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EDITED BY H. STANLEY REDGROVE, B.Sc. (LOND.), F.C.S.

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## REPORT OF THE FOURTH GENERAL MEETING.

THE fourth General Meeting of THE ALCHEMICAL SOCIETY was held at 8 p.m. on Friday, April 11th., at the International Club, Regent Street, S.W., the chair being taken by Mr. H. Stanley Redgrove, B.Sc., F.C.S.

A letter from Mr. P. S. Wellby, M.A., expressing regret for unavoidable absence, was read.

Messrs. Leonard F. Pembroke and Sijil Abdul-Ali were elected auditors for the current year. A motion was passed requesting the Council to alter the time of the General Meetings of the Society from 8 p.m. to 8.15 p.m.

A paper was read by Mr. Gaston De Mengel on "The Evidence for Authentic Transmutation", which was followed by a discussion. (The paper and an abstract of the discussion are printed in the present number of the JOURNAL.)

A vote of thanks was passed to Mr. De Mengel for his paper.

## THE EVIDENCE FOR AUTHENTIC TRANSMUTATION.

BY GASTON DE MENGEL.

It may be a truism to remark that the study and exposition of a subject must necessarily be more or less coloured by the mental characteristics and affectional temperament of him who undertakes such study and makes such exposition therefrom. Nevertheless, the fact is too often forgotten, and it would be well therefore if we were to take it into consideration whenever the outcome of any person's study of a subject is presented to our ken. For then we should understand that the presentation does not and cannot claim to be the whole truth about the subject, but can only be some phase or aspect of that truth.

This I would wish you to bear in mind when considering the essay I have the honour of presenting to you to-night. I have always had an affection for broadness of outlook on all planes; I have a passion for order in both action and thought, and my memory proves itself tenacious of such fundamental principles as I may be able to discern beneath the elaborations of fervid imagination. On the other hand, mere scholarship makes but little appeal to me, any more than collections of facts more or less unconnected with a plan of thought; and for dates, names, or the terminology affected by this or that writer, I have to refer to my notebook. After this confession of qualities and defects, you will know to some extent what to expect. But if my essay makes up for lack of empirical solidity or scholarly learning by a suggestiveness that may set some thinking on new lines, I shall be amply repaid.

With this apology for the perhaps unusual lines upon which my paper is drafted, I will proceed.

The impression I have received from the study I have made of matters alchemical, is that the alchemists had ever with them two great preoccupations. The one was the attestation of certain ontological and cosmogonic principles constituting a philosophy which to-day we would qualify as *à priori*; the other was the search for a process which, in accordance with these principles, could produce a material substance endowed with certain virtues—the philosopher's stone. The motives which led to the search for the philosopher's stone were no doubt mixed; but, at any rate, in all save the most unworthy, they seem to have been noble and altruistic. In the highest minded, the motive was probably the more or less unconscious desire to find some objective test of the validity of their theories, strong though their belief in them may have been.

The power of effecting the transmutation of metals, especially of the baser metals into gold, has been singled out of the manifold virtues attributed to the philosopher's stone as being the most striking, in the light of ancient, and indeed, all but the most modern, experience. But it must not be forgotten that the philosopher's stone was in reality considered as endowed with a universal virtue or activity which could bring about wonderful changes in other things than metals, hastening the evolution of all natural forms, mineral, vegetable or animal. Indeed, it could not be otherwise, seeing that its power was due to the operation of a universal principle postulated more or less definitely by all the alchemists, and the knowledge of which was the secret of the great work. This principle is generally referred to as the *Telesme*, the *Philosophic Mercury*, the *Aour*, etc. Metals being, however, among the most fixed forms of matter, the power to transmute them would be regarded as *prima facie*

evidence that the substance possessed of that power would also be possessed of those other virtues which made manifest, in a minor degree, the potency of the universal principle, the soul of the world.

If, therefore, there is any good evidence that the transmutation of metals was effected by means of a substance prepared according to the principles of alchemical philosophy, the presumptive truth of this philosophy will be greatly strengthened. What evidence there is may be said to be of three kinds: the purely negative, the positive historical, and the positive deductive.

Of the purely negative evidence, I will say but little. In his work, entitled *L'Alchimie et les Alchimistes*, published in 1854, the eminent French savant, Louis Figuier, declared that: "In the present state of our knowledge, it cannot rigorously be proved that the transmutation of metals is an impossibility; certain circumstances go to prevent the alchemical opinion being rejected as absurd and contrary to scientific fact." [Second edition, Paris, 1856, p. 363. There is no English translation.]

Likewise, the eminent chemist, Berthelot, in his work, *Les Origines de L'Alchimie*, published in 1885, at Paris, shows in various places that modern chemical philosophy is tending to revive, in an altered form, the alchemical theories. "Through the mystical explanations and symbols pervading the works of the alchemists," he says, "we can discern the essential principles of their philosophy, reducible ultimately to a few clear and plausible ideas of which some are seen to be strangely analogous to modern concepts." [p. 279.] "I repeat", he further says, "that no one assuredly has the right to deny *à priori* the possibility of manufacturing the so-called elements." [p. 320.] I need not remind you that the opinions of these scientists are greatly emphasised by the discoveries of the past ten years: the study of cathodic rays and of radio-activity has given an entirely new aspect to the scientific view of the nature of matter and the constitution of the so-called elements. You will find these views developed nowhere better than in Dr. Gustave Le Bon's *Evolution of Matter* [translated from the third French edition, by F. Legge, 1907.] Assuming therefore that we have no valid ground for denying *à priori*, for scientific reasons, the possibility of transmutation, I will pass to the positive historical evidence.

Of historical instances of transmutation, there are three which are recorded in detail by men of such good standing and scientific repute, that they deserve careful consideration. The first is that of Helvetius, otherwise Johann Friedrich Schweitzer, physician to the States General of the Hague, who published at Amsterdam, in 1667, a circumstantial account of his transmutation, under the title of *Vitulus Aureus*,

*quem Mundus adorat et orat.* On the 27th December, 1666, at six in the afternoon, he says that there came to his house at the Hague a man who was to him "planely unknown, but endowed with an honest gravity, and serious authority of countenance, cloathed in a *Plebeick* Habit, like to some Memnonite." [p. 45.] \* This man professed himself to be no physician, but "no other than a Melter of *Orichalcum*, and that in the Flower of his years, he had known many things from his Friend, rare to the Sight . . ." [p. 47.] Helvetius calls him *Elias* the *Artist*. Of the conversation of Helvetius with *Elias*, and the subsequent events, you can read a full account in *The Golden Calf*, which is a literal English translation of the *Vitulus Aureus*. An abridged account will be found in Mr. H. Stanley Redgrove's *Alchemy, Ancient and Modern* (1911), pages 83 *et seq.*, and a still more condensed one in Figuiet's work [p. 211], already referred to. It will suffice for the needs of my paper to give a brief statement of the important points of their intercourse.

The Artist *Elias* had called upon Helvetius because of having read some treatises of his, particularly that directed against the "sympathetic powder" of Sir Kenelm Digby, and in which was expressed the author's doubt of "the true Philosophick Mystery." Apparently *Elias* wished to convince Helvetius of this truth. At their first interview, he showed him what he claimed to be the philosopher's stone, and allowed Helvetius to keep it in his hand for a quarter of an hour, though he refused to part with even the smallest portion of it, saying it was not lawful for him to do so. He took the stone from an ivory box kept in his pocket, and Helvetius describes it as consisting of "three ponderous fragments, in magnitude scarcely equalizing a small walnut; these were Glass-like, of the colour of pale Sulphur, to which the interior scales of the Crucible did adhere, in which this most noble substance was liquefied." [*The Golden Calf*, p. 49.] *Elias* told Helvetius "many things worthy of note touching the Wonderful Effect of the same, for humane and Metallick bodies" [p. 49], and said that he had been taught the divine Art by "a certain Extraneous Friend, who for certain dayes lodged in his House" [pp. 54-58]; but he refused to perform a transmutation before Helvetius then, though he promised to return in three weeks.

During this interview, Helvetius had managed to break off a tiny particle of the stone, keeping it under his nail, and when alone, projected it, wrapped in paper, upon melted lead. But no trace of transmutation appeared, almost the whole of the lead volatilizing, and the remaining substance being transmuted into glassy earth. [p. 64.]

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\* The references are to the English translation, published in 1670, under the title of *The Golden Calf*.

Elias, however, returned punctually on the promised day, and, Helvetius having confessed his theft, he replied that the operation had failed because the stone had not been wrapped in yellow wax, so as to prevent its being volatilized together with the lead. [p. 64.] At this second interview, in which they talked for over two hours together, the alchemist still refused to effect a transmutation before Helvetius, but let him have the value of about half a rape-seed of the stone, saying it would be enough to transmute up to an ounce and a half of lead. He then promised to return at nine the next morning, and to show Helvetius the method of using the Medicine.

The next day Elias did not appear; but at half-past nine a stranger came in his stead, explaining that his friend was detained on urgent business, but would come at three in the afternoon. But Helvetius waited in vain until almost eight, and began to doubt the truth of the matter. His wife then came and persuaded him to try the transmutation himself, which he eventually did, ordering his son to kindle the fire. He asked for some yellow wax, with which his wife wrapped the matter of the stone, and himself cut off an ounce and a half of lead, which was fused in the crucible. His wife then threw the little mass upon the molten lead; the crucible was covered over, and in a quarter of an hour the whole mass of lead was transmuted into the best gold. [pp. 70-73.] They then hastened with this gold to a goldsmith, who tested it carefully and found it to be very pure, and worth fifty florins an ounce. The next day, the rumour having spread, the gold was tested, at the request of Dr. Porelius, General Examiner of the Moneys of the province, by a silversmith of the name of Brechtel, with the result that this singular gold was found to have transformed into its likeness two scruples of the silver with which it had been melted. Thrice after this was the gold tested by antimony, with the result that each time every drachm of gold produced, at the expense of the silver, an increase of a scruple of gold, whilst the silver itself was pure, good, and very flexible. [pp. 74-77.]

These tests are referred to in a letter of the philosopher Spinoza, addressed to Jarrig Jellis, and dated Voorburg, 25th March, 1667, in which he says: "Having spoken to Voss of the Helvetius business, he laughed at me, surprised at seeing me pay any attention to such trifles. To ease my mind on the subject, I went to the minter, Brechtel, who had tested the gold. He assured me of the fact that, in the melting, the gold had increased in weight when the silver had been thrown upon it. This gold must therefore have been of a very peculiar nature, since it changed silver into more gold. Not only Brechtel, but several others who had witnessed the test, assured me that such had been the case.

Then I went to Helvetius himself, and he showed me the gold and the crucible, which still had some gold adhering to its sides. He told me that he had thrown on the molten lead scarcely a quarter of a corn-grain of the philosopher's stone. He added that he would let everyone know of this. It seems that this adept had already made this experiment at Amsterdam, where he might still be found. This is all I could find about the matter." [B. D. SPINOZA: *Opera Posthuma*, p. 533].

This letter disposes of the theory that the account of Helvetius' transmutation was faked, either by Helvetius himself or with his connivance; unless indeed we go to the length of supposing that Helvetius, Brechtel, and probably also Porelius, all men of good standing, and having nothing to gain by such a fraud, were in collusion with one another, a supposition which I think we may dismiss as absurd, especially in view of the fact that Helvetius had been, prior to this event, a declared adversary of Alchemy.

But may it not be possible that Helvetius was in some way deceived? In a paper published in the *Mémoires de l'Académie des Sciences de Paris*, 15th April, 1722, entitled: "Des supercheries concernant la pierre philosophale," Geoffroy l'Ainé exposed the various frauds by which charlatans imposed upon a credulous and ignorant public, often with the object of securing large sums of money under various pretences. The full text is reproduced in Figuier's work, p. 381. Of the various tricks explained therein, only three could apply in the case of the transmutation of Helvetius. They are: (1) crucibles with false bottoms, consisting of a small heap of oxide or alloy of gold concealed under a layer of crucible-powder mixed into a paste with a little gum or wax; (2) hollow stirring rods of wood, filled with gold-powder; (3) chemical reactions then unknown, though quite familiar to modern chemists. The second I include merely because we are not specifically told that Helvetius did not stir the molten lead before covering the crucible. But for these tricks to be successful, be it remembered, either the alchemist himself, or some accomplice of his, must be present at the operation, or else the implements and materials must have been previously tampered with. Now the only persons present at Helvetius' experiment were his son and his wife. Could either of these, especially the wife, who threw the particle wrapped in wax into the crucible, have been persuaded, by some means or other, to hoodwink the experimenter? But surely Helvetius would have noticed whether something were thrown into the crucible, other than the philosopher's stone, or that the wax pellet supposed to contain it was unduly bulky. And if some gold or alloy of gold had been cleverly introduced in this way, or by means of a hollow stirring rod, what became of the lead that Helvetius,

a competent chemist, had with his own hands cut and weighed and put into the crucible? The same objection would apply equally to the case of a prepared crucible, even supposing that the accomplice had correctly guessed which crucible Helvetius was likely to use, and taking it for granted that the unaccustomed weight of the prepared crucible had passed unnoticed. The only way out of the difficulty would be to suppose that for the lead had been substituted an alloy of gold so cleverly prepared that a chemist was deceived into thinking it lead, even when melted, and the substance alloyed with the gold was so completely volatile as to leave no trace after completion of the operation. Of such an alloy it is difficult for even a modern chemist to conceive; but apart from this, we have to take into account the fact that the crucible was covered over during the essential part of the operation, thus preventing or at least impeding the process of volatilization, and then, of course, the presence of some impurity would have been detected in the testing. Furthermore, the ingot of gold would have weighed much less than the piece of supposed lead, and this fact could not have escaped discovery. Finally, how came it that the product had the power of turning into its likeness some of the silver introduced by the assayer, without the quality of the remaining silver being in the slightest degree impaired? Any one of these objections seem to me unanswerable, and taken together they constitute an insuperable obstacle to the theory that Helvetius could have been imposed upon. We have already seen that the testimony of the witnesses is unimpeachable.

Here we have an instance of authentic transmutation withstanding the severest criticism. One such instance would suffice as a proof. Yet there are two others perhaps equally valid. That of Claudius Berigardius is particularly striking. "I will relate", he says, "what once befel me when I was extremely doubtful of the possibility of changing mercury into gold. I received from an able man, who wished to remove my doubts in this matter, a drachm of powder of the colour of the wild poppy, and in odour recalling that of calcined marine salt. In order to remove all suspicion of fraud, I myself bought the crucible, the charcoal and the mercury at different dealers, so that no gold could have been concealed in these, as is the practice of charlatans. To ten drachms of mercury I added a little of the powder, put the whole on a sufficiently hot fire, and in a very little time the mercury was converted into nearly ten drachms of gold, of the genuineness of which various goldsmiths held no doubt. Had not this happened in a secluded place, out of reach of strangers, I might have suspected fraud; but I can confidently assert that things happened as I have stated." [*Circulus Pisanus Claudii Berigardii Molinensis . . . De veteri &*

*peripatetica philosophia*. Utini, 1643. Circulus XXV, p. 154.] Here we have the testimony of one versed in the natural sciences, and aware, moreover, of the deceptions practised by adventurers. The precautions he took preclude the possibility of fraud. But was he an unimpeachable witness? Apparently he and his works were held in good regard, since the *Circulus Pisanus*, from which the above extract is taken, bears the imprimatur of Fr. Antonius Vercellus, Inquisitor General of Padua, dated 12th May, 1641. Add to this the entire absence of motive, for Berigardius had nothing to gain by faking such a story, any more than Van Helmont. Indeed, he ran the risk of being accused of charlatanism, as was the case with the latter.

The transmutation of Van Helmont is the third well-authenticated instance to which I have alluded, and was perhaps as free from the possibility of deception as that of Berigardius. Van Helmont tells us that he himself transmuted, in his laboratory, eight ounces of mercury, with one quarter of a grain of the philosopher's stone, which had been given him by a stranger, who was not present when the operation was performed. The gold obtained weighed eight ounces less eleven grains. Van Helmont's own words are quoted in Redgrove's *Alchemy: Ancient and Modern* [p. 82]. It would have been no easy matter to deceive so eminent a chemist, and all accounts that we have of his life give us no warranty for accusing him of charlatanism. Besides, I repeat, what could he have gained by such deceit?

Here then are three cases of transmutation, one of which at least can be said to be proved as absolutely as it is possible to prove any historical fact, and the two others supported by evidence scarcely less impressive. I cannot see, therefore, how we can reject this accumulated testimony, without rejecting the validity of all human attestation, and thereby assuming all history to be based on a foundation of sand.

The only remaining obstacle to our accepting the truth of transmutation seems to be our inability to explain the process, at any rate as carried out by the methods of the alchemists. And though I hold that to disbelieve a sufficiently attested fact, because of lack of explanation, is unscientific, yet I will admit that, in some minds at least, the inability to explain a fact tends to beget doubt as to its authenticity. I will therefore endeavour to suggest a line of thought along which may be discerned, more or less dimly, some explanation of the *magnum opus*. This I will term the deductive evidence, as it is based on an attempt to harmonize what we know of matter and energy by means of a hypothesis as to the genesis of matter from Aether, and the modifications of Aether, and consecutively of matter, by spiritual activity.



If we allow our minds to soar over the vast field of natural science, in the endeavour to trace its outlines, we shall be struck by two features pervading the entire range of phenomena. The one is the tendency of all matter to dissociate, the other is the presence of some force, manifested variously as gravitation, cohesion or chemical affinity (Prof. Andrew Gray inclines to the opinion that they are in essence the same), tending to oppose the dissociation of matter, involving itself more and more in the production of new and ever more complex forms, and manifesting an activity—as, for instance, in the process of crystallization—which might well be called, in an analogical sense, intelligent. It is not here my intention to array the facts which justify this generalisation; they will be sufficiently familiar to those acquainted with the advance of modern physics. Suffice it to say that the universality of the dissociation of matter is strikingly brought out in Gustave Le Bon's *Evolution of Matter*, already referred to. I may also mention Charles Maurain's work on *Les Etats Physiques de la Matière* [Paris, 1910,] as an excellent exposition of the multitudinous aggregations of matter in all its states, and particularly of the phenomena of crystallization. What immediately concerns us is: can we frame any theory of the genesis of matter which will embrace these two great generalizations—dissociation on the one hand, aggregation on the other? In the absence of any definite formulation of such theory, at any rate that I know of, I venture to put forth mine. I do not propose, even were it possible, to give an account of how the theory originated in my mind, but will simply state it in the briefest possible outline.

I postulate as the basis of all matter an undifferentiated Aether, a philosophic continuum, imponderable, incompressible and absolutely non-rigid. Upon that Aether a Stress acts, with the result that some portion, more or less vast, of the Aether, becomes differentiated into innumerable vortex-rings, inconceivably small even when compared with an atom, and relatively close together; thus transforming the Prime Aether into a dense medium corresponding to the ether of the physicists, and capable, as Boussinesq shows in his *Théorie Analytique de la Chaleur*, of behaving as a perfect fluid towards the comparatively slow motions of the heavenly bodies, but as an extremely rigid solid in relation to the inconceivably rapid transversal vibrations of light. But whereas Boussinesq postulates an ether consisting of isolated corpuscles, endowed with rapid motion, I conceive of these "corpuscles" as being vortex-rings in a perfectly fluidic continuum, and endowed with considerable inertia in virtue of their gyration, in accordance with Kelvin's idea.

The Stress continuing to act, a portion of this now differentiated ether is thrown into spiral motion, the vortical

corpuscles beginning to close together, thus forming a (comparatively) huge spiral Vortex or "electronic nebula". This electronic nebula condenses, much in the manner of celestial nebulae, tending to give rise to an "electronic system". This tendency I call "electronic *metabasis*". The Stress which has thus endowed the inert Aether with motion, I call at this stage "electronic *kinesis*", and I conceive it as acting centripetally, although in the very acceleration of movement due to the condensation which it causes, the vortical corpuscles tend to fly off tangentially. Hence the beginning of a struggle which is continued throughout the entire genesis of material forms. The first outcome of this struggle is the production of an "electronic system", in the course of the formation of which some vortical corpuscles escape, the others held together by the counteracting *kinesis* constituting the "planets" of the system. By the continued action of Stress, a number of electronic systems, or electrons, are thrown together, the result being "atomic *metabasis*", or the genesis of an atomic system, such as the most recent theories have imagined. Be it noted, however, that to the "positive nucleus" corresponds simply the "atomic *kinesis*" (as at this new stage I will call the all-compelling Stress), the effect of which is to make things appear *as if* there were a centre of attraction in the midst of the system, whether or not there be at that centre a corpuscule more or less material. This idea will not seem strange if we bear in mind that the term "attraction" denotes purely the behaviour of two or more bodies in a particular manner, and leaves us in complete ignorance of the *nature* of that which has caused the behaviour. It is quite possible, therefore, that the so-called "positive nucleus" will never be isolated, being perhaps only an abstraction. And here it is well to remember also that when we apply the terms of the phenomenal world to the ether or to electrons, we are only speaking analogically, since the *atom* may be said to be the limit of even potential sense-perception, in relation to which (physical) perceptions alone those terms were originated. But to return to our atomic system. In the course of the atomic *metabasis*, a number of electrons escape, just as vortical corpuscles did in electronic *metabasis*, the remaining electrons going to form the atom, under the stress of the counteracting *kinesis*. This escape of electrons is made manifest to us in radio-activity and allied phenomena.

Proceeding in the same way, we shall find atoms thrown together to form inorganic molecules, under the continued influence of Stress, here called "chemical *kinesis*" or chemical affinity. In the course of chemical *metabasis* appear the various chemical phenomena. Inorganic molecules, again, continue to form organic (or colloidal) molecules, under the influence of "organic *kinesis*". Lastly, after

organic metabasis comes vital metabasis, or the formation of the cell, in the largest sense of that term. Needless to say, vital kinesis plays an important part in all vital phenomena, its actions determining anabolism, its inaction allowing the process of desintegration to begin—for desintegration is but the triumph of dissociation over aggregative kinesis.

The scheme I have just outlined will give us, I venture to think, some faint conception of the genesis of matter from Aether, in terms of aggregation and dissociation. But one thing remains dark, *viz.*, the nature of that Stress which manifests itself, under various aspects, as a universal aggregative force, or "kinesis", throughout the evolution of all natural forms. It is certainly not phenomenal. It can scarcely be said to be noumenal, since, of itself, it could not, lacking the Aetherial substance, be the cause of sensation. But do we know of any other category in which we could place it? To answer this question—and by so doing we shall gain a glimpse of the alchemical secret—we must turn for a moment to psychology.

Resting with eyes closed after some deep reflection, we may become aware of an ideal percept, as though the memory of something actual, and, opening our eyes, we will perceive the corresponding actuality. Or, intent upon a piece of work, we may, releasing for a moment our attention, "have an idea" that some friend is in front of us, and, looking around, we shall find the actual person of our thought sitting behind us, silently waiting: we had been too busy, so he explains, to notice his entry. Such occurrences as these seem capable of no other explanation but that sensations may affect us, sufficiently to be remembered, without actually entering our consciousness at the time. To test this theory, we can experiment, and we shall find that we can at will, by concentrating our attention on some idea, become unconscious of percepts which, under conditions in every other respect similar, we should almost certainly perceive. Hence sensations, and the being aware of sensations, are, with the highest probability, different things: sensations are capable of affecting, more or less permanently, a something which we call "mind" (of the nature of which we may devise various theories, according to the lights of our science); but the "awareness" of sensations (and affections, to which the same remarks apply) is something quite distinct, capable of being directed upon some part of the mind to the exclusion of others—hence the faculty of abstraction. This "awareness", being non-sensational and non-affective, is incapable of being described or analysed in any way; it is, indeed, in a new and special category, to which we will give the term "spiritual".

By its very definition, or rather lack of all positive definition, this spiritual category stands entirely apart from the

phenomenal or noumenal categories, and cannot therefore be said to be subject to the laws which obtain with these. It appears as unconditioned and free, and, under the aspect of awareness, capable of singularly affecting the process of thought and thereby of action. Moreover, we have no justification for declaring the mental attribute of awareness to be the sole aspect of the spiritual; indeed, if only from its character of indefinability, we have every justification for placing Stress in this same category, and considering it as being but another aspect of the spiritual. We might go yet further, for certain philosophical considerations make it probable that we have to look to this spiritual category for the origin of Aether and matter and the laws governing them. In the degree that man attains to the freedom of the spirit, it would thus be possible for him to modify nature, directly or indirectly, in the manner indicated by the alchemists. And if any analogy can be traced between the doctrines of the alchemists and the hypothesis I have here set forth, it would lend unusual interest to those cases of transmutation which seem sufficiently authenticated.

#### ABSTRACT OF DISCUSSION.

MR. SIJIL ABDUL-ALI said that the thesis presented, in regard to what the lecturer called the "positive deductive" evidence, seemed to him of such ingenious originality that he was prepared to make only some tentative remarks. He considered it doubtful whether there was scientific justification for placing gravity, cohesion and chemical affinity in the same category. At any rate the same mathematical law could not be held to obtain in the cases of cohesion and chemical affinity as in gravity. The force would have to be considered to vary inversely as some power of the distance higher than the second; otherwise, as Sir O. Lodge had pointed out [*The Ether of Space*, 1909, p. 116], the force between two atoms would be insufficient to produce an appreciable acceleration at molecular distances. It seemed probable that chemical affinity should be regarded as a purely electrical phenomenon, probably superadded to gravitation. But at any rate the three forces were connected by the fact that they were all bound up with the concept "ether".

Mr. J. W. FRINGS, after having expressed his appreciation of the lecture, suggested that it might be possible to explain the action of the philosopher's stone as that of a catalyst. The theory of the evolution of matter which the lecturer had advanced was one that he also embraced. The ultimate particles,—the electrons,—were, he thought, undoubtedly nothing more than etheric "whorls", or force-centres. All matter was radioactive and, therefore, potentially dissociative. In dissociation it lost all physical charac-

teristics, and, thus, ceased to be matter. This fact indicated the identity of the underlying substance and the practical homogeneity of all the elements when reduced to their primal essence. Admitting this there was no reason to doubt the possibility of transmutation. In the cases dealt with the lecturer had shown the improbability of the operation of trickery from outside sources. That the evidence of those recording the transmutations was itself quite dependable was a point that should be made quite clear.

THE CHAIRMAN said that he considered the lecture as very suggestive and containing novel views. In the days when Dalton's theory was accepted in its original form the possibility of transmutation could not be tolerated. Modern scientific research not only indicated this possibility, but also the means whereby it might be actualised. If the electrical theory of the constitution of matter was true, what was needed to bring about transmutation was energy in a highly concentrated form. The only known available source of such a form of energy was the spontaneous disruption of the atoms of niton and other highly radioactive elements. And Sir William Ramsay's experiments indicated, though they must still be regarded as *sub judice*, that he had succeeded in effecting certain transmutations by such means. But the highly radioactive elements were unknown to the alchemists; hence, whilst modern scientific research indicated the possibility of transmutation, it also indicated the improbability that the alchemists accomplished it. For it seemed certain that no mere compound of stable atoms, such as alchemical methods for preparing the philosopher's stone would yield, would evolve, by its dissociation, energy at a sufficiently high potential. He was not prepared to accept the lecturer's theory of the apparently miraculous creation of the philosopher's stone by the power of spirit, not because he disbelieved in the potency of spirit, but because he regarded spirit as always operative and manifest in the normal phenomena of nature. He was, however, much impressed with the historical evidences of transmutation, which had been passed over too lightly by chemists. Helvetius, van Helmont, Berigardo of Pisa and Spinoza, were all men of high standing, and it was very improbable that any of them would have committed a fraud. But if a method for converting base metal into gold had been discovered, it seemed almost incredible that the secret should never have leaked out. We were thus led into a mental *impasse* from which the speaker saw no escape.

Mr. G. DE MENGEL, in replying, said that we could conceive of the attraction due to Stress following the law of inverse squares for comparatively large distances, but some other law—say that of the inverse fifth power—at molecular distances. We had no means of ascertaining according to

what law Stress itself acted; we could only measure its effects, which might be considerably modified in close proximity to proto-atomic elements. Electrical phenomena were themselves but effects of Stress, according to his hypothesis. Catalytic action, he replied in answer to Mr. Frings, might be in essence analogous to that of the philosopher's stone; though such action did not change a substance, but simply facilitated the combination of two substances. He did not consider the electrons to be etheric "whorls", but rather aggregates of etheric "whorls". With reference to the Chairman's remarks, he said that he would hardly consider the philosopher's stone to be a compound of stable atoms: he regarded it as one in which Stress was peculiarly active, manifesting its activity, under special conditions, upon outside bodies. Since the nature of man was in part spiritual, it was conceivable that he might act directly upon nature by the operation of his free spiritual activity, and even communicate this activity to some extra-human substance. Alchemists might disguise spiritual processes under physical terms. That their secret should not leak out was in no way wonderful—esoteric secrets, when real, were too carefully guarded for that.

#### REVIEWS.

*A History of Chemistry from the Earliest Times till the Present Day.* By the late James Campbell Brown, D.Sc., LL.D. [Edited by Henry H. Brown.]  $8\frac{3}{4}$  ins.  $\times$   $5\frac{1}{2}$  ins., pp. xxx + 543 + 1 plate. London: J. & A. Churchill, 7, Great Marlborough Street, W. Price 10s. 6d. net.

Most histories of chemistry treat of the alchemical period with the utmost brevity. This is not the case with the late Prof. J. C. Brown's book. 191 of its pages deal with "Ancient History", and, in fact, we do not lose sight of the alchemists until some two or three chapters later. The chapter on Paracelsus contains views at variance with those of modern scholarship. Prof. Brown recognises the good Paracelsus did in breaking away from old traditions and widening the aims of chemistry; but he says "there is good reason to believe that he was on the whole a vain and self-seeking quack, who neither understood the nature of chemical science nor undertook any regular or successful investigation", and he accuses him of greed and intemperance. These rather extreme views are no doubt derived from the misstatements of Oporinus. There is a note by the Editor aiming at modifying them.

Prof. Brown had little liking for the mystical views of the alchemists; but (excepting Paracelsus) he has treated them with praiseworthy fairness and impartiality, and the first part of his scholarly work (with which this notice is only

concerned) forms one of the completest histories of Alchemy, written from the scientific standpoint, in the English language. Prof. Brown indicates that all the alchemists were not the knaves they have been accused of being. He says, "in fairness it ought to be said that, after allowing for all their shortcomings, the writings of the philosophical alchemists are not such nonsense as they seem to a modern student. We have lost the key to much of their symbolism, and the mysterious allusions with which they are filled no longer appeal to scientific thinkers. To us, therefore, they have little to say; but it was not so in the Middle Ages. Then they were studied not only by quacks, who sought to discover in them modes of enriching themselves at the expense of others, but also by earnest men, whose work resulted in a gradual improvement in chemical processes, and a steady, if slow, increase in the number of chemical compounds produced." (p. 73). Indeed, in one place he goes even further than this and suggests that the philosophy of the alchemists may not after all be entirely erroneous. He says, "the philosophy of the alchemists . . . when fully considered, is by no means despicable. The knowledge which was at that period available did not permit of the practical application of this philosophy, and the sages did not rightly understand their own theories. Yet we must not forget that while there is much that seems absurd and nonsensical, there is much which is not inconsistent with recent researches and discoveries of science. These old philosophers had a wonderful grasp of general principles. It may be that those doctrines of the unity of matter and the mutation of form, which they taught in the light of deductive philosophy, will ultimately by the use of inductive methods be established as the true explanation of phenomena at present inexplicable and outside the domain of science." (p. 134). These are highly suggestive words, and indicate a greater sympathy with Hermetic philosophy than one gathers from other remarks of the writer. He indicates, too, the existence of a purely mystical type of alchemist, who was concerned only with psychological processes in man; though, as he points out, there were not many of this sort.

Regarding the origin of the belief in the Philosopher's Stone, Prof. Brown says, "The conception of the philosopher's stone . . . originally arose from the practical work of goldsmiths in making debased gold and silver, or spurious imitations of them. This work being confined to members of the royal and priestly house, great revenues were derived from the art. But the writers of text-books in later times, losing touch with practical men and absorbing false philosophical notions from Greek ideas, evolved from the inner consciousness of the philosophers, and promulgated without the slightest attempt to test by experiment the truth

of the assumptions, drifted further and further from a knowledge of laboratory work." (pp. 178 and 179). This is, no doubt, in the main correct; but it confuses, I think, between cause and effect. Assuming that the alchemists misinterpreted the recipes of the old metallurgists, this was not the cause, but the result, of their views (formed *à priori*) concerning the nature of the metals and the possibility of transmutation. Moreover, although, no doubt, there was misunderstanding of details, there seems to have been no misunderstanding as to the possibility of transmutation, for, as Prof. Brown points out, the ancient Greek and Egyptian jewellers, imbued with the idea of the unity of matter, considered that, when they alloyed gold or silver with other metals (and thus "debased" it, as we should say) they had really increased the amount of gold or silver, providing of course the product resembled the noble metal; and they entertained similar ideas concerning alloys of common metals which superficially resemble silver and gold. Hence, it is to the mystical philosophy of Egypt and Greece and the prevalence of *à priori* reasoning that we must look for the real origin of the doctrines of Alchemy, rather than to any misunderstanding of ancient metallurgical recipes. Possibly this is Prof. Brown's view also, but he does not make it quite clear.

Prof. Brown's book, I may remark in conclusion, is enriched with very many illustrations (the alchemical portion contains 85), though they are, unfortunately, rather small in size and not very well produced. The book bears every sign of being the result of deep and extensive study, and should be in the library of everyone interested in the history of Alchemy.

EDITOR.

PERIODICAL LITERATURE.—

*The Path*, for April, contains the first instalment of a work on synthetic philosophy by Mme. Isabelle de Steiger, entitled "Superhumanity: A Suggestive Enquiry into the Material and Mystic Meaning and Condition of Regenerate Humanity." Of course, it is not written in the interests of historical research; but since many of the views advanced therein are stated to be based upon or in harmony with those of the alchemical philosophers, the work will no doubt be of interest to members of THE ALCHEMICAL SOCIETY as an interpretation of Hermetic philosophy. It is, judging by the first part, certainly suggestive and by no means lacking in interest.

EDITOR.