

## 6. APPLICATION OF THE METHOD TO SOME CONCRETE HISTORICAL TEXTS

**EXAMPLE 1.** *Roman History* by Titus Livy, M., 1887-1889, vv. 1-6. All graphs  $K(Q, T)$  for those parts of *History* which describe periods of 750-500 B.C. and 510-293 B.C., proved to be virtually identical to the ideal ones, i.e., the overwhelming majority of names appearing in the description of a generation by Titus Livy for the first time were most frequently mentioned by Titus Livy in the description of this particular generation, then gradually lost and forgotten. Consequently, the frequency damping principle is confirmed, and the relative order of “generation chapters” within the parts of *History* by Titus Livy is most likely chronologically correct. On the contrary, in the comparison of the two indicated parts of the text by Titus Livy with each other, the frequency damping principle turned out to be *false*, which may indicate that the *History* by Titus Livy contains duplicates and repetitions.

**EXAMPLE 2.** *Liber Pontificalis*, see [196], publ. T. Mommsen, *Gestorum Pontificum Romanorum*, 1898. This is the famous “Book of (Roman) Popes (pontiffs)”. Out of this set of texts, let us pick the pieces describing the periods of

- 1) 300-560 A.D.,
- 2) 560-900 A.D.,
- 3) 900-1250 A.D.,
- 4) 1250-1500 A.D.

All frequency graphs  $K(Q, T)$  for indicated texts 1-4 prove to virtually coincide with the ideal one, which confirms the frequency damping principle and the correctness of “chapter” alignment within each of the enumerated historical fragments.

Let us note one of the consequences of this experiment. It turns out that “ancient names were not in fashion” over the course of substantial time intervals, which is by no means obvious. Surely, *certain* ancient names are still used today, for example, Peter, Mary, etc. But, as we discovered, these names are either not full, or the percentage of such “survived ancient” names is *truly minute* as compared to *the bulk of names that “became extinct”*. The presence of rare “surviving” names means that over the course of movement from left to right, experimental graphs  $K(Q, T)$  decrease to a certain non-zero constant rather than zero.

**EXAMPLE 3.** We used the following original sources as text  $X$  describing the period of 976-1341 A.D. in the history of Byzantium:

- 1) Mikhail Psell, *Chronography*, Moscow, 1987, describing the period of 976-1075.
- 2) Anna Comnena, *An Abridged Legend about the Deeds of Czar Alexis Comnenus (1081-1118)*, St. Petersburg, 1859.
- 3) John Kinnam, *A Brief Review of the Reign of John and Manuel Comnenus (1118-1180)*, St. Petersburg, 1859.
- 4) Nicetas Aconiatius, v. 1, *History Beginning from the Reign of John Comnenus (1118-1185)*, St. Petersburg, 1860.
- 5) Nicetas Aconiatius, v. 2, *History from the Time of Reign of John Comnenus (1186-1206)*, St. Petersburg, 1862.
- 6) George Acropolite, *Cronicle (1203-1261)*, St. Petersburg, 1863.
- 7) George Pachymeres, *Story of Michael and Andronicus Palaeologi (1255-1282)*, St. Petersburg, 1862.
- 8) Nicephorus Gregoras, *Roman History (1204-1341)*, St. Petersburg, 1862.

We processed all those texts by selecting all proper names therein, and calculating the frequency allocation of references thereto. Said collection of texts contains several dozen thousand mentions of full names, with multiplicities. All frequency graphs  $K(Q, T)$  in the intervals of 976-1200 and 1200-1341 appeared to be virtually identical with the ideal one. Thus, the frequency damping principle proved to be true. On the other hand, it became clear that the chronological order of the texts within each of the time intervals indicated *is correct*.

**EXAMPLE 4.** F. Gregorovius, *The History of the City of Rome in the Middle Ages*, St. Petersburg, vols. 1-6, 1902-1912. The parts picked out from this text describe

- 1) 300-560 A.D.,
- 2) 560-900 A.D.,
- 3) 900-1250 A.D.,
- 4) 1250-1500 A.D.

Each of the fragments was divided into “generation chapters”. We selected all proper names and traced the frequency of references thereto. The complete reservoir of names contains several dozen thousand references. The frequency damping principle proved to be true, and the enumeration (ordering) of “chapters” in each of the texts 1-4 is chronologically correct.

A similar result is obtained also for Kohlrausch's monograph *The History of Germany*, Moscow, Volumes 1-2, 1860, out of which we picked the pieces describing

- 1) 600-1000 A.D.,
- 2) 1000-1273 A.D.,
- 3) 1273-1700 A.D.

## 7.

### METHOD OF DATING OF THE EVENTS

We have processed the total of several dozen large historical texts. For all such texts describing the events of the XVI-XX century, the frequency damping principle was confirmed. Hence the procedure of chronologically correct ordering of "generation chapters" in a text, or a set of texts, where this order is disrupted or unknown. Let us examine the complete "generation chapters" of chronicle  $X$  and number them in a certain order. Let us calculate the value  $K(Q, T)$ , with the assigned numeration of "chapters", for each "chapter"  $X(Q)$ . All the values  $K(Q, T)$ , with variables  $Q$  and  $T$ , are naturally arranged into a square matrix  $K\{T\}$  with the size  $n \times n$ , where  $n$  is the total number of "chapters". In the ideal theoretical case, frequency matrix  $K\{T\}$  assumes the form displayed in fig. 5.38.

Fig. 5.38 displays zeroes below the main diagonal, and the absolute maximum for each line is located on the main diagonal. Then each graph, in each line, fades away evenly.

A similar damping pattern turns out to be observed for the columns of the matrix as well, which means that the frequency of the use of names of earlier origin in "chapter"  $X(Q)$  also falls "on the average" as generation  $T$ , which gave birth to these names, moves away from the generation constant  $Q$ .

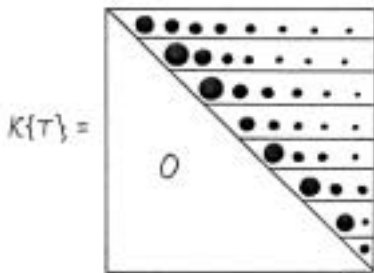


Fig. 5.38. A "well dampened" frequency matrix of the chronologically correct chapter disposition without any duplicates.

To evaluate the frequency damping rate, it is convenient to use the average graph

$$K_{\text{aver.}}(T) = \frac{\text{the sum of values } K(Q, P)}{n - T},$$

where  $P - Q = T$ .

The summation of this formula is performed for all pairs  $(Q, P)$ , for which the difference  $P - Q$  is fixed and equals  $T$ . In other words, the graph  $K_{\text{aver.}}(T)$ , obtained by averaging the matrix  $K\{T\}$  over its diagonals parallel to the main one, depicts an "average line" or "average column" of the frequency matrix. Here  $T$  varies from 0 to  $n - 1$ .

Experimental graphs may certainly not coincide with theoretical ones.

If we now change the numeration of "chapters" in the chronicle, the numbers  $K(Q, T)$  will also change, due to a rather complicated redistribution of "names appearing for the first time". Consequently, the frequency matrix  $K\{T\}$  and its elements will change. We shall change the order of "chapters" in the chronicle with the aid of different transpositions  $s$ , and every time calculate a new frequency matrix  $K\{sT\}$ , where  $sT$  is the new numeration corresponding to transposition  $s$ . We will look for such order of "chapters" of the chronicle, with which every, or almost every, graph assumes the shape shown in fig. 5.37. In this case, the experimental frequency matrix  $K\{sT\}$  will be closest to the theoretical matrix in fig. 5.38. The order of "chapters" of the chronicle, in which the deviation of an experimental matrix from the "ideal" one will be the smallest, should be considered chronologically correct and desirable.

Our method also makes it possible to date events. Let us regard a historical text  $Y$ , which is simply known to describe certain events (of one single generation) from epoch  $(A, B)$  already covered in text  $X$  divided into "generation chapters", the order of "chapters" in chronicle  $X$  being chronologically correct. How can we know which particular generation is described in text  $Y$  that is of interest to us? In this case we only want to use quantitative characteristics of texts, without appealing to their semantic content, which may be substantially ambiguous and admit largely different interpretations.

The answer is as follows. Let us add text  $Y$  to the corpus of "chapters" of chronicle  $X$ , considering  $Y$  to be a new "chapter" and assigning a certain number  $Q$

to it. Then we find an optimal, chronologically correct order of all the “chapters” of the obtained “chronicle”, and in doing so, a correct place for the new “chapter”  $Y$ . In the simplest case, by plotting a graph  $K(Q, T)$  for it, and changing its position in relation to other “chapters”, one can make this graph as close as possible to the ideal one. The position  $Y$  assumes among other “chapters” should be considered desirable one, thus making it feasible to date the events described in  $Y$ . The procedure is also applicable when not all names are examined, but only one or a few, for example, certain “famous names”. However, in this case, an additional analysis is necessary, since the decrease of the number of used names makes the results unstable.

The method was tested on large texts with a large number of names and reliable dating known before. In all those cases the efficiency of the method was confirmed.

### 8. THE FREQUENCIES DUPLICATION PRINCIPLE The duplicate detection method

The present method is, in a way, a particular case of the previous one, but considering the importance of dating, we devoted a separate section to the duplicate detection method proposed by the author in [884], [886], [888], [1129], [891], [895], [898], [901] and [1130].

Let the time interval  $(A, B)$  be described in chronicle  $X$  as divided into “generation chapters”  $X(T)$ , numbered chronologically correct as a whole *but with two duplicates among them*, i.e., two “chapters” describing the same generation that duplicate each other. Let us examine the simplest situation when the same “chapter” is found in chronicle  $X$  exactly twice, namely, under number  $Q$  and number  $R$ . Let  $Q$  be less than  $R$ . Our procedure makes it possible to reveal and identify these duplicates. In fact, it is clear that the frequency graphs  $K(Q, T)$  and  $K(R, T)$  assume the shape displayed in fig. 5.39.

The first graph obviously does not comply with the frequency damping principle, therefore, it is necessary to transpose “chapters” within the chronicle  $X$  in order to attain a better compliance with the theoretical, ideal graph. All numbers  $K(R, T)$  equal zero, since “chapter”  $X(R)$  does not possess a single “new name”

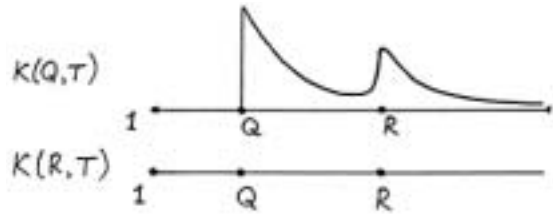


Fig. 5.39. Frequency graphs for duplicate cases.

– they all have already appeared in  $X(Q)$ . It is clear that the best concurrence with the ideal graph in fig. 5.37 will be obtained when these two duplicates are placed next to each other, or simply identified.

Thus, if we discover two graphs resembling the shape of those in fig. 5.39 among the “chapters” of a chronicle numbered correctly in general, these “chapters” are, most likely, duplicates, – that is to say, they describe approximately the same historical events, and should be identified with each other. All of the above applies to cases with several duplicates – three and more.

This method was also tested on experimental material. As a simple example, we considered an edition of *The History of Florence* by Machiavelli, 1973 (Leningrad), with detailed commentaries. It is clear that the commentary may be considered a series of “chapters” duplicating the main text by Machiavelli. The main text was divided into “generation chapters”, which made it possible to build a square frequency matrix  $K\{T\}$ , also covering the commentary to *History*. This matrix assumes the shape conditionally displayed in fig. 5.40, where thick inclined segments consist of squares filled with maxima. It means that our procedure successfully reveals known duplicates, in this case the commentary to the main text of Macchiavelli’s *History*.

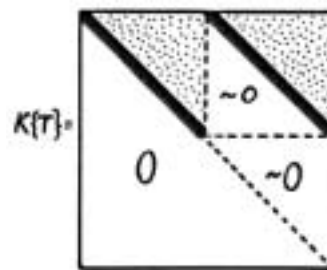


Fig. 5.40. An approximated frequency matrix for Machiavelli’s *History of Florence*. One sees duplicates, or repetitions.

## 9. STATISTICAL ANALYSIS OF THE BIBLE

### 9.1. Partition of the Bible into 218 "generation chapters"

The following example is of great importance for the analysis of the Scaligerian chronology. The Bible contains several dozen thousand references to names. Two series of duplicates are known to exist in the Bible – namely, each generation described in Samuel 1, Samuel 2, Kings 1, Kings 2, is described again in the Chronicles 1, Chronicles 2. The author of the present book divided the Old and the New Testaments into separate "generation chapters", q.v. below.

The table below displays, in parentheses, numbers of "chapter generations" selected by us, and also refers to particular fragments of the Bible composing a certain "generation chapter". The canonical division of the Bible into standard chapters and verses is used for reference. See, for example, the 1968 edition of the Bible, Moscow, Moscow Patriarchy, following the Synodal 1912 edition.

#### FIRST COMES THE DIVISION OF GENESIS:

- (1) = ch. 1-3 (Adam, Eve),
- (2) = 4:1-16 (Cain, Abel),
- (3) = 4:17 (Cain got to know his wife...),
- (4) = 4:18 (Herod was born to Enoch...),
- (5) = 4:18 (Mehujael gave birth to Methuselah...),
- (6) = 4:18 (Methuselah gave birth to Lamech...),
- (7) = 4:19-24 (And Lamech took two wives...),
- (8) = 4:25-26 (Adam got to know more of [Eve]...) +  
5:1-6 (Here comes the genealogy of Adam...),
- (9) = 5:7-11 (Upon Enoch's birth...),
- (10) = 5:12-14 (Kenan lived seventy [170] years...),
- (11) = 5:15-17 (Mahalaleel lived sixty five [165]  
years...),
- (12) = 5:18-20 (Horeb lived one hundred and  
sixty two years...),
- (13) = 5:21-27, (14) = 5:28-31,
- (15) = ch. 5:32 + ch. 6 + ch. 7+ ch. 8,
- (16) = ch. 9,
- (17) = 10:1,
- (18) = 10:2,
- (19) = 10:3,
- (20) = 10:4,
- ...

- (48) = 10:32,
- (49) = 11:1-9,
- (50) = 11:10-12,
- (51) = 11:13-14,
- (52) = 11:15-16,
- (53) = 11:17-19,
- (54) = 11:20-21,
- (55) = 11:17-19,
- (56) = 11:24-25,
- (57) = 11:26-27,
- (58) = 11:28,
- (59) = 11:29-32,
- (60) = ch. 12,
- (61) = ch. 13,
- (62) = ch. 14-24,
- (63) = 25:1-2,
- (64) = 25:3,
- (65) = 25:4,
- (66) = 25:5-10,
- (67) = 25:11-18,
- (68) = 25:19-26,
- (69) = 25:27-34,
- (70) = ch. 26-33,
- (71) = ch. 34-36,
- (72) = ch. 37-38,
- (73) = ch. 39-50.

#### THE BOOK OF GENESIS ENDS HERE.

- (74) = The book of Exodus,
- (75) = The book of Leviticus,
- (76) = The book of Numbers,
- (77) = The book Deuteronomy,
- (78) = The book of Joshua,
- (79) = The book of Judges, ch. 1,
- (80) = The book of Judges, ch. 2,
- ...
- (96) = The book of Judges, ch. 18,
- (97) = The book of Judges, ch. 19-20,
- (98) = The book of Ruth,
- (99) = The First book of Samuel, ch. 1-15,
- (100) = The First book of Samuel, ch. 16-31,
- (101) = The Second book of Samuel,
- (102) = The First book of Kings, ch. 1-11,
- (103) = The First book of Kings), ch. 12,
- (104) = The First book of Kings), ch.13,
- ...
- (112) = The First book of Kings, ch. 22,
- (113) = The Second book of Kings, ch. 1,

- (114) = The Second book of Kings, ch. 2,  
 ...  
 (135) = The Second book of Kings, ch. 23,  
 (136) = The Second book of Kings, ch. 24-25,  
 (137) = The First book of Paralipomenon (First book of Chronicles), ch. 1-10,  
 (138) = The First book of Paralipomenon (First book of Chronicles), ch. 11-29,  
 (139) = The Second book of Paralipomenon (Second book of Chronicles), ch. 1-9,  
 (140) = The Second book of Paralipomenon (Second book of Chronicles), ch. 10,  
 ...  
 (166) = The Second book of Paralipomenon (Second book of Chronicles), ch. 36,  
 (167) = The book of Ezra,  
 (168) = The book of Nehemiah,  
 (169) = The book of Esther,  
 (170) = The book of Job,  
 (171) = Psalm,  
 (172) = Proverbs,  
 (173) = The book of Ecclesiastes or Preacher,  
 (174) = Song of Solomon,  
 (175) = The book of Isaiah,  
 (176) = The book of Jeremiah,  
 (177) = Lamentations,  
 (178) = The book of Ezekiel,  
 (179) = The book of Daniel,  
 (180) = The book of Hosea,  
 (181) = The book of Joel,  
 (182) = The book of Amos,  
 (183) = The book of Obadiah,  
 (184) = The book of Jonah,  
 (185) = The book of Micah,  
 (186) = The book of Nahum,  
 (187) = The book of Habakkuk,  
 (188) = The book of Zephaniah,  
 (189) = The book of Haggai,  
 (190) = The book of Zechariah,  
 (191) = The book of Malachi.

THE OLD TESTAMENT ENDS HERE.

THE NEW TESTAMENT FOLLOWS:

- (192) = The Gospel of St. Matthew,  
 (193) = The Gospel of St. Mark,  
 (194) = The Gospel of St. Luke,  
 (195) = The Gospel of St. John,  
 (196) = The Acts of the Holy Apostles,

- (197) = The Epistle of St. James,  
 (198) = The First epistle of St. Peter,  
 (199) = The Second epistle of St. Peter,  
 (200) = The First epistle of St. John,  
 (201) = The Second epistle of St. John,  
 (202) = The Third epistle of St. John,  
 (203) = The epistle of St. Jude,  
 (204) = The epistle of St. Paul to Romans,  
 (205) = The First epistle of St. Paul to Corinthians,  
 (206) = The Second epistle of St. Paul to Corinthians,  
 (207) = The Epistle of St. Paul to Galatians,  
 (208) = The Epistle of St. Paul to Ephesians,  
 (209) = The Epistle of St. Paul to Philippians,  
 (210) = The Epistle of St. Paul to Colossians,  
 (211) = The First epistle of St. Paul to Thessalonians,  
 (212) = The Second epistle of St. Paul to Thessalonians,  
 (213) = The First epistle of St. Paul to Timothy,  
 (214) = The Second epistle of St. Paul to Timothy,  
 (215) = The Epistle of St. Paul to Titus,  
 (216) = The Epistle of St. Paul to Philemon,  
 (217) = The Epistle of St. Paul to Hebrews,  
 (218) = The Revelation of Apostle St. John the Evangelist (Apocalypse).

Thus, the Old Testament consists of 191 “generation chapters”, and the New Testament consists of “generation chapters” 192-218. Let us start with examining the first 170 “generation chapters” covering the so-called historical books of the Old Testament.

## 9.2. Detection of the previously known duplicates in the Bible with the aid of the frequency dumping principle

In 1974-1979, V. P. Fomenko and T. G. Fomenko undertook an enormous job to compose a complete list of all the names in the Bible, taking into account all of their multiplicities, and a precise distribution of references to the names along all “generation chapters”. In total, there appeared to be about 2,000 names mentioned in the Bible, while the number of references to them, including multiplicities, amounted to several dozen thousand. Thus, it became possible to plot all frequency graphs  $K(Q, T)$ , where number  $T$  runs through enumerated “chapters”.

The graphs plotted for the “chapters” of 1-2 Samuel + 1-2 Kings turned out to have the shape of the graph in fig. 5.39, i.e., names appearing in these “chap-

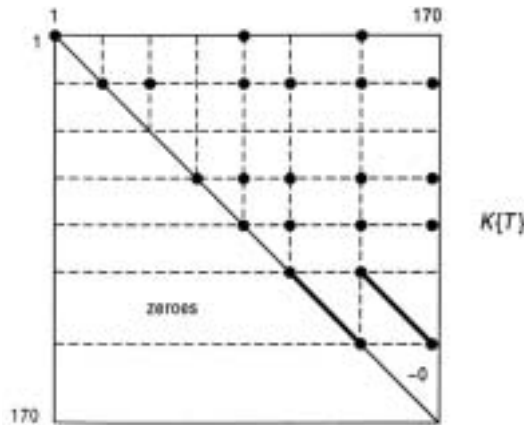


Fig. 5.41. An approximated frequency matrix for the Bible. One sees repetitions (duplicates).

ters” for the first time “revive” in their former quantity in appropriate “chapters” of 1-2 Chronicles. The relevant part of the matrix  $K\{T\}$  is presented in fig. 5.41. Two parallel diagonals filled with the absolute maxima of lines are marked with two bold lines.

The square frequency matrix of Biblical names is depicted in *greater detail* in fig. 5.42. The most essential concentrations of high frequencies are marked by accumulations of black dots. Statistical duplicates – both previously known and *new ones*, first discovered in our statistical experiment – are distinctly visible.

Thus, our method has successfully revealed and identified duplicates in the Bible, already known as such previously. Let us emphasize that our methods operate only with quantitative, numeric characteristics of texts, and require no “insight into the semantic content” of chronicles. This is a distinctive advantage of the new methods, since they do not rely on subjective – and therefore ambiguous – interpretations of old texts.

The application of the described statistical methods is sometimes facilitated by the great job on revealing repetitive text fragments already performed for many historical texts by commentators. The term “repetition” may apply to a name, as well as the description of a certain event, etc. For example, identical descriptions, lists of names, identical religious formulae, etc., repeat themselves many times over in the Bible; all of them have long ago been discovered, systematized, and assembled in the so-called apparatus of parallel places. Namely, next to certain verses

there are references to the verses in the same or other books of the Bible considered to be their “repetitions”, or “parallels”. If historical text  $X$  under investigation has such apparatus, or a similar one, then our duplicate detection method is applicable, considering repetitive fragments to be “repetitive names”.

**EXAMPLE.** Let us examine every book of the Bible – both the Old Testament and the New Testament. We have earlier presented the partition of the Bible into 218 “generation chapters”. Let us number them in the order they follow one another in the canonical sequence of the books of the Bible. The apparatus of “repetitions”, or parallel places in the Bible is known to contain about 20 thousand repetitive verses.

For each “generation chapter”  $X(Q)$ , we shall calculate the number of verses which have never appeared in the preceding “chapters”  $X(T)$ , i.e., which first appeared in  $X(Q)$ , and denote their quantity by  $P(Q, Q)$ . Then we shall calculate how often these verses repeat themselves in subsequent “generation chapters”  $X(T)$ , and denote the obtained numbers by  $P(Q, T)$ , after which all 218 frequency graphs  $P(Q, T)$  can be plotted. They differ from graphs  $K(Q, T)$  only by *verses* being taken instead of *names*, and repetitions of verses instead of repetitions of names. Verses which are not repetitions of each other or some other verse are examined here as “different names”. The bulk of this enormous job was performed by V. P. Fomenko.

Subsequently, in case of correct chronological order of “generation chapters” and the absence of duplicates, frequency graphs of the verse repetitions  $P(Q, T)$  must have an approximate shape of an ideal damping graph as in fig. 5.37. As well as in case of using names, a chronicler speaking about events of generation  $Q$ , given the order of the events described is correct, does not report anything about these events in the preceding “generation chapters”, since these events *have not yet occurred*. The chronicler would recall the events of generation  $Q$  still less frequently in subsequent “generation chapters”. Subsequently, a “chronologically correct” frequency graph must have an absolute maximum at the point  $Q$ , equalling zero to the left of  $Q$ , and evenly fading out to the right of  $Q$ .

An experimental test performed by us confirmed the frequency damping principle for all fragments of the Bible enumerated below:

- 1) Genesis, ch. 1-5,

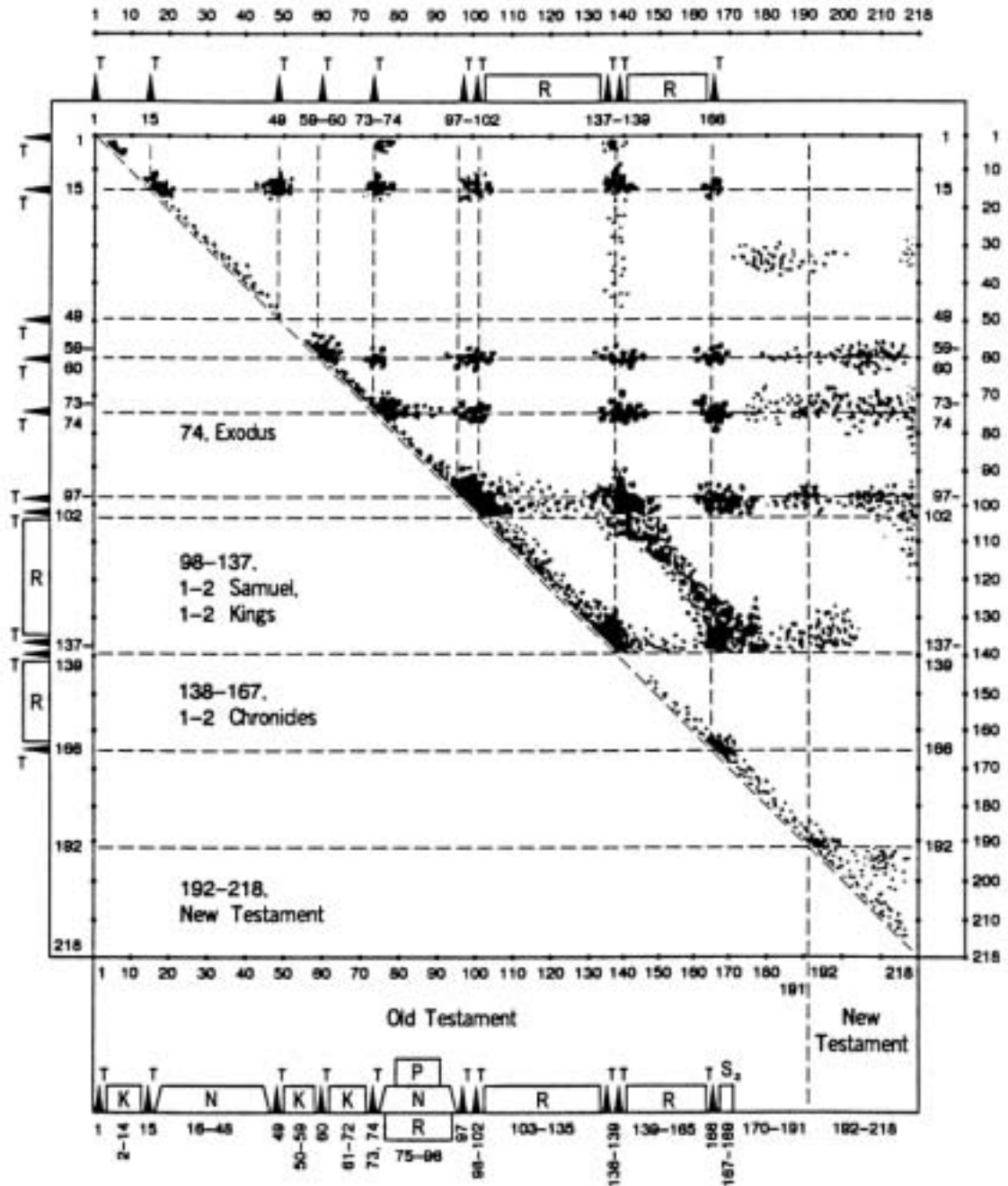


Fig. 5.42. A detailed frequency matrix for the Bible. The duplicates are clearly visible.

- 2) Genesis, ch. 6-10,
- 3) Genesis, ch. 11,
- 4) Genesis, ch. 12-38,
- 5) Genesis, ch. 59-50, + Exodus + Leviticus + Numbers + Deuteronomy + Joshua + Judges, ch. 1-18,
- 6) Judges, ch. 19-21, + Ruth + 1-2 Samuel, 1 Kings + 2 Kings, ch.1-23,
- 7) 1-2 Chronicles + Ezra + Nehemiah.

Frequency graphs  $P(Q, T)$  for each of the texts 1-7 turned out to possess the shape of a damping theoretical graph in fig. 5.37, which means that the frequency damping principle is confirmed for these indicated cases, and furthermore, the order of “generation chapters” in each of the texts 1-7 is more or less correct from the chronological point of view, without any essential duplicates within.

If all the “generation chapters” of the chronicle are numbered correctly in general, we can reveal duplicates among them by plotting graphs of “repetitions of verses”  $P(Q, T)$ . If two “chapters”  $X(Q)$  and  $X(R)$  are duplicates, then their frequency graphs  $P(Q, T)$  and  $P(R, T)$  shall possess the shape presented in fig. 5.39. This procedure has also been experimentally tested for the example described above, namely, 1-2 Samuel + 1-2 Kings duplicate 1-2 Chronicles.

Plotting of frequency graphs  $P(Q, T)$  for the Bible revealed that the “chapters” of 1-2 Samuel + 1-2 Kings and 1-2 of Chronicles appear to be precise duplicates from the viewpoint of frequency graphs  $K(Q, T)$  as well, which indicates a complete concurrence of the results of both procedures. In this case it should be noted that the apparatus of “parallel places” is not at all identical with the apparatus of “repetitions of names”, since many fragments and verses of the Bible containing no names at all are considered to be “parallel”.

### 9.3. New, previously unknown duplicates we discovered in the Bible. General scheme of their distribution within the Bible

Now we come to a summary of results of applying the methods developed to “antique” and medieval chronological material, usually referred to as epochs, preceding the XIII-XIV century. In doing so, duplicates considered different in the Scaligerian history, and currently dated back to substantially different epochs, were unexpectedly discovered.

Let us apply, for example, the duplicates detection procedure on the basis of the frequency graphs  $K(Q, T)$  and  $P(Q, T)$  to the Bible – namely, to the books of the Old Testament from Genesis to Esther. We will present the obtained result as a conditional line  $B$ , where identical symbols and letters denote the duplicates we discovered – i.e., fragments of the Bible apparently describing *the same events*, as it follows from the test of duplicating frequencies principle described above. Thus,

$$\text{line } B = T K T N T K T K T N \quad T \quad T \quad R \quad T \quad S[a]$$

$$P$$

$$R$$

This result of ours means that an entire historical part of the Old Testament consists of several pieces:  $T, K, N, P, R, S[a]$ , some of which are repeated in the Bible several times and installed in different places of the Biblical canon, which leads to a “long” chronicle line  $B$  described above. In other words, many pieces in the Old Testament indicated in the chronicle line  $B$ , apparently describe *the same events*.

This fact contradicts the Scaligerian chronology, according to which different books of the Bible, except for 1-2 Samuel + 1-2 Kings and 1-2 Chronicles, describe different events. Let us explain now the meaning of the indicated symbols in the Biblical chronicle line  $B$  by presenting fragments of the Bible respectively corresponding thereto.

Thus,  $B =$

$T =$  Genesis, ch. 1-3;

$K =$  Genesis, ch. 4-5;

$T =$  Genesis, ch. 6-8;

$N =$  Genesis, ch. 9-10;

$T =$  Genesis, ch. 11:1-9;

$K =$  Genesis, ch. 11:10-32;

$T =$  Genesis, ch. 12;

$K =$  Genesis, ch. 13-38;

$T =$  Genesis, ch. 39-50;

$T =$  Exodus;

$N/P/R =$  Leviticus + Numbers + Deuteronomy + Joshua + Judges, ch. 1-18;

$T =$  Judges, ch. 19-21;

$T =$  Ruth + 1-2 Samuel + 1 Kings, ch. 1-11;

$R =$  1 Kings, ch. 12-22 + 2 Kings, ch. 1-23;

$T =$  2 Kings, ch. 24;

$S[a] =$  2 Kings, ch. 25 + Ezra + Nehemiah + Esther.



Thus, besides the sequence of fragments  $T R T S[a]$  at the end of the chronicle = line  $B$ , is repeatedly described in 1-2 Chronicles. These two last series of duplicates are the only ones known before. *Other duplicates presented above have not been known before.* This is how these duplicates within “chapters” 1-170 in the Bible are revealed on the frequency matrix  $K\{T\}$ : Two series of previously known duplicates – “chapters” 98-137 and “chapters” 138-167 duplicating them – lead to appearance, along with the maxima filling the main diagonal, of another diagonal, also filled with maxima and parallel to the main one for the lines numbered 98-137, fig. 5.41 and fig. 5.42.

These diagonals are depicted in fig. 5.41 by black inclined segments. Lines 138-167 virtually consist of zeroes. Remaining duplicates are revealed through local peaks approximately identical in size, arranged on intersections of the appropriate lines and columns corresponding to duplicates. The duplicates of series  $T$ , those most frequently encountered in the Old Testament, are depicted in fig. 5.42.

Then we had additionally analyzed frequency matrices  $K\{T\}$  and  $P\{T\}$ . Each series of duplicates that we had discovered was united a singular generation chapter, after which matrices  $K\{T\}$  and  $P\{T\}$  were calculated *again*. It turned out that these new matrices, those following the identification of duplicates differ from the initial ones notably *and satisfy the frequency damping principle substantially better*.

The application of our method to the complete frequency matrix  $K\{T\}$  with the size of  $218 \times 218$  – i.e., for the entire Bible, broken up into 218 generation chapters – revealed that the current Scaligerian chronology of the books of the Old and New Testament is apparently incorrect. It turns out that in order to make the sequence of Biblical “chapters” 1-218 chronologically correct, it is necessary to shuffle “chapters” 1-191, i.e., the Old Testament, and “chapters” 192-218, i.e., the New Testament, in a certain specific manner – the books of the Old Testament and the New Testament should be mixed and moved into each other the way the teeth of two combs do. We omit the details of this rearrangement due to the bulkiness of the material, and shall only present one example below – but a very representative one.

After such a “ordering rearrangement” and the identification of duplicates we have discovered that

the matrices  $K\{T\}$  and  $P\{T\}$  become almost ideally damping ones in the Old and the New Testament.

These results indicate that, most probably, *the books of the Old and the New Testament were created more or less simultaneously, within the same historical epoch*, and it was only later that the Scaligerian chronology moved them apart by many hundred years arbitrarily, far from each other, and into the deep past. Moreover, some books of the New Testament were most likely created earlier than the Old Testament. Let us recall that the Scaligerian chronology assures us that the Old Testament was allegedly created several hundred years before the New Testament.

#### **9.4. A representative example: the new statistical dating of the Apocalypse, which moves from the New Testament into the Old Testament**

Let us illustrate the effect of mixing the books of the Old Testament and the New Testament on the example of the Apocalypse (Revelation of St. John) – the last book in the New Testament in the Scaligerian ordering. Therefore this book has the last number 218 in our numeration of the “Scaligerian generation chapters”.

If this current location of the Apocalypse in the Bible was chronologically accurate, then its frequency column graph of the names  $K\{T, 218\}$ , i.e., with  $Q = 218$ , would have to look like the lower graph in fig. 5.43.

*However, the actual frequency graph for the Apocalypse is entirely different!* See the upper graph in fig. 5.43. It is surprising that the maximum of the graph isn’t reached in the “chapters” close to the Apocalypse, i.e., number 218, but, rather, in the remote “chapters” 70-80 on the frequency graph of names, and the remote chapters 74-77 and 171-179 on the frequency graph of parallel places and references.

In other words, *the absolute maximum of both graphs is not in the New, but the Old Testament books, currently separated from the Apocalypse by several hundred years.* Thus, we revealed an explicit contradiction to the frequency damping principle, soundly confirmed earlier in reliably dated and chronologically correctly ordered texts. We already know how to react in such cases – transpose the Biblical “chapters” in such a way that their frequency graphs begin to fade

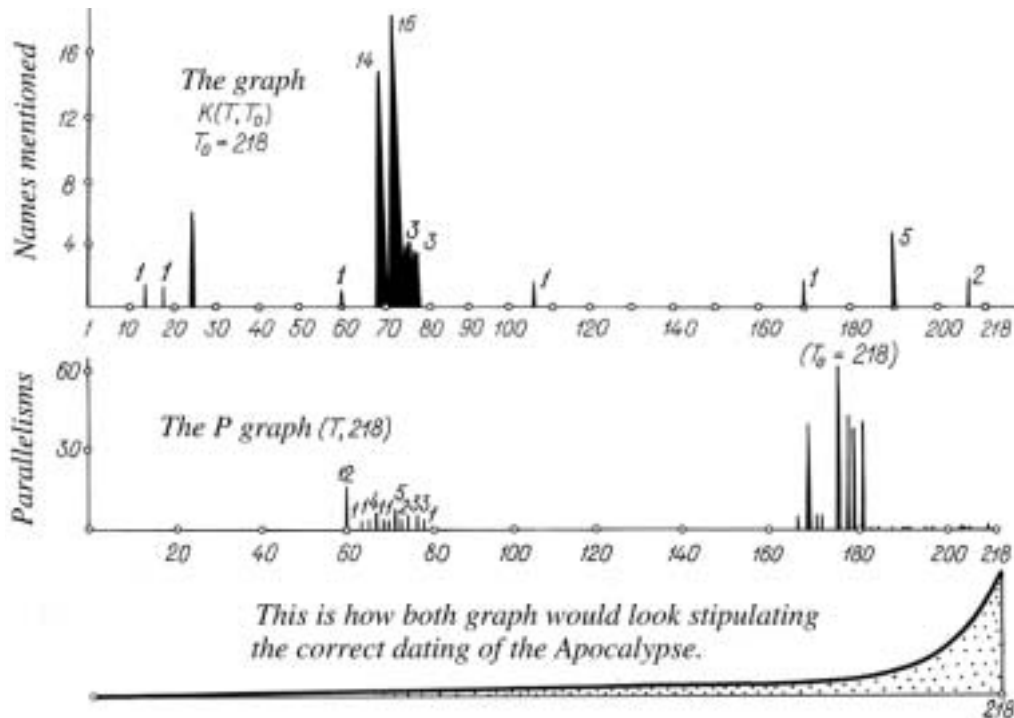


Fig. 5.43. A frequency graph for the Biblical *Apocalypse*. It is amazing that the graph peaks on the chapters that are located at some distance from the actual *Apocalypse*, and not the ones in its immediate vicinity. It indicates that the current location of the *Apocalypse* in the Biblical canon is apparently incorrect.

out. As a result, we will find the chronologically accurate order of “chapters” of the Bible.

This chronologically correct “mixing” of the Biblical books was described above. It is interesting that, with the “mixing”, we discovered that the New Testament *Apocalypse* appears to be near *the Old Testament prophecies* and “chapters” 69-75 – in particular, the Old Testament prophecy of Daniel, which is in perfect conformity with a well-known viewpoint that the prophecy of Daniel is “an *Apocalypse* in many ways similar to one from the New Testament” ([765], p.136).

## 10. THE METHOD OF FORM-CODES The comparison of two long currents of regal biographies

This method was proposed and developed by the author of this book in [884] and [885].

Fund phrases and adopted words used, for exam-

ple, to describe rulers, are common for the Scaligerian history. Chroniclers are believed to have sometimes assigned to their contemporary rulers the streaks and deeds of late ancient kings of long ago. The Scaligerian history assures us that this strange passion for the “old times” was widespread among chroniclers. Allegedly knowing nothing reliable about the life of their contemporary kings, chroniclers would supposedly act very simply. They provided their kings with “re-sounding biographies” of certain great rulers who had died a long time ago – of whose lives they, subsequently, were informed better, than of the lives of their contemporaries, which is fairly strange in itself. Such cases must have occurred, but most likely not very often. Our studies have shown that this strange “Scaliger effect” deserves a closer study, since conceals something much more serious than simply “the love of chroniclers for stock phrases”.

To reveal and study such fund phrases, repetitions, and duplicates, we introduced the concept of *form*

*code*, or *formalized biography* ([904] and [908]). An actual ruler described in chronicles acquires “a biography of historical annals”, which can have nothing in common with his true biography, e.g., be completely legendary. We are not discussing here the issue of how accurately a biography of annals of a king reflects reality – this past reality is beyond our current knowledge. Therefore, we can hardly restore authentic ancient biographies, and we do not have to do it now. Our aim is to try and reveal, among many biographical texts, those actually describing *the same person*. Though written by different people, they were not detected by posterior medieval chroniclers and chronologists as biographies of the same character, and were therefore placed into different parts of the Scalligerian “textbook of history”, even into different historical epochs, as biographies of allegedly completely different persons. Thus, one actual character was “multiplied” – only on paper, though! – and gave birth to several *phantom reflections* of himself.

On the basis of studying a large number of historical biographies, we developed the table we named the form-code (FC). The form table hierarchically streamlines the facts of a “biography” in order of decreasing of their invariance related to subjective evaluations of chroniclers. The form-code consists of 34 items, each containing several sub-items:

- 1) GENDER –
  - a. male;
  - b. female.
- 2) LIFETIME.
- 3) REIGN DURATION. The end of a reign is virtually always reflected unambiguously and usually coincides with the death of a king. The beginning of a reign sometimes allows for several versions, q.v. below. All versions are noted as equal.
  - 4) SOCIAL STATUS AND POSITION HELD –
    - a. czar, emperor, king;
    - b. commanding officer;
    - c. politician, public figure;
    - d. scientist, writer, etc.;
    - e. religious leader, Pope, bishop, etc.
  - 5) DEATH OF THE RULER –
    - a. natural death in a peaceful environment;
    - b. killed on a battlefield by enemies or lethally injured;
    - c. assassinated as a result of a plot outside the war;

- d. assassinated as a result of a plot during the war;
- e. special, exotic circumstances of death.
- 6) NATURAL DISASTER DURING THE RULE –
  - a. hunger;
  - b. flood;
  - c. epidemic diseases;
  - d. earthquakes;
  - e. eruptions of volcanoes; in this case, the duration of disasters and year (or years) when they took place are also marked.

- 7) ASTRONOMIC PHENOMENA DURING THE RULE –
  - a. existent (precisely what, with indication of dates);
  - b. nonexistent;
  - c. eclipses;
  - d. comets;
  - e. “starbursts”.

- 8) WARS DURING THE RULE –
  - a. existent;
  - b. nonexistent;

- 9)  $W$  = THE NUMBER OF WARS.
- 10) BASIC TIME CHARACTERISTICS OF WARS  $W_1 \dots, W_p$ . Namely,  $a_k$  = what year of the reign war  $W_k$  occurs or begins;  $c_{(k,x)}$  = time interval from war  $W_k$  to war  $W_x$ .

- 11) “POWER”, “INTENSITY” OF WAR  $W_k$  according to the chronicle, for each number “ $k$ ” –
  - a. strong;
  - b. weak.

More accurately, by how many lines the war is described in this chronicle.

- 12) NUMBER OF ENEMIES IN WAR  $W_k$  AND THEIR INTERRELATIONS – allies, enemies, neutral forces, mediators, etc.

- 13) GEOGRAPHICAL LOCALIZATION OF WAR  $W_k$  –
  - a. near the capital;
  - b. within the state;
  - c. outside the state, an external war, precisely where;
  - d. simultaneously internal and external war.

- 14) THE RESULT OF THE WAR –
  - a. victory;
  - b. defeat;
  - c. uncertain outcome.

- 15) PEACE TREATIES –
  - a. conclusion of a peace treaty with an uncertain outcome;
  - b. conclusion of a peace treaty after a defeat.

- 16) ON SEIZURE OF THE CAPITAL –

- a. seized;
- b. not seized.
- 17) THE FATE OF THE PEACE TREATY –
  - a. broken (by whom);
  - b. not broken in the course of the rule.
- 18) CIRCUMSTANCES OF SEIZURE OR COLLAPSE OF THE CAPITAL.
- 19) PATHS OF THE CAMPAIGN DURING THE WAR.
- 20) PARTICIPATION OF THE RULER IN THE WAR –
  - a. positive;
  - b. negative.
- 21) PLOTS DURING THE LIFE OF THE RULER –
  - a. existent;
  - b. nonexistent.
- 22) GEOGRAPHICAL LOCALIZATION OF PLOTS, WARS, REVOLTS.
- 23) THE NAME OF THE CAPITAL, translated into different languages.
- 24) THE NAME OF THE STATE AND THE PEOPLE, with translations.
- 25) GEOGRAPHICAL LOCALIZATION OF THE CAPITAL.
- 26) GEOGRAPHICAL LOCALIZATION OF THE STATE.
- 27) LEGISLATIVE ACTIVITY OF THE RULER –
  - a. reforms and their nature;
  - b. publication of a new code of laws;
  - c. restoration of old laws – precisely which.
- 28) LIST OF ALL THE NAMES OF THE RULER, with translations.
- 29) ETHNIC AFFILIATION OF THE RULER as well as his family and the members of the family.
- 30) ETHNIC AFFILIATION OF THE PEOPLE, TRIBE, CLAN.
- 31) FOUNDATION OF NEW CITIES, CAPITALS, etc.
- 32) RELIGIOUS SITUATION –
  - a. introduction of a new religion;
  - b. struggle between sects, precisely which;
  - c. religious revolts and wars;
  - d. church councils, religious meetings.
- 33) DYNASTIC STRUGGLE inside the clan of the ruler's relatives, assassination of relatives, enemies, claimants, etc.
- 34) REMAINING FACTS OF THE "BIOGRAPHY". We will not differentiate them in detail and conditionally name point 34 "the remainder of a biography".

Let us denote the enumerated points  $FC-1$ ,  $FC-2$ , ...,  $FC-34$ . Thus, each "biography of annals" can now

be recorded as a table form with several points appearing empty if no relevant information about a character is available. Let us assume that a certain chronicle describes a certain actual dynasty; let us then number its rulers and, on the basis of this chronicle, compose the form-code  $FC$  for each of them. We will obtain a sequence of form-codes, which we name *the form-code flow of the dynasty*. Since the same actual dynasty can be described by different chronicles, it can also be presented by different flows of form-codes.

How can we find out whether two different chronicles describe the same actual dynasty, or whether dynasties described thereby are actually different? If durations of rules of the kings are indicated in the chronicles, then one can apply the recognition procedure for dynasties of annals, see above. However, if no numerical data has been preserved, this task becomes notably complicated. So, how is it possible to recognize the same actual dynasty of kings in a great many form-code flows? To solve this issue, we developed a procedure based on the analogue of the "small dynastic distortions" principle, which in this case is briefly formulated in the following way.

If form-code flows of two dynasties *differ from each other "a little"*, they depict *the same actual dynasty*. But if two form-code flows depict *different dynasties*, these form-code flows are "*distant*" from each other.

How can one compare form-code flows of two dynasties and answer whether they are "similar" or not? And if they are, then to what degree? Let  $FC$  and  $FC'$  be form-codes of two rulers from different dynasties, which have the same ordinal number in their dynasty. Let us compare these two form-codes by each point, evaluating discrepancies between the points by marks. For different points these marks should be established differently, depending on the importance and degree of invariance of compared "biographical facts" in respect to subjective evaluations of chroniclers. As a result of experimenting with certain "biographies of annals", we developed the following system of marks, which makes it possible to reveal possible dependencies faster.

For points 1-10, excluding the point 3 (i.e., duration of rule), we will use marks 0, +1, -1.

For points 11-21 we will use marks 0, +1/2, -1/2.

For points 22-33, marks 0, +1/3, -1/3.

Comparing points of form-codes may lead to three opportunities, which we would illustrate on the basis of an example for points number 5, i. e., FC-5: “circumstances of death of the ruler”.

a) Compared data *coincide*. For example, both FC and FC' report that both compared kings died a natural death. In this case we will assign this pair of points the mark +1 (coincidence), and conditionally record it as  $E_5 = +1$ .

b) Compared data *obviously do not coincide*, but rather contradict each other. For example, FC reports that the king died a natural death, and FC' reports that the king compared to him was assassinated as a result of a plot. In this situation, we will assign the mark -1 (contradiction), and record  $E_5 = -1$ .

c) Compared data are *neutral*, i. e., they neither coincide, nor contradict each other. For example, FC reports that “the king died”, and FC' reports that “the king was assassinated”. Let us assign the mark 0 (neutral situation), i. e., record  $E_5 = 0$ .

Thus, for each pair of points with number  $i$  (compared form-codes) we obtain a certain number  $E_i$ . Consequently, it is possible to calculate the sum of all of the obtained numbers  $E_i$  for the pair of form-codes FC and FC' of the two compared kings:

$$f(FC,FC') = E_1 + E_2 + E_4 + E_5 + \dots + E_{33}.$$

Let us recall that we do not examine coefficient  $E_3$  here, as we developed a different procedure for comparing durations of rule, presented in detail above.

Experiments with specific historical form-codes showed that the value of coefficient  $E_i$  has to be considered equal to zero in many cases, since quite often, comparable data on two kings neither coincide nor contradict each other. Thus, the role of +1 and -1, when they appear, is growing. Furthermore, it turned out that, in the overwhelming majority of cases,  $E_{34}$  has to be assumed equal to 0. The fact is, that comparison of the “remainders of biographies” of two kings usually reveals such a diversity of secondary, data of minor importance that makes it hard to compare at all. For example, in the “remainder of biography” FC-34, one king is said to have loved art and even sung, and the other king is said to have had black hair. This information can certainly be taken into consideration, but makes any comparison senseless.

Naturally, in such cases mark  $E_{34}$  had to be assumed equal to zero.

Let us now have two dynasties of annals  $a$  and  $b$ , each consisting of  $k$  successive kings. “Filling in the form for each one of them”, i. e., composing a form-code for each king, we obtain a sequence, a flow of form-codes

$$FC_1, FC_2, FC_3, \dots, FC_k$$

for dynasty  $a$ , and another sequence, a flow of form-codes

$$FC'_1, FC'_2, FC'_3, \dots, FC'_k$$

for dynasty  $b$ .

The sequence of form-codes of kings

$$(FC_1, FC_2, FC_3, \dots, FC_k)$$

can naturally be named *the form-code flow of dynasty a*. Let us denote it as  $FC(a)$ . Similarly, we assign to the sequence of “forms of kings”

$$(FC'_1, FC'_2, FC'_3, \dots, FC'_k)$$

the name of *the form-code flow of dynasty b* and denote it as  $FC(b)$ .

In other words, the form-code flow of a dynasty is simply a sequence of form-codes of its kings, or actual rulers.

Now we want to compare form-code flows  $FC(a)$  and  $FC(b)$  of two dynasties,  $a$  and  $b$ . For each compared pair of form-codes of kings, we calculate the coefficient  $f(FC_i, FC'_i)$ , which makes it finally possible to determine the number:

$$e(a, b) = \frac{f(FC_1, FC'_1) + f(FC_2, FC'_2) + \dots + f(FC_k, FC'_k)}{k}.$$

i.e., simply an arithmetic mean value of all coefficients  $f(FC_i, FC'_i)$ . In other words, we compare, step by step, each pair of successive kings of two compared dynasties, calculate the “proximity quotient”  $f(FC_i, FC'_i)$  for each pair, and then compute arithmetic mean values for over all the kings of the dynasty.

Thus, the proximity or distance of form-code flows for the two dynasties  $a$  and  $b$  can be evaluated by a pair of numbers

$$(c(a, b), e(a, b)),$$

where coefficient  $c(a, b) = PACD$ , which has been described above.

We omit the description of numeric experiments in comparing form-code flows for dynasties of annals,

and only report the result: the procedure described above turned out to quite confidently enable separation of “dependent form-codes” from “independent form-codes”. For details, see [904], [908], as well as [884]. An experimental verification confirmed correctness of small distortions principle in this case as well. The form-code flows depicting one and the same dynasty, turned out to differ from each other essentially less than those of actually different dynasties, which makes clear the possibility of dating form-code flows of dynasties according to the system described above.

*Below we will present specific examples of dependent form-code flows of certain pairs of duplicate dynasties.* This comparative material is very useful, since it shows how clearly two duplicates, two different descriptions of the same actual dynasty manifest themselves in annals.

To conclude, let us dwell upon one important circumstance. The procedure of comparing form-codes as presented above is not simply a “tribute to the statistical fashion”, but an extremely useful research tool. It is important that the procedure be aimed at comparing not just *one pair* of separate biographies of annals, but *two long sequences of such biographies*. For example, we will compare *a sequence of twenty biographies* of kings from one dynasty to *a sequence of twenty biographies* of kings from another dynasty, see examples below. *A conclusion about the dependence of two dynasties can only be made on the basis of the proximity of two “long flows of biographies”.*

Let us note that the proximity or “similarity” of just *two separate isolated* biographies of some historical characters does not necessarily point out any chronological duplication. It is no big deal to select a pair of “similar biographies” of two different historical figures from our contemporary epoch by pulling out similar, sometimes surprisingly similar, facts of their lives. Moreover, sometimes quite a lot of such “similar facts” can be collected. At the same time, it is absolutely clear that these facts should not lead to any chronological conclusions, and all these coincidences can turn out to be just a freak of chance. *But when we reveal two close long sequences, two long “flows” of amazingly similar biographies; it is an entirely different matter.* When a formal statistical procedure “catches” a pair of “*similar long flows of biographies*” in an enormous collection of ancient documents, – not “at a

glance”, but in a formal way, – that means we have clearly revealed something very serious. Besides, our methods make it possible to evaluate, albeit roughly, the probability of how occasional this “proximity” is. If the probability of a random coincidence turns out to be low, it strengthens our suspicion of having actually encountered a “multiplication” of the same actual dynasty in different chronicles.

Let us emphasize again the following important circumstance unambiguously traced in all the examples of pairs of dependent dynasties *a* and *b*, which we revealed and will demonstrate soon. For example, let *a* be the Roman dynasty, *b* – the German dynasty. It turns out that:

- The biography of the first Roman king “is similar” to the biography of the first German king.
- The biography of the second Roman king “is similar” to the biography of the second German king.
- The biography of the third Roman king “is similar” to the biography of the third German king.
- And so on, until the end of the entire dynasty of fifteen or twenty kings.

But in this case, biographies of kings are individual within both the Roman and the German dynasty, and not similar to each other. This means that among fifteen or twenty biographies of Roman kings, there is not a single “similar” pair; likewise, among fifteen or twenty biographies of German kings, there is not a single “similar” pair. But *the flow of Roman biographies proves to be amazingly “similar” to the flow of German biographies.* If this similarity, statistically evaluated, appears to be “very strong”, it indicates that we encountered a pair of duplicate dynasties, as well as a serious contradiction inside the Scaligerian history.

## 11. CORRECT CHRONOLOGICAL ORDERING METHOD AND DATING OF ANCIENT GEOGRAPHICAL MAPS

In [908] and [904] the author has also proposed a chronologically correct ordering procedure of ancient maps. Each geographical map reflects the state of the science of the humankind in the respective epoch of its compilation. Maps are obviously getting better as scientific ideas develop, which means *as a whole, the quantity of erroneous geographical data de-*

creases, and the quantity of correct data increases. Having studied many ancient maps, we composed an optimum map-code, which makes it possible to represent each map, presented graphically or described verbally, in the form of a table similar to *FC*, which can be conditionally named *map-code*. The map-code is constructed on the same principle as the form-code is, and consists of several dozen points and signs. Let us present only the beginning of this table.

- 1) Type of map:
  - a. Globe.
  - b. Flat map.
- 2)
  - a. World map (map of the world).
  - b. Regional map (of a separate region, which precisely).
- 3) In case of world map, the following parameters should be indicated:
  - a. structure of “boundary of the world” (water, land, etc.).
  - b. arrangement of poles, equator, tropics, climatic zones.
- 4) Orientation of the map, i.e., use of the following terms:
  - a. Names of the sides of the world (the North, etc.).
  - b. Terms “above”, “below”, and so forth.
  - c. Where the North of the map is placed (top or bottom), where the East of the map is situated (on the right or on the left).
- 5) Depiction or description of seas in the following way:
  - a. “Rivers”, or narrow ducts.
  - b. Vast reservoirs.
- 6) Enumeration of basic reservoirs:
  - a. Oceans.
  - b. Seas.
  - c. Lakes.
  - d. Rivers.
- 7) For each reservoir, its name, in translation. Visual or descriptive characteristic of the shape of the reservoir, direction of flow, etc.  
Etc.

Geographical size of a region described in one point of the map-code (sea, etc.) should not be too large in order to minimize, while comparing map-codes later, the possible influence of distorting projections used by different cartographers to compile flat maps.

An experimental check performed in 1979-1980 made it possible to formulate and confirm the following *geographical map improvement principle*.

If a chronologically *correctly enumerated (ordered)* sequence of geographical maps is assigned, then in the course of transition from old maps to newer ones the following two processes take place.

A) *Incorrect* signs, i.e., those not corresponding to actual geography, *disappear* and *no longer appear* on geographical maps. In other words, “*errors are not repeated on maps*”.

B) Once a *correct* sign appears on a geographical map, – for example, presence of a strait, a river, or a more correct coast line, – it is *fixed and retained on all subsequent maps*. i.e., *correct information is not forgotten on maps*.

Due to the role that maps have always played in navigation and military science, this map improvement principle is quite comprehensible and simply reflects vital practical needs. The principle we formulated was checked afterwards with the system of preceding points. We fix a certain enumeration (ordering) of maps, then build a frequency graph  $L(Q, T)$  for each number  $Q$ , where number  $L(Q, Q)$  is equal to the number of geographical features appearing on the map with number  $Q$  for the first time, and number  $L(Q, T)$  shows how many of them remained on the map with number  $T$ .

Map ordering (enumeration) should be recognized as *chronologically correct* if all graphs  $L(Q, T)$  are close to the ideal damping graph in fig. 5.37, and incorrect in the opposite case. In particular, maps that are visually similar prove to be close temporally as well. Each historical epoch turns out to be characterized by its unique collection of maps. The verification of the principle was hindered by scarcity of truly ancient maps available in our time, but we nevertheless managed to gather a number of maps sufficient to make the verification of our theoretical model possible.

We found out that the sequence of mediaeval maps begins in the XI-XII century A.D. with *absolutely primitive maps*, very far from reality. Then the quality of maps improves more or less evenly until we finally come across fairly correct maps and globes of the XVI century A.D. At the same time, this quality improvement has been developing quite slowly.

Thus, for instance, the geographical knowledge in

Europe of the XVI century A.D. was still very far from the contemporary. The map of 1522, compiled by Occupario and kept in the State Historical Museum of the city of Moscow, depicts Europe and Asia in proportions blatantly different from the contemporary ones. Namely, Greenland is represented as a peninsula in Europe; the Scandinavian Peninsula stretches out as a thin stripe; the Bosphorus and the Dardanelles are greatly extended and enlarged; the Black Sea is skewed along the vertical axis; the Caspian Sea is horizontally elongated and literally beyond recognition, etc. The only region depicted more or less correctly is the Mediterranean coast, although Greece is represented as a triangle without Peloponnesus.

Ethnographical indications on the Occupario's map and other maps of that time are even further away from those ascribed to this period by the Scaligerian history. For example, Dacia is placed in Scandinavia; Albania is on the shore of the Caspian Sea; *Gottia* (Goths?) is marked on the Scandinavian peninsula; China is simply absent; we see *Judei* in the north of Siberia, etc. The map of Cornelius Niccolai, 1598, is also guilty of similar distortions, but to a lesser degree already. And finally, the globe of the XVII century, kept in the State Historical Museum of the city of Moscow, reflects reality sufficiently well.

The procedure described above makes it possible to date maps, including the "antique" ones, following the diagram described above. The obtained results are quite unexpected. Let us quote just a few examples.

1) The well-known map from the *Geographia* by Ptolemy, the Basler publication of 1545 (see, for example, [252], page 97), is considered today to be "very ancient". However, it falls not into the II century A.D., but the XV-XVI century A.D., or the epoch of the book's publication by the "ancient" Ptolemy, which makes us recall a perfectly similar situation with the *Almagest* by Ptolemy, q.v. in CHRON3. We reproduce this map in fig. 5.44.

2) An equally famous "ancient" map entitled *Tabula Pentingeriana*, presented, for example, in [544], Volume 3, pages 232-233, falls not into the beginning of A.D., the epoch of Augustus, but into the XIII-XV century A.D., with a deviation from the Scaligerian dating of more than one thousand years.

3) Let us also present the results for a series of "ancient" maps, which are, as a matter of fact, later re-

constructions after their verbal descriptions in "ancient" texts, see [252], – namely, the following maps:

*Hesiod*, allegedly the VIII century B.C.;

*Hekataeus*, allegedly the VI-V century B.C.;

*Herodotus*, allegedly the V century B.C.;

*Democritus*, allegedly the V-IV century B.C.;

*Eratosthenes*, allegedly years 276-194 B.C.;

the "globe" of *Crater*, allegedly years 168-165 B.C.

When dated by the method described above, all these maps do not fall into the above-indicated Scaligerian time intervals, but rather into the period of the XIII-XVI century A.D. See CHRON5 for learning about the dating of geographical maps in more detail.

In fig. 5.45 we present the famous map by Hans Rüst, dating to 1480 ([1160], page 39). This map is remarkable in many respects. It shows the authentic level of geographical knowledge towards the end of the XV century, – repeat, the *fifteenth century!* It is clearly evident that this level is still extremely low and primitive. This is not a map yet, but rather a "painted list", verbal enumeration of countries, peoples, and certain cities. Certainly, certain geographical regions can already be recognised, albeit hardly. This is apparently *the very beginning of cartography*, its first clumsy steps. This is why all allegedly "ancient", picturesque maps of much higher level, now presented as those of XIV-XV century, were "transposed into the past" only owing to the Scaligerian chronology, while their actual place is in the XVII-XVIII century.

In fig. 5.46 and fig. 5.47 we present a fragment of the map of Abyssinia and Congo from the *Atlas* by G. Mercator and J. Hondius, allegedly of 1607 ([90], pages 72-73). Contemporary commentators note: "To the left below, in the cartouche, we see in Latin: *Abys-sinia, or the domain of Presbyter John... in Africa...* Legends of a *Christian* state... the blissful reign of the righteous, ruled by a priest – Presbyter John – had been straying over Europe from the beginning of the XII century" ([90], page 73). Pay attention to the fact that in another cartouche, on the top, the African country of Congo is named a *Christian* state: *Congi Regni in Africa Christiani*, q.v. in fig. 5.47. Thus, in the beginning of the XVII century cartographers believed the domain of *Christian* Presbyter John to have extended not only into Asia and Europe, but also Africa, q.v. in CHRON5.





Fig. 5.44. World map from the *Geography* by the “ancient” Ptolemy. Taken from [1353], map 2.

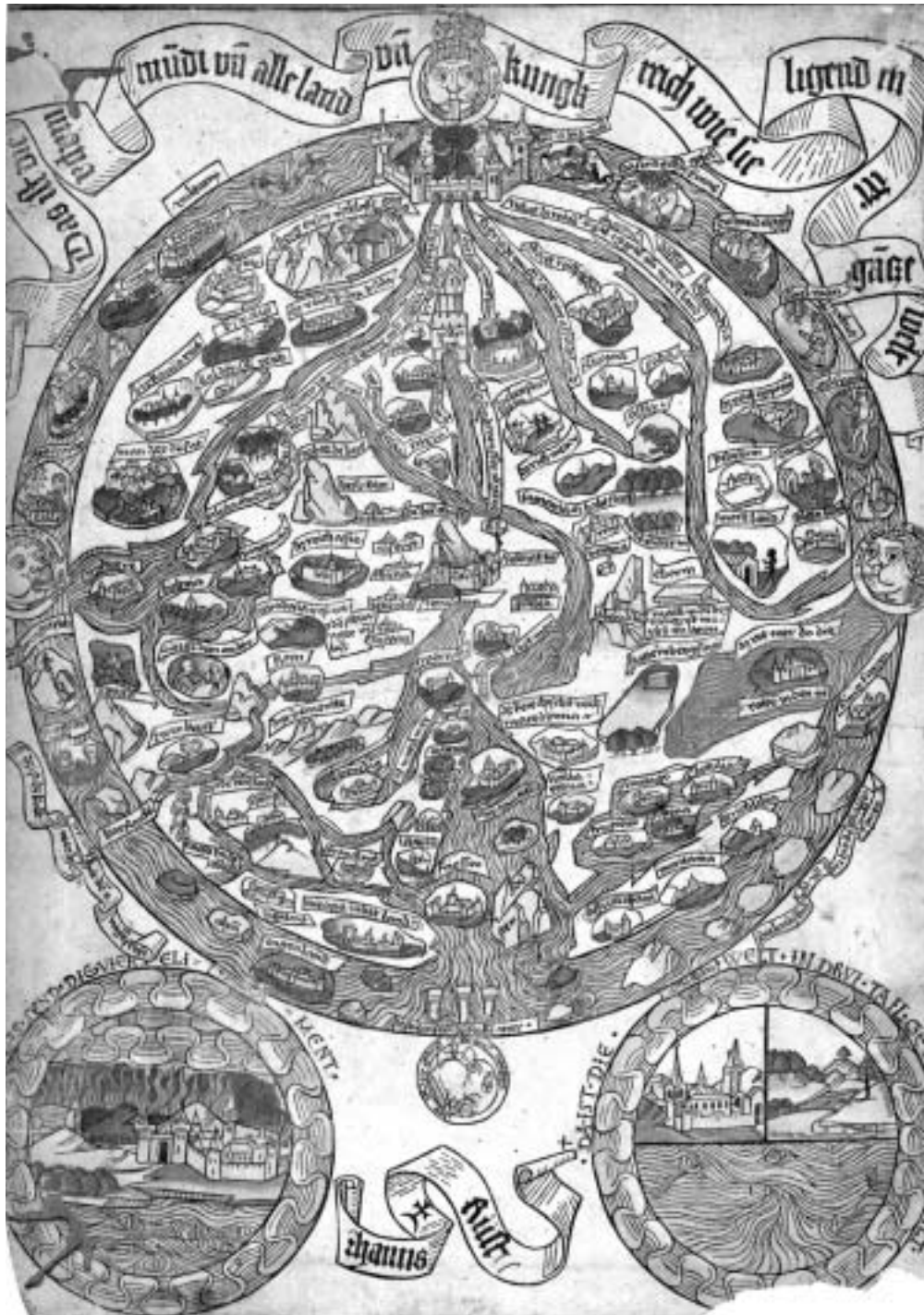


Fig. 5.45. A mediaeval map by Hans Rüst dating from 1480. One sees that the geographical science was still pretty rudimentary towards the end of the XV century. Taken from [1160], page 39.



Fig. 5.46. A fragment of the map of Abyssinia and Congo from the *Atlas* of Mercator-Hondius, 1607. Taken from [1160], pages 72-73.

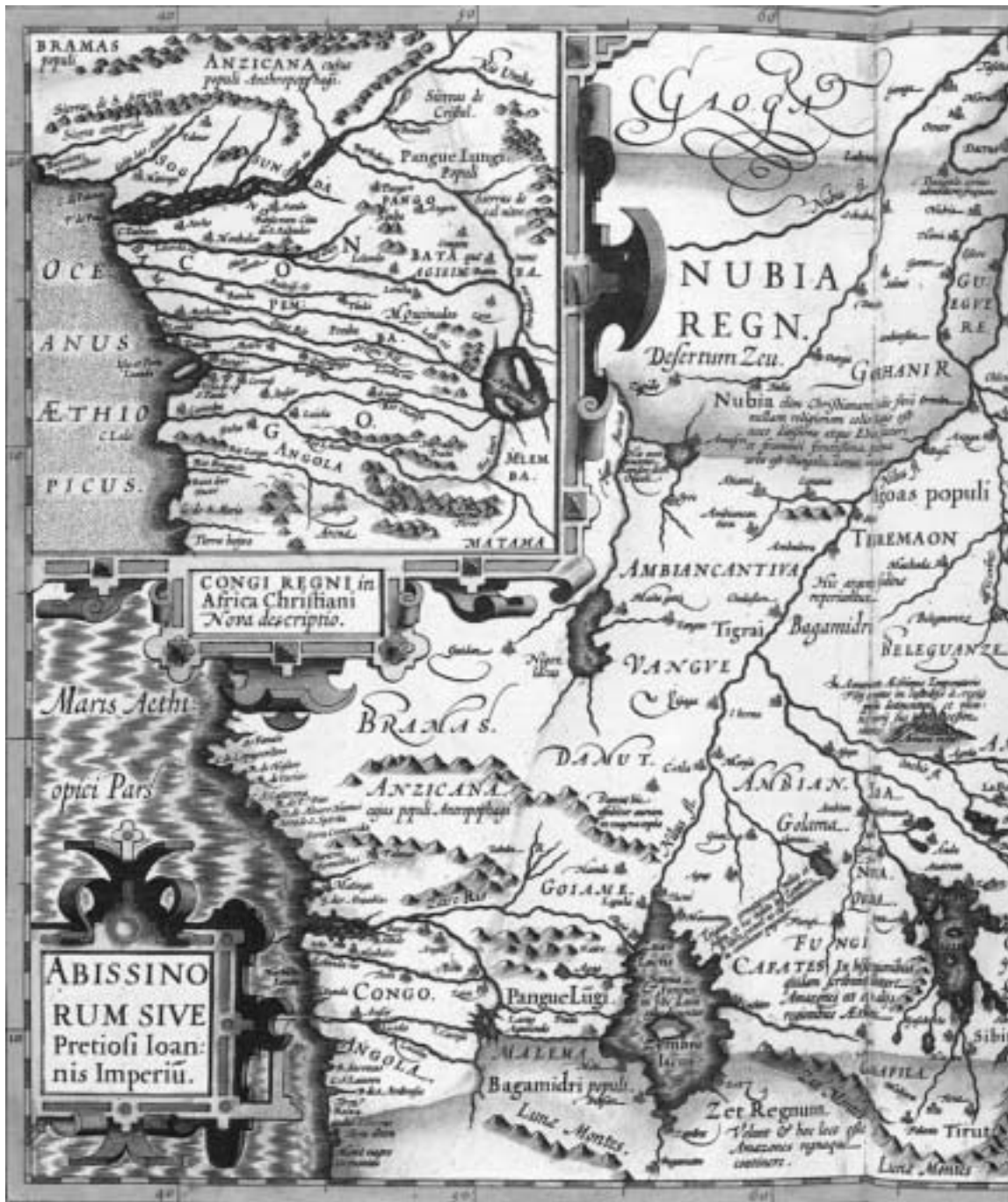


Fig. 5.47 A close-in of a fragment of the map of Abyssinia and Congo with a cartouche inscription. Taken from [90], pages 72-73.



Fig. 5.48. World map by Petrus Apianus allegedly dated 1520. Taken from [1459], sheet XXIII, map 61.



Fig 5.49 A close-in of a fragment of the map by Apianus showing Judaea that is located to the East from India. Taken from [1459], sheet XXIII, map 61.

Some more remarkable mediaeval maps: fig. 5.48 shows the map of the world by Petrus Apianus, made allegedly in 1520 ([1459], sheet XXIII, map 61). Let us point out that America is already painted. Enormous regions of China and Burma located to the East of India are named *Judah*. See names *Iudia* and *Iudiame* on the map, fig. 5.49. The Far East is named *India Superior*. It is interesting that Siberia is named *Scythia: Scythia Extra*. The European part of Russia is named *Tartaria*, fig. 5.50.

Fig. 5.51 shows a map of allegedly 1538, Solinus, Basel ([1459], map 71). One should notice that *the entire Europe to the North of Greece is named Moskovia*, fig. 5.52. This map has many other interesting names, which do not fit the Scaligerian version of history and geography.

Fig. 5.53 presents a rare map of Jerusalem of the alleged XIV century ([1177], page 475). We see Chris-

tian crosses on the buildings of Jerusalem. It is very interesting that at the same time, to the left below, *an Ottoman mosque with two high minarets* is shown, fig. 5.54. Apparently, this medieval map depicts Czar-Grad (King-City) = Jerusalem of the Gospels, with Ottoman mosques and Christian temples. Such maps, poorly fitting the Scaligerian version of history, must invoke irritation in contemporary historians. In this case, commentators named this image “a stylized map of Jerusalem”, as if calling to distrust the information presented on the map ([1177], page 475).

Fig. 5.55 shows the map of the World compiled by Isidore, in the alleged VII century A.D., but published in the book of the alleged XV century ([1177], page 302). We see an extremely primitive map, most likely drawn in the XV century for the first time the earliest, and reflecting the ideas of the XV century cartographers about the structure of the world.



Fig. 5.50. A close-in of a fragment of the map by Apianus showing Russia, or Tartaria. Taken from [1459], sheet XXIII, map 61.

In fig. 5.56 we see a fragment of the map of the world by Gregor Reisch, allegedly dating to 1515 ([1009], page 65). According to its level, it was most likely created later than the beginning of the XVI century. America is present. Russia is called Tartaria. White Russia (Belaya Rus') is shown in the north of Russia. Moreover, there are several Tartarias on the map, q.v. in fig. 5.57.

Fig. 5.58 represents the map of the world by Macrobius, an “ancient” late Roman philosopher. The map, however, has only appeared in the book allegedly dating from 1483 ([1009], page 16). It is clearly evident that the level of geographical ideas is still very primitive. Most likely, this map reflects the concepts of cartographers of the XV-XVI century.

Fig. 5.59 shows a fragment of the map of “the Holy Land”, allegedly dating from 1556 ([1189], page 94).

We see the city of Saint George next to Asur! To the left, a city named Indi – probably the “city of India” – is marked. Of interest are the city names of Skandalium and Skandaria, containing the root *Skanda* or *Scandia*.

Fig. 5.60 shows a fragment of an ancient map of 1649, on which the German river Moselle is named River *Mosa*, i.e., probably the river of Moses ([1189], page 171). Why and when such Biblical geographical names appeared, and how they became blurred subsequently in the territory of the Western Europe, is discussed in CHRON6.

Fig. 5.61 shows a fragment of a well-known map of the world by Schedel, allegedly dating from 1493 ([1459], map 44). A still extremely low level of geographical ideas towards the end of the XV century is clearly visible, see fig. 5.62.



Fig. 5.51. A map allegedly dated to 1538, Solinus, Basel. Taken from [1459], sheet XXV, map 71.





Fig. 5.52. Fragment of a map allegedly dated to 1538. Taken from [1459], sheet XXV, map 71.

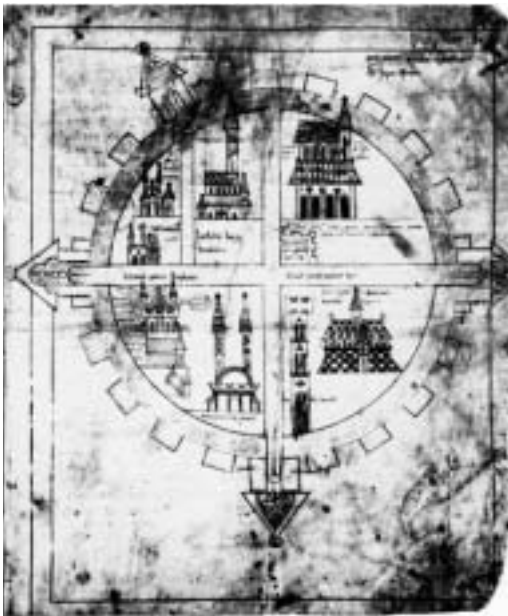


Fig. 5.53. A map of Jerusalem allegedly dating from the XIV century. We can observe buildings with Christian crosses, as well as an Ottoman mosque with minarets in this mediaeval city. Taken from [1177], page 475.

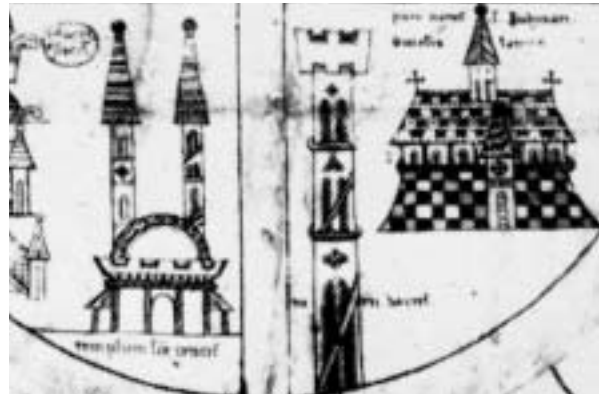


Fig. 5.54. Fragment of a map of Jerusalem. Taken from [1177], page 475.



Fig. 5.55. World map compiled by Isidorus in the alleged VII century A.D. that was published in a XV century book. Taken from [1177], page 475.



Fig. 5.56. A world map by Gregor Reisch allegedly dating from 1515. Taken from [1009], page 65.



Fig. 5.57 A close-in of a fragment with several Tartarias. Taken from [1009], page 65.



Fig. 5.58. A world map by the “ancient” late Roman philosopher Macrobius that only appeared in a book allegedly dating from 1483. Taken from [1009], page 16.



Fig. 5.59. Fragment of a map of the “Holy Land” allegedly dating from 1556. Taken from [1189], page 94.



Fig. 5.60. The German river Mosel is called the river *Mosa* on a map dating from 1649. Could this mean “the Moses river”? Taken from [1189], page 171.

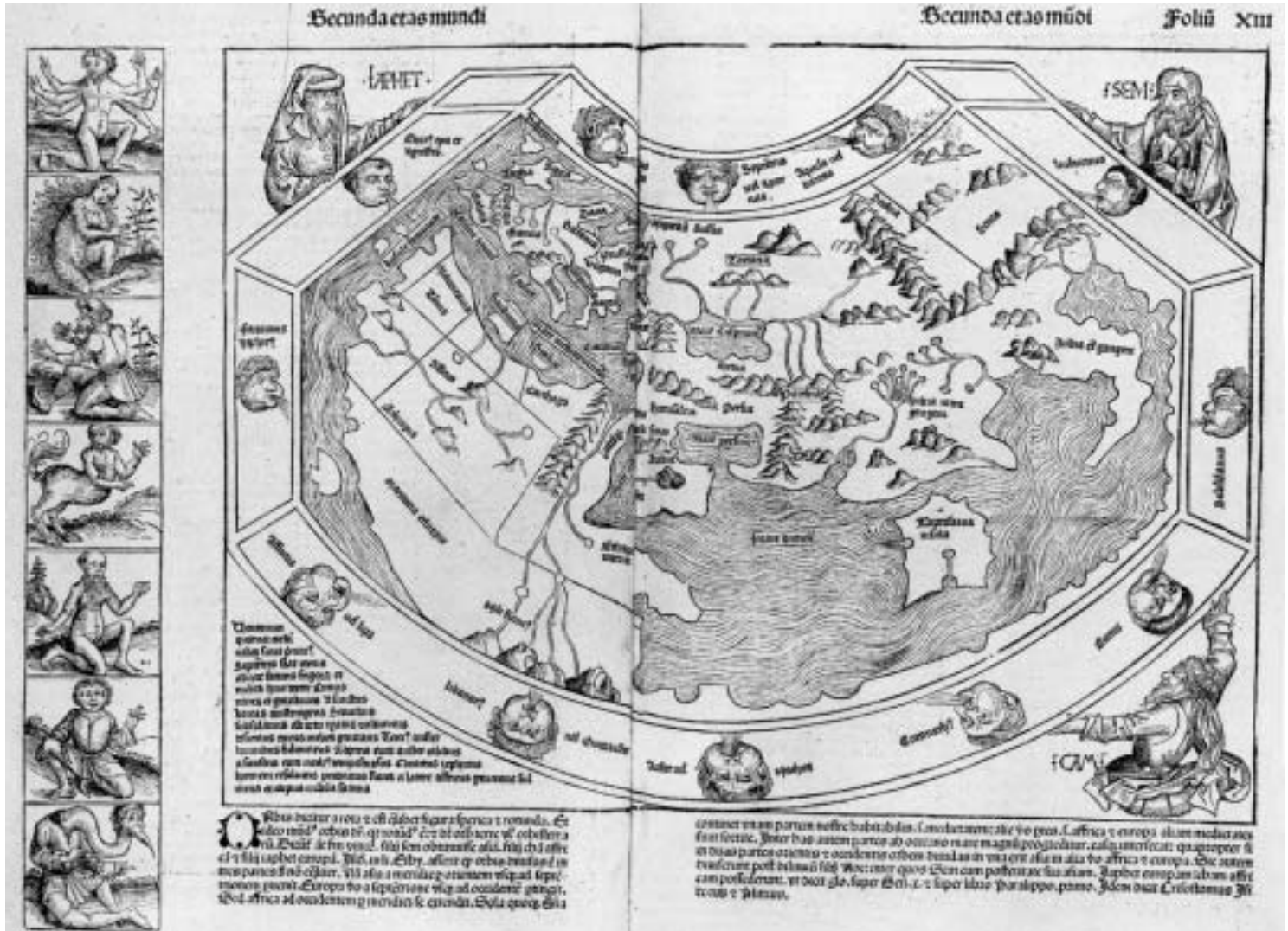


Fig. 5.61. A map by Schedel allegedly dating from 1493. One sees just how far the geographical concepts of the mediaeval cartographers had been from reality. Taken from [1459], sheet XII, map 44.

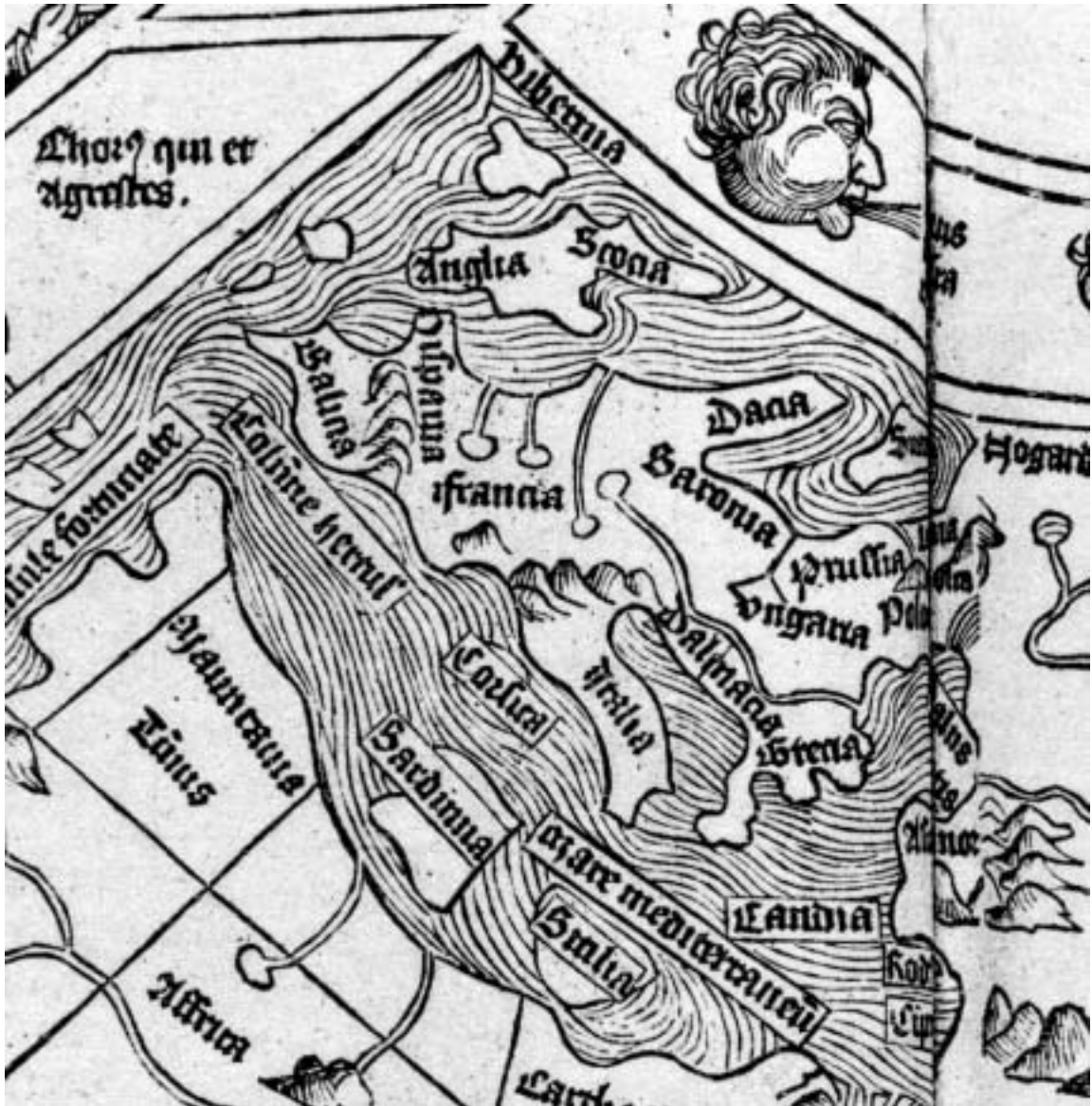


Fig. 5.62. Europe on Schedel's map. Taken from [1459], sheet XII, map 44.