

The first history of chemistry / by John Ferguson.

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the questions to be answered by an examination of the manuscripts, the way of looking at the questions, the manner of answering them—everything is different. The manuscripts are examined and interpreted at the present time, not for the sake of either defending or attacking the truth of alchemy, but for ascertaining, critically and dispassionately, when this first chemical idea—the idea of transmutation—originated, and what light the manuscripts throw upon its history; and their meaning is illustrated not by comparison with the results of modern chemistry alone, but also from the researches that have been carried on so long into the history and learning of the ancient world—themes undreamt of in the middle of the sixteenth century. It would have been as impossible for Berthelot to have gone back to the standpoint of Vallensis, as it was certainly impossible for Vallensis to have had any foreknowledge of the aids now at the disposal of the chemical archæologist and historian. In fact, the archæology of chemistry, if it has not been actually called into existence, has been stimulated at least, by the progress of archæology in general. But for the interpretation of the languages of the Egyptians and other ancient peoples, the discovery and editing of papyri, the examination of the multitudinous objects of religion, of art and of everyday life, which have been preserved to us from long bygone times, and the possibility of solving other problems by the help which all these have put within our reach, the early history of chemistry could have advanced very little. Even the disposition of mind to take up so apparently fruitless a topic as the origin of the notion of transmutation was wanting but a little while ago, when foregone conclusions against any subject were quite enough to prevent investigation of it. The comparison of histories of the same subject written at different times, in very different surroundings, by men holding opinions at very different stages of development, thus becomes valuable, not merely for the record of events which they each contain, but also because they illustrate the growth of knowledge of the topics treated of, as well as of the manner in which they are treated. Successive histories form an all-important possession for the elucidation of the rate of progress, and for the consideration of the principles which such a subject as chemistry follows in its growth, and of the conditions under which it moves forward. Before the student of the histories and history of his science are passed in steady review the relations it bears to other sciences; the mode in which its theories

originate, attain their maximum influence and disappear, absorbed in others more comprehensive; the attitude which the advocates of newer views assume towards those persuaded of the truth of older; lastly, what of scientific law each successive historian has been able to evolve from the multitudinous details of his narrative, and the success which has attended his efforts to present it to his contemporaries and preserve it for his successors.

§ 2.—The attempt to elaborate a philosophy of science—chemistry included—on a historical basis, was made many years ago by Dr. Whewell; but no one has tried to give a critical examination of the histories of chemistry in order of time, that is to write a chronicle of chemical histories, for the purpose of showing how the science developed, how at successive times it was thought this development should be described, and how it actually was described. It is not my intention even to start such an investigation on the present occasion, but merely to give a notice of a little work which may be regarded as containing one of the first attempts, if not absolutely the first, to collect materials for the avowed purpose of proving the antiquity of the science. The work itself is uncommon; what little is known about the author is imperfectly given; his name just appears in the histories of chemistry, and is not to be found at all in English books of reference, so that some notice of him may not be superfluous, seeing that his book would certainly be one of the first in a survey of chemical histories such as that indicated above.

The subject falls into three parts: I. the author's life; II. the book on the truth and antiquity of chemistry; and III. the author's treatment of the subject.

I.—THE AUTHOR'S LIFE.

§ 3.—The author was a Frenchman, whose name was ROBERT DUVAL, or in its Latinized form, ROBERTUS DE VALLE, or ROBERTUS VALLENSIS.* He was born in the latter part of the fifteenth

* He is called *Robertus de Valle* in the title of his abridgement of Pliny, as quoted by Harduinus (*Plinii . . . Naturalis Historiæ Libri XXXVII.* Paris, 1685, vol. I. Preface to the Reader). Elsewhere it is *Robertus Vallensis*. On the title-page of Hutten's *Ars versificatoria*, Paris, 1559, the name is curiously misprinted *Robertus Valdensis*. Watt (*Bibl. Brit.* 1824, II. 809 e), enters him erroneously as *Robertus Tallensis*, and J. F. John (*Handwörterbuch der . . . Chemie*, Leipzig, 1817, I. p. 161) styles him *Robertus Vallesis*.

century, some authorities say at Rugles, others at Rouen.* In his first book he is styled *Rothomagensis*, i.e., of Rouen, but, so far as I know, it is only in this book that this designation appears. Everywhere else his name is followed by the epithet: *Rugl.*, which is a contraction for *Ruglensis*. He was a canon of Chartres, who, judging by his writings, was interested in natural history, and who was led away, like many of his contemporaries, by the fascinations of alchemy.

§ 4.—Of his life apart from his writings there is no record. His first book was an abridgement of Pliny's Natural History which he dedicated to René, bishop of Chartres, and of which the first edition was printed in 1500. Along with it Vallensis published an *Explanatio Locorum Plinii difficiliorum ordine alphabetico*, Paris, by Durand Gerlier, 1500, in 4to.† Another edition appeared in 1505. The title is as follows: "*Roberti de Valle Rothomagensis compendium memorandorum vires naturales et commoda cōprehendens à Plinio data; valens nedum ad secreta nature noscenda; sed ad vsus quoq3 necessarios; corporisq3 et ingenii cōseruationē*;" Impressum Parisii (sic) per Felicem Baligault impensa magistri Durandi Gerlier, anno 1505," in small 4to.‡ It was reprinted in 1520 in 4to, and this edition was also published by Durand Gerlier.§ There was another in 1600 in 4to, but I have seen no detailed notice of it.|| All the editions seem to be of great rarity. There is one of the 1505 edition

* The *Biographie Universelle* says at Rugles, Lebreton (*Biographie Normande*, Rouen, 1857, I. p. 529) says he was born at Rouen or at Rugles, but Frère (*Manuel du Bibliographe Normand*, Rouen, 1858, I. p. 415) says definitely that he was born at Rouen and that the *Biographie Universelle* is in error. I am quite unable to decide who is right. Schmieder (*Geschichte der Alchemie*, Halle, 1832, p. 278) hazards the guess that he was a German, that his name was Robert Thaler and that he was a native of Ruhland, in Oberlausitz! Kopp (*Beiträge*, Braunschweig, 1869, p. 322) say he knows nothing about him, which is strange, considering that there is an article on him in the *Biographie Universelle* and that Poggendorff (*Biographisch-literarisches Handwörterbuch*, 1863, I. col. 635,) also mentions him.

† Graesse, *Trésor de Livres Rares*, Dresden, 1867, T. VI. ii. p. 251. Graesse does not seem to have known that *Robertus de Valle* was the same person as *Robertus Vallensis*.

‡ Ed. Frère, *Manuel du Bibliographe Normand*, I. p. 415.

§ *Biographie Universelle. Nouvelle Biographie Générale.* Lebreton *Biographie Normande*, I. p. 529.

|| Lebreton, *Ibid.*

in the library at Rouen,* but of the others I know of no copies; there is none of them in the British Museum. It must have been a work of the author's youth, perhaps a sort of school abridgement, as it purports to have been written *ad corrupti sermonis latini emendationem*. The youth of its author also may have prevented it being of any value as a contribution to Plinian literature, and this may form a slight defence against the crushing verdict passed on it by Harduinus, when he† describes it as: *opus nullius eruditionis, nulliusque fructus, aut pretii*.‡

§ 5. — A considerable number of years later appeared what probably was his second work—*Commentarius in artem versificatoriam Hulderici Hutteni*. It appeared, according to Graesse:§ *C. comment. Roberti Vallensis Raglensis* (sic) *Paris. ap. Joa. Yuernel. 1530. pet. in-8º. (40 ff.)*; and again: (*av. ce comm.*) *Paris. ap. Prigentium Caluarin in clauso Brunelli ad insigne Geminarũ Cypparũ. 1537. in-8º. (40 pp. ch.)*. There was also an edition, Paris, 1535, in 8vo.|| I have not seen any of these. The copies of the work which I have seen are in the British Museum, and are dated respectively 1551 and 1559. As this commentary of Vallensis is quite unknown to every one who has written a notice of him, it may not be out of place to quote the titles of the two editions:—

1551.—*Commentarius In Artem | Versificatoriam Hvlde- | rici Huteni, cum perbreui accessione primarum & | mediarum syllabarum, atque specierum carminis, à | Roberto Vallensi Ruglensi editus: ac denuo ab eodem | auctus & recognitus.*

Præterea adiectum est ad finem compendium | de Accentibus & periodis, siue clausularum | punctis.

Lvtetiæ, | Ex typographia Matthæi Dauidis, via | amygdalina, ad Veritatis insigne. | 1551. |

It is a small 4to, and contains pp. 55.

* Frère, *Manuel du Bibliographe Normand*, I. p. 415.

† Harduinus, *Plinii . . . Naturalis Historiæ Libri XXXVII.* Paris, 1685, vol. I. Preface to the Reader.

‡ In 1587 there was printed at London in small 4to, a black letter tract—*The Secrets and wonders of the worlde . . . Abstracted out of that excellent naturall Historiographer Plinie.* Is this a translation of Vallensis' *Compendium*, or has it anything to do with it? For a short notice of it see Part IV. of my *Bibliographical Notes on Histories of Inventions and Books of Secrets*, communicated to the *Archæological Society of Glasgow*, in January, 1885.

§ Graesse, *Trésor de Livres Rares*, Dresden, 1862, T. III. p. 397.

|| Panzer, *Annales Typographici*, Norimb. 1800, VIII. p. 192, No. 2518.

The other copy has a different title-page:—

1559. — Commentariivs | In Artem Versificato- | riam Hulderici Hutteni, cum perbreui accessione | primarum & mediarum syllabarum, atque | specierum carminis, à Roberto Valdensi (*sic*) | Ruglensi editus: ac denuò ab | eodem auctus & re- | cognitus. | Præterea adiectum est ad finem, Compendium de Accentibus, | & Periodis, siue clausularum punctis. | Parisiis, | Apud Gabrielem Buon, in Clauso Brunello, | ad D. Claudij insigne. | 1559. |

It is a small 4to, and contains ff. 28.

This too may have been a sort of school book written to promote scholarship and the appreciation of the technicalities of Latin verse.

§ 6.—The same year, 1559, he is said* to have edited the first edition of the chemical treatise ascribed to Morienus, *De Transfiguratione Metallorum*; two years later, in 1561, he brought out the little work on the Verity and Antiquity of Chemistry, which is specially the theme of the present notes, and to which fuller reference will be made presently, and in 1564 he certainly edited the second edition of Morienus.

§ 7.—With regard to the 1559 edition of Morienus, I am not prepared to say that Vallensis was not the editor. There is no direct proof, however, that he was; for the introductory address to the reader, which informs him that two Latin versions were employed, the best, by Castrensis, having been used to form the basis of the text, and the various readings of the other anonymous version being added on the margin, gives no indication as to who saw the book through the press, whether it was the printer, Guillard, himself, or some one else. On the other hand, however, the very last page contains two Latin couplets by Vallensis, so that it is quite possible that he had something to do with it.

The title is as follows:—

Morieni | Romani, Qvondam | Eremitae Hierosolymitani, | de trans-
figuratione metallorum, & oc- | culta, summaque antiquorum Phi- |
losophorum medicina, Li- | bellus, nusquam hacte- | nus in lucem |
editus. | Cvm Privilegio. | Parisiis, | Apud Gulielmum Guillard, in
via Iaco- | bæa, sub diuæ Barbaræ signo. | 1559. |

It is a small 4to, ff. [2] 34.

Both the first and second editions of Morienus are to be put certainly among the rarities of alchemical literature. The second edition is perhaps the rarer of the two.

* *Biographie Universelle. Nouvelle Biographie Générale.* Neither of the editions of Morienus is quoted by Lebreton and Frère.

§ 8.—As to Vallensis' revision of the second edition there is no doubt, for the title gives full details. It is as follows:—

Morieni | Romani, Qvondam | Eremitae Hierosolymitani, De | re Metallica,
Metallorum transmutatione, | & occulta summaq; antiquorum medicina
| Libellus, præter priorē editionem accuratè | recognitus. | Item, Nunc
primū in Lucem prodit | Bernardi Treuirensis Responsio ad Thomā |
de Bononia Caroli Regis octauī medicum | de Mineralibus, & Elixiris
seu pulueris phi | losophici compositione, quæ pars est secre | tioris
phisicæ, scholiis aliquot per Robertū | Vallensem Rugl. Illustrata. |
Ad calcem adduntur | Tabulæ breues ab eodem R. Vallensi conscriptæ
quæ antiquorū | intentionem de pulueris philosophici compositione,
abstrusis eorum | scriptis & ænigmatibus inuolutam, declarant | Cum
Indice copiosissimo. | Parisiis, | Apud Gulielmum Guillard, via Iacobæa
sub | D. Barbarę signo. | M.D.LXIII |

It is a small 4to, ff. [2] 66 [4].

In the prefatory note of Vallensis to this edition, he states that Guillard, the printer, being desirous of bringing out a few tracts *περὶ χημείας*, about chemistry, and especially that of Morienus, "which had been already once printed by him," asked Vallensis if he could contribute anything from his collection that would throw light upon the puzzling passages in Morienus; whereupon he selected the Epistle of Bernard of Trevisan to Thomas of Bononia, edited it very carefully from a number of copies (presumably in manuscript), added a marginal commentary, and had it printed for the first time. From the way he speaks one would infer that Vallensis had supervised this second edition only, and not the first, but there is nothing sufficiently explicit to enable the question to be decided with certainty. His aim in taking this trouble was the good of those who wished to have trustworthy instruction in the art, and to escape from the wiles of sophists and impostors. For he does not doubt that in consequence of the frauds practised by self-styled chemists many considered the art altogether delusive or extremely difficult, and in its results most uncertain; whereas he says that in his little book, previously published, *De veritate et antiquitate artis chemicæ*, he had collected the testimonies to its truth from the writings of distinguished theologians, jurists, physicians, and philosophers, and so he commends his labours to the true students of chemistry, with the hope that they will not fail to attain it, so profitable as it is to humanity, both for the making of gold and silver, and for preserving the body in health and warding off from it disease. Vallensis was undoubtedly a believer in the existence and virtues of the philosophical elixir, after which so many men ran for centuries.

§ 9.—The two tables which, as stated in the title, are affixed to the second edition, were intended by Vallensis still further to simplify the subject. The first is dedicated to Petrus Drouet,* and is intended to show that native minerals are composed of mercury and sulphur, and that mercury is of two kinds, common and philosophic; and secondly, that the philosophic powder is similarly composed of mercury and sulphur, and he gives a long list of synonyms of these two elements which correspond, each for each.

It is an early and very rudimentary attempt to give an elementary analysis of certain natural substances, and to state the results in a tabular form. This table is followed by a collection of fifty-one brief sentences, aphorisms and dark sayings on the same recondite theme, extracted from a number of authors. So far as I have observed, the second table is to be found only in this edition of Morienus, but the first table was reprinted several times.†

§ 10.—To Vallensis also is ascribed the authorship of an alchemical work entitled, *Gloria Mundi, alias Paradysi Tabula*.‡ What may have given rise to this is the fact that at the end of the introduction his name appears, and along with it another version of the Latin couplets contained in the editions of Morienus, with this difference that the two couplets have been expanded to

* Petrus Drouet was a physician at Paris, and wrote a tract, *Consilium novum de pestilentia*, Paris, 1573. His name is misspelt *Douet* in the reprint of Vallensis' table in the *Ars Aurifera*, 1593 and 1610; and in the 1613 German translation this is further metamorphosed into Peter Sovet (!), which is repeated by Fictuld (*Probiere-Stein*, Frankfurt, 1753, part I. p. 135).

† The reprints are to be found in the different editions of the collection of alchemical writings entitled *Ars Aurifera*; Basileæ, 1572, II. pp. 112-114; Basileæ, 1593, II. pp. 104-106; Basileæ, 1610, II. pp. 69-70; and in the German translation, *Turba Philosophorum*, Basel, 1613, II. pp. 91-93.

‡ Mercklin (*Lindenius Renovatus*, Norimb. 1686, p. 945, copied by Fuchs, *Repertorium*, 1806, I. i. p. 95), is the only person who makes this statement. Roth-Scholtz (*Deutsches Theatrum Chemicum*, Nürnberg. 1732, III. p. 358) says it is by an unknown writer, and Fictuld (*Probiere-Stein*, 1753, part I. p. 83)—if that be really his name—says it is either by a certain Barcius or by Johann von Sternberg. To Fictuld's statements, however, no value can be attached. The earliest recorded edition of the *Gloria Mundi* is of date 1620, but I have not seen it. The others (of which I have seen those with the asterisk) are *Museum Hermeticum*, *1625, *1678, and *1749; Roth-Scholtz's *Deutsches Theatrum Chemicum*, Nürnberg., *1732, vol. III. pp. 357-536; separate editions, Frankfurt, 1648; Hamburg, 1692; and a German translation, Hof, *1774.

six. There can be little doubt that Vallensis is not the author of this work, and it is safe to say that the editorship of the *Rosarium*, another alchemical compilation, is also erroneously assigned to him.*

§ 11. Besides the works just mentioned, he is said to have composed some of an ascetic character, of one of which the title is given:† *Traité des dispositions nécessaires pour mourir saintement*, 1567. It seems to have been prophetic, for this same year he died at Rugles.

II.—THE HISTORY OF CHEMISTRY.

§ 12.—I come now to the second head of the subject—the little work already quoted—which was an attempt to vindicate the importance and truth of the art of transmutation by an appeal to its antiquity, and to the continuous succession of allusions to it by writers of all ages, and on very different topics. It is said that it was a book in great request among the devotees of the art, but it seems to me that it was not really so, for only a very few editions of it appeared.‡ The *Biographie Universelle* says, very sapiently, that the statements of Vallensis will not be accepted without examination, meaning, of course, that what may have appeared true and irrefragable to Vallensis was not really so to the savant of 1814, when the *Biographie Universelle* article was written. To be sure—nor would one take the statements even of the *Biographie Universelle* itself without a considerable amount of caution, for mistakes occur even in it. But I suppose one may consider the opinions of Vallensis as those that he believed to be true at all events. Before passing them in review, however, a list of the different editions of the work may first be given.

§ 13.—

- 1.—1561. De Veritate Et Antiquitate Artis Chemicæ, & Pulueris, siue Medicinæ philosophorū, siue Auri potabilis materia & compositione, illiusque mira vi in tria rerū genera Animale, Vegetale, & Minerale, Testimonia & Theoremata: Ex uariis authoribus sacris, Theologis, Iurisperitis, Medicis, Philosophis, & Poetis, per Robertum Vallensem selecta.

Parisiis, Apud Federicum Morellum, in vico Bellouaco, ad vrbanam Morum. M.D.LXI.

* Fictuld, *Probiar-Stein*, I. p. 135.

† In the *Biographie Universelle*, and by Lebreton and Frère. There is no copy of this work in the British Museum.

‡ Nor was it much quoted. Penotus (*The Alchymists Enchiridion*, London, 1692) refers to it, however, and borrows several extracts from it.

16mo, no pagination, signatures A—F in eights, or 48 leaves in all. Printed in italics throughout.

This edition is quoted in the *Biographie Universelle* and the *Nouvelle Biographie Générale*, by Lebreton and Frère, by Watt (*Bibl. Brit.*, II. 809e), and by Kopp (*Beiträge* 1867, p. 322). There is a copy in the British Museum, but it is a book of the greatest rarity, as it has possibly been easily destroyed in consequence of its tiny dimensions.

- 2.—1591. According to Ladrage (*Bibliothèque Ouvaroff, Sciences Secrètes*, Moscow, 1870, p. 56, No. 546), the first edition appeared, "Lugduni, 1591." This is an obvious mistake. Evidently there is no copy of a 1591 edition in the Ouvaroff collection, for Ladrage's statement is appended as a note to the reprint contained in the *Theatrum Chemicum* of 1613. Ladrage may have made some confusion, for he is not always correct about the dates of first editions; but it is possible that there was an issue two years earlier of the book which is next on the list. Anyhow, I have seen no copy, and no other mention of a 1591 edition except the present.

- 3.—1593. De Veritate Et Antiquitate Artis Chemicæ Et Pulveris Sive Medicinæ Philosophorum Vel Auri Potabilis, Deque illius materiâ & compositione, eiusque mirâ vi in tria rerum genera Animale, Vegetale & Minerale, Testimonia Et Theoremata, ex variis auctoribus sacris, Theologis, Iurisperitis, Medicis, Philosophis, & Poëtis, per Robertum Vallensem selecta.

Lugduni Batavorum, Ex Officina Plantiniana, Apud Franciscum Raphelengium. cId. Id. Xciii.

Small 8vo, pp. 46, and 2 blank.

This edition is well known. It is referred to by Draudius (*Bibliotheca Classica*, Francofurti, 1625, p. 899); by Zedler (*Universal-Lexicon*, Leipzig, 1745, Bd. 46, col. 380); by Gmelin (*Geschichte der Chemie*, Göttingen, 1797, I. p. 297); by Watt (*Bibl. Brit.*, II. 809e). It is in the British Museum.

- 4.—1600. According to Draudius (*Bibliotheca Classica*, Francofurti, 1625, p. 899) the tract was reprinted "Basileæ apud Ludou. Kœnig, 8. 1600." Lenglet Dufresnoy (*Histoire de la Philosophie Hermétique*, Paris, 1742, T. III. p. 319) has repeated this statement omitting the place, and Schmieder simply gives the date, without either place or printer's name. I have not seen a copy of this edition.
- 5.—1601. De Arte Chemica Libri Dvo, Quibus omnia, quæ ad lapidis siue pulueris philosophici compositionem vsumque spectant, breuiter & apertè traduntur. Quorum Prior De veritate & antiquitate artis Chemicæ & pulueris siue medicinæ Philosophorum vel auri potabilis Testimonia & Theoremata ex varijs auctoribus per Robertum Vallensem selecta. Posterior. Ioan. Chrysippi Faniani de arte metallicæ metamorphoseos liber singularis. Item de Iure Artis Alchemiæ veterum auctorum & præsertim Iurisconsultorum Iudicia & responsa

ad quæstionem An Alchemia sit ars legitima. Ob argumenti, tractationis methodiq; similitudinem coniunctim in gratiam Philochemistarum editi. Montisbeligardi, Apud Iacobvm Foillet, M. DC. I.

Small 8vo, pp. 51; [6] 67.

- 6.—1602. There is another Montbéliard edition of this year. The title-page and the book throughout are identical with that published by Jacques Foillet in 1601, except that the date is M.DC.II. I suppose that in the remaining copies another I was inserted after the C.

It contains pp. 51; [6] 67.

No notice either of this or of the preceding edition is taken by any writer whatever. There is a copy of this edition in the British Museum, but none of the year earlier.

- 7.—1602. According to Mercklin (*Lindenius Renovatus*, Norimb. 1686, p. 945), it was reprinted "Basileæ, ap. Ludovicum König, 1602, in 8." This, therefore, would be a reissue of the 1600 edition. I have not seen a copy.

- 8.—1602. The tract is contained in the *Theatrum Chemicum*, Ursellis, M.DC.II. Vol. I. pp. 1-27.

- 9.—1602. There is an edition said to have been printed at Upsala in this year: *Rob. Vallesis* (sic) *de veritate et antiquitate artis chemiæ*, etc. Upsal, 1602. (See J. F. John's *Handwörterbuch der allgemeinen chemie*, Leipzig, 1817, 8vo, Bd. I. p. 161. Note.) A statement to the same effect had been made by Fuchs in 1806 (*Repertorium*, I. i. p. 99): *Rob. Vallensis De Veritate et antiquitate chemiæ et auro potabili* Vps. 8. It seems to me that this is a misprint for *Vrs.*, that is *Ursellis*, and that John has not observed it, but has aggravated it by writing the word at greater length. I know of no copy, and have seen no other mention of the book than the above.

- 10.—1613. The tract was again reprinted in the *Theatrum Chemicum*, Argentorati, 1613, Vol. I. pp. 1-24.

- 11.—1659. The last reprint that I know of was in the *Theatrum Chemicum*, Argentorati, 1659, Vol. I. p. 7-29.

These reprints are not commonly referred to by those who have written about Vallensis.

- 12.—In the British Museum (Sloane MSS. 1806. Sæc. XVII. 12mo. ff. 1-50), there is a translation into English of the "*De veritate et antiquitate artis chemiæ*." It follows the original closely, but some passages have been curtailed. So far as I know it was never printed. I am not aware of a translation of the treatise in any other modern language.

III.—THE SUBJECT.

§ 14.—When we turn to the work itself and ask what was its author's intention, and why it was thought of importance to discuss the question of the antiquity of the art at all, and how its truth and antiquity were proved, we find, it must be admitted,

a rather feeble essay, though sufficiently curious and interesting as a first attempt.

The reason for writing it was that, owing to the pretensions of many self-styled adepts, and of frauds perpetrated by them, most reasonable people disbelieved in the whole affair, and would have nothing to say even to those who, by chemistry, were able to produce some genuine and useful results, and Vallensis wanted to counteract this prejudice and vindicate the value of chemistry if he could.

§ 15.—In the strict sense of the term it cannot be called a history, for there is no narrative of the progress of the notion of transmutation. It is an attempt to prove the antiquity of the art by a collection of extracts from various writers, sacred and profane, some of which certainly do refer to transmutation, and the composition of the metals, while others are interpreted as referring to it. Interspersed are a few comments by Vallensis, partly explanatory and apologetic, partly historical.

It need hardly be said that it never occurs to Vallensis to criticise the passages he quotes. He accepts them as they stand, as authoritative evidence in favour of transmutation, and he explains them according to the views he held as to the composition of the metals. From what he says both in his Table (§ 9), as well as in his history, Vallensis held the then ordinary hypothesis that the metals are composed of sulphur and mercury, so-called, and that the different metals result from the different degrees of purity of these elemental substances, as well as from the different degrees of digestion or concoction of them with one another. This theory had been enunciated by Geber eight hundred years earlier, and it is probably still older, but, deeming that view to be entirely correct, Vallensis could describe the passage of one metal into another as "easy." On such a basis, and when the sciences were in an even more imperfect state than chemistry, and the crudest notions were current, it was not difficult to argue in favour of transmutation. One thing, however, he does not do—he records no instance of actual transformation.* That was reserved for the 18th century—a later, more ignorant, superstitious, credulous, and sceptical time—to describe. But one instance, clear, undoubted, and capable of repetition, would have been worth volumes of arguments a thousand times larger than Vallensis' mite of a book.

* Gmelin implies that he does.

§ 16. He begins by giving in the preface the derivation of the name *Chemistry* or *Chemia*, from the Greek χέω, meaning the art of fusion, the art which investigates the nature of those minerals which melt when heated, and from these teaches the preparation of that powder, or stone, or medicine, which melts like wax in the gentlest fire, and produces the most wonderful effects in the animal, vegetable, and mineral kingdoms. With the Arabic article *al* prefixed, it becomes *alchemia* or *alchymia*, but the words denote the same pursuit.

§ 17. He then proceeds to give a few quotations from the sacred writers, in which allusion is made to gold, and to the sun and moon, and to a medicine, and to the purification of silver by the fire, or in an *aludel* or subliming vessel, upon which he has a brief comment. He quotes Geber's account of sublimation, which is straightforward and intelligible, but he assumes it to signify transmutation itself, a meaning which appears forced and quite uncalled for. He takes for granted that these and other references—such, for instance, as the well-known verses by Adam à St. Victor, in which the power of transmutation is ascribed to St. John—are to be interpreted in the alchemical sense, which it is obvious they are not. The Smaragdine Table of Hermes follows, and next from Thomas Aquinas, Duns Scotus, Chrysogonus Polydorus, the lawyers Joannes Andreas and Oldradus, and other writers, are given quotations as to the aim of the art and to its legitimacy. The aim was to produce real gold, not sophisticated gold, and it was argued that there is nothing repugnant in art using natural causes to produce natural and true effects—for instance, to change copper or tin into gold or silver respectively—and if true gold or silver could be produced by art, it was, in the opinion both of the divines and the lawyers, perfectly legitimate to use it in place of the natural metal. The materials to be used were the stone, compounded, it is not said how, from philosophical sulphur and philosophical mercury. The possibility of transmutation was affirmed by these writers partly from the similarity of the metals to each other and partly from apparent transformations in nature, as, for example, the seeming formation of living things from dead matter. That such analogies could pass muster at this stage in the history of science is not surprising, when even yet, in Natural History, the theory of *spontaneous generation* is not without its supporters. The metals, as being ultimately the same in kind, could be more easily changed,

especially when assisted by art. For it was thought that, although it seems to be nature's purpose to attain metallic perfection, yet it takes a long time to do so, and may be altogether prevented unless art step in and remove obstacles; and here Vallensis quotes the beautiful passage from Geber, which is not unworthy of Bacon himself:—"*Similiter et metalla non mutamus, sed natura, cui secundum artificium materiam præparamus: quoniam ipsa per se agit, non nos, nos vero administratores illius sumus.*" From Avicenna, Daustin, and other writers, he quotes parallel passages to the same effect. He then reiterates that the metals are, from their nature, easily transmuted one into the other, and refutes certain theoretical objections to the possibility of a body being changed from the form imposed on it by nature from the beginning.

§ 18.—At this point he requests that they will consider the position they assume, who would subvert Nature itself, and who ignorantly deride chemistry, the finer part of natural philosophy, so necessary to the welfare of mankind, the imitator and rival of its parent, Nature, devoted as it is to the study of the character, causes and hidden virtues of all things. And then he quotes Hermes, Suidas, Geber and others who have lauded the art in the most lofty terms; he gives quotations showing the powers of the wonderful stone itself, and its value not only for perfecting the inferior metals and the less noble gems, but for conferring health and curing the sick.

And he expresses the hope that the student may be delivered from the wiles of impostors, who under false names, such as red and white tinctures, augmentations, multiplications, and extracts of gold, knowingly deceive their listeners, promising them many things, even mountains of gold. Whence it happens that the true, noble art of chemistry is treated by most as a mere deception.* From all such cheats who have no claim to be called chemical philosophers at all, the student will hold aloof, and will resign himself to the meditation of the true chemical books and philosophy, not for the sake either of gain or of glory, remembering that success in the art is a divine gift, only bestowed on those who devote themselves to it with a single heart.

Much of this—allowing for the exalted tone of the writer and the mistaken aim of his art—might be impressed with the same

* Similar to this is a portion of the preface to the second edition of Morienus, already quoted (§ 8), which Vallensis wrote three years later.

reason on the modern student of chemistry as on his predecessor three centuries ago. One can only wish that Vallensis had told us in a little more detail what he considered the true chemical books and how they were to be studied. That, however, might have been resented as revealing the secrets to the uninitiated, but doubtless the authors at least from whom he quotes may be reckoned as among those deserving the closest attention.

§ 19.—What may be viewed as the second part of the subject, for there is no distinct arrangement or division, contains extracts from Avicenna, Rhazes, and others, first as to the composition and transmuting power of the elixir or stone, and secondly as to its excellence as a medicine.

After some quotations, not always readily intelligible, from Bernard of Trevisan, Marsilius Ficinus, the pseudo-Aristotle, Geber and Albertus Magnus, he quotes the passage about the branch of gold from the sixth book of the *Æneid*, and the myth about the golden apples of the Hesperides in their alchemical connection.

§ 20.—Two of the most important quotations, from a historical point of view, which Vallensis makes, succeed. They are taken from Suidas, the first, containing the definition of the art and the story of Diocletian, and the second, Suidas' affirmation that the golden fleece was a parchment book in which the aurific process was described. Vallensis thereupon proceeds to mention the names of some of the authors—Greek, Arabic, Latin—who had written on the subject, and quotes three Greek MSS. preserved in the Royal Library of France, containing writings by Zosimus, Isaac Monachus, and Blemmidas. Among other Greeks whom he enumerates are Democritus, Synesius, Osthane, Pelagius, Heliodorus, names which have been referred to now more than once in the course of my communications to this Society. These allusions to the Greek MSS., though so brief, are really valuable, for, along with those of Picus Mirandulanus and of Gratarolus, they are among the earliest which are to be met with in modern chemical literature.

§ 21.—Vallensis concludes with a quotation from Picus Mirandulanus to the effect that under the veil of riddles and poetic inventions the ancients were wont to describe the loftiest and divinest truths, and in illustration he quotes a number of these:—Cadmus and the dragon's teeth; Medea and Jason; Saturn; Danaë and the golden shower; Ganymede; Dædalus; and so on, all of which were supposed under various guises to depict the search for

the philosopher's stone, and the transmutation by it of the metals. Even under such forms as the Labyrinth, the Sphinx, the Chimæra, sculptures of animals on temples and palaces, the production of the stone was supposed to be concealed, and as an example of this in modern times Vallensis quotes the figures designed by Nicolas Flamel, which the latter caused to be displayed on the Cemetery of the Innocents at Paris, and which, Vallensis adds, will be understood only of those most learned in the art. It would have been obviously hopeless to bring any criticism to bear on such a system of interpretation as this, or to point out the assumptions which those who welcomed it must have accepted. It marked the progress of that symbolism which at a later period, especially last century, neglected entirely what little experimental basis the art originally possessed, and became a maze in which the would-be expounders fairly lost themselves, and the outcome of which was a multitude of fantastic books that are a discredit to the century which boasted of its illumination. Vallensis concludes that from the evidence he has brought forward the reader will see that chemistry is not a new and uncertain art as the ignorant vulgar of his time imagined.

§ 22.—Certainly without accepting all his quotation in the sense he offers them, we can agree unhesitatingly in his conclusion. But it is hardly worth while discussing the question at all, seeing that far wider research has proved that the chemical art is much older than it has hitherto been the custom to suppose—perhaps even older than Vallensis supposed—and that the origin of the name is surrounded with much obscurity. Some light is beginning to be shed upon these much discussed Greek MSS., and the latest contribution of all is the edition, with a translation, of a Greek alchemical Papyrus, preserved at Leyden, recently published by the venerable custodier of the Museum, Dr. Leemans.*

We may recognise, however, in the imperfect endeavour of Vallensis, the perception of problems to be solved, though he knew neither how to set them nor how to answer them. In fact, the time had not come for making the attempt.

When one remembers the state of opinion in the middle of the sixteenth century, and the questions which agitated the mass of mankind, it is not to be wondered at, that the first history of chemistry should have taken the form of an apology. In the days of Vallensis the chemists or alchemists were looked upon with the

* *Papyri Graeci*, Lugd. Bat., 1885, T. II. p. 199.

strongest suspicion and dislike. It was not believed that they could effect what we know well enough now it was impossible for them to do. But this unbelief, though correct, was based on an ignorance far greater than that of the alchemists, for, whoever at the time had had the same knowledge could not well have avoided the inferences which the alchemists drew. It hindered also the diffusion of the positive knowledge about different substances, which the alchemists certainly accumulated, but to which they appear to have attached value, only in so far as the chemical relationships known advanced them on the way to the realisation of their hopes, and it thus retarded the application of chemistry to the arts to some extent, though not entirely, as my next paper to the Society will show.

Vallensis upheld such chemistry as he knew, for both its scientific and technological value, and tried to demonstrate its fruitfulness in spite of powerful antagonism to it. In these days it will hardly be asserted that the science is without fruit; but some will say that it bears no intellectual fruit comparable with other subjects; and others that the mere study of scientific principles is of very little use indeed for practical applications and for manufactures. Against both views chemistry has still to be on its defence. Its power of combating such objections, however, is very different from what it was three hundred years ago, and is ever becoming greater. Some future historian will doubtless be able to show that, backed as it is by the whole universe of matter, it has overcome all opposition, and that such vindication of its claims—as is still needed—to form part of a liberal, as well as of a professional and technical, education, will seem as antiquated to our successors as to us now appears the laudable effort of Vallensis to prove, as Richard Russell * puts it, that “Chymistry is a true and real art, and (when handled by prudent artists) produceth true and real effects.”

* In his Address to the Reader, prefixed to Geber's *Works*, London, 1678.

NOTE.—To the reprints enumerated in § 9, note †, must be added *Turba Philosophorum*, Vienna, 1750, II. pp. 123-127.

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