THE CONSTRUCTION OF CERTAIN SEALS AND CHARACTERS IN THE WORK OF AGRIPPA OF NETTESHEIM

By Karl Anton Nowotny

In Albrecht Dürer's etching 'Melencolia I' there appears this magic square:

16	3	2	13
5	10	11	8
9	6	7	12
4	15	14	1

The mathematical and astronomical instruments depicted in this drawing symbolize the tendencies of the melancholic temperament.[1] The square is the magic square of Jupiter, placed here to counteract the melancholic temperament, which comes under Saturn. The artist did not himself construct the square, but chose of all the innumerable possible formulae one showing the year date he wanted (1514). There can be no doubt that it was taken from a treatise on magic squares, their relation to astrology and their magic influence when on talismans. A version of this treatise is bound in with the fifteenth-century Cracow manuscript of the *Picatrix*.[2] By order of Alfonso X, the *Picatrix* was translated into Latin from the Arabic in 1276. A later version, differing considerably in text, appears in the pseudo-Paracelsian *Archidoxis magica*[3] printed in Bâle in 1572. It is obvious that these two versions are closely related as the same magic squares are to be found in each; they are considerably distorted in the *Archidoxis magica*.

In the period when Dürer designed his 'Melencolia' he was greatly interested in geometrical problems; his artistic style was going through a phase of decided change. He was clearly occupied at this time in the study of books on astrological magic. Magic squares and subjects of a similar nature, classed to-day under the heading "mathematical entertainments," were given a very different significance by prominent men of intellect in Dürer's day. At that very time Agrippa of Nettesheim was writing his *Philosophia occulta sive magia*, which will be referred to in greater detail. Agrippa's views on the magic squares coincided with those of the treatise mentioned above. He does not, however, put together a haphazard collection of squares such as that from which Dürer took his "Seal of Jupiter" in the 'Melencolia' etching, but shows ingeniously constructed, imaginative figures.

A magic square is a square divided into cells, the outstanding character-

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[1] Cf. E. Panofsky and F. Saxl, *Dürer's 'Melencolia I.' Eine quellen- und typengeschichtliche Untersuchung* (Studien der Bibliothek Warburg, II), Berlin, 1923. A revised and enlarged English version of this book is in preparation.

[2] Codex 793. Cf. H. Ritter, *Picatrix* ein arabisches Handbuch Hellenistischer Magie, (Vorträge der Bibl. Warburg 1921-22), Leipzig, 1923.

[3] Theophrast von Hohenheim known as Paracelsus, *Collected Works*, published by K. Sudhoff, 14 vols., Munich, 1933.

istic of which is that numbers are inserted in such a way that if every row, column and diagonal is added up they all show the same total. Besides this, many other rules of a geometrical or arithmetical nature may be discerned.[1] As a rule, magic squares are made up from a series of consecutive numbers commencing from one; this, however, is just one possibility amongst many.[2]

It is the mathematical aspect of magic squares which, to judge by the literature on the subject, has so far received the greatest attention.[3] Their historical significance, however, is far greater although of course they offer occasion for the study of many problems on permutations and combinations, and in the theory of numbers.

They came in with that wave of civilization from the East which, besides introducing Hellenistic cultural benefits in Arabian garb, brought with it chess and playing cards. To this day magic squares (wafk) are in use in Islamic countries.[4] These are usually squares of nine or sixteen cells, but also frequently the so-called Latin squares. The top line of such a square is filled with the letters of a divine name or with the first letters of a verse from the Koran, the remaining lines containing permutations of these letters. As the letters have a numerical value the result is a more or less perfect magic square. Agrippa's method of constructing characters from magic squares— in which the starting-point is arithmetical, letters being fitted to the numerals —is simply the inversion of this principle.

Clues to the history of magic squares are to be found in Arabian sources. These go back to about 900 A.D. and appear in the Encyclopaedia of the "Faithful Brethren" of Basra in the latter half of the tenth century. According to Ruska, records go back to the Sabians of Harran, a pagan sect whose priests used the Syrian language and who practised star worship; they can be traced as late as the eleventh century. Mathematicians and those cultivating the secret sciences in the thirteenth century were especially interested in this subject. The only known particulars are derived from the writings of Al-Buni, who died in 1225. So, too, the application of the squares of the numbers 3 to 9 to the seven planets can only be traced to this period. This application occurred in a double form: upward, a system introduced into the West by Agrippa, and downward (the square of the number 3 assigned to the Moon, etc.) as practised in the West according to Cardan.[5]

Apart from the difficulties caused by the scarcity of historical records, there are many interesting problems still unsolved. Agrippa apparently obtained his information from translations from Arabic. Numbers, letters, and incomprehensible characters used for purposes of magic appear even in the Hellenistic magical papyri. Little is yet known of the changes that took place in these matters during the long intervening period. Agrippa did indeed endeavour to compile an encyclopaedia and synthesis. His friend Abbot Trithemius of Spon-

[1] B. Lehmann, *Zahlenfiguren auf Amuletten und Planetensiegeln*, Strelitz-Alt, 1925.

[2] B. Kletler, *Magische Zahlenquadrate*, Vienna, 1930.

[3] S. Günther, *Vermischte Untersuchungen zur Geschichte der mathematischen Wissenschaften*, Leipzig, 1876.

[4] J. Ruska, article *Wafk* in *Enzyklopädie des Islam*, 1933; E. Doutté, *Magie et religion dans l'Afrique du Nord*, Algiers, 1909; Ahrens and Bergsträsser in *Islam*, VII, 1916; XII, 1922; XIII, 1923.
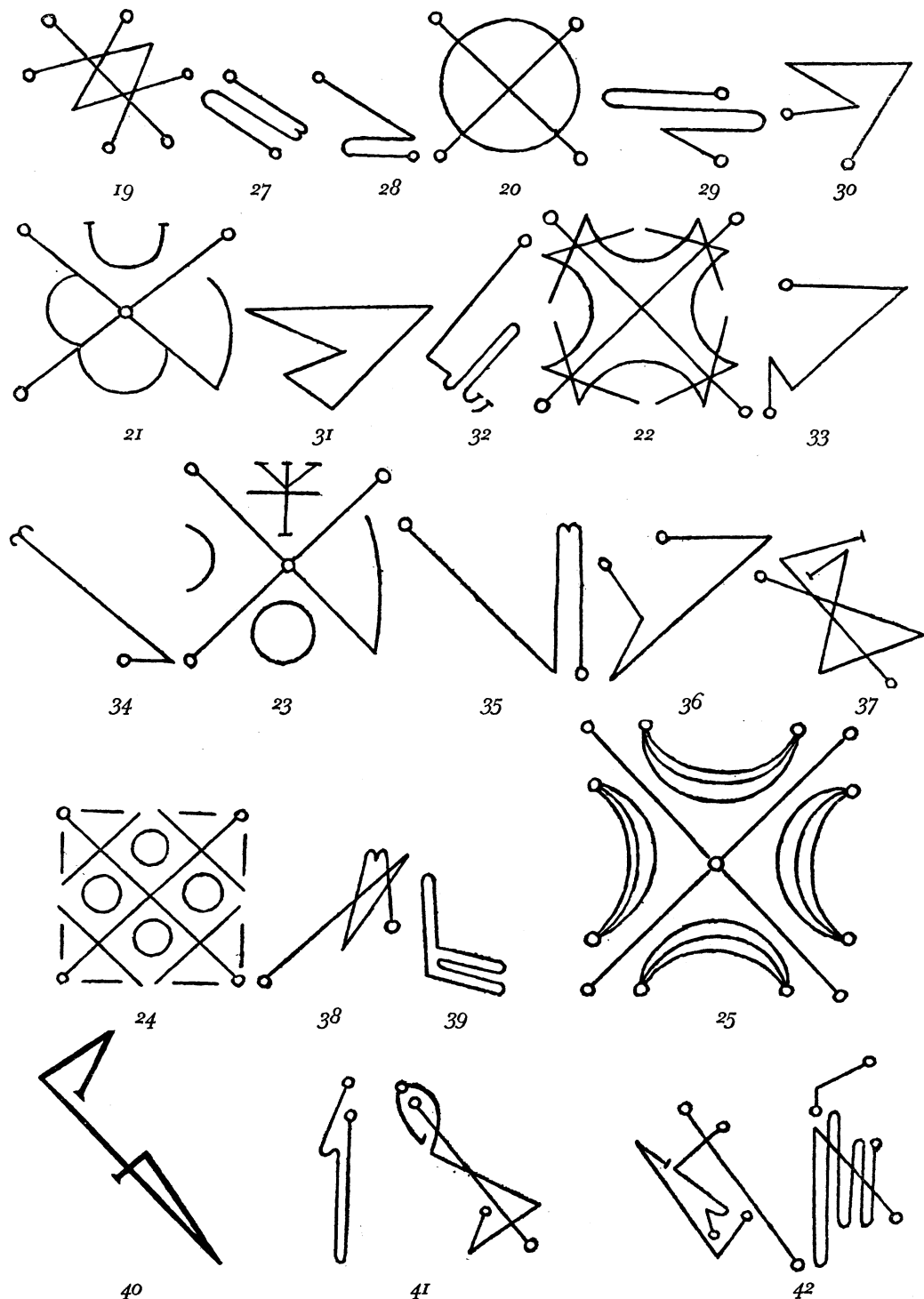
[5] *Practica arithmetica*, 1539.

Fig. 1—The "Signacula" and "Characteres" in Agrippa's *Occulta Philosophia*, Lyons, 1533
The numbering corresponds with that of figs. 19-25 and 27-42 on Plate 21

heim,[1] who was one of Paracelsus' teachers, devoted himself to cryptography. He used, for this purpose, elaborate magic formulae which earned him a reputation as arch-magician. Agrippa distinguished between seals derived from the geometrical pattern of the distribution of numbers in the squares, and characters from cryptographic names of the planet angels.[2] Whether, in following this method, he was relying on ancient tradition or was influenced by Trithemius has not, so far, been established.

The names given by Agrippa to the angels present another interesting problem. The fact that he chose Hebrew names may be accounted for by his adopting the cabbalistic philosophy, and also by the belief that Hebrew was the original language of antiquity. Angels and demons would, naturally, be assumed to make use of this language. An examination of the words employed with their fragments of Greek might give rise to interesting conclusions. Agrippa's magic squares are constructed both from Arabic numbers and from Hebrew letter numerals.[3]

Subsequent developments are also of great interest. Mathematicians,[4] astrologers, and cabbalists such as Robert Fludd, all concerned themselves with magic squares. Astrological amulets made of the metals of the seven planets attained special importance during the seventeenth and eighteenth centuries.

<p align="center">*   *   *</p>

The symbols of a cabbalistic nature, which occur very frequently on astrological medallions, seem in many cases to have originated with Agrippa of Nettesheim (fig. 1).[5] The manner in which such symbols can be taken from magic squares is shown by Agrippa in an elaborate chiasmus: "Qualiter autem eliciantur signacula et characteres cum stellarum tum spirituum ex istis mensulis, sagax scrutator, et qui harum mensularum verificationem intellexerit, facile invenire poterit." Thus, the *signacula* are related to the construction of the tables; the characters, on the other hand, are to be discovered by calculation.

The construction, however, is not easy to discern. Hardly any of the readers of Agrippa's skilful Latin have comprehended correctly its hidden meaning. In following Agrippa's directions one must first of all obtain a clear understanding of the construction of the square shown by him. This is in no sense a question of mathematics, of the many possible variations or similar problems. Agrippa uses very simple magic squares which are obtained by

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[1] *Steganographia*, Lyon, 1531; Darmstadt, 1606; Mainz, 1676; Nürnberg, 1721.

[2] F. Maak (*Die astrologische Bedeutung des magischen Quadrates*, Vienna, 1925) sought to explain these symbols by means of complicated mathematical expositions. The accuracy of the explanation given below is proved by the fact that the symbols can be divided into as many parts as there are words in the names in question, that they have as many ends and corners as there are letters in the words, and that words having the same first and last letters correspond to characters

in a reverse direction.

[3] W. Ahrens, *Hebräische Amulette mit magischen Zahlenquadraten*, Berlin, 1916.

[4] P. Tannery, *Le Traité manuel de Moschopoulos sur les carrés magiques*, Paris, 1886; Michael Stifel, *Arithmetica integra*, 1544.

[5] Henricus Cornelius Agrippa ab Nettesheym, *De Occulta Philosophia Libri Tres*, 1533, Lib. II. De Planetarum mensulis, earum uirtutibus & formulis, & quae illis praeficiantur, diuina nomina, intelligentiae & daemonia. Caput XXII. (Cf. fig. 1.)

means of simple changes and permutations from squares made up of numbers in their natural consecutive order. The squares are assigned to the seven planets in the order of their velocity. Three kinds of magic squares can be distinguished according to the number of units in a side: those containing an uneven number; those with an even number whose halves are uneven; and those containing an even number whose halves are even. The lowest number of units used to form one side of a magic square is three.

The magic square of the numeral 3, the table of Saturn (fig. 2),[1] is derived from the natural square (fig. 3) numbered from left to right, as in the construction of all uneven squares, by a turn of 45° to the right and the insertion of the numerals thus left on the opposite sides (fig. 4). The seal of Saturn (fig. 19) does not coincide with this construction, it simply shows the numerals of the square in their consecutive order (1-2-3, 4-5-6, 7-8-9). Small rings have been introduced at the ends of the lines. This seal corresponds to the construction of the square of the numeral 3 as interpreted by the "Faithful Brethren" in terms of the moves of chess-men.
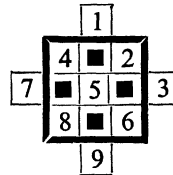

Fig. 2　　　　　　Fig. 3　　　　　　Fig. 4

The magic square of the numeral 4, the table of Jupiter (fig. 5), is formed by leaving in position one half of the numerals of the natural square (fig. 6— as in the case of all even squares, the sequence is from right to left) and turning the other half by 180°, as shown in the diagram of fig. 7. The seal of Jupiter (fig. 20) joins together the numerals left in position by means of a St. Andrew's cross with rings at the end, and the numerals turned round by means of a circle.
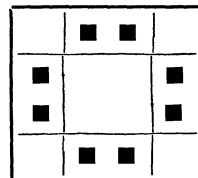

Fig. 5　　　　　　Fig. 6　　　　　　Fig. 7

The square of the numeral 5, the table of Mars (fig. 8), is formed in the same manner as the square of the numeral 3 from its natural square (fig. 9), as shown in the diagram of fig. 10. The seal of Mars (fig. 21) is more difficult to explain. The plan of construction of the uneven squares shows a chequered field like that of a chess board. The cells of the diagonals are joined by a St. Andrew's cross with rings on the ends and another in the centre as there is a numeral there also. The hook on the right connects the

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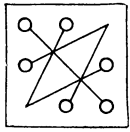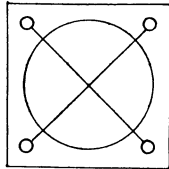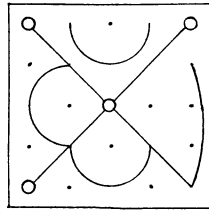[1] For explanation of the use of heavier type in this diagram and figs. 5, 8, 11, 15, 16, 18 below, see p. 55.
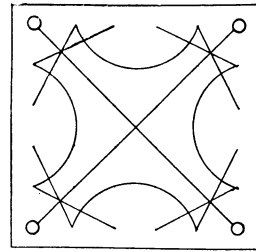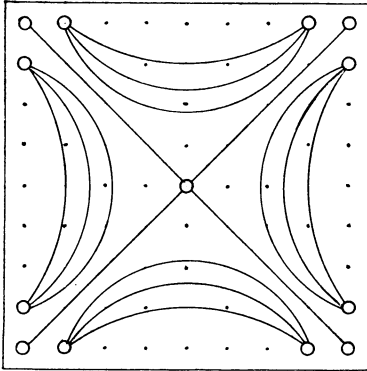
Fig. 19

Fig. 20

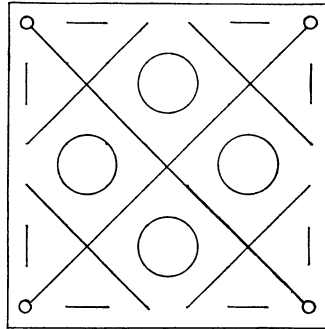Fig. 21

Fig. 22

Fig. 25

Fig. 24

Fig. 23

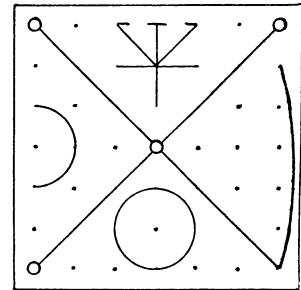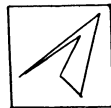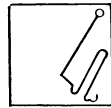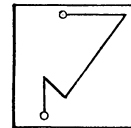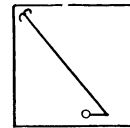Figs. 19-25—Seals of the Seven Planets (*p.* 50 f.)
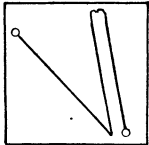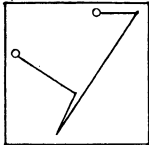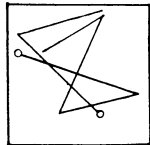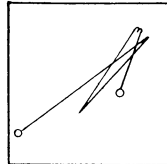
Fig. 27 Fig. 28 Fig. 29 Fig. 30 Fig. 31 Fig. 32 Fig. 33 Fig. 34
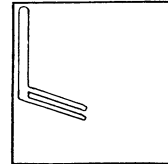
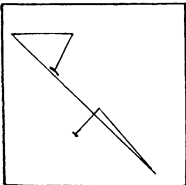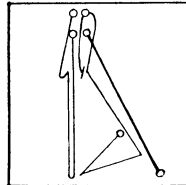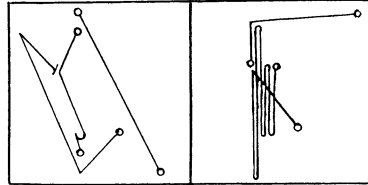Fig. 35 Fig. 36 Fig. 37 Fig. 38 Fig. 39

Fig. 40 Fig. 41 Fig. 42

Figs. 27-42—Characters of the Intelligences and Demons of the Planets (*p.* 53 f.)

Fig. 44a Fig. 43a Fig. 43b Fig. 44b

Figs. 43a, b—Sun Talisman (*p.* 56)   Figs. 44a, b—Moon Talisman (*p.* 56)
Münzkabinett, Vienna

two widely separated numbers 15 and 16. The significance of these numbers is at once made clear if one takes the trouble to join up all the numerals in this magic square.[1] The three half circles connect cells of the same colour in the chessboard pattern referred to above.
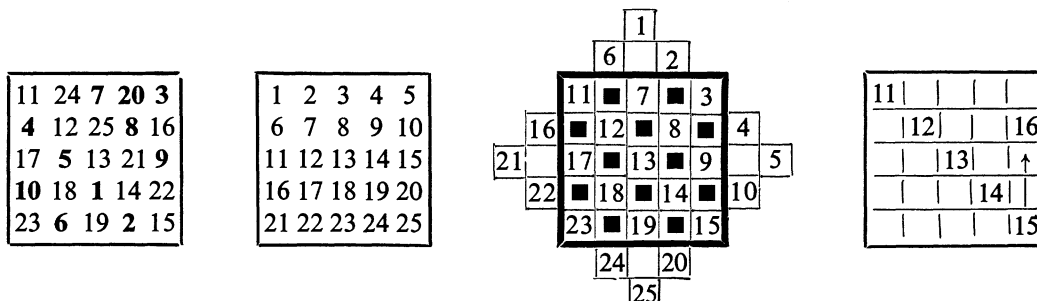

11	24	**7**	**20**	3
4	12	25	**8**	16
17	**5**	13	21	9
10	18	**1**	14	22
23	**6**	19	**2**	15

Fig. 8

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20
21	22	23	24	25

Fig. 9

Fig. 10

Fig. 10A

The magic square of the numeral 6, table of the Sun (fig. 11), is difficult to make. The numbers of the diagonals in the natural square (fig. 12) remain; the cells filled in with black in the diagram (fig. 13) are turned by 180°. The cells marked with a vertical line are mirrored in AB and those with a horizontal line are mirrored in CD. The construction of the larger even squares with uneven halves is still more complicated (cf. fig. 14—even wider variants of the square of the numeral 10 are possible). The lines of the seal of the Sun (fig. 22) join up the numbers of the diagonals. The mirrored numbers are connected by means of the characteristic hooks, as are the numbers which were only turned.

6	32	**3**	34	35	**1**
7	11	27	28	**8**	**30**
19	14	16	15	23	24
18	**20**	22	21	17	13
25	29	**10**	9	26	12
36	**5**	33	**4**	2	31

Fig. 11
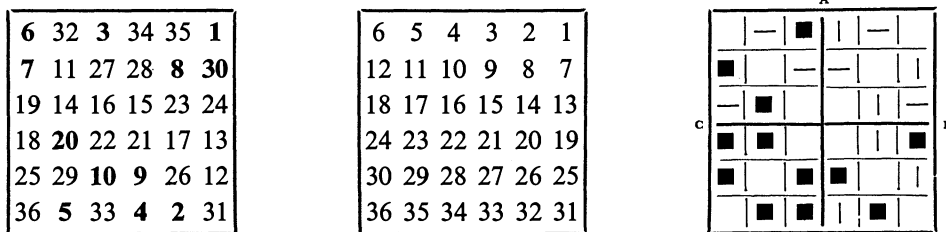
6	5	4	3	2	1
12	11	10	9	8	7
18	17	16	15	14	13
24	23	22	21	20	19
30	29	28	27	26	25
36	35	34	33	32	31

Fig. 12

Fig. 13

The construction of the square of the numeral 7, the table of Venus (fig. 15) follows the same principle as that of the uneven squares mentioned above. The seal of Venus (fig. 23) again shows the diagonals connected as in the square of the numeral 5, as well as the hooks joining the widely separated numbers 28 and 29. The circle at the bottom and the half-circle at the left-hand corner form links between cells of the same colour in the chess-board pattern of the diagram. In the top corners these cells are connected by a cross and a triangle. The figures resulting from this arrangement may have symbolic significance.

[1] When one starts the construction of the magic square by writing the diagonal in its natural order, the only problematic step is from 15 to 16 (see fig. 10A) and this must be repeated at 20, 25, 5, 10. Cf. W. W. Rowse Ball, *Mathematical Recreations and Essays*, 10th ed., London, 1931, chapter VII, p. 139.
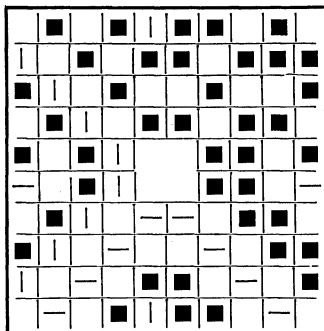
Fig. 14

22	47	16	41	10	35	4
5	23	48	17	42	11	29
30	6	24	49	18	36	12
13	31	7	25	43	19	37
38	14	32	1	26	44	20
21	39	8	33	2	27	45
46	15	40	9	34	3	28

Fig. 15

The square of the numeral 8, table of Mercury (fig. 16), is formed in the same manner as that for the numeral 4. There are three variants of analogous diagrams. The example given (fig. 17) shows, after the interchange of the stationary and turned cells, the formula *a b b a* on a half turn. The variants *a a b b* and *a b a b* are also possible. The seal of Mercury (fig. 24) shows the stationary numbers in the diagram fig. 17 joined together by a St. Andrew's cross with rings on the ends and by four straight lines cutting through the arms of the cross. The turned numbers are joined by four circles and eight short lines.

8	58	59	5	4	62	63	1
49	15	14	52	53	11	10	56
41	23	22	44	45	19	18	48
32	34	35	29	28	38	39	25
40	26	27	37	36	30	31	33
17	47	46	20	21	43	42	24
9	55	54	12	13	51	50	16
64	2	3	61	60	6	7	57

Fig. 16

a   b   b   a
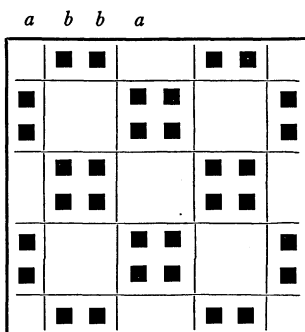
Fig. 17

37	78	29	70	21	62	13	54	5
6	38	79	30	71	22	63	14	46
47	7	39	80	31	72	23	55	15
16	48	8	40	81	32	64	24	56
57	17	49	9	41	73	33	65	25
26	58	18	50	1	42	74	34	66
67	27	59	10	51	2	43	75	35
36	68	19	60	11	52	3	44	76
77	28	69	20	61	12	53	4	45

Fig. 18

The square of the numeral 9, the table of the Moon (fig. 18), is formed in the same way as the uneven squares already referred to. The seal of the Moon (fig. 25) again shows the St. Andrew's cross with rings at the ends and at the point of intersection. Cells of the same colour in the chessboard pattern are connected by triple crescents with rings on the ends. This form must certainly have been chosen with direct reference to the Moon.

Thus, the interpretation of the seals of the planets is to be sought, as Agrippa says, in the construction of the tables. This is especially evident in the squares with an even number of cells. In the squares containing sides with uneven numbers, besides the lines inherent in the diagram, symbolic figures are drawn over the chessboard pattern indicating the nature of the planet.

*   *   *

The characters (*characteres*) are formed very differently. In the first place,

the names of angels are selected, the letters of which give the numbers of the magic squares.[1] The numbers contained in the magic squares assigned to the seven planets are as follows:

	No. of units in a side	No. of cells	Sum along any line[2]	Total
Saturn	3	9	15	45
Jupiter	4	16	34	136
Mars	5	25	65	325
Sun	6	36	111	666
Venus	7	49	175	1225
Mercury	8	64	260	2080
Moon	9	81	369	3321

The names of the angels or spirits assigned to the planets are as follows:

Intelligentia Saturni
Agiel אגיאל
(Cf. fig. 27)

$$30 + 1 + 10 + 3 + 1 = 45$$

Daemonium Saturni
Zazel זאזל
(Cf. fig. 28)

$$30 + 7 + 1 + 7 = 45$$

Intelligentia Iovis
Iophiel יהפיאל
(Cf. fig. 29)

$$30 + 1 + 10 + 80 + 5 + 10 = 136$$

Daemonium Iovis
Hismael הסמאל
(Cf. fig. 30)

$$30 + 1 + 40 + 60 + 5 = 136$$

Intelligentia Martis
Graphiel גראפיאל
(Cf. fig. 31)

$$30 + 1 + 10 + 80 + 1 + 200 + 3 = 325$$

[1] The numerical values of the Hebrew letters are as follows:

1	א	ɔ	ɔalef	10	י	j	jod	100	ק	q	qof
2	ב	b,bh	beth	20	כ	k,kh	kaf	200	ר	r	res
3	ג	g,gh	gimel	30	ל	l	lamed	300	ש	s,s	sin
4	ד	d,dh	daleth	40	מ	m	mem	400	ת	t,th	taw
5	ה	h	he	50	נ	n	nun	500	ך		Final-kaf
6	ו	w	waw	60	ס	s	samekh	600	ם		Final-mem
7	ז	z	zain	70	ע	ᶜ	ᶜain	700	ן		Final-nun
8	ח	ch	cheth	80	פ	p,f	pe	800	ף		Final-pe
9	ט	ṭ	ṭeth	90	צ	ṣ	ṣade	900	ץ		Final-ṣade

[2] The "sum along any line" is known as the Magic Constant of the square. It is $\frac{1}{2}n(1 + n^2)$ for a square of n units in a side. The Total of all the numbers in the square is $\frac{1}{2}n^2(1 + n^2)$.

Daemonium Martis
Barzabel ברצאבאל $30 + 1 + 2 (+ 1) + 90 + 200 + 2 = 325 (+ 1)$
(Cf. fig. 32)

Intelligentia Solis
Nachiel נכיאל $30 + 1 + 10 + 20 + 50 = 111$
(Cf. fig. 33)

Daemonium Solis
Sorath סורת $400 + 200 + 6 + 60 = 666$
(Cf. fig. 34)

Intelligentia Veneris
Hagiel הגיאל $30 + 1 + 10 + 3 + 5 = 49$
(Cf. fig. 35)

Daemonium Veneris
Kedemel קדמאל $30 + 1 + 40 + 4 + 100 = 175$
(Cf. fig. 36)

Intelligentiae Veneris
Bne Seraphim בני שרפים $600 + 10 + 80 + 200 + 300; + 10 + 50$
(Cf. fig. 37) $+ 2 = 1252 (!)$

Intelligentia Mercurij
Tiriel טיריאל $30 + 1 + 10 + 200 + 10 + 9 = 260$
(Cf. fig. 38)

Daemonium Mercurij
Taphthartharath תפתרתרת $400 + 200 + 400 + 200 + 400 + 80 + 400$
(Cf. fig. 39) $= 2080$

Daemonium Lunae
Hasmodai חשמודאי $10 + 1 + 4 + 6 + 40 + 300 + 8 = 369$
(Cf. fig. 40)

Daemonium daemoniorum Lunae
Sched barschemoth Schartathan שד ברשהמעת שרתתן
$700 + 400 + 400 + 200 + 300; + 400 + 70 + 40 + 5 + 300 + 200$
$+ 2; + 4 + 300 = 3321$
(Cf. fig. 41)

Intelligentia intelligentiarum Lunae
Malcha betharsitim hed beruach schehakim
מלכא בתרשיתים עד ברוח שחקים
$600 + 10 + 100 + 8 + 300; + 8 + 6 + 200 + 2; + 4 + 70; + 600$
$+ 10 + 400 + 10 + 300 + 200 + 400 + 2; + 1 + 20 + 30 + 40$
$= 3321$
(Cf. fig. 42)

The characters are formed by joining the numerical values of the letters forming the names of the angels in the tables of the planets; this can easily be confirmed by a comparison of the angels' names given above with figs. 27 to 42. The numbers in the construction employed in this manner are printed in heavy type in the planet tables in order to facilitate comparison (figs. 2, 5, 8, 11, 15, 16, 18).

The tens and hundreds are often expressed by ones, even where the numeral ten is already given. Ones, on the other hand, may be shown as tens. The same method occurs in a fairly widely distributed cryptographic writing, mentioned by Agrippa (cf. fig. 26). Letters having the same numerical value but varying in position are expressed by the same angle signs and distinguished only by diacritic dots, if at all.

גלש	בכר	איק
וסם	הנך	דמת
טצץ	חפף	זען

⅂ ⌐ ⌐ ⅃ □ ⊏ ⌐ ⊔ ∟

Fig. 26

The joining of the numbers is by no means consistent. The main idea was, apparently, to produce characters as pleasing as possible to the eye. Small rings are usually placed at the ends of the lines; where there is no room for rings these are replaced by cross strokes (figs. 40, 41, 42). If a word terminates with two letters having the same numerical value the character is sometimes completed by a double hook (figs. 32, 34). Two letters having the same numerical value occurring in a word are sometimes represented by an indentation (figs. 27, 35, 38, 41, 42), sometimes not at all (figs. 29, 31); sometimes, however, in cases where the position-value of the numbers is different, they are joined by lines (figs. 33, 36, 41, 42). In cases where the words begin and terminate with the same letters the characters, quite logically, are turned inward on themselves (figs. 31, 39). Two of the characters appear in the old woodcuts in reversed positions (cf. figs. 28 and 32 with fig. 1). One character shows a superfluous twist (fig. 32). The two words in the character of fig. 37 are not separated by rings or slanting lines as they form a double word. In this character the name of the angel is wrongly assigned to Venus, as the numerical value is 1252 and not 1225.

Apart from these irregularities, there are obvious mistakes in the characters of the Moon. This may be accounted for by their very complicated nature. In the character of the Demon of the Moon, for instance, the symbol of Mem (40) has been omitted; a ring is missing, also, from one of the ends. In the character of the Supreme Demon of the Moon one line is incorrectly crossed through, and the symbol for He (5) is missing. In the character of the Supreme Intelligence of the Moon a Final-Mem is given instead of a simple Mem, and so one hairpin-like loop too many has been drawn. The character of the word Malcha, in the old woodcuts, is in the wrong position in its relation to the other character. It may be, however, that it was constructed of Mem (40), Lamech (30) and Final-Kaf (500). The extremely

complicated outlines of the Supreme Intelligence of the Moon necessitates the use of two characters or of two juxtaposed magic squares. In the old woodcuts the second character is correct, apart from an incorrect cross stroke.

Agrippa's seals and characters frequently occur, with many other signs, on post-mediaeval medallions and seem usually to be taken from his works. The examples reproduced (figs. 43a, b and 44a, b) are from the Münzkabinett in Vienna. The medallion of the Sun shows (fig. 43a) the Sun in his astrological house, the Lion, as on the coat of arms of Persia. On the reverse (fig. 43b) there appear the character of the Intelligence of the Sun (Nachiel—cf. fig. 33), the zodiacal sign of Leo, and the sign of the "heart of the lion" (Cor leonis), i.e., the bright fixed star Regulus. This sign appears also in Agrippa's book, and moreover, Dürer depicted it in the portrait of Kleeberger in Vienna;[1] for Kleeberger was born in this significant conjunction of the Sun and Regulus (Sol in Corde leonis). The medallion of the Moon (figs. 44a, b) is a good example of the interconnection of astrology and astronomy. It shows the picture of the Moon as it might have been seen in a telescope, with a little figure of Luna within it (fig. 44a); the magic square of the Moon (fig. 44b); and, divided between the two sides, a distorted version of the character of the Supreme Intelligence of the Moon (Malcha betharsitim hed beruach schehakim—cf. fig. 42). The other characters and names of angels originate from the *Heptameron* of Petrus de Abano and from the *Clavicula Salomonis*.

Agrippa credits his planet tables with the well-known influences, both for good and evil, ascribed to the seven planets. Referring to the working of these influences at the opening of Chapter XXII of Book Two, he gives expression to Neo-Platonic views which are of the very essence of his "occulta philosophia, sive magia." Hence he laid great stress on their significance:

> Traduntur insuper a magis quaedam numerorum mensulae, planetis septem distributae, quas planetarum sacras tabulas vocant multis admodum magnisque coelestium virtutibus insignatas, quatenus repraesentant divinam illam coelestium numerorum rationem a divinae mentis ideis per rationem animae mundi coelestibus impressam, illorumque suavissimam coelestium radiorum harmoniam, secundum effigierum proportionem, intelligentias supramundanas consignificantium, quae aliter exprimi non possunt, quam per notas numerorum et characterum. nihil enim materiales numeri et figurae possunt in mysteriis rerum abditarum, nisi repraesentative per numeros et figuras formales, quatenus reguntur et informantur ab intelligentiis et numerationibus divinis, quae nectunt extrema materiae atque spiritus ad voluntatem animae elevatae per magnum affectum operantis coelesti virtute potestatem accipiens a deo, per animam universi et coelestium constellationum observationes in materiam applicatam ad formam convenientem, dispositis mediis solertia et scientia magicali.

[1] A. Loehr, "Astrologie in der Numismatik," *Berliner Münzblätter*, 52, Nos. 349, 350, Berlin, 1932; *idem*, "Sol in Corde leonis," *Numismatische Zeitschrift*, Vienna, 1947.

The magic squares must arouse great interest, whether regarded as a preparation of the human mind for later triumphs in the exact sciences, or considered from an historical standpoint as the transition from magic thought to scientific thought.

The theory of the magic squares as maintained by Agrippa in the early sixteenth century is a particularly illuminating example of a bold compromise between the two points of view such as could only have existed in that period of transition. This blending of ideas is here far more clearly discernible than, for example, in the theory of the relation of the planets to metals, colours, etc. These theories also are the result of compromise, but their development began at such an early period and continued so gradually that it is more difficult to perceive them.

Agrippa's views in regard to magic influence are still quite in accord with those of the ancient magicians, in that he connects it with an angel (Intelligence or Demon) who can be summoned by the use of his name.

This philosophy, however, is combined with that ascribing all influences to the forces of Nature, which it seeks to probe. It assigns to the planets a series of squares involving mathematical problems and arranged in the order of their velocity. These numbers and lines seem to reveal the laws of the harmony of the spheres. The construction of this harmony is on rational lines. To a contemporary observer it would appear that only the absence of a key to the harmony of these squares conceals from him a knowledge of the final solution.