Chymia

Chymia:
Science and Nature in Medieval and Early Modern Europe

Edited by

Miguel López Pérez, Didier Kahn
and Mar Rey Bueno

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PROLOGUE

MIGUEL LÓPEZ PÉREZ

History of alchemy has been considered a rich field of research for a few years, as meetings, conferences, monographs, collective books and an impressive number of scientific papers testify. There has never been before such a flow of scholarly communication on history of alchemy among historians. The conference from which this book originated is but another manifestation of this growing scholarly movement.

The international conference *Chymia: Science and Nature in Early Modern Europe*, held at the Royal University Center "Escorial - María Cristina" from September 7th to 12th, 2008 was, most of all, a come-true desire. The alchemical hobbies of the Spanish King Philip II had mainly took place at San Lorenzo's Monastery of El Escorial. In 1587, one hundred meters away from where the conference was held, stood the largest alchemical laboratory of Europe in the sixteenth century, with four hundred alembics working at the same time (Archivo del Monasterio de San Lorenzo de El Escorial, XI-9). Surprisingly enough, this has not been well-known among historians of alchemy out of Spain, and the same is true for most of Spanish history of alchemy in early modern times. Therefore, one of the aims of this international conference, besides a *desiderium scientiæ* common to all of us, was to have as many historians of alchemy as possible come together to Spain and use this magnificent scene as an ideal place to talk about history of alchemy. It demanded a dreadful effort of organization and planning, an economic effort, and finally, a whole editing work, resulting in the present book.

During the conference in El Escorial, the good environment among participants, the high quality of papers, being delivered both by junior researchers and seniors, the possibility to exchange ideas and opinions at length in a friendly, pleasing, exciting atmosphere, and the desire to share scientific ideas were constant. The diversity of approaches in which this international meeting resulted is represented in the following pages as well. From detailed papers on the origin and diffusion of medieval texts to articles discussing unusual political situations, part of the substantial and varied impact of alchemy in culture and society of the past centuries reflects in this book.

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QUESTIONS OF METHODOLOGY ABOUT PSEUDO-AVICENNA'S *DE ANIMA IN ARTE ALCHEMIAE*: IDENTIFICATION OF A LATIN TRANSLATION AND METHOD OF EDITION

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In 1572, Mino Celsi edited in Basel in the publishing house of Pietro Perna a compendium of alchemical medieval texts entitled *Artis chemicae principes, Avicenna atque Geber*. Among the works of this compendium, we find the sole edition of a Latin treatise wrongly attributed to Avicenna, the *De anima in arte alchemiae*.[1] This work is a compilation and a Latin translation (the chronological order of these stages cannot be precisely defined)[2] of three Arabic treatises, probably written between the end of the 11th and the middle of the 13th century.[3]

This article is divided in two parts. In the first section are presented some practical considerations about identifying a Latin translation of an Arabic text. The second part proposes a method of edition for Latin medieval texts derived from the Lachmann system.

1. Some considerations concerning the identification of a translation

When one faces a Latin text that contains Arabic features (linguistic or other), one of the main questions is to determine whether the treatise is a translation from Arabic, or a text directly written in Latin. In the next pages, I intend to give some practical remarks about this main question, referring, as an example, to the *De anima in arte alchemiae*.[4]

How to recognize a Latin translation of a lost Arabic treatise

To recognize that a Latin text is a translation from Arabic, the first step is historical research. If no Arabic original can be found, the searcher has to try to discover mentions of the treatise in other Arabic treatises (attributed to the same author or not). In the case of the *De anima in arte alchemiae*, no mention of it can be traced either in Avicenna's work, or in other Arabic treatises: the text seems to have not been much known to Arabic scholars. As opposed to this, many mentions of it are found in Latin texts. This lack of Arabic traces is important for the history of the text, but it does not prove anything about the status of the *De anima in arte alchemiae*, it does not show that the text is a later forgery.

Philological research is a more accurate way to identify a translation. Two stages of Latin translation from Arabic, corresponding to two different methods, may be defined.[5] During the beginning of the movement of translations from Arabic, i.e. around the first half of the 12th century, translators used to keep a distance from the original text: they do not hesitate to rewrite the whole work (and sometimes attribute the treatise to themselves), and try to use Classical Latin. They also often write a prologue, explaining their work. The second stage, from the second half of the 12th century to the end of the 13th century, is characterised by a different system: translators try to give a Latin version that is as close as possible to the Arabic text, i.e. the method called *verbum de verbo*, a word by word system of translation.[6] A translation of the first stage is very difficult to determine. Some of them are clearly described as translations in their prologue, but if not, the identification may be impossible. The content may give information, especially if the author (real or fake) is known, but this is clearly not significant: indeed, the text can be an apocrypha written in Arabic or in Latin. For example, the fact that the real Avicenna denied the possibility of transmutation[7] is not sufficient to say that the *De anima in arte alchemiae* is not a translation. A more accurate observation is the presence of Latin transcriptions of Arabic words, but once again, these are not sufficient: some transcriptions were used even in Latin composition (even persons' and places' names)[8]. The Arabic word *alembic*, for instance, is found even in later Latin texts. However, a large number of transcriptions and transcriptions of rare words (hapax legomena or with a few occurrences) can indicate a translation, but this kind of wealth of transcriptions is rare during the first stage. Consequently, for translations of the first stage, we can find hypotheses, but it is generally impossible to assert anything with certainty without the original. When the text is a translation of the second stage, the problem is less difficult to solve. As for translations of the first stage, the content may provide the

addition of some information. But it is in the language itself that evidence of translation can be found, concerning transcriptions, morphology, syntax and style. The transcriptions, as has been said, can betray an Arabic origin: they are much more frequent in translations of the second stage. In the *De anima in arte alchemiae*, common words such as *alcofol* for *al-kuḥl* (the kohl),[9] and more rare terms such as *azer* for the Arabic *al-zīr* (the highest-pitched string of the Arabic lute) or *acercon* for *al-zarqūn* (the minium)[10] are found. The word *in* is sometimes used in the meaning of *about*, corresponding to the Arabic *fī*. We also observe Spanish words such as *plata* for *argentum* (silver)[11], or *raton* for *mus* (mouse)[12], and even a specifically Andalusian word, *morabetini* for *al-murābiṭūn*, the Almoravid, which in this case designates a coin (the maravedis)[13]. About morphology, some word constructions are traces of other languages: in the *De anima in arte alchemiae*, we come across many infinitives ending in *-ar* instead of the Latin *-are*, which is a Spanish feature. The syntax is also a good indication: in the *De anima in arte alchemiae*, the presence of many exceptative formulas, i.e. concessive constructions (the Latin text abounds in *nisi*, much more than a usual Latin text), is a trace of Arabic syntax; we also observe the specific construction of the Arabic word *bayna* (meaning between): the phrase *inter laminam et laminam* (between the slices) is more Arabic, Latin would normally prefer *inter laminas*. The style can sometimes be interesting to observe, but in a less convincing way: the liking for supposed objections, such as "if somebody asks us… we will answer…", is characteristic of the Arabic style. These results have to be interpreted: in the *De anima in arte alchemiae*, presence of Spanish words is not evidence that the treatise was translated from Spanish into Latin, because other elements have to be taken into account: the number of Spanish characteristics is much fewer than the Arabic characteristics and the historical background (the context of the translation from Arabic into Latin) leaves us think that the *De anima in arte alchemiae* is a translation from Arabic (specifically Andalusian Arabic) made in Spain. In addition to this, we must pay attention to interpolations: the *De anima in arte alchemiae* contains an Italian word, *scorza* (meaning the bark),[14] but this sole term is not sufficient to assume an Italian origin, it is probably due to a later interpolation.

If these observations may help to put forward hypotheses, they are not really undisputable evidences. The best way to be sure that a text is a translation is to find translation errors. In the *De anima in arte alchemiae*, the translator uses the Latin word *porta* (meaning door) to designate a chapter.[15] This comes from a confusion: in Arabic, the word *bāb* means *door*, but also *chapter*, so the translator made a mistake. This error could

also be intentional, following from the *verbum de verbo* method; the word *porta* also appears with the meaning of *door* in the treatise, so the translator used the same word *porta* to translate all the occurrences of *bāb*. Some extracts of the *De anima in arte alchemiae* are so obscure that the only explanation seems to be the lack of understanding of the translator.[16] Another error in the *De anima in arte alchemiae* is to be found in two passages:[17] speaking about the human sperm (used in pseudo-Avicenna's alchemy), the texts is "*tempta inter digitos si se peccat aut non*", literally "*test with your fingers if it makes a mistake or not*" which means nothing intelligible. The word *se peccat* is actually a bad reading of an Arabic word: the translator read *ghalaẓa* (غلظ), meaning *to make a mistake*, *to be wrong*, and translated it into *se peccat*, instead of *ghaluṭa* (غلط), which signifies *to be thick*.[18] This last proof is undisputable.

How to recognize a text directly written in Latin with Arabic features or with an Arabic attribution

If we find only signs that a text is a translation, but no undisputable evidence, the text could have been directly written in Latin with Arabic features or with an Arabic attribution (or both). This question is much more difficult to solve than the previous one.

The first step is historical research similar to the one explained before. By searching for an original, mentions of the text, fragments and other translations, evidence that the text is a translation can be found, and consequently evidence that the text was not directly written in Latin. However, it is important here to stress the question of fragments. Many compilations were made in Latin, but from different Arabic texts. To find these, a philological analysis is required: if we observe differences of languages between parts of a treatise, it could be a compilation. But we have to pay attention to the method of the *verbum de verbo*: with a very literal system of translation, differences stemming from Arabic are also found in the Latin translation, so that it becomes difficult to say whether the compilation was made in Arabic or in Latin.

Concerning the philological research, we can observe the same traces, i.e. concerning the content and the language, as explained above. Proving that a Latin text attributed to an Arabic author is not authentic brings out an argument, but no evidence. About the language, a) if some elements described before are found, i.e. indications of Arabic origin in vocabulary, morphology, syntax or style, three hypotheses may be put forward. 1) The text could be a translation, as mentioned before. 2) But it could also be a resumption of a translation, joined to other resumptions of texts which are

not translated or to direct compositions of the compiler. For example, the *Declaratio lapidis physici Avicennae filio suo Aboali* (another alchemical treatise attributed to Avicenna) is clearly a pseudepigraphical treatise directly written in Latin, but it contains some Arabic linguistics features;[19] the explanation is that the *Declaratio lapidis* is actually a compilation of two texts: the beginning is a rewriting of quotations of the *De anima in arte alchemiae*, the second part is composed of quotations of the *Turba Philosophorum*, another Latin translation of an Arabic alchemical treatise. 3) As for the third option, the text may be a Latin treatise written in the style of a translation: for example, the *Summa perfectionis*, attributed to the Arabic author Jābir ibn Ḥayyān, is actually a Latin composition written as a translation.[20] b) If we do not find any (or not enough) Arabic element in the language, two hypotheses may be put forward. 1) The text could be a translation of the first stage, i.e. a translation in classical Latin. 2) The second possibility is that the text is a pseudepigraph directly written in Latin.

Thus for the question of texts directly written in Latin, we may not found evidence that the text is a pseudepigraph, but only that the text could be a pseudepigraph; there are only hypotheses. If a text shows no evidence of Arabic origin and is attributed to an Arabic author, we may never assert that it is directly written in Latin without external evidence, i.e. evidences outside the text,[21] such as another translation of the same treatise, or quotations of a Latin treatise subsequent to the composition/translation: for example, the *Tractatulus Avicennae* is an apocryphal alchemical Latin treatise attributed to Avicenna, in which we find quotations of a commentary on the *Tabula Smaragdina* of Hortulanus, which was written in Latin around the middle of the 14th century.[22] But even this kind of quotation may be doubtful, because of possible later interpolations.

2. Method of Edition

I will now present the method that I used to edit the *De anima in arte alchemiae*. This method can be applied to other Latin medieval texts. This explanation, preceded by a short inventory of the witnesses of the *De anima in arte alchemiae*, is given in the most practical way, explaining each step of the work.

Witnesses

Up to now eight manuscripts containing a part of the *De anima in arte alchemiae* have been found, not including Celsi's edition:[23]

1. L = Oxford, Bodleian Library, Laud Misc. 734, ff. 1r-66r. End of the 13th - 14th century.
2. H = Glasgow, University Library, Hunter 253, ff. 1r-28r. End of the 13th - 14th century.
3. F = Paris, Bibliothèque Nationale de France, Ms. Lat. 6514, ff. 144r-171v. End of the 13th - 14th century.
4. C = Bernkastel-Kues, Bibliothek im St. Nikolaus Hospital, 299, ff. 1r-49v. 14th century.
5. V = St Gall, Stadtbibliothek (Kantonsbibliothek), Vadianus 300, ff. 1r-37r. 14th century.[24]
6. O = Montréal, McGill University, Osler Library, 480, ff. 1r-227r. 14th century.
7. S = London, British Library, Sloane 1754, ff. 186v-193r. 14th century.
8. D1 and D2 = Oxford, Bodleian Library, Digby, 219, D1 ff. 1r-27v, D2 ff. 28r-74v. 16th century, containing two versions of the text.

As for other sources, we find two important groups of quotations:

1. Some passages in Vincent of Beauvais' *Speculum doctrinale* (book 11 entitled *De artibus mechanicis*) and *Speculum naturale* (book 7 entitled *De corporibus quae continentur in terrae visceribus*),[25] finished between 1256 and 1259.[26]
2. A summary with quotations in a compendium of alchemical texts attributed to Roger Bacon (1214-1294), the *Sanioris Medicinae Magistri D. Rogeri Baconis Angli, de arte chymiae scripta (…)*, Frankfurt: Johann Saur et Johann Theobald Schönwetter, 1603, pp. 17-66 (l. 6): "Excerpta de libro Avicennæ de anima […] per fratrem Rog. Bacon. […]".[27]

Establishing the stemma codicum

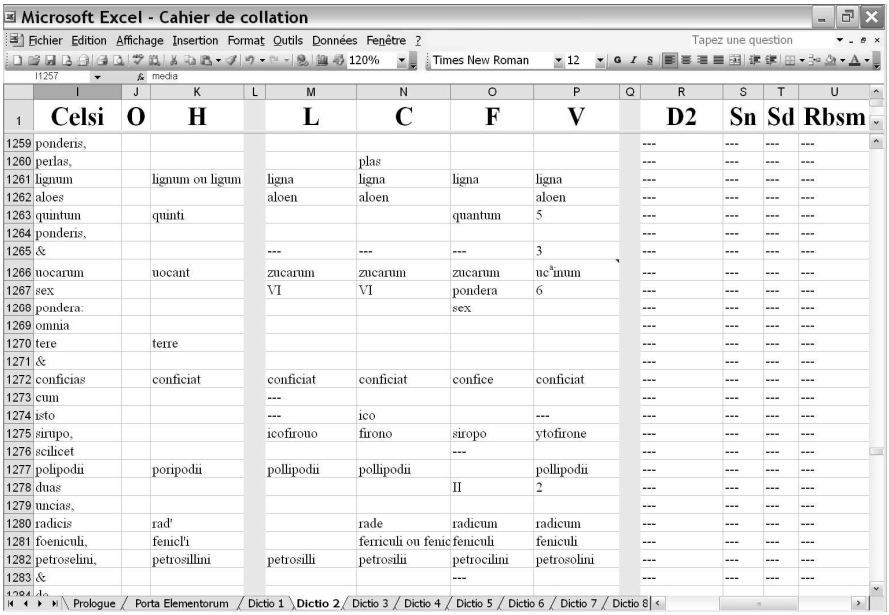
In order to provide an edition as critical as possible, I use a method derived from Karl Lachmann's (1793-1851) system.[28] But the method that more precisely inspired me is the method of Joseph Mogenet[29] (1913-1980), Professor at the Université catholique de Louvain, already used in several PhD theses.[30] I will first briefly recall its main steps.

After choosing a reference text,[31] Mogenet collates the manuscripts (with a column system). Then, he balances and sorts all the 'accidents'[32] in accordance with precise pre-defined rules. Afterwards, he can compare

manuscripts two by two to determinate if they are in a direct filiation (the accidents of the father manuscript have to be in the son manuscript).

Since Mogenet worked on Byzantine astronomical texts, an adaptation of his method was necessary. But before explaining this, it is important to stress here the improvement of the collation method thanks to computers. With the Excel program, it is possible to make, in a simple file, a collation book which, if printed, would be around 5000 pages. Even without being an ecological militant, we see the advantage of computers for this kind of work.

The left column is the reference text, i.e. Celsi's edition; the others columns represent the different manuscripts:



Microsoft Excel - Cahier de collation

Fichier Edition Affichage Insertion Format Outils Données Fenêtre ?

	I	J	K	L	M	N	O	P	Q	R	S	T	U
1	Celsi	O	H		L	C	F	V		D2	Sn	Sd	Rbsm
1259	ponderis,									---	---	---	---
1260	perlas,					plas				---	---	---	---
1261	lignum		lignum ou ligum		ligna	ligna	ligna	ligna		---	---	---	---
1262	aloes				aloen	aloen		aloen		---	---	---	---
1263	quintum		quinti				quantum	5		---	---	---	---
1264	ponderis,									---	---	---	---
1265	&				---	---	---	3		---	---	---	---
1266	uocarum		uocant		zucarum	zucarum	zucarum	uc^{a}inum		---	---	---	---
1267	sex				VI	VI	pondera	6		---	---	---	---
1268	pondera:						sex			---	---	---	---
1269	omnia									---	---	---	---
1270	tere		terre							---	---	---	---
1271	&									---	---	---	---
1272	conficias		conficiat		conficiat	conficiat	confice	conficiat		---	---	---	---
1273	cum				---					---	---	---	---
1274	isto				---	ico		---		---	---	---	---
1275	sirupo,				icofirouo	firono	siropo	ytofirone		---	---	---	---
1276	scilicet						---			---	---	---	---
1277	polipodii		poripodii		pollipodii	pollipodii		pollipodii		---	---	---	---
1278	duas						II	2		---	---	---	---
1279	uncias,									---	---	---	---
1280	radicis		rad'			rade	radicum	radicum		---	---	---	---
1281	foeniculi,		fenicl'i			ferriculi ou fenic	feniculi	feniculi		---	---	---	---
1282	petroselini,		petrosillini		petrosilli	petrosilii	petrocilini	petrosolini		---	---	---	---
1283	&						---			---	---	---	---

Prologue / Porta Elementorum / Dictio 1 / Dictio 2 / Dictio 3 / Dictio 4 / Dictio 5 / Dictio 6 / Dictio 7 / Dictio 8

After making the collation, I adapted Mogenet's system. Because of the length of the treatise (480 pages in Celsi's edition, reduced to 264 in my edition) and the large number of lacunas, it was necessary to work on samples instead of the entire book. As shown in table 1, the two samples chosen are 141 pages, which represent 29,3 % of the treatise. The first sample was chosen because it is found in almost all witnesses, the second was used to confirm hypotheses made by studying the first one:[33]

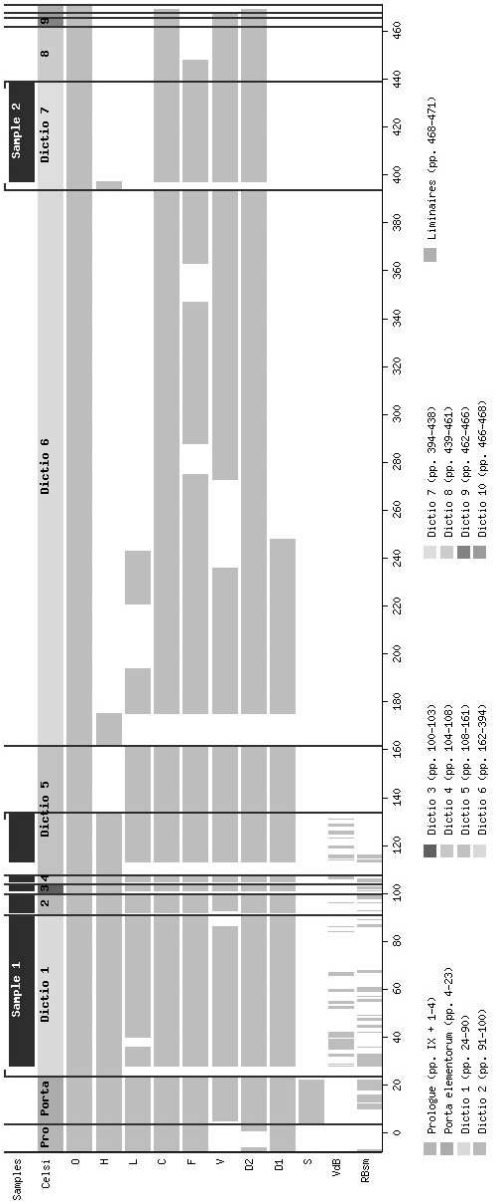

Samples
Celsi
Pro
Porta
Sample 1
Dictio 1
2
3
4
Dictio 5
Dictio 6
Sample 2
Dictio 7
8
9
O
H
L
C
F
V
D2
D1
S
VdB
RBsm
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
380
400
420
440
460
Prologue (pp. IX + 1–4)
Porta elementorum (pp. 4–23)
Dictio 1 (pp. 24–90)
Dictio 2 (pp. 91–100)
Dictio 3 (pp. 100–103)
Dictio 4 (pp. 104–108)
Dictio 5 (pp. 108–161)
Dictio 6 (pp. 162–394)
Dictio 7 (pp. 394–438)
Dictio 8 (pp. 439–461)
Dictio 9 (pp. 462–466)
Dictio 10 (pp. 466–468)
Liminaires (pp. 468–471)

Table 1

Secondly, the categories chosen for balancing and sorting the accidents are adapted from those of Mogenet[34] to correspond to Latin medieval texts. Each accident has to be qualified:

V major variant: important variant, viable reading opposed to another viable reading.
Example: *frigiditas* instead of *calor*.
m minor variant: variant of minor importance, or due to a misreading of a word or an abbreviation. Example: *quod* instead of *quam*; *faciant* instead of *faciunt*.
c case variant: variant of the case of a word that does not change the meaning of the sentence (medieval Latin allows great liberty in cases choice).
L lacuna: omission of more than three words.
O omission: omission of no more than three words.
A major addition: addition of more than three words.
a minor addition: addition of no more than three words.
I inversion: change of word order.
F error: every obvious error (written error, repetition, etc.). Examples: *quo* instead of *quō* for *quomodo*, *faciut* instead of *faciunt*.
Gr written variant: written peculiarity. Example: *azeiar* instead of *azeizar*.
Ch number variant: variant of a number (measurement, time, etc.).
Inc incipit et explicit: some manuscripts contain incipit and explicit for chapters, that can distort the results.

When working on medieval Latin texts, it is not necessary to take all the accidents into account, since the medieval Latin tradition is more variable than the Greek tradition. The results can even be completely distorted by numbering accidents of lesser importance (such as the *faciut* instead of *faciunt* quoted here above).[35] Thus one cannot number all the accidents found in the text. Moreover, I had to leave aside some manuscripts of less importance. The D1 and D2 versions, as they are something like the complete rewriting of the treatise, were not studied with this system. I could not study manuscript O in the first sample for practical reasons: the Osler Library refused to make a copy of the manuscript because of its condition, and sent me a microfilm in which only half of the manuscript is legible. Fortunately, this manuscript O is the direct model of Celsi's edition, who did not change the text very much. The extracts and quotations were also left aside for the moment.

Once they are selected, the accidents are sorted into a table, not two by two like in Mogenet's system, but all together. In table 2, I show my results for the first sample. The horizontal coordinate shows the types of accidents, the vertical coordinate the manuscripts (the TOT. column indicates the total):

	V	m	c	L	O	A	a	I	F	Gr	Ch	Inc	TOT.
HLCFV	59	98	33	2	45	9	87	24		14	1	1	373
HLCF	3	12	2		3		12	4		4		1	41
HLC V	6	14	10		3			2		2			37
HL FV	1	8					1	1		2			13
H CFV		1					5						6
LCFV	49	102	50	7	94	17	70	13		23	1		426
HLC	3	9	1		1		2			10		1	27
HL F	1	2	1							6			10
HL V	1	4	1		1						1		8
H CF		3	2				7			1			13
H C V	1	5	3				2	1		2			14
H FV		5					2	1		4			12
LCF	3	15	13		4	3	12	2		9		38	99
LC V	14	33	25	2	23	2	11	4	1	19			134
L FV		5	2		1		2			4			14
CFV	1	12	5		3		5	1		1			28
HL			2		1					5			8
H C	3	6	1		4		2		1	6			23
H F	4	16	5	1	8		7			6			47
H V	4	13	2	2	2		3	1		8			35
LC	8	31	25	1	8	2	12	1	3	15		6	112
L F	2	11	3		5		1	1	3	6		2	34
L V	3	17	9		10		4	3	1	11			58
CF	2	16	4		6		8	4		7		1	48
C V	1	23	6	1	6	1	4	1	1	7	1		52
FV	5	12	10		11		6	6		7			57
H	71	27	2	33	20	2	19	1	7	105			287
L	9	9	6	7	8		4		11	60	1		115
C	51	26		14	13	1	18		29	102	1		255
F	81	45	4	13	32	6	53		7	128	6	1	376
V	116	33	3	32	39	4	29	1	21	122	5		405
													Total
													3167

Table 2

For example, the first number (59) shows that there are 59 major variants (V) common to manuscripts H L C F V that are different from Celsi's version (reference text). It is also interesting to produce same tables with only major variants (V), minor variants (m), lacunas (L), omissions (O), major additions (A) and minor additions (a): these help to see the families better, as the results are not distorted by accidents of lesser importance (case variants, etc.).

In addition to table 2, I compared (table 3) the accidents by manuscript alone:[36]

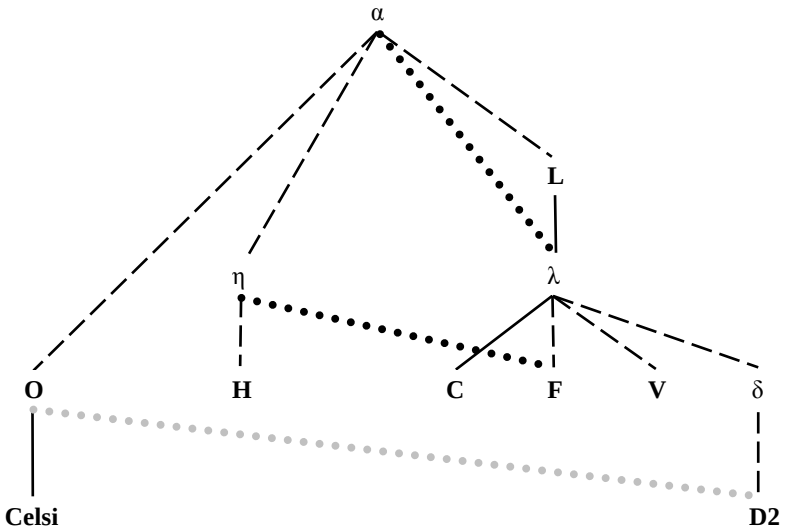
By ms.	Acc.	Ind.	Com.	% Perso.	% Com.
H	666	172	494	25,8	74,2
L	1009	37	972	3,7	96,3
C	1142	123	1019	10,8	89,2
F	1122	230	892	20,5	79,5
V	1194	253	941	21,2	78,8

Table 3

Once all this work has been done, we can try to interpret the results. Some numbers are indeed really significant, for example:

- The first line H L C F V of table 2 (373 accidents) seems to show that Celsi's edition (and, by the way, manuscript O) represents a separate branch of the tradition, as it is often opposed to all the manuscripts.
- The line L C F V of table 2 (426 accidents) seems to indicate that these manuscripts form a family.
- The line L C V of table 2 (134 accidents) seems to show that, in the L C F V family, the F manuscript has a special place
- The line L C of table 2 (112 accidents) seems to stress a link between those two manuscripts.
- The independent accidents of the L manuscript in table 3 (37 accidents) seem to indicate that L is closer to the archetype in the L C F V family (almost all its accidents are in the other manuscripts of the family).

Of course, it is important to stress that *these are only hypotheses, and it is necessary to check every idea by studying the accidents one by one, by verifying if no accident invalidates the hypothesis*. I cannot reproduce here all the discussions I made about the accidents, because of their large number and length. After studying the accidents one by one,[37] I finally made a stemma codicum that fits with the results of the system I made *and* with the accidents study:



The continuous lines indicate direct filiations, the discontinuous lines indirect filiations whose intermediaries are lost, and the dots indicate contaminations (the dots going from O to D2 are lighter because the contamination is more hypothetical).

Extracts, quotations and manuscripts left aside can then be studied to be placed in the stemma codicum. Of course, the stemma codicum may be changed during the edition, if some accidents invalidate it.

Advantages and disadvantages of the method

The main advantages of the method are the accuracy of the study and the reduction of subjectivity in the first approach to the tradition. It allows a good overview of witnesses' affinities, even if all hypotheses have to be proved.

The main disadvantages are the time it takes and the danger in interpreting the results. We may indeed be deceived by numbers and try to force the stemma to fit the results.

Edition

The manuscripts family chosen for the edition of the *De anima in arte alchemiae* is the L C F V family, in which preference is given to the L manuscript, due to its position in the tradition. This family seems to be less corrupt and more widespread (*textus receptus*).

When editing a translation, it is necessary not to try to edit the original text, but only the translation, including translation errors: it is then important to correct the text as little as possible, especially when the original is lost. This brings up problems with obscure passages, which are quite frequent in medieval alchemical texts: we may never use the *cruces* (i.e. the sign showing a corruption of the text in the tradition), as the corruption may come from the translator himself. The translator of the *De anima in arte alchemiae* was not a good translator, and the difficulty of many passages led him to commit mistakes because of his lack of understanding of the Arabic text. In addition to this, the edition of glosses is often very tricky: they may come from later scribes, but also from the author or from the translator. The most widespread method used for medieval Latin translations from Arabic, the *verbum de verbo*, uses glosses thoroughly to make the text clear. Consequently, it is rarely possible to assert anything about them, and the editor has to edit them in the text. Another important problem is the Arabic transcriptions in Latin. The spelling of these words is generally different in each manuscript, and choosing a spelling for the edition is often difficult: when the word is not identified, we may follow the base manuscript, but when the word is identified and the base manuscript presents a distorted spelling, the choice is not simple.

3. Annexes

The version given here is my critical edition, but the pages refer to Celsi's edition. The first passage is about music, in a chapter about glass, and the second about geometrical measures.

Music

> "Istud temptamentum est corporale, modo dicam tibi temptamentum spiritale. Tu scis quod dicit musica quia voces sunt duodecim, et unaquaeque illarum dividitur in multas partes talis est quod est alexir, almagne, et alibem, et alhanzar, et albenzar, et harin aharra minalcaf; et scias quod azer habet sonum altum, albane habet sonum sed non altum, alibem habet sonum latum, alanzar habet sonum longum. De vitro quod est bonum accipe."[38]

I give here Ruska's proposal of explanation:[39] *azer* and *alexir* may correspond to *az-zīr* (الزير), that is, to the highest-pitched string of the Arabic lute; *almagne* and *albane* may be the transliteration of *al-mathnā* (المثنى), namely, the second string after the highest-pitched one; *alibem* may come from *al-bamm* (البمّ), the lowest string; *alhanzar* and *alanzar* could be *al-khinṣir* (الخنصر), by which is meant the little finger or the musical mode corresponding to this one; *albenzar* may be the transliteration of *al-binṣir* (البنصر), the ring finger; the words *harin aharta minalcaf* are more difficult to explain: Ruska proposes to see *harin* as a transliteration of *ḥādd* (حاد), which means high-pitched, and *aharta minalcaf* as *al-wusṭā min al-kaff* (الوسطى من الكفّ), the middle of the hand, that is, the middle finger.

The geometrical measures

> "Debes scire quod maneries cum quibus mensurant in geometria sunt quinque: scilicet digitus et algerab et canna et albeu et algabet. Digitus est 2 ossa digiti, algerab est 6 pili iuncti infra 3, canna est 14 digiti; algatab est mons qui habet 12 portas, unaquaeque porta habet 1550 cannas, unaquaeque canna 14 digiti, ergo in illo monte unaquaeque porta habet 21 700 digiti, et unusquisque digitus habet 18 pilos iunctos, ergo sunt in isto monte de pilis iunctis 1 200 000 renumerata 4 vices et 500 000 renumerati 3 vices et 30 000 et 25."[40]

Proposal of explanation:[41] *albeu* could come from *al-bā'* (الباع) (or from its plural *al-'abwā'*) which means the fathom;[42] *algerab* may be derived from the Arabic word *al-jarīb* (الجريب), meaning the acre (the surface measure); *algabet* could come from *al-qabḍ* (القبض) or *al-qabḍa* (القبضة), which designates a measure of one-sixth of a cubit; *algatab* could come from the same word as *algabet*, or could be a transcription of *al-qaḍīb* (القضيب), the cane;[43] *mons*, *jabal* (جبل) in Arabic, may come from a

confusion for the word *habl* (حبل), which means *rope*, *cable*;[44] *porta*, *bāb* (باب) in Arabic, is probably a bad reading of the word *nāb* (ناب), which designates a measure of six cubits.

Notes

[1] (pseudo-) Avicenna, *De anima in arte alchemiae*, in *Artis Chemicae Principes, Avicenna atque Geber*, ed. Mino Celsi, Basel : Pietro Perna, 1572, 9 pp. not numbered + pp. 1-471 (http://web2.bium.univ-paris5.fr/livanc/?cote=75697&do=livre), hereafter cited as DAIAA. The other works of the compendium are: the *De investigatione perfectionis Gebri* (pp. 473-497), the *Summa perfectionis Gebri* (pp. 497-708), the *De inventione veritatis Gebri* (pp. 709-735), and the *Liber Fornacum Gebri* (pp. 736-767).

[2] However, we may propose the dates 1226 or 1235 for the Latin translation, as proposed in a colophon in two witnesses.

[3] Cf. Sébastien Moureau, *Le* De anima in arte alchemiae *du pseudo-Avicenne. Edition critique, traduction et étude*, Louvain-la-Neuve: Faculté de Philosophie, Art et Lettres, Institut orientaliste, mars 2010. This PhD thesis will be published within the next years. As for older studies about the *De anima in arte alchemiae*, see: Marcellin Berthelot, *Histoire des sciences. La chimie au Moyen Âge*, avec la collaboration de Octave Victor Houdas pour les textes arabes, Paris: Imprimerie nationale, 1893, t. 1, 293-305; Moritz Steinschneider, "Zur alchimistischen Literatur der Araber," *Zeitschrift der Deutschen Morgenländischen Gesellschaft*, 58 (1904): 309-315; Moritz Steinschneider, *Die europäischen Übersetzungen aus dem Arabischen bis Mitte des 17. Jahrhunderts*, Vienna: Carl Gerold's Sohn, 1904-1905, § 143, (Sitzungsberichte der Akademie der Wissenschaften in Wien, 149 and 151); Julius Ruska, "Die Alchemie des Avicenna," *Isis* 21 (1934): 23-45; Julius Ruska, "Zum Avicennatext des Cod. Vadianus 300," *Sudhoffs Archiv* 27 (1934): 499-510; Georges C. Anawati, "Avicenne et l'alchimie", in *Oriente e Occidente nel Medioevo : filosofia e scienze, Convegno internazionale 9-15 aprile 1969*, Rome: Accademia nazionale dei Lincei, 1971, 286-288; Georges C. Anawati,"L'alchimie arabe", in Roshdi Rashed (dir.), *Histoire des sciences arabes, III : Technologie, alchimie et sciences de la vie*, Paris: Le Seuil, 1997, 111-141; Sébastien Moureau, "Some Considerations Concerning the Alchemy of the *De anima in arte alchemiae* of Pseudo-Avicenna," *Ambix* 56 (2009): 49-56.

[4] In this article, I refer to the *De anima in arte alchemiae* as a whole, not as a compilation of three Arabic treatises, as it is used as an example. For the complete discussion (much longer) about the three parts of the *De anima in arte alchemiae*, cf. Sébastien Moureau, *Le* De anima in arte alchemiae *du pseudo-Avicenne. Edition critique, traduction et étude*, Louvain-la-Neuve: Faculté de Philosophie, Art et Lettres, Institut orientaliste, mars 2010.

[5] I am here summarizing and simplifying the question, the periods are not so clearly defined. Cf. Charles Burnett, "Translating from Arabic into Latin in the

Middle Ages, theory, practice, and criticism", in Steve G. Lofts and Philipp W. Rosemann (dir.), *Editer, traduire, interpréter : essais de méthodologie philosophique*, Louvain-la-Neuve: Editions Peeters, 1997, (Philosophes médiévaux, XXXVI), 57-78.

[6] For more information about this method, cf. Charles Burnett, "Translating from Arabic into Latin in the Middle Ages, theory, practice, and criticism", in Steve G. Lofts and Philipp W. Rosemann dir., *Editer, traduire, interpréter : essais de méthodologie philosophique*, Louvain-la-Neuve: Editions Peeters, 1997, (Philosophes médiévaux, XXXVI), 57-78.

[7] As he said in the *Kitāb al-ma'ādin wa al-āthār al-'ulwiyya* (*Book of metals and celestial phenomena*), the 5th part of the *ṭabī'iyyāt* (*physics*) of the *Kitāb al-Shifā'* (*Book of healing*), translated under the title *De mineralibus* (but more known by historians under the title *De congelatione et conglutinatione lapidum*). Cf. Jean-Marc Mandosio and Carla Di Martino, "La 'Météorologie' d'Avicenne (Kitāb al-Shifā' V) et sa diffusion dans le monde latin", in *Wissen über Grenzen : arabisches Wissen und lateinisches Mittelalter* (Berlin: De Gruyter, 2006), 404-25.

[8] We may mention the particular case of the Latin translation of Avicenna's *Kitāb al-ma'ādin wa al-āthār al-'ulwiyya*, in which the translator Alfred of Sareshel try to erase any Arabic traces and insert fake Greek traces. Cf. Jean-Marc Mandosio and Carla Di Martino, "La 'Météorologie' d'Avicenne (Kitāb al-Shifā' V) et sa diffusion dans le monde latin", 414-6.

[9] *DAIAA*, p. 154.

[10] *DAIAA*, pp. 118-119.

[11] *DAIAA*, pp. 45, 47, 99.

[12] *DAIAA*, p. 50.

[13] This word appears 34 times in the treatise and seems consequently not to be a later interpolation.

[14] *DAIAA*, p. 295.

[15] The word *porta* is used nine times with this meaning.

[16] I think about two passages in which many Arabic transliterations are found. Even with the identification of the Arabic words, the text does not mean anything. I give those two passages at the end of this article (annexes).

[17] *DAIAA*, pp. 78, 116. I quote only the first passage here, the mistake is the same in both.

[18] I thank Charles Burnett for helping me to understand this translation mistake.

[19] Cf. Julius Ruska, "Die Alchemie des Avicenna", *Isis* 21 (1934): 45-8.

[20] Cf. William R. Newman, *The* Summa Perfectionis *of pseudo-Geber, a critical edition, translation and study* (Leyde: E. J. Brill, 1991). However, the question is still discussed. Ahmad Y. Hassan claims that the text is likely a translation from Arabic, cf. his articles about the *Summa perfectionis* on his website: http://www.history-science-technology.com/Summa/Summa.htm.

[21] Even if the content is not compatible with the doctrine of the Arabic author to whom the text is attributed, the pseudepigraph could have been written in Arabic and then translated.

[22] Cf. Julius Ruska, "Die Alchemie des Avicenna", *Isis* 21 (1934):. 48-50.

[23] Each manuscript is preceded by the sigla we use in this article. I do not mention here the very short extracts found in some manuscripts, except the Sloane 1754 (which is longer). However, this Sloane 1754 is not included in my further discussion and stemma codicum, due to its shortness.

[24] Cf. Julius Ruska, "Zum Avicennatext des Cod. Vadianus 300", *Sudhoffs Archiv* 27 (1934): 499-510.

[25] Cf. Vincent de Beauvais, *Speculum Quadruplex sive speculum maius, naturale / doctrinale / morale / historiale* (repr., Graz : Akademische Druck- u. Verlagsanstalt, 1964) (1st ed., Douai: Balthazar Beller, 1624), 4 vol., 1053-1072 of the *Speculum doctrinale* and pp. 425-492 of the *Speculum naturale*.

[26] Cf. Monique Paulmier-Foucart, "L'atelier Vincent de Beauvais. Recherches sur l'état des connaissances au Moyen Âge d'après une encyclopédie du XIIIe siècle", *Le Moyen Age* 85 (1979) : 87-99.

[27] The same summary is found in two manuscripts: Pennsylvania, University of Pennsylvania, codex 110, ff. 42v-45v (first half of the 15th century), but without the attribution to Roger Bacon; and Oxford, Bodleian Library, Ashmole 1467, ff. 1r-30r (16th century). I prepare at the moment a critical edition of this summary. At the point where the *Sanioris medicinae (…) scripta* stops quoting the *De anima in arte alchemiae* at chapter 2 of the 5th *dictio* (the chapters of the treatise are called *dictiones*, a literal translation of the Arabic *maqāla*, which designates a section of a book) and begins to quote the *Epistola ad Hasen regem de re recta*, the manuscripts continue the summary. The *Sanioris medicinae (…) scripta* were reprinted in 1620 (Frankfurt: Joannes Carolus Unckelius).

[28] Lachmann, Karl, *Kleinere Schriften zur Classischen Philologie*, ed. Jphannes Vahlen (Berlin : Reimer, 1876).

[29] Joseph Mogenet, *Autolycus de Pitane : histoire du texte ; suivie de l'édition critique des Traités de la sphère en mouvement et des levers et couchers* (Louvain : Bureaux du Recueil, 1950).

[30] Cf. Theon of Alexandria, *Le Grand commentaire de Théon d'Alexandrie aux Tables faciles de Ptolémée*, ed. joseph Mogenet), rev., compl. and comment. Anne Tihon (Città del Vaticano: Biblioteca apostolica Vaticana, 1985-1999).

[31] By reference text, I do not signify the base text of the edition, but only the text that will be used as a reference for the collation.

[32] By this word, he means everything that happens to the text (all the readings of the witnesses), not only variants, but also omissions, lacunas, additions, etc.

[33] The first line shows the samples. The transversal bars (with the little horizontal bars upon them) mark them out. The order of the witnesses prefigures the linear order of our stemma codicum. The VdB line shows the extracts of Vincent of Beauvais's *Speculum maius*, the Rbsm line those of Roger Bacon's *Sanioris medicinae (…) Scripta*. The page numbers in brackets show the pages in Celsi's edition. The chapters of the treatise are called *dictiones* (see n. 27).

[34] The list given here contains only a summary explanation of my classification, the rules are actually more precise (and take up much more space, so I cannot give them all here). They are all preceded by the sigla used for the rest of this article.

[35] Moreover, the case variants (c), the errors (F) and the inversions (I) are almost never numbered when they belong to one witness alone (unless they are important), because they are too frequent.

[36] This table shows the results for the first sample, without case variants, inversions, errors, written variants, number variants, and incipit-explicit. "Acc." column shows accidents, "Ind." column independent accidents (that we find only in this manuscripts), "Com." column common accidents (common with one witness or more).

[37] For the witnesses I could not study with the method I explained (like D2, extracts, quotations, etc.), this observation of the accidents one by one was the only way to classify them.

[38] *DAIAA*, p. 155. "This test is corporeal. Now, I will tell you about the spiritual test. You know that music says that there are twelve voices, and that each of them is divided into many parts, such as: *alexir*, *almagne*, *alibem*, *alhanzar*, *albenzar*, and *harin aharra minalcaf*. Know that the *azer* has a high-pitched sound, and that the *albane* has a sound, but not high-pitched. The *alibem* has a wide sound, and the *alanzar* has a long sound. Take glass of good (quality)."

[39] Cf. Julius Ruska, "Die Alchemie des Avicenna", *Isis* 21 (1934): 42.

[40] *DAIAA*, pp. 338-339. "You have to know that there are five measures in geometry: the finger, the *algerab*, the cane, the *albeu* and the *algabet*. A finger is two bones of the finger; an *algerab* is six times three hairs joined; a cane is fourteen fingers; the *algatab* is a mountain that has twelve doors, each door measuring a thousand five hundred and fifty canes of fourteen fingers each. In this mount, each door thus measures twenty-one thousand seven hundred fingers, and each finger measures eighteen hair joined; so there are in this mount on million two hundred thousand multiplied by four, plus five hundred thousand multiplied by three, plus thirty thousand plus twenty-five hair joined."

[41] To explain this passage, I specifically used the lexicon of Al-Khwārizmī (not the mathematician, but a Persian secretary of the 10th century): Al-Khwārizmī, *Mafātīḥ al-'ulūm*, ed. Gerard van Vloten, 2nd ed., Leiden: Brill, 1968 (1st ed. 1895).

[42] *Albeu* could also come from *al-bawā'* (البواء), a very rare word which designates the *equality*, the *equivalence*, but that seems much less probable.

[43] Whatever the hypothesis, it causes an arithmetical problem.

[44] This word is the proposition of Julius Ruska in "Die Alchemie des Avicenna," *Isis* 21 (1934): 41.

THE JEWS AND ALCHEMY: NOTES FOR A PROBLEMATIC APPROACH*

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The idea of the existence of a peculiar relationship between the Jewish people and the secrets of alchemy has been held since the origin of this art. It has left traces in many alchemical treatises written by non-Jews and in general histories of philosophy and science.

Marcelin Berthelot, in his pioneering works on Greek alchemy, provides a translation and a commentary on three ancient alchemical documents in Greek language in which reference is made to the Jewish people and the Hebrew language. In the works of the Pseudo-Democritus – composed probably between the first century BCE and the first century CE – some Greek names of precious stones, of minerals and of alloys are transcribed in Hebrew letters. Berthelot explains this feature as the result of the will of the author to conceal the alchemical knowledge to laymen.[1] This assumption seems to imply that the knowledge of the Hebrew language – or, at least, of its alphabet – was considered in these early sources as an essential requirement for the alchemist.[2] Moreover, one passage of the Greek treatise *De Arte Sacra* ("On the sacred art") attributed to Olympiodorus and studied by Berthelot makes reference to the Jewish people as the only depositories of the secrets of the alchemical art: "μόνοι δέ Ἰουδαίοις ἐξὸν ἦν λάθρα ταῦτα ποιεῖν καὶ γράφειν, καὶ ἐκδίδοναι" ("only the Jews obtained its knowledge and wrote and described these things in a secret language").[3] Other evidence of the early perception of a close relationship between the Jews and alchemy is to be found in the Leiden Papyrus known as Papyrus W, which appears to be largely based on anonymous works ascribed to Moses.[4] In this work, an example of early gnosis and hermetic knowledge, many are the references to Biblical figures, such as Moses, Abraham, Isaac and Jacob and to the Temple of Jerusalem.

Among the earliest statements of Jewish excellence in the field of alchemy there are the references to the teachings of the Jews in the works of Zosimus of Panopolis (4th-5th century CE): in many passages of his treatises, Zosimus quotes alchemical authorities of the past.[5] In particular, he maintains to have derived a large part of his knowledge from the teachings of a certain "Mary", who is frequently referred to as "the Jewess".[6] Even if the original works of this alchemical authority are to be considered lost and scholars have to rely on secondary sources such as Zosimus' quotations, the presence of a Jew – true or legendary - at the very beginning of the traditional history of alchemy would leave a deep mark in the beliefs of the adepts of the Art.[7]

The apocryphal *Fourth Book of Enoch* – known also as *Ethiopic Book of Enoch* – contributes to the idea of a pre-eminence of the Jewish people in the field of the practical arts with the tale of the rebellion of the angels who revealed the secrets of the arts to humans:

> 7.1 […] they [the rebel angels] taught them charms and spells, and showed to them the cutting of roots and trees […]. 8.1 And Azazel taught men to make swords, and daggers and shields and breastplates. And he showed them the things after these, and the art of making them: bracelets, and ornaments, and the art of making up eyes and of beautifying the eyelids, and the most precious and choice stones, and all [kinds of] coloured dyes. And the word was changed.[8]

Alchemists in every time tried to dignify their art through the attribution of the origins of their doctrines – and the composition of alchemical treatises, as well – to illustrious authorities of the past.[9] This is the case of Biblical characters, whose names were used as a guarantee of authoritativeness by many authors. As an example, Adam himself was assumed to be the first recipient of the alchemical knowledge which was taught to him by God or by one of his angels.[10]

The idea of a Jewish primacy in the field of alchemy lived on even after the Enlightenment,[11] until at least the end of the 18th century, when the influence of the movement of the *Haskalah* led Jewish scholars to a strongly negative view of all the aspects of the literary and intellectual production of the Jews that were considered in opposition with the enlightened reason. Alchemy, together with cabala, was banned from the number of 'accepted' disciplines and Jewish scholars tended to condemn it as a fraudulent practice and to deny any participation of the Jewish people to its development.[12]

This tendency can be found for instance in the works of the master of Hebrew bibliography, Moritz Steinschneider. When dealing with the

subject of alchemy, he tends to minimize the implications of the Jews in this art, as apparent in an article published in 1873, where he assumes that the Jews were too acquainted with the use of real balances for being mislead by the philosopher's stone.[13] In a note in the same article, Steinschneider remarks that he does not know any evidence about a particular relationship between the Jews and the knowledge of alchemy. He then assumes that in a later period some alchemical writings were pseudo-epigraphically attributed to Sa'adiah Ga'on and Maimonides. Although in his catalogues of the Hebrew manuscripts preserved in the major European libraries he happened to describe alchemical treatises in Hebrew language,[14] he tended to consider any attribution of alchemical works to Jewish authors as pseudoepigraphical.[15]

A similar point of view is found in the first *Jewish Encyclopedia* published in New York in the first decade of the 20th century. Moses Gaster, author of the entry 'alchemy', is very sceptical about the Jewish contribution to it, although he recognizes that "there is, however, scarcely a single important ancient work upon the science which is not directly related to the Jews, with their traditions and their science".[16]

In the three editions of the *Encyclopaedia Judaica*, the voice alchemy is committed to the pen of Bernard Suler. In his contributions, Suler traces a complete account of the relationship between the Jews and alchemy, remarking the fact that the Jewish pre-eminence in the field was mainly stated in treatises written by non-Jews. Although he recognizes that much research is still to be conducted, he seems to agree with Steinschneider's opinion when he maintains:

> The number of Jews who practiced the art of alchemy was apparently relatively small; however the state of knowledge on this point is incomplete […]. The conclusion at which De Pauw arrived 150 years ago, namely that the Jews were the creators of alchemy, is incorrect. Alchemy is neither a Jewish science nor a Jewish art. The Jews were engaged in it in the same measure as they were engaged in other secular traditions or fields of knowledge.[17]

A similar position was shared by Joshua Trachtenberg in his work on *Jewish Magic and Superstition* published in 1939, where he does not deal with alchemy apart from a brief note in the chapter on medicine. He considers alchemy as part of the magical arts and states that it had in general very little currency among the Jews. He adds that, although the Jews were traditionally considered to be adepts of the Art, there is no

evidence of this fact in any of the Hebrew Northern European literary works he was acquainted with. [18]

A radically new approach to the problem of the relationship between Jews and alchemy is found in Gershom Scholem's contribution to the knowledge of the connections between alchemy and cabala.[19] The explicit aim of Scholem's book is to clarify the boundaries of the two fields of knowledge and analyze their relationship in order to clear the confusion that eventually led to consider the two words as synonyms. As a starting point, Scholem explains that there is a theoretical difference between the beliefs of the alchemists and those of the cabalists and that this difference is found at the level of the basic principles of the two doctrines: while for the alchemists gold is associated with the masculine principle and silver with the feminine one, the case is completely the opposite in Jewish mystical writings. This basic opposition would avoid – at least during the Middle Ages – any real intersection between the two doctrines: the confusion between the two fields of knowledge took place later and was actively promoted by Christian cabalists, who started to make use of concepts derived form the Jewish cabala together with images of alchemical origin.

Patai's project of reconsidering the role of the Jews in the transmission and development of alchemy was accepted by the academic world with some noticeable critics. In a review appeared on *Isis* in 1995, Gad Freudenthal criticizes the phenomenological – more than historical – approach showed in Patai's book. He then suggests two main points of weakness in Patai's work: firstly, "converted Jews and some persons whose Jewishness is more than doubtful receive extensive treatments, although naturally their writings have nothing Jewish to them", secondly that "the criterion by which a text is considered as alchemical is rather blurry". He eventually concludes that "Patai's occasional general suggestions concerning Jews' interest in alchemy are unsatisfactory".[20] In his own review of the same book, Tzvi Langermann comments on Patai's monograph defining it a "work of antiquarianism, not one of professional scholarship". The questions raised in Langermann's review can be considered a stimulating starting point for debate and further study: "Is there anything in the values and traditions of Judaism that can help us understand the Jewish interest, or lack thereof, in alchemy?".[21] In other words: is there any trace of a kind of alchemy that could be described as peculiar to Jews?

Much work still has to be done in order to unveil the contents of manuscripts that could preserve possible traces of genuine alchemical treatises written by Jews. I am referring in particular to the still