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Persian and Arabic Calendars as Presented by Anania Shirkatsi

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Abstract
Here is an attempt to present the ideas concerning the Medieval Persian and Arabic calendars as offered in the works of the 7th century A.D. Armenian scientist Anania Shirakatsi. The calendars of Christian Persians and Arabs, as explained in Anania's work, are of the Julian type, with 365.25 days per year. By Persian and Arabic Calendars, he means variants of the Julian calendar used by groups of Christians living in the Persian and Arabic lands. These calendars had a structure very different from what is generally known as Arabic or Islamic and the traditional Persian calendar.

Keywords: Anania Shirakatsi (Shirakouni), Armenian calendar, Persian calendar, Arabic calendar

Introduction

Most of the works of the 7th century Armenian scientist Anania Shirakatsi are published and examined. However, as the majority is in Armenian, these works have not been accessible to those scholars that do not possess the command of the Armenian language[1]. Yet, Anania's works provide valuable information on the science and culture of other nations. His calendrical

1. For a General account of Anania's life, works, sources and beliefs in English see "Science in 7th century Armenia: Anania of Širak", Robert H. Hewsen, *Isis*, 59 (1968), pp.32-45.

compendium, called "*Tomar*"[1], is of particular importance as it gives the description of fifteen nations' calendars, including those of Persians and Arabs. Today we know more about the medieval calendars of these nations. However, it is most useful to become acquainted with the manner in which these were executed in relation to the scientific traditions of their immediate neighbors-the Armenians. It is no less interesting to see the state of Persian and Arabic calendars in the 7th century, at the dawn of Islam. The works of Anania Shirakatsi, the great Armenian scientist of that crucial moment in history, allow us to have this most valuable opportunity[2].

Anania's Life and Scientific Achievements: An Overview

Anania Shirakatsi, an outstanding author of the 7th century, is acknowledged as the greatest scientist of Medieval Armenia. He calls himself Anania Shirakatsi (according to his birthplace) or Anania, son of Jovhannes Shirakouni (Shirakouni as his family name). He is also known as Anania Anetsi (from Ani), Metzn (the Great) Anania, Anania Hamarogh (the Mathematician), etc. In early middle Ages Armenian authors referred to him as Shirakouni. Recently, the name Shirakatsi has become more widespread. Anania lived and worked in late 7th century, a relatively peaceful short period in Armenian history. We know little about his life and scholarly activity. According to his autobiography, Anania was born in the region of Shirak, in a village called Ani or Shirakawan. His father was Jovhannes Shirakouni, probably a minor Armenian nobleman.

1. The word "*tomar*" in Armenian means calendar. The origin of this word is from Greek ημερλόγιο meaning "a book", "a volume". As we know now the word "*tomar*" was used by Anania as the proper name of the part of his "*K'nnikon*" concerning the calendar.

2. Abū Rayḥān al-Bīrūnī the eminent Iranian scholar of the 10th-11th century A.D. gives an extensive account of the calendars used by different peoples in his *Chronology of the Ancient Nations*. He does not provide any information about the Armenian calendar. However, he gives references to some Armenian feasts (al-Bīrūnī, pp. 211, 298, 309).

According to his own evidence, Anania received elementary and higher education in his motherland, becoming proficient in all sciences (including the Biblical) that were available at this time in Armenia. The schools established in the 5th century by Mesrop Mashtots and Sahak Partev incorporated the Trivium (grammar, rhetoric and logic or dialectic) in their educational program, and this practice continued till the 7th century and beyond.

Anania, however, was not satisfied with the education he had received. He longed for further knowledge; he wished to master the second level of the western educational system of the time–the Quadrivium (arithmetic, geometry, music and astronomy). According to Anania's personal testimony, these disciplines were not taught in Armenia at the time, and there were no textbooks that would allow him to gain knowledge on these subjects. Thus, in order to complete his education, Anania left for Western Armenia[1], the city of Karin (modern Erzurum), known as Theodosoupolis at the time. In Karin he met Eghiazaros, a well-known scholar. We do not know whether Anania studied here or not, the sources are silent on this issue. We know, however, that from Eghiazaros he learned about another scholar, the mathematician Christosatour, who lived in the "Chorrord Hayk" (Fourth Armenia), a province in the Western Armenia, which corresponds to Kharpout region in modern Turkey. Anania left Karin to study with him and stayed with Christosatour for six months. At the end of this time, realizing that he could not further benefit from his instruction, Anania embarks on a long journey to Constantinople, in search of a teacher. While in Sinop, he learned from his acquaintances that no good teachers could be found in Constantinople, and that the best one was the famous scholar Tiwkhikos who lived in Trebizond and attracted students from Constantinople itself. He

1. From 387 A.D. to the 7th century Armenia was divided between the Roman (afterwards Byzantine) Empires, called "Western Armenia" and Persia, called "Eastern Armenia".

was the most erudite person of his time, well versed in Greek science, as well as Armenian language and grammar. Anania becomes the student of Tiwkhikos, studying in his school for eight years. In 666 A.D. Anania returned to Armenia where he opened a school and soon gained prominence as a teacher as well as a scholar. The main source of this information is Anania's autobiography (Anania Shirakouni, pp. 206-209; Abrahamian, 1944, pp. 31-42; Broutian, The Date of Christ's Birth According the Armenian Literary Tradition, pp. 88-89). We learn from several Armenian sources that the Supreme Patriarch of Armenia, the Catholicos Anastas Akoretsi (ca. 661-667 A.D.) invited Anania and ordered him to compose a textbook that would contain all the sciences he had studied, especially, the Armenian calendar with the corrections it needed. We also know that as a result of this commission, Anania wrote the work entitled "*K'nnikon*." Modern scholarship considers this work as a textbook that contained instruction on all disciplines of the time: grammar, rhetoric and logic or dialectic, as well as arithmetic, geometry, music and astronomy, in other words, the disciplines included in the Trivium, and the Quadrivium. Besides these, *K'nnikon* included some practical knowledge and the calendar. Although Anania's *K'nnikon* didn't survive in its entirety, as a single work, parts of it have reached us in various Armenian manuscripts. They are preserved as separate works, some still maintaining the original intent, while others have reached us with considerable editorial changes that reflect the "revisions" executed at different periods in time. It is interesting to note that the oldest known textbook containing the four operations of arithmetic (in a ciphered numerical system) is contained in the surviving portions of Anania's *K'nnikon*. As for the parts in Anania's *K'nnikon* that relate to the calendar, called "*Tomar*" it is of particular importance that we can now restore it to its original form (Matevossian, 1974, no.7, pp. 66-78, no.8, pp. 71-81; idem, 1994, pp. 16-30).

The Calendar (*Tomar*) of Anania

The *Tomar* (Calendar), which was included in Anania's *K'nnikon*, consisted of explanatory texts, theoretical discourses and many calendar tables. The calendars of fifteen Christian nations were represented here. Fourteen of these -indicated by Anania as Hebrews, Arabs, Macedonians, Romans, Syrians, Greeks, Egyptians, Ethiopians, Athenians, Bythanians, Cappadocians, Georgians, Albanians[1], and Persians[2]-had their calendars parallel presented in the part of Anania's *Tomar* called "*Kharnakhoran*"[3]. This was a set of especially constructed large tables, twelve in number, showing all the days of the year on separate lines indicating the New Year day, the beginning of each month, the days of the equinoxes and solstices, as well as the important feast days of all the calendars belonging to the nations mentioned above. Some special parameters that allowed the establishment of the phases of the moon for each day of the year were employed in a few auxiliary tables (Broutian, *Kharnakhorau*, pp. 32, 33, 39-46). There were also some texts explaining how to use the above mentioned tables.

One can notice that there are nations in this list that are now recognized not to be Christians. However, we know that in the 6-7th centuries there were well organized, large Christian communities living among these nations. As Anania has composed his works in mid-7th century, we shall take into account that we can find in his works only the calendars of different nations as he knew them-it means-as they were before his time (not later than 660-s). On the other hand, we know from the works of Armenian

1. This is the Caucasian Albania of early middle ages located in the north-east of Armenia, between the Caspian Sea, the Caucasian mountains, and bordering Armenia with the river Kura.
2. Here we refer to the Christian parts of these nations that existed there until the adoption of Islam.
3. The word "*Kharnakhoran*" consists of two components: *Kharn*, the first part of the word means "mixed," "joined," "united," and *khoran*, the second part means "table," or "a column within the table." Thus the word "*Kharnakhoran*" used by Anania means a table with mixed, joined columns. The *Kharnakhoran* has reached us in various editions. Due to their wide applicability these tables were subjected to essential changes, depending upon the purpose of application. This is why some copies of the *Kharnakhoran* preserved in Armenian manuscripts do not include certain parts of the original.

historians of 8th-10th centuries that before the beginning of Islam there was a strong and well organized Christian community in Iran. For example, they claimed that the famous king Khosrov Anushirvan (531-579) [Khosrov Parviz (590-628)?] adopted Christianity 3 days before his death and was baptized by the Catholicos (Supreme Patriarch) of Iran whose name was Eran (Hovhannes Draskhanakerttci, pp. 66-67; Stephanos T. A., p. 112; Sebēos, pp. 69-70). As our sources tell us about a community that was ruled by a Catholicos, who baptized the king, we have to assume that this community should have been strong enough having a vast number of members and it should have the complete organization of Christian church with all official institutionary steps. So Anania's presentation of Iranian calendar concerns to this Christian part of Iranian society. The same must be said concerning Arabian and Hebrew calendars. Although we have no detailed data in our sources about Christian organizations in these nations, nevertheless we have some evidences about early organized Christian communities there. We know, for instance, from Anania, that in 1st-2nd centuries Orewgenēs son of łewontēs composed the 19-year cycles of Christian Easter for Arabs and Macedonians on the basis of Hebrew cycles (Anania Shirakouni, p. 295). This means, also, that the Hebrew Christian calendar was constructed before that. According to Armenian sources all these calendars were composed by the representatives of Alexandrian Church[1]. We can for this reason consider it natural that all these calendars are of the same type. They are all are different variations of Alexandrian solar calendar.

Indeed, all the calendars of the above mentioned fourteen nations in Anania's *Tomar* are presented according to the Julian system, where the years have an average length of 365.25 days and the 365 days (12×30

1. We know now that the Oecumenical Council of Nicaea in 325 A.D. has given a commission to the Alexandrian Church to regulate the Christian calendar problem and adjust the calendars of all Christian nations.

days+5) structure is complemented with a single day of the leap year, added once every four years.

The Armenian calendar was also of the same 12×30 days+5=365 days structure, but it did not use the system of a leap year. The duration of the Armenian year was only 365 days, and the beginning of the year was not fixed with respect to the seasons. For these reasons, Anania did not include the Armenian calendar in the *Kharnakhoran*, instead, presenting it separately in the detailed 532-year tables as well as some other auxiliary tables. These 532-year tables cover the years between 580 A.D. and 1112 A.D. For each of the 532 years some key calendar parameters (such as epacts[1], septenaries[2], etc.) and the days of important feasts are given both in Julian fixed and Armenian moveable months. The enumeration of the years begins from the 29th Armenian year[3] and ends with 560th.

These tables allow us to compare and find the corresponding Roman (Julian) date for every Armenian feast in all the years covered within the period. Once the Roman dates are known, it becomes possible to find the corresponding dates in the calendars of the thirteen nations used in the *Kharnakhoran*, mentioned above. The process, of course, is reversible. Thus, the calendar tables of Anania's book allow us to recognize the comprehensible interrelation between the individual calendars of all fourteen Christian nations as well as their interconnection to the calendar of the Armenians.

1. Numbers between 1 and 30 which are added to the number of the day of the year to determine the corresponding lunar phase. These numbers are repeated in 19 years cycles.
2. Numbers between 1 and 7 which are added to the number of the day of the year to determine the week-day. They are repeated in 28 years cycles.
3. Anania begins his calendar table from the 29th year of Armenian Era, instead of the 1st, because according to Armenian Era, the counting of the years began from 552 AD. Omitting a single cycle of 28 years, Anania adjusts (fits) the beginning of his table to both, the Armenian cyclic period of 28 years (solar cycle), and the Alexandrian period of 19 years (lunar cycle).

There also were special explanatory texts interpreting the calendars of the Christian communities among different nations. These texts were called "Duplicates" ("patčēn"-in Armenian). We now know that such detailed explanations existed for Armenian, Roman, Hebrew, Syrian, and Egyptian calendars. Unfortunately, so far we have no information about the existence of such Duplicates for the calendars of other nations (Abrahamian, p. 111).

In Anania's *Tomar* the Armenian calendar is the only one with detailed presentation. The Armenian months with the total number of days, their calendar parameters, the names of the days of months including those of the Epagomenai 5 days and also the names of the 24 hours of the day, divided into 12 daylight and 12 night hours are presented in separate tables (MS 1999, Mashtots Matenadaran, fols. 16v-17r).

Among other calendars, the Roman calendar is the one with relatively more detailed description. It is presented in its traditional way, counting the days inversely, using Calendas, Nonaes and Ides[1]. The *Kharnakhoran* gives a detailed explanation regarding the Roman calendar's unusual way of counting the days.

In the manuscripts of Anania's *Tomar*, besides the Armenian, Roman, Hebrew, Syrian, Greek and Egyptian calendars no other calendars are known to contain detailed explanatory texts; only the names of months, their length and their doubles ("*krknak*" [2] in Armenian, which refers to the two

1. In the oldest Roman calendar the first day of a month was called "calenda" from Lat. "calare"-to declare): hence our word "calendar", Armenian "kaland" meaning the New Year day. The 5th (in short months) or 7th (in long months) days in Roman calendar were called "nonae" (or "nonus"). The 13th (in short months) or 15th (in long months) days were called "idus" (or "ide"). The origin of these two names is now thought to be from Etruscan calendar and is not completely clear yet (Klimishin, pp. 197-198; Nemirovski, p. 187). The days preceding calends, nonaes and ides were called "pridee" in Latin ("eve" in English). All the other days were called mentioning their position before the following calends, nonaes or ides. For example, instead of saying "24th of February" it was usual to say "6th day before the Martian calend (March 1st).

2. Krknaks were week-day parameters for the months. They would be what are called in Latin "nota" for the beginning of the months. Since Armenian months had 30 days, the Krknak for each month was the Krknak of the previous month plus 2.

days that follow the 28 days of a four-week month) are presented in separate tables. As for the beginning of each month and the New Year day for these calendars, they were given in the *Kharnakhoran*.

The calendars of the fourteen nations represented in Anania's *Tomar*, appear in four groups: Hebrew (together with parallel, Arabic and Macedonian calendars), Roman (together with parallel Syrian and Greek calendars), Egyptian (together with parallel Athenian, Bythanian, Cappadocian, Georgian, Ethiopian and Albanian) and Persian. The grouping is based on considerations relating to the New Year day; in each one of these groups the New Year falls on the same day. The Persian calendar is not included in any of the groups because its New Year day does not coincide with that of any one of the calendars mentioned above.

Persian and Arabic calendars in Anania's works

The following is a representation of the Persian and Arabic calendars as they appear in Anania's *Tomar*.

	Persian months	days	*krknak*s	Beginning of months
1	fruardi	30	-	August 06
2	artapehešt	30	2	September 05
3	xurtat	30	4	October 05
4	tir	30	6	November 04
5	murdat	30	1	December 04
6	šahrir	30	3	January 03
7	mehr	30	5	February 02
8	apan	30	-	March 04
9	adar	30	2	April 03
10	dimah	30	4	May 03
11	pehman	30	6	June 02
12	asfandar	30	1	July 02
	awelik (epagomenai)	5	3	August 01

Table 1

	Arabic months	days	*krknak*s	Beginning of months
1	nisan	30	-	March 22
2	iyar	30	2	April 21
3	agagt'iras	30	4	May 21
4	agagłasar	30	6	June 20
5	ełt'amuz	30	1	July 20
6	ełasmar	30	3	August 19
7	agagt'ał	30	5	September 18
8	agałt'łbat'	30	-	October 18
9	ełgona	30	2	November 17
10	asron	30	4	December 17
11	Kałandi	30	6	January 16
12	elgog	30	1	February 15
	epagomenai	5	3	March 17

Table 2

These two tables given above present:

Column 1: the successive number of months

Column 2: the names of Persian and Arabic months according to MS 1973 in the collection of Yerevan Mashtots Matenadaran (fols. 15v, 34v).

Column 3: the number of days in corresponding months. In the manuscripts of Mashtots Matenadaran the calendar tables of some nations, especially those of Persians and Arabs, do not have this column[1]. Considering the fact that such information, as a rule, exists in other nations'

1. The probable cause of this is the fact that the manuscript sources of the *Kharnakhoran* we now have at our disposal are all copies of 14th or later centuries, and by this time Persians and Arabs had already become Muslims, therefore the information concerning their calendars, being no longer of practical use and significance for the Christian calendars, bore no relevance and thus could be omitted by the scribes who were copying the manuscripts.

calendars, we have taken the liberty of completing this column here for those which do not have it in the manuscript.

Column 4: the *krknak*s[1] (the doubles) of months

Column 5: the beginning of months. In the manuscripts the calendar tables do not have this column. We have taken the liberty of inserting it here in order to present the information contained in the *Kharnakhoran* in a more accessible manner, for these calendars as well.

There are also special markings in the *Kharnakhoran* that refer to the place the leap year's additional day should occupy. March 17, for instance, is preceded by the following note: "Hebrews put the day of the leap year here." This means that in the other calendars of the same group the place of this additional day will be the same. Thus, the place of the leap year's additional day in the Arabic calendar should be before March 17, i.e., March 16.

Many copies of the *Kharnakhoran* do not contain information regarding the leap year's additional day in Persian calendar. However, as the beginning of months is fixed, it must be presumed that once every four years, the day of the leap year will fall on March 3 (March 4 is always the 1st of Aspandar). This is what we observe in some *kharnakhorans*. In the *Kharnakhoran* of Ms no. 2068 (17th century), in the collection of Mashtots Matenadaran (fol. 362v.-363r.), March 3 has the following note: "Persians put the day of the leap year here."

Such placing of the leap year day, of course, does not always correspond to the knowledge we now have about the Persian calendar. According to modern understanding, the regulation of the Persian calendar was achieved

1. This column shows how many days one should add t the septenary of the year to find out the days of the week in that month. For example, if the septenary of the year is 5, and the double (krknak) of the month Khourtat is 4, then the 1st of Khourtat will be 5 + 4 + 1 = 10, and, as 10 is more than 7, we have to subtract 7 and so we get 10 – 7 = 3, i.e. the 1st of Khourtat in such years (with the septenary equal to 5) will be Thursday (Sunday = 1, Monday = 2,...).

by the introduction of an additional month once every 120 years (Saha-Lahiri, pp. 166-167). But we also know that in some cases, the leap year's additional day was inserted every four years (Lifshits, pp. 320-332). If we accept the structure of regulating the year through the addition of a month once every 120 years, then it would be impossible to fit such a calendar in the *Kharnakhoran*, parallel with the other calendars. As mentioned above, all the calendars in the *Kharnakhoran* are of the same Julian type, with years of 365.25 days of average length and an extra day added once every four years. We can deduce that the Christian Persians used a calendar of the Julian type with the day of the leap year inserted once every four years on March 3. The same can be said about the calendar of the Arabs. In Medieval Armenian manuscripts the term "Arabic Calendar" refers to the calendar of Christian Arabs. As for the calendar of non-Christian Arabs, the same manuscripts refer to it as "The Calendar of Muslims."

The list below presents the names of Persian and Arabic months, along with the variants that have come down through the Armenian manuscripts. Although the main source of the lists with the names of months in different calendars must have been the calendar of Anania, there are variations; sometimes the proper name of a month occurs with many alterations in different manuscripts. Such distortions must have happened while copying the manuscripts – the scribes, for whom most of the names were unknown, and incomprehensible, must have been the source of these discrepancies[1].

As mentioned above, in some manuscripts of the *Kharnakhoran*, there is information concerning the calendar of Muslim Arabs. The manuscript no. 2068 (fol. 357v) from the collection of Mashtots Matenadaran, for instance, contains a comparative table that presents Roman, Greek, Syrian months, complete with their days.

1. There are cases where the name of the same non-Armenian month occurs in different forms on different pages of the same manuscript.

Names of the Persian months in some Armenian manuscripts

	Ginzel, p.278	MS 817	MS 1973	MS 2068	MS 1971
1	Ferverdin	p'arwartin	fruarti	p'arartin	p'arvardin
2	Ardebehesht	artabēhēšt	artapehešt	artabēhēšt	artahešt
3	Khordad	xurdat	xurtat	xurtat	xurdar
4	Tir	t'irtah	tir	t'irmah	teri
5	Mordad	murtat	murdat	murdat	agudat'
6	Sharir	šahriar	šahrir	šahriar	šahriē
7	Mihr	mehran	mehr	mehran	mēhr
8	Aban	aspandar	apan	aban	apani
9	Ader	adar	adar	adar	adar
10	Dei (Dae)	dah	dimah	dah	dahē
11	Bahman	bahman	pehman	bahman	bahman
12	Asfendarmed	aswindar	asfandar	asp'andar	aspndar

Table 3

Names of the Arabic months in some Armenian manuscripts

	MS 2001	MS 817	MS 1973	MS 2068	MS 1971
1	nisan	nisan	nisan	nisan	nisan
2	iar	iar	iyar	iar	iar
3	agag t'iras	agag t'iros	agagt'ira	agag t'iray	agag t'iray
4	agag łasar	agagzanar	agagłasar	agagzanan	agag łasar
5	elt'amuz	et'amuz	elt'amuz	elt'amuz	egh t'amuz
6	ełasmar	elasmar	ełasmar	elasmar	eł asmar
7	agag t'ałat'	agag	agagt'ał	agag	Ag łat'
8	agag t'ałbat'	agagt'ałbat'	agat't'ałbat'	agagt'ałbat'	agag łat'
9	ełgonay	elkt'on	ełgona	elkt'on	eł gon
10	asronay	asaron	arson	asoron	arson
11	kałandios	kałandios	kałandi	kałandios	kałandis
12	ełgok'	ełgog	ełgog	ergoc□	ełgog

Table 4

In the same table, Muslim Arabs (under the name of "Tačik")[1], are also presented with the names of their calendar's months and the number of days. There is a special note here telling that the "Muslim" months neither with their beginnings, nor with the New Year's Day corresponds to the Roman or any other calendar.
Here is the Muslim calendar as shown in the table mentioned above.

The Muslim Arabs' calendar from the MS 2068 (fol. 357v)

	Month	days		Month	days
1	muhaŕam	30	7	ŕaǰap	30
2	Safar	29	8	šapan	29
3	ŕabi awal	30	9	ŕamatan	30
4	ŕabi axĕr	29	10	šawayl	29
5	ǰamaťi awal	30	11	zl łay	30
6	ǰamaťi axĕr	29	12	zl ťǰad	29

Table 5

As the table shows, the calendar presented here is a simple lunar one, just like the Islamic calendars we know. The names of these months also occur in Armenian manuscripts in distorted forms. Nevertheless, it is helpful to present the versions that occur in Armenian manuscripts.

1. The Armenian text refers to "amisk' tačkac'," indicating "the months of Tačiks." The word "Tačik" in Armenian, in general means "Turk," or "Muslim." In this context, we must interpret the word as simply "Muslim." The etimology of the Armenian word "Tačik" is given from Iranian origin, from Pahlavi "tāčik" meaning "the Arabs of Mesopotamia", originally from Iranian "tāč"-to run (Ajarian, pp. 365-366).

Names of the Arabic Muslim months in some Armenian manuscripts

	Ginzel, p. 253	MS 1973	MS 2068	MS 1971
1	Moharrem	muhamaṙ (muhaṙam)[1]	muhaṙam	muhaṙam
2	Safar	safar	safar	safar
3	Rebi I	ṙapial awal	ṙabi awal	ṙabil awal
4	Rebi II	ṙapial axir	ṙabi axĕr	ṙabil axĕr
5	Dschumada I	čmētal awal	ǰamaťi awal	ǰamatal awal
6	Dschumada II	čmetal axir	ǰamaťi axĕr	ǰamutl axr
7	Redscheb	ṙaǰab (ṙǰab)	ṙaǰap	ṙaǰab
8	Schaban	šaypan (šayban)	šapan	šahpan
9	Ramadan	ṙamadan (ṙamatan)	ṙamatan	ṙamadan
10	Schawwal	šawal	šawayl	šayual
11	Dhul-kade	til ɫayta	zl ɫay	zĕlxatē
12	Dhul-hiddsche	til heča	zl ɫǰad	zĕl ɫǰē

Table 6

Conclusion

Thus, in the Calendar (*Tomar*) of Anania Shirakatsi, the calendar of Christian Persians was presented under the name "Persian calendar," a name that continued to be used in Armenian calendar tradition also in later centuries. This was a calendar of the Julian type, with an average of 365.25 days per year and 12×30 days+5=365-days structure in a year, with an additional day for the leap year, once every four years, on March 3. The New Year day was on August 6.

The Arabic calendar that was presented in Anania's *Tomar*, as in later centuries, until late Middle Ages, is known in two versions. The first, called

1. In this column of our table we represent in brackets the names of Arabic months as they occur in the third column of the table of the manuscript if they differ from those given in the first column. See also the previous footnote.

"Arabic calendar," was the calendar of Christian Arabs, while the second called "Muslim calendar" was the calendar of Muslim Arabs. The first version was of the Julian type, with an average length of 365.25 days per year and 12×30 days+5=365-day structure in a year, with an additional day of leap year, once every four years, on March 16. The New Year day of this calendar was on March 22. The Muslim Arabic calendar was a simple lunar one with 29 and 30 successive days a month. The New Year day of this calendar was, of course, moveable[1].

The difference between the new year days of the calendars presented by Anania may be due to some indigenous traditions of these nations. In all of these calendars, the extra day of the leap year follows the last day of the month which is closest to February 28. This leads to minimum discrepancy between these calendars and the Julian calendar.

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