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Alphabetic Writing and the Old Georgian Script

A Typology and Provenience of Alphabetic Writing Systems

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Old Semitic Consonantal–Syllabic Writing

1. The origin of alphabetic writing systems of the Christian period as a private problem of general typology of writing.

1.1. The first alphabets of the Christian period, following Greek and Latin, were Coptic, Gothic, Classical Armenian, Iberian (Old Georgian), and Old Slavic. And though the histories of these languages are well known, the precise origin of their writing systems remains unclear. They all come under a common typological group of alphabetic scripts showing quite a number of structural-typological features. One should consider these features against the broad background of the phylogenetic development of writing and the formation of a proper alphabetic system, of which the Greek script is the earliest example.

2. Writing as a Semiotic system and the General Theory of Writing ("Grammatology"). "The Plane of Content" and "The Plane of Expression" of a Writing system. "Paradigmatics" and "Syntagmatics" of Writing

2.1. Writing systems will be conceptualized in what follows as a set of interrelated characters of a special nature, forming a single integral structure. The conceptualization of writing as a semiotic system places it on a par with the other such human systems. This defines the *theory of writing*, proposed in modern linguistic science, to be named *grammatology* [cf. Gelb, 1974; 1975: 1040 ff.; 1980], as a division of the general theory of sign systems, viz. semiotics or semiology.[1]

Thus we may apply, to the writing system, a number of operational concepts developed in other semiotic disciplines, primarily in linguistics. This is facilitated not only by the close historical relationship that exists between language and writing—the latter in a sense being superimposed on language—but also by the very nature of writing, which displays many of the common structural features of a language system. The conceptualization of writing as a sign system affords a better insight into its ontological nature. This conceptualization enables one to develop a general typology of writing and to determine its place in the development of human culture.

2.2. As a semiotic system, writing consists of visual symbols of sign structure. This means that every written sign-symbol constitutes a

two-sided entity, i.e., a systemic unit characterized by two sides: *expression* and *content*. The expression of a graphic symbol, or its signifier (*signans*) is that physical substance by means of which a visual representation of a sign is realized. This representation may be a drawing, a geometric sign, or a figure. The content of a graphic sign, or its *signified* (*signatum*) is all that is expressed by such a written symbol, all to which it is correlated. This may be a definite concept, idea, number, word, syllable, or an individual sound. The writing system, when seen as a sign system, is characterized by two planes—those of expression and content, to which, because of their dual nature, the graphic signs of a particular writing system are correlated.

Such dual nature of the writing system gives grounds for a typological classification of writing according to the character of its "plane of expression." This classification in turn permits a comparative analysis of various types of script in order to develop criteria for their assessment, necessary for the clarification of the question of the origin of writing and determination of the principal stages of its phylogenetic development.[2]

2.3. Two principal typological classes may be identified with regard to the "plane of content": (a) *semasiography* or *ideography*, and (b) *phonography*.

Semasiography is characteristic of the class of writing systems in which the graphic signs designate not the phonetic side of a particular language (individual words, syllables, or sounds of the given language), but instead denote concrete concepts or even whole situations. They correlate directly with the "plane of content" of the language. In other words, in such writing systems the *plane of content*—expressed by the words and phrases of a particular language—is directly reflected in the signs, the latter performing the role of units which—along with the words and word combinations of a concrete language—designate universal conceptual categories of various levels of abstraction. Such signs in ideographic (semasiographic) systems, being correlated to definite concepts but devoid of the phonetic envelope of the words of concrete languages, are understood and read correctly by representatives of diverse languages who possess knowledge of these signs, i.e., knowledge of the correlation of these signs with concepts. Such knowledge of the content of the signs and symbols of an ideographic system is based either on the identification of their signifiers with objects of the real world, whose iconic reflection they are, or on a conventionally adopted relation of concrete signs of a writing system to corresponding semantic conceptual signifiers.[3]

In this connection the question arises regarding the *plane of expression* of a writing system. The characters of an ideographic system

may graphically resemble with their signifiers the objects of the real world to which they are correlated through their connection with corresponding concepts. This iconic resemblance of the signifiers of the signs of the system to the objects they reflect characterizes the writing system as pictographic, i.e., an iconic system of writing.

When there is no external resemblance between the symbols of the ideographic system and the objects of the real world to which they are correlated by virtue of their link with corresponding conceptual categories (cf. for example, numerical designations) the writing system may be described as *conventional*.

Phonography refers to a class of writing systems in which the signifiers of the signs are correlated not to the universal conceptual categories of the language—essentially available to all language communities at a definite level of cultural development—but to the concrete phonetics of a particular language. In such systems it is not concepts that play the role of the *signified* of particular signs, but concrete words characterized by concrete sounding, or language units of a lower order—individual syllables and/or sounds. In the case of *phonographic systems*, knowledge of the writing system presupposes the preliminary knowledge of the relationship—often *conventional*—between the sign and the concrete phonetic word of the given language, or the sound segment of a lower order (syllable, sound).

Writing proper is believed—apparently without sufficient grounds—to be represented by *phonographic* systems, while *ideography* constitutes in its phylogenetic development a sort of precursor of writing.

Thus, in *phonographic* systems writing is already correlated to speech, and the phonetic form of a language serves as the *plane of content* of such systems—definite sound segments (phonetic word, syllables, or individual sounds) turn into the signified of the graphic signs of a writing system.

A writing system, related to phonography and possessing characters expressing individual lexemes of a concrete language, is defined as *logographic*. A separate sign of such a system is a *logogram*. A phonographic system with characters expressing separate syllables is defined as *syllabography*. The characters of such a system are *syllabograms*. A phonographic system with signs expressing individual sounds (sound units) is described as an *alphabet*.

In the typology of writing, the alphabetic system occupies the highest rank. It is the most economical in terms of the number of signs needed for a complete recording of phonetic speech and for the transmission of information over a distance. Thereby the invention of alphabetic writing signified an outstanding achievement in the cultural

development of mankind. In the form of alphabetic writing mankind acquired a simple and effective means of graphic recording of speech and of its transmission over space and time (cf. Gelb 1963; 1975; 1980; Pulgram 1976).[4]

In its turn, the alphabetic system is subdivided into *phonological* and *phonetic* types. The *phonological* system of writing records graphically only the phonemic units of language, leaving out of consideration the sound variants of phonemes, no matter how they differ phonetically. Phonological writing is an artificial recording of the sound form of language in terms of the phonological (phonemic) units of language, employed in special linguistic studies.

The *phonetic* system of writing expresses individual sound units of language, irrespective of their phonemic status in the language system. The historically evolved alphabetic systems of writing are phonetic systems, although an implicit realization is often observable of the phonological principle and the recording in script only of those phonetic differences that have a functional, distinctive meaning.

With regard to the *plane of expression*, phonographic systems may be characterized by both *pictography* and *conventionality* of the relation between the *signified* and the *signifying* of a sign. This makes sense with respect to *logography*, whose signs may be either pictograms or conventional graphic symbols. With regard to *syllabography* and the *alphabet* one should speak of a full *conventionality* of writing, for in such systems the *signified* of the graphic symbols themselves are not *signs* and are devoid of any *content*. Therefore, the *signifiers* of such signs can by no means resemble their *signified*. In this case, one may speak of the pictography of graphic symbols only in the historical aspect, i.e., from the viewpoint of their probable graphic resemblance (if such is the case) to definite objects of the real world. Any such resemblance would reflect the primary origin of such symbols and their use in the semasiographic or logographic function in a writing typology of nonalphabetic origin (cf. Pulgram 1976).

Thus, the *plane of content* of a script as a semiotic system is the unity of the items of various levels of language (sound, syllable, word, number, etc.), denoted in various writing systems by relevant graphic symbols, the concrete aggregate of which forms the *plane of expression* of a particular writing system.[5]

Specific designations of the graphic symbols of a concrete system, as well as questions of the direction of writing, etc., are also related to the *plane of expression*.

2.4. Along with the concepts of the *plane of expression* and the *plane of content* of a writing system, the concepts of the *paradigmatics*

and *syntagmatics* of writing should also be transferred from linguistics to grammatology as a semiotic discipline.

The *paradigmatics of writing* presupposes the correlations of the elements of writing (graphic symbols) in a system, and their consecutive (linear) arrangement with respect to one another. Paradigmatics of writing is a structure governed by the rules of ordering of the set of graphic symbols in the system, and their representation in a definite linear sequence. Every writing has its special paradigmatic structure, i.e., its own specific order of elements in the system, its own special linear sequence of graphic symbols.[6]

The syntagmatics of writing presupposes correlations of the elements of writing (graphic symbols), represented in a definite sequence in the text, within individual words, word combinations, or larger units of the syntagmatic plane.

The explicit demarcation of the paradigmatic and syntagmatic planes of a system, introduced into linguistics by de Saussure, should become an obligatory principle also in the analysis of a writing system, in the general theory of writing or grammatology.

3. A Typology of Old Semitic Writing

3.1. The Old Semitic, or more precisely, proto-Semitic writing, from which the three principal varieties of Semitic writing—Phoenician, Canaanite, and Aramaic—originated later, should be described as a *consonantal-syllabic* system of writing (rather than *consonantal* proper, i.e., an essentially alphabetic system; cf. Driver 1948: 130, or *syllabic* proper, Gelb 1963: 148 ff.; cf., however, Ullendorff 1977: 573). The reason for this is that Old Semitic writing appears simultaneously as *consonantal* (paradigmatically, i.e., within the system) and as *syllabic* (syntagmatically, i.e., in the text). In a way, this is a dual system, emerging in the typology of writing as a certain intermediate link between consistently *syllabic* [i.e., syllabic both in *paradigmatics* and *syntagmatics* (cf., e.g., the Greek Linear B writing)] and *alphabetic* proper systems of writing (of the type of Classical Greek).

3.2. The Old Semitic consonantal-syllabic writing, consisting of twenty-two graphic signs of a linear character, has a definite paradigmatic structure and strict order of graphic elements within the system. It is in paradigmatics that the consonantal character of Old Semitic writing is manifested, defined by mutually uniform correspondence between the graphic symbols and consonantal phonemes of the language.[7]

In the syntagmatics of writing the same symbols perform the function of *syllabic* signs. The symbols have the structure *consonant* plus

any *vowel* of the language, or the *absence of a vowel*, depending on the morphological structure and character of the word or combination of words (*resp.* morphemes) expressed by a concrete syntagmatic sequence of graphic symbols. Unlike the properly syllabic system of writing with graphic symbols of the structure: *consonant* plus a definite *vowel*—characteristic of such a writing system both in paradigmatics and in syntagmatics—the *consonantal-syllabic* system is characterized by graphic signs of the structure: *consonant* plus *any vowel* of the language (or *absence of a vowel*) in syntagmatics, with the structure of *pure consonant* in paradigmatics.[8] Thus, for example, the signs of Old Semitic writing, expressing consonantal values ' and *b* paradigmatically, called *'āleph* and *bēth* respectively,[9] in syntagmatic combination with each other (in order to express a definite word), denote not individual *consonants* but concrete *syllables* of *C(V)* structure. Such a syntagmatic combination of characters in ancient Phoenician reads—depending on the context—as *'ab* "father" or *'abī* "my father." The א *'āleph* sign here denotes the syllable /'a/, while the sign ב *bēth* stands for the syllable /bī/ or /bØ/, a consonant with an absent vowel which, in later date consonant-syllabic systems, was designated by a special diacritical sign of the type of Hebrew *šᵉwā*, Syr. *marhᵉṭānā*, Arab. *sukhūn*. Analogously to this, the characters of Old Semitic writing, פ *phē*, ע *'ajin*, and ל *lāmed*, which occupy definite places in the systemic sequence of the characters of Old Semitic writing and express the paradigmatically consonantal values of *pʰ*, ', and *l*, in the syntagmatic sequence פעל (which in Phoenician reads as *pʰaʿala* "did" (sing.) or *pʰaʿalū* "did" (pl.)), express concrete syllables of -*CV*- structure. Herein should the specificity of consonantal-syllabic writing be seen, distinguishing it from properly *syllabic* and consistently *alphabetic* systems of writing.[10]

3.3. The invention of the Old Semitic consonantal-syllabic writing is considered by a number of researchers as an independent creation of an individual genius (cf. Gelb 1963: 139-146). In solving the problem of the creation of ancient Semitic writing, the possibility of certain external influences should also be taken into account. In particular Egyptian hieroglyphics should be considered, it being a mixed-type writing, which also contained graphic symbols with single consonantal values of the *s, r, d*, etc., type (cf. Lundin 1982).

3.4. In the typology of writing, *consonantal-syllabic* writing emerges as the more perfect writing system than *syllabic* or (even more so) the *syllabo-logographic* writing. It is paradigmatically more economical, permitting an adequate expression of the phonetic side of the language by means of a small number of graphic symbols—approximately corresponding to the number of consonant phonemes. Hence the

invention of consonantal-syllabic writing was understandably an enormous achievement, marking a new stage in the development of writing and paving the way for the formation of a qualitatively new writing, viz. the *alphabetic* system of writing.

TABLE 1
THE PHOENICIAN WRITING

	Aḥīrâm	Jeḥī-milkʰ	Mĕšaᶜ
'	K	K K	K
b	9	9	9
g	1	ʌ	1
d		◁	△
h	∃	∃	△∃
w	YẎ	YY	Y
z	I	I	II
ḥ	目	目	H
ṭ	⊕		⊗
j	ȝ	ȝ	ȝ
kʰ	↓	↓	⅃
l	∠	∠	⅃
m	₹	₹	₹₹
n	₹	₹	₹
s	∓		∓
ᶜ	○	○	○
pʰ	⊃	⊃	⊃
ṣ		₹	⋏
q		99	P
r	◁	4	٩
š	W	W	W
tʰ	+X	X	X

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TABLE 2
THE ANCIENT HEBREW SQUARE WRITING

ʾ	א	א אא	א	א
b	גכ	כ ב	ב	ב
g			ג	ג
d		ד ל	ד	ד
h	ח	חאג	ה	ה
w	ו	ו ו	ו	ו
z	ז	ו	ז	ז
ḥ	ז	חח	ח	ח
ṭ		66	ט	ט
j	ו	,,	י	י
kʰ	ל	ו3 וכ	דכ	דכ
l	לל	לל	ל	ל
m	סמ	סמ	סמ	סמ
n	נו	וג	ונ	ונ
s	ס		ס	ס
ʿ	ע	ע	ע	ע
pʰ	ו	וזב	לף	ףפ
ṣ (c)		צצצ	צץ	עצ
q	ק	ק	ק	ק
r	ר	,ץ	ר	ר
š, ś	שש	ש	ש	ש
tʰ	ת	תתת	ת	ת

2.
The Greek Alphabetic Writing

1. Transformation of the Old Semitic Consonantal-Syllabic Writing in Greek and the Transition to the Alphabetic System of Writing.

1.1. The emergence of the ancient Greek system of writing on the basis of Old Semitic (Phoenician) *consonantal-syllabic* script heralded the advent of a writing of a new structural type—that of the *alphabetic* system of writing.

The transition from the Old Semitic *consonantal-syllabic* writing to a *consistently alphabetic* system was effected as the result of the creation of special characters to express vowel sounds of the language, independent of their combination with consonants. In other words, the formation of the alphabetic system of writing became feasible with the appearance in the paradigmatics of writing of special characters for the *vowel* phonemes along with characters for *consonants* proper. Such transformations of paradigmatics caused radical changes in the syntagmatics of writing. In the syntagmatics of such a system, paradigmatically consonantal characters express not syllables of $C(V)$ structure—as in the case of *consonantal-syllabic* writing—but *consonantal phonemes* proper. *Vowel phonemes* are conveyed by special signs introduced into the paradigmatics of writing. Thus the content of the symbols in alphabetic writing appears to be identical in the paradigmatics and syntagmatics of the system (the separate expression of vowels and consonantal phonemes). This is in contrast to the consonantal-syllabic system of writing in which the same signs express consonants in the paradigmatics, and syllables along the syntagmatic axis of the system.

1.2. Such change from the Semitic consonantal-syllabic writing to the alphabetic system proper—which led to a qualitative leap in the typology of writing—occurred for the first time in post-Mycenaean Greek writing. This was a result of the replacement of the consonantal values of a number of signs by vocalic values in borrowing the Old Semitic (Phoenician) writing and adapting it to the Greek language. In particular, the Semitic symbols with consonantal values: ', *h*, *j*, ', and *w* were transformed in the Greek system into graphic symbols with the respective meanings of *a*, *e*, *i*, *o*, and *u*, characteristic of these symbols both in paradigmatics and in syntagmatics. The retention of the other signs of the ancient Semitic writing as consonantal symbols in Greek gave rise to a new kind of writing, alphabetic, which initiated all the currently

known consistently alphabetic systems of writing. In creating the Greek alphabetic system through adapting the Phoenician writing to the Greek language, the paradigmatics of the Old Semitic writing was fully preserved. This was attained through the replacement of the Semitic consonantal values of individual characters by corresponding vocalic values in Greek and through the transformation of definite values of certain signs of the Semitic system. The plane of expression of the Old Semitic system was also retained: the outlines of the signs, their names, and the direction of writing from right to left. This alternated with the direction of left to right in alternate lines in the archaic Greek boustrophedon writing. However, the syntagmatics of writing in Greek altered significantly in comparison with the Old Semitic writing, for the introduction of special letters for vowels turned the Old Semitic *consonantal-syllabic* system into an *alphabetic* one in which each graphic symbol expresses a separate phoneme—consonantal or vocalic—both in the paradigmatics and in the syntagmatics of the system.

1.3. In the archaic Greek system of writing, representing as it does the oldest variety of Greek alphabetic writing in the form it was originally created, the Old Semitic consonantal signs *'āleph, hē, jōd, 'ajin*, and *wāw* assumed the function of vocalic signs for designating the corresponding Greek vowels a, e, i, o, and u—both short and their corresponding long correlates ā, ē, ī, ō, and ū (cf. Table 3, of Greek writing juxtaposed with Old Semitic).[11]

In the archaic Greek system of writing, the letters ι and υ syntagmatically played a dual function, for they might express the vocal values of [i] and [u] as well as the values of the non-syllabic elements [i̯] and [u̯] (in syntagmatic combinations with the proper vowels e, a, and o). Strictly speaking, the letters I ἰῶτα and Y ὖ ψιλόν in the archaic Greek system do not designate the i and u vowels proper but the sonantic phonemes /i̯/ and /u̯/ with two positional variants: syllabic [i] and [u], and corresponding non-syllabic [i̯] and [u̯] occurring in diphthongs of the [ei̯, ai̯, oi̯] and [eu̯, au̯, ou̯] types.[12] In archaic Greek, the labio-dental element [v], occurring in the intervocal position V-V in anlaut before the vowel #-V serves as the third positional variant of the same phoneme [u] (cf. Morpurgo Davies 1970: 80 ff.)).[13] It was this sound [v] of the archaic Greek language that was expressed in the Greek writing system by the letter Ϝ *digamma* (Greek Ϝαῦ), derived from the Old Semitic Y *wāw*. The Greek letter in the alphabetic sequence occupies the same, sixth, place as the corresponding Old Semitic sign, representing a certain graphic modification of the latter. The tracing of the Semitic *wāw* recurs in Greek writing in the archaic Greek letter Y ὖ ψιλόν which derives from the same Old Semitic letter. However, in Greek

paradigmatics it occupies not the sixth place corresponding to Semitic paradigmatics (the place having been occupied already by the letter F digamma, deriving from the same Semitic prototype), but was placed at the end of the Greek alphabetic sequence which ended precisely with this, twenty-third, graphic symbol.

1.4. The Greek voiced occlusives *b d g* were expressed by the Semitic signs for the corresponding voiced *b d g*, which in Greek paradigmatics occupied the same places with respect to other letters as in the corresponding Semitic.

From the point of view of rendering Greek occlusives by corresponding Semitic graphic prototypes attention is attracted by the fact that to express the Greek voiceless (non-aspirated) stops *p, t, k*, use is made of Semitic characters for corresponding aspirated p^h, t^h, k^h[14] (cf. the Old Semitic letters Ð $p^h\bar{e}$, ח $t^h\bar{a}w$, and כ k^hap^h with Greek Π πῖ, T ταῦ, and Κ κάππα). Conversely, the Semitic letter ʋ ṭēṯ, expressing in Semitic the (non-aspirated) emphatic dental phoneme ṭ, is transferred into the Greek system to designate the Greek aspirated phoneme t^h (cf. Greek Θ θῆτα). The remaining voiceless aspirated occlusive phonemes in Greek, /pʰ/ and /kʰ/, are rendered in archaic Greek writing through joining the letters *p - h, k + h*, or *q + h*.[15] This is due to the fact that the system of Old Semitic writing, comprising only twenty-two consonant signs, had no more graphic symbols left to designate the whole set of Greek phonemes.[16] Special letters to designate these Greek aspirated phonemes as well appeared only in later local varieties of Greek writing. In the eastern Greek system of writing, special additional symbols Φ φῖ and X χῖ (with various graphic variants) were developed to designate the voiceless aspirated p^h and k^h. These new symbols had no prototypes in Old Semitic writing.

How should one account for the fact that the creator of the Greek alphabet identified the Semitic aspirated stops p^h t^h k^h with the Greek non-aspirated π τ κ, rendering them through the signs πῖ, ταῦ, and κάππα (κόππα), which reflect Semitic graphic prototypes for *aspirated* sounds, whereas to designate the Greek aspirated /tʰ/ use is made of the Semitic sign for the (non-aspirated) emphatic ṭ?[17]

Such phonetic discrepancy between the Old Semitic and archaic Greek writing systems, being obviously the result of a deliberate transformation of the Old Semitic system when adapting it to the Greek language, is again explainable by the exceptional linguistic flair of the creator of the Greek alphabet. A phonologically essential feature of Semitic emphatic consonants is identified in the Greek system with the aspiration of voiceless stops—a feature essential to Greek—whereas the feature of aspiration—phonologically redundant for Semitic voiceless

consonants—is disregarded, and the Semitic p^h t^h k^h are equated with the Greek pure (non-aspirated) stops π τ κ. In accordance with this, the Semitic signs for the voiceless aspirated p^h t^h k^h were borrowed into the Greek system in order to render the pure voiceless stops p t k, while retaining their relevant places in the Greek paradigmatics.[18]

1.5. Specific transformations underwent the system of Semitic sibilants z, s, $ṣ$, and $ś/š$ in adapting the Old Semitic writing to Greek. Unlike Semitic, in Greek the need arose to express only two sibilant phonemes: the voiced sibilant spirant z (or a complex sound zd; cf. Hirt 1902: 69; Fasmer 1914: 10; Allen 1987: 59) and the voiceless spirant s. Of the four Semitic symbols designating sibilant spirants, in the Greek system it sufficed to use two symbols to express corresponding sibilant spirants. Of these, the Semitic letter for z (zajin) was used to express the Greek z (resp. zd), Greek Ζ ζῆτα, while in order to designate the Greek sibilant spirant s use was made not of the Semitic ס $sāmek^h$ (the phonetic value s), which would have been quite natural in view of the phonetic similarity between the Semitic s and the Greek s, but the Semitic ש $šīn$ which in Semitic expressed the hushing and/or hissing-hushing phoneme $ś/š$ (Greek letter Σ σίγμα).[19]

Originally, to express the hissing spirant s in the archaic Greek system use was made of a special letter M deriving from the Semitic צ $ṣā$-$dē$. The Doric name of this letter, σάν, may be related to the Semitic name $šīn$. But already in the early period of development of Greek writing σάν fell out of use, giving place to the letter Σ σίγμα to express the Greek spirant s. An exceptionally early loss by the letter σάν—which goes back to the Semitic צ $ṣādē$—of the phonetic value [s] and its transfer to the letter σίγμα can be seen in the fact that the letter σάν, initially occupying a place corresponding to the Semitic $ṣādē$ in Greek paradigmatics, dropped out of the system. The letter σαν did not retain in the Greek alphabetic sequence its originally held place with its corresponding numerical value (as was the case with the letters δίγαμμα, ξῖ, κόππα, which had lost or altered their phonetic values but retained their original places in the alphabetic sequence that reflected the corresponding ancient Semitic paradigmatics). This letter in the form of the symbol ϡ continued a later existence in Byzantine Greek under the name of σάμπι (< ὡς ἂν πῖ "as πῖ") and with the numerical value of "900" (cf. Larfeld 1914: 225).

THE GREEK ALPHABETIC WRITING

TABLE 3

Phoenician writing	Phonetic values	Numerical values	Archaic	Eastern Greek				Western Greek			Classical alphabet	Numerical values	Printer's type
𐤀	'	1	ΛΛ	a ≮Α	ΔΑ	ΔΔ	a	ΔΑΛ	ΔΑ	ΔΑ	a A	a 1	A
𐤁	b	2	ᏝᏒᎺ	b ΒΒ		ʃ�	b	ΒΒ	Β		b Β	b 2	B
𐤂	g	3	ᏗᏕᎱ	g ΛΛ	Γ	﹤C	g	ΛΓ	Λ	﹤C	g Γ	g 3	Γ
𐤃	d	4	Δ	d ΔD	Δ	Δᗞ	d	ΔᏢᗞ	ΔD	ᗞΔᗞ	d Δ	d 4	Δ
𐤄	h	5	ᚨΕ	e ᏒᎬ	ᏒᎬ	ᏒᏴᏴ	e	ᏪᎬᏒᎬ	ᏒᎬ	ᏒᎬ	e Ε	e 5	Ε
𐤅	w	6				ϜF	v	FϹ	Ϝ	F	v Ϝ	6	
𐤆	z	7	ᚦ	z Ι	Ι	ΤΞ	z	Ι			z Ζ	z 7	Z
𐤇	ḥ	8	ΗΒ	h,e ΗΒ	ΗΒ	Β	h(e) ΒΗ		Β	Β	h Η	e 8	H
𐤈	ṭ	9	⊕⊙	th ⊕⊗	⊗⊕	⊖⊙	th ⊕Β		⊗⊕	⊕	th ⊙	th 9	-
𐤉	j	10	ᏕᏉᏕᏉ	i ᏕΙ	Ι	ᏕΞ	i	Ι	Ι	Ι	i Ι	i 10	J
𐤊	kᵏ	20	ΚΚΚ	k Κ	ΚᏒ	Κ	k Κ		Κ	Κ	k Κ	k 20	K
𐤋	l	30	ᎴᏉ	l ᏝᏒ	ᏉᏉ	ᏒᏉ	l Ꮭ		ᏒᏉ	ᏝᏉ	l Λ	l 30	Λ
𐤌	m	40	ᎺᎷ	m ᎷᎷ	Μ	ᎷᎷ	m ᎷᎷ		Μ	Μ	m Μ	m 40	M
𐤍	n	50	ᏝᎷᎳ	n ᏔᏔ	ᎴᎳ	Ꮄ	n ᏔᏔ		ᎴᎳ	Ν	n Ν	n 50	N
𐤎	s	60			ᏒᎳ	Ξ	ka ✛	🎲	Χ	✛	ka Ξ	ka 60	Ξ
𐤏	'	70	ΟϹ	o Ο	Ο	Ο	o ᏒᎳ	🎲	Ο	Ο	o Ο	o 70	O
𐤐	p	80	ᏒᏒ	p ᏒᏒ	ᏒᏁ	ᏒᏒ	p ᏒᏁᏉ		ᏒᏁᏒ	ᏒᏁ	p Γ	p 80	Π
𐤑	ṣ	90	Μ	e		Μ	s				ᏔᎹ	900	
𐤒	q	100	ΦϙΦ	q Ϙ	(Ϙ)	Ϙ	q		Ϙ	Ϙ	q Ϙ	90	
𐤓	r	200	ᏢᏢᏢ	r ᏢᏒᗞ	ᏢᏢᗞ	ᏢᏢᏢ	r ᏢᏢᏢ	ᏢᏢᏢ	ᏢᏢ	r Ꮲ	r 100	P
𐤔	š	300		ᏕᏒᎬ	ᏕᎬ		s ᏕᏒᎬ	ᏕᏕᎬ	ᏕΣ	s Σ	s 200	Σ
𐤕	tʰ	400	Τ Υ	t ΤᏒ	Τ	Τ	t ΤᏒ	Τ	Τ	t Τ	t 300	T
𐤅	w		ΥᏒᎳ	u ᏉΥ	Ꮙ	ᏉΥ	u ᏉᏒᏒ	ΥᏒᎳ	Ꮙ	u Υ	u 400	Γ
				⊕Φ	⊙	ΦΦ	pk ⊕Φ	Ϙ		ph Φ	ph 500	+
			↓	ka Χ✛	Χ	Χ✛	kh ᏊᎰ	ᏉΥ	↓	kh Χ	kh 600	X
					ᏉΥ	ᏉᎰ	ps		✳✳	ps Ψ	ps 700	Ꮃ
			⊙	ô	Ω		ô			ô Ω	ô 800	Ω

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The Semitic צ ṣādē is the only graphic symbol among Old Semitic letters whose equivalent in Greek paradigmatics is not represented at the place corresponding to the Old Semitic paradigmatic sequence. All the other symbols of the Old Semitic system are reflected in their Greek graphic equivalents, with the retention of their places in the paradigmatic series, and with phonetic values transformed in accordance with the phonetic structure of the Greek language. In several cases, characteristic of later systems of Greek writing, the graphic symbols are devoid of a concrete phonetic value, yet retaining their original places in the paradigmatics of the system and, accordingly, concrete numerical values.

1.6. Thus, the paradigmatics of the Old Semitic system can be fully mapped onto its Greek counterpart, apart from the single case of the loss of the graphic equivalent of the Semitic צ ṣādē in the Greek. A few additional letters are identifiable in the Greek system that were created on properly Greek ground in order to designate Greek phonemes or combinations of phonemes that had not been expressed in the archaic Greek system.

This archaic Greek system with twenty-three letters in the alphabetic sequence, ending with the symbol Y ὗ ψιλόν constitutes that common original core from which later all other varieties of Greek alphabetic writing were derived (Kirchhoff 1887).

This archaic Greek system of writing—representing the oldest specimen of alphabetic script—must have been the result of the individual creativity of an outstanding personality who adapted Old Semitic writing to the rendering of the phonetic system of the Greek language, thereby developing a qualitatively new—alphabetic—system of writing. This presupposes the creation of archaic Greek writing initially at some particular place (probably on the islands of the southern archipelago), with its subsequent diffusion throughout the Greek world in the shape of differing local variants (cf. Jeffery 1961: 2 ff.).

The beginning of the first millennium B.C. should be considered the period of creation of the Greek alphabetic writing. It was then that the Old Semitic signs assumed the graphic shape characteristic of the tracing of the letters of archaic Greek writing (cf. the highly characteristic shape of the archaic Greek Κ κάππα, which expresses the graphic form of the Semitic ﬤ kᵃapᵃ that appears in Phoenician inscriptions only from the beginning of the 9th century B.C. (cf. Gelb 1963: 180 ff.).

2. Paradigmatics of Writing and the System of Numerical Values

2.1. The stable paradigmatics of Greek alphabetic writing—accurately reflecting the paradigmatics of its prototype, the Old Semitic consonant-syllabic writing[20]—served as the basis for the expression of numerical values by means of letters, i.e., for the employment of these letters as numbers. Thus, the plane of content of such writing should involve not only the system of phonetic values expressed by individual letters but also numerical values which can be expressed with the help of the same graphic symbols.

The decimal numeration in Greek led to the decimal recording of numbers with the aid of the graphic symbols of the Greek alphabet. The first nine symbols of the paradigmatic series served to express "single digits," the next nine, "tens," and the following nine, "hundreds":

TABLE 4
NUMERICAL VALUES

"Integers"			"Tens"			"Hundreds"		
A	a	1	I	i	10	P	r	100
B	b	2	K	k	20	Σ	s	200
Γ	g	3	Λ	l	30	T	t	300
Δ	d	4	M	m	40	Y	ū	400
E	e	5	N	n	50	Φ	ph	500.
Ϲ	(v)	6	Ξ	ks	60	X	kh	600
Z	z	7	O	o	70	Ψ	ps	700
H	ē	8	Π	p	80	Ω	ō	800
⊙	th	9	Ϙ	(q)	90	ϡ	—	900

For example, the number 111 is recorded thus: PIA (or AIP and PIA), 121 as PKA (or AKP and PAK), and so on.

Understandably, such a system of expressing numerical values by means of individual graphic symbols of writing requires a minimum of 9 · 3 = 27 symbols in the system,[21] and precisely 27 graphic symbols are contained in the classical Greek writing that took shape in Athens towards the end of the fifth century B.C. on the basis of the Ionian alphabet. Characteristically, the letters of the Greek writing that had lost their original phonetic values as a result of phonetic transformations of Greek dialects (cf. the Greek letters Ϝ δίγαμμα, Ϙ κόππα) were not deleted from

the paradigmatic series but were retained at their old places in the alphabetic sequence, even though deprived of all phonetic value. This should be accounted for by a desire to preserve the old paradigmatics of writing and, accordingly, the old numerical values of the letters of the paradigmatic series. The loss by certain letters of their phonetic values and their exclusion from the writing system would each time entail a change of the paradigmatics of the system and accordingly of the numerical values of the letters remaining in the system. The system of the numerical values of writing serves thereby as a kind of constraining factor opposed to the change of the ancient inherited paradigmatics of writing.

It can be concluded on these grounds that the system of numerical values in Greek writing originated prior to the occurrence in Greek dialects of the oldest phonetic changes (loss of the *digamma*, fusion of the two variants of the phoneme /k/, etc.). It is hardly possible, however, for such a system to have originated already in the archaic Greek writing with its 23 graphic symbols, which—owing to the small amount of writing symbols—is not suited for the expression of numerical values. Such a system of designation of numerical values could originate in Greek writing only with the appearance of additional letters and by bringing the number of graphic symbols to 27,[22] i.e., to a number necessary and sufficient for the designation of "integers," "tens," and "hundreds."

For the same reason, it is doubtful that the Old Semitic writing with 22 graphic symbols of consonantal-syllabic characters should have originally expressed a system of numerical values as well. A writing system having fewer than 27 symbols is incapable of expressing the entire system of numerical values. Such a defective system of numerical values must evidently have originated under the influence of Greek writing as a result of the adoption from the Greek writing system of numerical values and the designation of *integers* by the first nine symbols, *hundreds* by the following nine, and the incomplete series of *thousands* by the remaining four symbols.

The comparatively later emergence of a system of expressing numerical values in Greek writing (following the creation of the archaic Greek alphabet proper rather than concurrently with it) is seen in the exclusion of an equivalent of the Old Semitic ϰ ṣādē from the Greek paradigmatic series and its relegation to the end of the alphabetic sequence as the 27th symbol with the numerical value of "900."[23]

The dropping out of the Greek equivalent of the Old Semitic ϰ ṣādē (the letter M σάν of the archaic Greek writing)—in contrast to the letters Ϝ δίγαμμα (σταῦ) and Ϙ κόππα, which are preserved in the paradigmatic series at their respective places, with the numerical values of

"6" and "90"—must be indicative of the fact that, by the time of the creation in Greek writing of a system of numerical values, the symbol deriving from the Old Semitic צ ṣādē in Greek (letter σάν) was already devoid of all phonetic function (the phoneme /s/ was already designated by the letter Σ σίγμα, deriving from the Old Semitic ש (šīn), whereas the letters F δίγαμμα and Ϟ κόππα continued to express definite phonetic values (cf. Gardthausen 1879: 266).

The dropping of the equivalent of the Old Semitic ṣādē out of the Greek alphabetic sequence resulted in a certain "condensation" of Greek paradigmatics and a shift of the letters one step upward in comparison with the Old Semitic paradigmatic series. This is the cause of a certain discrepancy in the numerical values between the Old Semitic and Greek graphic symbols: the letter Ϟ κόππα, following immediately after the letter Π πῖ = "80," in the Greek alphabetic series is characterized by the numerical value of "90," whereas the ק qōpʰ, the Old Semitic prototype of κόππα, which in Old Semitic paradigmatics follows the letter צ ṣādē = "90," is assigned the value of "100." In the Greek paradigmatic series the numerical values of the following letters are shifted respectively by one step.

2.2. The expression of numerical values by means of letters leaves a special imprint on the character of writing, viz. on its paradigmatics and the numerical composition of its graphic symbols. Under the above-described system of expressing numerical values the writing system should have at least 9 × 3 = 27 graphic symbols to designate respectively the *integers*, *tens*, and *hundreds* (while *thousands* are designated by means of additional diacritical marks attached to the principal symbols). A writing system containing a lesser number of letters necessary to express the phonetic units of the language is raised to 27 graphic symbols (admitting a whole number of symbols without phonetic values), necessary and sufficient to express the entire system of numerical values. A typical example of such writing is the Greek alphabetic writing with its 27 letters for the expression of *integers*, *tens*, and *hundreds*, and diacritical marks to express *thousands*.

It is natural to expect that writing systems containing a larger number of graphic symbols for the expression of the phonetic units of a language should strive to reach a number necessary and sufficient to designate with respective letters the system of numerical values: *integers*, *tens*, *hundreds*, and *thousands*, i.e., to reach 9 × 4 = 36 graphic symbols, even through the introduction (or retention) of certain letters devoid of concrete phonetic values. In other words, a writing system that expresses—along with phonetic values—a system of numerical values as well, tends to contain a number of graphic symbols forming a multiple of

nine. In such a system the graphic symbols number 27 or 36, depending on the number of phonetic units expressed in each particular system of phonetic units: 27 graphic symbols where the number of phonetic units designated in writing is less than or equal to 27, and 36 graphic symbols where the number of phonetic symbols designated in writing exceeds 27.

A whole number of writing systems, originating directly from the Greek system of writing or formed on the pattern of Greek writing, are characterized precisely by the foregoing features. However, the chief characteristic of all these systems, traced back to different variants of Greek writing, is its consistently alphabetic character, as opposed to the consonantal-syllabic character of proto-Semitic writing. To these belong primarily ancient Italic scripts based on the western variant of Greek writing (proto-Tyrrhenian, Etruscan, and related Faliscan-Latin and Osco-Umbrian writing systems), ancient Asia Minor varieties of writing (Phrygian, Lycian, Lydian, etc.), as well as a whole cycle of later writing systems that originated in the Christian period.

3.
Scripts of the Christian Epoch Originating from Greek

1. Coptic Alphabetic Writing

1.1. Scripts of the Christian period that originated from the Greek writing system represent a specific group of alphabetic writing: Coptic, Gothic, Classical Armenian, and Old Slavonic, as well as Old Georgian (Iberian), writing systems.

With the proclamation of Christianity as the national religion in Egypt, New Egyptian began to revive as the official state language; since the times of Alexander the Great this language had been ousted by Greek. Christian culture in Egypt now began to develop on the basis of the local national New Egyptian (or Coptic) language, changing from the complex Egyptian Demotic script to a new writing system based on the Greek alphabet.

Coptic writing originated from that variant of Greek uncial writing which appeared in the first century B.C. The outlines of Coptic letters are essentially the same as the corresponding graphic symbols of Greek uncial writing. The earliest Coptic written monuments are dated to the second and third century B.C.

To render corresponding Coptic sounds, 25 letters were borrowed from the Greek alphabet in the established sequence. Of these, one letter, namely that holding the sixth place in the Greek alphabetic sequence, is employed in the Coptic only in the numerical value. This reflects the peculiarity of the Greek alphabet of a definite period when the Greek letter ϛ στίγμα, occupying the sixth place and stemming from the archaic graphic symbol Ϝ δίγαμμα, was devoid of phonetic value, carrying only the numerical value of "6."

In the Coptic alphabet, the place of the Greek ϙ κόππα is taken by the letter ϥ *fåj*, with the phonetic value [f] and numerical value "90." The letter ϙ κόππα, which had lost its phonetic value in the Greek phonetic system, is ascribed in the Coptic alphabet the phonetic value of [f]—specific to the latter language. The letter preserves the alphabetic sequence of the corresponding Greek prototype and gains the numerical value "90."[24]

TABLE 5
COPTIC WRITING

Numerical values	Phonetic values	Names	Coptic letters	Greek uncial letters
1	a	alfa	Ⲁ	Ⲁ
2	b, v	vēda	Ⲃ	Ⲃ
3	g	gamma	Ⲅ	Ⲅ
4	d	dalda	Ⲇ	Ⲇ
5	ē	ēje	Ⲉ	Ⲉ
6	—	sou	Ⳉ	Ⳉ
7	z	zāda	Ⲍ	Z
8	ē	hāda	Ⲏ	Ⲏ
9	t-h	tutte	Ⲑ	Ⲑ
10	j, i	jōda	Ⲓ	Ⲓ
20	k	kabba	Ⲕ	Ⲕ
30	l	lōla	Ⲗ	Ⲗ
40	m	mēj	Ⲙ	Ⲙ
50	n	ni	Ⲛ	Ⲛ
60	ks	eksi	Ⲝ	Ⲝ
70	ō	ou	Ⲟ	Ⲟ
80	p	bej	Ⲡ	Ⲡ
100	r	rou	Ⲣ	Ⲣ
200	s	samma	Ⲥ	Ⲥ
300	t	daū	Ⲧ	Ⲧ
400	i	he	Ⲩ	Ⲩ
500	p-h	fij	Ⲫ	Ⲫ
600	k-h	kij	Ⲭ	Ⲭ
700	ps	ebsi	Ⲯ	Ⲯ
800	ō	ō	Ⲱ	Ⲱ
900	—	—	Ϥϥ	

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The Coptic letter, corresponding to the last symbol ⲹ σάμπι in the Greek alphabet, is employed similarly to its Greek prototype, only in its numerical value of "900."

TABLE 6

Numerical values	Phonetic values	Designations	Coptic letters	Demotic letters	Hieroglyphics
–	š	šāj	ⲙ	Ӡ	⟋⟍⟋
90	f	fāj	ϥ	Ƴ	𓂺
–	ḇ	ḇāj	ⳑ	כ	𓏤
–	h	hŏri	ⲉ	𝟤	𓎡
–	ğ	ğanğa	ⳉ	Ɣ	𓌙
–	(g,č) š	šima	ⲥ	ϭ	◠
–	ti	dīj	ⳁ	t	𓃀

The Table presents the seven graphic symbols that complete the Coptic alphabetic sequence. The symbols are traceable to their corresponding demotic prototypes, expressing specifically Coptic sounds that have no phonetic equivalents in Greek. Their hieroglyphic prototypes are also adduced (cf. Jensen 1969: 478).

The names of the letters of the Coptic alphabet essentially reflect their corresponding Greek designations. In the properly Coptic part the names of the letters are based on corresponding demotic designations (Schwyzer 1931: 193-194).

The Coptic alphabetic sequence thus consists of two parts: a "principal" part, corresponding to the Greek alphabetic sequence and repeating the phonetic and numerical values of Greek paradigmatics, and an "additional" part, attached to Greek paradigmatics, with graphic symbols expressing specific Coptic sounds that have no phonetic equivalents in Greek. The symbol ϥ *fāj* should also be referred to the Greek part of the Coptic alphabet; in the alphabetic sequence it occupies the place corresponding to the Greek Ϙ κόππα (numerical value "90"), but expresses the properly Coptic phonetic value [f].

Thus Greek paradigmatics—the phonetic and numerical values of corresponding graphic symbols—is fully preserved in that part of the Coptic alphabet which corresponds to the Greek alphabetic sequence. In one case, the phonetic value [f], specific to Coptic, is ascribed to the symbol ϥ *fāj*, that stems from the Greek Ϙ κόππα. However, there remained sounds in Coptic that had no phonetic equivalents in Greek and that had to be expressed in writing by means of special graphic symbols. Such phonetic units were rendered in the newly created Coptic writing by the additional six letters for which the local demotic writing served as the prototypes. These letters were placed in the Coptic alphabetic sequence after the properly Greek part of Coptic writing (see Table 6).

2. The Gothic Alphabetic Writing

The Gothic alphabetic writing, created at approximately the same time, is of analogous character. In this case as well, the creation of a new alphabet was connected with the adoption of Christianity. In order to translate the Bible into Gothic, the bishop of the West Goths, Ulfilas (A.D. 318-388) rejected the ancient monumental Runic writing, linked to pagan beliefs, and invented a writing of a new type, i.e., the Gothic alphabetic script.

Greek uncial writing served as the model for the newly created Gothic alphabet, which is incontestably manifested in the shape of Gothic letters and essentially Greek alphabetic order, reflected in the paradigmatics of the Gothic alphabet (see Table 7).

In the Gothic alphabet the paradigmatics of the Greek prototype is preserved through the reference of specifically Gothic phonetic units to those letters of the Greek phonetic series that are devoid of phonetic value in Greek, or express sounds alien to the Gothic language. This prevents the violation of the paradigmatics of the prototype system. For example, the sixth place in the Gothic alphabetic series, with the respective numerical value of "6," is held by the symbol **U** with the phonetic value [qʷ], specific to Gothic (equivalent of the Greek ς στίγμα, with the numerical value of "6").

At the eighth place in the Gothic alphabetic sequence, instead of the Η ἦτα we find a letter expressing the phoneme /h/ (long vowels are alien to Gothic). Following it, and having the numerical value "9" (at the place corresponding to the Greek Θ θῆτα), stands the letter **Ψ** designating a specifically Gothic interdental spirant, /þ/ (aspirated stops are not characteristic of Gothic). Graphically, this letter is traceable to the Greek Ψ ποῖ, while the place corresponding to the Greek ποῖ is occupied by the letter **Θ** with the specifically Gothic phonetic value [hʷ], numerical value "700" (the archaic Greek Θ θῆτα served as the graphic prototype of this Gothic letter).

The place corresponding to the Greek Ξ ξῖ in the Gothic alphabetic series is held by the letter **G** with the phonetic value [j] (numerical value "60"), believed to be a borrowing from the Latin. The Greek letter Ξ ξῖ, expressing the consonant complex *ks*, alien to Gothic, is replaced in the latter's alphabetic sequence by a letter expressing the phoneme /j/.

The next letter **Π** in the Gothic alphabetic sequence, with the numerical value "70" (in place of the Greek Ο ὄ μικρόν), expresses the phoneme /u/, traceable to a corresponding letter of Runic writing. To designate the value /u/, Ulfilas did not take the graphic equivalent of the Greek digraph OY but borrowed a letter from Runic writing. He did the same in designating the vowel /o/ by the letter **Ω** that in the Gothic alphabetic series occupies the place of the Greek Ω ὦ μέγα (numerical value "800").

In the Gothic alphabet, the letter **Ч** with the numerical value "90" derived from the Greek ς κόππα—like the letter κόππα in the late Greek alphabet—is here devoid of phonetic value.[25]

TABLE 7
GOTHIC WRITING

Numerical values	Phonetic values	Gothic writing	Uncial Greek writing	Origin
1	a	Λ	Δ	
2	b	Ʀ	Β	
3	g	Γ	Γ	
4	d	ᴅ	Δ	
5	ē	Є	Є	
6	q	Ц	Ϙ	Lat.
7	z	Z	Z	
8	h	𝔥	𝔥	
9	þ	Ψ	Ψ	
10	i	Ⴑ	Ι	
20	k	Κ	Κ	
30	l	Λ	Λ	
40	m	Η	Μ	
50	n	Ν	Ν	
60	j	Ϭ	Ϛ	Lat.
70	u	Π	Π	Run.
80	p	Π	Π	
90	–	Ч	Ϲ	
100	r	Ʀ	Ϲ	Lat.
200	s	S	Ʀ	Lat.
300	t	Т	S	
400	w	Υ	Т	
500	f	F	Υ	Lat.
600	χ	Χ	F	
700	hw	Ꙩ	Χ	
800	ō	Ω	Θ	Run.
900	–	↑	Ω	

Thus, in using the Greek alphabet as a prototype for the creation of Gothic writing, Ulfilas did not omit letters expressing specific Greek sounds from the alphabetic sequence but replaced them in their respective places by letters with specific Gothic phonetic values. Thereby the paradigmatics of the Greek prototype system is reflected in Gothic, with the preservation of the numerical values of the respective letters in the Greek and Gothic systems.

The Greek and Gothic systems fully coincide. The Gothic alphabet has no so-called "additional" letters in comparison with the Greek alphabet, as is the case in the Coptic system.

Similarly to Greek, the Coptic alphabet contains 27 (i.e., 9 × 3) letters in all; of these, the first nine express "integers," the following nine, "tens," and the final nine, "hundreds." The closing 27th symbol of the Gothic alphabet—used only in the numerical value of "900"—reflects the Greek episemon ϡ σάμπι, with the numerical value "900."

The absence in Gothic of "additional" letters is accounted for by the fact that specific Gothic sounds fitted perfectly into the framework of Greek paradigmatics through replacement of some specifically Greek phonetic values—redundant from the viewpoint of Gothic phonetics—by phonetic values necessary for Gothic. Thereby the Gothic system became fully "embedded" in the Greek, emerging as a reflection of the Greek system (with account of certain phonetic and graphic substitutions).

Ancient Runic writing, to which some of the letters of the Gothic alphabet are traceable, is considered to have been the principal source of graphic substitutions in Gothic (Gutenbrunner 1950: 501).

The link of the Gothic alphabet with ancient Runic writing is manifested also in the special names of Gothic letters. These represent the names of ancient letters and reflect corrupted Germanic words (cf. Arntz 1944: 171 ff.).

3. The Armenian Alphabetic Writing Erkat'agir

The Armenian alphabet *Erkat'agir* or "Iron writing" should also be ascribed to the same group of Old Christian scripts based largely on the Greek writing system. Armenian historical tradition links the creation of the alphabet in question with the enlightened work of the first teacher of the Armenians, Mesrop Mashtots.

The Greek basis of Classical Armenian writing is manifested primarily in the construction of the alphabetic sequence according to Greek paradigmatics, as seen after the elimination from the Armenian sequence of letters expressing specifically Armenian sounds that were alien to Greek. The sequence of the letters of the Armenian alphabet,

obtained thereby, fully coincides with the Greek alphabetic sequence. Only several letters with specifically Greek phonetic values were omitted.

To create a new writing, the Compiler of the Classical Armenian alphabet took the Greek writing system as a model. Each special letter of the newly-created script was correlated with each letter of the Greek alphabet that expressed a phonetically corresponding sound in Armenian. Thus emerged a special sequence of the Armenian sounds, expressed by corresponding graphic symbols and coinciding in the main with the Greek alphabetic sequence. It is here that the Greek basis of the Classical Armenian alphabet becomes apparent, i.e., the creation of the Armenian alphabet "conforming to the system of Greek syllables."

In comparison with Greek, Classical Armenian was characterized by a larger number of consonant phonemes. Only part of the Armenian consonants were being covered by Greek equivalents. Therefore, for the additional consonants in Armenian, i.e., for specifically Armenian sounds that had no phonetic correspondences in Greek,[26] there arose a need to create additional symbols that would supplement the sequence of letters expressing Classical Armenian sounds that were phonetically similar to Greek ones, as was the case in Coptic writing.

But the creator of Classical Armenian writing had recourse to a different procedure. The "additional" letters of the Armenian alphabet were placed not at the end of the alphabetic sequence, next to the graphic symbols designating phonetic units similar to Greek, but were inserted at different places in the main part that corresponded to the Greek paradigmatics. These "additional" letters were distributed within the primary part of the Armenian alphabet which reflects the Greek alphabetic sequence. This primary core of the Armenian alphabet, built on the basis of the Greek paradigmatics, commenced with the letter Ա a and ended with the symbol Ք k'.

In this respect, the Armenian alphabet rather resembles Gothic writing with an alphabetic series limited to Greek paradigmatics. Their difference lies in the fact that while the Gothic alphabet follows the Greek prototype not only in regard to the alphabetic series but also with respect to the number of letters in the system, Classical Armenian writing has a considerably larger number of letters in comparison with its Greek counterpart (36 letters in Armenian as compared to the 27 letters of the classical Greek system). This accords with the broader scope of Armenian consonantism.

Therefore, while Ulfilas contented himself with the substitution of properly Gothic values for specifically Greek phonetic values in the system, without changing in the Gothic system the sequence of letters and their number characteristic of the Greek system, Mesrop Mashtots

was obliged to introduce into the Armenian system a number of additional letters expressing specifically Armenian phonetic units (chiefly consonantal). These additional letters in the Armenian alphabetic sequence came not after the Greek part, but are distributed at different places, without any noticeable regularity, among the graphemes of the "principal" Greek part of the system. Thus, from the viewpoint of correlation with its Greek prototype, the Armenian alphabet differs essentially from the Coptic as well as the Gothic systems of writing.[27]

TABLE 8
CLASSICAL ARMENIAN WRITING

Armenian Paradigmatics in Juxtaposition with Greek

1. Ա *a*	1. A *a*	19. Ճ *č*	
2. Բ *b*	2. B *b*	20. Մ *m*	12. M *m*
3. Գ *g*	3. Γ *g*	21. Յ *y*	
4. Դ *d*	4. Δ *d*	22. Ն *n*	13. N *n*
5. Ե *e*	5. E *e*	23. Շ *š*	
6. Զ *z*	6. Z *z*	24. Ո *o*	14. O *o*
7. Է *ē*	7. H *ē*	25. Չ *č̣*	
8. Ը *ə*		26. Պ *p*	15. Π *p*
9. Թ *tʰ*	8. Θ *th*	27. Ջ *ǰ*	
10. Ժ *ž*		28. Ռ *ṙ*	16. P *r*
11. Ի *i*	9. I *i*	29. Ս *s*	17. Σ *s*
12. Լ *l*		30. Վ *v*	
13. Խ *x*		31. Տ *t*	18. T *t*
14. Ծ *c*		32. Ր *r*	
15. Կ *k*	10. K *k*	33. Ց *c̣*	
16. Հ *h*		34. Ւ *w*	19. Υ *ü, w*
17. Ձ *j*		35. Փ *pʰ*	20. Φ *ph*
18. Ղ *ł*	11. Λ *l*	36. Ք *kʰ*	21. X *kh*

Such a distribution of the additional letters of the Armenian alphabet among the letters of its "principal" part expressing Greek paradigmatics leads to a total disruption of the system of numerical values characteristic of the Greek prototype. A coincidence of numerical values in the Greek and Armenian systems is observable only between the first seven letters of the alphabet. Beginning with the eighth letter, the symbols of the Armenian system indicate different numerical values. The first symbol of the group of "additional" letters, in particular the one designating the vowel ə, was introduced into the "primary core" of the Armenian system after the seventh letter է which expressed the vowel ē —the Armenian phonetic equivalent of the Greek ē̃ = ῆτα.

Since the Armenian system had a greater number of letters than the Greek prototype, conformably to the greater number of Armenian consonant phonemes expressed in writing, it appeared practicable to create a more perfect system of expressing numerical values in Armenian. By means of the $9 \times 4 = 36$ letters of Armenian writing it proved feasible, with the aid of individual written symbols, to express "thousands" as well.[28]

TABLE 9
THE NUMERICAL SYSTEM OF CLASSICAL ARMENIAN

"Integers"			"Tens"			"Hundreds"			"Thousands"		
Ա	a	1	Ժ	ž	10	Ճ	č	100	Ռ	ṙ	1.000
Բ	b	2	Ի	i	20	Մ	m	200	Ս	s	2.000
Գ	g	3	Լ	l	30	Յ	y	300	Վ	v	3.000
Դ	d	4	Խ	x	40	Ն	n	400	Տ	t	4.000
Ե	e	5	Ծ	c	50	Շ	š	500	Ր	r	5.000
Զ	z	6	Կ	k	60	Ո	o	600	Ց	ç	6.000
Է	ē	7	Հ	h	70	Չ	č̣	700	Ւ	w	7.000
Ը	ə	8	Ձ	j	80	Պ	p	800	Փ	ph	8.000
Թ	th	9	Ղ	ṫ	90	Ջ	ǰ	900	Ք	kh	9.000

The foregoing does not exhaust the differences between the Classical Armenian alphabet, on the one hand, and the Coptic and Gothic systems of writing, on the other. A considerable difference between these systems also is seen in the character of the "plane of expression" and its correlation with the graphic expression of the Greek prototype.

Whereas the Coptic and Greek systems repeat—almost unchanged—the graphic form of the corresponding letters of Greek

uncial writing, Classical Armenian breaks all graphical links with the letters of the Greek writing system. The Classical Armenian letters that express sounds phonetically equivalent to Greek have nothing in common graphically with corresponding letters of Greek writing. They are characterized by an absolutely different graphic basis.[29]

This graphic peculiarity of *Erkat'agir* has often provided ground for hypotheses on the origin of Classical Armenian writing from the most diverse written sources. Classical Armenian writing has been pronounced as deriving from Semitic, and partly from Greek (cf. Müller 1864), particularly Greek cursive (Gardthausen 1876), Pahlavi (which in its turn derives from Aramaic (Taylor 1899: 268; Junker 1925/1926), particularly the Aramaic of the North Mesopotamian type (Perikhanyan 1966:111 ff.).

Such derivation of an entire writing system from a certain written source on the basis of similarities and differences in the outlines of individual letters, i.e., essentially only on the basis of a graphic analysis of the plane of expression of the writing systems under discussion, cannot be considered methodologically justified. Graphic resemblance of individual letters in various writing systems does not yet give ground for asserting their origin from one or another writing source. Such assertions call for more substantive inner systemic characteristics of writing that could serve as the basis for hypothesizing the dependence of this or that writing system on a definite writing source.

The paradigmatics of a writing system constitutes one such inner systemic characteristic of writing. In this respect, Classical Armenian writing reveals an indubitable relationship with the Greek writing system that served the Creator of the Armenian alphabet as the initial writing model.

It was according to the Greek writing that corresponding Armenian sounds (as well as phonetic units specific to Armenian) were identified and arranged in a definite sequence originally reflecting the Greek alphabetic series. However, the Creator of the Armenian writing consciously severed all external relations with the graphic symbols of the Greek prototype system, freely inventing the graphic form of corresponding letters according to a definite principle. In the course of such "graphic creativity," Mesrop Mashtots could naturally use the available graphic specimens from most diverse writing systems, such as Aramaic-Pahlavi, Syriac, Ethiopic, Greek, etc., scripts whose writing displays some likeness to the graphic symbols of Classical Armenian writing.[30]

Classical Armenian writing is the product of an ingenious creativity of its author rather than the result of the historical

transformation or graphic reproduction of a definite writing. This accounts for the graphic links of Classical Armenian writing with various systems, not reducible entirely to a definite graphic system.

Such free creation of the graphic symbols of Classical Armenian writing and the development of letters of original outline, differing graphically from their Greek counterparts, must have been motivated by a desire to conceal the dependence of the newly created writing on the writing source used as a model for creating it—in the present case, on Greek writing. In this way, an apparently original national writing was created—independent, as it were, of any external influences or links.

The distribution of "additional" letters of the Armenian alphabet among the symbols of the "principal" part, corresponding to Greek paradigmatics, must apparently be explained by the same considerations. Thereby the sequence of symbols inherited from the Greek system was violated, and a correspondingly new system of numerical values came into being.

The same was possibly the cause of the replacement in the Armenian writing system of the names of letters characteristic of the Greek prototype. The majority of these names are words created on a properly Armenian phonetic basis. Some names may have been formed on foreign patterns. Thus, the Armenian *pē* was perhaps created under the influence of its corresponding Semitic (Syriac-Hebrew) name. The names *žē*, *ḫē*, *čē*, *jē*, *sē*, *rē*, and *kʿē* follow the same pattern; the names *vew* (Sem. *wāw*), *gim* (Sem. *gimel*), and *da* (Sem. *dālet*, Syr. *dālat*) are possibly based on the Semitic pattern; *za*, *ca*, *ša*, *ça*, and *ra* follow the same model. The names *tʿo*, *ho*, and *ço* were perhaps suggested by the Greek prototype ῥῶ, and others (cf. Schwyzer 1931: 194-195).

In all probability this was a manifestation of the tendencies in the eastern Christian cultural world of the period, dictated by definite religious and political considerations, towards concealing all links and dependence of the local Christian culture on Greek culture (Peeters 1929). Analogous tendencies were manifested in the creation of other scripts of the Christian period, particularly the Old Slavonic writing.

4. The Old Slavic Writing

Beginning with the 9th century A.D., fully developed original writing systems, based on the Greek writing system, came into being in the Slavic cultural world. The Slavonic writing systems, named *Glagolitic* and *Cyrillic*, were invented for the recording of texts in the Old Church Slavonic language,[31] in which divine worship began in the Slavic Christian world and the Slavic Christian literature was first written.

Historical tradition ascribes this to the enlightenment activities of the Christian missionaries—the first teachers of the Slavs—the brothers Constantine, later surnamed Cyril (827–869) and Methodius (d. 885).[32]

To all appearances, the Old Slavonic Glagolitic arose from the 9th-century Greek minuscule writing. This manifests itself in the Greek arrangement of the Glagolitic alphabet, in the paradigmatics of the letters, essentially reflecting the Greek sequence. The paradigmatics of the system's prototype is broken only at several places owing to the insertion of a number of letters expressing properly Slavonic sounds.[33]

This in turn caused some shift of the numerical values expressed by the respective letters in the Old Slavonic system, as compared with the system of the Greek prototype. Inasmuch as the number of the sound units of Old Slavonic exceeded considerably the number of Greek phonemes, it became necessary to create a whole group of additional characters to express such specifically Slavic sounds. Accordingly, the number of letters in the newly developed writing, which was intended to simultaneously express the system of numerical values as well, must not be less than $9 \times 4 = 36$ (for the expression of "integers," "tens," "hundreds," and "thousands" by individual letters). And indeed, the Old Slavonic Glagolitic originally contained $9 \times 4 = 36$ graphic symbols. The last nine letters of the alphabetic series were used as numerical symbols expressing "thousands":

TABLE 10

THE GLAGOLITIC ALPHABET

1	✚	a	10	♈ ℥	i_1	100	Ꮟ	r	1000	♥	ĉ
2	℮	b	20	♉	i_2	200	♌	s	2000	Ш	š
3	♈	v	30	Ϻ	ⱉ	300	ᚼ	t	3000	℥	ь
4	♋	g	40	ⴣ	k	400	♌	$ü_2$	4000	℥	ъ
5	♒	d	50	♒	l	500	ⱔ	ĭ	5000	Δ	ä (ⱑ)
6	♋	e	60	℥	m	600	Ꝺ	x_2	6000	♭	x_1
7	Ж	ž	70	♇	n	700	Ꝋ	o_2	7000	♋	ö
8	♻	ʒ	80	Ⱏ	o_1	800	♌	ÿ	8000	ℙ	$ü_1$
9	♌	z	90	♈	p	900	V	c	9000	ℰ	N

The graphic specificity of Glagolitic writing stems from the fact that the letters of the Greek minuscule cursive are represented here in syntagmatics as isolated graphic symbols. At the same time, the symbols of the Glagolitic—in comparison with corresponding letters of Greek

minuscule writing—bear the imprint of their Creator's graphic modification, formally distancing them from their Greek graphic prototypes. The tracing of the exceedingly complex and intricate letters of Glagolitic writing, with numerous flourishes and loops is so peculiar that some researchers believe it to have been the result of Constantine-Cyril's independent original creativity (Georgiev 1952).[34]

There can be no doubt that the Creator of the Glagolitic effected a deliberate modification and stylization of the original Greek letters—perhaps with a view to concealing the dependence of the newly created writing on its Greek counterpart and to creating the impression of a complete independence and originality of the new national writing (Fortunatov 1913: 13). However, Greek minuscule writing, with the graphic symbols charecteristic of cursive, must have served as the basis of all such letters.

In the case of a number of Glagolitic letters belonging to the "additional" part of the alphabetic series and lacking Greek graphic prototypes, the influence of some other, chiefly Oriental, graphic specimens may be hypothesized. Thus, for example, the Coptic characters ɰ *šāj*, ✗ *ǧanǧa*, and ϧ *ḫāj* may be assumed to have served as prototypes of the Glagolitic letters ɰ *š*, ✗ *ž*, and ϧ *x$_!$*, and the Hebrew ץ *ṣādē* for the Glagolitic ♈ *c*, and so on [Fortunatov 1913:19]. The Inventor of Glagolitic discovered the phonetic equivalents of Old Slavic sounds that were absent in Greek in a number of Oriental languages and accordingly borrowed the characters expressing these sounds from the respective scripts.

The names of the letters of the Glagolitic alphabet were invented entirely on original grounds by selecting definite Slavic words on the acrophonic principle, i.e., of words whose initial phoneme coincided with the phonetic units expressed by the corresponding letters: *az, buki, glagol, dobro*, etc. Such designation of the letters of a writing system coincides with the principle characteristic of Germanic Runes and Gothic writing (cf. Schwyzer 1931: 198), as well as with the principle of designating the graphic symbols of the writing system hypothesized for the Old Semitic system (see above).

The second variety of Old Slavonic writing, known under the name of *Cyrillic*, is clearer with respect to the outline. Of the 43 letters of this alphabet, 24 repeat the graphic symbols of 9th-10th century Greek writing, with their respective phonetic values. Conformably to the Greek prototype, the combination of the letters OY served as the symbol for the vowel *u*. In comparison with the Greek prototype, the ligatures $i + a =$ [ja], $i + e =$ [je], and $i + o =$ [ju] constitute graphic innovations.

Several letters designating specifically Old Slavonic sounds, i.e., ž, c, č, š, št, etc., were apparently borrowed with definite graphic simplifications from Glagolitic writing (Troubetzkoy 1954: 38 ff.). [See Table 9.]

What is the relationship between these two varieties of Old Slavonic writing?

According to the most widespread view, Constantine-Cyril must have invented the *Glagolitic* alphabet as an absolutely original Slavic writing, on the basis of the Greek prototype, borrowing at the same time a number of letters from various Oriental scripts. The extensive philological education and linguistic erudition of Constantine-Cyril—a philosopher and first teacher of the Slavs—render understandable the links displayed by the Glagolitic with the Greek system of writing and with a number of oriental scripts (cf. Dvornik 1970: 103).

The graphically complex and intricate Glagolitic writing, invented by Constantine-Cyril, is second to the graphically more perfect variety of Old Slavonic writing—the so-called *Cyrillic*—with its geometrically simple form of letters based on Greek uncial writing. This second variety of Old Slavonic writing, with certain systems and graphic modifications (Istrin 1961: 307 ff.), is represented in particular by the modern Russian alphabet.

TABLE 11
THE OLD SLAVIC SCRIPT

Glagolitic	Numerical values	Cyrillic	Numerical values	Phonetic values
	1	а	1	a
	2	б	—	b
	3	в	2	v
	4	г	3	g
	5	д	4	d
	6	є	5	e
	7	ж	—	ž
	8	ѕ	—	dz
	9	з, ꙁ	7	z
	10	і	10	i
	20	и	8	i
	30	—	—	ǵ
	40	к	20	k
	50	л	30	l
	60	м	40	m
	70	н	50	n
	80	о	70	o
	90	п	80	p
	100	р	100	r
	200	с	200	s
	300	т	300	t
	400	оу, ѹ	400	u
	500	ф	500	f
	—	ѳ	9	θ
	600	х	600	x
	700	ѡ	800	w
	800?	щ	—	št
	900	ц	900	c
	1000	ч	—	č
	—	ш	—	š
	—	ъ	—	ə
	—	ꙑ	—	y
	—	ь	—	ь
	800?	ѣ	—	ě
	—	ю	—	ju
	—	ꙗ	—	ja
	—	к	—	je
	—	ѧ	900	ę
	—	ѫ	—	ǫ
	—	ѩ	—	ję
	—	ѭ	—	jǫ
	—	ѯ	60	ē
	—	ѱ	700	ψ
	—	ѵ	400	ü

4.
Old Georgian Writing: 'Asomtavruli'

1. A Typology of Invention of Ancient Alphabetic Writing Systems

1.1. A comparative study of various ancient alphabetic systems of writing reconstructs the typology of writing, yielding a general picture of the invention of alphabetic scripts based on a sample writing system that served as a model for the newly created systems.

The first and principal stage of this process is the breakdown of the phonetic side of a language into separate phonetic units that should be expressed in writing by special graphic symbols, in essence the creation of the "plane of content" of the writing system. This basic stage of the creation of writing essentially constitutes a phonetic-phonemic analysis of language for which a writing is being created (cf. Rosén 1984: 226). This is conducted on the basis of a comparison of the phonetic aspect of the language with the sound units represented in a definite sequence in the writing system taken as a model.[35] As a result, the written model induces in the language for which the writing is being invented a definite set of phonetic units. The aggregate of the phonetic units forms the "plane of content" of the newly created writing system.

The isolation and ordering of the phonetic units of a language for which the writing is being created presupposes the simultaneous invention of definite graphic symbols by means of which these sounds, identified by reference to a particular writing model, must be expressed. Essentially this is the creation of the "plane of expression" of the writing system. These two processes—the isolation and arrangement of the phonetic units of the language in a definite sequence and the invention of graphic symbols to express them—are interrelated procedures, presupposing each other. The shaping of both the "plane of content" and the "plane of expression" of a writing system is a single creative process of its inventor.[36]

1.2. Exact reproduction of the outlines of corresponding graphic symbols of the prototype system, arranged in a definite sequence, would be the simplest and most natural way of shaping the "plane of expression" of the newly created writing system. "Additional" letters, expressing sounds specific to the given language, might be borrowed from other writing sources possessing sounds phonetically resembling these specific sounds, or be created by modifying definite letters of the given system.

Archaic Greek writing, which essentially repeats the paradigmatics and the outlines of Old Semitic writing, may serve as an example of the method of creating the "plane of expression" of a new script. The "additional" letters of the Greek system were developed later through graphic modification of the "principal" letters of the system or through borrowing them from other writing systems.

From the viewpoint of the "plane of expression" of a system, the Coptic and Gothic as well as the Old Slavonic (Cyrillic) alphabets are of analogous character, all being based on Greek writing not only with respect to the inner structure but also to the form and shape of the corresponding letters of Greek uncial writing.

1.3. In the process of creating a script for a certain language L, the phonetic units of this language are identified through their comparison with the sounds of the language L′, represented in a definite sequence in the writing system of L′, which is adopted as a model for the newly created writing. The phonetically similar sounds of the language L, identified by the method just described, are arranged according to the pattern of the original alphabet of the language L′, and are given relevant graphic expression. In other words, phonetic correlations are established on the basis of the phonetic resemblance of the sounds of language L and L′, the writing of the latter being taken as a model for the newly created writing.

As a result of the establishment of such phonetic correlations, the phonetic composition of the prototype language L′ and the sequence of the sounds in the initial script are naturally "mapped" onto the corresponding phonetic series of the language L for which the writing is being created. The "paradigmatics" of the initial writing of the language L′ is thus reflected in the paradigmatics of the newly created writing. The latter is determined or induced by the "paradigmatics" of the writing system of the language L′ taken as a model.

If in the language *L*, for which a script is being created, there happens to be more phonetic units than in the language *L′*, whose script is being taken as a model, a larger number of graphic symbols must be introduced into the newly created writing in order to express the "additional" sounds lacking in the prototype language (cf. from this point of view the Coptic or Armenian systems with respect to Greek, or Greek to Old Semitic). Such graphic symbols, expressing sounds that are "additional" from the viewpoint of the prototype language, are added in a definite sequence to the "principal" part of the graphemes reflecting the paradigmatics of the writing system taken as the model (cf. the Coptic system with respect to the Greek, and the Greek to Old Semitic). Such "additional" graphic symbols may be placed alternatively with the

symbols of the main part, resulting in the paradigmatics of the initial writing system being disrupted in the newly created system (cf. the Armenian system with respect to Greek).

In case of a reverse correlation, i.e., when the number of phonetic units in the language L', which is taken as a model, is greater, a number of superfluous symbols are left over, expressing sounds that are "redundant" from the viewpoint of language L.

Cases are practically rare (perhaps even not occurring at all) when the set of sounds of one language fully coincides phonetically with the set of sounds of another language. Normally, in each of the languages compared, in addition to the set of phonetically similar sounds, a definite group of sounds is identified that are specific to each language. When this is the case, in the newly created writing the phonetic values of the system taken as the model are replaced by phonetic values specific to the given language, while retaining in the alphabetic series the places inherited from the paradigmatics of the prototype system (cf. in the Greek system the places of the letters for the vowels and the respective places for laryngeal-pharyngeal consonants in Old Semitic paradigmatics; cf. also the letters in Gothic paradigmatics for the sounds q'' $þ$ h'' in comparison with the Greek system in which the respective places are taken by the letters for the consonants t^h, ps, etc.).

Such substitution of phonetic values in a newly created writing is motivated by a tendency to retain the paradigmatics of the prototype system in the new system and to the isomorphic reproduction thereby of the expression by means of letters of the numerical values of the initial writing.[37]

"Additional" letters in these systems are also created through graphic modification of the "principal" letters or through borrowing separate symbols from other writing sources. In some cases these "additional" letters come from earlier writing systems of the same language; cf. the Demotic letters in Coptic, Runic letters in Gothic writing, and Glagolitic letters in Cyrillic.

1.4. An absolutely different way of shaping the "plane of expression" of a script is presented by the case when the graphic symbols of the prototype system are transferred to the newly created system not in the same graphic form but with certain (possibly considerable) graphic modifications. This method alters—often beyond recognition—the original shape of the initial letters of the system (cf. the shapes of the Glagolitic letters in juxtaposition with Greek minuscule writing). Such graphic modification of the writing system taken as a model may have been effected consciously, in order to conceal the dependence and

connections of the newly created script with the system of the prototype writing.

The Classical Armenian writing "Erkat'agir" represents an extreme expression of this tendency, for in it the "plane of expression" of the Greek prototype system is fully replaced. The graphic symbols of *Erkat'agir* were largely invented independently of Greek writing as the result of the original creativity of its Inventor, making use of various non-Greek graphic specimens.

In this respect Classical Armenian writing is typologically opposed to other writing systems based on Greek writing: Coptic, Gothic, and Old Slavonic. In the typological group of writing systems based on the Greek prototype the systems under discussion occupy extreme poles. Between them one may perhaps place Old Slavonic Glagolitic. It does not graphically break completely with the Greek system but represents the respective letters of the prototype system as extremely modified and graphically stylized writing symbols.

One more script—the Old Georgian *Asomtavruli* writing—should be referred to the same typological group of writing systems deriving from the Greek prototype.

2. The Problem of a Prototype System for the Old Georgian Asomtavruli Writing. The Greek Basis of the Old Georgian Script.

2.1. The creation of Old Georgian alphabetic writing on the pattern of the Greek writing prototype, i.e., its derivation from the Greek system of writing, can be established on the basis of a number of inner structural indices of the Old Georgian writing system.

2.2. Old Georgian writing was created for recording the Georgian language of a definite period through expressing the principal phonetic units of the language by means of special graphic symbols.

A notable specificity of the phonetic system of the Georgian language throughout its development is an astonishing phonetic conservatism of the system. The phonetic structure of the Georgian language of the earliest period is preserved to the present day without significant phonetic changes. This largely accounts for the fact that Georgian writing fully preserves one-to-one correspondence between the phonetic units of the language and the graphic symbols of writing both in paradigmatics and syntagmatics. This in general is one of the main characteristics of an alphabetic writing system at its creation and at the initial stages of its development.[38]

As was noted above, preliminary segmentation of the phonetic system of a language into separate sound units, which should be expressed

by means of special graphic symbols, is the first and obligatory stage in the process of the creation of writing. This is especially true of an alphabetic writing system. As a matter of fact, the character and degree of functional adequacy of the writing system to the sound oppositions to be expressed in writing depend on this preliminary analysis of the phonetic side of the language. The more consistent and comprehensive is the preliminary phonetic analysis of language, the more perfect is the writing that reflects its phonetic composition, and the more it meets the aims of graphic recording of a language.

A study from this point of view of the Old Georgian *Asomtavruli* writing shows that the Creator of the Georgian alphabet renders the sound oppositions of his contemporary Georgian language with amazing precision and fulness. With exhaustive completeness he takes into account the sound (phonemic) inventory whose rendering in script is necessary for an adequate expression of the Georgian language in writing.

The Georgian sound inventory is reflected so fully and adequately in the Old Georgian *Asomtavruli* that subsequently Georgian writing did not suffer special structural alterations. The addition of letters for the designation of sound oppositions left unexpressed in the old system was not necessary, as was the case in late Greek systems of writing as compared to the archaic Greek system.

2.3. What writing system served as a model for the Creator of the Old Georgian alphabet, i.e., as the writing pattern according to which the Georgian sound units were identified and arranged in a definite sequence reflecting the paradigmatics of the prototype system? This is essentially the problem of the origin of the Old Georgian *Asomtavruli* writing, reduced to the solution of a concrete task, viz. the establishment of the writing system on which Old Georgian writing rests as its writing model or prototype that determined its structure and paradigmatics.

In general, two writing sources in the above sense could be hypothesized as a prototype system for Old Georgian writing: Old Semitic writing (or other Semitic writing systems deriving from it, cf. Javakhishvili 1949) or the Greek alphabetic writing (or other alphabetic systems deriving from it [cf. Gardthausen 1879; Kekelidze 1929], etc.).

2.4. In either case (i.e., in assuming the Semitic or Greek writing prototype), one thing is clear in advance: a comparison of these systems with the sound units of the Georgian language shows that in Georgian—which is characterized by richer consonantism—a whole group of consonants would be identified, without phonetic equivalents in the systems juxtaposed. Such Georgian consonants may be considered "additional" specific sounds from the viewpoint of the sound composition of the prototype system.

OLD GEORGIAN WRITING: "ASOMTAVRULI"

TABLE 12

Asomtavruli	Modern print form	Phonetic value	Designation	Asomtavruli	Modern print form	Phonetic value	Designation
Ⴀ	ა	*a*	an	Ⴐ	რ	*r*	rae
Ⴁ	ბ	*b*	ban	Ⴑ	ს	*s*	san
Ⴂ	გ	*g*	gan	Ⴒ	ტ	*t'*	t'ar
Ⴃ	დ	*d*	don	Ⴓ	უ	*wi*	wie
Ⴄ	ე	*e*	en	Ⴔ	ფ	*pʰ*	pʰar
Ⴅ	ვ	*v*	vin	Ⴕ	ქ	*kʰ*	kʰan
Ⴆ	ზ	*z*	zen	Ⴖ	ღ	*ɣ*	ɣan
Ⴇ	ჱ	*ej*	he	Ⴗ	ყ	*q'*	q'ar
Ⴈ	თ	*tʰ*	tʰan	Ⴘ	შ	*š*	šin
Ⴉ	ი	*i*	in	Ⴙ	ჩ	*č*	čin
Ⴊ	კ	*k'*	k'an	Ⴚ	ც	*c*	can
Ⴋ	ლ	*l*	las	Ⴛ	ძ	*ʒ*	ʒil
Ⴌ	მ	*m*	man	Ⴜ	წ	*c'*	c'il
Ⴍ	ნ	*n*	nar	Ⴝ	ჭ	*č'*	č'ar
Ⴎ	ჲ	*j*	je	Ⴞ	ხ	*x*	xan
Ⴏ	ო	*o*	on	Ⴟ	ჴ	*qʰ*	qʰar
Ⴐ	პ	*p'*	p'ar	Ⴠ	ჯ	*ž*	žan
Ⴑ	ჟ	*ž*	žan	Ⴡ	ჰ	*h*	hae

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Thus, in the course of the creation of Old Georgian writing, the juxtaposition of Georgian sounds with the writing system taken as a model must have resulted in the breakup of the entire set of Georgian sound units into two parts. The first and basic group of sounds would be determined by the sound units of the system compared: These sounds must have been distributed conformably to the paradigmatics of the prototype system. The other group of sounds must have included sound units, special from the viewpoint of the compared prototype system and hence "additional" with respect to the "principal" group determined by the character of the initial writing system. Therefore, the problem of the origin of Old Georgian writing is characterized by two basic aspects: first, the establishment of the writing prototype on the model of which the "principal" part of the Georgian alphabet must have taken shape, and second, identification of those writing sources and principles on the basis of which the "additional" part of the alphabetic sequence, supplementing the "principal" part to build a single writing system, must have been formed.

Thus, the problem of the origin of Old Georgian writing, at this stage of research, acquires a still more concrete content and is reduced to the identification of the pattern on which the basic part of the Old Georgian alphabet was shaped. To be more precise, the question is which writing prototype—Semitic or Greek—determined the inner structure and makeup of respectively the "principal" and the "additional" parts of the Old Georgian alphabet.

Clearly enough, the adoption of the Greek or Semitic writing system as the basic writing pattern and prototype would shape differently the "principal" and "additional" parts of the newly created writing. A varied character would be imparted to these component parts of a single system from the viewpoint of their sound composition and paradigmatic structure.

2.5. A comparison from this point of view of the Semitic and Greek systems of writing with Georgian writing brings out a genetic relationship of the latter with the Greek system, and rules out its derivation from the Semitic writing system. In the process of creating the Old Georgian alphabet, the Greek system of writing must have been used as a model of writing, according to which the sound units must have been identified in Georgian and arranged in alphabetic order. The assumption of the Greek system as the writing prototype in the creation of the Old Georgian alphabet renders quite understandable the structure and character of the "principal" and "additional" parts of the Old Georgian alphabetic sequence. Only those sound units of the Georgian

language that have no phonetic correspondence in Greek are found in the "additional" part.

If the Semitic system is assumed as the basis of Old Georgian writing its "principal" and "additional" parts would be characterized by an absolutely different structure and arrangement.

It should be noted, however, that all the characteristic structural peculiarities that differentiate the Greek writing system from Old Semitic writing, are fully reflected in the Old Georgian alphabet. These peculiarities arose on a properly Greek basis when Greek writing was being created from Old Semitic or in the process of its subsequent development. All this clearly points to the origin of the Old Georgian alphabetic system from Greek writing rather than directly from the Semitic system of writing.

Juxtaposition of the Old Georgian writing with the Semitic and Greek systems brings to light an arrangement of the Old Georgian alphabetic sequence that differs from Semitic, and its overlapping in the main with Greek paradigmatics that must have served as the writing model for the creation of the Old Georgian alphabet.

TABLE 13
JUXTAPOSITION OF SEMITIC, GREEK, AND GEORGIAN SCRIPTS

Semitic			Greek			Georgian			
א	'	1	A	a	1	ⴀ	ა	a	1
ב	b	2	B	b	2	ⴁ	ბ	b	2
ג	g	3	Γ	g	3	ⴂ	გ	g	3
ד	d	4	Δ	d	4	ⴃ	დ	d	4
ה	h	5	E	ĕ	5	ⴄ	ე	e	5
ו	w	6	Ϛ	–	6	ⴡ	ვ	v	6
ז	z	7	Z	z	7	ⴅ	ზ	z	7
ח	ḥ	8	H	ē (ej)	8	ⴆ	ჱ	ẹ,ej	8
ט	ṭ	9	Θ	tʰ	9	ⴇ	თ	tʰ	9
י	j	10	I	i	10	ⴈ	ი	i	10
כ	kʰ	20	K	k	20	ⴉ	კ	k'	20
ל	l	30	Λ	l	30	ⴊ	ლ	l	30
מ	m	40	M	m	40	ⴋ	მ	m	40
נ	n	50	N	n	50	ⴌ	ნ	n	50
ס	s	60	Ξ	ks	60	ⴑ	ჯ	j	60
ע	ʿ	70	O	ŏ	70	ⴍ	ო	o	70
פ	pʰ	80	Π	p	80	ⴓ	პ	p'	80
צ	ṣ	90	Ϟ	–	90	ⴕ	ჟ	ž	90
ק	q	100	P	r	100	ⴗ	რ	r	100
ר	r	200	Σ	s	200	ⴚ	ს	s	200
ש	š	300	T	t	300	ⴒ	ტ	t'	300
ת	tʰ	400	Υ	ü,w	400	ⴞ	ჳ	wi (ü),w	400
						Ⴍⴞ	უ	u	
			Φ	pʰ	500	ⴔ	ფ	pʰ	500
			X	kʰ	600	┼	ქ	kʰ	600
			Ψ	ps	700	ⴖ	ღ	ɣ	700
			Ω	ō	800	ⴙ	ყ	q'	800
			ϡ	–	900	ⴜ	ჰ	š	900

3. Juxtaposition of the Old Georgian Asomtavruli Writing with Greek and Semitic Systems

3.1. The first letter of the Old Georgian alphabet, Ⴀ *an*, with the phonetic value [a] and numerical value "1" corresponds to the first symbol of the Greek alphabet A ἄλφα (phonetic value [a], numerical value "1"). In the Semitic system its equivalent sign is notably א *'ālep̂* that designates a laryngeal consonant ['].

The second letter in the Georgian alphabet is Ⴁ *ban*, with phonetic value [b] and numerical value "2" which is an equivalent of the Greek B βῆτα with similar values.

The third letter Ⴂ *gan* (phonetic value [g], numerical value "3") reflects fully the values of the third symbol of the Greek alphabet Γ γάμμα.

The fourth letter of the Georgian writing system Ⴃ *don*, with phonetic value [d] and numerical value "4" corresponds to the fourth letter Δ δέλτα in the Greek system.

The fifth letter of the alphabet Ⴄ *en* (phonetic value [e], numerical value "5") corresponds to the Greek E ἒψιλόν that derives from the Semitic consonantal sign ה *hē* (phonetic value [h]). Greek transformed the consonantal sign into the vocalic symbol [e], and it is precisely in this vocalic value that the corresponding letter Ⴄ *en* is used in the Georgian script.

3.2. The sixth place in the Georgian system is occupied by the letter Ⴅ *vin* (phonetic value [v], numerical value "6") which repeats precisely the phonetic and numerical values of the archaic Greek Ϝ δίγαμμα.

Δίγαμμα in archaic Greek is used to denote one of the non-syllabic variants of the sonant /u̯/ (in particular, the frivative [v] in certain phonetic environments: In intervocalic position, in initial position before a vowel, etc., and a similar behavior is characteristic of the Georgian [v], being one of the positional variants of the sonant /u̯/. In Old Semitic the corresponding place is occupied by the sign ו *wāw* denoting the sound [w].

A precise phonetic and functional correspondence of the Georgian Ⴅ *vin* to the Greek Ϝ δίγαμμα points to the familiarity of the inventor of the Georgian script with the system of archaic Greek writing. In later varieties of the Greek writing system the respective place in the sequence is taken by the sign Ϛ στίγμα that is devoid of any phonetic value (as a result of the loss of the sound [v] in a number of Greek dialects), and is continuing the archaic Ϝ δίγαμμα only in its numerical value of "6." A specific feature of the newly created Georgian script

seems to have been the tendency of ascribing to the episemons (i.e., symbols having only numerical value) of the prototype system certain specific phonetic values. Thus to the Georgian letter Ⴔ *vin* equivalent to Greek Ϛ στίγμα in the Classical system was ascribed a specific phonetic value [v], apparently under the impact of archaic Greek Ϝ *digamma* used with the phonetic value [v] and numerical value of "6".

A certain familiarity by the Inventor of the Old Georgian script with the archaic Greek alphabet and the Greek phonetic theory is evidenced also by some other structural features of the Old Georgian writing system (see below).

The seventh letter of the Georgian alphabet Ⴆ *zen*, with phonetic value [z] and numerical value "7," corresponds to the Greek Z ζῆτα (phonetic value [z], also [zd], numerical value "7").

3.4. The eighth letter of the Old Georgian alphabet Ⴡ *he* (phonetic value [ei], numerical value "8") is equivalent to the Greek H ἦτα that designated in Greek a long vowel /ē/. This vocalic phoneme in ancient Greek was pronounced apparently as a narrow long [ẹ̄] which shifted as a result of its diphthongization to [ei], later to [i]. It is precisely in its diphthongal value [ei] that this sign in Georgian is used, taking its eighth place, as in the Greek system, in the alphabetic sequence.

The vocalic—not consonantal—value of the letter Ⴡ *he* in Georgian refers the latter unambiguously to the Classical Greek system, but not Semitic, in which in the respective place we find the symbol ח *ḥēt*, with the consonantal value of [ḥ] changing in Greek to the vocalic value [ē].

The adoption by the Georgian alphabet from Greek of a sign with the diphthongal value [ei] may be accounted for by the tendency to preserve in the newly created script a full sequence of signs of the prototype system, even if some signs in the paradigmatic sequence denote sounds not specific and thus not necessary for the newly created writing. As a matter of fact, the diphthongal value [ei] could have been expressed in Old Georgian by a sequence of letters e + i (as in the case of the diphthongs [ai] ≈ a + i and [oi] ≈ o + i). A special sign Ⴡ *he* in the Old Georgian script to express the diphthong [ei] was used in the Old Georgian paradigmatics as an equivalent of H ἦτα in the Greek paradigmatic sequence.

3.5. The ninth letter of the Old Georgian alphabet, Ⴇ *tʰan*, with the phonetic value [tʰ] and numerical value "9," is an equivalent of the letter Θ θῆτα of the Greek system (phonetic value [tʰ], numerical value "9"). Characteristically enough, the corresponding place in Old Semitic writing is occupied by the letter ט *ṭētʰ*, expressing the emphatic

(nonaspirated) consonant [t]. This character enters the Greek system as an *aspirated* [tʰ], whereas the Semitic character ח *tʰāw* for the aspirated [tʰ] is borrowed into the Greek to designate the Greek non-aspirated [t] (vd. supra).

In this respect, too, the Old Georgian alphabet reflects the specificity of the Greek system rather than of its Old Semitic prototype. In Old Georgian paradigmatics the ninth place is held by the character Ⴇ *tʰan* with the phonetic value of the aspirated [tʰ] rather than the glottalized [t']. This ought to have been expected owing to the phonetic closeness of the glottalized [t'] and the emphatic [t] had Old Semitic writing been used as a prototype system. At the same time, in the Georgian system the glottalized (non-aspirated) [t'] is rendered by the letter Ⴒ *t'ar* (numerical value "300"), designating the non-aspirated Greek [t] (unlike its Semitic prototype *tʰāw* expressing the aspirated [tʰ]).

Analogously, in the paradigmatics of the Old Georgian system, in the places corresponding to the Greek Κ κάππα (numerical value "20") and Π πῖ (numerical value "80") we have the symbols Ⴉ *k'an* and Ⴎ *p'ar* (numerical values "20" and "80," respectively). These symbols express the glottalized (non-aspirated) consonants [k'] and [p'], while the symbols Ⴔ *pʰar* and Ⴕ *kʰan* (numerical values "500" and "600," respectively), which express—in full accord with the Greek prototype—the aspirated consonants [pʰ] and [kʰ], serve as equivalents of the Greek characters Φ φῖ (numerical value "500," phonetic value [pʰ]) and Χ χῖ (numerical value "600," phonetic value [kʰ]).

Had ancient Semitic writing been used in creating the Old Georgian system of writing one would naturally expect an absolutely different paradigmatics of occlusives. One could also expect a different distribution of the characters for glottalized and aspirated consonants according to the paradigmatics of the prototype system. In particular, in that case, one should have expected the distribution of the Georgian aspirated /pʰ tʰ kʰ/, phonetically correlatable with the Semitic aspirated /pʰ tʰ kʰ/ in places corresponding to the latter in the paradigmatic series. The same refers also to the Georgian glottalized /t' k'/, phonetically close to the Semitic emphatic ṭ and q. They should have occupied not those places in the paradigmatics that are recorded in the historical system (the numerical values "300" and "20," respectively), but the places corresponding to the Semitic ṭ and q. The character for the glottalized phoneme /p'/, having no phonetic equivalent in Semitic, should have found its place somewhere in the "additional" part of the paradigmatic system.

The tenth letter of the alphabet Ⴈ *in*, with the phonetic value [i] and numerical value "10," corresponds to the Greek I ἰῶτα with the

same values. In the Georgian system the use of this sign in the vocalic value reflects its connection with the respective Greek, and not the Semitic sign ʼ *jōd* expressing non-syllabic [i].

The eleventh letter ჱ *k'an* (phonetic value [k'], numerical value "20") is an equivalent of the Greek K κάππα, with respective phonetic and numerical values.

The following twelfth, thirteenth, and fourteenth places in the Georgian paradigmatics are taken by the sonorants [l], [m], and [n], expressed respectively by the letters ˈb *las* (numerical value "30"), ꝺ *man* (numerical value "40") and ჶ *nar* (numerical value "50"), these being equivalents to the Greek letters for sonorants Λ λάμβδα, M μῦ, N νῦ, with corresponding phonetic and numerical values.

The reflection in the paradigmatics of Old Georgian writing of the changes occurring in the transformation of the ancient Semitic system into Greek, as well as in the subsequent developments of Greek writing, is a clear proof of the dependence of Old Georgian paradigmatics on Greek writing. Greek writing served as its prototype system according to which the sound units were identified and distributed in a definite order in the newly created system.

3.6. The fifteenth letter of the Old Georgian alphabet, ჳ *je*, with the phonetic value [i̯] and numerical value "60," in the alphabetic series holds the place corresponding to the Greek letter Ξ ξῖ (phonetic value [ks], numerical value "60"). It expresses a non-syllabic variant of the sonant /i/ in the archaic system of the Georgian language. The syllabic variant [i] of the same phoneme was expressed by a special character, ꝺ *in*, which in the Georgian alphabet is at the place corresponding to the I ἰῶτα of the Greek system.

In the case of the symbol ჳ *je* we have a total discrepancy between the phonetic values of this character of the Old Georgian system and its paradigmatic equivalent, Ξ ξῖ, in the Greek system. It holds the fifteenth place in the alphabetic sequence (numerical value "60"), but expresses the phonetic value [ks], specific to Greek (unlike its phonetic value [i̯] of the corresponding symbol of the Georgian system).

In drawing the paradigmatics of the Old Georgian writing system, the paradigmatic equivalent of the Greek Ξ ξῖ was ascribed the phonetic value [i̯] when replacing the original value [ks] of the Greek prototype letter seen as "redundant" from the viewpoint of Georgian phonetics.

The Greek basis of the Old Georgian alphabet is seen unequivocally in the above fact, too. If the Old Semitic system had been used as the prototype for the Old Georgian system, at this place of the alphabetic series one should expect a character designating the whistling

spirant [s], since at the corresponding place of the Old Semitic system we have the character ס *sāmek^h*, expressing the hissing spirant [s] that phonetically resembles the Georgian hissing spirant [s]. The replacement of this value in the Greek system by [ks], accountable for by the peculiarities of the development of the Old Greek system of writing, renders understandable the substitution of the phonetic values [ks]⇒[i] when the Old Georgian paradigmatics was being drawn up on the basis of Greek. Total removal of this character from Georgian paradigmatics would have entailed a shift of the numerical values of the subsequent letters, and hence a violation of the system of numerical values of the Greek prototype system. To avoid this, the equivalent of the Greek letter was left at its corresponding place of the Old Georgian paradigmatic system, with a corresponding numerical, but given a phonetic value specific to the Georgian system.

Such replacement of the phonetic values of the prototype system by phonetic values characteristic of the language whose writing system is being created constitutes one of the devices of preserving the structure and paradigmatics of writing of the system taken as a model for the new writing system. The phonetic substitutions effected in the Coptic, and especially, Gothic systems of writing in comparison with their prototype Greek writing may serve as examples of such a procedure.

3.7. The sixteenth letter of the Old Georgian alphabet, Ⴍ *on*, with the phonetic value [o] and numerical value "70," corresponds to the Ο ŏ μικρόν of the Greek system, with the same values. The symbol ყ *'ajin*, expressing the laryngeal consonant /ʻ/ in the Old Semitic system, and transformed in Old Greek into a character for the designation of the vowel [o], serves in the Old Georgian system—similarly to Greek—to express precisely the vocalic phoneme [o].

The graphic symbols Ⴀ *an*, Ⴄ *en*, Ⴈ *in*, and Ⴍ *on* (expressing vowels in the Old Georgian writing system and occupying in the paradigmatics the same places as do the corresponding characters of the Greek system) constitute an obvious proof of the link of the Old Georgian alphabet with Greek in terms of the use of the latter as a prototype system for the identification of the sound units of the Georgian language and for their arrangement in a definite paradigmatic order. It was in the Greek language that special characters were first created to express properly vowel phonemes, which turned Greek writing—itself arising from the Old Semitic *consonantal-syllabic* writing—into a consistently *alphabetic* writing system.

The seventeenth letter of the alphabet Ⴎ *p'ar* (phonetic value [p'], numerical value "80," corresponds to the Greek Π πῑ, with the

numerical value of "80" and phonetic value [p] (voiceless non-aspirated stop).

3.8. The eighteenth letter of the Old Georgian alphabet, Ⴗ *žan*, with the phonetic value [ž] and numerical value "90," occupies in the paradigmatics of Old Georgian writing the place corresponding to the Greek character Ϙ κόππα (numerical value "90").

The emergence of the phonetic value [ž] in the part of the Old Georgian alphabet that corresponds to Greek paradigmatics may at first sight seem unexpected in view of the absence in Greek of phonemes of the type of the voiced hushing spirant [ž]. This phonetic value in the Old Georgian alphabet became linked to a symbol paradigmatically corresponding to the Greek Ϙ κόππα, inasmuch as κόππα, deriving from the Old Semitic ק *qōp^h*, in a relatively late Greek system was devoid of a concrete phonetic value and was used only to express the numerical value "90" (see supra). The borrowing system avoids the elimination from the alphabetic sequence of the prototype system of a concrete character, even though devoid of a definite phonetic value, in order to preserve its paradigmatics and not to upset the system of correspondences of the numerical values of the subsequent characters.[40]

It should be noted that the Semitic character צ *ṣādē*, dropped from the Greek alphabetic sequence, coming before ק *qōp^h* in the Old Semitic paradigmatics, fails to be reflected in this part of the Old Georgian system. This omission once again points to the compilation of the Old Georgian alphabet on the basis of the Greek rather than the Old Semitic system.

The point is that in the Old Greek system the character deriving from the Semitic צ *ṣādē* was originally used to designate the spirant [s]. Later, this character fell out of the alphabetic series inasmuch as the Greek spirant [s] came to be designated by the character Σ σίγμα that arose from the Old Semitic ש *šīn*. The Greek alphabetic system became somewhat condensed as a result of the dropping of the character equivalent to the Semitic צ *ṣādē* from the system. Later, *ṣādē* was added to the Greek paradigmatics as the last (27th) character-episemon with the numerical value of "900" (see supra).

This is the only case in the Greek system of a character falling from its relevant place in the paradigmatics (rather than its retention in the alphabetic series through the replacement of the original phonetic value or through its use as an episemon). As a consequence, the numerical values of the Greek system at this place of the paradigmatic sequence happen to be shifted one step upwards as compared to the Old Semitic system. The numerical value "90" is expressed in the Greek system through Ϙ κόππα, while "100" is expressed through its following

character **P** ṗō̃, whereas in the Semitic system "90" is expressed by ץ *ṣādē* and its following ק *qōp*[ʰ] (prototype of the Greek Ϙ κόππα) expresses "100."

If we took the ancient Semitic system as the basis of the Old Georgian alphabet, and identified the Georgian letter Ⴗ *žan* (phonetic value [ž], numerical value "90"), then the question would arise as to why the Semitic character ק *qōp*[ʰ] (with the phonetic value [q] and numerical value "100"), following ץ *ṣādē*, failed to be reflected in the Old Georgian writing.[41]

The Old Semitic ק *qōp*[ʰ] designated the emphatic velar stop [q]—phonetically close to Georgian sounds requiring graphic expression (e.g., such as the glottalized [k'] or [q']). The same may be said of the phonetic value of the emphatic ṣ, expressed by the Semitic character *ṣādē*, for which the phonetic equivalents may have been found in the Georgian phonetic system (such as the affricates *c, c', č, č'*). This Semitic character failed to be reflected at the respective place in Old Georgian paradigmatics for the simple reason that it was not represented at this place of the paradigmatics of the prototype system, this again leading us to the Greek alphabet.

In contrast to this, the Greek Ϙ κόππα, which continues the Semitic symbol ק *qōp*[ʰ], was transferred into the Georgian system, at the place corresponding to the Greek, with the numerical value "90."

3.9. The 20th letter of the Old Georgian alphabet, Ⴑ *san*, with the phonetic value [s] and numerical "200," corresponds to the Greek Σ σίγμα, which has the same values and occupies the 20th place in Old Greek paradigmatics.

The Greek letter Σ σίγμα, expressing the voiceless hissing spirant [s], stems from the Semitic ש *šīn*. In Semitic *šīn* expressed the hushing and/or hissing-hushing spirant *š/š*. Instead of expressing the hushing spirant [š], alien to Greek, the letter Σ σίγμα was used in the Greek alphabet to designate the only hissing spirant [s] in Greek. It is in this phonetic value, i.e., to designate the hissing spirant [s], that the character Ⴑ *san* is used in the Old Georgian alphabet, paradigmatically corresponding to the Greek Σ σίγμα and Semitic ש *šīn*. In this case, too, the Georgian alphabet reflects the changes that took place in the Greek system as compared to the Old Semitic, this pointing to the direct link of the Old Georgian system with the Greek, omitting the Old Semitic. In assuming the use of Semitic writing as the prototype system for Georgian the following fact would remain unaccounted for: The Semitic character ש *šīn* was for some reason used in the Georgian system to express the hissing spirant [s] instead of the hushing [š] which is part of the Georgian

phonetic system and which therefore had to be expressed in writing by means of a definite graphic symbol.

The twenty-first letter of the alphabet Ɛ *t'ar*, with the phonetic value [t'] and numerical value "300" corresponds to the letter T ταῦ of the Greek system, expressing the non-aspirated phoneme /t/. This as the other signs designating in the Old Georgian alphabet non-aspirated (glottalized) stops follow in all details the Greek system and reflect those transformations that occurred in Greek in the process of adapting the Semitic writing system to the Greek language (vd. supra).

3.10. The twenty-second letter of the Georgian alphabet, Ⴍ *wie* (numerical value "400"), serves in the Old Georgian writing system as a graphic symbol whose phonetic and numerical values are fully determined by the Greek prototype Y ῦ ψιλόν. The Greek system determines both the place of this character in the alphabetic series and its functional value in the Old Georgian writing system.

The phonetic value of this Greek character [ü], alien to the Georgian phonetic system, was transferred to the corresponding character of the Georgian system as the segment [ɥi], phonetically related to the palatalized vowel [ü] (cf. the frequent interchange of the segments [ü] ~ [ɥi] in individual languages).

Another, more archaic, phonetic value of the Greek character Y was the expression of the non-syllabic segment [ɥ] in diphthongs of AY [aɥ], EY [eɥ] type. An analogous use of the Old Georgian Ⴍ *wie* in segments of [aɥ], [eɥ] type must be reflective of precisely this specificity of the Greek character.

The same character Ⴍ *wie*, in a graphic combination with the character Ⴍ *on*, is used in the Old Georgian writing system to express the vowel phoneme [u].

The designation of the vowel [u] in Old Georgian writing by the digraph Ⴍⴍ [oɥ] was dictated wholly by the rules of Greek orthography (cf. in this respect an analogous means of expressing the vowel [u] in the Classical Armenian and Old Slavonic writing systems).

The syntagmatic combination of the characters OY, expressing the diphthong [oɥ] in Old Greek, turned at a fairly early period into a digraph to express the long vowel [ū] that resulted from the monophthongization of the diphthong [oɥ]. At the transition in these dialects of the original vowel [u]—expressed by Y ῦ ψιλόν—into a palatalized variety of [ü], the combination of OY became the only graphic means of rendering the nonpalatalized vowel [u] (vd. supra). It is this graphic method of designating the vowel [u]—reflecting the natural phonetic changes in the Greek system—that underlies the graphic

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rendering of the vowel [u] by means of the syntagmatic combination of the characters Ოჳ [oɥ] in the Old Georgian alphabet (as well as in other systems based on the Greek writing prototype).

It should be noted that the twenty-third character Y ʋ ψιλόν in the Old Greek system is additional in comparison to the Old Semitic system of 22 graphic symbols introduced into the Old Greek system to express the vowel [u] (as well as the nonsyllabic segment ɥ). In the case of ჳ *wie*, the Old Georgian alphabet repeats—exactly and in all details—the peculiarities of this specifically Greek additional character, attesting to direct links in the above sense between the Greek and Old Georgian systems of writing.

3.11. The twenty-third Ფ p^har and twenty-fourth Ქ k^han letters of the Old Georgian alphabet, with phonetic values [p^h] and [k^h] and respective numerical values "500" and "600," coincide phonetically and functionally with the Greek symbols Φ φῖ and X χῖ, the latter two lacking graphic prototypes in the Old Semitic system. These characters constitute "additional" graphic symbols with respect to the Old Semitic system. They were created later on a properly Greek basis to designate the aspirated sounds [p^h] and [k^h] that had remained unexpressed by special characters in the Old Greek system of writing with its 23 graphic symbols based directly on the characters of the Old Semitic writing system.

The last three graphic symbols of the Old Georgian alphabet Ღ *γan*, Ყ *q'ar*, and Შ *šin*), with phonetic values [γ], [q'], and [š] and numerical values of "700," "800," and "900," respectively, emerge in the system as paradigmatic equivalents of the Greek characters Ψ ψῖ [ps], Ω ὤ μέγα [ō], and Ϡ σάμπι, completing the Greek alphabetic sequence, with the numerical values of "700," "800," and "900" respectively. To these graphic symbols in the Old Georgian system were ascribed the specifically Georgian phonetic values [γ], [q'], and [š]—absent in Greek—in place of the Greek phonetic values [ps] and [ō], specific to Greek and expressed by prototypic Greek characters, but redundant from the viewpoint of the phonetic composition of the Georgian language. In the case of these three graphic symbols, completing the alphabetic sequence of the Greek prototype system, one should assume a similar substitution of the phonetic values in the course of the compilation of the Old Georgian alphabet as well as in giving shape to some other above-discussed characters of the paradigmatics.

3.12. The twenty-seven graphic symbols of the Old Georgian alphabet, considered in the foregoing and reflecting the paradigmatics of Greek writing, are distributed in the system in full accord with the Greek prototype in three groups of nine characters in each, expressing *digits*,

tens, and *hundreds*, respectively. Similarly to the 9 × 3 = 27 graphic symbols of the Greek system expressing consecutively *digits*, *tens*, and *hundreds*, the first 9 × 3 = 27 characters of the Old Georgian alphabet, originating on the pattern of the Greek system, designate *digits*, *tens*, and *hundreds*, respectively:[42]

TABLE 14

Greek		Georgian	Greek		Georgian	Greek		Georgian
a	1	a	i	10	i	r	100	r
b	2	b	k	20	k'	s	200	s
g	3	g	l	30	l	t	300	t'
d	4	d	m	40	m	ū	400	wi
e	5	e	n	50	n	ph	500	ph
(v)	6	v	ks	60	j	kh	600	kh
z	7	z	o	70	o	ps	700	ⳁ
ē	8	ej	p	80	p'	ō	800	q'
th	9	th	(q)	90	ž	—	900	š

4. The "Additional" Part of the Old Georgian Alphabet

4.1. The twenty-seventh character, Ⴟ *šin*, expressing the phonetic value [š] and numerical value "900," completes that part of the Old Georgian alphabetic sequence which was ordered on the pattern of the Greek writing system. Those Georgian phonetic units were distributed in a definite sequence and were appropriately expressed by graphic symbols in this part of the paradigmatic system of Old Georgian writing for which phonetically close correlates were found in Greek, as well as some specifically Georgian sounds which, in the alphabetic sequence, occupied the places of Greek symbols with specifically Greek phonetic values (or the places of characters expressing only numerical values in the Greek system).

Since the system of the Georgian language is characterized by a larger number of sound units—consonants, in particular—than the Greek, following the establishment of sound correlations and the distribution of a definite set of sounds on the pattern of the Greek alphabetic series, in Georgian there must have remained some more sounds that had no corresponding correlates in Greek.[43] Such Georgian sounds make up a specific group of phonetic units, attached as an "additional" part to the

"principal" part of the alphabetic system that was arranged conformably to the paradigmatics of the Greek prototype system.

This "principal" part of the Georgian alphabetic sequence, corresponding to the Greek system, is formed of a sequence of letters, from Ⴀ *an* (numerical value "1") to Ⴘ *šin* (numerical value "900"), whereas, beginning with the following, twenty-eighth letter Ⴙ *čin* (phonetic value [č], numerical value "1000"), the Old Georgian alphabet features "specifically" Georgian—differing from Greek—"additional" sounds and the graphic symbols expressing them.

4.2. Inasmuch as the sound system of the Old Georgian language possessed more than $9 \times 3 = 27$ sound units, it proved feasible to create a more perfect than Greek system of expressing numerical values by means of alphabetic writing. This was accomplished by adding to the system of $9 \times 3 = 27$ letters as additional graphic symbols to designate *thousands*. To express a complete series of "thousands" it was necessary and sufficient to introduce an additional *nine* graphic symbols in order that the total number of letters in the alphabetic system make up $9 \times 4 = 36$ units. Precisely such nine graphic symbols, expressing "specifically" Georgian sound units—differing from Greek—were added to the basic part of the Old Georgian alphabet that was arranged on the Greek pattern. This allowed the designation in writing of all possible sound differences of the Georgian language, and created a complete system of numerical values expressed by special graphic symbols for *digits, tens, hundreds,* and *thousands.*"

This "additional" part of the Old Georgian alphabet is given in the following sequence of graphic symbols, with the phonetic and numerical values expressed by them:

TABLE 15

Phonetic value		Numerical value	Designation
Ⴙ	č	1.000	*čin*
Ⴚ	c	2.000	*can*
Ⴛ	ʒ	3.000	*ʒil*
Ⴜ	c'	4.000	*c'il*
Ⴝ	č'	5.000	*č'ar*
Ⴞ	x́	6.000	*xan*
Ⴟ	qʰ	7.000	*qʰar*
Ⴠ	ʒ̇	8.000	*ʒ̇an*
Ⴡ	(h)	9.000	*hae*

Thus, the "additional" part of the Old Georgian alphabet contains graphic symbols and the sound units expressed by them that have no phonetic correlates in the Greek system and which—from this point of view—prove to be "specifically" Georgian sounds, not characteristic of the Greek language.[45]

4.3. It is easy to perceive that the character and composition of the "principal" and "additional" parts of the alphabetic series depend entirely on the character of the prototype system taken as a model. The concrete phonetic characteristics of the "principal" and "additional" parts of the Old Georgian alphabetic sequence are fully motivated by the phonetic characteristics of the Greek paradigmatic system. The sound units represented in the concluding part of the Old Georgian alphabet are "specifically" Georgian because they are not characteristic of the Greek phonetic system. The same sounds might happen to be phonetically similar (and in this sense not "specifically" Georgian) to the sounds of some other system adopted as the writing prototype, and hence find their way into the "principal" part of the alphabetic series. Thus, for example, in the case of using the Semitic system as the writing model in shaping Old Georgian writing such Georgian phonemes as [š], [c'], [q'], and the graphic symbols designating them, whose phonetic correlates are found in Semitic languages (as the sounds expressed by the letters ש šīn, צ ṣādē, ק qōpʰ) should have been placed among the graphic symbols of the "principal" part—within the first twenty-two letters reflecting the system of Old Semitic writing.

4.4. In reality the Old Semitic writing (probably its Aramaic variety) may have been used in the course of creating the Old Georgian alphabet—mainly in identifying "specifically" Georgian sounds [š], [q'], [c], [c'], [x], etc., remaining unidentified on the basis of the Greek system, and in referring them to the "additional" part of the Old Georgian alphabet. Such sounds might have been distinguished in Georgian and appropriately expressed by means of graphic symbols through their identification with phonetically similar Semitic sounds [š], [q], [ṣ], [x]. In the case of the Georgian letters Ⴕ q'ar (phonetic value [q']) and Ⴓ c'ar (phonetic value [c']) even the graphic influence of the Semitic symbols ק qōpʰ and צ ṣādē may be hypothesized in the evolvement of corresponding Georgian letters (cf. Tsereteli 1949). However, notwithstanding traces of such a graphic influence of Semitic writing, detectable in individual graphic symbols of the "additional" part of the Old Georgian alphabetic sequence and the sound units expressed by them, this part of Old Georgian writing evidently did not evolve entirely on the pattern of some single writing prototype.

4.5. The distribution of the graphic symbols and the specifically Georgian sounds they express in this part of Old Georgian writing follows a definite phonetic principle (the voiced affricate [ʒ] in the center of the group, the voiceless affricates [č c] before this phoneme, and (voiceless) glottalized affricates [c' č'] following it). Then come the post-velar consonants [x] and [qʰ], correlating with the consonants γ, q', š that complete the "principal" part of the alphabetic series. This entire group of consonants is completed by the affricate [ǯ] and the graphic symbol ჴ ǯan expressing it, followed in the alphabetic series by the symbol ჰ hae which originally must have served as the character-episemon "9.000," lacking a concrete phonetic value.

TABLE 16

PARADIGMATICS OF "SPECIFICALLY" GEORGIAN SOUNDS
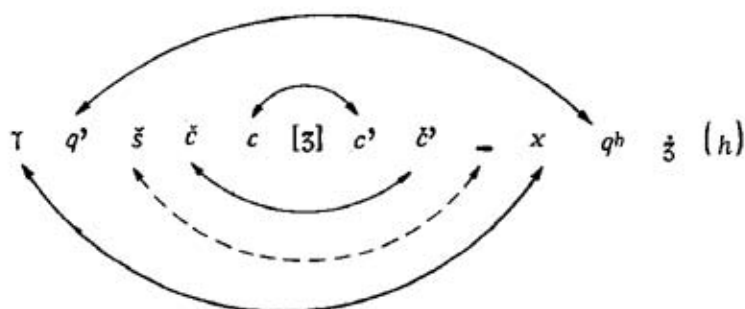
Such phonetically conceptualized distribution of the sound units in the "additional" part of the Old Georgian alphabet—that did not have a definite writing prototype—points to the familiarity of the inventor of Old Georgian writing with definite principles of the phonetic classification of sounds.

In particular, the distribution of affricates in the sequence [č c ʒ c' č'] [with the voiced affricate [ʒ] in the middle and aspirated and glottalized (non-aspirated) affricates on either side] may reflect the phonetic principle of classification of sounds by Dionysius Thrax, into δασέα "thick" (i.e., aspirated; Lat. aspiratae: φ θ χ); ψιλά "bare," "simple" (i.e., pure non-aspirated; Lat. tenues: π τ κ), and μέσα "middle," "medial" (i.e., voiced; Lat. mediae: β δ γ), characterized as τῶν ψιλῶν μὲν δασύτερα, τῶν δὲ δασέων ψιλότερα "thicker than pure (consonants) and purer than thick (i.e., aspirated) consonants." It is precisely such characteristics that are manifested by the voiced affricate [ʒ] in Georgian with respect to the aspirated affricates [č c], on the one hand, and to the

non-aspirated (glottalized) affricates [č' c'], on the other. The voiced affricate /ʒ/, being a "middle" or "medial" consonant (τὸ μέσον), was accordingly placed in the center of this group of affricates (cf. Boeder 1975).

It is interesting to note that in the "principal" part of the Old Georgian alphabet, the Georgian *voiced stops* [b d g] are identified—as indicated above—with the Greek voiced β δ γ (i.e., "medial," μέσα), the Georgian *aspirated* [pʰ tʰ kʰ] are equated with the Greek aspirated φ θ χ (i.e., "thick," δασέα), while the Georgian *glottalized* sounds, being phonetically non-aspirated consonants, are juxtaposed with the Greek *pure* (i.e., non-aspirated; ψιλά) consonants: π τ κ.

5. The Designations of the Letters of the Old Georgian Asomtavruli

5.1. The designations of the letters of the Old Georgian alphabet do not repeat the names of the corresponding characters of the Greek prototype system (or of any other writing system), and apparently were created artificially as certain conventional designations of graphic symbols.

5.2. The designations of the characters for the vowels were composed by adding the element -n to the respective vowel: *an, en, in, on, un.*

The designations of the characters expressing consonants were shaped as monosyllabic words with various vowels and the final -n: *ban, gan, don, vin, zen, tʰan, k'an, man, san, kʰan, yan, šin, čin, can, xan, ʒan.*

The monosyllabic designations of seven letters are characterized by the final -r : *nar, p'ar, t'ar, pʰar, č'ar, q'ar, qʰar.*

The designations of two characters have the sonorous *l* as the final element: *ʒil, c'il;* only one designation has the final *s: las.*

The designations *rae* and *hae* form a peculiar disyllabic structure. The designations *he, je,* and *wie* also end with the vowel *e*.[46]

5.3. The designations of the letters in the alphabetic series are distributed in such a way as to give the impression of a rhymed sequence. This doubtless was a mnemotechnical means facilitating a better memorization of the alphabetic series. It is interesting to note that the designations of the letters of the Old Georgian alphabet contain the sonorous consonants -n, -r, -l (in one case the spirant -s) as the final elements, and it is these consonants that play a special role in the rhyming clausule of the Georgian verse, being the most frequent consonantal elements in it (cf. Tsereteli 1973:76-77).

6. A Graphic Analysis of the Signs of Old Georgian Asomtavruli

6.1. A graphic analysis of the letters of Old Georgian writing and their comparison with the corresponding symbols of Greek writing show their utter graphic incongruity and incompatibility. In the creation of Old Georgian writing, the Greek writing system was evidently taken as a model according to which the Georgian sound units were identified and distributed, and expressed subsequently by special graphic symbols. However, the graphic symbols of the Old Georgian alphabet do not repeat the shapes of the corresponding characters of their contemporary Greek writing, as is the case in the Coptic or Gothic alphabets, or the Slavonic Cyrillic. On the other hand, a number of characters of Old Georgian writing manifest some graphic features that bring them close to the outline of the graphic symbols of Classical Greek writing (overlapping in principle with the graphics of Phoenician scripts). The Old Georgian characters ৭ *ban* (cf. archaic Greek 𐌁 βῆτα), Ն *gan* (cf. archaic Greek Ꮄ γάμμα), � *en* (cf. archaic Greek Ꮇ ἒ ψιλόν), Ꮈ *vin* (cf. archaic Greek Ꮇ δίγαμμα, etc.—all facing left—may be considered as such characters of Old Georgian writing that come close to the archaic outlines of corresponding graphic symbols of the Greek system. However, the majority of the characters of Old Georgian writing do not show any traits of resemblance with the shapes of the corresponding characters of the Greek writing system.

6.2. How should one account for the graphic difference of the majority of the characters of Old Georgian writing and the paradigmatically corresponding characters of Greek writing, while there is resemblance of some characters with their archaic Greek counterparts? Is such a graphic difference between these systems the result of natural development and graphic evolution of the Old Georgian system, in the course of which it must have considerably diverged from the outlines of the characters of the archaic Greek prototype system that served as the basis of Georgian writing?

Under such an assumption we should date the formation of the Old Georgian alphabet on the Greek pattern to a very early period when the archaic Greek system of writing prevailed—directed from right to left, with letters slanting leftward, and with a number of archaic graphic and phonetic peculiarities.

Even if we leave aside the difficulties of cultural-historical order, arising with the assumption of such an early chronology of the origin of the Old Georgian *Asomtavruli*[47] system of writing, the fact of the reflection in the Old Georgian writing system of a number of graphic and

phonetic specifications that emerged in Greek writing much later[48] renders such an assumption unlikely.

Consequently, it should be assumed that in creating Old Georgian writing the archaic Greek alphabet was used as the model of writing, with account of the graphic and phonetic changes arising in the Greek system in the subsequent period. All this warrants the assumption of an artificial creation of the Old Georgian alphabet, as a result of conscious archaizing and graphic stylization of the Classical Greek graphic system taken as a model.

The Inventor of the Old Georgian writing took as his writing prototype his contemporary monumental Greek writing, effecting its stylized archaization, expressed in the turning of some graphic symbols to the left and in their graphic transformation. At the same time, a whole number of original graphic symbols were created, not repeating the outlines of the corresponding letters of the Greek prototype system. In this way, an outwardly independent monumental writing with letters of wholly original outline was created, whose connection with the Greek writing prototype that determined its paradigmatics and inner structure could have been established only through a special systemic analysis.

6.3. It appears feasible to analyze the graphemes of the Old Georgian monumental *Asomtavruli* writing as formed of a limited number of original graphic elements. A *straight line* and a *semicircle* may be taken as such graphic elements. All the graphic symbols of the Old Georgian *Asomtavruli* may be drawn by means of various combinations of such a "straight line" and a "semicircle" within a square—described by definite rules of combination (cf. Boeder 1975; Machavariani E. 1970, 1977; 1982). The characters of the *Asomtavruli* writing constitute definite geometrical figures of the same height, drawn by means of *compasses* and a *ruler* within a certain invisible square. The initial elements of these figures—straight line and semicircle—combining with each other, fill the *whole* square or its *half.* The straight lines are arranged exclusively along the perpendicular median of the square and along its horizontal and/or vertical catheti, forming right angles (see Table 17). Herein lies one of the cardinal graphic differences of Old Georgian monumental writing from the geometric figures of Greek monumental writing; the latter can also be viewed as combinations of a "straight line" and a "semicircle" within a geometrical square, permitting, however, an inclined position of the "straight lines," i.e., a position along the diagonals of the square (cf. Harder 1942): cf. the geometric structure of the following Greek graphemes, as different from the Georgian *Asomtavruli* writing:

A Δ Λ X Z K M N Σ Y Ψ

6.4. The Inventor of the Old Georgian alphabet created an original national writing. According to ancient notions, such a writing should be entirely original and independent of any other, earlier known writing system. The simplest and most natural way of attaining such outward independence of the system consisted in a deliberate graphic transformation of the characters of the prototype system and in creating a number of cases of quite new and original graphic symbols to express and arrange in a definite alphabetic sequence the sounds of the language, identified on the basis of and comformably to the system of the writing prototype.

Apparently analogous motives underlay the creation by Mesrop Mashtots of the original characters of Classical Armenian writing, retaining the overall monumental nature of Greek writing but totally differing in outline from the graphic symbols of the Greek writing prototype. Obviously it was for the same reason that the characters of Greek minuscule writing underwent stylization in the Old Slavonic Glagolitic, altering beyond recognition the letters of the Greek prototype. This is done in order to assert the national uniqueness of the newly created writing and to demonstrate its independence from other writing systems.

Such a tendency led the Inventor of the Classical Armenian alphabet to the creation of absolutely new and original letters. The Inventor of the Old Georgian alphabet chose a somewhat different path; he did not break completely with the "plane of expression" of the writing taken as a model, i.e., with the shapes of the letters of the Greek prototype system, but effected only a graphic archaization and stylization of the characters of the prototype system by recourse to various graphic techniques. As a result a new and original writing system was created, resembling the prototype system in the outline of certain graphemes as well as by the overall monumentalness of writing and the geometric character of the graphic symbols.

The Inventor of the Old Slavonic Glagolitic acted in an analogous way, deliberately stylizing the graphics of the Greek minuscule writing, taken as the basis.[49]

The authors of these ancient alphabets had one purpose—that of creating an original national writing; however, the aim was reached in these systems by diverse graphic techniques.

6.5. The creation of an original national writing was dictated by the common tendency following the Christianization of a country in the Eastern Christian world to revive its local culture on the basis of the national language. The conversion of the population and the proclamation of Christianity as the official religion of a country in the Eastern Christian area implied at the same time a wide development of translational activity and the spread of Christian literature in the vernacular by means of a new writing specially created for the purpose (cf. Jakobson 1945).[50] This was the case with the creation of the Coptic, Gothic, Classical Armenian, and Old Church Slavonic writing systems. Analogous factors must have led to the creation of the Old Georgian national writing *Asomtavruli*.

TABLE 17
A GRAPHIC DERIVATION OF THE ASOMTAVRULI LETTERS
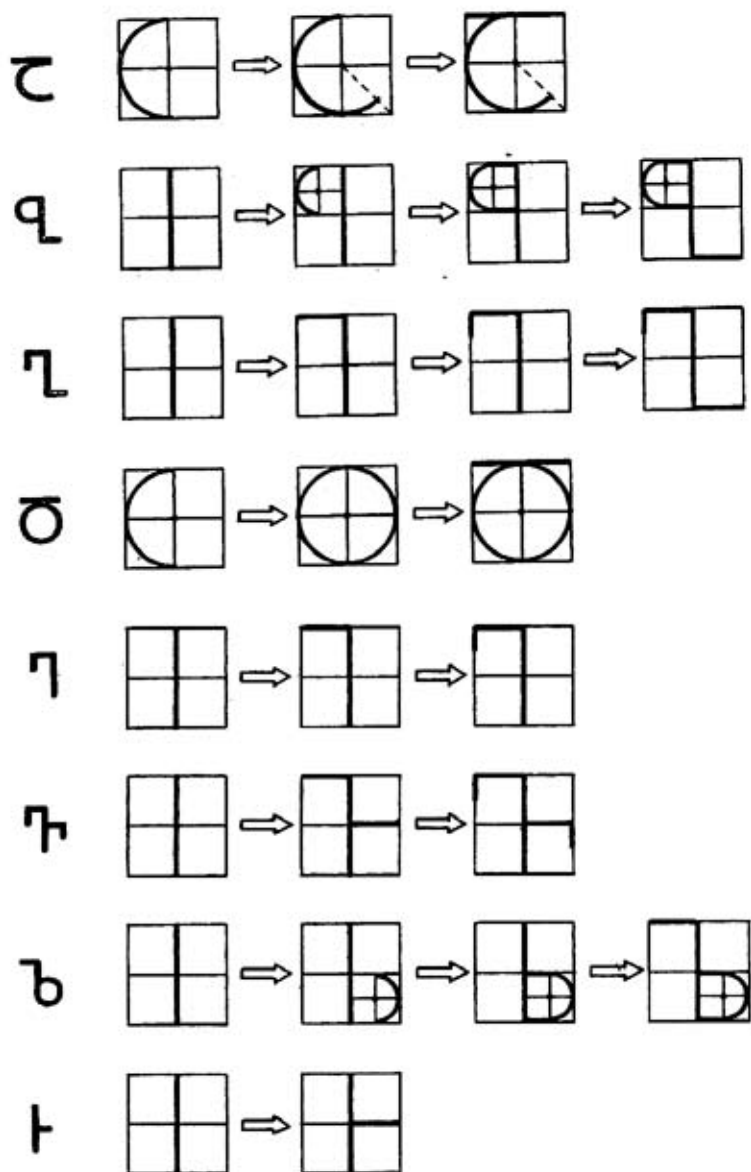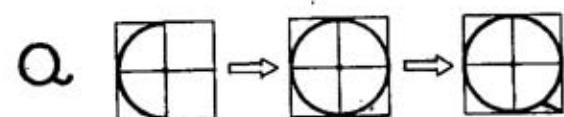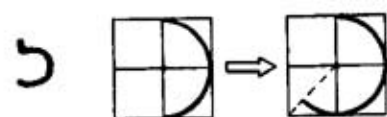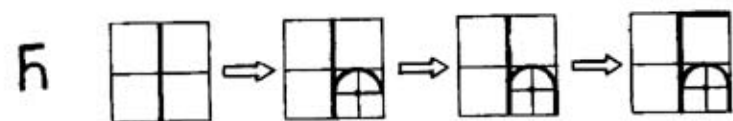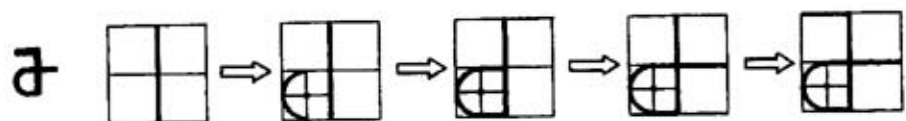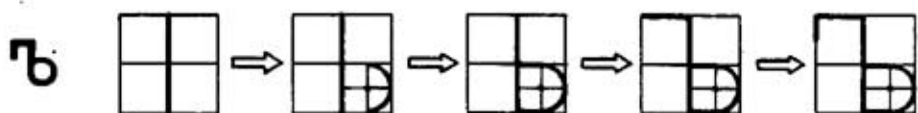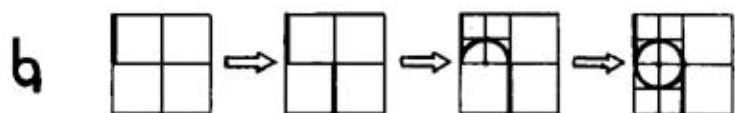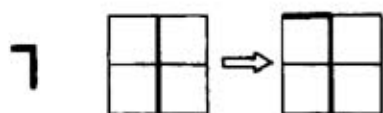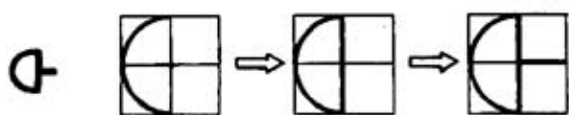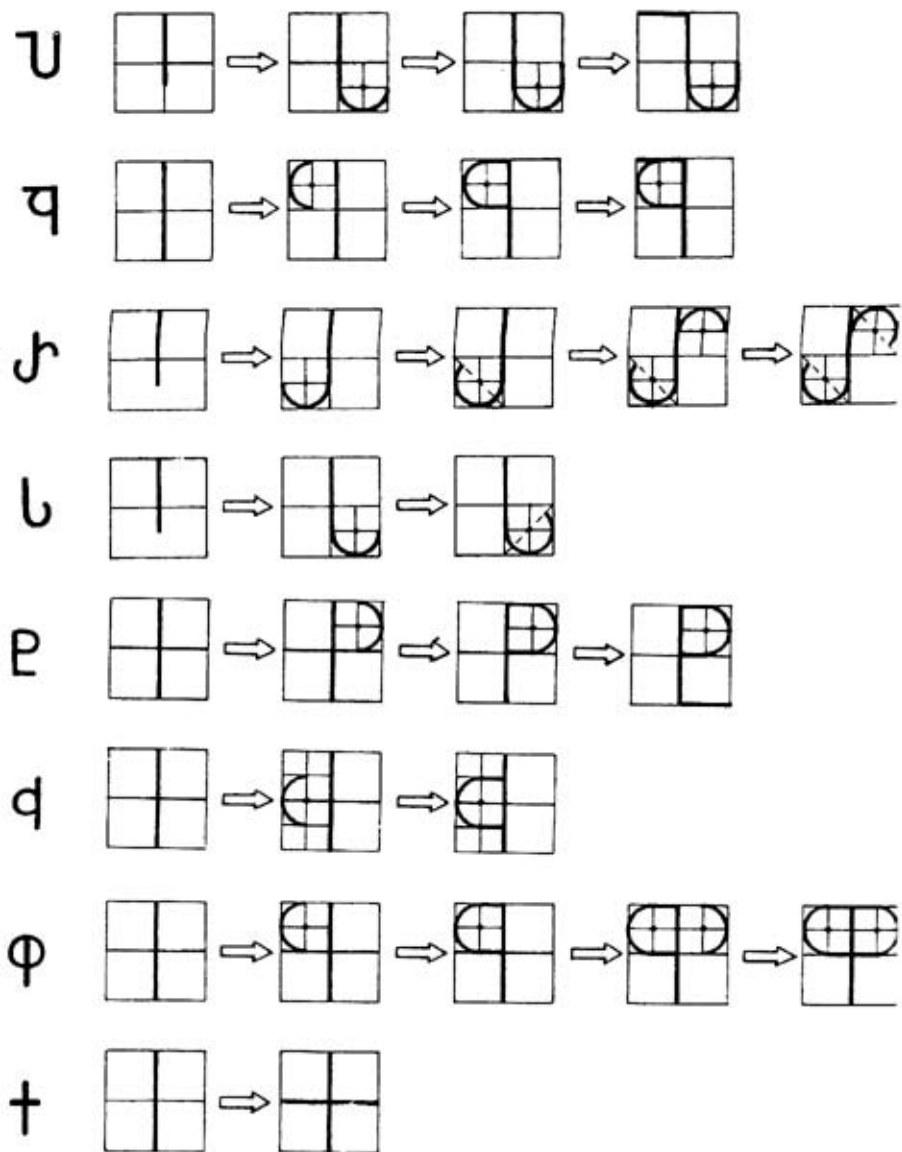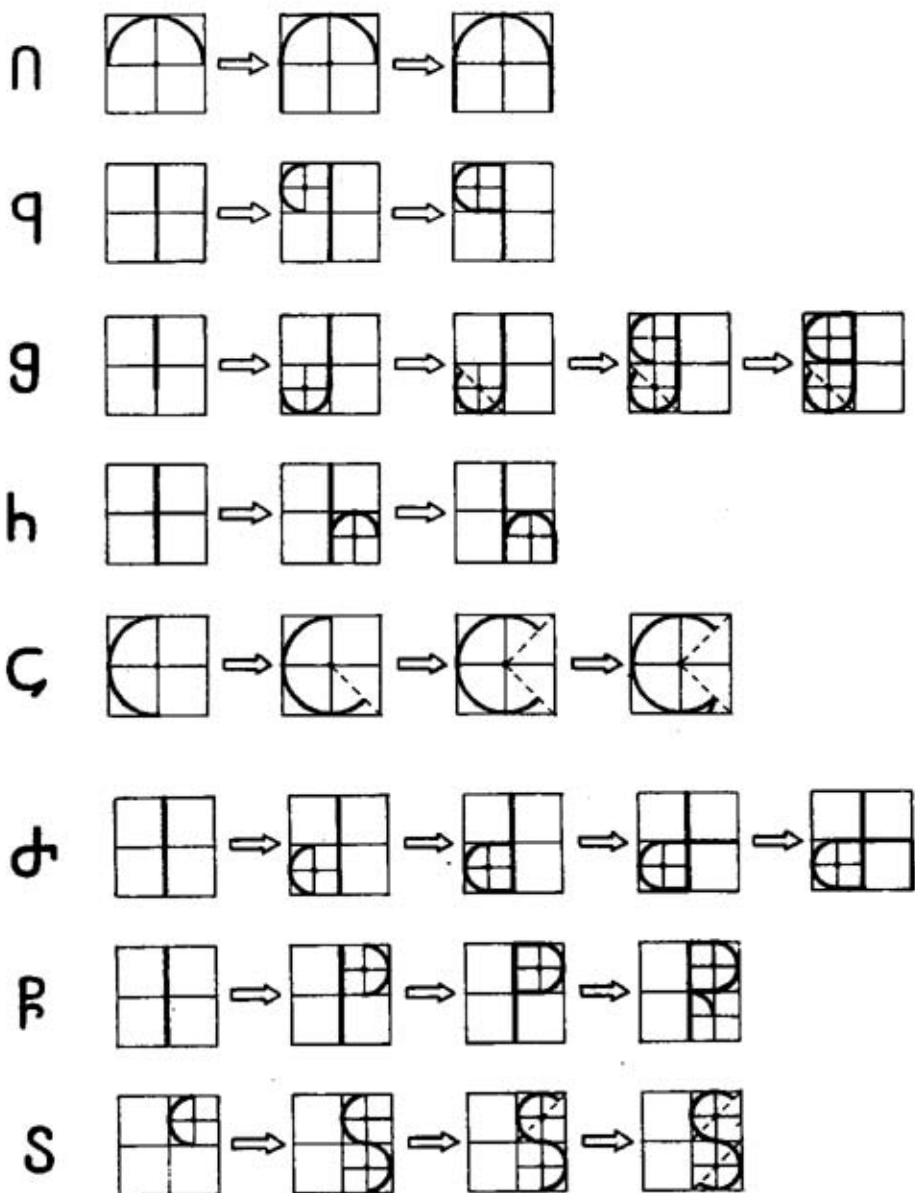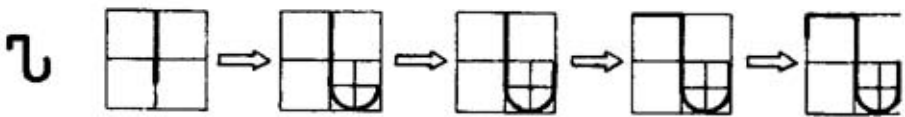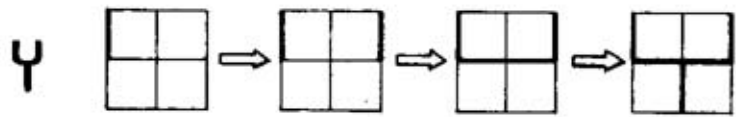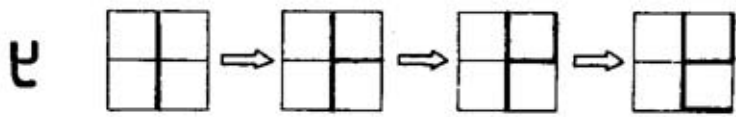
7. A Typological Comparison of Old Georgian Asomtavruli with Coptic, Gothic, Classical Armenian, and Old Slavic Writing Systems

7.1. The acceptance of the Old Georgian *Asomtavruli* writing as an essentially Christian script and the dating of its invention to the time of conversion and Christianization of Georgia (fourth century A.D.) render understandable a number of formal and structural specifications of *Asomtavruli* writing with respect to the other scripts of the early Christian cultural world: *Coptic, Gothic, Classical Armenian*, and *Old Slavonic*. All these writing systems constitute a single typological group of scripts based on a common writing prototype—the Greek writing system—and are characterized by a number of common structural and typological features.

7.2. The Coptic and Gothic writing systems have in common with the Old Georgian script the principle of paradigmatic dependence on the Greek prototype system. In this respect these writing systems diverge from Classical Armenian writing, where such a dependence is consciously disrupted.

The entire paradigmatic series of the Greek system is fully reflected in the Old Georgian alphabet, as well as in Coptic and Gothic; all the $9 \times 3 = 27$ letters of the Greek prototype, characterized by definite phonetic and numerical values (or only by the latter in the case of the symbols Ϛ στίγμα, Ϙ κόππα, Ϡ σάμπι), have been taken over into these alphabets in the same sequence, with corresponding phonetic and numarical values. Greek episemons are transferred in the same function (i.e., only as symbols expressing definite numerical values; cf. the Coptic letters with the values "6" and "900," and Gothic letters with the numerical values "90" and "900"), or they acquire in the new systems specific phonetic values characteristic of the given language (cf. the letter ϥ *fāj* in Coptic—phonetic value [f], numerical value "90"; the letter Ⴓ in Gothic with phonetic value [qʷ] and numerical value "6"; the letters Ⴅ *vin*, Ⴚ *žan*, and Ⴘ *šin* in Georgian—phonetic values [v], [ž], [š] respectively, and numerical—"6," "90," and "900," and others).

Greek letters with phonetic values (such as [ks], [ps], [ō], etc.)—specific from the viewpoint of these systems—enter the newly created writing systems with new phonetic values, specific already to the sound system of the given languages, retaining, however, the numerical values of the prototype system (cf. the Gothic characters with the numerical values "9," "60," and "700," respectively, and phonetic values [þ], [i], and [hʷ]; Old Georgian characters Ⴑ *je*, Ⴌ *yan*, and Ⴕ *q'ar*, with numerical values "60," "700," and "800," and respective phonetic values [i], [ɣ], and [q']).

The paradigmatics of the initial writing system, taken as the writing model, is essentially preserved through such "phonetic substitution" and retention at relevant places in the alphabetic series of the newly created writing of all the graphic symbols of the prototype system. The paradigmatics of the prototype system is thereby mapped, as it were, onto the alphabetic series of the newly developed writing.

In Gothic, such "mapping" of the paradigmatics of the Greek prototype system onto the alphabetic series was effected without the need of adding to it a number of characters with specifically Gothic phonetic values. Such specifically Gothic phonetic values found room fully in the paradigmatics of the Greek prototype as a result of effecting certain phonetic substitutions. Hence the Gothic alphabet contains the same number ($9 \times 3 = 27$) of graphic symbols as the Greek prototype. Of these the first nine symbols in the alphabetic sequence express *digits*, the next nine, *tens*, and the nine graphic symbols completing the alphabetic series, *hundreds*.

In Coptic and Old Georgian, following the mapping of the paradigmatics of the Greek prototype system onto the alphabetic series of the newly created system and the effecting of definite phonetic substitutions, there still remained a certain number of specific sound units that had to be expressed in writing. These "specific" sounds and the graphic symbols designating them were added to the "principal" part of the alphabetic series by way of completing it, reflecting the paradigmatics of the initial prototype system with $9 \times 3 = 27$ graphic symbols. Such "additional" characters permitted the expression of numerical values of "thousands" also in the Old Georgian alphabet.

The Classical Armenian alphabet is based on an essentially different paradigmatic principle, typologically opposing it to the Coptic, Gothic, and Old Georgian writing systems.

In drawing up the Classical Armenian alphabetic series, all the episemons (i.e., characters expressing in Greek only numerical values: Ϛ στίγμα, Ϟ κόππα, Ϡ σάμπι) were removed in advance from the paradigmatics of the Greek prototype system, as well as all the graphic symbols designating sounds specific to Greek but non-characteristic of Armenian: Ξ ξῖ (phonetic value [ks]), Ψ ψῖ (phonetic value [ps]), and Ω ὦ μέγα (phonetic value [ō]). It appears that in drawing the Classical Armenian alphabet it was not a substitution of properly Armenian sounds for the specifically Greek phonetic values that was effected (as was the case in creating the Coptic, Gothic, and Old Georgian scripts), but a reduction of the Greek alphabetic series to a sequence containing only correlates of Armenian sound units that had to be expressed by special letters. The Greek paradigmatic sequence originating in this way (i.e.,

following the elimination of phonetic values specific from the viewpoint of Armenian in the alphabetic series of the Greek prototype system) served as the initial nucleus of the phonetic values on the basis of which the entire system of the Classical Armenian alphabet was shaped through adding specifically Armenian sound units expressed by special graphic symbols.

However, these specifically Armenian values do not constitute a continuation in the alphabetic series of the "principal" part, reflecting the Greek paradigmatics, although reduced in a special way, but are given in alternation with it. The symbols of the "additional" part are inserted at different places between the graphic symbols of the "principal" part, thus upsetting the original paradigmatics motivated by the Greek prototype, and accordingly the system of numerical values characteristic of the initial Greek model.

The principle of preserving the numerical values of the writing prototype in the newly created writing system—strictly observed in the Coptic, Gothic, and Old Georgian alphabets—is totally rejected by the Inventor of Classical Armenian writing who uses Greek writing only as a reference for the identification of corresponding Armenian sound units. This evidently also accounts for the fact that, in using Greek writing as a model, the Inventor of the Classical Armenian alphabet does not take into account the graphic symbols in it that express specifically Greek sounds, superfluous from the Armenian point of view, or the characters-episemons devoid of any phonetic value whatsoever. For this reason, the nucleus of the Greek alphabet, underlying the Classical Armenian system, is made up of a sequence of symbols from A ἄλφα (Arm. Ա *ayb*) to X χῖ (Arm. Ք *kʰē*), excepting certain characters with specifically Greek values within this sequence. Between these extreme characters of the Classical Armenian alphabet are arranged—at different places and alternately with the graphemes of the "principal" part—all the additional symbols, forming, jointly with the graphemes of the "principal" part, an absolutely new paradigmatics of Classical Armenian writing, differing from the system of the Greek prototype.[51]

As a result, the correspondence completely breaks down between the Greek writing prototype and the Classical Armenian alphabet with respect to expressing with correlatable graphic symbols respective numerical values. This is why Classical Armenian writing drastically differs from the Coptic, Gothic, and Old Georgian writing systems, which in this sense all form a single typological class.

7.3. Besides the common principle of the paradigmatic dependence on the Greek prototype system, the cited writing systems

come close to one another by a number of other structural typological characteristics, as well.

Thus, Old Georgian and Coptic scripts come together not only under the common principle of preserving the paradigmatics of the prototype system through phonetic substitution of specific sound values of the initial system, but in one case also by the coincidence of the phonetic value of such substitutes.

In the Gothic alphabet—as well as in Old Georgian—the Greek letter Ξ ξῑ (phonetic value [ks], numerical value "60") is replaced by corresponding graphic symbols having the same phonetic value [i] (numerical value "60") and exhibiting at the same time some graphic similarity with each other: cf. Goth. **G** [i], "60," and Old Georgian Ɔ [i], "60". It should be noted that the replacement of the Greek [ks] precisely by [i] in both these systems cannot be justified on purely phonetic grounds, for the sound segments [ks] and [i] differ too much phonetically.

Such coincidence in the phonetic value of the substitutes of the Greek [ks] in both writing systems may attest rather to the presence of definite historical links between them.

The Inventor of the Old Georgian alphabet was doubtless familiar with his contemporary writing systems, including possibly the Gothic alphabet, the data of which he might have taken into account in inventing the new writing.[52]

In the light of this, it is perhaps not accidental that the designations of certain letters of the Old Georgian alphabet coincide with the names of the corresponding characters of Gothic writing. Thus, for example, the designation of the Old Georgian letter **ს** *las*, with the phonetic value [l] and numerical value "30," being phonetically isolated with respect to the other designations, resembles very much the name *laaz* of the Gothic letter **λ**, with the phonetic value [l] and numerical value "30"; cf. also the names of the graphemes of Georg. [v] *vin* and Goth. [w] *uuinne*; Georg. [m] *man* (numerical value "40") and Goth. [m] *manna* (numerical value "40").

7.4. From the viewpoint of the historical interrelations of the alphabets of the Christian period—based on the system of Greek writing—consideration also should be given to the Old Slavonic Glagolitic and Cyrillic scripts which belong to the same typological group of old writing systems. The Old Slavonic Glagolitic writing is essentially based on the same principle of the paradigmatic dependence of the newly created writing on the Greek prototype system as in the Coptic, Gothic, and Old Georgian alphabets.

The basic part of the Glagolitic—corresponding to the Greek system—is ordered on the pattern of the Greek alphabet, with definite phonetic substitutions. The specific sound units—differing from the Greek—are represented in the system as an "additional" part, completing the alphabetic series and expressing the numerical values of *thousands*.

To single out such specifically Slavic sounds and arrange them as the "additional" part of the alphabet the Inventor of the Glagolitic had to consider the data of other contemporary writing systems. Old Georgian writing also may have been consulted by him.[53] Traces of this can be perceived in the distribution of some letters expressing *thousands* in the "additional" part. The "additional" part of the Glagolitic, consisting of nine symbols expressing *thousands*, begins with a grapheme with the phonetic value [č] and numerical value "1000," just as in the Old Georgian alphabet, where the "additional" part of the system begins with the grapheme, with the phonetic value [č] and numerical value of "1000." The sixth place in this group of graphemes in the Glagolitic is occupied by a symbol with the phonetic value $[x_1]$ and numerical value "6000," similarly to the Old Georgian alphabet in which the respective place in the alphabetic series we have a symbol with the phonetic value [x] and numerical value "6000."

N. S. Trubetzkoy considered it possible to assume such a historical relationship between the Old Georgian alphabet and the Old Slavonic Glagolitic (cf. Trubetzkoy 1954: 23). In this sense, in the Glagolitic the sequence of the symbols ᰱ *c* "900" ~ ⹁ *č* "1000" ~ ⱔ *š* "2000" (expressed also in the Cyrillic as the sequence Ц *c* ~ Ч *č* ~ Ш *š*) is characteristic, being the reverse of the sequence of the respective symbols in the Old Georgian writing system: ყ *š* "900" ~ ჰ *č* "1000" ~ Ⴚ *c* "2000."

7.5. Besides the resemblance of the paradigmatic structure, Old Georgian *Asomtavruli* writing and the Old Slavonic Glagolitic share the common principle of the distancing of the graphics of the newly created writing from that of the prototype system. This was accomplished in order that the emergent system be characterized by all the features of an "independent national writing" with no outward resemblance to other contemporary writing systems.

Classical Armenian writing, with its graphics totally differing from the Greek prototype, created by Mesrop Mashtots, proved an extreme manifestation of this principle. Fully basing himself on the Greek writing system in inventing Classical Armenian writing, Mashtots totally changed the graphics of the prototype system, resorting to different graphic techniques in shaping corresponding characters of the new

writing. In this way all external links with the Greek prototype are severed and a semblance of the complete independence and originality of the newly created writing is created.

The Inventor of the Old Georgian *Asomtavruli* alphabet deliberately modifies—with the same purpose—the Greek prototype system; in the newly created system he does not break with the Greek graphics, but merely transforms it by a deliberate archaization of the graphics of the prototype system and graphical modification of corresponding characters. By this, the Creator of the Old Georgian alphabet achieves essentially the same result in inventing an original national writing as Mashtots did by creating an original Classical Armenian national writing on a graphic basis absolutely differing from the Greek prototype.

Such tendencies in the Eastern Christian Cultural World—dictated by political and religious considerations—led to the creation of several outwardly differing writing systems, resting on Greek writing but exhibiting outward graphic independence with respect to the Greek prototype system.

From this point of view the Old Georgian *Asomtavruli* writing, the Classical Armenian *Erkat'agir*, and Old Slavonic *Glagolitic* fall into a common typological class—opposed to *Coptic* and *Gothic* scripts as well as to the *Cyrillic*, whose graphic expression reflects the graphics of their contemporary Greek writing system.

At the same time, however, Old Georgian writing (as well as the Old Slavonic Glagolitic) drastically differs from the Classical Armenian alphabet with respect to the internal, paradigmatic structure of writing. From the viewpoint of paradigmatic dependence on the system of the Greek prototype Old Georgian writing (as well as the Old Slavonic Glagolitic) is typologically closer to the oldest specimens of Christian scripts: Coptic and Gothic writing systems.

7.6. The establishment of the Old Georgian capital *Asomtavruli* as the writing of the Christian period, compiled on the basis of the Greek alphabet, naturally raises the question as to the identity of its Inventor: Who was the person that created—on the basis of his contemporary Greek alphabetic writing—an absolutely new and original writing of monumental style as the result of a deliberate archaization and modification of the graphics of writing of the Greek prototype system?

History has preserved the names of the great Inventors of Christian scripts: Gothic, Classical Armenian, and Old Slavonic alphabets. These were outstanding men of letters of their time: Ulfilas, Mesrop Mashtots, and Constantine-Cyril. However, we do not know for certain the identity of the man who created the Old Georgian monumental

Asomtavruli writing, nor is the name of the Inventor of the Christian Coptic writing known.

The Armenian historical tradition links the creation of Old Georgian writing (as well as the writing of Caucasian Albanians) to the work of Mesrop Mashtots. On the other hand, on the basis of the evidence of the same historical tradition it may be concluded that Mesrop Mashtots was not familiar with Georgian, which totally rules out the possibility of his inventing the Georgian script.

As noted above, the evolvement of a new writing does not imply only the invention and compilation of definite graphic symbols of writing: It primarily presupposes a profound linguistic analysis of the phonetic side of language, and isolation of its individual sound units that have to be expressed in writing by appropriate graphic symbols. Logically this is the first and main stage in the process of creating a new writing on which is essentially based the entire subsequent procedure of the graphic expression of individual sounds and their arrangement in a definite sequence depending on the alphabetic series of the prototype system. All this renders impossible the creation of a writing for a definite language by a person who has not mastered this language thoroughly and hence is incapable of carrying out its detailed phonetic analysis.

Neither is there any objective ground to consider Mesrop Mashtots an "instructor" or "consultant" in the creation of Old Georgian writing, who "imparted his experience and general principles to the inventor of the new writing" (cf. Perikhanyan 1966: 132; Greppin 1981). The Old Georgian alphabet, as has been shown above, is based on structural principles differing from Classical Armenian. Both the paradigmatics of the Old Georgian system and the graphic characteristics of the letters manifest—regarding the dependence on the Greek prototype system—a picture substantially differing from the Classical Armenian system, which rules out the participation of the Inventor of Classical Armenian writing in the compilation of Old Georgian writing even in the role of a "consultant" (cf. Gamkrelidze 1981).

It is natural to assume the presence of definite historical relations and mutual influences between the Christian Old Georgian and Classical Armenian scripts of the same period, which might be attested by a number of similar features detectable in these systems: cf. the graphics of Georg. ქ [k'] and Arm. կ [k]; cf. also Georg. ფ [pʰ] and Arm. Փ [pʰ], Georg. ქ [kʰ] and Arm. Ք [kʰ], reflecting the graphics of the corresponding letters of the Greek prototype; cf. the names of letters: Georg. *k'an* - Arm. *ken*; Georg. *ban* - Arm. *ben*; Georg. *in* - Arm. *in*, and others. However, the direction of such influences may be determined

only with the establishment of the precise date of the invention of the Old Georgian and Classical Armenian systems of writing.

In any case, separate instances of such possible mutual relationships do not obliterate the fundamental structural-typological differences existing between the Old Georgian and Classical Armenian systems, which turn them, notwithstanding certain similarities in their monumental-style graphics, obviously motivated by the graphic nature of the Greek writing prototype, into polar systems within a single typological group.

The Georgian historical tradition relates the emergence of Georgian writing to the activity of King Parnavaz (third century B.C.), who "introduced Georgian literacy." Although the credibility of this evidence of the eleventh-century Georgian historian *Leonti Mroveli* is questioned by some scholars, the entire cultural and historical situation of the period does not rule out in principle a possible existence in ancient Iberia of a special kind of "pre-alphabetic" Georgian writing. Such "Archaic Georgian writing" may have been employed in the pre-Christian Georgian state in recording texts of varied character.[54] With the conversion of Iberia and the proclamation of Christianity as the official religion of the country a new alphabetic writing was created on the basis of the Greek system, that might have supplanted the "Archaic Georgian writing" of the pre-Christian period, becoming the dominant writing with an official state and religious status in Christian Iberia. The first translations of the books of the Scriptures in Georgian were made with the aid of this new, specially created national *Asomtavruli* writing, followed by original literary works in the hagiographic genre.[55]

Notes

1. Cf. Cardona 1981. Such an approach to writing as a *sign* or *semiotic* system is observable already with de Saussure, as evidenced by notes from his records published in 1972 (Saussure 1972: 10-11).

2. The phylogenetic development (or phylogeny) of writing refers to the evolution of writing in general, with account of the consecutive stages of its development, beginning with semiography up to the alphabetic stage of phonography. The ontogenetic development (or ontogeny) of writing is the origin and development of the consecutive stages of an individual writing system, beginning with its creation and continuing up to the time of its study.

3. Elements of ideography are present in many ancient and modern writing systems (cf. for example, the numerical designations in most writing systems, symbols of the type of &, e.g., cf. in English, the system of mathematical signs, and so on). Uninterrupted ideographic writing systems are characteristic of the ancient stages of the phylogenetic development of writing.

4. Elements of ideography may be present in any alphabetic writing. Hence, one can speak only relatively about the greater perfection of the alphabetic system of writing in comparison with ideography (cf. Morpurgo Davies 1986). The "perfection" of alphabetic writing should be taken in the sense that it is chronologically a further stage in the phylogenetic development of writing, consecutively passing the stages of ideography, logography, and syllabography, up to the emergence of the alphabetic system proper, although in the development of alphabetic writing cases may be observable of a reversion to principles of ideography and the emergence of separate ideographic scripts (cf. e.g. the elements of ideography in modern English writing).

5. In this sense, traditional *paleography* emerges as a particular discipline of *grammatology* that studies primarily the "plane of expression" of a writing system, i.e., the specificity of the graphic expression of special meanings with the aid of definite graphic signs, and the questions of the graphic transformation of these signs in time. It is not accidental that in tackling such problems as historical correlations between various scripts, traditional paleography—largely concerned with the "plane of expression" of a writing system—based its conclusions mainly on the external aspects of graphic resemblance between the signs of these systems, without due account of their inner structural peculiarities

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determined by the interrelation of the "plane of content" and the "plane of expression" of the system.

6. Such a linear order of graphic signs in a system, determining its paradigmatic structure, may be motivated by various factors. A special place among them is held by the factor of graphic resemblance of the symbols and the phonetic likeness of the sounds expressed by these signs. The paradigmatics of the Old Semitic system of writing is largely determined precisely by these factors (cf. Driver 1948: 182 ff.; Taylor 1899: 190-191). In many derivative writing systems, borrowed from definite written sources and created on the pattern of the latter, the paradigmatics of the graphic symbols—unmotivated from the viewpoint of the given systems—may reflect the order of the characters of the prototype system (cf. the paradigmatics of the Greek system with respect to Old Semitic).

7. In Phoenician "consonantal-syllabic" writing the question of a mutual one-to-one correspondence between the graphemes and consonantal phonemes of the language is complicated by the nature of the symbol [ѡ]: does this sign render the voiceless hushing sibilant phoneme $š$ or is it used also to designate the hissing-hushing sibilant $ś$, as in Hebrew, in which these sounds are differentiated by means of diacritical marks on the principal symbol? In this case, the preservation of the phonemic differentiation of $š$ - $ś$ should be assumed in the class of sibilant phonemes in Phoenician, as well as in Hebrew, inherited from common Semitic. But in this case how is one to account for the use of a single graphic symbol to render the two phonemes $š$ and $ś$ in Phoenician as well as in the other systems of Old Semitic writing, whereas all the other consonantal phonemes were expressed by special graphic symbols? This gives ground to assume the occurrence—prior to the recording of the language—of a merger of the sibilant phonemes $š$ and $ś$ into a common phoneme /š/ in Phoenician, as well as in all the other languages of the Western Semitic group (Moscati et al. 1969: 33 ff.). The opposition of $ś$ ~ $š$ may have been preserved only in the Jerusalem dialect of Hebrew, passing from here into later Hebrew (Harris 1939: §4). But a trace of such phonemic differentiation could be seen in Phoenician itself in the case of the spelling of the type of 'sr "ten," reflecting rather the hissing-hushing sibilant $ś$ and not the hushing $š$ (Friedrich 1951: 20).

8. This specificity of "consonantal-syllabic" writing presents the principal difficulty in reading a Semitic text. The element of deciphering, attending the reading of a text recorded in consonantal-syllabic writing (cf. Diakonoff 1974: 101), lies in determining the concrete vowel with which the consonant occurs in the given syntagmatic combination. Such difficulties are totally absent in properly "syllabic" writing systems with a

stable character of vowels with corresponding consonants both in the syntagmatics and the paradigmatics of the writing system.

9. The question of the origin of the names of the signs of Old Semitic writing cannot be considered to have been finally solved at present. The designations of the signs of Old Semitic writing— constituting the "plane of expression" of the system—may express words whose object denotata are expressed by relevant signs. Thus, the sign ∡ called 'aleph—denoting an "ox" in Semitic—originally represented the head of an ox, the letter 𐤁 bēth "house," was a drawing of a *house*, the letter △ dāleth "door," was a drawing of a *door*, and so on. It is not ruled out, however—and this appears more probable—that such designations of the signs of ancient Semitic writing originated as conventional words whose initial consonants coincide with consonants expressed by corresponding graphic symbols. The sign ∡ expressing the consonant ' came to be called 'aleph, for the latter word has an initial consonant '. The sign 𐤁 expressing the consonant *b* was called bēth (but it could have been given the name of any other word with the initial /b/) due to the presence of an initial *b* in this Semitic word, and so on (cf. an analogous acrophonic principle with the designations of the letters of the Old Slavic alphabet: *a ~ az* "I," *b ~ buki* "letter," *v ~ vedi* "knowledge," *g ~ glagol* "word," etc.).

10. Later, in the ancient Semitic system there arose a special graphic means of designating the long vowels $\bar{i}$ and $\bar{u}$ by the respective signs for *y* and *w* which initially denoted only the consonantal phonemes /j/ and /w/ (or syntagmatic-syllabic sequences with the initial *j* or *w*): cf. the spelling 'bj in Phoenician which, along with the ancient reading 'abija "of my father," presupposes also the reading 'abī "my father"; cf. also the spelling 'šwr in *King Mesha*'s inscription on the Moabite stone along with the usual 'šr to designate the name 'Ašūr "Assyria" (cf. Friedrich 1951: 39 ff.). Full spelling of words (*scriptio plena*), with the designation of long vowels by definite consonantal signs, which gained currency in late varieties of Old Semitic writing, is opposed to "incomplete writing" (*scriptio defectiva*) which reflects the ancient state of consonantal-syllabic Semitic writing which was characterized by the absence of special signs for vowel phonemes. Vowel phonemes are implicitly assumed in such a system with each consonant graphically denoted by a concrete sign and occurring in a syntagmatic combination with other consonants to build definite word-forms.

11. Special signs for long vowels—to oppose them to short ones—appeared later, in separate local varieties of Greek writing. In particular, the archaic Greek H (hēta, Semitic ḥēth), which originally expressed the aspiration *h* (*spiritus asper*), later came to express long $\bar{e}$ in dialects that had lost aspiration (e.g., in Ionic). In the same way, as a result

of a graphic modification of the symbol which in the archaic system expressed o and $ō$ vowels, letters Ω and ☉ originated in individual varieties of the eastern Greek writing for the special designation of the long vowel $ō$ (ὦ μέγα), in contrast to the archaic symbol ☉ which began to be used in such systems specially to express the short o (ὄ μικρόν).

12. The archaic Greek diphthongs ει, αι, and ου were subjected to monophthongization already at the early period of development of Greek dialects. The ει and ου diphthongs changed respectively to the narrow vowels $ẹ$ and $ọ$, which were later transformed into $ī$ and $ū$. The diphthongs αι and οι underwent analogous alterations, yielding e and $ü$ > i respectively (cf. Hirt 1902: 65; Meillet 1913: 32-33; Schwyzer 1939: 191 ff.). As a result of such phonetic changes, the spellings of EI, OI, AI, and OY in ancient Greek dialects already did not reflect diphthongal pronunciation. Of these, the diphthong $oμ$, changing to the vowel $ū$, suffered the earliest monophthongization. Owing to this, the digraph OY came to express graphically the vowel u in general. At the same time, the initial vowel /u/ in Greek dialects, expressed earlier by the letter Y, changed to the palatal vowel $ü$. Thus Y, occupying in the archaic Greek paradigmatic system the last, twenty-third, place, appears as a polyfunctional symbol expressing both the syllabic and non-syllabic values of the sonant phoneme /μ/.

13. In a number of Greek dialects the sound [ṿ] was lost very early (in the Ionic-Attic dialects already before the period of the written recording of the language, i.e., prior to the 6th century B.C.). In other dialects it was preserved longer and expressed in writing respectively by the *digamma* (in Crete up to the 2nd century B.C.): cf. the spellings of Ϝαναξ, Ϝετεα, Ϝεξ, and πολυνοϜας, etc. Approximately from the 4th century B.C. the vowel [v] began to disappear in various Greek dialects— first in the medial position, and then at the beginning of the word (cf. Thumb 1899). In accordance with such phonetic development in Greek dialects the Greek *digamma* lost the function of designating the sound [v]. Nevertheless it retained its relative sixth place in the paradigmatics of writing, and was used in the late Greek system as an *episemon*, i.e., a letter devoid of phonetic value and used only in a numerical value determined by its original place in the paradigmatics of writing.

14. On aspirated consonants in Greek, see Allen 1987: 18 ff.

15. Such graphic expression of the Greek aspirated phonemes /p^h/ and /k^h/ through representing them as the sounds p plus h, k plus h points to the fine linguistic flair of the creator of the Greek alphabet, who, being aware of the complex character of the aspirated stops, broke them up into component parts (the *occlusive component* plus *aspiration*).

16. The Semitic sign ק *qōpʰ*, which in Semitic expressed the emphatic velar stop *q*, was adopted into the Greek system to designate the same voiceless (non-aspirated) back stop [*k*], which in the Greek system is expressed by the letter Κ κάππα, reflecting the Old Semitic *kʰapʰ*. The employment of the letters Κ κάππα and Ϙ κόππα, in the archaic Greek system to designate one and the same phoneme /k/ is explained by the presence of two phonetically differing positional variants of the phoneme /k/ in archaic Greek. The variant [k] appears before the vowels *a, e, i*, expressed by the letter Κ κάππα, and the variant [q] (possibly velarized) before the back vowels *o, u*, which was expressed by the letter Ϙ κόππα. Such opposition of two positional variants of the phoneme /k/ is lost in later Greek dialects. As a result, the phoneme /k/ in all positions comes to be expressed by the only letter Κ, while the no longer used letter Ϙ now expresses, in the paradigmatics of the writing system, only the numerical value of "90," being devoid of all phonetic value. As a rule, such phonetic transformations affect the "plane of content" of a writing system, while its "plane of expression" is preserved.

17. Characteristically enough, in borrowing words from Semitic languages into Greek (or vice versa) the Semitic aspirated *pʰ tʰ kʰ* are, as a rule, rendered in Greek through the corresponding aspirated φ θ χ, while the Semitic emphatic *ṭ, q* are reflected in Greek by the pure (non-aspirated) stops τ and κ.

18. The names of these letters are changed correspondingly. In place of Semitic aspirated sounds in the corresponding Greek names pure voiceless sounds appear: πῖ, ταῦ, κάππα.

19. The Greek name of this letter, σίγμα, was perhaps formed under the influence of the Semitic name *sāmekʰ* (*semkʰ*) (Nöldeke 1904: 134]. The Semitic ס *sāmekʰ* itself, which in the Greek alphabet occupies its old place—traced back to Semitic paradigmatics and expressing the numerical value "60"—in one group of Eastern Greek writing assumes the phonetic value *ks* and is called ξεῖ, later ξῖ (Larfeld 1914: 217). The employment of a special letter to express the *ks* complex is accounted for by its relative frequency in Greek (Schwyzer 1939: 329). One of the phonetically free graphic symbols of the Greek alphabet, which preserved its original place in the paradigmatics and respectively its particular numerical value, was used in a number of later Greek systems of writing to express a specifically Greek complex of consonants. In the original archaic Greek system this symbol, occupying a relevant place in the paradigmatics of the system, had only a numerical value, while the phonetic value *ks* was expressed by the sequence of letters *k + s*.

The graphic symbol Ψ ψῖ expressing the sequence of the consonants *ps* and represented in a number of groups of Greek writing, is of analogous character. In the archaic Greek system this complex is

designated by the sequence of letters $p + s$. The special graphic symbol Ψ, which has no prototype in the Old Semitic system, is placed in the alphabetic sequence after the additional letters Φ p^h and X k^h, created in later systems on properly Greek ground.

20. With the exception of the single case of the dropping out of the Greek system of the letter reflecting the Semitic ϟ *ṣādē* and its placement later at the end of the alphabetic series as a symbol completing the sequence and carrying the numerical value of "900."

21. In such a system, "thousands" are designated by means of certain additional diacritical signs to principal symbols. In the Greek system "thousands" are expressed by placing a prime before the letters standing for the "integers": ′A = 1000, ′Γ = 3000, ′H = 8000, and so on (Larfeld 1914: 300).

22. The additional part of the Greek alphabet, in particular the letters Φ φῖ, X χῖ, and Ψ ψῖ must have come into being fairly early, presumably towards the end of the 8th century B.C., soon after the creation of the archaic Greek alphabet (cf. Larfeld 1914: 241). The origin of the system of numerical values in Greek writing should be dated to approximately the same period.

23. Cf. the letter ϡ σάμπι which is a graphic modification of the archaic σαν, its numerical value being "900."

24. The letter ϥ *fāj* is usually placed among specifically Coptic "additional" symbols (Jensen 1969: 478). However, the design of this letter and its numerical value "90" explicitly point to its origin from the Greek prototype ϙ κόππα. Therefore, this letter should occupy in the Coptic alphabetic sequence the place corresponding to properly Greek paradigmatics.

The phonetic value of this letter [f] in Coptic and its name *fāj* are explainable by the graphic resemblance of this symbol to the demotic sign ⲋ having the phonetic value [f]. The graphic similarity of these symbols must have served as the basis for the ascription to the Coptic letter *fāj*, stemming from the Greek prototype and having the numerical value of "90," of a specifically Coptic value [f] and for its respective designation.

25. Cf. in this connection, the Coptic letter *fāj*, equivalent in Coptic paradigmatics to this Gothic letter, but which in Coptic acquires a specific phonetic value.

26. In Armenian, the following sequence is identified as such sounds, additional from the viewpoint of the Greek system: *ə, ž, l, x, c, h, j, č, y, š, č̣, ǰ, v, r, c̣*.

27. A substantial systemic difference of the Armenian alphabet from the Coptic or Gothic scripts seems also to lie in the fact that the Armenian writing is based not on the entire Greek paradigmatics of 27

letters but only on that part of the Greek system whose phonetic values correspond to Armenian sounds. All the episemons or graphic symbols expressing only numerical values are excluded from the Greek basis of the Armenian alphabet: Ϛ στίγμα, Ϟ κόππα, and Ϡ σάμπι as well as the letters designating the phonetic units: Ξ *ks*, Ψ *ps*, and Ω *ō*, which are alien to Armenian.

28. Thus the Greek basis of the Armenian alphabet represents its "primary core" that is constituted of the paradigmatics of the Greek system, reduced in a sense to the sequence of those letters only, whose phonetic values have correspondences in phonetic units of the Armenian language.

29. The only exceptions are փ [pʰ], cf. Gr. φ; ք [kʰ], cf. Gr. χ; and possibly ե [e], cf. Gr. ε.

30. Classical Armenian writing evinces particularly close links with Ethiopic script (Sevak 1962; Olderogge 1974). The graphic principle of vocalization in Ethiopic, expressed in the adding to the principal letter of a stroke or circle, must have been employed by Mesrop Mashtots in creating a whole group of graphic symbols expressing absolutely different phonetic values: cf. the values designating ո *o*, ռ *ŕ*, and թ *tʰ*; ս *s* and մ *m*; դ *d* and ղ *ł*, etc. According to D. Olderogge, 22 or 23 graphic symbols, i.e., one third of the entire Classical Armenian graphic system, were obtained by this method. (For a differing view on the graphic principles underlying Classical Armenian writing, see also Muravyov 1980.)

At the same time, a number of letters of Armenian display a special graphic closeness to one another. Such are, for example, the letters designating ձ *j*, ջ *ǰ*, ճ *č*, etc. The graphic closeness of these letters is obviously motivated by the phonetic closeness of the sounds expressed by them. The creator of Armenian writing was no doubt well aware of the phonetic relationship of the affricative sounds designated by these letters.

31. Regarding the term "Old Church Slavonic language" see Tseitlin 1987.

32. It is not ruled out that the Old Slavs had local varieties of special-type writing prior to the creation by Constantine-Cyril of the alphabetic writing system on the Greek pattern (cf. Likhachev 1951; Georgiev 1952).

33. The sounds that had no phonetic correspondences in Greek were placed at the end of the alphabet, after the part corresponding to the Greek system. This "additional" part of the alphabet contains such typically Slavic sounds as *č*, *š*, *ь*, *ъ*, *x̣*, etc., which are absent in Greek.

However, individual letters, expressing Slavic sounds proper, were inserted after certain letters in the sequence of the "principal" part

corresponding to the Greek. This was apparently due to the phonetic closeness of such sounds to those included in the basic part of the Glagolitic alphabet. Such phonetically close groups of sounds are formed, e.g., by the labial occlusive b and the labial spirant v, the sibilant phonemes $\check{z}$, $ʒ$, z; the vowels i_1 and i_2, etc., arranged one after another in the sequence of letters of the Old Slavonic alphabet.

34. The graphic peculiarity of Glagolitic writing gave ground for the emergence of most diverse points of view regarding the origin of this system of writing. By the outline of individual letters and by their resemblance to letters of various scripts, Old Slavonic Glagolitic has been linked to Germanic Runes, Phoenician, Hebrew, and Samaritan scripts, to Ethiopic writing and to the Latin alphabet, and so on. (For an analysis of the various points of view regarding the origin of the Old Slavonic Glagolitic and Cyrillic writing systems see Istrin 1961: 258 ff.; Jensen 1969: 481.) Here, too, the origin of a definite writing system can of course not be solved only on the basis of the graphic resemblances and differences of individual letters of the system from the letters of other scripts, without consideration and analysis of the inner characteristics of the system, i.e., only on the basis of its "plane of expression."

35. Inasmuch as every writing system, and especially the alphabetic system of writing, implicitly presupposes a preliminary phonetic-phonemic analysis of the language by its compiler, every respective writing system represents the oldest specimen of a linguistic study of the given language.

36. Behind each writing system—whether Old Semitic, archaic Greek, Coptic, Classical Armenian, Gothic, Old Slavonic, etc.—is its concrete inventor who gives shape to a new writing for his language on the basis of a definite writing prototype, working according to a plan outlined in advance. The process of the invention of writing should not be conceptualized as a collective creativity, i.e., as if a certain person invents at some time a certain number of letters, then someone else adds some more letters, then some more appear, and so on, until a graphic system adequate to render the basic phonetic units of the language comes into being.

A script (if it exists), from the very moment of its creation, represents a fairly complete system with an adequate number of graphic symbols needed to express the basic sound oppositions characteristic of the given language. Subsequently, in the course of evolution of a writing system thus created (i.e., as a result of the single creative act of its inventor) it may undergo definite systemic and graphic transformations aimed at its perfection and a fuller and more adequate expression of the sound oppositions (cf. the creation of additional characters to express vocalic length, as well as for the aspirated p^h and k^h in Greek writing) or

to reflect in writing the phonetic changes of the language. The possible graphic changes of writing are expressed in the changes in time of the outlines of the letters and in the overall graphic appearance of the script due to the changing manner of writing. In this sense, the following question may be asked regarding any writing system: Do we know the given script in the form it came out of the hands of its inventor, or does the writing that has come down to us represent a later variety that took shape as a result of systemic and graphic transformation of the original system?

37. In certain cases, in a newly created writing system, letters expressing no other values apart from numerical are retained with the same purpose. Such letters-episemons are characteristic of the Greek system itself, and of writing systems based on Greek (cf. the letters Ϛ στίγμα = "6," Ϙ κόππα = "90," in the late Greek system; the Gothic letters **Ч** and **U** with the numerical values of "90" and "6," respectively).

38. In many originally alphabetic writing systems, created for an adequate expression of the phonetic side of a language, the spelling of the words no longer reflects fully their actual pronunciation, owing to more or less significant transformations of the phonetic system. The sound syntagmatics of the language becomes ever more removed from the graphic syntagmatics that reflected the phonetic makeup of respective words at the creation of the alphabetic writing system and at the early stages of its development, while the ancient phonetic makeup of words was still preserved (cf. Pulgram 1976: 7; Gelb 1980: 11).

In such later alphabetic systems the graphic structure of individual words essentially represents a conventional sign for expressing the phonetic side. In such systems, individual graphic symbols may emerge, in syntagmatics, not as representatives of separate sounds and phonemes but as graphic elements of a certain syntagmatic aggregate expressing the phonetic aspect of a whole word (cf., for instance, the spellings of individual words in modern English or French).

A logical sequel to such a disparity in the development of the phonetic aspect of a language and the ancient syntagmatics of writing may be the transformation of a writing of alphabetic origin into a quasilogographic system with individual letters or syntagmatic groups of letters expressing whole words (at a total disparity between the phonetic values of these letters and sounds that form these words). The writing breaks, as it were, all links with the phonetic side of the language, turning into a system independent of language, with a definite number of graphic symbols and special rules reflecting the ancient phonetic syntagmatics. It is only in this sense that one can speak of the autonomic character of a

writing system with respect to a phonetic language (cf. Uldall 1966; Vachek 1966).

39. In the course of phonetic identification of the sounds of the Georgian language with the sound units of the prototype system the glottalized consonants /p' t' k'/, phonetically characterized by the absence of aspiration, were apparently likened to the Greek non-aspirated /π τ κ/, whereas the Georgian aspirated /pʰ tʰ kʰ/ were naturally compared with the corresponding ancient Greek voiceless aspirated stops /φ θ χ/.

40. Characteristically enough, in the respective place of the Gothic alphabetic series we find a graphic symbol deriving from the Greek Ϙ κόππα, without a definite phonetic value but with the numerical value "90." An analogous situation may be hypothesized for the early state of the Old Georgian alphabet. In the Old Georgian writing system, this character, stemming from the Greek Ϙ κόππα, was probably devoid at the beginning of a concrete phonetic value, being used merely as an episemon with the numerical value "90." The concrete phonetic value [ž] was ascribed to this character only later, at the time of the advent— obviously from a foreign source—of the phoneme [ž] into the phonetic system of the Old Georgian language.

41. The letter Ⴟ žan (numerical value "90") in the Old Georgian alphabetic sequence is followed by Ⴐ rae, with the phonetic value [r] and numerical value "100," which exactly reflects the Greek paradigmatics of Ϙ κόππα "90" — Ρ ῥῶ [r] "100."

42. It is interesting to note that the *vigesimal* system of counting in Georgian is expressed in writing by the *decimal* system, pointing to a certain disparity between the system of counting (*Zahlsprache*) and its written expression (*Zahlschrift*), cf. Menninger 1957: 64. The decimal principle of numerical values—normal for Greek and expressing the decimal system of counting in Greek, was borrowed into Georgian which, however, is characterized by the *vigesimal* system of counting.

43. These "specifically" Georgian sound units must have been left over even after the distribution of such sounds in that part of the Georgian alphabetic series which corresponded to the Greek system, serving as substitutes of specifically Greek sounds.

44. Originally, in the Old Georgian system of writing the letter Ⴠ hae was obviously an episemon, i.e., a symbol expressing only the numerical value "9.000," conformably to the thirty-sixth place held by it in the alphabetic series (cf. an analogous function of the letters Ϙ κόππα and Ϡ σάμπι in the classical Greek system, as well as the letter Ⴟ with the numerical value of "90" in Gothic). At the time of the creation of the Old Georgian alphabet the sound [h] obviously did not constitute a

phonetic unit of the language, appearing in Georgian later as a result of definite positional transformations of the velar spirant [x] (in all probability, not earlier than in the 6th-7th century A.D.). With the emergence of the phoneme [h] in Georgian this phonetic value was ascribed to a character-episemon 𐌕 that had hitherto lacked phonetic value (cf. above, an analogous assumption regarding the letter 𐌐 *žan*).

45. It is interesting to note that the "additional" part of the Coptic alphabet happens to contain approximately the same sounds as in the concluding part of the Old Georgian alphabetic series: *š, x, ǧ,* and *č.*

46. It is not ruled out that some of these designations were created under the influence of corresponding designations of characters from other writing systems. Thus, e.g., the Semitic *šīn* may have served as the prototype of the Georgian *šin,* while the designation *čin* may have been patterned on *šin;* cf. also the Georgian *zen* with the Semitic *zajin;* Georgian *san* with the Greek (Doric) σάν; Georgian *he* with Greek ἦτα, etc. (cf. Schwyzer 1931: 197).

As for the resemblance of the Georgian designation *in* to the designation *in* for the vowel [i] in the Armenian, here we are dealing apparently with an accidental coincidence of designations rather than with the influence of one system on the other. If one must insist on the borrowing of this designation from one system into another (see Perikhanyan 1966: 132), then one should rather assume borrowing from the Old Georgian into Armenian, and not vice-versa. In Georgian this designation reflects a special principle of forming the designations of the vowels (vowel + *n* : cf. Georg. *an, en, in, on, un*), whereas in Armenian *in* is the only designation of such a structure among the names of the vowels (cf. Arm. *in, ayb, eč, o*).

47. The earliest specimens of Old Georgian *Asomtavruli* writing date from the first half of the 5th century A.D.

48. In particular, such features of the Greek system—reflected in the Old Georgian alphabet—that arose after the establishment of writing from left to right, as the disappearance from the system of the letter stemming from the Semitic ş *şadē,* and the emergence of additional symbols characteristic of Greek; the transition of [u] into its palatalized variety [ü], the expression of the vowel [u] through a combination of OY, and so on.

49. Since the letters of the systems under consideration are the product of their Inventors' free creativity, our assumptions regarding the concrete graphic shaping of these letters will always remain highly tentative and hypothetical. Indeed, it is impossible to ascertain precisely what kind of graphic associations might arise in the mind of the Inventor of a writing in the course of creating this or that graphic symbol. Any

researcher's inferences in this respect reflect rather his or her subjective impressions rather than the objective processes of the creation of the graphic symbols of an ancient writing system.

We can only simulate the synchronic graphic interdependence of separate symbols of a particular writing (see above on the compilation of all the graphic symbols of Old Georgian writing out of a straight line and a semicircle). However, this does not mean the reconstruction of the picture of the graphic procedure followed by the inventor of the given writing in shaping individual graphic symbols. Nor is it methodologically justified to draw conclusions on the origin and ways of creation of a particular writing on the basis of such graphic analysis.

In this respect highly characteristic is the method of analysis of Caucasian scripts (Classical Armenian, Old Georgian, Albanian), used by S. N. *Muravyov* in his numerous papers (see references in Muravyov 1982). Considering a number of characters of Old Georgian writing (in particular, those for vowels) to have been created through "graphic deviation" from corresponding Armenian vowels, the author "proclaims" on this basis the conclusion that Old Georgian writing was created from Classical Armenian.

On the basis of an analogous graphic method of analysis of individual symbols of Classical Armenian and Old Georgian scripts (in this case, the characters for the consonants), R. *Pataridze* (1972)—much earlier than *Muravyov*—arrived at a diametrically opposed conclusion on the interrelationship of these two scripts, viz. on the derivation of Classical Armenian from Old Georgian writing.

All this shows clearly how subjective and arbitrary are the conclusions on the origins of this or that writing when they are mainly based on a graphic analysis of letters.

50. In this respect, the Eastern Greek Christianity differs sharply from the Roman Church that propagated Christianity in Western Europe on the basis of Latin language and Latin script, denying the local peoples the right to translate the books of the Holy Scripture into their own languages and to conduct divine service in their native tongue (cf. Marquart 1917: 1 ff.; Meyendorff 1982: 7 ff.).

51. The letter [š] in the Classical Armenian alphabetic series (numerical value "500") does not occupy the place of the Greek Ξ ξῖ, expressing the specifically Greek phonetic value [ks], as assumed in Perikhanyan 1966: 119, but represents a symbol of the "additional" part, occupying in the sequence of the initial nucleus the place between the letters Ն [n] and Ո [o], corresponding to the Greek N νῦ and Ο ὂ μικρόν. The same refers to the character Ջ [ǰ] (numerical value "900") which, in the Classical Armenian alphabetic series does not occupy the place of the

Greek Ϛ κόππα but in the original sequence holds the place between ϟ [p] and ቡ [i̇], corresponding to the Greek symbols Π πῖ and Ρ ῥῶ.

52. The West Goths—the eastern branch of the Germanic people of the Goths that adopted Christianity in the 4th century—populated the northern Black Sea littoral at the time (cf. Vasiliev 1936: 3 ff.). Hence, the new Gothic writing created by Ulfilas on the Greek basis may have been known to peoples of neighboring countries, particularly to the Inventor of Old Georgian writing.

53. The familiarity of Constantine-Cyril, the Inventor of the Old Slavonic alphabet, with Iberian (Old Georgian) writing may be concluded also on the basis of Cyril's *Life*, in which Constantine-Cyril mentions Georgian among the original alphabets known to him (cf. Dvornik 1970: 129).

54. The "introduction of Georgian literacy" ascribed in the Georgian historical tradition to King Parnavaz may reflect the type of "writing" that I. Gershevitch (1979) describes as *alloglottography* (i.e., "writing in another language"), having become widespread in a number of countries of the ancient Near East, in particular in the Iranian world. Under the system of alloglottography, the text or communication, dictated in one language, e.g., Old Persian, was recorded in a language with a special writing, in the present case, Elamite, and was read by the addressee (or to the addressee by a person familiar with Elamite or the Elamite system of writing) not in Elamite, in which the text has been recorded, but in the original language of communication—in this case Old Persian. It was only later that the Old Persian cuneiform proper was invented for direct recording of Old Persian texts.

For the Middle Persian period it was not Elamite that served as the mediator language but Aramaic with consonantal-syllabic writing that had become widespread at the time. Elamography, characteristic of the literacy of the Old Persian period, changed in the Middle Persian period to Arameography, leading subsequently to the heterography and ideography of the Middle Iranian period.

According to a graphic comparison made by Gershevitch, the described method of recording an oral text in antiquity is comparable to the modern recording of speech on a tape-recorder. The scribe, recording the oral Persian text with its automatic translation into Elamite or Aramaic, and the reader of this recorded text, translating it back into Persian while reading it, is likened to a modern recording device. In the former case the Elamite (or Aramaic) language and writing emerge as the "mechanism" of such a device, and in the latter, the electric apparatus. The method of alloglottography was evidently widely used in the Near East, which accounts for the particular spread at various times of individual languages (Elamite, Aramaic) throughout the region.

It is not ruled out that the prevalence of Aramaic in inscriptions, particularly those done in a special Armazian script, in pre-Christian Transcaucasia reflects the alloglottography that was widely practiced in this region (primarily in ancient Armenia and Iberia) in recording texts in the local languages. This is probably how one should interpret the chronicler's evidence to the effect that in the time of King Parnavaz "only Georgian was spoken" in Kartli, and that he "created Georgian literacy," i.e., "Georgian alloglottography"—naturally on the basis of Aramaic, the most widespread language at the time (3rd century B.C.), i.e., a writing that subsequently developed in Transcaucasia into a special variety, named Armazian after Academician George V. Tsereteli (1941).

55. It should be assumed that such written translations into Georgian of the books of the Scriptures, made after the invention of the Old Georgian *Asomtavruli* writing, largely reflected those oral translations of canonical religious texts that, in the early Christian times, could have been made by Christian missionaries in the alloglottoepic way, i.e., "reading or pronouncing the original in a different language." Such a method of oral rendering in the national language of foreign-language religious texts while preaching—prevailing in ancient Armenia and Iberia—must have contributed largely to the terminological and lexical perfection and development of the national language in its oral form (cf. the study of *J. Kh. Sarkisyan* (1980), who calls such a method of "foreign-language reading" heteroepy.

Bibliography

ALLEN, W. S.
    1987. *Vox Graeca: The Pronunciation of Classical Greek*, 3d ed.
    Cambridge University Press.
ARNTZ, H.
    1944. *Handbuch der Runenkunde*, 2d ed. Halle/Saale:
    Niemeyer.
BOEDER, Winfried.
    1975. "Zur Analyse des altgeorgischen Alphabets," in *Forschung
    und Lehre: Festgruß Joh. Schröpfer*, 1974. Hamburg: Slavisches
    Seminar, pp. 17-34.
CARDONA, George R.
    1981. *Antropologia della scritura*. Torino: Loescher.
DIAKONOFF, Igor M.
    1974. "Ancient Writing and Ancient Written Language: Pitfalls
    and Peculiarities in the Study of Sumerian," in *Sumerological
    Studies in Honor of Thorkild Jacobsen on His Seventieth
    Birthday*. Chicago and London: University of Chicago Press, pp.
    99-121.
DRIVER, G. R.
    1948. *Semitic Writing: From Pictograph to Alphabet*. London:
    Oxford University Press.
DVORNIK, F.
    1970. *Byzantine Missions among the Slavs: Ss. Constantine-Cyril
    and Methodius*. New Brunswick, N.J.: Rutgers University Press.
FASMER, M.
    1914. *Studies in the Field of Greek Phonetics*. Moscow. [In
    Russian.]
FORTUNATOV, F. F.
    1913. On the Origin of Glagolitic Writing. St. Petersburg.
FRIEDRICH, Johannes.
    1951. "Phönizisch-Punische Grammatik," in *Analecta Orientalia*,
    32. Rome: Pontificium Institutum Biblicum.
GAMKRELIDZE, Thomas V.
    1981. "A Reply to John Greppin," in *Bazmavep: Revue
    d'Études Arméniennes*, vol. cxxxix, no. 3-4, pp. 457-459.

GARDTHAUSEN, V.
>   1876. "Über den griechischen Ursprung der armenischen Schrift," in *Zeitschrift der Deutschen Morgenländischen Gesellschaft*, vol. XXX, pp. 74–80.
>   1879. *Griechische Palaeographie*. Leipzig:B. G. Teubner.
GELB, Ignace J.
>   1963. *A Study of Writing. A Discussion of the General Principles Governing the Use and Evolution of Writing*. 2d ed. Chicago: University of Chicago Press.
>   1974. "Records, Writing and Decipherment," in *Visible Language*, vol. VIII, no. 7, pp. 293-318.
>   1975. "Forms of Writing," *Encyclopaedia Britannica*. Macropaedia, Vol. 19, pp. 1033-1045.
>   1980. "Principles of Writing Systems within the Frame of Visual Communication," in *Processing of Visible Language*, ed. P. A. Kolers, M. E. Wrolstad, and H. Bouma. New York and London: Plenum Press, Vol. 2, pp. 7-23.
GERSHEVITCH, I.
>   1979. "Alloglottography of Old Persian," in *Transactions of the Philological Society*, London, pp. 114-190.
GEORGIEV, E.
>   1952. *Slavic Writing Prior to Cyril and Methodius*. Sofia.[In Russian.]
GREPPIN, John A. C.
>   1981. "Some Comments on the Origin of the Georgian Alphabet," in *Bazmavep: Revue d'Études Arméniennes*, vol. cxxxix, no. 3-4, pp. 449-456.
GUTENBRUNNER, S.
>   1950. "Über den Ursprung des gotischen Alphabets," in *Beiträge zur Geschichte der Deutschen Sprache und Literatur*, vol. 72, no. 3, pp. 500-508.
HARDER, R.
>   1942. "Die Meisterung der Schrift durch die Griechen," in *Das Neue Bild der Antike*, ed. H. Berve. Leipzig: Koehler-Amelang, pp. 94-108.
HARRIS, ZELLIG.
>   1939. *Development of the Canaanite Dialects: An Investigation of Linguistic History*. New Haven: American Oriental Society.
HIRT, HERMANN.
>   1902. *Handbuch der griechischen Laut- und Formenlehre: Eine Einführung in das sprachwissenschaftliche Studium des Griechischen*. Heidelberg: Carl Winters Universitätsbuch-

handlung.

ISTRIN, V. A.
1961. *The Development of Writing.* Moscow. [In Russian.]

JAKOBSON, ROMAN.
1945. "The beginning of national self-determination in Europe," in *The Review of Politics,* 7, pp. 29–42.

JAVAKHISHVILI, IVANÉ A.
1949. *Georgian Palaeography,* 2d ed. Bk. III, pt. I. Tbilisi. [In Georgian.]

JEFFERY, L. H.
1961. *The Local Scripts of Archaic Greece: A Study of the Origin of the Greek Alphabet and Its Development from the Eighth to the Fifth Centuries B.C.* Oxford: At the Clarendon Press.

JENSEN, HANS.
1969. *Die Schrift in Vergangenheit und Gegenwart.* 3d ed. Berlin: Deutscher Verlag der Wissenschaften.

JUNKER, H. F. J.
1925–1926. "Das Awestaalphabet und der Ursprung der armenischen und georgischen Schrift," *Caucasica,* fasc. 2 (1925), pp. 1–82; fasc. 3 (1926), pp. 82–139.

KEKELIDZE, K.
1929. "Two Festivals of Georgian Culture," in *Mnatobi,* no. 5/6, 7. [In Georgian.]

KIRCHHOFF, A.
1887. *Studien zur Geschichte des griechischen Alphabets.* Gütersloh: Verlag von Bertelsmann.

LARFELD, W.
1914. *Griechische Epigraphik.* Munich: Oskar Beck.

LIKHACHEV, D. S.
1951. "The Historical Antecedents of the Origin of Russian Writing and Russian Literature," *Voprosy Istorii,* no. 12, pp. 30–54.

LUNDIN, A. G.
1982. "On the Origin of the Alphabet," *Vestnik Drevnej Istorii,* no. 2, pp. 17–28 [In Russian].

MACHAVARIANI, E. M.
1970. Georgian Manuscripts, Tbilisi: "Khelovneba" [In Georgian].
1977. "The graphic principles of the Georgian alphabet," in *Sabchota Khelovneba,* no. 10. [In Georgian.]
1982. The Graphic Principles of the Georgian Script. Tbilisi:

"Khelovneba" [In Georgian].

MACHAVARIANI, GIVI.

1965. *The Common Kartvelian Consonantal System.* Tbilisi. [In Georgian.]

MARQUART, JULIUS.

1917. *Über das armenische Alphabet in Verbindung mit der Biographie des heiligen Mašt'oç.* Vienna: Mechitaristen-Buchdruckerei.

MEILLET, ANTOINE.

1913. *Aperçu d'une histoire de la langue grecque.* Paris: Librairie Hachette et Cⁱᵉ.

1936. *Esquisse d'une grammaire comparée de l'arménien classique.* 2d ed. Vienna: Imprimerie des pp. mekhitaristes.

MENNINGER, K.

1957. *Zahlwort und Ziffer: Eine Kulturgeschichte der Zahl.* 2nd ed., vol. 1. Göttingen: Vandenhoeck & Ruprecht.

MEYENDORFF, J.

1982. *The Byzantine Legacy in the Orthodox Church.* Crestwood, N.Y.

MORPURGO DAVIES, ANNA.

1970. "Greek and Indo-European Semi-Consonants: Mycenaen *u* and *w*," in *Acta Mycenaea: Proceedings of the Fifth International Colloquium of Mycenaean Studies held in Salamanca,* p. 80 ff.

1986. *Forms of Writing in the Ancient Mediterranean World,* in *The Written Word. Literacy in Transition,* ed. G. Baumann. Oxford: At the Clarendon Press, pp. 51-77.

MOSCATI, S.; SPITALER, A.; ULLENDORFF, E., and SODEN, W. VON.

1969. *An Introduction to the Comparative Grammar of the Semitic Languages,* ed. S. Moscati. Wiesbaden: Otto Harrassowitz Buchhandlung.

MÜLLER, FR.

1864. "Über den Ursprung der armenischen Schrift," *Sitzungsberichte der Wiener Akademie,* vol. 48, pp. 431-438.

MURAVYOV, S. N.

1980. "On the Protosystem of the Armenian Alphabet," *Istoriko-filologicheskij Zhurnal,* no. 2 (89) [In Russian].

1982. *Three Ancient Alphabets of the Caucasus: Their Differences, Their Similarity, the Problem of Their Affinity.* Yerevan [In Russian].

NÖLDEKE, TH.

1904. *Beiträge zur semitischen Sprachwissenschaft.* Strassburg: K. Y. Trübner.

OLDEROGGE, D. A.

1974. "L'Arménie et l'Ethiopie au IV siècle (à propos des sources de l'alphabet arménien)," in *IV Congresso Internationale di Studi Etiopici, Roma, 10-15 aprile 1972.* Rome: Accademia Nazionale dei Lincei, pp. 195-203.

PATARIDZE, RAMAZ.

1972. "Les bases graphiques de l'Erkataguir," in *Bedi Kartlisa: Revue de Kartvélologie,* vol. xxix-xxx, pp. 294-302.

PEETERS, P.

1929. "Pour l'histoire des origines de l'alphabet arménien," *Revue des Études Arméniennes,* vol. ix, fasc. 1, pp. 203-237.

PERIKHANYAN, ANAHIT G.

1966. "Towards the Origin of Armenian Writing," in *Peredneaziatskij Sbornik,* vol. 2, *The Decipherment and Interpretation of the Scripts of the Ancient East.* Moscow. [In Russian.]

PULGRAM, ERNST.

1976. "*The Typologies of Writing Systems,*" in *Writing Without Letters,* ed. W. Haas. Manchester: Manchester University Press.

ROSÉN, HAIIM B.

1984. "Le transfert des valeurs des caractères alphabétiques et l'explication de quelques habitudes orthographiques grecques archaïques," in *Aux Origines de l'Hellenisme. La Crète et la Grèce: Hommage à Henri van Effenterre.* Paris, pp. 225-236.

SARKISYAN, G. KH.

1980. "Towards the Prehistory of Armenian Writing," in *Kavkaz i Vizantija,* no. 2 [In Russian].

SAUSSURE, FERDINAND DE.

1972. "Note sulle leggede germaniche," *Raccolte da D'Arco Silvio Avalle.* Torino.

SCHWYZER, EDWARD.

1931. "Griechische Interjektionen und griechische Buchstaben-namen auf -α," *KZ,* vol. 58, pts. 3-4, pp. 170-204.

1939. *Griechische Grammatik (auf der Grundlage von Karl Brugmanns Griechischer Grammatik).* Munich: C. H. Beck'sche Verlagsbuchhandlung.

SEVAK, G. G.

1962. *Mesrop Mashtotz (On the 1600th anniversary of his birth): The Creation of Armenian Scripts and Literature.* Yerevan [In

Russian].
TAYLOR, I.
 1899. *The History of the Alphabet: An Account of the Origin and Development of Letters.* London: E. Arnold. Vols. I, II.
THUMB, A.
 1899. "Zur Geschichte des Griechischen Digamma," *IF,* vol. ix, pt. 3-4, pp. 294-342.
TRUBETZKOY, N. S.
 1954. *Altkirchenslavische Grammatik: Schrift-, Laut- und Formensystem.* Vienna: Österreichische Akademie der Wissenschaften.
TSEITLIN, R. M.
 1987. "On the Content of the Term: 'Old Slavonic Language'," *Voprosy Jazykoznanija,* no. 4 [In Russian].
TSERETELI, G. V.
 1941. *The Armazian Bilingual: A Bilingual Inscription Discovered during Archaeological Excavations at Mtskheta-Armazi.* Tbilisi [In Georgian and English].
 1949. "The Armazian Writing and the Problem of the Origin of the Georgian Alphabet, II," in *Epigrafika Vostoka,* II, pp. 90-101 [In Russian].
 1973. *Meter and Rhyme in 'The Man in the Panther's Skin.'* Tbilisi. [In Georgian.]
ULDALL, H. J.
 1966. "Speech and Writing," in *Readings in Linguistics,* vol. II, ed. E. P. Hamp, F. W. Householder, and R. V. Austerlitz. Chicago and London: University of Chicago Press.
ULLENDORFF, ED.
 1977. "Writing without Letters," *Bulletin of the School of Oriental and African Studies,* vol. XL, pt. 3, pp. 572-579.
VACHEK, J.
 1966. "Some Remarks on Writing and Phonetic Transcription," in *Readings in Linguistics,* vol. II, ed. E. P. Hamp, F. W. Householder, and R. V. Austerlitz. Chicago and London: University of Chicago Press.
VASILIEV, A. A.
 1936. *The Goths in the Crimea.* Cambridge, Mass.: Mediaeval Academy of America.