Various Eras and Calendars used in the Countries of Islam

(Continued from Vol. IX, 4, p. 922.)

By S. H. Taqizadeh

In the first part of this article we have discussed seven different eras or (to be strictly correct) different kinds of time-reckoning with or without a common era. We are now going to deal with the fourteen remaining sections of our list. But before proceeding to the discussion of the next number, I want to insert here a small note relating to No. 3, i.e. the Kharāji era in Egypt, as a complement to what has already been said in the preceding number of this Bulletin (BSOS., pp. 914–15).

Professor A. S. Tritton called my attention to a few Kharāji dates occurring in an Arabic manuscript in the British Museum (Or. 1338). On examining these dates, which belong to the fifth and early sixth centuries A.H., I find some interesting points which supplement our knowledge about that era as used in that country in the time of the Fātimid caliphs. This anonymous book is a history of the Monophysite patriarchs of Alexandria, from St. Mark to Matthew the 87th patriarch who died 31st December, 1408, and it must have been composed by an unknown author soon after the latter date. Some of the Kh. dates in this book are given with their corresponding dates of the Diocletian era (era of the Martyrs). These are as follows:

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<th>Kh.</th>
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<td>463</td>
<td>790 (fol. 268b)</td>
<td>482</td>
<td>809 (fol. 281a)</td>
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<td>475</td>
<td>802 (fol. 274b)</td>
<td>511</td>
<td>838 (fol. 289a)</td>
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Moreover, the date of the death of the Fātimid Caliph al-Musta‘li, which happened in the month of Șafar, A.H. 495 (Hilālī) = December, A.D. 1101, is given as 491 Kh. (fol. 284b).

1 An erratum which may cause confusion has slipped into the last page of the first part of this article (BSOS., IX, 4, p. 922) in the postscript note, where an unnecessary bracket is opened in the 8th line of the said note and is closed at the end of the note.

2 The book seems to be an abridgment of the famous history of the patriarchs of Alexandria by Severus (Ibn al-Muqaffa‘) with continuation to the time of the author. It ends on fol. 345 and is followed by a few pages on the same subject by a later author, who begins with the life of the 103rd patriarch enthroned in the year 1672–3 and concludes with the death of the latter’s successor (the 104th patriarch) in 1725–6.
The first date (463) implies a divergence of about three years between the \textit{Hilālī} and \textit{Kharājī} dates, the second a difference of about 3 years and 4 months, the third about 3 years and 7 months, the fourth about 4 years and 5½ months, and the fifth (the date of the death of the Caliph) 3 years and 10 months.

These dates, if accurate, prove: (1) that contrary to the version of al-Qalqashandī and the printed text of Maqrīzī's book, the "sliding" in A.H. 501 (if it ever took place) was not from 499 to 501 but from 497 to 501, as a variant of Maqrīzī has it (see \textit{BSOS.}, IX, p. 914 and footnote 1); and (2) that the said "sliding", if it was really effected, did not affect the popular reckoning which apparently did not take that operation (the forward shifting of the solar date) into account, but that it was only a matter for the official reckoning and remained limited to the official circles. It appears also that since the institution of the \textit{Kharājī} year by al-'Azīz in A.H. 366 no "sliding" was effected till A.H. 501. The "sliding" was apparently considered as the abolition of the \textit{Kharājī} system, as may be deduced from a statement by Ginzel (i, 265), whose source of information is unknown.\textsuperscript{1} It may even be supposed that the institution of the \textit{Kharājī} year meant the abolition of the "sliding" rather than its introduction.

I must also add that, as according to what now is proved by the above-mentioned facts, no "sliding" had ever taken place between A.H. 366 and 501, Neugebauer's table for the \textit{Kharājī} years must be correct and the question as to its helpfulness (\textit{BSOS.}, IX, 4, p. 914, n. 2) must be withdrawn.

The \textit{Jālālī} (or \textit{Malikī}) Era.—The inconvenience of the Arabian novilunar year for practical purposes in the life of the individual and still more in the social life was by no means unnoticed by the Muslims who used that system of the time-reckoning not only for religious purposes but also for their civil business and in daily life. Particularly in the affairs of the State and most of all in the financial matters of the government this defect always caused much difficulty. On the other hand, the adoption of the Persian year with the Persian (Yazdegirdian) era, besides possibly offending the Muslim sentiment, would not have brought complete stability into the calendar, because the

\textsuperscript{1} According to Nuwairî (\textit{Nīhāyat}, Cairo ed. i, p. 164) the operation of "sliding" was practised in the early times of Islam (\textit{صادر الإسلام}).
Persian year being a vague year its beginning (with which the collection of the taxes and the payment of the pensions, etc., were connected) was itself retrogressing in the tropic year. Therefore this system of computation of time, which seems to have been more or less in use in Persia by the people in the time of the early Abbasid Caliphs, also needed periodical correction if the time of the tax-collection had to be kept fixed so as to correspond always to the periods of the natural seasons of the tropic year. But as the necessary correction which, according to the report of the early Muslim astronomers, consisted of the adjustment of the Persian year by the intercalation of one month each 120 years and by which method, in the Sassanian period, the said year was periodically brought into harmony with the tropic year (or rather with the Julian year), was neglected after the Arabian conquest (and even at least about half a century before that event), the instability of the New Year was the subject of continuous complaints of the Persian landlords and farmers as well as all other taxpayers.

Different methods for remedying these deficiencies were proposed, one after the other, and some were tried. The adjustment of the Arabian lunar year through the intercalation of an extra month each two or three years with a view to harmonizing it with the natural solar year, as the Babylonians did, being considered contrary to the precepts of the religion, other ways such as the system of the Kharājī year (Nos. 2–3) and the calendar reform of al-Muʿtaḍid (vide infra) were applied but without the desired result. The periodic shifting in the Kharājī year (sliding) each thirty-three or thirty-four years was liable to be forgotten and neglected, as we have seen. The reform of Muʿtaḍid, with its four-yearly bissextile day adopted after the Julian model, was, on the other hand, not acceptable to the Zoroastrians, who never admitted any change in the names of the days of the month, nor was it popular with the masses of the Muslim Persians as it, being used with the Hijra era and Kharājī year, added another complication to the already difficult system of time-reckoning and moreover changed the place of the greatest national feast, i.e. the New Year (Naurūz).

The Seljuqian empire with its extensive dominion, consolidated

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1 It is even doubtful whether this old Persian usage of intercalation which was certainly effected always in the religious (and not in the civil) year ever affected the matters relating to taxation, etc. as well.

2 The intercalation was considered to be the same as the nasi' which is condemned in religion (Qurān ix, 37).
power, comparatively tolerable order, peace and prosperity, settled state and stable government, as well as a quite good administrative organization, was at the zenith of its greatness in the time of Malikshāh (reigned A.H. 465–485) and his wise and experienced minister, Nizām al-mulk. It was natural that the men responsible for the administration of this great empire should feel the inconvenience of reckoning by the lunar year as a serious handicap to the correct management of the finances and the keeping of the public accounts in good order. Therefore, by consulting the learned astronomers, they found that no radical and efficient remedy for the difficulty encountered by them on account of this deficiency of the system of time-reckoning was possible so long as they did not separate the two systems of computation (the lunar and solar year) completely from each other by using each of them with a different era. At the same time the astronomers advised them of the necessity of basing their solar calendar on a strictly accurate measure of the length of the tropic year if they wished to prevent the year from receding against the natural seasons. Therefore the king decided to institute a new era with a new calendar and he appointed a committee for the study of the question.

The era (Jalālī or Malīkī) began with the vernal equinox in the year A.H. 471 (15th March, A.D. 1079). The Jalālī year was made the strictly astronomical tropic year according to the measure fixed by the observation then held to be the most correct one. It is said that eight astronomers forming the committee helped in the calendar reform. Their names found in some later sources, however, seem to have been given not very accurately. For instance, 'Abd ar-Rahmān al-Khāzīnī (or al-Khāzin), whose name is included in the list of the members of the said committee, could hardly have taken part in the deliberations of that body unless he had had a very long life and had joined the elder astronomers in his early career. His astronomical tables entitled az-Zīj al-mu’tabar as-Sanjari must have been composed more than sixty years after the institution of the era, if the chronological table of the Seljūq rulers and of the events of their time given there was authentic. 'Umar Khayyām, the famous mathematician and poet, was actually a member of the committee though having died in 526 or at any rate not before A.H. 518; he also must have been very young in the early years of Malikshāh’s reign. Another astronomer mentioned in the older sources, Abū'l-Mu'azzafar Asfizārī by name, too, cannot have been an old man at that time, as we find him in Nishāpūr in A.H. 506 (i.e. thirty-nine years later) again in company
of Khayyām (see Chahār Maqāla of Nizāmī ‘Arūḍī, GMS., xi, p. 63). The part of Khayyām in this reform is somewhat exaggerated in modern times owing to the giving of too much prominence to the composer of the widely known and popular quatrains, and even sometimes going so far as to credit him with the initiation of the reform.

The date of the reform of the calendar (which must not be confounded with the beginning of the era) and the institution of the system of fixing the leap years have both been the subject of much controversy and of a great many conjectures by modern authors. The Oriental sources are not in agreement about the date. Ulugh Bey in his Zīj composed about A.D. 1437 gives two different dates, namely the 10th Ramādan, 471, and 5th Sha’bān, A.H. 468. Khāzīnī in his above-mentioned Zīj (Vatican MS., fol. 15 and 122) gives the date of the “issuing of the royal order” as the 8th Rajab, 467, which date corresponds to the Persian New Year’s Day (or the day preceding it). Ibn al-Athīr in his general history also gives the same year.1 Since the two last-named sources are older than other books referring to the date of this reform, we may reasonably accept their record and assume that in the year 467, the third year of the reign of Malikshāh, he issued an order, on the Persian New Year then falling on 27th February, A.D. 1075, to reform the calendar so that the Naurūz might fall henceforth on the vernal equinox and not in winter. This order must have been carried out either immediately or from the next year (468) on. The latter date agrees with one of Ulugh Bey’s dates.2

Perhaps the best way of interpreting these different versions and of establishing a harmony between them would be to suppose that Malikshāh and his advisers, in celebrating the Persian New Year in A.H. 467 (A.D. 1075), as usual, felt the inconvenience of celebrating this feast in winter, to which season, as we have seen, it had receded, and therefore they issued an order to the effect that the astronomers should be invited to deliberate and recommend a reform by which

1 Abū al-Fidā’ī has also the same date for the calendar reform.
2 It is, of course, also possible that the decree came into force (i.e. the actual use of the new calendar began) only in A.H. 471, the beginning of the Malikī era. Also it is not impossible to suppose that Ulugh Bey found in his source the two dates given without any qualification, though both referred to the one and the same year, the one (471) being the Hilāli (lunar) and the other the Kharājī date of the same year, but taking both of the dates as of different lunar years he worked out the month and day of the equinox for the lunar year 468 (which month and day were not given in the said source) adding the words “5th Sha’bān” to the date of the year.
the next Naurūz might be celebrated in the spring. It may be that the King, as we are told by the old authors,¹ at the same time also expressed a desire for a new observation of the stars (especially the planets) to be undertaken. The result of the consultation was the famous reform which was applied to the next year, when the New Year was made to correspond not to the 26th February but to the 15th March, 1076 (the day of the vernal equinox). After the reform of the year it was realized that the adoption of a new era for the use of the new calendar was also necessary if the disharmony between the Arabian Hijra lunar years and the reformed new solar year was to be avoided in future.² Then the astronomers advised the King to institute an era bearing his name, and accordingly the vernal equinox or the Jalālian New Year falling in the year A.H. 471 was chosen for the beginning of the Malikī era. The epoch was Friday, the 15th March, A.D. 1079, and the 19th Farvardīn, A.Y. 448. As to the Arabian date, though all reports agree in that it was a Friday, some of our sources give it as the 10th Ramadān and some others as the 9th day of the same month. But none of these dates agree with the said day of the week (Friday). The last new moon (or the conjunction of the moon and sun) preceding this date was, according to the calculation based on Schram's Mondphasentafel, at 6 hours a.m. Greenwich time (in Isfahān at about 9 h. 24 min. a.m.) Wednesday the 6th March (1079), and therefore the earliest possible visibility of the moon would have been on the evening of the next day (Thursday). Consequently the 1st day of Ramadān (as well as the 8th of that month) would be a Friday. At any rate, the date 10th is absolutely impossible, and the 9th is hardly possible unless we assume that the new moon in Persia was a few hours before the time given above and that on that occasion the interval happened to be the minimum possible between the new moon and the first visibility of the crescent. I am, however, not able to confirm either of these possibilities.

There exists, however, no doubt as to the first year of the era which began, as already stated, in A.H. 471, yet it is curious that a contemporary astronomer, Muḥammad ibn Ayyūb al-Ḥāsicīt-Ṭabarī, who, already in A.Y. 438 (A.H. 461–2 or A.D. 1069–1070), was engaged

¹ Ibn al-Athīr reports this expressly also as an event happened in A.H. 467. This author states also that the work in the observatory, for which a large amount of money was spent, began by the famous astronomers in A.H. 467 and has continued till the death of the Sultan in A.H. 485.

² Just as Mutawakkil and Mu’taṣid tried to deal with both inconveniences, though by other means.
in astronomical works, undertook the observation of the stars in Āmul (Mazandarān) in A.Y. 452 or A.H. 476 (i.e. only four years after the institution of the era) and must have written his Zīj shortly after Malikshāh's death,\(^1\) puts in the said Zīj (Cambridge O, 1, 10, fol. 19b) the beginning of the Maliki era in A.Y. 447, i.e. in the year which ended twenty days before the real beginning of the said era.\(^2\)

As to the system of the new calendar, there has been much misunderstanding on the part of the Oriental as well as Occidental authors on this matter. The Jalālian year being tropic and beginning always on the vernal equinox, the commencement of the year was to be found out every year by calculation. The astronomical beginning was always the exact point of time when the sun (in reality the earth) reached the equinoctial point of the ecliptic which in astronomy is conventionally called "the first point of Aries". The New Year's Day, however, was always the day at the midday of which the sun was already in Aries, or in other words the day on which the equinox occurred before its noon and after that of the preceding day. It follows that each time the equinox happened after noon (provided that it had occurred before noon in the preceding year),\(^3\) that day was a leap day and the year just coming to a close a leap year (of 366 days). Therefore no rule for the periodical readjustment of the year by the intercalation of a supplementary day was necessary nor was it provided. The same system is adopted now in Iran and consequently the question of finding the leap years according to a conventional rule never arises (see above, No. 5). The result of the process described above in the Jalālian years was that while normally each fourth year was a leap year, this fell, from time to time, in the fifth instead of the fourth. But the precise time of this quinquennial or five-yearly intercalation was never fixed, by a regular rule, by the reformers. It was left absolutely dependent on the result of the astronomical calculation each year. Some rule for this periodical shifting of the bissextille year could be, of course, worked out if the exact length of the tropic year, in the opinion of the reformers, was

\(^1\) All these dates are found in the said Zīj.

\(^2\) This astronomer may have not had a clear idea of that recent innovation of his time as is shown by his giving the day corresponding to the autumnal equinox in A.H. 476 as the day Ashtād (the 26th) of the Maliki month Mihr and the 1st day of Jumādā I, whereas the equinox day and the first of Jumādā corresponded in that year to the day Ashtād of the Persian (Yazdegerdian) Mihr and not to that of the Maliki Mihr. The day was the 6th Mihr (Khordād) of the Maliki calendar.

\(^3\) Or, in other words, the equinox took place after noon but before 5:49 p.m.
known or according to any other length adopted after this or that Zij (astronomical tables). The later Oriental astronomers, though they expressly stated that the only way of finding out whether a leap year is to be a quadrennial or quinquennial is the deductive method (بَلَّا سُتْرُ) expressed at the same time the opinion that the quinquennial ones would follow at times the sixth and at other times the seventh quadrennial without giving any regular sequence for the alternative courses. Some others put the alternative periods as 7 and 8 which means periods of 33 and 37 years for the quinquennial leap years. Also some of these authors tried to work out a formula for the sequence of the 29 and 33 yearly periods, each of course according to his own opinion of the length of the year. It would take us too far afield to discuss the details of all those conjectures or theories. These are to be found fully in my Essay on the Iranian Calendar in Persian (pp. 168–174 and 298–300). In this article the mention of those formulas will suffice. Much more space would be needed to mention all the theories proposed by the modern European authors on this question. Having misunderstood the statements of the Oriental astronomers as to the alternative periods of the recurrence of the quinquennial leap years, these authors tried to discover (not only to work out) the supposed original system of these periods which they presumed was laid down by the founders of the Jalālīan calendar. Gohuis, Bailly, Weidler, Montucla, Ideler, Sédillot, Matzka, Ginzel, and Suter have discussed the question, and many of them have proposed formulas based, in fact, on their own calculation according to the modern opinion of the length of the tropic year. Some of them have even credited the founder of the Jalālīan calendar with such an ingenious system as to make the divergence between the Jalālīan and real tropic year possible only one day in each 10,000, or each 28,000, or even each 400,000 years. These theories are also described in my above-mentioned Essay.

The truth is that not only the men responsible for the institution of the Jalālīan calendar did not establish any rule for the four-yearly or five-yearly leap years, but that even their opinion of the length of the tropic year is not known to us to make it possible to base on it a formula by working it out. We may assume that the length of the year in the opinion of Malikshāh’s astronomers did not differ much from that given by their younger contemporary Khāzīnī in his above-mentioned Zij. According to
this astronomer, who was engaged in the observation of the stars in A.H. 509, i.e. thirty-seven years after the institution of the Jalāli era, the length of the solar year was 365° 14' 22'' 36''' 47''', which in terms of time would come to 365 d. 5 h. 45 min. and little more than 44 seconds. But it is curious that Ḫāzīnī gives a formula for the leap years according to which the complete cycle was 220 years, and to find out whether a given Jalāli year was a leap or common year (kabīsa or basīta) one has to add 172 to the number borne by the Jalāli date in question, then to multiply the total by 53 and to divide the product by 220. If the remainder after the division was less than 53 the year was a leap year, and if it was more than that number it was a common year. Then he states that out of 220 years 53 were leap years, of which 8 were quinquennial and 45 quadrennial.1 This cycle, however, does not agree with the above-mentioned measure of the length of the year given by that author.2 Other rules for the same matter (i.e. to find whether a coming leap year should be the fourth or the fifth year after the last bissextile year) given by some other Oriental astronomers (no doubt according to their own opinion of the length of the year) are: (1) a 1,440 yearly cycle in which 305 quadrennial and 44 quinquennial leap years occurred, and of the latter 41 were 33 yearly and 3 only 29 yearly, i.e. the seventh leap year coming after six four-yearly ones 3; (2) a cycle of 491 years with fourteen successive 33 yearly and one (the last) 29 yearly quinquennial leap years 4; (3) a 258 yearly

1 The author apparently considers the first year of the Jalāli era as the 173rd year of the cycle which must, in his opinion, have begun in a year when the entry of the sun in Aries had happened (perhaps in Isfahān) just at noon or a very short time (say two or three minutes) before it.

2 A 220 yearly cycle with 53 leap years implies a length, for the solar year, of 365 d. 5 h. 46 min. and little more than 54.5 seconds, whereas with the length adopted by Ḫāzīnī (vide supra) the formula would be much nearer to perfection if a cycle of 429 years had been adopted which contained sixteen 25 yearly and one 29 yearly quinquennial and 86 quadrennial leap years. In this case the excess would have amounted to less than half a minute in a whole cycle (of course without taking into consideration the gradual shortening of the tropic year proved by modern astronomy).

3 Mīram Chalabī (d. A.D. 1525) in his book Dāstūr al-ʿamal fī taṣḥīḥ al-Jadwal (Berlin MS., Wetzstein, ii, 1140). This calculation is apparently based on the length of the year according to Zūj i Ilkhānī of Naṣīr ad-dīn Ṭūsī (365 d. 5 h. 49 min.), and curiously enough not on that given by Zūj i Ulugh Beg (Gürkānī) of which his (Chalabī’s) grandfather was the co-author and he himself the commentator (365 d. 5 h. 49 min. 15 sec. and a fraction of the second).

4 Sharḥ i Si-Faṣl, a commentary by an anonymous author to the Persian treatise Si-Faṣl on the calendriography by the famous Naṣīr ad-dīn Ṭūsī. The commentary was composed in A.H. 824 (Brit. Mus. MS. Add. 7700).
cycle with 50 leap years, of which 42 were quadrennial and 8 quinquennial, without a precise order being given for them; (4) a cycle of 3,989 years composed of 121 sub-cycles of which 120 were 33 yearly (i.e. with seven quadrennial leap years and the last one quinquennial), and one or the last, 29 yearly (i.e. with six successive quadrennial and one quinquennial).

Naṣir ad-din Ṭūsī in his famous Zīj i Ilkhānī, composed in the second half of the thirteenth century, simply gives a table for the leap years in the first 300 years of the Jalālīan era worked out according to his own opinion of the length of the solar year (365 d. 5 h. 49 min.). This confirms the opinion expressed above, namely that no regular and established rule for ascertaining the quinquennial leap years had existed, as otherwise that illustrious savant would have known of it. In the said table the quinquennial leap years are: 31st, 64th, 97th, 130th, 167th, 192nd, 225th, 258th, and 291st (MS. Paris, ancien fonds, 163). A certain Ḥasan ibn Ḥusain ibn Shahanshāh of Simnān, in a commentary he wrote in A.D. 1393-4 to the same Zīj (Brit. Mus. Add. 11636), completed the said table down to A.D. 1521 (443 Jalālīan era). There the quinquennial leap years after the 300th Jalālīan year are given as: the 320th, 353rd, 386th, and 419th.

I need hardly repeat that all the above-mentioned conjectural theories, worked out according to this or that opinion on the length of the tropic year, have nothing to do with the original scheme of the founders of the Jalālīan era and calendar. These not only did not formulate any rule for the leap years but they may even have paid no attention to the periodical recurrence of the quinquennial intercalations. It is very curious that Qutb ad-din ash-Shīrāzī, the famous man of science in his at-Tuhfat ash-shahiyya (Brit. Mus. MS. Add. 7477, fol. 146a), composed about A.D. 1276 (A.H. 675), criticizes 'Umar Khayyām for "his blunder" concerning the leap years "when he (Khayyām) stated in his Zīj (فزيج ابن الطي وفعه) that all intercalations were in the fourth years," or in other words the leap years were always quadrennial.

It must also be said that even with the modern measure of the

2 Rabi‘al-mumajjimin, also a commentary to Si-Fasl mentioned above.
3 Ulugh Bey, on the other hand, gives in his Zīj a table containing the number of days plus the fraction of a day elapsed since the beginning of the Jalālī era up to the end of each Jalālīan year from the 1st to the 1,000th year, by adding always for each year 365 d. 5 h. 49 min. 15 sec., the length of the year according to his own observation.
length of the tropic year it is not possible to formulate a simple rule, applicable for a long period of time, for the intercalation of the bissextile day, because the said length is continually decreasing at a rate of 0.00000614 day each century. It would perhaps be useful to add that according to calculation based on Schram's Zodiakaltafel, the vernal equinox took place in Isfahān in A.D. 467 (the probable date of the calendar reform) on 24 Rajab 7 h. 12 min. a.m. apparent time (15th March, A.D. 1075), and in A.H. 471 (the year in which the era began) on 9 Ramaḍān 6 h. 9 min. a.m. (apparent time). Therefore the year beginning with the former was a leap year because the next vernal equinox must have fallen in that town at about 1 p.m., but the year beginning with the latter equinox (in 471), in spite of its being the fourth after the last leap year, must have been a common year as it ended a little before midday. Thus the first leap year of the Jalālīan era was the second year of the era and at the same time a quinquennial bissextile as this is confirmed by the old authors.

As to the length of the months again there was no unanimity. While most people counts twelve months each of thirty days with five (and in the leap years six) supplementary days added to the 12th month, some astronomers adopted for the length of each month the period of time during which the sun remained in the corresponding zodiacal sign. Thus the first and second months corresponding to Aries and Taurus were each 31 days long; the 3rd month corresponding to Gemini 32 days, etc. There are also differences as to the names of the Jalālīan months. Most of the sources agree that the names were the same as those of the Persian (Yazdegerdian) months, as is confirmed by the use of the same by the famous Persian poet Sa'dī about two centuries later. Nevertheless some authors speak of the introduction of the new names for the Jalālīan months and even the days of the month of which a list is given by them.

The Era Khānī (i) or the Era of Chingiz Khān.—The use of this era in the Arabic or Persian books has more than once come to the notice of the present writer, but unfortunately no note has been made of those cases except one from a book on astronomy composed

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1 e.g. Khāzini.
2 According to Qutb ad-din.
3 He speaks in his Gulistān of the Jalālīan month Ardibibisht.
4 These names are to be found in Si faṣī of Naṣīr ad-din Ṭūsī and elsewhere.
in A.H. 764 (A.D. 1362–3) for (or dedicated to) the Emperor of China of the Yuan dynasty (Mongol) whose name as well as the Mongolian names and the Chinese titles of his ancestors up to Chingiz are given in Arabic spelling. According to this he was the great-great-grandson of Tülü the son of Chingiz. The book is curiously enough in Arabic and the author, a certain Abü Muḥammad ʿAṭā ibn ʿAhmad ibn Muḥammad ibn Khwāja Ghāzī of Samarqand often uses in this book (Paris Arab. 6040) an era which he calls Khānī with the Persian month names. For instance, he makes the date of the composition of the book A.H. 764 correspond to the year 157 of this Khānī era. This era is, no doubt, counted from A.D. 1206 (A.H. 603) when Temūchīn, after defeating the Naimāns and uniting all the peoples of Mongolia under his rule, proclaimed himself king and assumed the title of Chingiz Khan. In the same book one meets here and there with such expressions as “the month Bahman of Khānī” era or the Khānī Farvardīn, etc.

I find also in a calendar for the Persian year beginning on the 2nd Shaʿbān, A.H. 1005 (21st March n.s., A.D. 1597), a mention of this era. This calendar is appended by Mullā Muẓaffar of Gunābād, the famous court astronomer of Shah ʿAbbas I, to his book Sharḥ i Bīst Bāb, composed also in A.H. 1005. The said year is there called the year 394 after the accession of Chingiz Khān to the throne (Teheran edition, A.H. 1271, p. 173).

The famous Khānī (ii) Era of Ghāzān.—This is the better known of the two eras under this name. According to the famous historian Ḥamdallāh Mustawfī of Qazvīn in his Tārīkh i guzīda (GMS., xiv, 1, p. 595), it was founded on 12 Rajab, A.H. 701 (13th March, A.D. 1302). The same date is given by the same author also in his versified general history Zafar-nāma (Brit. Mus. Or. 2833). But it is curious that in his other work entitled Nuzhāt al-quṭūb composed in A.H. 730 (Brit. Mus. Add. 16736, fol. 30a) he gives the day as 13 Rajab. ʿAlī Yazdī in the introduction to his Zafar-nāma (which introduction he entitles Tārīkh i Jahāngīr), in the course of the history of the reign of Ghāzān states that the Khānī

1 It is unnecessary for me to try to give the spelling of these names in Roman letters.

2 This date, if it is correct, makes the accession of Chingiz fall in 1203, i.e. the first stage of the consolidation of power by Chingiz after his decisive defeat of the Kerāyits.
era which was used by the servants of the state was founded in his (Ghāzān's) time in A.H. 701 in Pārs yīl (the year of the cheetah). The position of the year in the Turkish duodenary animal cycle leaves no doubt as to the correctness of the date.\(^1\) Abu'l-Fadl 'Allāmī in his Aʿīn i Akhbarī also gives the date of the composition of the book as corresponding to the year A.H. 1002, A.Y. 963, 516 of the Jalālīan era and 293 of the Khānī era. This correspondence again implies that the beginning of the era was A.H. 701. The Khānī dates given in the Persian astrological calendars published every year in Persia also agree perfectly with the same epoch for this era. For instance, one of these calendars which was for the year beginning with the vernal equinox of the year A.D. 1935 gives the corresponding dates according to other eras and among them 857 Jalālī and 634 Khānī. This would again make the first year of the Khānī era correspond to the year 224 Jalālī and A.H. 701.

However, there is another version which contrary to all above-mentioned testimonies seems to put the beginning of the era in A.H. 700. This is given, curiously enough, by no less an authority than Vaṣṣāf, the famous historian of the Mongol court in Persia, who was himself a contemporary of Ghāzān and a witness of his reforms and who presented to Ghāzān the first three volumes of his comprehensive work (the history) in 1303, i.e. only one year after the institution of the era. In some passages of the same book this author makes the first Khānī year correspond to the year 692 Kharājī and the third Khānī year to 694 Kharājī (Tārīkh i Vaṣṣāf, Bombay ed., pp. 404 and 435). This correspondence would have agreed with the statements of the other authors if Vaṣṣāf meant by the Kharājī date that which was used in Persia where the Kharājī year 692 began, as a matter of fact, in Rajab, A.H. 701. But as the author in a passage of the same book (p. 404) expressly makes the 694th Kharājī and the third Khānī year begin with the Jalālī Naurūz (New Year) or the vernal equinox falling on 22nd Rajab, A.H. 702, this shows that he meant the Kharājī date as reckoned in Baghdaḏ, which, as we have seen (No. 2), was one year behind the more widely used computation, i.e. the Kharājī years as reckoned in Persia. Consequently the beginning of the Khānī era would be according to Vaṣṣāf on the 1st Rajab, A.H. 700.

It must, however, be said that the different passages in Vaṣṣāf's

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1 The Chinese year of the tiger (or cheetah) began on the 30th January, 1302, and 29th Jumādā i, A.H. 701.
book relating to this matter are not very clear and that they are sometimes inconsistent with each other. Therefore, I think we can continue to take the well-known epoch, namely A.H. 701, as the beginning of the era. Moreover, this date is more suitable for the institution of the era than 700, because in the month Rajab of the latter year Ghāzān was still on his way back from Syria and was not yet settled again in his residence.

Mulla Muzaffar, on the other hand, in his above-mentioned calendar (see above, No. 9) made for the solar year beginning on the 21st March, A.D. 1597, makes the said year correspond (roughly) to the Khānī year 295. This would imply that the beginning of the era was in A.H. 702!

11

The Ilāhī Era of Akbar.—We do not need to describe fully this era of which full details are to be found in A‘in i Akbarī of Abū ’l-Faḍl Allāmī (English translation by Jarret, vol. ii, p. 30). This author tells the story of the institution of this era. It suffices here to give the main points:—

The era was instituted by Akbar, the famous Moghul Emperor of India, in the year A.H. 992 (A.D. 1584) or in the 29th year of the same era. It was made to begin not from the date of the institution but retrospectively from the first New Year (the vernal equinox) after the accession of that Emperor (in fact twenty-five days after the accession) in A.D. 1556. The years were tropic like the Jalālī years but without putting the five supplementary days at the end

1 While he always makes the 1st year of the Khānī era correspond to the 692nd Kharājī year, he gives in another passage (p. 435) the 3rd Khānī year as corresponding to 704 Kharājī. In another place, as it is stated above, he gives the beginning of the year 694 Kharājī, which is according to him the same as the third year Khānī, as 22nd Rajab, A.H. 702 (p. 404), and this implies the correspondence of 692 Kharājī and the first Khānī year with the novilunar year A.H. 700. He speaks also of the time between the death of Arghun (d. 7 Rabi‘ i, A.H. 690) and the accession of his successor as the year 682 Kharājī (Brit. Mus. MS. Add. 23517, fol. 296c), and of the Kharājī 6 (no doubt 686) as the early days of the reign of Ghāzān, who came to the throne towards the end of A.H. 694. Both these correspondences agree only with the Baghdadian reckoning of the Kharājī era in which only eight years divergence existed between the Kharājī and Hilālī Hijra dates as against the nine years difference in Persia.

2 Only two years after the Gregorian calendar reform.

3 Akbar came to the throne on the 3rd Rabi‘ ii, A.H. 963, and the equinox was on the 28th of the same month. ‘Allāmī curiously enough makes an error in giving the beginning of the second year of the Ilāhī era as corresponding to the 27th Rabi‘ ii, whereas it must be the 9th Jumādā i.
of the year. According to Bendrey (Tārīkh-i-Īlāhī, 1933, p. 18), this era was in use till the accession of Shāh Jahān in 1628 (see also Ginzel, i, p. 395).

The Foreign Eras Used by Muslims or Mentioned in the Books of the Muhammadan Writers

12

The Christian era with the Gregorian calendar was adopted in Turkey in 1926. The month names are Syrian with the exception of March, May, and August for which European names are in use.

13

The Mundane era or the era of the creation.—This era is mentioned in the books of the Muslim historians and astronomers and is discussed by Birūnī (Chronology, p. 15 seq.) and many others. They speak of the difference of opinion between the Jews and Christians about the beginning of the era.

14

The era of the Deluge.—This era was not only mentioned in all Oriental books on chronology but was also used by some astronomers in time reckoning. As to the beginning of the era opinions in Arabic and Persian books are widely divided. The following are some of the different calculations which have come to my notice and which by no means form an exhaustive list:

(a) Abū Ma'shar of Balkh, the famous astronomer of the ninth century, who is said to have based his tables of astronomy (Zīj) on the era of the Deluge, in a treatise on the conjunction of the superior planets, etc., entitled دلالات الأشخاص العلويّة الدالة على الأحداث الكائنة في عالم الكون والفساد من جهة مثلاً عند طواف البوادى القرآنية وغيرها (Brit. Mus. MS. Or. 3577), puts (fol. 39a) the interval between the Deluge and the conjunction which happened just before the birth

1 i.e. counting 29, 30, 31, or 32 days.
2 Though the calculations are different from each other the results of some of them agree approximately.
3 In a marginal note it is stated that the treatise is the same as Kitāb al-qirānāt and that the book is ascribed by some authors to Abū Ma'shar and by some others to Ibn al-Bāziyār.
of Muḥammad as 3,671 years. This means that the Deluge had taken place in or about 3,101 B.C.

(b) Ḫaṁza of Isfahān in his Annals (ed. Berlin, p. 11) quotes the same Abū Maʾshar (mentioned above) as giving the interval between the Deluge and the beginning of the era of Yazdegerd (16th June, 632) as 3,735 years and 322 days.1 This would bring the Deluge back to about 3,104 B.C.

(c) According to Masʿūdī in his at-Tanbih wʾal-ʾishrāf (BGA., viii, p. 198), some people believed the interval between the Deluge and Alexander (Sel. era) to be 2,925 years. This makes the Deluge fall in 3,237 B.C.

(d) Sajzī (Aḥmad ibn Muḥammad ibn Ṭabd al-Jalīl), who flourished in the second half of the tenth century, in his book entitled Muntaḵẖab1 Kitāb al-mawālid (Brit. Mus. Or. 1346, fol. 81a), states that the fourth millennium (of the Deluge) ended in A.Y. 266, which means that the Deluge had taken place in 3,103 B.C.2

(e) According to Birūnī (Chronology, p. 25), the same Abū Maʾshar (mentioned under a) has given the interval between the Deluge and the beginning of the Seleucidian era (312 B.C.) as 2,790 rectified years (i.e. with the intercalation of about one day each four years) 7 months and 26 days. This comes to about 3,102 tropic or 3,104 vague years B.C.3

(f) Again according to Birūnī (op. cit., pp. 24–5), “the astronomers have found as a result of their calculations that the Deluge happened 2,604 years before the era of Nabonassar” (beg. 747 B.C.). Consequently it must have taken place in 3,351 B.C.

(g) Birūnī ascribes (op. cit., p. 23) to the Jews the belief that from the Deluge to the Seleucidian era (Ṭārīḵ al-ʾIskandar) 2,792 years 4 have elapsed, which would bring the former to 3,103 or 3,104. This

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1 The text is not in good order and apparently one or two lines are omitted where the date is confused with the date of the departure of Mutawakkil for Damascus. The source of Ḫaṁza’s statement was most probably the famous book of Abū Maʾshar entitled Kitāb al-ulāf wʾal-adwār of which an abridged copy is contained in a volume in Brit. Mus. (Or. 3577) where in fol. 4a the same statement occurs.

2 A.Y. means the era of Yazdegerd.

3 The same number is also the result of the calculation given by Abū al-Fadl in Aʾin i Aḵbārī, where he puts the composition of the book in 4696 after the date of the Deluge as given by Abū Māʾshar (Engl. translation by Jarrett, Calcutta, 1891, vol. ii, p. 22).

4 In al-Qānūn al-Masʿūdī of the same author (Brit. Mus. MS. Or. 1997, fol. 27a) the number is 1793 given in words. Possibly the word alf (thousand) is a miswriting for alfa (two thousand).
last number agrees with the version (b) as well as with the version of Hamdallâh Mustawfî, who in his Târikh i guzîda (GMV., xiv, 1, p. 10) makes the year A.Y. 698, the date of the composition of the book, correspond to 4,433 after the Deluge “according to the astronomers”.

(h) Also the same author (ibid. and Qânûn, 27a) attributes to the Christians the belief that 2,938 years have elapsed from the Deluge to the Sel. era. Thus the former must have, according to them, occurred in 3,249 B.C.

(i) According to Kûshyâr (ibn Labbân (?)) Bâshahri Jîî), the famous astronomer of Gilân, who flourished in the second half of the tenth and the early years of the eleventh century, in his book Mujmaš al-üsûl (Brit. Mus. Add. 7490, fol. 22b), the beginning of adwâr (the astrological cycles relating to the zodiacal signs and planets) ¹ was 276 years ² before the Deluge and the end of these, when a complete course came to an end, was in A.Y. 321. The course (12 × 360) needing 4,320 years must have begun in 3,368 B.C. to end in A.D. 952 or A.Y. 321. Deducting 276 from 3,368 the remainder will be the epoch of the Deluge, i.e. 3,092 B.C.

(j) Ideler, in his Handbuch der mathematischen und technischen Chronologie (Berlin, 1820, vol. ii, pp. 625–7), quotes the Arabic text of a passage from the Zij of Kûshyâr (manuscript of Berlin) which deals with the era of the Deluge and gives the intervals between the Deluge and other eras. In the case of the Seleucidian era the interval is given as 2,792 years, which means that the Deluge was in 3,103 B.C. Ideler, however, basing his calculation on the interval between the Deluge and the era of Nabonassar given there as 860,172 days, puts the Deluge on 18th February, 3,102 B.C. Abû Ma’shar in Kitâb al-adwâr (see p. 122, n. 1) puts it on 29th February.

(k) Şalâfî in his al-Wâfî bil-wafâyât (JA., 10th serie, tome xvii, 1911, pp. 270–2) counts the interval between the Deluge and the era of Bukhtanassar (meaning Nabonassar) 2,400 [solar] years and

¹ According to Kûshiyâr the cycles began when there was a conjunction [of Saturn and Jupiter] and Saturn was in Crab. Therefore the first cycle of 360 years was the cycle of the Crab and Saturn and the second cycle also of the same length was the cycle of Leo and Jupiter and so forth. Thus every cycle was succeeded by that of the next sign and the next planet, and one whole course of the cycles concluded when the turn came again to Crab. Each cycle was under the influence of the planet and sign dominant in that period as is stated.

² According to Abû Ma’šhar in his above-mentioned book on the effect of the conjunctions this was 287 years before the Deluge. Birûnî gives the interval as 229 years and 108 days (Chronology, p. 24).
11 months. Adding 747 years (the difference between the latter era and the Christian era) to this number we get 3147, B.C. as the date of the Deluge.\(^1\)

\(l\) In an anonymous Persian book on astronomy (Berlin MS. Orient. 4° 848), composed apparently in the second half of the eleventh century (probably in 1074) and which I believe to be a copy of Rawdat al-munajjimīn, the famous work of Shahmardān ibn abi 'l-Khair of Ray, the author of another work entitled Nuzhat nāma i 'Alāī, the interval between the Deluge and the era of Yazdegerd is given as 3,705 years and 322 days. This makes the former correspond to 3074, B.C.

\(m\) Finally, Sharaf ad-dīn 'Alī Yazdī, in the introduction to his book Zafar nāma, which introduction he calls Tārīkh i Jahāngīr (Brit. Mus. Or. 6558, fol. 11\(a\)), states that "the astronomers have an era reckoned from the Deluge and in our days in the year 788 A.Y. 4,021 years have elapsed from the Deluge". Consequently the Deluge according to this author must have taken place in 2,602 B.C.

All these thirteen versions do not seem, however, to be of independent origin and different from each other. The versions \((a), (b), (d) (e), (g), (j)\) may be considered as traceable to a common origin.

15

The era of Alexander (Tārīkh al-Iskandar).—This era is the well-known Seleucidian era which has also been given many other names by the different peoples who used it. It was called the "years of the Kingdom of the Greeks" or the "years of the reign of the Greeks" or the "era of the Hellenes",\(^2\) the "era of the Seigneur",\(^4\) the "era of the Chaldaeans",\(^5\) the "era of the astronomers of Babylon",\(^6\) the "Syro-Macedonian era",\(^7\) the "era

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\(^1\) The author adding 436 (solar) years and a fraction of a year, which is the interval between the Nabonassarian and Seleucidian eras, to the above-mentioned number (2,400) concludes that the interval between the latter era and the Deluge was 2,832! This number is apparently reached by converting the solar years into lunar years and dividing the real product (2,836) by 30 (\(!!\)) and adding the quotient to the dividend.

\(^2\) By the Jews in the books of Maccabees and Josephus.

\(^3\) Also by the Jews.

\(^4\) By the people of Tyre.

\(^5\) By Ptolemy in his Almagestes (ix, 7, and xi, 7), for the dates of three observations of the planets.

\(^6\) By Mānī in Shāpurakan (see below).

\(^7\) By later Greeks, e.g. Paschal Chronicle.
of the Macedonians”,¹ the “era of Seleucus”,² the “era of the Greeks” (Tārīkh al-yūnānīyyīn) (i.e. the Syrian Greeks),³ and the “era of the two-horned one” (Tārīkh i Dhi ’l-qarnain).⁴ This era was used in Babylonia in the astronomical tablets since the third century B.C., the oldest date of this kind known being from A.S. 23 (beg. 289 B.C.), and in many parts of Western Asia. Besides being used by the Jews in the Maccabees where we find dates according to this era relating to times as far back as the beginning of the second quarter of the second century B.C. It was used also on the coins of many countries and towns, from Asia Minor, Syria, and Arabia in the West to India in the East. Leaving aside the controversial dates of some of the Phoenician coins supposed to be from the year A.S. 5, dates according to this era appear on the coins of the Seleucid kings since 201 B.C., on the Parthian coins as early as 188 B.C., and on a coin of one of the Graeco-Bactrian rulers, corresponding to 165 B.C.⁵ However, with the falling away of some Syrian towns from the Seleucidian Empire, dating according to this era ceases, each of them instituting then a new era beginning apparently with the date of its freedom. But the use of the Sel. era continued in the Syrian churches, and with the Syrian Christians it was, till modern times,⁶ almost the only method of dating. It was used by them in their writings as early as the first half of the fourth century.⁷

The epoch of the era seems to be connected with the death of Alexander IV (Aegus) which probably happened in 311 B.C. Therefore, the beginning of the era was for the Macedonians the first day of the Macedonian year during which that event (the death of Aegus) happened, namely the first day of the month Dios which fell in the

¹ By the Syrian writers.
² Also by the Syrians.
³ By the Syrian and Arabian writers.
⁴ By the Arab authors, Muslims, and Christians. Agapius uses this expression exclusively.
⁵ All these dates on the coins are believed to be Sel. because they are fitting according to that era, though the name of the era does not appear in the legends.
⁶ It was in current use, at least in the beginning of the present century, with the Nestorians as well with some Jewish communities in the East, such as those in South Arabia.
⁷ e.g. Aphraates uses it in his Demonstrations written between A.D. 337 and 345. With regard to the details relating to the Sel. era, cf. G. F. Hill, The Catalogue of the Greek Coins of Arabia, Mesopotamia, and Persia; Percy Gardner, Catalogue of Greek Coins—the Seleucid Kings of Syria; also The Parthian Coinage and The Coins of the Greek and Scythic Kings of Bactria and India by the same author, Ginzel, i, 136, 263, 305; ii, 59; iii, 40–2; Gutschmid, Geschichte Irans u. seine Nachbarländer, passim; Bouché Leclercq, Histoire des Seleucides, ii, 516; and Pauly’s Realencyclo-
pädie (Aera).
autumn of the year 312 B.C. But for the Babylonian astronomers, who used this era, it began with the commencement of the Babylonian year during which Aegus died, i.e. with the 1st day of the Babylonian month Nisân, which fell on 2nd April, 311 B.C. With the Jews it seems that the era began with their (religious) New Year or the Jewish Nisân in 311 B.C. (also in the spring), and curiously enough the epoch of the Sel. era used for the dates of the observations of the planets given by Ptolemy according to the “years of the Chaldaeans” is 9th November, 311 B.C., i.e. the 1st Toth or the beginning of Egyptian year which followed that during which Aegus died. With the Syrian Christians of the Roman Empire the year began with Tishrin I (October) and therefore the Sel. era with them was of the Syro-Macedonian form (i.e. beginning with Oct., 312), but the Syrian Christians of the East and particularly those of the Persian Empire in the times before the fourth century (and perhaps some even during the fourth and fifth centuries) reckoned by a lunar year beginning in the spring, and consequently their era (the Sel.) must, like that of the Babylonian astronomers, have begun in the spring of 311 B.C. but not necessarily exactly at the same time. Their year, though beginning with their month Nisân and near the vernal equinox, seems to be not identical with the Bab. year. I am, however, unable to discover to what kind of calendar it belonged, as the week days

1. The Macedonian year was lunisolar and therefore its beginning has oscillated around the autumnal equinox. Some time after the conquest of Syria by the Romans the Macedonian months were made to correspond to the Julian months (Hyperberetaios = October and so forth) and the year became solar, beginning for the Syrians in general with the 1st October, but for some Western Syrians who followed the Greek indications (after these had come into use in the Orient since the fourth century), with the 1st September.

2. The Babylonian New Year’s Day oscillated in the post-Selucidian period between 21st March and 22nd April.

3. The Oriental authors give not only the number of the days elapsed between the epoch of “the era of Alexander” and that of Hijra as well as that of Yazdegerdian era, but they state also that the former fell on a Monday. Both of these data agree only with the 1st October (Julian), 312 B.C. But it must be borne in mind that the said number and the week day are only reached by backward calculation based on the presupposed date of the era and not on tradition.

4. If Kugener’s reading of the indiction number relating to the date of the ordination of Severus, the Monophysite Patriarch of Antioch, in the Syriac text of the book of Michael the Syrian should prove to be correct, we have here another instance of the reckoning of the Sel. era from 311 B.C. Kugener in his Extraits relatifs à Sévère, vii, 9 (Patrologia Orientalis, vol. 2, p. 314), gives the French translation of an extract from the list of the Jacobite bishops in the Syriac book on general history by the said Michael (late twelfth century). In that passage the date of the ordination of Severus is given as Tishri ii, 823 (Sel.), indiction vi. The same occurs also in another anonymous Syriac note (p. 317 of the same volume, Notice 1). The indiction number points to
which are given in some of the acts of Oriental martyrs, together
with the day number of the month, agrees neither with the Syro-
Macedonian nor with the Babylonian month.

The name of Alexander was probably given to this era, as is already
mentioned, on account of its epoch being the year of the death of
Alexander "Aegus". But the designation of the Seleucidian era by
this name ("the era of Alexander") seems to be of Syrian and late
Greek origin and the Muslim authors have most probably adopted
it from the Syrians. So far as I know there is no evidence of any use
of this denomination in pre-Islamic Persia. We may even assume
that this name was unknown there in Sassanian times. Mānī, in his
book, Shāpūrakān, calls this era "the era of the astronomers of
Babylon" (Bīrūnī, Chronology, pp. 118 and 206). Although the era
was, as has already been said, used in the Seleucidian and Parthian
periods on the coins of those dynasties, as well as on those of some
other minor dynasties, we have no proof that such a name (Alexander)
was ever used to designate it. This point may have a bearing on the
much discussed question of the traditional date of Zoroaster. According
to the national tradition which can hardly have originated as late
as the Islamic age, the date of Zoroaster (his birth or his mission
or the conversion of Vishtāspa to the new faith) was 258 years before
Alexander's conquest of Persia and the death of Dārā (Darius). This
date has, I believe, nothing to do with the Seleucidian era. The
chronology of the Kings of Iran in Bundahishn also implies 258 years
from Zoroaster to the death of Dārā (though the beginning of this
period is given there as the coming of the religion in the thirteenth

the year A.D. 512 and this implies that the era used began in 311 B.C. and excludes 312.
In the second note (same page) the date of the ordination is given as 8th November, 820,
"which is the year 509 of our Lord," and this reduction again means the same
beginning for the Sel. era. It is, however, curious that the indiction number in the
French translation of Chabot in the Revue de l'orient chrétien, 1899, p. 446, from which
Kugener professes to have taken the above-mentioned passage, as well as in the original
Syriac text edited by Chabot (Chronique de Michel le Syrien, tome iii, fasc. iii, Paris,
1910, p. 752), and in the French translation (the same volume, p. 448), is x and not vi,
though this number (x) is not fitting in any of the years after 501-2 and before 516-17.
(I learn from a Syriac scholar that Chabot's translation is a slip on his part due to
his misreading of the Greek word number used in the Syriac text.) According to
Comte de Mas-Latrie in his Trésor de Chronologie, col. 36, the Syrian Catholics use,
even now, the era of Alexander as reckoned from 311 B.C.

1 It was used by Aphraates of the fourth century (Patrologia Syriaca, ed. Graffin,
vol. i, col. 723-4, 942, 1043; vol. ii, col. 150), and in the proceedings of the
Chalcedonian Council in the middle of the fifth century, where it is said "in the
year 636 after Alexander . . ." (Mansi, Sacror. concil. collect., iv, 956), and also in
the Acts of Martyrs as well as by Agathias (second half of the sixth century).
Taking this number as the interval between the conversion of Vishtasp (which was the real starting-point for the success of the mission just as the *Hijra* was for the Muḥammadan faith in spite of its being posterior by many years to the first revelation) the year 588 B.C. would be the 42nd year of the life of Zoroaster and consequently his birth would fall in 630–29. This date is not only exactly 300 years before the death of Darius III, which number agrees with the other tradition preserved in the Pahlavi books of Zād Spram and Arda Virāz, but it conforms also with another tradition coming from a quite different source, namely "the book of Scholia" of Bār Qōnāi, a Syriac work probably of the seventh century, where Zoroaster's date is given as 628 years and 7 months B.C., i.e. roughly 629 years (see Pognon, *Inscriptions Mandaites . . .*, Appendix II, p. 165). There is also another point to be raised in support of the authenticity of the tradition and its being old and relating to the well-known Alexander the Great and his conquest of Persia. Ardashir, the founder of the Sassanian dynasty, has, according to Mas'udī and Biruni, falsified the history of Persia by causing the time which elapsed between Alexander the Great and his own accession to the throne of Irān to be officially put as 266 years (or according to another version 260). This was, it is related, with a view to shortening the space of time between himself and Zoroaster. As the eschatological belief in the millennial calamities was generally established, he feared the end of the millennium (the 10th), and hence the calamity for his country and his dynasty would fall not far from his time if the real interval between Alexander and himself were to be taken into calculation. This means that the interval between Alexander and Zoroaster (with whom the millennium began) having been rendered indisputable by the force of tradition, the only cut possible was in the period after Alexander by ignoring a great part of the period of the unpopular Arsacid rule, so that the beginning of his (Ardashir's) reign should

1 Though these two sources speak of the religion as flourishing for 300 years till Alexander's conquest of Persia, this does not prevent us from supposing that the period was counted from the birth of Zoroaster just as in common language one may hear it often said to-day that the Christian faith is now 1,939 years old.

2 In fact the astronomical year 629 B.C. is the historical 630. The date also fits with the story about the age of the famous Cypress of Kashmar which is said to have been 1,450 years old when it was cut down in 861 by order of the Abbasid Caliph Mutawakkil. The planting of the tree by Zoroaster or Gushtasp would thus fall in 589 B.C.

3 *BGA.*, viii, p. 98.

4 al-Qānūn al-Mas'ūdī.

5 See the letter of Tanasar ed. Minovi 44, Mas'ūdī (op. cit., p. 99), and Misköye (*GMS.*, vii, p. 125).
fall roughly in the 524th or the 518th year of the Zoroaster's millennium (the 10th). He nearly halved the length of the period of 549 years from the death of Alexander to his own time (323 B.C.-A.D. 226), or, to make it more exact, perhaps between Alexander's death and the beginning of his reign as a local prince in Pars. Is it not obvious that if there was not such an indisputable tradition in the way, the pre-Alexandrian period would be much more suitable for the operation of falsification than the period after Alexander? Moreover, how could Ardashir pretend that only 266 years had elapsed since Alexander if an era under the very name of Alexander was in current use or known among the Persians outside Babylonia and its astronomers or the Syrian subjects of Persia, and if everybody knew that the year of Ardashir's accession was the 537th of the so-called "era of Alexander"? That the above-mentioned number (266) was contained in the official history of Persia and was given in Khwadhāi nāmak is proved beyond doubt by many proofs which cannot be discussed here.

However, the Muhammadan historians who adopted the designation of Tārīkh al-Iskander (the era of Alexander) were misled by the same name and thought it had begun with Alexander the Great (either with his succession to the throne of his father or with his invasion of Persia). Therefore they took the old Persian tradition relating to the interval between Zoroaster and Alexander as meaning that Zoroaster lived 258 years before the "era of Alexander" which under the influence of Syrian writers was in current use with them for the solar years. Accordingly by adding always 258 to any Seleucidian date in their own time they worked out the time elapsed between Zoroaster and that date. This explains all the errors of Birūnī in his first book, the work of his early career, al-Āthār al-bāqiya (pp. 14, 119, and 213), where he worked out the interval between the first man and Zoroaster and between the latter and Yazdegerd I, as well as the time of Abū Zakariyya at-Ṭammāmī, all according to the above-mentioned erroneous basis, namely the interpretation of the word Alexander by the era of this name, i.e. Seleucidian era. He discovered his mistake later, however, and corrected it fully in his al-Qānūn al-Masʿūdī, where he gives a fairly correct history of Alexander's life and puts

1 Birūnī had at the time of the composition of that book no clear idea as to the time of Alexander the Great or the real meaning of the "era of Alexander". He takes the latter as beginning from the 26th year of Alexander's life (p. 28) and at the same time gives the interval between the accession of Cyrus and that of Alexander as 222 years (p. 18), which is correct.
Zoroaster 276 years before the "era of Alexander" (the Seleucidian). Apparently he wrote also a treaty of apology for his great mistake of early life on this matter, as the title given in the list of his works composed by himself suggests (see Sachau's introduction to the edition of chronology, p. xxxiii).

The fact that Birûnî's earlier book (Chronology) was available to everybody in Sachau's edition while the Qânûn, composed about twenty years later, is not yet published and hence not accessible except in the manuscripts in few public libraries, is responsible for Birûnî's erroneous statements becoming the basis for the discussion, by many scholars, of the tradition relating to the date of Zoroaster. It is curious that even Abû Ma'shar Balkhî, the famous astronomer, apparently knowing that the conquest of Persia by Alexander was eighteen years earlier than the so-called era of Alexander, was still under the impression that the 258 years interval between Zoroaster and Alexander referred to the said era and not to the reign of the Macedonian conqueror in Persia and therefore put Zoroaster 240 years before Alexander.

The principal historical question of the date of Zoroaster and of choosing between the traditional date and an earlier one based on philological grounds, namely the antiquity of the Gātha dialect, and on the statements of the classical authors, is, however, outside the subject of this article as well as of my province.

16

The era of Šufr or the Spanish era.—This era began with the 1st January, 38 B.C. This is believed to be the date of the conquest of Spain by Augustus. It was used in Muḥammadan Spain and North Africa and is sometimes called by the Muslim authors the year of Majūs or the Magians. This expression occurs in an Arabic book of astronomy composed about A.D. 1020 by a certain Muḥammad ibn Raḥiq ibn ‘Abd al-Karîm (Berlin Lbg. 108).

17

The Diocletian era or the era of Martyrs (Tārîkh ash-shuḥadā' or Tārîkh al-aqḍî), beginning with the 29th August, A.D. 284. This era was used in Egypt and especially in the Arabic books of the Monophysite Christians.

1 e.g. Herzfeld in Pavry memorial volume, and AMI., ii, pp. 41-4.
2 al-mudhakarat li Shādhān ibn Babr. Cambridge Gg. 3, 19, fol. 4a.
The Mu’tadidi Calendar.—As is already stated, the Abbasid Caliph Mutawakkil attempted to change the position of the Persian Naurūz in the tropic year by postponing it to 17th June and stabilizing it there. This was to relieve the people from paying the land taxes in April, in which month the Persian New Year fell at that time, instead of in summer when the crops were collected. The life of the Caliph, however, came to an end before the new calendar had been solidly established and found currency. The idea was revived about forty years later by the Caliph Mu’tadid, who in A.H. 282 reformed the Persian calendar and postponed the Naurūz from 12th April, on which day it fell at that time, to 11th June and made it stable there by introducing into the Persian year the Julian system of four-yearly intercalation of one day. The names of the months and their length remained as they were. Only the supplementary days at the end of the eighth month (Ābān) were made, once each four years, six instead of five. This new calendar was in use for a long time and perhaps till the Jalālián reform. The first Naurūz of this new calendar was on the 13th Rabi‘ al-akhar,1 282.

The reform of Mu’tadid of the Persian year was imitated by the ruler of Khwarizm, Ahmad ibn Muhammad ibn ‘Irāq ibn Mansur, in A.D. 959 (A.H. 347) when he reformed, in the same way, the Khwarizmian calendar (see Biruni, Chronology, p. 241). He stabilized the Khwarizmian New Year on the 2nd day of April.2 Full details about the calendar of Mu’tadid are to be found in the Essay mentioned above.

In the Naurūz-nama, a Persian treatise attributed to ‘Umar Khayyām, the author speaks (ed. Minovī, p. 12) of a calendar reform (Kabīsa or intercalation) introduced by the famous Šaffārid Prince of Sistān Khalaf ibn Aḥmad and states that up to his (the author’s) time again a difference of sixteen days has grown up. This means

1 As Šafadī correctly gives it and not on the 12th Rabi‘ al-awwal as Birūnī and some others have it.
2 This is the correct date as it is given in the at-tafhim by Birūnī and not the 3rd April as given by the same author in the Chronology.
that the year was not well stabilized by the said reform. As the reign of Khalaf in Sistān ended in A.H. 393, the reform must have been effected in the second half of the tenth Christian century.

20

The financial year of Persia before the last reform in 1925 (see No. 5) was a solar year used with the duodenary animal cycle of the Turko-Chinese system and with the corresponding date of the lunar Hijrī year. The month names were those of the zodiacal signs. The year began on the vernal equinox. In Afghanistan the month names are still those of the constellations, though the era used is the solar Hijrī.

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The Sogdian and Khwārizmian calendar, each of them with special month names but both with the Persian year except for the difference of the position of the epagomene, were also used by the Muslims of Transoxiana and Khwārizm in the first centuries of Islam. However, the system being exactly the same as that of the Persian calendar, these two calendars can be considered as coming under Nos. 6 and 7 as far as it concerns the time before the stabilization of the Khwārizmian calendar mentioned above.

There are some other eras mentioned or discussed in the chronological books of Muslims such as the era of Nabonassar, the era of Philip of Macedonia, the era of Augustus, and that of Antoninus. However, these eras are never or very seldom used for dating by the Muslim authors and therefore they are not included in the list of the eras discussed in this article.

1 In the last years before its abolition (I believe since 1911) it was also often used with the solar Hijra dates.