

The Voynich Manuscript: An Elegant Enigma

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National Security Agency: AN ELEGANT ENIGMA

This bulletin reproduces choice pages from the so-called Voynich Manuscript from a PDF available on the website of the Beinecke Rare Books Library at Yale University, interspersed with choice pages from the U.S. National Security Agency report pictured on the cover.

From the Beinecke Rare Books Library website:

In 1912, the rare book dealer Wilfrid Voynich discovered what is now known as the Voynich Manuscript in a Jesuit library at the Villa Mondragone near Rome. Since then, historians have traced its history all the way back to the court of the Holy Roman Emperor Rudolph II at Prague circa 1600–1610—but no further. Its vellum has now been dated at 1404 to 1438 with 95% certainty, but its author, origin, purpose, contents, and provenance before 1600 all remain resolutely unknown. Not a single word of it has yet been successfully deciphered.

All pages reproduced here are the same size as the originals.

Cover: A bound copy of the official NSA report.

Chapter 1

The Known Facts

1.1 *The Manuscript As Found*

It seems important first of all to distinguish clearly between the givens—the incontrovertible facts available to all students of the manuscript—and the lush growth of conjecture that has accumulated around the few meagre certainties we have. A clear physical description of the codex itself is provided by several authors. The entry in the catalogue of H. P. Kraus (antiquarian bookdealer and owner of the manuscript for a number of years) provides an excellent, compact sketch (see figure 1). In brief, the mysterious manuscript consists in a small quarto volume, with leaves of varying size but of an average nine by six inches, some multiply folded. Most pages contain, in addition to copious text in the unknown script (which I will call the "Voynich script" throughout this paper), colored pictures of considerable variety, whose meaning is open to conjecture. Most appear to represent plants, astrological or cosmological material, and pharmaceutical recipes, while a few show human figures surrounded by bizarre objects in scenes of undetermined import. The text and drawings will be studied in considerable detail in Chapters 3 and 4.

The manuscript has no cover; the first page contains only four brief paragraphs of text without pictures, but with an apparent crude attempt at rubrication by means of enlarged and embellished initial characters in red ink. The last page shows a few lines of writing near the top, in a different script or mixture of scripts than the bulk of the text, along with a few symbols from the Voynich script, and a scattering of sketchy drawings of animals, people, and other unidentifiable objects in the upper left corner. Some leaves in the body of the manuscript also contain jottings (largely illegible) in scripts and hands apparently differing from the majority of the text. These atypical scraps of writing will be dealt with more fully below.

We have one other bit of concrete data to exploit: a letter, found between the pages of the manuscript by Wilfrid Voynich. Figure 2 shows this letter, and figure 3 provides its translation from Latin as prepared for Voynich and published by him (1921, p. 27). The letter was written by Joannus Marcus Marci in Prague to accompany his gift of the manuscript to Athanasius Kircher, S. J., in Rome. The letter adds the following solid facts to our knowledge (as fleshed out by the research of Voynich, which he describes in interesting detail in the work cited above):

The manuscript was in the hands of Joannus Marcus Marci (A.D. 1595–1667), official physician to Emperor Rudolph II of Bohemia (A.D. 1552–1612), in the year 1665 or 1666.

It had previously been in the possession of one or more other persons, otherwise unidentified, probably associated with the court of Rudolph II.

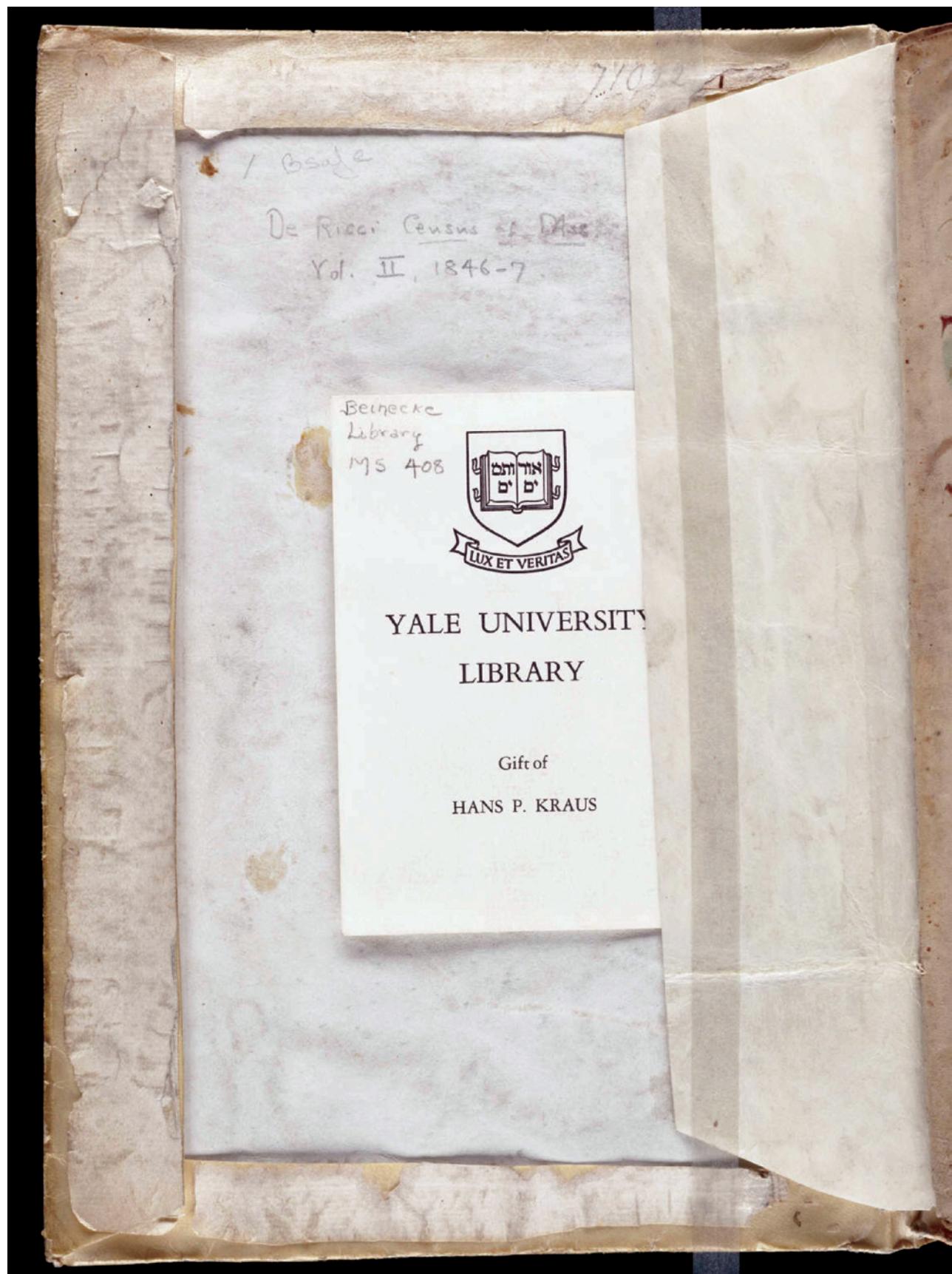
It passed from the possession of Marci to Athanasius Kircher in 1665 or 1666, and remained in his hands for an unknown period of time.

It had been sold to Rudolph by an unidentified person at an unstated time for the large sum of 600 ducats, according to information provided to Marci by a Dr. Raphael Missowsky (A.D. 1580–1644), who was a familiar at the courts of Rudolph and his successors.

Another nugget of information was wrested from the enigmatic pages of the manuscript itself as a result of a fortunate accident. A mishap during photographic reproduction of the manuscript revealed a partially erased signature on the first page. Examined under infra-red light, this signature was found to be "Jacobij à Tepenecce", that of a man identified by Voynich as Jacobus Horcicky de Tepenecz (d. 1622). This man was director of Rudolph's botanical gardens and alchemical laboratory. He did not acquire the patent of nobility with the title "de Tepenecz" until after 1608. Thus, we have one additional fact: the manuscript was in the hands of another familiar at Rudolph's court at some time during the period from 1608 to 1622.

The last bit of concrete evidence we have is the place where the manuscript was found by Voynich in 1912; this source was kept secret for some years, in the expectation that Voynich might wish to return and purchase more manuscripts there. It was ultimately revealed to be the Villa Mondragone, in Italy not far from Rome. The following is a précis of information concerning Mondragone, gathered by John Tiltman:

"...A villa in Frascati near Rome, built by Cardinal Altemps about 1570. In 1582 Pope Gregory XIII issued from Mondragone the bull reforming the calendar. The villa apparently continued in the Altemps family, as in 1620 a later member bequeathed the Mondragone library to the Vatican Library. In 1865 the villa became a Jesuit College which was finally closed in 1953" (Tiltman 1968, p. 2).









2.2 Authorship and Purpose

2.2.1 A Hoax, a Forgery, or Nonsense?

Many students have had, at times, an uncomfortable suspicion that the mysterious codex upon which so much fruitless effort had been spent might be a fabrication, its text representing nothing meaningful or orderly enough to be capable of decipherment and translation. Wilfrid Voynich seems to have felt that the manuscript was unquestionably a genuine production of a thirteenth-century author, and specifically of Roger Bacon. Dr. Albert H. Carter (one time technical historian of the Army Security Agency) states the opinion shared by most students who have grappled with the elegant puzzle when he says, "So much time and so much expense in vellum of excellent quality went into it, it cannot be a hoax. . . . It is conceivably the work of a wealthy and learned, if deranged, person, but not a hoax" (1946, p. 1). In an early report, John Tiltman, one of the most faithful and thoroughgoing of the manuscript's students, expresses his considered confidence in its authenticity: "I do not believe the manuscript is completely meaningless, the ravings or doodlings of a lunatic, nor do I believe it is just a hoax—it is too elaborate and consistent for either. . . . About the worst thing it can be is a deliberate forgery for gain. . . . I regard this as rather improbable. . ." (1951, p. 1).

In a more recent presentation, Tiltman reiterates these judgements, refusing to accept suggestions that the manuscript contains only "meaningless doodlings". He continues, "There is more sense to the idea that the work is a forgery. This I think is highly unlikely, especially if Captain Currier's ideas are correct." (Tiltman 1975; the reference to Captain Currier concerns his findings of multiple "hands" in the text, for which see Section 6.8 below.) Erwin Panofsky, a prominent scholar of medieval and Renaissance studies, added the weight of his learning to this view: "I should like to reiterate my opinion that the Voynich manuscript, whichever its place of origin, date and purpose, is certainly a perfectly authentic document" (1954, p. 3). Finally, Elizabeth Friedman, wife of William Friedman (prominent cryptologist and student of the manuscript) and a distinguished scholar and cryptologist in her own right, expresses a similar opinion: "All scholars competent to judge the manuscript . . . were—and still are—agreed that it is definitely not a hoax or the doodlings of a psychotic but is a homogeneous, creative work of a serious scholar who had something to convey" (1962).

At least one recent researcher has spoken out in favor of an opposing view, stating that the manuscript is in fact a forgery, and may contain a considerable quantity of meaningless "dummy" text intended merely to fill it out to an impressive length. Robert Brumbaugh (1974, 1975, 1976) claims that the book was expressly and calculatedly designed by some sixteenth-century opportunist in order to fool the Emperor Rudolph into parting with the large sum of money that he did, indeed, spend to obtain it. To this end, the text was provided with a wealth of apparently easy "keys", and just enough easily decipherable material on the last page to convince Rudolph's experts that it would prove to be readable with the expenditure of a reasonable amount of effort. Faked "evidence" was also planted on the last page, according to Brumbaugh, to associate the secret book closely to Roger Bacon—that exciting and mysterious possessor of impressive scientific and occult powers in whom John Dee had been busily raising interest to a fevered pitch at Rudolph's court.

In spite of all this, Brumbaugh shares the view that the manuscript is not totally meaningless. He says, "There is an underlying text . . . and sooner or later, by collaborative work, it will be read. There is no way of predicting what it will say; it could be anything from a standard botany textbook to formulae for the Elixir of Life deriving from Roger Bacon" (1975, p. 354). Father Theodore C. Petersen, another dedicated long-term student of the manuscript who possessed a wide background of learning in history and philology, expresses his view thus: "There is agreement that the text of the Voynich manuscript obeys uniform rules which are constant and unchanging throughout the whole 246 extant quarto pages of writing—indicating that the script contained an intelligible meaning for its writer" (1953, p. 1).

Newbold, Feely, and Strong, the three other principal claimants (besides Brumbaugh) to some degree of success in deciphering the manuscript, all accepted it as a genuine and serious production either of the thirteenth or the sixteenth century. William Friedman also, while not to my knowledge associating the manuscript with any specific author, regarded it as a valid document with some content capable of being deciphered and read.

Some students of the manuscript, and others who disclaim any interest in it, have advanced the view that its content can have no value for science or for the study of human thought. Tiltman, in his early report to Friedman, says, "I do not in any case imagine there is anything historically or scientifically important contained in the manuscript" (1951, p. 1); this, in spite of his deep and long-continued interest in the problem and his firm rejection of the theory that the manuscript is completely meaningless or fraudulent. Elizabeth Friedman indicates that the lack of serious interest in the manuscript on the part of scholars was, on at least one occasion, a cause of disappointment to her husband in his research: "It appears to be gibberish to many serious-minded academics, who are apt to scoff at the idea that its solution would be of any value to science or learning—as did a great foundation to which Friedman once applied for a grant for the detailed study of the manuscript. In the opinion of the board, a solution would not advance human knowledge. The manuscript probably contains only trivia, the board said." (1962)

I must confess that I can see little justice in the reasoning of those "academics" who dismiss the Voynich manuscript out of hand, after what can only be the most superficial attention. Even if it is, in fact, a fabrication associated with the court of Rudolph II, an understanding of who wrote it, its passage from one to another of Rudolph's familiars, and the part it played in the remarkable congeries of religious and political activities at Prague in those times could prove to be of great interest. In the history of thought, it is not the intrinsic importance of a work that matters so much as its place within a larger pattern of events and meanings. If the manuscript is a compilation, however "deranged" or idiosyncratic, drawn from earlier magical, alchemical, or medical works, it has at least as much intrinsic interest and "scientific" import for the history of Western thought as do other similar manuscripts which are readable, and concern only one topic (i.e., they are either astrological, or alchemical, or medical). Reputable scholars apparently see no waste of time in studying "plaintext" manuscripts of this type, and may spend much of their lives so occupied.

The Voynich manuscript appears to be unusual in that it combines in one book at least four different medieval disciplines, apparently with some attempt to integrate them into a single system. If read, it could provide a highly interesting picture of a theory or doctrine interrelating all these disciplines, at least in the beliefs or practices of one individual or school. Finally, even if the text is totally meaningless (a possibility that seems to me highly unlikely), a decipherment of the text in some manner permitting an understanding of the code, cipher, or other concealment system employed should be of great interest for the history of cryptology, and perhaps also for the study of alphabets and writing systems. In summary, I could accept a finding that the manuscript was a hoax or a forgery; I might also accept the presence of a large amount of dummy or filler text, to pad out the length of the document or to act as "cover" text within which a shorter message is hidden. I cannot, however, see any justification for dismissal of the manuscript as trivial or unworthy of careful and systematic study. We can assess its value for human knowledge only after we have read it, or at least learned quite a lot more about it.

2.2.2 Who Wrote It, and Why?

Roger Bacon (A.D. 1214?-1292?) as Author. Voynich, as we have seen above, was certain of Bacon's authorship from the outset. His reasoning, presented above (Section 2.1) need not be recapitulated here. William R. Newbold, the first would-be decipherer of the secret book, maintained that Bacon wrote it, as a diary of novel scientific researches unacceptable to the Church. He intended the book, according to Newbold, for his favorite pupil John, or for some other disciple or friend, providing the recipient with an oral key subsequently lost. The first chapter of the book describing Newbold's findings presents an excellent sketch of Roger Bacon's life, writings, and thought, indicating that he had made a thorough study of the thirteenth-century friar and his works (1928, pp. 1-28). J. Malcolm Bird (1921) accepts Newbold's decipherment, and the attribution to Bacon, in favor of which he provides a lengthy justification.

At least two other objective and painstaking researchers agree that there is no conclusive evidence against the original authorship of the manuscript by Bacon (whether it is in his autograph hand or represents a later copy of his work). John M. Manly (prominent literary scholar who later refuted Newbold's solution) expressed his opinion thus in an early comment: "That the manuscript is Bacon's, or even that it dates from the thirteenth century, cannot then be proven by documentary evidence, but there is no evidence against this tradition, and the appearance of the manuscript itself confirms it. . ." (1921, p. 189). Tiltman concurs with this view: "There is as yet no solid evidence that the manuscript is not by Roger Bacon, or a copy of a work by him" (1968, p. 13). A number of prominent Baconian scholars accepted, indeed hailed with enthusiasm, Newbold's claim to have proven that Bacon was the author (Carton 1929; Gilson 1928). For further discussion of this question, see Chapter 7 below.

Roger Bacon Not the Author. Others are just as emphatic in their rejection of Bacon either as the scribe or contributor of any content in the manuscript. The objections of some revolve around their rejection of an early date for the book, and their apparent unwillingness to consider it as a later copy of Bacon's work. They cite opinions of experts dating the manuscript around 1500, and therefore much too late to have been a work by Bacon, or even likely to have been a copy (most copies of Bacon's works that have come down to us were made in the fourteenth and fifteenth centuries). Still others reject Baconian authorship not, apparently, in general, but specifically as a part of their emphatic rejection of Newbold's decipherment and his attribution of the manuscript to Bacon, along with such impossibly anachronistic activities as the invention of the compound microscope and telescope, and their use to observe events within a frame of reference completely foreign to Bacon's times. Erwin Panofsky has stated flatly that "The Roger Bacon theory is in my opinion at variance with all the available facts and has been convincingly disproved by Mr. Manly" (i.e., in Manly's articles demolishing Newbold's theories) (1954, p. 2). Dr. Charles Singer, eminent historian of science, said in a letter to Tiltman (12 November, 1957), "I came to the conclusion that all suggestion of a knowledge of the microscope [again referring to Newbold's decipherment]

was simply nonsense." Finally, Lynn Thorndike has, with characteristic emphasis, stated his opinion that "There is hardly one chance in fifty that Roger Bacon had any connection with the production of the Voynich manuscript." (1929, p. 319).

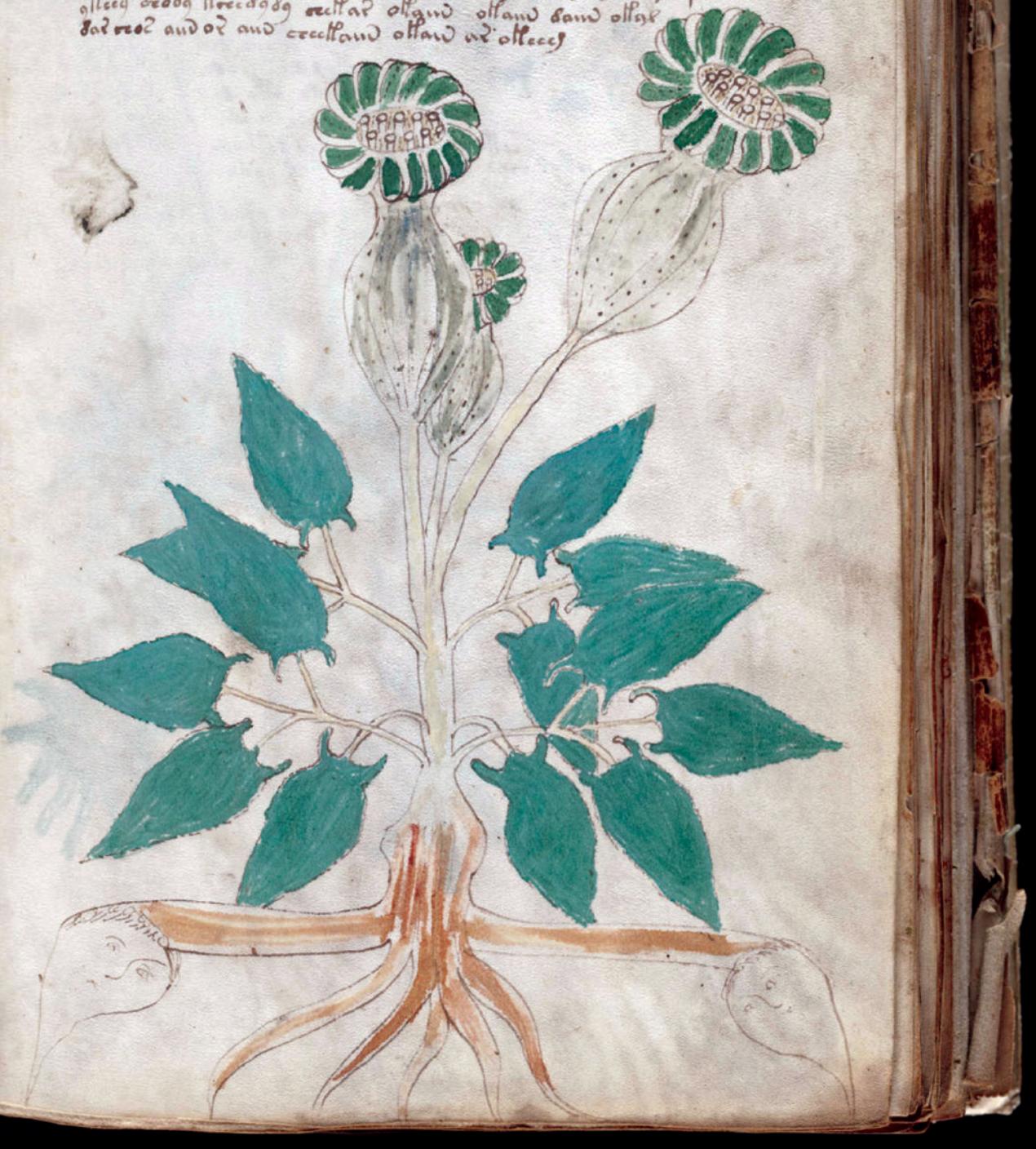
Anthony Askham as Author. Dr. Leonell C. Strong (whose claims to a decipherment of the manuscript are discussed in Section 5.3 below), insisted that the author was a sixteenth-century physician named Anthony Askham (or Ascham), who had published several almanacs, astrological works, and an herbal. (Tiltman has ferreted out references to a number of these, as early printed books: see Askham 1548a, 1548b, 1550, 1552, and 1553.) Strong claimed, further, to have deciphered Askham's name on folio 93 of the manuscript. No other student has accepted this theory, and Strong's proposed readings of the text have been emphatically rejected.

Other General Suggestions Regarding Authorship. Dr. Carter claimed to see evidence of "a copyist at work" (1946, p. 1). He mentions duplication among the zodiac diagrams, there being in fact two leaves showing the Ram, Aries, and two showing the Bull, Taurus. (These diagrams are, in actuality, quite different when examined carefully, and the apparent "duplications" are only superficial; the pairing of diagrams for these two zodiac signs clearly had some definite purpose known only to the author of the manuscript.) Dr. Singer, in a letter to Tiltman (12 November, 1957) expresses the opinion that the origin of the manuscript was somehow related to Rudolph's court and to John Dee. While he does not further specify the nature of the connection, one gains the impression that he may have had in mind an idea similar to Brumbaugh's discussed above. Panofsky states the following view: "My idea always was that the manuscript was written by a doctor or quack trying to impart what he considered secret knowledge to his son or heir" (1954, p. 2).



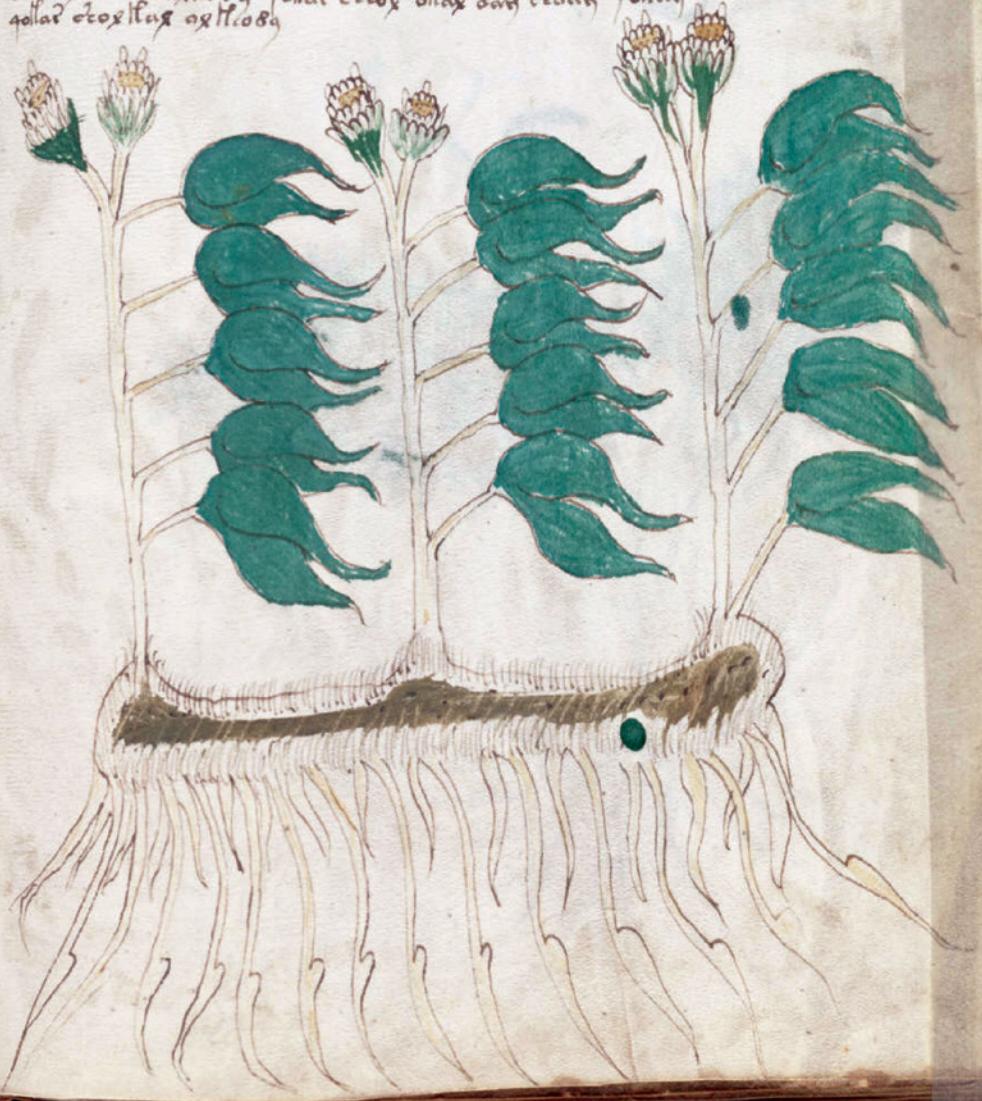
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Wolde ceder cederen trede qolden folghele ollceden ricde sand
ollceden qolden ceder ollceden qolden olae oldae qolden ollae ollceden
rowd q ceder qolden ceder cederen w qolden oda cederlede qolden
sand recteq or olae sand olland bad crudq cederq had and
had or and olland or had and ollae ollae ceder cederlede qolden ollae
ollae ceder qolden cederlede olland olland sand ollae
bad reol and or and cederen and olland ad ollae





40



Chapter 4

Avenues of Attack: The Text

4.1 Nature and Characteristics of the Voynich Script

However complex and interesting the drawings are, the script in which the bulk of the manuscript is written is undoubtedly the most intriguing part of the elegant enigma. It has a deceptively flowing, rhythmic quality that suggests long practice and familiarity on the part of the scribe or scribes. The script seems like a reasonable, workable, well-constructed system of writing, with a look of ease and natural flow. On closer inspection, the surface appearance of simplicity vanishes, and a still more seductive and captivating character emerges, in the form of an intricate but structurally logical system of ligaturing or compounding of simple forms to build up more complex outlines. Whatever else may be alleged concerning the value of the manuscript as a whole to science, I am convinced that an understanding of the construction of this writing system cannot fail to be of great interest in the study of human thought. It appears to be a *tour de force* of artistry and ingenuity.

4.1.1 Provenience and Style.

Unfortunately, although many students mention the style, calligraphy, and appearance of the script as a factor in their judgements of the date and origin of the manuscript, they provide little real evidence or detail to back up their claims. Nowhere among the sources I have examined have I seen any really factual or complete discussion of the matter. Some sources mention, in passing, the possible derivation of the Voynich symbols from "Roman minuscule characters." McKaig (n.d.) states that "the text is written in a beautifully symmetrical script that slightly resembles writing used in Italy in the 1500's" (p. 48).

4.1.2 Relationships to Known Scripts and Character Sets.

Attempts to link the origin of the Voynich symbols to other systems of writing have been many and far-ranging. A diligent study of known alphabetic, syllabic, or ideographic scripts has turned up nothing remotely similar, though various individual symbols have distant parallels in some compendia. Several symbols resemble early forms of Arabic numerals; this has been pointed out by more than one student of the manuscript, for example, by A. W. Exell (of the Botanical Library, British Natural History Museum), in a letter to Tiltman, 30 August 1957, and by Robert Brumbaugh (1974, 1975). Figure 16 shows a comparison of some Voynich symbols and various forms of early Arabic numerals extracted from tables in Hill (1915) that look similar in my opinion. (See also Section 8.10 for a discussion of the history of Arabic numerals in Europe.) Some form of substitution cipher may be involved, of course; thus, the fact that a given Voynich symbol looks like an early form of "7" or "4", for example, need not imply that it actually stands for that number in the text. Early forms of Arabic numerals were often employed in a wide variety of codes and ciphers, as we will see in Chapter 9.

Similarities are also clearly apparent between some Voynich symbols and certain Latin abbreviations in use at various times during the Middle Ages. These relationships have been investigated and exploited by several students, notably Petersen and Feely. Figure 17 shows a selection of Latin abbreviations extracted from Cappelli (1949) and some Voynich symbols that resemble them in my opinion. A general similarity was apparent to me, and was also noted, independently and earlier, by Tiltman, between certain commonly-occurring looped symbols standing above the line and the decorative extensions of letters with tall stems in the top line of a manuscript illustrated in Cappelli (Table IV). Some artificial writing systems of various kinds that might throw some light on the Voynich script will be discussed in Chapter 9.

4.1.3 Attempts to Decompose the Symbols into Elements.

It has been concluded by most students that the Voynich script includes at least some compound symbols. Various attempts have been made to arrive at a rationale to explain the ligatures and resolve them consistently into component elements. Some students have proposed that the symbols may have been built up from elementary strokes in a manner similar to the method upon which they supposed that the Chinese writing system was based. Tiltman suggested that missionaries visiting the Far East, who had studied the Chinese system, might have brought back a description of it which then might have inspired some fifteenth- or sixteenth-century scholar to design the Voynich script (unpublished notes). A. W. Exell, in his letter to

Tiltman, 30 August 1957, refers to a theory (not further specified) that early Arabic numerals were built up from one, two, three, four or more strokes in a similar Oriental manner; he suggests a sketchy and incomplete correspondence between Voynich symbols and conventional numerals along these lines. No one has, to my knowledge, worked out a "stroke" theory of this kind in sufficient detail to test it out as a hypothesis.

In this connection, it is interesting to note that Roger Bacon provided extensive information concerning the Far East in a highly interesting section of the *Opus Majus* on geography and the customs of foreign peoples. He states there that he had closely questioned several missionaries and travellers recently returned from visits to these far-away places. His descriptions of many foreign peoples and customs are clearly recognizable, although some are fabulous and distorted, as might be expected. A clear description of Buddhist monks at worship, even including a garbled version of "Om mane padme hum", is particularly striking. The following is his description of writing in China: "The people in Cathay to the east write with the same instrument with which painters paint, forming in one character groups of letters, each group representing a sentence. By this method characters are formed with many letters together, whence reasonable and natural characters have been composed of letters, and have the meaning of sentences." (Bacon 1928b, p. 389.)

The compound Voynich symbols are not easy to "take apart" in any consistent and unambiguous way; they are too smoothly blended to form a single flowing outline. Figure 18 shows some examples of apparently compound forms, and some suggestions regarding their decomposition. Some symbols which appear to be simple at first sight may in fact also be compounds; for example, "Ⓐ" may be made up of "Ⓛ" and "Ⓜ", and "Ⓕ" may be a combination of "Ⓛ" and "Ⓣ". My own feeling is that we need not go as far afield as the Orient to explain these complex outlines: the system of Latin abbreviations in common use throughout the Middle Ages has the same character. An abbreviated form typically preserves one or two letters of a word and distorts or combines them to form a single sinuous, conventionalized character. Some of the parts of such a compound form may then be partially disconnected and used in abbreviations of other, partially similar words. The distorted and truncated scraps of words are usually combined with overlines, superfixed characters, loops, tails, and slant lines which mark the form as an abbreviation, or stand for a set of missing letters. Each of these structural features has a counterpart in the Voynich script: a horizontal stroke seems to connect many symbols; a comma- or hook-like mark often appears above certain symbols, and characters are frequently shown standing above or in the midst of others as infixes or superfixes; long tails curve up or slant down from letters at the ends of words and lines.

It is my feeling that we need not look beyond the system of Latin abbreviations, familiar to all learned men of the Middle Ages and Renaissance throughout Europe, combined with early forms of Arabic numerals and some common alchemical and astrological symbols, to find the inspiration for the design of the Voynich script. Unfortunately for the student, the designer has exhibited a truly remarkable ingenuity in blending and distorting these elements so as to make of them an entirely new writing system, fundamentally independent of and distinct from any of its sources, so that our recognition of similarities to known symbols has not helped us to unlock the secret of the script. It is interesting to note that the characters which occur as superfixes or infixes with other ligatured characters may also occur next to them in ordinary sequence: the explicit and carefully shown ligature must, therefore, provide some distinct element of meaning. (For example, is "ⓁⓁ" the same as "ⓁⓁ"? How does "Ⓛ" differ from "Ⓛ"? Is "Ⓛ" equivalent to "ⓁⓁ" or "ⓁⓁ" or neither?)

Most cryptanalytically-oriented students of the manuscript have put considerable effort into analyzing the script and attempting to devise a working transcription alphabet for use in cryptanalytic and computer studies. Various researchers have adopted different theories regarding the decomposition of the symbols into elements, and the identification of variant forms of a single symbol. Some, like Tiltman and the First Voynich Study Group, arrived at a relatively small working alphabet of basic symbols, regarding all the rest as secondary compounds. At the other extreme, Currier, Krischer, and the Second Study Group included a number of obvious compounds in their working alphabet to produce a considerably longer list of symbols. Currier's alphabet and the others based on it embody a theory about the symbol "Ⓛ" and its occurrence in groupings of one, two, or three immediately preceding certain ending symbols ("Ⓛ", "Ⓛ", and "Ⓛ"). My own transcription alphabet includes an attempt to allow for some relatively rare ligatured elements in addition to those in the commoner compounds. Figure 19 shows several different transcription alphabets.



Ferag cwestleg drotfercda ferolheas tollas edan tollas aran tollas das
tollas band tollas ceas astolfercda tollas aran ar tollas das
tollas olas ceas tollas astolfercda tollas tollas das tollas
tollas olas ar tollas tollas ar tollas ar tollas tollas ar tollas
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To the west of the town of St. Albans, about two miles from the town, stands a large Gothic church, the tower of which is one of the highest in England. The church is built of stone, and has a fine tower and spire. The interior is spacious and well lighted, with a high vaulted ceiling. The altar is made of white marble, and is surrounded by a canopy. The pulpit is made of wood, and is mounted on a platform. The organ is large and powerful, and is situated in the choir. The choir is made of wood, and is mounted on a platform. The organ is large and powerful, and is situated in the choir. The organ is large and powerful, and is situated in the choir.

Hoc est enim Regulus fortissimus vir atque dexterus credidimus illam
etiam ostendit ostendit regis officia fortissimorum regum sicuti sollicito
Hoc ergo fortissimi officia fortissimorum regum credidimus fortissimorum
officium officium ac credidimus fortissimorum officia credidimus regum
Hoc ergo fortissimorum regum fortissimorum officia credidimus regum
fortissimorum regum fortissimorum regum fortissimorum officia credidimus regum



Digit	13th century	14th century	15th century	16th century	Similar Voynich symbols
1	۱۱	۱	۱	۱	۱
2	۲۳۳۲ ۲۷۷	۲۷	۲	۲	۲۴
3	۳۳ ۳	۳	۳	۳	۳ (rare)
4	۴۹۹ ۴ (Italy)	۸۹	۸۹۴ ۸۹	۸۴	۸۴
5	۴۶۴۴۴	۴۹۹	۴۵۴	۵۹۵	,
6	۵۵۵	۵۵	۵	۵	۵ ۵
7	۷۷۷۷ ۷۷	۷۷	۷۷	۷۷	۷
8	۸۸	۸	۸	۸۲	۸
9	۹۹۹۹	۹۹	۹	۹	۹
0	۰۰۰۰	۰	۰۰۰	۰	۰

Fig. 16.—Comparison of Voynich Symbols and Early Arabic Numerals
(Numeral forms redrawn from Hill 1915)

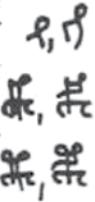
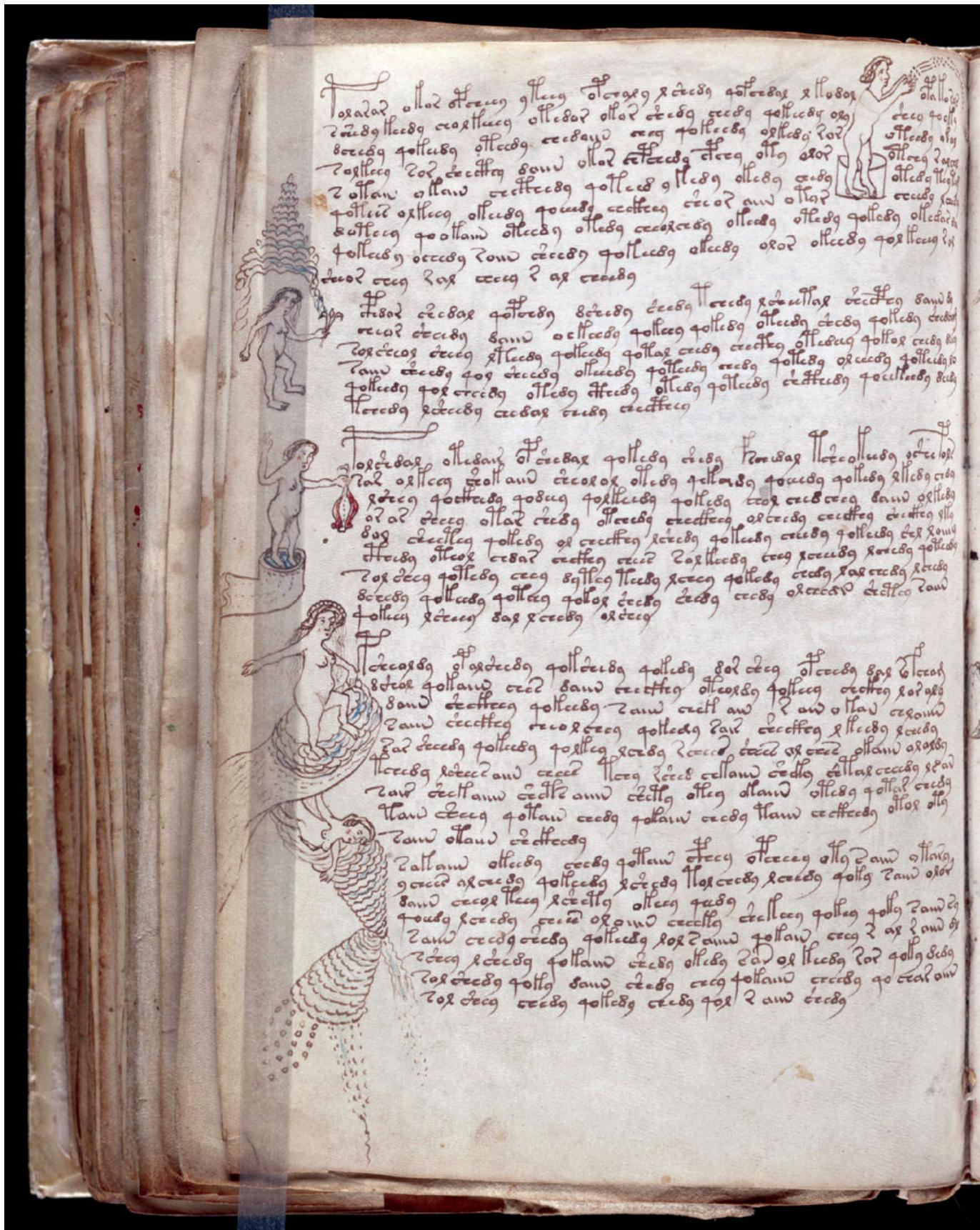
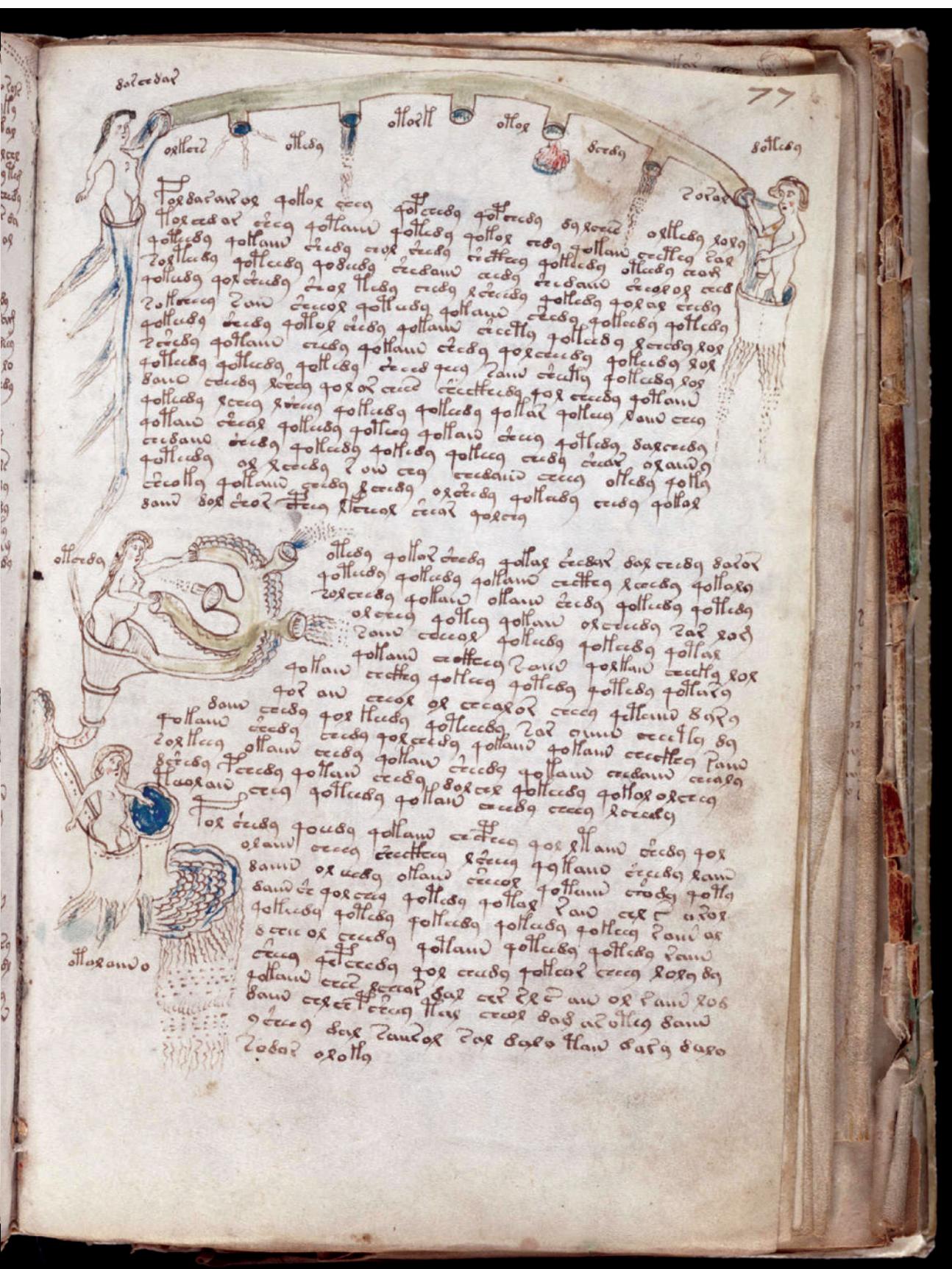
Tiltman	First Study Group	Second Study Group	Kirscher	Currier	DiImperio
 	D H G 8 2 4 0 A C I T S L R E DZ HZ	P F H D G A R K 2 0 L N M 8 4 E C T S I PZ FZ HZ DZ V Y " 0	4 0 9 8 2 B P V F # @ S Z C A E I Y J U K G Q D N M W H L R T / -	4 0 8 9 2 E R S N P B F V Q W X Y A C I G H I T U O D N M 3 J K L 5 6 7 / -	A B C D E F G H I J K L N O P Q R S T W X Y Z 2 1 3 6 7 8 9 0 space () / ?

Fig. 19.—Transcription Alphabets of Several Researchers









Chapter 11

Concluding Remarks: Some Suggestions for Further Research

In closing this monograph on the Voynich manuscript, I would like to suggest some lines along which future work on the problem might profitably be directed. These suggestions include efforts aimed at gathering more data to resolve some of the many unknowns in the problem; and efforts designed to achieve a more rigorous, complete, and scientific analysis of the data we now have.

11.1 Paleographic and Other Scientific Studies of the Manuscript

In my opinion, it is of primary importance that the inks, pigments, and vellum of the manuscript be tested and examined scientifically and compared to those of other manuscripts by paleographers and art historians; and that the pages of the manuscript be studied under special lighting and otherwise treated to bring up traces of erased, faded, or illegible writing. As far as I have been able to discover, no such research has ever been carried out. Further, there are no current plans on the part of the present owner of the manuscript (the Beinecke Library at Yale) to make any such studies in the near future. Nevertheless, only studies such as these can offer any hope of satisfactory answers to many of our questions. They could turn up crucial new information that might completely alter the complexion of the problem. I hope that some present or future student will be able to arouse interest in a scientific physical study of the manuscript, obtain funding for it, and set the necessary wheels in motion to accomplish the research and make its results known to other students. If any reader of this monograph knows of any such scientific studies already carried out on the manuscript, I hope he will inform me of them.

11.2 Uncovering More of the Manuscript's History

As we saw in Chapters 1 and 2, Wilfrid M. Voynich succeeded in ferreting out a considerable quantity of useful and interesting information about the history and previous ownership of the manuscript. In his historical sketch (Voynich 1921), he indicated many promising leads for others to pursue. Every known or suspected owner of the manuscript should be researched in depth; renewed attempts should be made to locate correspondence, libraries, and other collections of papers pertaining to or belonging to these people, and to track down any references to the manuscript and attempts to decipher it. Someone should certainly try to locate the Villa Mondragone or other places where papers and manuscripts once stored there might now be preserved, in the hope of finding additional records relating to the manuscript (for example, notes made by Athanasius Kircher or by the unknown previous owner who wrote to Kircher about the manuscript). The archives of Rudolph's Court at Prague should also be a promising source of correspondence or notes concerning the manuscript. Background sleuthing of this nature is certain to provide us with at least a few new nuggets of information that could transform the problem or, at least, reduce the discouraging number of unknowns that now confront us.

11.3 Collateral Research

While all the most obvious sources have apparently been examined, as well as some more obscure ones, in search of possible parallels to the Voynich text and drawings, it still seems worthwhile to keep up the hunt among less well-known and less accessible sources. I believe that alchemy writings, in particular, deserve closer attention, since they may not have been so thoroughly studied by Voynich manuscript researchers as have herbal, medical, and astrological sources. More attention to early cryptographic writings of the fourteenth through the sixteenth centuries might also richly repay our efforts. In fact, a determined, thorough, and painstaking attempt to search through manuscript collections and early printed books on almost any of the topics sketched in Chapters 8 and 9 of this monograph could still turn up a new and illuminating bit of evidence for a student specifically searching for a parallel to the Voynich manuscript. It seems to me highly unlikely that the Voynich manuscript scribe(s) and illuminator(s) never wrote or drew any other work in their lives; there is always a hope of finding somewhere a drawing of similar style that might give us a clue to their identity or place of origin, or another scrap of text in the Voynich script among someone's papers.

11.4 *A Comprehensive Machine File of the Text*

In Chapter 6, we saw that several abortive attempts were made to carry out computer studies of the entire corpus of Voynich text. Out of the approximately 250,000 characters of text in the manuscript, most students have studied only small samples ranging from 5000 to 25,000 characters in length. Currier has probably dealt with the largest machine samples of any student, and his transcription alphabet appears to be the most practical choice for machine processing. (I have discarded my own transcription in favor of Currier's, in spite of the fact that I had already placed some 19,000 characters of text on magnetic tape using my own alphabet before I came upon detailed descriptions of his research.) Father Petersen's concordance of the entire manuscript, made by hand, is preserved in the Friedman Collection at the Marshall Library in Lexington, Virginia, where it is not easily accessible to most students.

It would be of great value, in my opinion, to have a complete machine file of the corpus, in Currier's transcription, and including identification of "hand," "language," and the apparent subject matter (herbal, pharmaceutical, astrological, etc.), as well as any other property which students have found to be statistically significant. This file could be used as a basis for a wide variety of studies, to help in forming and testing hypotheses concerning the text, and exploring further the important "hand" and "language" phenomena discovered by Currier as well as other matters. Smaller, carefully selected samples could be formed from the entire corpus for any specific purpose.

11.5 *Scientific Hypothesis Formation and Testing*

Hypotheses about the nature of the text should be based on all the known phenomena, and on a careful study of the entire corpus of text (not just one section or a few pages here and there). The hypotheses should also take into account and attempt to explain all the phenomena clearly demonstrated by other researchers (Tiltman's "beginning-middle-ending" structure, Currier's "languages" and "hands"; the repetitive patterning of "words," etc.). Finally, the hypotheses should be consistent with, and bear some relation to, what is known of the nature, background, and history of the manuscript itself. In addition, I think we should entertain not just one hypothesis, but a set of alternative theories that seem capable of explaining all or a large part of the data. Having set up such a body of reasonable hypotheses, we should design "experiments" based on samples selectively drawn from the entire corpus (all made accessible to computer processing in one format and transcription, as suggested above): samples such that we can attempt to confirm or disconfirm each of our theories in an orderly manner. This research will, of necessity, also involve parallel studies of text in Latin, in certain other natural languages, or in synthetic languages of various types.

In the absence of any cribs, parallel texts, or other breaks into the text via external or collateral data, our only hope of success lies in an orderly and cooperative scientific approach to the entire body of text and all the other data we have. In this way, perhaps we can some day achieve a solution whose satisfying completeness and appropriateness will do full justice to the elegant enigma of the Voynich manuscript.