: Gonads]

Akasa: "In the akasa principle, the "OE" oscillation, evokes the most profound cognition which can only be brought about by **love divine**, apart from the knowledge that is called the **quabbalistic quintessence**. By the help of this oscillation, the quabbalist gets to know all the possibilities of **transformation of the spirit**, all the systems and ways serving this end, and all knowledge concerning transformation in all other fields. He is informed about everything that, deriving from the act of creation, had to pass through all the modes of transformation to be reunited. The quabbalist must attain all the faculties that are offered by the "OE" oscillation in the akasa principle, must make use of all the possibilities, in order to get convinced that they cannot be described by words, but must be experienced, lived through.

"I have mentioned the letters "AE" and "OE" as the last ones in this series of exercises, because by the help of their oscillations one is able to comprehend, from the akasa principle, the crown of all wisdom in the micro- and macrocosms, from the act of creation to the present state of evolution, and even to the final development.

Mental: "Evoked in the mental kingdom, the "OE" oscillation will secure the perfect mastery of **quabbalistic alchemy**. By this, one understands the transformation of ideas, virtues, etc., by the quabbalistically pronounced word, which is a very great and comprehensive field.

Astral: "In the astral kingdom, the "OE" oscillation develops the faculty of perfect **astral projection** and the mastery of all occult and magical phenomena that have reference to **transformation**, so that the quabbalist may, for instance, assume any desired form in the astral body without being recognized by other beings and with only Divine Providence seeing through him. Apart from this, the quabbalist is able to transform any astral oscillation into the oscillation he wants and to do the same with any element.

Material: "When mastered in the physical body, the "OE" oscillation will lead to perfect knowledge of **quabbalistic alchemy** in the material world. The quabbalist is taught the true preparation and charging of the philosopher's stone in the physical sense. As he can influence, at will, any oscillation -- atomic oscillation, electronic oscillation -- by quabbalah, and as he is able to transform it into the oscillation desired by him, he naturally also perfectly masters the laws of transmutation. Therefore, he is able to transform any metal into gold, any stone into a precious stone, etc., if he wishes to do so. By the help of this oscillation the quabbalist will be furnished with many other faculties of which he cannot even dream now and which non-initiates would regard as absolutely impossible.

A - OE ~ "This twofold key imparts the faculty of solving any problem of quabbalistic alchemy with effortless ease. The formula magician uses this formula for his students who have difficulties in delving into the problems of quabbalistic alchemy. If one is in doubt about a formula, particularly when experimenting on alchemistic transformation based on quabbalah, concerning the change of a power or ability, etc., or if there are difficulties in applying a formula, then one should resort to this formula, for it will evoke the desired faculty.

B - OE ~ "Using this formula, the formula magician projects the electromagnetic fluid in the form of light and warmth, in order to be able to evoke any phenomena of astral projection. By this twofold key, he is also able to enliven any kind of medicine and to make it bring on better results. Since this formula also contains the secret of forming the mental matrix for the production of the philosopher's stone, the formula magician will be given the faculty of enlivening any material object to his own liking.

C - H ~ "Through this twofold key, the formula magician may obtain mercy from Divine Providence and influence his own or somebody else's fate at will. If embodied into food and drink, the "C-H" formula will bring on the realization of all wishes. If clear water is influenced by this formula after 4 drops of quinta essentia universalis --- alchemistic universal tincture --- were given into it, the person who drinks this impregnated water will be given the donation of having any material wish fulfilled that he or she may utter in connection with this formula. At the same time, a rejuvenation, a prolongation of life and perfect health may be obtained by embodying the "C-H" formula into the *quinta essentia*, i.e., by enlivening the same. Alchemists who do not know all this, usually fail in preparing the *quinta essentia*, since they are not able to enliven the same mentally. The universal tincture has not only to be charged materially, but it must also be charged and influenced with the analogous connections in an astral and mental manner, apart from other irradiations connected to the quadripolar magnet.

C - OE~ "In the mental body, the "C-OE" formula reveals the secrets of alchemy in all its phases, and makes one see the true connections to the universal law. In the astral body, it arouses the faculty of permanent astral projection, no matter whether the projection of universal light, fluids, elements or any other phenomena of transformation is in question. In the material world, this formula, if embodied in food and drink, turns every formula magician into a perfect alchemist who is equipped with all relevant knowledge, abilities, etc. This formula is particularly important for those formula magicians who want to become perfect alchemists one day." **(1)**

The Angelic Stone, the ultimate degree of the Philosophers' Stone, is the quabbalistic formula revealed by the Grace of God in "Alchemia", the frontispiece to this book.

Franz Bardon also published *The Practice of Magical Evocation,* in which he introduced several genii who are concerned with alchemy in the Earth zone and other planetary spheres. These spirits can provide invaluable assistance to the magician-alchemist who contacts them in the correct manner. Any error in this regard can trap the magus-alchemist in a Faustian bargain, which is completely unnecessary and avoidable:

Andimo ~ "Since he is well acquainted with alchemy he may also assist, theoretically and practically, the magician in this respect. My own experience makes me point out to every magician that Andimo may easily tempt him to project physically, either directly by himself or by the help of one of hi subjects, a burning stone, the so-called "living sulfur". If, in such a case, the magician, during the projection of the stone, takes the stone into his hand, he will get badly burned by it. Andimo likes to place such stones before the magician's feet or before the magic circle. You must leave this stone untouched and order Andimo to take it away. If the magician touches the burning sulfur transmuted by Andimo from the principle of the earth (i.e., transmuted by the principles of Alchemy), with the sign of Andimo's seal, which he earlier drew on a piece of parchment, the seal will catch fire and the sulfur stone at once turns into the true alchemical projection powder of a red color, the so-called "red lion". This powder then is quite safe and may be gathered up with a glass spoon and stored away in a well shut-up glass. This kind of projection powder usually has a projection capacity of 1:10,000 and is the philosopher's stone in its purest form. However, the magician may then be tempted to use this powder for making gold or prolonging his own life. If the magician is misled by such temptations he would conclude, by such alchemical operations, a formal pact with the said being. The magician is therefore warned in advance not to do such a rashness and never to practice alchemy in such a manner. Not even in case he assumes that he is mature and experienced enough in everything that has to do with the science of magic, for he might, nevertheless, be misled to take an ill-considered step. When dealing personally with Andimo I had the opportunity of convincing myself of these facts, but I ordered Andimo to take the powder back to his kingdom. At that moment it disappeared at once, with a hissing sound.

Armiel ~ "Knows about all alchemical processes. He can teach the magician the secrets of the transmutations of metals; that is, he can, for instance, inform him how the philosopher's stone is to be made in a dry process and what preparations are necessary for this...

Malacha ~ "Can give good advice in respect of alchemy, i.e., he can procure the prima materia for the preparation of the Great Elixir in a dry process...

Yromus (12° Aries) ~ "From Yromus the alchemist learns to prepare various herbs and roots in a spagiric and alchemical manner, and how to make these especially dynamic by the application of an electromagnetic fluid and a special kind of volting...

Nablum (1° Cancer) ~ "Will be well pleased to inform the magician, by inspiration and intuition, on the various degrees of warmth ~ temperature ~ in respect of alchemic or spagiric methods... Nablum is an expert in alchemic and spagiric operations, and the magician can profit much in this respect by his inspirations.

Tmako (12° Cancer) ~ "Initiates the magician into the secrets of transmutation of powers, effects, and the like, in the zone girdling the earth and into the secrets of plants, minerals and metals in our physical world. This intelligence may be called a guardian of true alchemy.

Corocona (20° Leo) ~ "Makes the magician acquainted with the preparation of alchemistic substances made of metals. The magician is taught by this intelligence how to produce the true alchemic gold tincture, and how to use it for diverse diseases. He is also instructed by Corocona in measuring out dosages of alchemical medicines.

Kirek (9° Virgo) ~ "Is known as an excellent initiator into alchemical magic...

Buriuh (10° Virgo) ~ "Is an excellent initiator into alchemical secrets and entrusts the magician with methods by which he can achieve diverse faculties and powers by the application of appropriate alchemical means...

Eralier (11° Scorpio) ~ "Will convince the magician that the making of the philosopher's stone is no allegory and no symbolic-esoteric speculation. The magician learns from this head the preparation of the philosopher's stone in its most diverse grades for the most various purposes. Furthermore, he will be told the methods of transmuting metals, especially by dry procedure. The person to some extent informed on alchemy will already perceive what is meant by this. The preparation and realization of the philosopher's stone rests on many methods. Eralier can entrust the magician with these..."

It should be noted that the forementioned entities can be contacted by evocation or invocation with Hermetic magical means, or the spirit's name can be used in a quabbalistic manner to educe the same information and effects without karma. Franz Bardon teaches methods by which magical authority can be attained in his book *Initiation Into Hermetics*. **(2, 3)**

2. John Keely

Late in the 19th century, John E.W. Keely published *40 Laws of Harmony*, which served as the foundation for the Sympathetic Vibratory Physics he discovered and developed. The following representation was cribbed from Dale Pond's website, www.spvril.com :

(1) Law of Matter and Force ~"Coextensive and coeternal with space and duration, there exists an infinite and unchangeable quantity of atomoles, the base of all matter; these are in a state of constant vibratory motion, infinite in extent, unchangeable in quantity, the initial of all forms of energy." *(2) Law of Corporeal Vibrations* ~"All coherent aggregates when isolated from like bodies, or when immersed or confined in media composed of matter in a different state, vibrate at a given ascertainable pitch."

(3) Law of Corporeal Oscillations ~ "All coherent aggregates not isolated from like bodies, oscillate at a period-frequency varying with the tensions that augment and diminish the state of equilibrium."

(4) Law of Harmonic Vibrations ~ "All coherent aggregates are perpetually vibrating at a period-frequency corresponding to some harmonic ratio of the fundamental pitch of the vibrating body; this pitch is a multiple of the pitch of the atomole."

(5) Law of Transmissive Vibraic Energy ~"All oscillating and vibrating coherent aggregates create, in the media in which they are immersed, outwardly propagated concentric waves of alternate condensation and rarefaction, having a period-frequency identical with the pitch of the aggregate.

Scholium: All forms of transmissive energy can be focussed, reflected, refracted, diffracted, transformed, and diminished in intensity inversely as the square of the distance from the originating source."

(6) Law of Sympathetic Oscillation ~ "Coherent aggregates immersed in a medium pulsating at their natural pitch simultaneously oscillate with the same frequency, whether the pitch of the medium be a unison, or any harmonic of the fundamental pitch of the creative aggregate."

(7) Law of Attraction ~"Juxtaposed coherent aggregates vibrating in unison, or harmonic ration, are mutually attracted."

(8) Law of Repulsion ~"Juxtaposed coherent aggregates vibrating in discord are mutually repelled."

(9) Law of Cycles ~"Coherent aggregates harmonically united constitute centers of vibration bearing relation to the fundamental pitch not multiples of the harmonic pitch, and the production of secondary unions between themselves generate pitches that are discords, either in their unisons, or overtones with the original pitch; from harmony is generated discord, the inevitable cause of perpetual transformation."

(10) Law of Harmonic Pitch ~"Any aggregate in a state of vibration develops in addition to its fundamental pitch a series of vibration in symmetrical sub-multiple portions of itself, bearing ratios of one, two, three, or more times its fundamental pitch."

(11) Law of Force ~ "Energy manifests itself in three forms: Creative, the vibrating aggregate; Transmissive, being the propagation of isochronous waves through the media in which it is immersed; Attractive, being its action upon other aggregates capable of vibrating in unisons or harmony."

(12) Law of Oscillating Atomic Substances ~"Coherent atomic substances are capable of oscillating at a pitch varying directly as the density, and inversely as the linear dimensions from one period of frequency per unit of time to the 21st octave above, producing the creative force of Sonity, whose transmissive force (Sound) is propagated through the media of solids, liquids, and gases, and whose static effect (Sonism) produces attractions and repulsions between sympathetically vibrating bodies according to the Law of Harmonic Attraction and Repulsion."

(13) Law of Sono-Thermity ~ "Internal vibrations of atomic substances and atomic molecules are capable of vibrating at a period-frequency directly as their density, inversely as their linear dimensions, directly as the coefficient of their tension from the 21st to the 42nd octaves, producing the creative force (Sono-thermity), whose transmissive force (Sono-therm) is propagated in solid, liquid, gaseous, and ultra-gaseous media, statically producing adhesions and molecular unions, or disintegration, according to the Law of Harmonic Attraction and Repulsion."

(14) Law of Oscillating Atoms ~ "All atoms when in a state of tension are capable of oscillating at a pitch inversely as the cube of their atomic weights, and directly as their tension from 42 to 63 octaves per second, producing the creative forcce (Thermism), whose transmissive force (Rad-energy) propagated in solid, liquid, and gaseous ether, produces the static effects (Cohesion and Chemism) on other atoms of association, or dissociation, according to the Law of Harmonic Attraction and Repulsion.

Scholium: Dark radiant heat begins at absolute zero temperature, and extends through light, chemical rays, actinic rays, and infra-violet rays, up to the dissociation of all molecules to the 63rd octave."

(15) Law of Vibrating Atomolic Substances ~"Atoms are capable of vibrating within themselves at a pitch inversely as the Dyne (the local coefficient of Gravity), and as the atomic volume, directly as the atomic weight, producing the creative force (Electricity), whose transmissive force is propagated through atomolic solids, liquids, and gases, producing induction and the static effect of magnetism upon other atoms of attraction or repulsion, according to the Law of Harmonic Attraction and Repulsion.

Scholium: The phenomenon of Dynamic Electricity through a metallic conductor and of induction are identical. In a metallic conductor, the transmission is from atom to atom, through homologous interstices, filled with ether, presenting small areas in close proximity. In crystalline structures, heat, which expands the atoms, by twisting them produces striae, increases the resistance, etc. Between parallel wires and through air the induction takes place from large areas through a rarefied medium composed of a mixture of substances, whose atoms are separated by waves of repulsion of various pitches, discordant to electric vibrations; the said atoms sympathetically absorb the vibrations and dissipate from themselves, as centers, concentric waves of electric energy which produces heat and gravism."

(16) Law of Oscillating Atomoles ~ "Atomoles oscillating at a uniform pitch (determined by their uniform size and weight) produce the creative force Atomolity, whose transmissive form, Gravism, is propagated through more rarefied media, producing the static effect upon all other atomoles, denominated Gravity."

(17) Law of Transformation of Forces ~"All forces are different forms of Universal Energy unlike in their period- frequency, merging into each other by imperceptible increments; each form representing the compass of 21 octaves. Each form or pitch may be transformed into an equivalent quantity of another pitch above or below it in the scale of 105 octaves. The transformation can occur only through its static effect, developing vibrations of harmonic pitches above or below their fundamental vibration, or developing with juxtaposed aggregates, resultant and difference, or third order, as the case may be.

Scholium: A table of the intervals and harmonics of the normal harmonic scale will indicate the ratios in which the transformation of forces will occur."

(18) Law of Atomic Pitch ~"Atoms have each a different and definite pitch, at which they naturally vibrate.

Scholium: Atomic pitch is determined directly from its simple spectrum.

Scholium: Atomic pitch is determined by computations from its associate spectrum with all other atoms, as in known spectra.

Scholium: Atomic pitches are more important working data than atomic weights; tables of atomic pitches must be precise."

(19) Law of Variation of Atomic Pitch by Rad-Energy ~ "The higher harmonics and overtones of projected rad-energy are of a pitch sufficiently high to cause the atom to expand; by causing the atomoles to vibrate systematically the same influence will cause the atom to contract, and thus by changing the volume, atomic pitch is varied."

(20) Law of Variation of Atomic Pitch by Electricity and Magnetism ~ "Electricity and Magnetism produce internal vibrations in the atom, which are followed by proportional changes in volume and, therefore, pitch."

(21) Law of Variation of Atomic Pitch by Temperature ~ "Atoms in chemical combination oscillate with increasing amplitude directly as the temperature, and simultaneously absorb overtones of higher harmonics, producing expansion of volume and diminution of pitch.

Rule: The gradual approach of the temperature of harmonic combination can be observed by mutually comparing superimposed spectra; chemical combination commences when the fundamental lines of each spectrum bear harmonic ratios by linear measurement."

(22) Law of Pitch of Atomic Oscillation ~"Atoms not isolated and in a state of tension between forces that oppose and increase the equilibrium oscillate bodily at a pitch that is a resultant of the atomic weight, atomic volume, and tension."

(23) Law of Variation of Pitch of Atomic Oscillation by Pressure ~ "The frequency of atomic oscillation increases and diminishes inversely as the square of the pressure."

(24) Law of Variation of Atomic Oscillation by Temperature ~"The force of cohesion diminishes inversely as the square of the distance the atoms are apart, and the force of the chemical affinity diminishes in the same ratio. Heat increases the amplitude of the oscillations in a direct ratio to the temperature of the natural scale.

Scholium: New thermometers and accurate thermometric tables, on the natural base, wherein doubling the temperature doubles the pitch of the transmissive energy, are required. Such a table of temperature will bear natural relations to atomic weights, pitches, specific heats, chemical affinities, fusions, solubilities, etc., and will disclose new laws. One table for each must be constructed."

(25) Law of Variation of Atomic Oscillation by Electricity ~"The electric current destroys cohesion and chemical tension directly as square of current in amperes, inversely as the resistance in ohms, inversely as the chemical equivalent, and conversely as the coefficient of the difference between the freezing and volatilizing temperature of mass acted upon."

(26) Law of Variation of Atomic Oscillation by Sono-Thermism ~"Diminishes the tensions directly as the quantity of heat developed, and in antithetical proportion to the harmonics absolved."

(27) Law of Chemical Affinity ~ "Atoms whose atomic pitches are in either unison, harmonic or concordant ratios, unite to form molecules.

Corollary: When two atoms are indifferent, they may be made to unite by varying the pitch of either, or both.

Scholium: This necessitates the construction of tables, representing variation of atomic pitches by temperature, pressure, etc.

Scholium: Tables of all harmonics and concords, and harmonics founded upon a normal harmonic scale, are equally essential.

Scholium: Optical instruments may be made to measure pitches of energy."

(28) Law of Chemical Dissociation ~ "If the pitch of either atom, in a molecule, be raised or lowered; or, if they both be unequally raised or lowered in pitch until the mutual ratio be that of a discord; or, if the oscillation amplitude be augmented by heat until the atoms are with the concentric waves of attraction, - the atoms will separate."

(29) Law of Chemical Transposition ~ "New molecules must be harmonics of the fundamental pitch."

(30) Law of Chemical Substitution ~ "(too complex for brief statement)"

(31) Law of Catalysis ~"The presence of harmonics and discords."

(32) Law of Molecular Synthesis and Combination (Organic) ~"The molecular pitch must be a derived harmony of the radicals.

Scholium: Reconstruction of electric units to represent pitches and amplitudes."

(33) Law of Chemical Morphology ~ "The angle of crystallization is determined by the relation between the molecular pitch of the crystallizing substance to the variation- density of the liquid depositing it."

(34) Law of Atomic Dissociation ~ "Overtones of high rad-energy pitches produce separation of the atomoles and recombinations among the atomolic molecules of the atoms."

(35) Law of Atomolic Synthesis of Chemical Elements ~ "Harmonic pitches of atomolity produce association of etheric-atomolic particles to form atoms; the kind of atom is determinable by the pitches employed."

(36) Law of Heat ~ "Atoms under the tension of chemical combination oscillate with an amplitude directly as the temperature, inversely as the pressure, and as the square of the specific heat. Diminishing the pitch of oscillation inversely as the square of the distance of the atoms apart, and simultaneously increasing the vibrating pitch of the atom by absorption of overtones and higher harmonics."

(37) Law of Electro-Chemical Equivalents ~"An atom vibrates sympathetically under the influence of electric energy, such undertones of which are absorbed as are a harmonic or harmony of the electric pitch; the amount of energy absorbed being directly as the arithmetical ratio of the undertone of the fundamental electric pitch.

Scholium: A table of electro-chemical equivalents on the normal basis will indicate the electrical conditions and amount of chemical change."

(38) Law of Cohesion ~"The cohesion between atoms diminishes directly as the square root of the pressure and temperature, and as the square of electric intensity."

(39) Law of Refractive Indices ~ "A table of the refractive indices of substances indicates their molecular pitch; and in connection with crystalline form the phase of molecular oscillation."

(40) Law of Electric Conductivity ~ "Electric energy is transmitted through homogeneous bodies with a completeness in direct proportion as the atoms are more or less perfect harmonics of the electric pitch, but not at all through substances whose atoms are discordant to the electric pitch; also through molecular substances, when their resultant notes are harmonics of the electric pitch, - the transmissions being inversely as the temperature, directly as the density diminished in proportion to the amount of crystallization, and inversely as the cube of the dyne, also directly as the reciprocal of the local magnetic intensity."**(12)**

The phenomena of Cymatics, the wave phenomena, vibrational effects, and harmonic oscillations revealed by the Chaldni plate, etc., was researched by Hans Jenny in the 1960s. He demonstrated the basic unified triadic phenomenon of vibrational, kinetic and dynamic effects in acoustic interactions with matter. The triadic phenomenon occurs in many other fields (biology, mineralogy, astronomy, atomic physics, etc) and is a skeleton key that unlocks many gates of knowledge. Certainly it aids in understanding and practicing quabbalistic transmutation, and pertains to the work of John Keely and Dr Stephen Emmens. For example: the sacred word "Om" forms the Sri Yantra geometry when spoken into a Chaldni plate or Tonoscope! **(6)**

It should be noted that Franz Tausend, who made gold from mercury for the Nazis, developed a circular periodic table of the elements with Pythagorean musical correlations, based on his understanding of atoms.

Sacred geometry is another rewarding area of study for alchemists. The phi ratio (5/8, 0.618, &c) enables the alchemist to impregnate and enliven matter with cosmic energies in a simple manner. For example, a model of the Great Pyramid (incorporating phi in its base angle of 51^{o} 51') will exert phenomenal effects on substances placed within it (i.e., mummification, sharpening dull razor blades, enhanced germination of seeds, &c).

3. Abiogenesis & Astrochemy

Charles Littlefield ~ At the beginning of the 20th century, Dr Charles W. Littlefield experimented with the effects of mental concentration (visualization and prayer) on the crystallization of tissue salt solutions. He was able to produce many microscopic images of life forms, alphabets, structures, etc, some of which he published in his book *Man, Minerals and Masters*. Dr Littlefield conducted long series of experiments with vitalized mineral salts. The vitalizations were accomplished by repeated evaporations. Littlefield offered these guidelines for experimentation:

"The number of evaporations necessary to effect this [radiate structure] with each salt, is generally one evaporation for each tenth part of the molecular weight or fraction thereof as shown by the following table:

Salt:	Molecular weight:	Number of Evaporations:

Na-Chloride	58.37	6
Si-Oxide	60.22	7
K-Chloride	74.2	8
Ca-Fluoride	78	8
Ca-Sulfate	135.73	14
K-Phosphate	174	18
K-Sulfate	174	18
Mg-Phosphate	246	25
Fe-Phosphate	301.36	31
Ca-Phosphate	309.33	31
Na-Sulfate	321.42	33
Na-Phosphate	357.32	36

"Another interesting and important fact with this process of vitalization is, those salts that are otherwise insoluble in water are by the evaporation of water rendered soluble. This is a most valuable discovery from the standpoint of treating disease, as all the mineral salts must be dissolved in the blood before they are available to the tissue cells as food.

"I began my experiments by attempting mind control of one or more of these salts dissolved in distilled water. First, a drop of the mineral solution was put on the glass slide of my microscope, then placed in a temperature nearly that of the human body. As the water dried away, I would repeat the [unspecified Biblical] verse referred to above, the mystic three times.

"While doing this I would image, or mentally picture, the form of some fowl or animal as the victim of the bleeding. Finally, I succeeded in making the crystals of common table salt, which is the most abundant salt in the blood, group themselves in the form of a chicken.

"Long before I succeeded, there built up from the mineral solutions a great variety of microscopic organisms in the shape of octupi, fish, and reptiles. I do not know why.

"Continued experiments demonstrated that forms of different kinds could be *predetermined* by the proportion, number, and kind of salts used. Thus I discovered that *mineral composition* is the law of living forms... These laws may be stated as follows:

"1. A mental image is the beginning of every created thing. With whatever functions, faculties or qualities this image may be endowed by the mind creating it, the same will be expressed by the creature.

"2. This mental image has the power to group the twelve mineral salts normally found in organic nature, in the exact proportion necessary to build the form, and all the tissues and organs necessary to express all the functions, faculties and qualities which the mind image may be endowed. Hence *composition* becomes the *law* of form and function.

"3. Evaporation of water, a process universal on sea and land, generates *a subtle magnetism* which is the vital force of plants and animals. This force saturates the mineral salts of organic nature making them susceptible to mental control, so that any picture that the mind accepts as true in principle may be fixed in them...

"Procure twelve one-ounce bottles with fresh, clean corks. Label each bottle with the name of the salt it is to contain. Into each bottle put about 10 grains of one of the salts and fill with pure distilled water. Shake frequently. Not all the salts are equally soluble, some in large amounts and others only slightly.

From time to time remove a drop of any one of the solutions with a clean toothpick to the glass slide of the microscope. Heat the slide carefully until the water is evaporated. Then examine the crystal formed from the salt. Do this with each of the twelve salts until you become familiar with their forms and differences. Then combine one or more of the solutions in a clean bottle. Place a drop of this on the glass slide, then evaporate and examine. It will be seen by these experiments that the slightest difference in the amounts of each solution will make the widest possible difference in the resulting crystals...

"In my own experiments I use sulfate of potash and sulfate of soda, one part of the potash to ten parts of the soda. When this combination forms crystals like the letters C, D, or O, then the solution of these salts is susceptible to mental mastery by my mind...

"In the formation of mantras any statement or description of any scene may be chosen. Three of the words selected from it must agree in number, or four of them may be of two different numbers. For example: "Veda (5) Yoga (2) Pyramid (5) Wisdom (2)" as given by the masters to indicate the system of philosophy they taught, two of which correspond to the same number. Or the mantra may be formed by a combination of numbers and letters, as the one for Mount Zion: "144,000 (9) Symbolize (9) Your (7) Church (7)"..."

Dr Littlefield also claimed to have produced microbial flora with simple experiments that anyone could test. *Scientific American* magazine (30 September 1905) offered the following instructions and description of the operation:

"The supplies... comprise a large but shallow glass vessel, having a capacity of one quart, several smaller dishes, a bell jar sufficiently large to inclose those receptacles, and finally, a good high-powered microscope. The chemicals used are sodium chloride, alcohol, ammonia, and distilled water. In the larger vessel 2 ounces of the salt are dissolved in 6 ounces of the water, and when this is done 6 ounces of 90% pure alcohol is added.

"A portion of the solution thus formed is poured out of the larger into the smaller dishes, when 2 ounces of aqua ammonia is stirred in with a clean glass rod, and the bell jar is then placed over them. A chemical reaction is set up and in the course of a few minutes bubbles of hydrogen will begin to form on the surface of the fluid, and a closer observation will show these little spheres to be gyrating with high velocity. In the course of half an hour the bubbles will cease to form; the liquid is then ready for the crucial test. With the microscope at hand and previously focused so that a globule of the unstable solution may be quickly observed, a very small portion is transferred from the dish to the glass slide... On examination the detached particles of matter are seen moving through the medium from the center to the circumference with extreme rapidity, and continued investigation indicates other changes the liquid is undergoing. Crystals begin to appear, and those first formed are the characteristic transparent cubes of sodium chloride, and hence these are incapable of further development. After these, other crystals follow, and some assume a hexagonal form on the surface of the saturated solution, and it is from these that the growth of the elementary organisms is said to take place...

"The growth of this supposed rudimentary vital element next follows in sequence, and as it metamorphosed from the hexagonal crystal into a free, smooth, disk-shaped cell, we are informed that it bears a close resemblance to a red-blood corpuscle. The cellular disk now gradually expands in a direction at right angles to is surfaces and an ovoid form results from which pseudopodia or temporary extensions protrude similar to the amoeba...

Dr Littlefield went so far as to claim that he had produced a microscopic insect formerly unknown to entomology:

"It resembled a common house-fly, having two antennae protruding from its head, while from its body grew six attenuated legs, the two nearest its head being of the comparative form and length of a grasshopper, while its transparent wings were covered with light hair. This new insect is the outcome of thousands of experiments, and it has no counterpart in the textbooks dealing with that branch of zoology."

The obvious criticism is that Dr Littlefield failed to conduct his experiments with sterile equipment. **(8, 13)**

***Andrew Crosse* ~** In 1837, Andrew Crosse reported to the London Electrical Society concerning the accidental spontaneous generation of life forms while he was attempting to produce artificial crystals with the influence of a voltaic cell. He produced acari insects repeatedly in many carefully controlled experiments under a wide variety of conditions utterly inimical to life as we know it. The experimental details are repeated here in extended quotation to facilitate your own experiments:

"In the course of my endeavors to form artificial minerals by a long continued electric action on fluids holding in solution such substances as were necessary to my purpose, I had recourse to every variety of contrivance which I could think of, so that, on the one hand, I might be enabled to keep up a never-failing electrical current of greater or less intensity or quantity, or both, as the case seemed to require... Amongst other contrivances, I constructed a wooden frame, of about two feet in height, consisting of four legs proceeding from a shelf at the bottom; supporting another at the top, and containing a third in the middle. Each of these shelves was about 7 inches square. The upper one was pierced with an aperture, in which was fixed a funnel of Wedgwood ware, within which rested a quart basin on a circular piece of mahogany placed within the funnel. When this basin was filled with a fluid, a strip of flannel wetted with the same, was suspended over the edge of the basin and inside the funnel which, acting as a siphon, conveyed the fluid out of the basin, through the funnel, in successive drops. The middle shelf of the frame was likewise pierced with an aperture, in which was fixed a smaller funnel of glass, which supported a piece of somewhat porous red oxide of iron from Vesuvius, immediately under the dropping of the upper funnel. The stone was kept constantly electrified by means of two platina wires on either side of it, connected with the poles of a voltaic battery of 19 pairs of 5-inch zinc and copper single plates, in 2 porcelain troughs, the cells of which were filled at first with water and 1/300 of hydrochloric acid, but afterward with water alone... The lower shelf merely supported a wide mouth bottle, to receive the drops as they fell from the second funnel... It was by mere chance that I selected this volcanic substance, choosing it from its partial porosity; nor do I believe that it has the slightest effect in the production of the insects to be described. The fluid with which I filled the basin was made as follows.

"To a portion of the silicate of potassa... I added some boiling water to dilute it, and then slowly added hydrochloric acid to supersaturation... My object in subjecting this fluid to a long-continued action, through the intervention of a porous stone, was to form, if possible, crystals of silica to one of the poles of the battery, but I failed in accomplishing this by those means. On the 14th day from the commencement of the experiment, I observed, through a lens, a few small whitish excrescences or nipples projecting from about the middle of the electrified stone, and nearly under the dropping of the fluid above. On the 18th day, these projections enlarged, and 7 or 8 filaments, each of them longer than the excrescence from which it grew, made their appearance on each of the nipples. On the 22nd day, these appearances were more elevated and distinct, and on the 26th day, each figure assumed the form of a perfect insect, standing erect on a few bristles which formed its tail. Till this period I had no notion that these appearances were any other than an incipient mineral formation; but it was not until the 28th day, when I plainly perceived these little creatures move their legs, that I felt any surprise, and I must own that when this took place, I was not a little astonished. I endeavored to detach, with the point of a needle, one or two of them from its position on the stone, but they immediately died, and I was obliged to wait patiently for a few days longer, when they separated themselves from the stone, and moved about at pleasure, although they had been for some time after their birth apparently averse to motion. In the course of a few weeks, about a hundred of them made their appearance on the stone. I observed that at first each of them fixed itself for a considerable time in one spot, appearing, as far as I could judge, to feed itself by suction; but when a ray of light from the sun was directed upon it, it seemed disturbed, and removed itself to the shaded part of the stone. Out of about a hundred insects, not above 5 or 6 were born on the south side of the stone. I examined some of them with the microscope, and observed that the smaller ones appeared to have only 6 legs, but the larger ones 8... It seems that they are of the genus *Acarus*, but of a species not hitherto observed...

"I have never ventured an opinion as to the cause of their birth, and for a very good reason --- I was unable to form one.."

Crosse repeated his experiments with more carefully controlled conditions and obtained similar results. Other experiments utilized copper nitrate and sulfate, iron and zinc sulfates, hydrochloric acid, and arsenic; the acari appeared in every cell but those containing arsenic and potassium carbonate. In one of the simplest experiments that produced acari, Crosse proceeded thus:

"A bent wire, 1/5th of an inch in diameter, in the form of an inverted siphon, was plunged some inches into [a concentrated solution of silicate of potassa] and connected with the positive pole, whilst a small coil of fine silver wire joined it with the negative.

"After some months' electrical action, gelatinous silica enveloped both wires, but in much greater quantity at the positive pole; and in about 8 months from the commencement of the experiment, on examining these 2 wires very minutely... I plainly perceived one of these incipient insects upon the gelatinous silica on the silver wire, and about half an inch below the surface of the fluid, when replaced in its original position. In the course of time, more insects made their appearance, till, at last, I counted at once 3 on the negative and 12 on the positive wire. Some of them were formed on the naked part of the wires, that is, on that part which was partially bare of gelatinous silica: but they were mostly embedded more or less in the silica, with 8 or 10 filaments projecting from each beyond the silica... I must not omit to state, that the room... was kept almost completely darkened...

"I have not observed a formation of an insect, except on a moist and electrified surface, or under an electrified fluid... These insects do not appear to have originated from others similar to themselves, as they are formed in all cases with access of moisture, and in some cases 2 inches below the surface of the fluid in which they are born; and if a full-grown and perfect insect be let fall into any fluid, it is infallibly drowned. I believe they live for many weeks: occasionally I have found them dead in groups, apparently from want of food...

"I have obtained the insects on a bare platina wire plunged into fluo-silicic acid, *one inch below* the surface of the fluid at the negative pole of a small battery of 2-inch plates in cells filled with water. This is somewhat a singular fluid for these insects to breed in, who seem to have a flinty taste, although they are by no means confined to siliceous fluids...

"I have closely examined the progress of these insects. Their first appearance consists in a very minute whitish hemisphere, formed upon the surface of the electrified body, sometimes at the positive end, and sometimes at the negative, and occasionally between the two, or in the middle of the electrified current; and sometimes upon all. In a few days this speck enlarges and elongates vertically, and shoots out filaments of a whitish wavy appearance, and easily seen through a lens of very low power.

"Then commences the first appearance of animal life. If a fine point be made to approach these filaments, they immediately shrink up and collapse like zoophytes upon moss, but expand again some time after the removal of the point. Some days afterwards these filaments become legs and bristles, and a perfect acarus is the result, which finally detaches itself from its birthplace, and if under a fluid, climb up the electrified wire and escapes from the vessel... If one of them be afterwards thrown into the fluid in which he was produced, he is immediately drowned... I have never before heard of acari having been produced under a fluid, or of their ova throwing out filaments; nor have I ever observed any ova previous to or during electricization, except that the speck which throws out the filaments be an ovum; but when a number of these insects, in a perfect state, congregate, ova are produced."

The abiogenesis of acari discovered by Andrew Crosse was investigated carefully by Weeks; he took every precaution to ensure the sterility of the equipment and reagents in a series of electrified experiments conducted with unelectrified controls. Acari eventually and invariably appeared, in numbers depending approximately on the percentage of carbon in the mother liquor. Weeks reported his results to the Electrical Society. **(5)**

In 1837, Michael Faraday stated in a paper read to the Royal Institution, that he too had encountered manifestations of similar insects in the course of some of his own electrical experiments. He was uncertain, however, whether their appearance was due to revivification of dormant ova, or formation *in vitro*.

In the 1940s, Dr Wilhelm Reich announced his discovery of the Orgone life force and the technology to utilize it. One of the areas he investigated involved the abiogenesis of "Bions". Reich also managed to crystallize the atmospheric orgone in vacuum tube orgone accumulators. He named this form "Orene". A polluted form of orgone called DOR (Deadly Orgone) was found to be associated with radioactivity. It can be rectified with geometry, etc. The discovery of orgone gives new credence to the old alchemical concept of Phlogiston, and it serves as a basis for some astral technologies.

Decades later, the Canadian Dr Gustaf Naessans also discovered novel life forms reminiscent of Reich's bions, and implicated them in the pathology of cancer. Naessans developed a revolutionary cure(lymphatic injections of "camphorminium chloride") based on his discoveries.

The concept of an aether was defined by Larousse as "an imponderable fluid, filling space and forming the source of light, heat, electricity, etc." The aether was a cornerstone of many physics theories until Einstein prevailed with his Theory of Relativity. Modern quantum mechanics and other post-relativistic physics theories, however, require an aether or something just like it.

Professor D. Mendeleeff, developer of the periodic table of atomic elements, published a fascinating booklet in 1904: "An Attempt towards a Chemical Conception of the Ether". Mendeleeff explained the ether as follows:

"The ether may be said to be a gas, like helium or argon, incapable of chemical combination... This point lies at the basis of our investigation into the chemical nature of ether, and includes the following two fundamental propositions: (1) that the ether is the lightest (in this respect ultimate) gas, and is endowed with a high penetrating power, which signifies that its particles have, relatively to other gases, small weight and extremely high velocity, and (2) that ether is a simple body (element) incapable of entering into combination or reaction with other elements or compounds, although capable of penetrating their substance, just as helium, argon, and their analogues are soluble in water and other liquids.

"When in 1869 I first showed the periodic dependence of the properties of the elements upon their atomic weights, no element incapable of forming definite compounds was known, nor was the existence of such an element even suspected. Therefore the periodic system was arranged by me in groups, series, and periods, starting in group I. and series I., with hydrogen as the lightest and least dense of all the elements. Guided by this system, I was able to predict both the existence of several elements and also their physical and chemical properties in a free and combined state. These elements, gallium, scandium, and germanium, were subsequently discovered by Lecoq de Boisbraudan, Nilson, and Winkler respectively. I made these predictions by following what is known in mathematics as a method of interpolation, that is, by finding intermediate points by means of two extreme points whose relative position is known. The fact of my predictions having proved true confirmed the periodic system of the elements, which may now be considered as an absolute law. So long as the law remained unconfirmed, it was not possible to extrapolate (i.e. to determine points beyond the limits of the known) by its means, but now such a method may be followed, and I have ventured to do so in the following remarks on the ether, as an element lighter than hydrogen. My reason for doing this was determined by two considerations. In the first place, I think I have not many years for delay; and in the second place, in recent years there has been much talk about the division of atoms into more minute electrons, and it seems to me that such ideas are not so much metaphysical as metachemical, proceeding from the absence of any definite notions upon the chemism of ether, and it is my desire to replace such vague ideas by a more real notion of the chemical nature of the ether... Those phenomena in which a division of atoms is recognized would be better understood as a separation or emission of the generally recognized and all-permeating ether. In a word, it seems to me that the time has arrived to speak of the chemical nature of the ether, all the more so since, so far as I know, no one has spoken at all definitely on this subject. When I applied the periodic law to the analogues of boron, aluminum and silicon, I was 33 years younger than now, and I was perfectly confident that sooner or later my prediction would be fulfilled. Now I see less clearly and my confidence is not so great. Then I risked nothing, now I do. This required some courage, which I acquired when I saw the phenomena of radioactivity. I then saw that I must not delay, that perhaps my imperfect thoughts might lead some one to a surer path than that which was opened to my enfeebled vision...

"If the ratio of the atomic weights be Xe: Kr 1.56:1; Kr: Ar = 2.15: 1; and Ar: He = 9.5: 1, we find that the atomic weight of *x* = 0.17. This must be considered the maximum possible value. Most probably the atomic weight of *x* is far less...

"Its mass is $50.129.10^{18}$ or nearly 65.10^{29}, and its radius nearly $698.10^{6...}$ or 26.10^{8} Hence the velocity required will be nearly Ö $2.65 \times 10^{20}/26 \times 10^{8}$ = 2,240,000 meters per second, or 2,240 kilometers per second...

"The atomic weight of *x* as the lightest elementary gas, permeating space and performing the part of the ether, must be within the limits of 0.000,000,96 and 0.000,000,000,053, if that of H - 1.

"I think it is impossible, under the present conditions of our scientific knowledge, to admit the latter value... I consider the majority of phenomena are sufficiently explained by the fact that *the particles and atoms of the lightest element x capable of moving freely everywhere throughout the universe have an atomic weight nearly one millionth that of hydrogen, and travel with a velocity of about 2,250 kilometers per second."* **(9)**

Mendeleeff's Ether might have been discovered by Charles Brush (d. 1929), who claimed to have discovered "Etherion: A New Gas", which he reported to the American Association for the Advancement of Science in August 1898:

"The purpose of this purely preliminary paper is to announce the discovery of a new gas, presumably elementary, and possessed of some extraordinary properties. It is a constituent of the atmosphere, and is occluded by many substances. Its chief characteristic thus far ascertained is enormous heat conductivity at low pressure...

"I had observed that glass apparatus, when highly exhausted and heated, involved gas for an indefinite length of time, rapidly at first, then slower, but never stopped until the temperature was reduced. On cooling, rapid re-absorption always took place, but was never complete; indicating that two or more gases had been evolved by heating, one of which was not absorbed on cooling. In other words, the absorption was selective...

"I tested the conductivity of the residual air from time to time as the preliminary exhaustion progressed. When the exhaustion approached a good vacuum, an astounding phenomenon developed. At 36-millionths pressure, the residual gas conducted heat twice as well as air, and nearly as well as hydrogen, at 3.8-millionths it conducted 7 times as rapidly as hydrogen, at 1.6-millionths 14 times, and at 0.96 of one millionth 20 times as rapidly...

"Believing that the new gas is very much lighter than air or hydrogen, and may therefore be separated from the atmosphere by successive diffusions, I have spent several months in experiments with this end in view...

"The best results have been obtained with porous porcelain having its superficial pores nearly closed by suitable treatment. A tube of this type, closed at one end, was connected with the apparatus, and the whole kept exhausted to a pressure of 1.3 mm. About 19 cc of gas was diffused per hour... As both phosphorus pentoxide and soda-lime absorb the new gas, they cannot be used for dessication..." **(4)**

4. Prophecy

Prophecy is the memory of future histories, echoing across time and space. The future is revealed to us through dreams, drugs, religious epiphany, magical rituals and the mantic arts. Prophecy has exerted a powerful influence on the course of history. Alchemy has been the subject of several predictions that await possible fulfillment in proximal futures.

***Paracelsus* ~** The great adept Theophrastus von Hohenheim, or Paracelsus, was a prolific writer; his publications revolutionized medicine in Europe. He made major contributions to Western mysticism, including a small book of 32 prophecies called *Prognosticatio eximii doctoris Theophrasti Paracelsi* (ca. 1530). Though the predictions were written in symbolic terms, several of them have been satisfied by history. Several others can be interpreted easily and offer a clear view of the apparent future he saw. **(10)**

Paracelsus associated the 4th Monarchy (the millennial new age) with the rediscovery of the alchemical Philosophers' Stone by the Grand Monarch, as suggested by the following section of a longer prophecy:

"The people of the earth shall then be in commotion, and no ties of brotherhood, marriage, or friendship will be respected.
The lion will join himself to the fishes.
And the crown will be subject to the fine hat.
Then will the rue-wreath be soiled with milk.
And the pelican shall be devoured by his young.
But the phoenix shall be consumed in the fire, and when the dew moistens the ashes he will revive again according to his nature.
But he will become a noble phoenix, and will press hard upon the toad, and he will take to the lion and give him a choice.
The lion will select the best and no more.
Upon the other wild horse this phoenix will place a bridle and will ride it with spurs but without a saddle.
Then a new generation of beasts with various strange heads shall be born. They will have many mouths and stomachs,
but only one natural draught.
The most profligate will maintain his magnificence, and his angels will be clothed in blood. They will be intent upon
one work alone.
A pair of horses will appear and in all places the wail of the fugitives

will be heard.
The dragon of sleep will cause the eagle to become weary of all magnificence.
The fountain of life will commence to flow.
And a white eagle will be changed into black.
Milk and blood will decrease, and the animal tree will begin to grow.
An old lion will be bound and a young lion will become free. He will please all those animals which the old had vexed.
He will do even more, for he will change his mane and hair into silk.
The bear will lay snares, and the ox-head will seek to gore him.
The griffin will fly over him but will not harm him.
Then shall the pearl, so long lost, be found by one of humble estate, and will be set, as a jewel, in gold.
It will be given to the prince of all beasts, that is, to the right lion.
He will hang it around his neck, and wear it with honor.
He will resist the bear and the wolf, and rend them asunder; so that the beast of the forest shall be safe.
Then will the old art flourish and no heed will be given to the new.
Then will the New World begin, and the white and black shall disappear.
All vain glory will be ended, and the plumes of the bird of the East shall be burned by the sun of the south.
How then will it be with thee, oh thou lion and earthly one who art painted and bound with gold?
All thy doing shall be changed, and the seven heads shall become one head. Out of this one, a head shall be born that shall be armed with a horn.
This horn shall bruise all that which has so long brought sorrow to Iffinos.
And the great city shall be the head of the less and shall become free from servitude.
Europe shall be the head, Asia the crown, but Africa shall be the jewel."

This prophecy is difficult to interpret, but some of the symbols are obvious: the phoenix is the alchemist king, who will be graced with the Philosophers' Stone, "the pearl, so long lost." The toad is France: that animal was the glyph from which the present fleur-de-lys was derived. The bear is Russia, the lion is England, and the griffin might the USA. The ox represents the Muslims.

In Chapter 8 of his treatise *De Minerabilis*, Paracelsus predicted the advent of Elias Artista (Elias the Artist), Master of Alchemy. Elsewhere in the literature of Hermetic science, Elias Artista is referred to as "a symbol of the ripeness of the age! He is the great day to come when all secrets shall be brought to light, and things now rooting in the dark earth shall be brought to light, and things now rooting in the dark earth shall come forth to full growth and flower and bear a treasure, which is for the healing of nations... a symbolic representation, the collective breath of generous vindications. Spirit of Liberty, of science and love which must regenerate the world!"

Paracelsus, Glauber, Thomas Norton, Alexander Seton and other alchemists wrote of Elias as if he were an individual. Paracelsus wrote: "What is small and humble, God has revealed, but the more important is still in the dark and shall likely remain so until the arrival of Elias Artista... One shall come after me whose splendor is not yet in this life, and who shall reveal much." According to Glauber, "This Elias Artista shall restore the true spagyric medicine of the old Egyptian Philosophy which was lost over a thousand years. He shall bring it with him and show it to the world."

Thomas Norton ~ The 15th century master alchemist Thomas Norton transmitted a poetic prophecy about Elias Artista in his *Ordinal of Alchemy*:

"Arise by Surname when the change of Coin was had,
Made some men sorry, and some men glad:
And as to much people that change,
Seemed a thing new and strange;
So that season befell a wonderous thing,
Touching this Science without leaving.
That three masters of this Science all
Lay in one Bed nigh to Leadenhall,
Which has Elixirs perfect White and Red,
A wonder such Three to rest in one Bed,
And that within the space of days Ten,
While hard it is to find one in Millions of Men.
Of the Dukedom of Lorraine one I understand
Was born, that other nigh in the middle of England,
Under a Crosse, in the end of Shires three,
The third was borne; the youngest of them is he.
Which by his Nativity is by Clerks found,
That he should honor all English ground;
A Man might walk all the World about,
And fail such Three Master to find out;
Two be fleeting, the Youngest shall abide,
And do much good in this Land at a Tide.
But sin of Princes shall let or delay
The Grace that he should do on a day.

The eldest Master changed of him a song,
And said that he should suffer much wrong
Of them which were to him greatly beholden.
And many things more this Master told,
Which since that time hath truly befall,
And some of them hereafter shall,
Whereof one is truly (said he)
After Troubles great Joy shall be
In every quarter of this Land,
Which all good Men shall understand:
The younger asked when that should be,
The old Man said when men shall see
The Holy Cross honored both day and night,
In the Land of God in the Land of Light;
Which may be done in right good season,
But long delayed it is without reason:
When that begins note well this thing,
That Science shall draw towards the King;
And many more Graces ye may be told;
Grace on that King shall descend,
When he old Manners shall amend:
He shall make full secret search,
For this Science with dulcet speech;
And among the Solitary,
He shall have tidings certainly.
So sought King Kalid of many men,
Which helped Kalid at his need,
His virtues caused him to speed.'"

The eminent British occultist Arthur E. Waite reprinted the prophecy in interpretive prose form in *The Hermetic Museum*:

"This knowledge would often have been the glory of England's kings, if their hopes had been firmly placed upon God. One who shall have obtained his honors by means of this Art, will mend old manners, and change them for the better. When he comes, he will reform the kingdom, and by his goodness and virtue he will set an everlasting example to rulers. In his time the common people will rejoice, and render praise to God in mutual neighborly love. O King, who are to accomplish all this, pray to God the King, and implore His aid in the matter. So the glory of thy mind will be crowned with the glory of a golden age, which shall not then be hoped for as future."

Michel Nostradamus ~ The 16th century prophet Michel de Notredame (Nostradamus) is considered to be one of the greatest prophets of future history. The following quatrains contain alchemical themes that may inspire aspiring adepts, and certainly confuse them:

"The divine word will give to the substance,
Including heaven, earth, gold occulted in the mystic milk:
Body, soul, spirit having all power,
As much under its feet as the Heavenly see." (C.3.2)

"When Venus will be covered by the Sun,
Under the splendor will be a hidden form:
Mercury will have exposed them to the fire,
Through warlike noise it will be insulted." (C.4.28)

"The Sun hidden eclipsed by Mercury
Will be placed only second in the sky:
Of Vulcan Hermes will be made into food,
The Sun will be seen pure, glowing red and golden." (C.4.29)

"Eleven more times the Moon the Sun will not want,
All raised and lowered by degree:
And put so low that one will stitch little gold:
Such that after famine plague, the secret uncovered"(C.4-30)

"So much silver of Diana and Mercury,
The images will be found in the lake:
The sculptor looking for new clay,
He and his followers will be steeped in gold.'(C.9.12)**(7)**

Finally, in the closing passages of the Biblical Revelation of John, we are promised that, "To he who overcomes, I will give a White Stone, and in it a New Name written, that is known only to he whom it is revealed." This suggests that the Christian survivors of the Tribulation will receive the Philosophers' Stone in its physical and angelic forms. Amen.

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Adept Alchemy

By Robert A. Nelson

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