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INTRODUCTION

TO

HISTORICAL CHRONOLOGY,

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TRANSLATED FROM THE GERMAN,

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The following work has been translated for the purpose of supplying, in the readiest way, an obvious deficiency in the usual course of elementary instruction in history, among the schools and colleges of this country. Chronology, as a distinct science, holding the same general relation to history which geography does, is indeed but little known in our elementary systems. I know of no text book, that has been in use for teaching what will be found in the manual here offered to the public. The larger works in our public libraries were designed for other purposes, and even the treatise of Strauchius, of which a translation exists, and is here and there met with, is obviously far less suited to the end in view. The prefatory remarks of the author, though they refer chiefly to a work unknown in this country, with which he compares his own views, yet show what he regards as the peculiar advantages of the present work. It is referred to by

Heeren, as a very convenient manual for common use, and for the supply of our wants seems better suited, than any other. I have made no changes of any importance, and what few additions have been inserted will be found so designated, as to distinguish them from the original work. THE TRANSLATOR.

PREFATORY NOTICE.

GATTERER'S outlines of chronology is, so far as I know, the most recent manual for instruction in this science, that has appeared in the German language.

That work, for the beginner, who brings to it the necessary attention, and that untiring patience, which is indispensable to all sound learning, is indeed sufficient to open to him the way to chronological knowledge.

The book is at the same time a monument of the manifold learning of the author, of his industry, and of his praisworthy zeal, to promote rather the benefit of his hearer or reader, than to advance his own reputation.

Yet, commendable as he is for these properties of his work, it has seemed to me, that he might have facilitated the study of chronology more, than he has

there done, and that he has, in fact, needlessly incumbered it with difficulties, which do not pertain to it. He has done this, partly by the want of a natural, and clearly arranged method, and partly by mixing with it particular doctrines and investigations, which do not belong to an elementary work, but divert the scholar from his general purpose, and involve him in perplexing questions of minor importance.

1. Instead of separating from each other, what relates to the division of time, or the methods of dividing it, on the one hand, and what relates to the succession of these divisions, or the methods of designating the order of successive periods, on the other, Gatterer has throughout his work mingled them confusedly together. Instruction in regard to the division of time must naturally precede what concerns the sequence of the divisions adopted.

2. He has adopted unnecessay and groundless theories respecting natural and fundamental eras, calendars, periods, &c. These to a beginner must appear obscure and mystical, and there is in fact no reason for such a distinction. What Gatterer distinguishes

by such terms are nothing more than examples, by which the conceptions of an era, a calendar and a period are clearly represented.

The Juliano-Gregorian year has as little claim to be called a fundamental form of the year, as the Latin word *mensa* has to be considered a fundamental declination. Both are simply the most intelligible examples, to those for whom they are used, of that which they represent.

3. Gatterer has given an unnecessary number of special rules, by which the calendars of particular nations may be made familiar, and their festivals determined. These rules, at least for the beginner, and indeed for the mere historical chronologist generally, may be dispensed with, without disadvantage to the science.

4. He has not sufficiently distinguished and separated mathematical or astronomical chronology from historical, but has presented both together in a mingled form. They properly require each its own peculiar method.

I have been led to believe, therefore, that a new

introduction to the study of merely *historical chronology*, requires nothing more in the way of improvement, than the avoidance of the four faults, if I may call them such, above specified, to become both useful and agreeable to the youthful votaries of historical science. I say, agreeable, yet only in the negative sense, in which we find all saving of unnecessary toil agreeable. For to attempt to render chronology agreeable, in the positive sense of the term, would be a vain undertaking. It must always retain the character of a dry and uninteresting science.

INTRODUCTION

TO

HISTORICAL CHRONOLOGY.

1. *Object and purpose of Chronology.*

Chronology is the science, which determines the relations of the distinguishable portions of time, in respect to their *magnitude* or *duration*, and in respect to their *succession*, or *order*.

In other words it teaches how to *measure*, and to *distinguish* the parts or divisions of time. What is here meant by the term *distinguish* will be explained in the sequel.

Chronology has for its object, therefore, not time *in itself*. The question what time in itself is, the chronologist leaves to the metaphysician, and satisfied with that clear presentation of it, which, though not to be explained by words, is inseparable from the consciousness of every man, concerns himself only with its divisions, (with years, month, days &c.) This distinction is well expressed in the following Latin

definition. Chronologia est scientia (not tempus, but) *tempora* metiendi ac distinguendi.*

The practical purpose aimed at in this science is two-fold—to furnish a principle of order in the science of history—and to promote the orderly arrangements of social life. This it accomplishes by teaching us how to give with correctness and precision—1. the divisions of past time, in which any thing happened—2. the divisions of the present or future, in which any thing happens, or is going to happen.

2. *The divisions of time have a two-fold relation to each other.*

Space and time, as the metaphysicians express themselves, are the two conditions, on which is grounded the possibility of all our sensuous intuitions. The same thing may be expressed in more common terms, by saying whatever exists or comes to pass, exists or comes to pass *in space and time*, or in some place, and at some time.

The parts or divisions of *space* have a three-fold

*Chronology is the science, which teaches to measure and distinguish (not time, but) *times* or the *divisions* of time.

Instead of chronology the Greeks seem also to have used the word chronography (*χρονογραφια*) in the same form with geography. The science, which treats of time in the abstract or *pure* time, may be termed chronometry, corresponding with geometry as the science of pure space. Tr.

relation to each other, that of magnitude, of position, and of figure. In other words I can say of a portion of space—1. it is greater or less than another—2. it lies before or behind it, above or below, on the one, or the other side of it—3. it is either a triangle, a square a circle, a cube or sphere, or of some other regular or irregular figure.

The parts of *time* have only two relations to each other, that of magnitude or duration, and that of order or succession. Of a portion of time, I can only say it is greater or less than another, and it precedes or follows another. A year is greater than a month, a month than a day. The present year is of a certain number, in the order of succession, since the birth of Christ, &c.

3. *The quantity or duration of the divisions of time. Possibility of dividing time, and of determining the quantity or duration of its different portions.*

As the geometrician, in measuring space, assumes certain portions of determinate magnitude as units, so must the chronologist proceed in like manner in the measurement of time. As the foot or the inch are employed for determining the dimensions of a given space, so the definite periods, a year, a month, or a day, are used to determine the duration of a given portion of time.

How then, it may be asked, do we find the different portions of time, that are employed as measures of quantity in chronology ?

Time is apprehended by us through the perception of movements in nature, as well the inward movements of our minds, as of objects, that fall under the notice of our outward senses in space. Any one movement, from its beginning to its end, may be considered as a determinate portion of time.

If then we observe in nature movements, that follow each other in unbroken and uniform succession, and so that the beginning and the end of each is easily marked, we may adopt such as measures of other portions of time.

In the successive movements of our minds the beginning and end are not readily observed, and there is in these no uniformity. Hence, though the inward movements, of which we are conscious, have duration, and may be contemplated under the relation of time, they cannot be adopted as its measure.

But among the phenomena of the outer sense the movements of two of the heavenly bodies, the sun and moon, have from the earliest times attracted the notice of mankind by their uniformity, and by their never intermitted recurrence, and the periods of both have been employed, as the most convenient measure for

the duration of time, or rather of its distinguishable parts.

The sun, from the very dawn of human observation, could not but be observed to have always two distinct motions, or at least to present the appearance of such, (and it is the appearance only, not what actually takes place, with which the chronologist is concerned.) Each of these motions of the sun has its commencement and its termination obvious to the notice of our senses, or rather the end of one revolution and the beginning of another fall in the same point of time, or, more strictly still, there is truly neither beginning nor end, but only what the human mind assumes as such.

Each of these revolutions at the instant of its termination begins always anew, and so proceeds with unvarying uniformity, neither accelerated nor retarded. From one arise years, and the seasons of the year, from the other days and nights, and hence men have from the first regarded years and seasons, days and nights, as natural divisions of time.

The moon in like manner, describes in unbroken succession uniform revolutions, the one around the earth in about twenty-four hours, the other through the signs of the zodiack in a period of near thirty days. This last revolution of the moon has also from the earliest times, together with the four obvious chan-

ges in its form, *been* regarded as a natural division and measure of time, and the entire period of it denominated a *month.*

But although these measures of time are grounded in the phaenomena of nature, it is still, in part at least, a matter of arbitrary determination, what point in the revolutions of the sun and moon shall be taken as their commencement. In the diurnal motion of the sun, for example, we may place it at sunrise, or midday, or sunset; in its annual revolution at the summer solstice, (the longest summer day) or at the winter solstice, (the shortest winter day.) Again the beginning and end of these revolutions, as sunrise or sunset, cannot always be accurately observed. They mark, too, only the larger divisions of time, as years, months, and days, while for the purposes of social life still smaller divisions are necessary. Hence legislators, the founders of religious institutions, and the organizers of civil society, have, by the necessary laws, fixed definitely—1. what point should be reckoned, as the begnning and end theof the larger divisions of time, (the year, the month, and the day,) and—2. into how many smaller parts the greater should be divided.

There are therefore *natural* divisions of time, (partes temporis naturales,) such as are marked by natural phaenomena, and *civil* divisions, established by law

and custom, (partes temporis civiles.) These last may also be termed *artificial* or *arbitrary*; artificial, because found by artificial means, arbitrary, because it was a matter of arbitrary determination, whether one or another division should be preferred, as whether the day should be divided into twelve, or into twenty four hours.

To determine with precision the quantity or duration of the natural divisions of time is the business of the Astronomer, or of the mathematical Chronologist. On the other hand the civil or arbitrary divisions of time are matter of mere historical knowledge. Yet the mathematical chronologist cannot speak of the divisions of time, nor give their precise duration, without availing himself of the civil divisions. Mathematical and historical chronology are so far, therefore, inseparably connected.

4. *Order, in which the conceptions of the several divisions of time are to be given.*

It might seem at first glance, that, in giving a knowledge of the divisions of time, it would be the most natural method to arrange them in the order of their magnitude, proceding either from the least to the greatest, or from the greatest to the least. In the first we should have, for example, seconds, minutes,

hours, days, weeks, months, and years, and in the second the same divisions in the reverse order.

But both these methods have the same inconvenience, that we cannot obtain a definite conception of either extreme, the year or the second, without having first a conception of the divisions, that are intermediate. The conception of a day is the only one, that can be clearly apprehended independently of the rest.

The easiest method, therefore, and the freest from all difficulties, is to begin with the day, and in it to mark the smaller divisions, into which it has been divided, not by nature, but by arbitrary arrangement. We can then proceed from the day to the year, from this to the month, and from the month to the division into weeks.

5. *Of Days.*

The *natural* day (dies naturalis, arcus diurnus) is the portion of time, during which the sun continues above our horizon, or which begins with sunrise and ends with sunset. The *natural* night (nox naturalis, arcus nocturnus) is the time marked by the continuance of the sun below our horizon, or which begins with sunset and ends with sunrise.

But as the natural day varies in length, continually

increasing from the winter to the summer solstice, and again decreasing from the summer to the winter, it cannot furnish the unit of duration. by a repetition or division of which we may obtain the measure of other periods. In order to obtain a unit of unvarying magnitude or duration, therefore, the founders of civil institutions have taken the natural day and night together, as a whole; for, since the variation in the length of the natural night is inversely proportioned to that of the day, increasing as it diminishes, and diminishing as it increases, the union of the two gives a whole, the quantity of which is invariable. This whole, arising from the union of the natural day and night, is called the *civil* day (dies civilis, artificialis, *νυχθημερον.*)

In this arrangement it was a matter of indifference, whether the beginning of the civil day (epocham diei civilis) was placed at the rise of the sun above, its descent below, or at its highest point of elevation above the horizon—in the morning, evening, or noonday.

Some nations, as the Babylonians and ancient Persians, have considered the day as beginning with sunrise, others, as the Jews, Arabs, and ancient Germans, with sunset.

An ancient people of Italy, the Umbrians, chose the point, when the sun was on the meridian, or

noon, as the beginning of their day. Astronomers have regarded noon, as the most fitted for this purpose, because then the position of the sun, at its highest point above the horizon, serves to mark with the greatest precision *the limit* between the completed and the incipient day. At this point, too, its position can be easily observed in all places and on almost every day, while, on the contrary, the varying times of the sun's rising and setting, with the clouds and fogs frequent at those times, render them, as points for the beginning of the diurnal revolution, indefinite, and difficult to be generally ascertained with precision.

Finally, the Romans began their day, with no regard to astronomical observation, *at midnight*, and to them it is probably to be ascribed, that this practise has become general among the European nations.

This custom is unastronomical, because nature itself furnishes no indication, by which that point in the revolution can be known. In order to ascertain it, artificial means, the division of the day into hours, and the use of time keepers, must have been invented.

6. *Of Hours.*

Nature itself furnished very obvious suggestions for a farther division of the day, according to the different aspects of the sun, at its rise, its highest elevation, its setting, &c. The Romans had sixteen designations for so many divisions of a day and night taken together, grounded on the different gradations of light and darkness.

But the necessity of having, in the busines of civil life, more accurate and precise divisions of the day was long felt, before an instrument was invented for making a precise artificial division. The instruments first invented, and for a long time employed for this purpose, were very imperfect, such as the sundial, and hour glass, with either sand or water. Clocks and watches, which answer the purpose most perfectly, were not invented before the Middle Age, and watches not till the fifteenth century at Nuremburg.

These artificial divisions of the day are called *hours*. Some ancient nations, as the Jews, the ancient Greeks, and the Romans, divided the natural day and the natural night separately, each into twelve hours. The hours of the day were consequently longer in summer and shorter in winter, and those of the night the reverse of this. These unequal hours (horae inaequales) are at variance with the purpose of a di-

vision of the day into smaller portions, and the civil day was finally divided into twenty four *equal* hours (horae aequales.) This division, from its obvious convenience, has been adopted throughout Europe, and among the descendants of Europeans. They do not however number the twenty four hours in a continuous series, but, beginning at midnight, when they commence the civil day, reckon from one to twelve at midday, and thence repeat from one to twelve at midnight.

The Italians alone of the Europeans, down even to our own age, numbered the hours of the day in a continuous series from one to twenty four, beginning with sunset. This custom is now however discontinued in Italy.

Astronomers also reckon in the same way, from one to twenty four, but commence from midday.

The ancient Babylonians had at that early period divided the day into hours, but into twelve only, so that one Babylonian hour (hora Babylonica) was equal to two European of the present day. See Herodotus B. 11. C. 109.

Remark 1. The striking of a clock, and the index of a watch, show, not the commencing, but the past hours.

2. A reason for numbering the hours from one to

twelve and repeating it, instead of proceeding continuously from one to twenty four, is to save the ear the pain of so great a number of strokes, and also to avoid the labour, and time, and inconvenience of counting so great a num ber.

7. *The divisions of an hour.*

Astronomers have divided the hours of the civil day into sixty equal parts each, which are called *minutes*, horary minutes (scrupula horaria or communia.)

Each minute they divide again into sixty *seconds* (scrupula secunda,) and each second into sixty *thirds*. These minute divisions are important in astronomical observations, but the historical chronologist has no occasion to employ them.

Remark. Astronomers denominate the usual subdivisions of hours horary minutes, to distinguish them from another division, which they sometimes employ, of the civil day into sixty equal parts, which are termed diurnal minutes (scrupula prima diurna.)

8. *The Year.*

The uninterrupted, and constantly regular, succession of the seasons furnishes to all men the means of observing the duration or length of the year. Yet,

from the phaenomena obvious to common observation, it could only be determined vaguely, and within certain indefinite limits, and the science of astronomy must have been carried to a high degree of perfection, before the following propositions could have been demonstrated, as they now are.

1. That the length of the year is determined with precision by the motion of the sun from one of the tropics to the other, and its return to that from which it set out.

2. That the true period of this revolution, and consequently the precise length of the solar year, is 365 days, 5 hours, 48 minutes, 45 seconds, and 30 thirds, which, expressed in astronomical characters, is 365d, 5h, 48′ 45″ 30‴

But, in the practical arrangements of civil society, it is obvious, that the commencement of the new year cannot be marked with such precision, as to determine the hours, minutes &c. Hence for civil purposes it is arranged that the year shall consist of 365 days, till the repetition of the fraction shall amount to another day, and that then a day shall be added, so as to make a year of 366 days. This is termed *intercalating* a day, and the year, in which the day is intercalated, is called an *intercalary* or leap year (annus bissextus, intercalaris, embolimaeus) The day

so inserted also is called an intercalary day (dies bissextus, &c.) The years, that are not intercalated are called for the sake of distinction *common* years (anni communes.)

The year in its natural duration, as determined by astronomers, is termed the *natural* or astronomical year, that which is defined by legislation, or by custom, a *civil* year (annus civilis.)

Nature has left it to the arbitrary determination of men, where to place the commencement of the year, whether in Spring or Autumn, Summer or Winter. Legislators, and founders of civil institutions, have followed in this, each his own conception of propriety. Hence some nations commence their year in the Spring, and some in each of the other seasons.

Remark 1. In the Latin language, the intercalary year and intercalary day are commonly denominated annus bissextilis, and dies bissextilis. But Ideler, in his "Historical enquiries respecting the astronomical observations of the Ancients," has already remarked, that the Romans used the form bissextus, instead of bissextilis.

2. The natural Solar year above described Astronomers denominate the Tropical Solar year, because it is described by the motion of the sun between the tropics. From the Tropical year they distinguish an-

other, under the name of the Sidereal year, (annus sidereus.) They understand by it the time, which the sun takes, not only to complete its tropical revolution, but also to arrive at the same star, at which it was observed at the beginning of its revolution. For, while the sun is performing its tropical circuit, the fixed stars also have had a motion of their own, such that in order to reach the one, from which the sun's revolution was commenced, it must advance still 20,′ 25,″ 30,‴ farther. The sidereal year, therefore, is 20,′ 25,″ 30‴ longer than the tropical—of this, however, no practical use is made in historical chronology.

9. *Of the seasons of the year.*

The seasons, which by their influence on the air and earth, on animals and plants, must have attracted the notice of men from the earliest infancy of the race, have, however, in nature no precise and determinate beginning nor end, but only a gradual transition from one to the other. Astronomically the beginning of each is determined by the entrance of the sun into a particular sign of the Zodiack. Its entrance into Aries determines, for the Northern hemisphere, the commencement of Spring (the vernal Aequinox, Aequinoctium vernale,) but for the Southern

the commencement of Spring. With the entrance of the sun into *Cancer* begins, in the Northern hemisphere, the Summer, in the Southern, the winter, while with its entrance into Capricorn the seasons are reversed in the different hemispheres. These two last points, the entrance of the sun into Cancer and Capricorn, are called Solstitial points, or the summer and winter Solstices (from *sol*, the sun, and *sto*, to stand still,) because the sun, in commencing from these points its returning course, seems for a while to be stationary in them, or because these points are the limits, beyond which its course does not extend.

The four days, in which the sun enters these four signs, namely the 20th of March, in which it enters Aries, the 20th June, in which it enters Cancer, the 22d September, in which it enters Libra, and the 21st December, in which it enters Capricorn, or the two Aequinoxes, and the two Solstices, are termed the four cardinal points of the year (puncta cardinalia, τροπαι.)

Out of these four points nations from the earliest times have selected the commencement of their civil year, some dating it from one, some from another of these, it being obviously a matter of arbitrary choice.

10. *The division of the year into Months.*

(*a*) *Lunar Months.*

The revolution of the Moon round the Earth, which it completes during a natural day and night, or in about 24 hours, has never been used, as a measure of time, because the period, which would be measured by it, is determined with more precision by the sun.

But the revolution of the moon through the signs of the Ecliptick, during which its phases are four times changed, has ever so attracted the notice of mankind, especially by this variation of its form, that they have at all times employed this revolution, or the number of days, in which these changes of the moon are completed, as a convenient measure of time.

These four phases of the moon, have been called the new moon, the first quarter, the full moon, and the last quarter, and the period from one new moon to another, a *month*.

But the precise duration of this revolution of the moon can no more be determined, without numerous and exact astronomical observations, than that of the annual revolution of the sun. Astronomers now reckon this Lunar period, or the Lunar month, at 29d, 12h, 44,′ 3,″ 12.‴

But since in common life we cannot reckon the smaller fractions, hours, minutes, &c, lawgivers have

substituted the civil in place of the natural month, and made it to consist of a certain number of whole days. *Civil* months are differently limited by different nations; having with some an equal number of days for all, while with some again one month has more and another less.

Remark. The month, as above described, embracing the interval from one new moon to another, astronomers distinguish as the *synodical* Lunar month, because the new moon is occasioned by the conjunction (συνοδος) of the moon and sun in the same sign of the Ecliptick. The *periodical* Lunar month includes the interval, during which the moon passes from a given point of the Ecliptick round to the same point again. This periodical Lunar month consists of 27d, 7h, 43,′ 5.″ Of this no use is made in historical chronology.

11. *(b) Of Solar months.*

Along with the Lunar, astronomers have also adopted what are termed *Solar* months (menses Solares.) By a Solar month is meant that period of time, which the sun occupies in passing through each of the twelve signs of the Zodiack. But this period is not the same for the different signs, and the Solar months therefore would be different in length. In order to

make them of equal length astronomers have divided the whole time, in which the sun completes its revolution, equally among the twelve signs, and assigned to the several months an equal duration. Thus a Solar month is precisely the twelfth part of a year, or of 365d, 5h, 48,′ 45,″ 30,‴ and consequently consist of 30d, 10h, 29,′ 47,″ 30.‴

The legislators of some nations, among whom astronomical knowledge had been diffused, have had regard to the Solar in determining the civil month, while those of other nations have taken into view only the Lunar month.

12. *The Lunar Year.*

Some nations, who, in seeking the length of the year, have paid more regard to the revolutions of the moon, than to those of the sun, and who had remarked, that the year commences anew after about twelve Lunar revolutions, have adopted this as the measure of the year. Twelve complete revolutions of the moon, each from one new moon to another, constituted their year.

Since the natural Lunar month, so determined, and reckoned with astronomical precision, consists as above stated of 29d, 12h, 44,′ 3,″ 12,‴ the true duration of a natural Lunar year is 354d, 8h, 48,′

38," 12."' The difference between this and the solar therefore, is as follows.

The Solar year 365d, 5h, 48,' 45," 30."'
The Lunar year 354d, 8h, 48,' 38," 12."'

Excess of the Solar 10d, 21h, 0,' 7," 18."'

How the nations, who adopted the Lunar as their civil year, regulated it, in respect to the smaller divisions of time, will be shown in some particular cases in the sequel.

Remark. From the difference between a Lunar and Solar year it is obvious, that in 32 Solar there are 33 Lunar years. For the 10d, 21h &c, which are the excess of the Solar, make in 32 years 359d, 3h, 36' &c, or 4d, 18h, 48' more, than a Lunar year.

13. *Of Weeks.*

The arbitrary division of time into weeks, whether of seven days (hebdomades,) or of eight (ogdoades,) or of ten (decades,) (for such have existed among different nations,) is very ancient. The week of seven days seems to have been the most ancient, and existed, at least among the Hebrews, from the earliest period.

Yet the invention of this division of time is by some also ascribed to the Chaldaeans, not a nation of that

name, but the learned men at Babylon, who it would seem bore this name, as a title of distinction.

The seven days, which compose the week, have been distinguished among many nations, from the most ancient periods, by the names of the seven planets, which were thought to compose our system, and this mode of distinction also is believed to have come from the learned men of Babylon. We shall say more of this in a more suitable connexion.

The weekly period of seven days would be very naturally introduced among a people, who, in their division of time, had more regard to the moon, than to the sun, and consequently had Lunar months and years.

From the fourfold change of form, which the moon exhibits during a revolution, the division into weeks, is very obviously suggested, and, as the Lunar period consists of 29 days, the nearest division into quarters, which it admits, would give 7 days to each.

But the adoption of this division also by nations, who use the Solar year and month, has occasioned in their divisions of time two inconveniences, which, accustomed as we are to them from childhood, appear sufficiently obvious, but which, if now

first introduced, we should find quite inadmissible.

1. The Solar year does not consist of an even number of weeks, but has an excess of one or two days. The common year of 365 days has 52 week and 1 day, every fourth or leap year of 366 days has 52 weeks and 2 days. The year is at an end, while the week, which should be an included part of the year, has not yet terminated, and the new year falls continually, in common years, one day, in leap years, two days later in the week, than in the preceding year.

2. So too the months consist, not of a number of completed weeks, but of four weeks and some additional days.

In the sequel we shall meet with examples, in which nations have adopted the division into weeks of ten days, or decades, which is obviously more convenient, where they are united with Solar months, of a corresponding length.

Remark. It is obviously more convenient in all kinds of measurement to have but one standard, or element of quantity. As in reckoning the value of money and coin it is better to take either gold alone, or silver alone, as the standard, so also, for convenience in measuring time, it would be better to use

only, the period of the sun's revolution, than to connect with this a second, like that of the moon, where the relations of the two are so difficult to be determined.

14. *Forms of the year and Calendar.*

These are the divisions of time, as naturally marked out by the revolutions of the sun and moon, according to the careful observation of astronomers in regard to their duration, and as established in the regulations of civil society. We have seen, that it is left to the arbitrary direction of lawgivers to determine, with what day the year shall commence, of how many days a month shall consist, &c. These legal determinations and ordinances, taken together, constitute what is termed the *form of the year* (anni ratio, forma.)

A *Calendar* or *Almanac* (calendarium, fasti) is a register or designation of all the days, weeks, and months, which make up a *civil* year, with a notice of —1. the days, which are legally appointed as festival days—2. natural or astronomical incidents worthy of notice, by which one day is distinguished from another, as the days of new and full moon, of the first and last quarter, of the aequinoxes, the solstices, the eclipses of the sun and moon, the ebb and flow of the tide, &c.

Remark. So far mathematical or astronomical chronology must be combined with historical, and they are inseparable from each other. Mathematical chronology could not give with precision the true magnitude of those divisions, which are natural, without availing itself of the civil divisions of time. How time has been divided legally by different nations, we can learn only from testimony, or in other words historically.

In what follows, the purpose will be only to exhibit what pertains to *historical Chronology*, and we shall aim--1. to show the *form of the year* used among different nations, as determined by the founders of religious and civil institutions;—2. the important events, which have been fixed upon by different nations, as *Epochs*, or fixed points of time, from which they commence numbering the succession of years, and finally—3, to select a form of the year and an Epoch, as a standard, to which those of all nations may be reduced, in order to arrange, in accordance with those selected, the historical incidents of all nations and of all ages.

15. *The Julian Year.*

In order to obtain a distinct notion of the different forms of the year, which were used among ancient

nations, or are still in use elsewhere, it will be of service to exhibit, as a model for comparison, that with which we of European origin have been from our infancy familiar. We can then readily compare others with this, and mark their deviations, and can the more easily judge, whether those deviations are defects or the reverse.

The form of the year in general use among the European nations, and those of European origin, may be termed the Juliano-Gregorian year or the Juliano-Gregorian Calendar, the Julian modified by Gregory.

The name Julian Calendar, or Julian year, is given, because this form of the year was introduced by the Roman dictator, Julius Caesar. All the nations of Europe, who were converted to Christianity, adopted this Calendar, and retained it, till the year 1582 after the birth of Christ. About this time important improvements were made in it under the direction of Pope Gregory XIII, and this improved Calendar is called the Gregorian Calendar.

Since that time it is usual to distinguish the original, formed by Julius Caesar, as the *old* Calendar, or *old style* (annus or calendarium vetus, veteris stili,) and the improved one, as the *new* Calendar, or as New Style (annus, calendarium stili novi.)

In the Calendar, which Julius Caesar introduced, it was assumed, that the Solar year consisted of 365 days and 6 full hours. Hence, as these 6 hours would make just a day in four years, a day was intercalated every fourth year making it a leap year of 366 days.

The year thus determined was divided into twelve civil months, whose names January. February, &c, are sufficiently known. Seven of these months had each thirty one, four had thirty days, and February in common years twenty eight, but in leap years twenty nine days.

It was a great inconvenience, that the months had not all an equal number of days, and still greater, that the longer and shorter follow each other by no rule.

The beginning of the year was placed in the midst of the winter season, and this indeed could not of itself be objected to, since it is matter of indifference, whether it be in the winter, or either of the other seasons. But that the shortest day of winter, or the winter Solstice, was not chosen, instead of the eighth day after that, as the first day of the year, may be considered as transgressing astronomical principles. For as the revolution of the Sun, from one of the tropics round to the same point again, was to be the measure of the year, it would seem, that the year should commence, when this revolution commences.

We shall exhibit in the sequel the probable reasons, why Julius Caesar, against his better knowledge, found it advisable to admit these inconveniences into his Calendar.

This Julian year was farther divided, not by Julius Caesar himself, but at a much later period, and after Christianity had become the prevailing religion, into fifty two weeks, each of seven days. But, as these fifty two weeks give only 364 days, we have in common years an excess of one, and in leap years of two days beyond the fifty two weeks. From this again the new incovenience arose, that the commencement of each new year fell, in common years one, and in leap year, two days later in the week, than in the preceding year. [For a farther account of this see section 49.]

16. *Essential defect of the Julian year.*

Besides the inconveniences above mentioned, the Julian year had a more essential defect. The length of the year, as assumed by it, was greater than its true length by 11,' 14," 30.'" This in the course of some hundred years amounted to several whole days, and in the 16th century it was observed, that new year's day fell, according to the calendar, about ten days later, than it should according to the course

of the sun. This variation of the Julian Calendar from the true Solar year was especially noticed in the celebration of the feast of Easter. According to a canon of the Nicene Council, Easter was to be celebrated on the first sunday after the full moon immediately succeeding the Vernal Aequinox. This Aequinox ought to fall, according to the Julian Calendar, on the 21st of March, but it was observed in the 16th century, that it was already ten days earlier than the 21st March as set down in the Calendar.

After many attempts of Astronomers to remedy this error, Pope Gregory XIII gave it in charge to Aloysius Lilius, a man eminent in the science at that period, to reform the Calendar. The Calendar so reformed this Pope ordered in 1582 to be introduced throughout Christendom, and was immediately obeyed by the Catholic States.

With the remedy of this error the Calendar was suffered to pass, the inconveniences before mentioned remaining as they were.

17. *The Gregorian Year.*

In order to bring back the year to an accordance with the place of the sun in its annual course, ten days were thrown out of the month of October in the year 1582, and thus the next new year's day in the

Calendar made to coincide with the right point in the sun's motion. Immediately after the fourth of October, instead of the fifth, was written the fifteenth, and this year therefore had but 355 days.

To avoid the return of the same evil from the excess of 11,′ 14,″ 30‴ in the Julian year above the true time, it was determined, that every hundredth year, for three centuries in succession, which according to the Julian Calendar, would be leap years, should be common years, but for the fourth century a leap year. According to this rule the years 1700, 1800 and 1900 were to be common years instead of leap years, as they would have been by the Julian Calendar, but the year 2000 a leap year, and so for the last years of succeeding centuries, every fourth only will be a leap year.

This improved Calendar, as above remarked, was adopted, at the requisition of the Pope, by all the Catholics states, and by those of Germany particularly at the Diet of Ratisbon in 1582. But the German Protestants at this Diet, as well as the Protestants generally throughout Europe, did not adopt it, because they were unwilling to give the appearance of being in any thing controlled by the authority of the Pope. The difficulty consequently arose of having among the states of Europe two different Calendars, the Cath-

olics using the new, and the Protestants the old. In countries, where Catholics and Protestatnts lived together in habit of intercourse, this difference in the mode of reckoning time occasioned great inconvenience in the business of social life. The festivals, which were celebrated alike by both, were held by them at different times. All documents and letters must have a two-fold date, and even historians in recording events must give the day according to both Calendars, or in old and new style. Both days were usually given in the form of a fraction, as that an event happened on the $\frac{14}{24}$ of August, the 14th old style and the 24 new style.

At length the Protestant's in Germany concluded no longer to reject the improved Calendar, and introduced it with the year 1700. But as the difference between the two Calendars, during an interval of more than a hundred years, was now increased to the amount of about one day, they rejected eleven days from the year 1700. In Febuary, which by the Julian Calendar should have had 29 days, only 18 were reckoned, and the 1st of March placed in the Calendar immediately after the 18th of February.

Denmark, Holland and Switzerland now followed the example of the German Protestants. England did the same in 1752, and Sweden in 1753.

The Russians are the only Christian nation in Europe, which still retains the unreformed Calendar.

18. *Forms of the year, most worthy of notice, adopted by other nations.*

We shall now exhibit the forms of the year, or the Calendars, of some other nations of different periods, and first in order those of the nations, whose history and literature have for us the greatest interest.

19. *The year of the Athenians.*

In aiming to exhibit only such Calendars as have an interest in literature and history, it will not be necessary for us to enquire what mode of reckoning existed among the most ancient Greeks. But the Attic year, or that of the Athenians, which was first introduced at Athens in the more advanced periods of Grecian culture, and supposed, on probable grounds, to have been gradually adopted by the other Grecian states, is of course a matter of literary interest, and important to be known.

The introduction of this Calendar would seem to have taken place in the time of Solon, and probably through his means, about the year 590 before Christ. The Greeks had begun at this period to cultivate among other sciences, Mathematics and Astronomy,

and yet it is probable, that they did not invent their Calendar by the help of their own science alone, but borrowed it from some nation of Asia, or at least had before them that of some Asiatic nation in the arrangement of their own.

The Attic year was a Lunar year, commenced at the winter Solstice, and was divided into twelve months having alternately 29 and 30 days. The three months, belonging to each quarter of the year, were distinguished by an epithet designating the season. The following table shows the names and order of the months, and the number of days in each.

The Winter months, (*μηνες χειμερινοι.*)

Gamelion — 29 days.

Anthesterion — 30 —

Elaphebolion — 29 —

The Spring months, (*μηνες εαρινοι.*)

Munichion — 30 days.

Thargelion — 29 —

Skirrophorion — 30 —

The Summer months, (*μηνες θερινοι.*)

Hecatombaeon — 29 days.

Metageitnion — 30 —

Boedromion — 29 —

The Autumnal months (*μηνες απωρινοι.*)

Maimakterion — 30 —

Pyanepsion — 29 —

Poseideon — 30 —

The Attic year had thus only 354 days. Observing, however, that the Solar year was about eleven days longer than this, the Athenians added, every second year, another month of 22 days. It followed after the month Poseideon, and was named the second Poseideon, (*ποσειδεων δευτερος.*) These two years taken together, or cycle of two years, was called a Dieteris (*διετηρις,*) or in the Latin form a Biennium.

The number of days in these two years was equal to the number in two Solar years, if we reckon only the entire days. But the Athenians observed also, that the Solar had an excess above the Lunar, not only of the eleven whole days, but of an additional fraction of about a quarter of a day. At the end of every alternate biennium, therefore, or of every fourth year, they added another day to the intercalary month making it a month of 23 days. This cycle they called a Tetraeteris, (*τετραετηρις,*) or a Quadrennium.

This cycle of four years gave 1461 days, equivalent to three common and one leap year of the Julian Calendar.

This method of intercalating was afterwards changed, and a cycle of eight years adopted, called an Octaeteris, (*οκταετηρις*,) or Octennium. In this cycle a second month Poseideon of thirty days was added to the third, the fifth, and the eighth year. It contained 2922 days, or was equivalent to six common and two leap years of the Julian Calendar.

A year, to which the intercalary month was added, was called in Greek *ενιαυτος εμβολιμαιος*.

As this Calendar was not strictly correct, reforms were proposed by Meton about 430, by Callippus about 330, and by Hipparchus about 150 before Christ. But since it is boubtful, whether their proposed reforms were ever adopted and carried into effect, it seems unnecessary here to give a detailed account of them.*

Remark 1. A *cycle* (*κυκλος*, cyclus, circulus, circle) designates a period or series of a determinate number of years, or other intervals of time, after the completion of which the enumeration is commenced anew.

2. We shall see in the sequel, that some very ancient Oriental nations had much more perfect approximations to the true Solar year, than this Lunar year of the Greeks. We must therefore admit, if we would not be blinded by prejudice in favour of the

*See an account of the Metonic cycle in section 49.

Greeks, that the Mathematical and Astronomical sciences were successfully cultivated at an earlier period by those Orientals, than by the Greeks, and that consequently the Greeks were not the pioneers in these sciences.

20. *Division of the month among the Greeks.*

The Greeks had no weeks of seven days, but divided the month into three decades (δεκαδες,) or divisions of ten days each. The first of these was called the decade of the *beginning* of the months, (δεκας μηνος ἑξαμενου or αρχομενου,) the second the decade of the *middle* (μηνος μεσουντος,) and the third the decade of the *close* of the month, (μηνος φθινοντος or απιοντος.)

The first day in each month was called the new moon (Νουμηνια,) or the *first.*

The nine following days were designated by the successive ordinals, as the second, third, &c. with the addition *of the beginning of the month.*

The nine first days of the second decade were designated as the first, second, &c, *of the middle of the month,* or otherwise *after the tenth* (επι δεκαδι.)

The tenth of the second decade was called simply the twentieth (εικοστη or εικας.)

In the third decade the days were numbered in the reverse order. The twenty first day of the month was called, in months having thirty days, the tenth, in those having twenty nine, the ninth, the next the eighth &c, *of the close of the month*, or the declining month.

The last day of the month was called the *old and new* (ἑνη και νεη,) as if it belonged, half to the departing, and half to the beginning month.

The following table will give a clear conception of this very inconvenient mode of reckoning, which only early usage, it would seem, could make familiar or tolerable. It exhibits the successive days of the first month, in the Greek, the month Gamelion of 29 days.

Γαμηλιων,	Gamelion.
1. *Νουμηνια*, the new moon, or *Πρωτη*, the first	
2. *Δευτερη*, the second	
3. *Τριτη*, the third	*μηνος ἱσαμενου* or *αρχομενου*, of the beginning of the month.
4. *Τεταρτη*, the fourth	
5. *Πεμπτη*, the fifth	
6. *Ἑκτη*, the sixth	
7. *Ἑβδομη*, the seventh	
8. *Ογδοη*, the eighth	
9. *Ενατη*, the ninth	
10. *Δεκαιη*, the tenth	

11. *Πρωτη*, the first
12. *Δευτερη*, the second
13. *Τριτη* the third
14. *Τεταρτη*, the fourth
15. *Πεμπτη*, the fifth
16. *Ἑκτη*, the sixth
17. *Ἑβδομη*, the seventh
18. *Ογδοη* the eighth
19. *Εννατη*, the ninth

μηνος μεσουντος, of the middle of the month or *επι δεκαδι*, after the tenth.

20. *Εικοστη* or *Εικας* the twentieth.
21. *Εννατη*, the ninth
22. *Ογδοη*, the eighth
23. *Ἑβδομη*, the seventh
24. *Ἑκτη*, the sixth
25. *Πεμπτη*, the fifth
26. *Τεταρτη*, the fourth
27. *Τριτη*, the third
28. *Δευτερη*, the second

μηνος φθινοντος or *απιοντος*, of the close of the month, or the declining month.

29. *Ἑνη και νεη*, the old and new

21. *Division of the day among the Greeks.*

The Greeks, or at least the Athenians, began their civil day with the setting of the sun. They divided it into twelve equal (Babylonian) hours, and made use of sun-dials for measuring them.

Both these, the hours and the sun-dials, probably the Greeks of Asia Minor first received from some of the Asiatic nations, among whom the Babylonian culture had been diffused.

Anaximenes, a philosopher of the Ionian school, is

said to have set up the first sun-dial at Sparta, about the year 555 before Christ.

To supply the place of a dial at night and in cloudy weather, the Greeks had hour glasses, in which water was used instead of sand, Clepsydras (κλεψυδρας.)

22. *The Macedonion Year.*

By this we are to understand—1. the Calendar, which was used in Macedonia itself, till the time of Alexander, and perhaps still later, and—2. those which were used in the Asiatic states founded by Alexander's Generals.

The ancient and original Macedonian Calendar seems to have differed from the Athenian only in two particulars. The year began, not with the winter Solstice, but with the autumnal Aequinox, and the months had other names.

The Macedonian months corresponded with the Athenian as follows.

The Macedonian.	The Athenian.
1. Dios,	10. Maimakterion,
2. Apellaeos,	11. Pyanepsion,
3. Audinaeos,	12. Poseideon,
4. Peritios,	1. Gamelion,

5. Dystros,	2. Anthesterion,
6. Xanthikos,	3. Elaphebolion,
7. Artemisios,	4. Munychion,
8. Daisios,	5. Thargelion,
9. Panemos,	6. Skirrophorion,
10. Lo-os,	7. Hecatombaeon,
11. Gorpiaeos,	8. Metageition,
12. Hyperberetaeos,	9. Boedromion,

In Demosthenes and Plutarch the time of certain events is sometimes given in the terms of this ancient Macedonian Calendar.

After those states arose in Asia, in which the several Dynasties, that originated with the Generals of Alexander, bore rule, and in which the language, the customs, and the civil institutions of the Greeks were introduced, this Macedonian Calendar seems to have been there also the one in general use, at least in public documents and monuments. The original Asiatic nations, who came under the sway of the Macedonians as the Syrians, the Babylonians, &c, may perhaps, among themselves, and in matters concerning themselves only, especially in the celebration of their festivals and stated religious ceremonials, have still made use of their own Calendars employed by their ancestors.

But, after all the Grecian conquests in Asia came under the dominion of the Romans, and after Julius Caesar had reformed the Roman Calendar, this was introduced in these parts of Asia, as in all the Roman provinces. Only the Macedonian names of months were retained, and the year was commenced on *the 24th of September*. This Calendar is also called the Macedonian. To distinguish it from the ancient it may be denominated the *new* Macedonian.

It is necessary to be acquainted with the arrangements of this Calendar, in order to understand the Greek authors, who wrote after its introduction in Asia, and followed it in giving the dates of events.

It stands related to the Julian Calendar as shown in the following table.

Dios	1	fell	on	September	24.
Apellaeos	1	—	—	October	24.
Audinaeos	1	—	—	November	23.
Peritios	1	—	—	December	24.
Dystros	1	—	—	January	23.
Xanthikos	1	—	—	February	22.
Artemisios	1	—	—	March	25.
Daisios	1	—	—	April	25.
Panemos	1	—	—	May	25.

Lo-os	1	—	June	25.
Gorpiaeos	1	—	July	25.
Hyperberetaeos	1	—	August	25.

But under the dominion of the Romans even, and after the introduction of the Julian Calendar, some countries and states in Asia retained their ancient domestic Calendars, as may be seen from the coins of these countries..

23. *The Roman Calendar before its reform by Julius Caesar.*

The Roman year in use before the time of Caesar is said to have been introduced by Numa Pompilius but to have undergone some alterations in the time of the Decemvirs. It was a Lunar year, but consisted of 355 days. It was divided into 12 months, which till the time of the Decemvirs are said to have followed each other in the following order.

1.	January	of	29 days
2.	March	—	31 —
3.	April	—	29 —
4.	May	—	31 —
5.	June	—	29 —
6.	Quintilis	—	31 —

7. Sextilis — 29 —
8. September— 29 —
9. October — 31 —
10. November— 29 —
11. December— 29 —
12. February — 28 —

After the Decemvirate the order of the months was changed. The second month was called February, March was the third in order, and December the last. So at least say ancient authors, who make mention of this subject.

In order to make this Lunar year correspond with the Solar, a month was intercalated every second year of 22, and every fourth year one of 23 days.

So far this cycle of intercalation agreed with the Tetraeteris of the Athenians, but, as the Roman year had one day more than the Attic, the four years of the Roman cycle gave 1465 days, which exceeds by four days both the Attic cycle and four Julian years.

The intercalary month the Romans called Mercedonius or Mercidinus, and placed it between February and March.

24. *Confused state of the Roman Calendar before the time of Julius Caesar.*

The College of Priests, Collegium Pontificum, had the charge of arranging the Calendar for each new year, and so held, as the Romans expressed it, custodiam fastorum. These priests seem to have been quite destitute of astronomical science. Yet it was not from ignorance merely, that they made faulty Calendars, but from design, lengthening or shortening the year as they saw fit. "Instead of improving the Calendar, as their official duty required," says an old Roman author, "they made it still more confused, by intercalating more or less, in order that a public magistrate, according as he was friendly or otherwise to them, might go out of office earlier or later, that a favorite farmer of the revenue might make the more gain, or a hated one suffer greater injury, from the extension or the abridgement of the year."*

In an epistle to Atticus (V. 9.) Cicero begs this friend of his to oppose by every possible means the intercalation of the usual number of days in the then current year, in order that his (Cicero's) proconsulship in Cilicia might not be prolonged.

*Horum (sacerdotum) plerique, ob odium vel gratiam, quo quis magistratu citius abiret, diutiusve fungeretur, aut publici redemptor ex anni magnitudine in lucro damnove esset, plus minusve ex libidine intercalando, rem sibi ad corrigendam mandatam, ultro depravarunt. Censor. de die natali c. 30.

By such caprices of these Calendar-makers, a month was often transferred from one season to another, so that, according to the Calendar, the summer harvest fell in the autumnal months, and the vintage in the winter.*

An epistle of Cicero to Atticus (X. 17.) is, according to the Roman method of writing, dated XVII, Kal. Jun. or after our mode the 16th of May, and the Vernal Aequinox had not yet arrived. This letter Cicero wrote, when, after the breaking out of the civil war, he was going to join Pompey in Greece, and the Captain of the vessel was waiting for the Aequinox to be past. The Aequinox, says Cicero, holds on very tediously.

25. *Julius Caesar the author of the Julian Calendar.*

Julius Caesar put an end to these disorders. As *Pontifex Maximus* it became his official duty to take charge of improving the Calendar, and his versatile genius was particularly inclined to the mathematical sciences and to astronomy. The poet, who excites our admiration, when he sets forth the genius, as he does our abhorrence, when he represents the ambitious

*—ut neque messium feriae aestati, neque vindemiarum autumnus competerent. Sueton. in Jul. Caes. 40.

deeds of Caesar, introduces him speaking as follows:

Media inter proelia semper
Stellarum coelique plagis superisque vacavi;
Nec meus Eudoxi vincetur fastibus anni.

Lucan. Phars. X. 4. 185.

Plinius (H. N. XVIII. 25.) names *Sosigenes*, a Peripatetic at Alexandria, as the astronomer, who was specially employed by Caesar in this matter. Macrobius names still another, *Marcus Flavius*. He is termed a scribe, which was, among the Romans, a common designation of all, who were employed by the Senate, or magistrates, or even by private persons, for drawing up written documents, for copying them, for keeping accounts, &c.

It was in Caesar's fourth consulate, the year 709 from the building of the city, and the year 45 before the birth of Christ, that the reformed Calendar was introduced. It was at once denominated by the Romans in honour of its author the *Julian Calendar*, and the form, which he gave to the year, the *Julian year*.* The form itself we have given above (No. 15.)

*Ex hoc anno, a Julio Caesare ordinato, ceteri ad nostram memoriam Juliani appelluntur, iique consurgunt ex quarto Caesaris consulatu. *Censorinus.*

From the same author we learn, that it was from a reference to certain festivals and religious ceremonies of the Romans appointed for stated days of the month, that Caesar gave to the

We only remark farther here, that, on the introduction of the new Calendar, the name of the month Quintilis, in honour of Julius Caesar, was changed to *Julius*. The next month, Sextilis, still retained its former name, and was not changed into *August* till a later period, in honour of Augustus Caesar.

26. *Singular confusion of the year 708 a. U. C., in which preparation was made for introducing the new Calendar.*

The year 708 after the building of the city, by the disposition of which all the errors and confusion of the

months so unequal a number of days, and had so little regard to that number in the order of their arrangement. Otherwise it is probable, from his accurate judgment, that he would have preferred a more equal distribution of days, and a more regular arrangement in the order of succession. Censoriuus says on this point; Itaque diebus CCCLV addidit X, quos per septem menses, qui dies undetricenos habebant, ita distribuit, ut Januario et Sextili et Decembri bini accederent, ceteris singuli, eosque dies extremis partibus mensium apposuit, *ne scilicet religiones sui cujusque mensis a loco submoverentur*. In this we recognize the prudence of Caesar, that he preferred to endure slight imperfections, in the form of his year, rather than do violence to ancient and deep rooted associations, usages, and habits, and by a needless misuse of power weaken the principles of action in the minds of men. Ideler has expressed the very probable conjecture, that on similar grounds, and from respect for ancient usages, said to have been established by Numa Pompilius, Caesar made his year commence where it does, instead of commencing at the winter Solstice, or the shortest day of the year, which would seem to have been more consonant with astronomical principles.

old Calendar were to be removed, before the new arrangement could be introduced, was a very singular year. In this year not only the usual intercalary month Mercedonius, or Mercidinus, of 23 days, but 67 days more, to the amount of which the Roman year had now receded from the Solar year, were intercalated. The intercalation of these 67 days was between November and December, in two nameless months, the one of 34, the other of 33 days. This year had therefore 15 months, and 445 days. It was yet more singular, that the month Mercedonius was intercalated after the 23d of February, and after it followed the 5 remaining days of February. This year deserved the name, given it by Macrobius (Saturn. 1. 14,) of the year of confusion, annus confusionis.

The subjoined table will exhibit more distiuctly to the eye the form of this extraordinary year.

The year 708 afer the building of the city.

Order and names of the months with the number of their days.	Days of the reformed Calendar, on which the first of each month would have fallen.
1. January of 29 days	— The 13th of October of the year 47. before Christ.
2. February — 23	— 11 November.
3. Mercedonius — 23	— 4 December.

	February	— 5	— 27 December.
4.	March	— 31	— 1 January of 46 before Christ.
5.	April	— 29	— 1 February.
6.	May	— 31	— 2 March.
7.	June	— 29	— 2 April.
8.	Quintilis	— 31	— 1 May.
9.	Sextilis	— 29	— 1 June.
10.	September	— 29	— 30 June.
11.	October	— 31	— 29 July.
12.	November	— 29	— 29 August.
13.	Intercalary	— 34	— 27 September.
14.	Intercalary	— 33	— 1 November.
15.	December	— 29	— 3 December.
		445 days	

After the 29th December followed then the 1st January of the year 709 after the building of Rome, or the 45th before the birth of Christ, and with this 1st of January the new Calendar went into use.

27. *Division of the month among the Romans, and their method of numbering the days of the month.*

The first day in every month was called the Calends, *Kalendae*, as Kalendae Januarii, Kalendae

Februarii, &c. The *seventh* day, in the four months *March*, *May*, *July* and *October*, were called *Nonæ*, the Nones, and in the other eight months the *fifth* day had that name. In the four months above named the *fifteenth* day was called, *Idus*, the Ides, in the other eight the *thirteenth* was so called. Thus every month was divided into three parts—1st from the *Calends* to the *Nones*—2d from the *Nones* to the *Ides*—3d from the *Ides* to the *Calends* of the following month.

In each division the days were numbered backwards, with a reference to the end of that division, as the point from which the days were counted. Thus the 4th before the Nones of January was reckoned from the Nones backwards, that being regarded as the day, from which the numbering commenced, and as that was by our mode of reckoning the fifth, the fourth before it in our reckoning was the 2d of January.

The 5th before the Ides of January was our 9th of January.

The 15th before the Calends of February was our 18th of January.

The day immediately preceding the Calends, Nones, and Ides was not expressed by a numeral, (the 2d before the Nones &c,) but by the word *Pridie*—Pridie

Nonarum, Pridie Idus, Pridie Kalendarum — the day before the Nones, &c.

The following table will make this mode of reckoning more intelligible by two examples, the one the month of January, in which the Nones fell on the fifth and the Ides the 13, and the other the month of March in which the Nones fell on the 7th and the Ides the 15th.

Our mode of numbering.		Roman mode.
JANUARY.		
1.	=	Kalendae.
2.	=	4 ante Nonas.
3.	=	3 — —
4.	=	Pridie Nonarum.
5,	=	Nonae.
6.	=	8 ante Idus.
7.	=	7 — —
8.	=	6 — —
9.	=	5 — —
10.	=	4 — —
11.	=	3 — —
12.	=	Pridie Idus.
13.	=	Idus.

14.	=	19 ante Kalendas Februarii.
15.	=	18 — —
16.	=	17 — —
17.	=	16 — —
18.	=	15 — —
19.	=	14 — —
20.	=	13 — —
21.	=	12 — —
22.	=	11 — —
23.	=	10 — —
24.	=	9 — —
25.	=	8 — —
26.	=	7 — —
27.	=	6 — —
28.	=	5 — —
29.	=	4 — —
30.	=	2 — —
31.	=	Pridie Kal. Februarii.

Our mode. Roman mode.

MARCH.

1.	=	Kalendae Martii.
2.	=	6 ante Nonas.

3.	=	5 — —
4.	=	4 — —
5.	=	3 — —
6.	=	Pridie Nonarum.
7.	=	Nonae.
8.	=	8 ante Idus.
9.	=	7 —
10.	=	6 — —
11.	=	5 — —
12.	=	4 — —
13.	=	3 — —
14.	=	Pridie Idus.
15.	=	Idus.
16.	=	17 ante Kal. Aprilis.
17.	=	16 — —
18.	=	15 — —
19.	=	14 — —
20.	=	13 — —
21.	=	12 — —
22.	=	11 — —
23.	=	10 — —
24.	=	9 — —

25.	=	8 — —
26.	=	7 — —
27.	=	6 — —
28.	=	5 — —
29.	=	4 — —
30.	=	3 — —
31.	=	Pridie Kalendarum Aprilis.

Remark. 1. The etymology and signification of these three terms is unknown. According to Macrobius (Saturn. XV.) the Pontifex, after summoning the people to the capitol, proclaimed to them with a loud voice, that the new month was begun, and that so many days, as the case might be, would intervene before the Nones. This proclamation was at that time designated by a Greek term, adopted into the Latin, *Kalare* (καλειν.) The meaning of Kalendae may be, therefore, the proclamation day.

The term *Nonae* is said by the same author to be derived from dies nonus, the ninth day, the Nones being nine days before the Ides.

Of the word *Idus* Macrobius gives two possible derivations, and two possible grounds for the application of it in this case. According to one mode Idus comes

from videre, and this properly from the Greek ἰδειν (to see,) and this day was originally so designated, because, at that time of the Lunar month, the moon could be seen in its full form (the full moon.) According to the other mode of forming it, the word comes from one in the ancient Etruscan, which at the time when these names were first used, was adopted into the Latin. This word was *iduare*, to divide, and was applied here, because the Ides fall near the middle of the month, and divide it into two nearly equal parts.

2. The Romans were accustomed to this mode of reckoning from their childhood, and by early practise the most difficult task becomes easy, while the most capricious and absurd customs come to seem natural and rational. But that philologists and antiquarians, from the 16th century nearly to our own times, should have preferred this Roman mode of reckoning to the natural and rational one adopted in our present Calendars, was a pedantry deserving the severe satire which Wolf has bestowed upon it in his Latin Chronology.

3. This seems to be the most suitable place to give some account of the origin of our present customary division of the month into *weeks*, and of the *names*, by which the several days of the week are distinguished.

The Romans had no weeks. The division of the month into three parts, by Nones, Ides, and Kalends, was the only one known among them, and this was retained, not only while Rome continued Pagan, but long after it became Christian. Ammianus Marcellinus, who wrote about half a century after Christianity had become the religion of the State, reckons the days of the month by Kalends, Nones, and Ides. The constitutions of a Christian emperor, even those of Justinian I, in the Corpus Juris, are dated after the same manner.

Weeks were introduced by the Christians, and these received them from the Jews, the first Christians having themselves been Jews. The only deviation from the Jewish week was, that, instead of the seventh, the sabbath of the Jews, the Christians kept sacred the first day of the week, as a memorial, that Christ rose from the dead on that day, and hence called it the Lord's day (dies Dominca.) On this day the Christian churches (the ecclesiae) met for mutual edification, for celebrating the eucharist, &c. And thus, in their religious concerns, this mode of reckoning time, by weeks of seven days each, had become customary with them, while yet they were objects of persecution to their Pagan rules. After they had gained the victory over Paganism and abolished it, they gradually introduced the division by weeks

into the regulations of civil life, and dropped the old Roman method of reckoning the days of the month. When and how this took place, as to the details of its history, is wholly unknown.

As regards the names of the several days of the week, Monday, Tuesday, (dies Lunae, Martis &c.) it is altogether improbable, that the Christians employed them on the first introduction of weeks into the Calendar. Whatever had any connexion with the names and worship of the Pagan Gods was their abomination. But in the course of some centuries the Pagan worship had so fallen into oblivion, that it was no longer known, among the new generations of men, in what it consisted, and the names connected with it had ceased to have their original associations and offensive import. Among the monks, whose business it became to attend to the regulation of the Calendar, especially for the use of the church, there were many, who had a taste for astronomical studies, and who therefore pursued every kind of knowledge, which was connected with the astronomy of the ancients. The Chaldaeans, i. e. the astronomers or astrologers of Babylon, were celebrated, as having been the greatest astronomers of antiquity, and from these the monks adopted the astrological chimera, that each day of the week was under the influence of one of the seven

planets, which were then considered as composing our planetary system. The monks, therefore, had no scruples of conscience against naming the days of the week after the seven planets, as they had been named by the Babylonian Astrologers. The names Jupiter, Mars, Mercurius, Venus and Saturnus, in the designation of the days,as dies Jovis, Martis &c.* were regarded by them, not as names of heathen Gods, but as names of the planets.

In regard to the origin of this division of time among the Germans and other northen nations, and the names of the days in the German, Dutch, Danish, and other languages, there are different opinions.— Some suppose, that the division into weeks was in use among all these nations in very ancient times.— Kastner adopted the opinion, that it was a remnant among them of the religion of the Patriarchs, to whom

*The Latin names of the days of the week used where the Latin language has been employed by the learned in modern times, are dies Solis (sunday,) dies Lunae (monday,) dies Martis (tuesday,) dies Mercurii (wednesday,) dies Jovis (thursday) dies Veneris (friday,) dies Saturni (saturday.]

The English names are taken, for sunday and monday, obviously as in the Latin, from the Sun and Moon, and, for the four next following, from the objects of worship among the Northern nations, most nearly corresponding with those, from which they were named in the Latin. These were Tuu, Woden or Odin, Thor and Freya, answering respectively to Mars, Mercury, Jupiter and Venus. Saturday is probably, as in Latin, derived from Saturn, though some say from a Saxon Idol of a similar name.

it had served as a memorial of the creation of the world.

At the same time it is assumed, that in process of time the original purpose of the division was forgotten. These nations became sunk in Idolatry, and named the days of the week after the objects of their idolatrous worship. Thor the God of thunder, Odin or Wodin the God of war, Freya the Goddess of pleasure, &c.

But is it susceptible of proof, that the division by weeks was in use among these nations, before their conversion to Christianity? To me it would seem, that so remarkable a fact in the economy of the Germans must have attracted the notice of the Romans, and that Tacitus could not have failed to mention it.

My own opinion is, that weeks were first introduced among these nations along with Christianity, and that Christianity gave a very natural occasion for their introduction, since all the religious feast and fast days, which recur after weekly intervals, and especially Sunday and Friday, rendered this division nearly indispensable.

Since now the Christian Ecclesiastics, in the Latin language, which they employed in their religious services, designated the days of the week by the names of Jupiter Mars, Venus, &c, they naturally were less

scrupulous in seeking, in the languages of these nations, for the names of those among the objects of their ancient worship, which had any resemblance to these Roman divinities, and in thus marking the days of the week in their languages, in the same way, as had been adopted in the Latin language.

28. *Division of the day and night among the Romans.*

Before the Romans introduced the artificial division of the day into hours, they distinguished the parts of the natural day and night according to obvious appearances in nature. No less than sixteen terms of distinction are found in Roman authors, by which the different parts of the day and night were designated.

Media nox (midnight)—mediae noctis inclinatio (after midnight)—Gallicinium (cock-crowing)—Conticinium (———)—Diluculum (the dawn of day)—Mane (sunrise)—Ad meridiem (towards noon)—Meridies (mid-day)—Meridiei inclinatio (afternoon)—Solis occasus (sunset)—Vesper (evening)—Crepusculum (the dusk)—Prima fax (candle-lighting)—Concubium (bed-time)—Nox intempesta (dark night)—Ad mediam noctem (near midnight.)

This natural division seems to have answered the

purpose of the Romans for more than four hundred years. It was not till about the year 460 from the building of the city, that the first sun-dial is said to have been brought to Rome from the conquered Grecian colonies in Italy, and about the year 590 Scipio Nasica is said to have caused hour-glasses (clepsydrae) to be set up in public places, especially in the judicial tribunals.

In later times the wealthy and powerful had such in their private houses, and employed a slave for the special office of calling out the hours as they elapsed.

How many and how great conveniences, in the business and social intercourse of life, accrue to us from inventions, which must have cost their authors much reflection time and patience, but which have become to us of habitual and daily use, we are scarcely able to estimate, or rightly to appreciate their worth. The inventors of the clock and watch are forgotten, by the thankless generations, that have come after them, while the inventors of the instruments of calamity and death are held in remembrance and honour.

29. *The year of the Jews.*

What form of the year was in use among the Jews, before they came into Canaan, is uncertain. During

their sojourn in Egypt, they were probably regulated in their mode of reckoning by the Egyptian Calendar.

After they became an independant people in Canaan, until the loss of their independance, or until the so-called Babylonian captivity, they used a Lunar year of 354 days. It was divided into 12 months as follows.

1.	Abib or Nisan	29 days.
2.	Tziv or Ijar	30 —
3.	Sivan	29 —
4.	Thammuz	30 —
5.	Ab	29 —
6.	Elul	30 —
7.	Tisri or Aethamim	29 —
8.	Bul or Marchesvan	30 —
9.	Chisleu	29 —
10.	Thebet	30 —
11.	Schabat	29 —
12.	Adar	30 —

They began the year with the month *Abib*, in commemoration of their exodus from Egypt in that month. It was a religious rite among them to make an offering to God of the first ripe ears of barley during the first ten days of this month. But since, in so imper-

fect a year of 354 days, the harvest would happen continually later in the Calendar, they must judge, in the last month of the year, by looking upon their fields, whether they would have ripe barley in the next month Abib. If the time of harvest seemed yet too remote, they added at the end of the year an intercalary month of 30 days, which was called Ve-Adar, or the second Adar. This leap year had thus 384 days. The intercalation, we perceive, was determined by observing the natural period of vegetation, and from authentic accounts of travellers we know, that in Palestine barley comes to maturity about the time of the Vernal Aequinox. At this period, therefore, the ancient Jewish year commenced.

After their return from the Babylonish captivity, the Jews retained the Babylonian or Chaldee names of the months, which they had adopted during that period. What other changes the Jews afterwards made in their Calendar, under the influence of the foreign nations, to which they were subjected, can interest only those literary men, who seek a minute acquaintance with the manners and customs of the Jews, in the different periods of their history.

Through the Talmud, which was completed about the year 500 of the Christian Era, the Jewish year received a new form, which from that time they retained merely for the purpose of their festivals and

religious rites. A knowledge of this form can in like manner be of importance only to a few literary men.

30. *The weeks of the Jews, and their division of the day.*

The Jews had weeks of seven days, the seventh of which was the *Sabbath* (day of rest.) On this they must abstain from all work, in remembranc of God's having rested on the seventh day, after he had in six days finished the work of creation.

It does not appear, that the other six days were designated by particular names.

An artificial division of the day into hours does not seem to have been in use among the Jews in ancient times, since in their ancient writings, the parts of the day are marked only by natural characters. Mention is indeed made of a Sun-dial (2 Kings 20; 9. and Isa. 38, 8.,) but in such a manner, that it would seem to have been something extraordinary, or perhaps the only one, and that they were by no means in common use.

The hours mentioned in the New Testament (as in Matth. 27, 45. 46. Mark 15, 25.,) the Jews adopted from the Greeks and Romans.

31. *The year of the Egyptians.*

No other people had, in their natural situation, so many favourable circumstances to guide them to a knowledge of the true length of the Solar year, as the Egyptians. Natural incidents of the most striking character called their attention to it, and aided in its determination.

The first of these deserving notice was the annual overflow of the Nile, and the regularity of its recurrence, a second was the invariable winds (the Etesiae) at certain seasons of the year, a third the regular disappearance and return of certain fixed stars, which by their brilliant sparkling, in an atmosphere almost constantly pure, were objects strikingly fitted to attract observation, especially Sirius, or the Dog-star, which rose according to our Calendar about the last of July. Lastly the city Syene (now Assuan,) on the Southern border of Egypt next to Ethiopia, is said to have been situated directly under the Tropic of Cancer. The sun, consequently, at noon, on the day of the summer Solstice, was vertical to the inhabitants, and cast no shadow. A well in the city, also at midday received the direct rays of the sun upon its bottom (Plin. H. N. II, 75.)

That the Egyptian priests too knew the true dura

tion of the Solar year, and that it was not only 365 days, but about one fourth of a day more than this, is admitted by all enquirers into antiquity. But whether the Egyptians made any use of this knowledge for the regulation of their civil year, and whether they had common years of 365, with leap years of 366 days, the learned are not agreed.

That they had such in regular interchange, and thus a perfect civil year, the following proofs have been adduced.

Diodorus Siculus says, "The Thebans" (the inhabhabitants of the city Thebes, or only the priests there may be understood,) "added to the 12 months five days and *one fourth* of a day." (πεντε ἡμερας και τεταρτον. Diod Sic. 1, 50.

Strabo says, "*The priests at Thebes* are particularly celebrated for their knowledge of astronomy and philosophy. They bring into their reckoning of the year the parts of a day, over the 365 days, which are necessary to make up the entire year." The sense of these words can be no other, than that, when those parts of a day amounted to a whole one, the priests intercalated it in the following year. (Strabo XVII, 554.)

Horapollo asserts, that "from one rising of Sirius to another is a year of God, (i. e. of the Sun) of three

hundred five and sixty days and one fourth of a day, and, consequently, in every cycle of four years (τετραετηρίδι) one day more is reckoned" (Horap. I. 15.)

The following arguments have been offered to prove that the Egyptians had *not* a perfect civil year, and that they had no intercalation in their civil years.

The proofs of the opposite opinion, advanced above are thought to be invalidated by the remark, that in Diodorus and Strabo it is obviously only the priests at Thebes, who are spoken of, and, since the knowledge spoken of is ascribed only to the priests, it follows from this very circumstance, that this more perfect form of the year was not in use in the business of civil life. As to the other author, Horapollo, he wrote at a period (after the birth of Christ,) when the Julian Calendar had been introduced into Egypt.

A passage in Herodotus also is appealed to, in which he says, (according to Idelers translation of it) "They (the Egyptian priests) assured me unanimously, that the Egyptians had of all men first found out the year, and divided it into twelve divisions, and they say that they attained this knowledge by means of the Sun. In my opinion they proceed in this with more insight than the Greeks, who intercalate a month in every alternate year. The Egyptians on the contrary add every year, to their twelve months of thirty days, yet

five supernumerary days, and so their seasons return in a regular circle." If the Egyptians are supposed at that time already to have introduced the leap year, it can hardly be doubted, that the priests would have mentioned it to Herodotus, and that he would have spoken of it, since the Greek intercalary month gave him so natural an occasion for doing so.

Finally it is an undoubted fact, that the Egyptians under the Ptolemies had only common, and no leap years, and it is not easy to see, if leap years had previously been in use among them, when and why they were dropped, and wherefore an imperfect was introduced in the place of a much more perfect form of the year.

Gatterer, indeed, who had formed a very elevated conception of the culture of the Egyptians, and who ascribed to them in those early times the most perfect Solar year, would controvert this objection by an hypothesis. The Persians, he supposes, after they conquered Egypt, had rejected the more perfect Egyptian year, and introduced their own defective one. But in the first place it is not certain, that the year of the Persians was defective, it is even probable, as we shall see in the sequel, that the ancient Persians had a very perfect Solar year. What motive moreover could the Persians have to impose upon the Egyp-

tians an inferior Calendar, when they had found a better one among them, especially as in other matters they left to the Egyptians the enjoyment of all their ancient manners and customs, so far as they were compatible with Persian supremacy, even their idol worship, though it was an abomination in the eyes of the Persians.

These facts and arguments seem rather to preponderate, and induce the conclusion, that a Solar year was not at least in general use.

The civil year of the Egyptians, under the Ptolemies (probably also in earlier times,) was divided into 12 months of 30 days each. The Egyptian names of the months are found in Ptolemy, and also in a Greek epigram, where they are distinguished by their natural characters. (Brunck Anal. vet. poet. Graec. II. p. 510.) They are as follows.

1. Thoth.	5. Tybi.	9. Pachon.
2. Phaophi.	6. Mechir.	10. Pauni.
3. Athyr.	7. Phamenoth.	11. Epiphi.
4. Chojak.	8. Pharmuth.	12. Mesori.

As these contained only 360 days, the Egyptians added at the close of the last month 5 days, which Ptolemy calls ἡμερας επαγομενας (supplementary days.)

The rising of *Sirius*, the Dog-star, or his reappear

ance in the horizon, in our Calendar about the last of July, was the astronomical incident adopted by the ancient Egyptians to mark the beginning of the new year. This star was called, in their language, *Thoth*, and this name they gave to the first month, and to the first day of the year.

But as their civil year was about one fourth of a day, and four of these years, consequently, one whole day too short, their Thoth, or new year's day, came every four years about 1, and every hundred years about 25 days, earlier than the rising of Sirius, and thus their new year's day, in the course of a few centuries, receded through a whole year.

After Egypt became a Roman province, the Julian year, under the Emperor Augustus, was introduced at Alexandria, and among the Greeks and Romans inhabiting Egypt, so far as to make every fourth a leap year. The old Egyptian names of the months, with 30 as the number of days in each, and the 5 supplementary days at the end of the last month, were retained. But as the New Year's day, in the year when the Julian Calendar was thus introduced, fell on the 29th August by our Calendar, this continued to be the commencement of the year after that time in Egypt.

This Julian year, so modified in Egypt, is known

among authors as the *Alexandrian year*, because it was introduced only at Alexandria, and among the Greeks and Romans in Egypt. The native Egyptians continued to adhere to their common, without the quadriennial leap year, as we learn from two very credible authors. Censorinus, who lived in the 3d century of our Era, says that then the Egyptians had no leap year. Annus Egyptiarum civiles habet 395 dies, sine ullo intercalari. The other author is Theon of the 4th century, from whom only a fragment is extant. "Since the year of the Alexandrians contains $365\frac{1}{4}$ days, but that of the Egyptians only 365, it is clear that the Alexandrian year, in comparison with the Egyptian, has an excess of about one day in every four years, and in 1460 years about 365 days or one whole Egyptian year."

The Alexandrian year, or the regular interchange of common and leap years, may probably have been introduced among the native Egyptians after they became Christians.

32. *The year of the Babylonians or Chaldeans, called also the Nabonassarian year.*

The primitive nation, that we are accustomed to call Babylonians or Chaldeans, and which was so celebrated in ancient times for its astronomical knowledge, had nevertheless an imperfect civil year, or a common

year only of 365 days. It was therefore, like the Egyptian, what astronomers call a wandering or ambulatory year (annus vagus.) For since the new year's day came every fourth year one day earlier, than it should to coincide with the true Solar year, it would of course wander gradually, in the course of 1460 years, through all the days in the year.

But this imperfection of their year is no sufficient ground for calling in question the astronomical science of the Babylonians. Experience has taught, that there are many difficulties in the way of reforming, according to astronomical principles, the civil year, to which a people have been for centuries accustomed.

The name *Nabonassarian,* which chronologists and astronomers have given to this Babylonian year, had an origin, of which we can more properly given an account in the sequel.

The Babylonians, like the Egyptians, divided their year into 12 months of 30 days each, and added, at the end of the last, 5 days for the completion of the year.

Some regard the Chaldaeans, or in other words the astronomers at Babylon, as having invented the division into weeks, and named the days of the week after the seven planets. But weeks of seven days were in

use among several nations, equally ancient with the Babylonians, ase. g. the Jews and Arabians, without the names of the days. The use of this division seems indeed, to have been much earlier, than the names of the several days of the week. The names may perhaps have been first given by the astronomers of Babylon.

The Babylonians began their civil day with the rising of the sun, and divided it into *twelve* equal hours, one of which is, therefore, equal to two of the division, to which we are accustomed. They are still termed by astronomers Babylonian hours. Sun-dials were in use among the Babylonians.

33. *A very perfect form of the year, in use (probably) among the ancient Persians.*

Among the Persians a form of the year was once in use, which has been considered by astronomers one of the most perfect.

It had common years of 365, and leap years of 366 days, and so far coincided with our form of the Julian year. But the mode of intercalation was, in the judgment of astronomers, better than ours. The time and mode of intercalating was reckoned with such accuracy, that the first day of the year always fell on the day of the Vernal Aequinox. The year had twelve

equal months of 30 days each, and an intercalation at the end of common years of 5, at the end of leap years of 6 days.

The existence of such a Calendar proves, among the people where it was introduced, a very successful cultivation of astronomy. The question now is, in what century was this used in Persia? Was it in the highest periods of antiquity? or was it first introduced after the Christian Era?

It is an undoubted historical fact, that Malek Schah, or as he was also called Djelaleddin, king of Persia, of the Seldjukian dynasty, in a certain sense introduced this Calendar in Persia, towards the end of the 11th century of our Era, and hence this form of the year is called by astronomers and chronologists the year of Djelaleddin.

But in what sense are we to understand him as introducing it?

It is not probable, that Malek Schah made this the civil year of the Persians; for 1. he was a Mohammedan, and the Arabians, in all the countries, which they conquered, introduced the Lunar year along with their religion. Since they conquered Persia, it has there also become the civil year. 2. If Malek Schah had made his Solar year the civil year of the Persians,

then it must have been again rejected, and the Arabian Lunar year introduced, for in every age, since the time of that prince, the Persians have made use of the Lunar year for their civil reckoning. Mention too would have been made of this recurrence to the Lunar year, by some of the oriental authors, who speak of this year, but no such mention occurs.

It seems probable then, that the year of Djelaleddin was introduced only by astronomers, to be used in their scientific pursuits. At that time the sciences of the Arabians were still flourishing in the East, and there were some among the Mohammedan princes of the middle age, even those of Turkish and Mongolian descent, who loved and cherished these sciences. Astronomy, combined indeed with astrology, was a favorite science with these princes. Malek Schah was one of the most distinguished for his love of science, and astronomy was with him also a special favorite. Oriental authors relate, that he summoned together an assembly of all the astronomers, and with them brought his Solar year to perfection.

This Calendar of Djelaleddin is most fully treated of by Thomas Hyde, in his work de Religione vet. Persar. c. 14.—16. In the 16th chapter p. 200—211. he give many passages from Persian and Arabian writers, which relate to this interesting subject. He

gives them in the original languages, and adds a Latin translation. Judging from the translations (for I do not understand the originals,) these passages themselves render it probable, that the Solar year was used only by the astronomers. At least its introduction, as the mode of reckoning in civil life, is not mentioned, as we might presume it would have been, had it taken place, and had the Lunar year, adopted by all the Mohammedan nations, and so closely connected with their religious worship, been here thrown out of use.

One circumstance renders it probable, that Malek Schah and his astronomers did not even first find out this Solar year, but that it had been in use before in Persia, perhaps introduced even in the time of Zoroaster, and not yet forgotten since the introduction of the Mohammedan year. According to the accounts of credible travellers, the day of the Vernal Aequinox is a popular festival among the Persians, especially in the country, and at the same time has no relation to their present Mohammedan religion. They call this day also Naurus, which word is said to mean new-year's day. As it is a very ancient festival, we may, with great probability at least, conclude, that at some period the civil year in Persia began on this day, and this festival may have led Malek Schah and his astronomers to commence their more accurate Calendar at the same time.

34. *The Lunar year of the Arabians introduced among all Mohammedan nations.*

The civil year of the Arabians, that is introduced among all the nations, who adopted the religion of Mohammed, is a Lunar year, in the arrangement of which no regard was had to the Solar year. It consists of 354 days. But, after the Arabians studied astronomy, they found, that the true Lunar year has an excess of 8h. 48′ over the 354 days, and that these 8h. 48′ multiplied by 30 make about 11 days. The observation of these facts led the Arabian Astronomers to a method of intercalating this fraction of time, after it amounted to an entire day. They adopted a cycle of 30 years, in which they made 11 intercalations of one day. There were consequently in the cycle 11 leap years of 355 days, the remainder being common years of 354. This cycle was received into the Calendar of the civil year.

The leap years in the cycle are the 2d, 5th, 7th, 10th, 13th, 15th, 18th, 21st, 24th, 26th, and 29th.

The Arabian year is divided into 12 months, as follows,

1.	Moharrem	30	days
2.	Saffar	29	—
3.	Rabia el Auwal	30	—

4.	Rabia Achar	29	—
5.	Djomada el Auwal	30	—
6.	Djomada Achar	29	—
7.	Radjib	30	—
8.	Shaban	29	—
9.	Ramadsan	30	—
10.	Schawal	29	—
11.	Dsulkada	30	—
12.	Dsulhadje	{ 29 in common { 30 in leap years.	

In 32 Solar years the 10 days and 21 hours, by which the Solar exceeds the Lunar year, amount to 359d. 3h. 26,′ or a whole Lunar year, and from 4 to 5 days over. (See above § 12.)

The Arabians had from primitive times weeks of seven days, but the days of the week were not named after the planets, and were only distinguished by number, as the first, second, &c. From this it would seem, that the division into weeks was more ancient, than the naming of the days.

35. *Of the Calendars of other nations.*

For mathematical and astronomical chronologists, it must be matter of interest to know the Calendars of the Bramins, the Chinese, the Japanese and other nations,

in order to compare them with our own, and from their greater or less perfection to infer the state of astronomical, and other kindred sciences among those nations, at the time, when their Calendars were introduced.

But as they would be of use to the historical enquirer only in case of his reading the history of those nations in their own authors, we may dispense with them in this introduction without disadvantage, or the charge of incompleteness in regard to the purpose intended by it.

But we must not pass over in silence a remarkable Calendar, which in our own times was for a while introduced among a people, who sought at once to carry the arts of civil life to the highest perfection, and for that end went to work with an enthusiasm, that was regulated by no wisdom, and with a haste, that was guided by no prudence.

36. *The year of the French in the period of their Republic.*

It was introduced by a decree of the Legislative assembly October 6th 1793.

New year's day was fixed to be on the 22d September.

To the twelve months new and significant names were given, and the three, which belonged to the same season had names of the same termination.

The three Autumnal months were Vindemiaire, Brumaire and Frimaire.

The three Winter months were Nivose, Pluviose, and Ventose.

The three Spring months, Germinal, Florial, and Prairial.

The three Summer months, Messidor, Thermidor, and Fructidor.

Each month had 30 days. The five last days of the year, from the end of Fructidor to the beginning of Vindemiaire, according to the Gregorian Calendar from the 17th September to the 21st inclusive, were called *jours complementaires* (or complemental days.)

The week of seven days was rejected, and in its stead each month was divided into three parts of ten days each, called a decadi.

Each day of a decadi had its proper name in the new vocabulary, primidi, duodi, tridi, quartidi, quintidi, sextidi, septidi, octidi, nonidi, decadi.

The intercalary day, which every fourth year was added to the jours complementaires, was called, le jour de la Republique, and the cycle of four years was called, la Franciade.

This Republican Calendar, after it had been in use for 12 years, was by a Senatus-Consulte again drop-

ped, September 9th 1805, and the Gregorian Calendar restored January 1, 1806.

37. *Relations of the divisions of time to each other, in respect to their order of succession.*

Thus far, we have been occupied with showing, how the divisions of time are measured, in respect to their quantity or duration. We have exhibited the two kinds of standards of measurement, and shown the use, which is made of each, with their relations to each other—1. the *natural* or *astronomical*, as the natural, astronomical, Solar year, Lunar year, Solar and Lunar month, day, &c. and—2. the *artificial, arbitrary, civil*, as the civil year, month, week, day, hour &c.

We have, therefore, accomplished the *first* of the two objects, at which chronology was said to aim. Chronologia est scientia tempora *metiendi*. We now proceed to the *second*, and enquire how the division of time, since the existence of the human race, or rather since the study of its history was commenced, *have succeeded each other*. In order to this, it is necessary to mark, by some determinate characters, the divisions, which preceded others, or followed after them, in order to distinguish the preceding from the succeeding, and know the order of sequence. Chro-

nologia est scientia tempora metiendi, et *distinguendi.*

In the continually uniform current of time, we can distinguish its parts, as they follow each other, only by the events, which occur in them.

These are either *natural* occurrences—as we distinguish the morning by the rising of the sun, which is a natural occurrence.

Or *human* occurrences—as we distinguish the year, from which, as a fixed point, we usually reckon the years that preceded and followed it, only by the birth of Christ. This was one of those events, which, although it was in itself a natural occurrence, or took place in the course of nature, we yet reckon among human events, as we do the birth and death of Alexander, of Charlemagne, of Luther, &c. because they are so important in the history of mankind.

Events, therefore, are the tokens of distinction, the time-marks, the chronological characters, of the divisions of time, (characteres chronologici.)

If they are natural events, they are called natural marks or characters (characteres naturales,) and since astronomers employ for this end celestial phaenomena, i. e. changes in the situation of the stars relatively to each other, these are called *astronomical* characters. (characteres Astronomici.) Of this sort are the new and full moon, the Aequinoxes, the Solstices, the

Solar and Lunar eclipses, the appearance of comets &c.

If they are human events, and adopted by men, as distinctive marks of particular portions of time, they are called *artificial* or *arbitrary*, marks or characters (characteres instituti, arbitrarii.)

As the means of designating the place and order of succession, in which the division of time (years, months days, &c.) follow each other, we must assume one of these as the first. Distinguishing this by the event, that characterised it, we then reckon the uniform and equal portions of time, as years, months, &c. from this, *as a fixed point*, for those which preceded, *backwards*, for those that followed, *onward*. The time so chosen, as the fixed point, with the events, by which it is distinguished, is called an *Epoch* or *Era*. (Epocha Aera, Terminus, Radix.) Of this kind are the year of the birth of Christ, the building of Rome, the flight of Mohammed from Mecca to Medina.

Among some nations, such Epochs are introduced by legislators, by founders of religious institutions, or by custom, so that in the business of civil life, in documents, contracts, legal enactments, &c. dates are given in conformity with them. These may be called *civil* Epochs (Epochae civiles.)

Other Epochs are chosen by historians, in order to

arrange and determine by them the sequence of the events, which they describe, so that their order may be distinctly recognized. These *historical* Epochs (Epochae historicae) must be distinguished from the civil.

In the selection of these historical Epochs, there is always more or less of arbitrary determination. For although it must always be marked by some important event, which may be regarded, as the cause or the commencement of a new series of connected events, yet it depends on the judgment of the historian to what events he may suppose such importance attaches itself, and the judgments of men are here often very diverse. Hence we find little agreement among the most distinguished writers of general history in their choice of Epochs. Thus Gatterer has adopted one, Schlosser another, Beck a third, &c.

The portions of time, (years, &c.,) which elapse from one Epoch to another, are denominated a *period*. Two Epochs, following each other in the same historical series of events, therefore, include one period, three include two, and four include three periods. Thus the building of Rome was the first Epoch in Roman history, the expulsion of the kings the second, and the time included between these forms the first period of Roman history.

Remark 1. Epochs may be compared to the resting places, or stations, in which the traveller stops for refreshment or repose. As the wanderer, reposing himself beneath the shade of a tree, or upon a rock, looks back upon the way which he has passed over, and forward to that which is still before him, so the way-farer in the path of historical investigation, when he has arrived at some great and distinguishing event, seems to have completed a past, and to be entering upon a new and commencing series of future events. He stops his progress, and dwells for a while, in his reflexions, upon the important event, which separates the past from the future, reviews again what he has already passed over, and forms his conjectures respecting what may possibly, or more probably follow, in the yet future train of events. This image of a resting place, which invites to reflexion, is contained in the etymological import of the word *Epoch*, as derived from the Greek επεχειν.

2. The word Aera is written also Era, and sometimes Hera. In the period of classical Latinity it was not in use. Philologists have found the earliest traces of its use in Spain. The Julian Calendar was introduced into Spain under Augustus, in the year 716 after the building of the city, or 37 years before Christ. After this years were numbered in Spain from the

time of the introduction of the Calendar, and this reckoning of the year was called the *Aera*. This mode of reckoning in fact continued to be used in Spain, under the same name, in the middle ages, and it was not till the deliverence of the country from Moorish domination, that the so-called Aera Hispanica was laid aside, and the custom of reckoning from the birth of Christ introduced.

But whence the word *Aera* was taken, what was its original signification, and how it came to be used in the sense, in which it now is, no satisfactory account has yet been discovered.

38.

It is the duty of chronologists and historians, to make themselves acquainted, as well with the civil Epochs and modes of reckoning, which were in use among different nations, as with the historical, which were chosen by historians merely for the purposes of method in the composition of history. For the times, in which events occurred, are given in the traditions and historical records of different nations, only according to those Epochs, and those modes of reckoning time, which were used among themselves. Chronologists and historians of the present day among us must therefore reduce dates, given by Epochs foreign to our

habits, to those Epochs and modes of reckoning now customary among ourselves.

39. *Epochs and modes of computing time among the Egyptians, Babylonians and Persians.*

Of *civil* Epochs, and computations of time, among these three nations, we know nothing, though it is probable they were not without such. For as civilized nations they had public documents, which always presupposed a mode of reckoning time, and determining dates. Perhaps they used, as Epochs, the commencement of each king's reign, numbering the years from that, so long as his reign continued. Some Persian documents, which occur in the writings, of the Jews confirm this supposition in relation to that people.

Some chronologists and historians have supposed, that the Babylonians made use of the Nabonassarian Era, as a mode of civil reckoning. This however is an error, as we shall soon see, that the Nabonassarian Era was a different thing from that.

Neither are *historical* Epochs, well defined and authentic, found in the obscure ancient accounts of Babylonian history, except the single one of Nebuchadnezzar. This frightful conquerer, who trampled under foot the previously existing Asiatic States, and independant nations, from the Euphrates to Egypt, has

left one year in his reign marked with chronological precision. This is the year 588 before Christ, in which he conquered Jerusalem, and carried its people into captivity.

In Egyptian history Herodotus gives indeed historical Epochs, (Menes, the Dodecarchie, and Psammetichus,) but so indefinite and obscure, that they cannot with any certainty be reduced to the corresponding years before the birth of Christ. The only Epoch, historically certain and well defined, in the ancient history of Egypt, is the loss of its independence, and its subjection to the Persian yoke, about the year 526 before Christ.

The ancient Persian history has two Epochs, historically ascertained, and defined with chronological precision, that of the organization of the monarchy by Cyrus, about the year 536, and that of its downfall, or conquest by Alexander the Great, 331 before Christ.

40. *The Nabonassarian Era, and the Canon of Ptolemy.*

In one of the works of Ptolemy, that namely, which the barbarous Latin translators of the middle ages have entitled Almagestus, but which in the Greek original is superscribed, μεγαλης συνταξεως βιβλιον ιγ,

there is found a list of king's and emperors (*κανων βασιλεων* or *βασιλειων*.)

The first division, or section, contains the names of 18 kings, who reigned in Babylon, the second section the names of Persian monarchs from Cyrus to Darius, the third contains Alexander and his two successors, who were regarded as his heirs, and consequently as rulers over the whole monarchy, as established by him, namely, his half brother Arrhidaeus, and his son by Roxana, Alexander II. The fourth section contains the Grecian kings of Egypt, from Ptolemy Lagi to Cleopatra, the fifth and last the Roman emperors, from Augustus, who first converted Egypt into a Roman province.

With the names of these kings and emperors, are arranged two columns of numbers. In the first column, the number designates the sum of the years, during which the monarch reigned, to whose name it is annexed, the number in the second column, the sum made up by adding the preceding to the reigns of his predecessors. Thus, after the last Babylonian king, Nabonadius, stand the numbers 17 and 209. Nabonadius reigned 17 years, and this sum, added to the years of all his predecessors, amounts to 209.

The first of the Babylonian kings, with whom the table begins, is Nabonassar, who reigned 14 years.

Astronomical chronologists have computed, that the beginning of his reign fell in the year 747 before Christ, and on the day, which in the Julian Calendar would be the 26th February. This Epoch astronomical chronologists have called the Nabonassarian Era (Aera Nabonassaris.)

If it be asked, how were Astronomers able to compute this with so much precision, the answer is easy. It is well known, that they can not only ascertain with precision, on what day, and hour future eclipses of the sun and moon will occur, but can compute, with the same precision, those which have occurred in the most ancient times.

Ptolemy has mentioned three eclipses of the moon, which had been observed by astronomers at Babylon, and has given the times of their occurrence, in the years, months, and days, of those king's reign. Thus he speaks of an eclipse of the moon, which happened at Babylon on the 29th of the month Thoth, in the first year of the reign of king Mardocempad. Modern astronomers have computed, that an eclipse of the moon must have been visible at Babylon, in the year 721 before Christ, on the 19th of March, by the Julian Calendar. The first year of the reign of Mardocempad was, therefore, the year 721 before Christ.

Besides these three Lunar eclipses, Ptolemy has

given, with equal definiteness, other astronomical observations, made at Babylon. By means of these, and the table of successive reigns, astronomers have been able to attain the precision above referred to.

Another question naturally arises, for what purpose was this canon made, and by whom?

From the use, which Ptolemy himself made of it, it is obvious, that it was made for the use of Astronomers, in order to determine the times of their observations, by reference to civil modes of computation. Perhaps the two first sections were formed in Babylon itself, and abstracts carried to Alexandria, when under the Ptolemies Astronomy was zealously prosecuted there. At Alexandria the canon, or tabular lists of reigns, was continued, the line of Ptolemies added, and afterwards, when Egypt became a Roman province, the Roman emperors also.

Whether Ptolemy himself made these additions is uncertain, and a matter of indifference. This list was continued after his death, as he lived under the emperors Hadrian and Antoninus Pius, from about 125 to 162 after Christ, and the table contains the names of those, who reigned after that time.

Besides Ptolemy, there are only three ancient authors, who make mention of the Era of Nabonassar, viz. Censorinus, Theon, and Syncellus, and all in

reference to astronomical and chronological objects. No other writer, and no mere historian speaks of it, not even where Babylonian history was the chief topic of discourse.

The hypothesis, therefore, adopted by some historians and chronologists, that under Nabonassar, or by his means, an important political revolution happened at Babylon, and a new dynasty came to the throne, cannot be fully established, and is rendered, indeed, only in a slight degree probable.

It is more probable, that under Nabonassar something important was done in Babylon for the science of astronomy. Perhaps the civil year may have been reformed, as the Roman was by Julius Caesar, and like that too named after the individual, under whose auspices it was effected. Some chronologists have in fact ascribed the Babylonian year, of which we have given an account above (§22,) to Nabonassar, and called it after his name. (Ideler in his Untersuchungen.)

The table above described, and usually known as the Canon of Ptolemy, is in other respects very important to ancient chronology. It has served inquirers, as a guiding line, in tracing out the perplexities and obscurities, which arise from the great diversity of methods, by which ancient historians have distinguished the times, of which they wrote.

Remark. 1 Among the Babylonian kings in the Canon, the name of Nebuchadnezzar is not found. Yet there is no doubt remains, that a great conqueror of that name ruled at Babylon, during the period there included. Probably, however, all these names were at first incorrectly spoken and written by the Greeks, to whom they had a barbarous sound, and were afterwards still more corrupted by transcribers. In the Canon, there is found a king Nabocolassar, whose reign falls at the time, in which, according to the more authentic records of the Hebrew writers, Nebuchadnezzar reigned. The one may have been made out of the other by repeated errors of transcribers.

2. If this Ptolemaic Canon is, as I think it, to be considered authentic, it is alone sufficient to remove all the doubts, which have been stated, by certain modern Orientalists, against the existence of Cyrus and his successors, as represented by the Greek authors. Those doubts rest only on the ground, that Persian and Arabian authors, many centuries later, and, on other grounds, of no authority, make no mention of these kings.

41. *Mode of computing time among the Greeks.*

a. By generations.

When men began to give attentionto the distinctive

characters, by which the times, when events transpired, are distinguished from each other, in order by these to measure the interval of time from one event to another, they found nothing better, than the three generations, *grandfather*, *father*, and *son*; or *father*, *son*, and *grandson*. Thus an event occurred in the time of the grandfather, another in that of the father, &c.

Probably all nations, among whom civil modes of reckoning time, and fixed Epochs have been introduced, have long employed this very natural, but very indefinite mode. In regard to the Greeks, it is certain, that for a long time they had no other. The chronology of the heroic age can be computed only by this vague method, and the earliest Grecian historians depended on this alone.

Pherecydes and Cadmus, (the last from his native country, known as Cadmus of Miletus,) the two most ancient historians of the Greeks, and who lived about 500 years before Christ, are said to have given the dates of events by this method, availing themselves of the genealogies of celebrated families.

Herodotus sometimes also reckons by the succession of generations. "The queen Semiramis," he says, "lived five generations before queen Nitocris." (Herod. 1, 184.)

Herodotus expressly lays down the proposition, that three generations (γενεας, generationes) may be taken for a century. He says, B. II. 144. "Three hundred generations of men are equal to ten thousand years, for three generations are a hundred years."

In conformity with this, the Greeks assigned 33⅓ years to each generation.

The genealogies of celebrated families among the Greeks were kept in remembrance, by always attaching to the name of a distinguished individual the name of his father, as Agamemnon the son of Atreus, Miltiades the son of Cimon. Another fact, tending to the same result, was, that the name of every celebrated man, without exception, was found upon some public monument, either in some temple, or in some other public place.

Especially was the genealogy of the kings of Lacedaemon, of the race of the Heraclidae, or the descendants of Hercules, known by such monuments.

Let us see, how, according to this method, by means of the genealogy of these kings of Lacedaemon, they sought to determine the time of the Trojan war.

Leonidas, the king of Lacedaemon, who fell at Thermopylae for the liberties of Greece, was a descendant, in the 17th generation, from Aristodemus, the Heraclid, who won the kingdom of Lacedaemon

for his family. At $33\frac{1}{3}$ years to a generation, this period is 567 years. Aristodemus was the 4th generation from Hercules, making an interval of 139 years, which added to the former gives 697 years from Hercules to Leonidas.

The Trojan war was one generation, or about 33 years after Hercules, which subtracted from the above 697 leaves 664 years. This then, according to Grecian estimates, was about the interval from the Trojan war to Leonidas.

Even modern chronologists have no other means of determining the time of the Trojan war, because among the ancients, who make mention of it, no other dates are found.

Since, then, Leonidas died for his country in the year 480 before Christ, modern chronologists assume, according to the above computation adding 664 to 480, that the Trojan war was about 1144 years before the birth of Christ.

The principle of reckoning three generations, as equal to a hundred years, is in one sense not far from the truth. But Newton first made the remark, that the Greeks applied the principle erroneously, when they considered the reigns of three successive kings equal to three generations, and reckoned them also a hundred years. He showed, that in the average only

about 18, and at most 20 years, could be reckoned, as the period of a single reign, and that the longest period assigned to three successive reigns could not be more than 66 years. Hence he wrote his "Chronologia veterum emendata" for the purpose of showing the errors in the chronology of the ancients, arising from this erroneous application of a principle, where it does not belong.

The reigns of the 17 Heraclidae at Lacedaemon, according to the remark of Newton, would amount only to about 340 years, and therefore, by his computation, the Trojan war happened not far from 900 or 920 before Christ.

This method of computing time by generations has been called the cycle of generations (Cyclus generationum.)

Remark. Eratosthenes and Apollodorus, two Greek authors, are said to have reckoned the sum of the 17 reigns of Lacedaemonian kings at 622 years, which would give in the average $36\frac{1}{2}$ years for each. By this reckoning the Trojan war would be placed still earlier, or about 1200 before Christ. Some chronologists, who since the revival of letters have treated the subject, have placed it thus early, merely from regard to the authority of those two authors.

42. b. *The Olympiads.*

The Grecian Republics had no civil reckoning of time common to them all. In each Republic, the year, when any event occurred, was designated merely by the name of him, who for the year held the highest office in the State.

At Athens, where the executive government was administered by ten Archons annually chosen, it was the first in rank among these, whose name was inserted in the laws, in treaties with other States, and upon the public monuments. Hence he was distinguished from the others by the epithet *Eponymus* (as giving name to the year.)

At Lacedaemon it was not the names of the kings, but that of the first in rank of the five annual Ephori, which was inserted in public documents, and placed upon public monuments.

This want of a mode of reckoning time common to the different States, made it very difficult for historians to give the dates of events, in a manner intelligible to all. We cannot but wonder indeed, that the advantage of such a mode should have failed to occur to a people so inventive, and having so ready a perception of what convenience required in the ordinances of civil life, as the Greeks.

Timaeus of Sicily, after the time of Alexander, is said to have first remarked, that the Olympic Games might serve for a sure, a fixed, and generally intelligible, designation of chronological dates, and in his writings, of which none are extant, to have marked the dates of events by Olympiads. The convenience, and definiteness of this mode of reckoning, was manifest to all subsequent historians.

Yet in public business, and for the purposes of civil life, the Olympiads were still never adopted in Greece.

The Olympic Games were always celebrated at intervals of four years. These four years from one celebration to another were called an Olympiad, and numbered as the 1st, 2d, 3d, and 4th years of the I. Olympiad, of the II. Olympiad, &c.

The Olympiads, however, were not numbered from the first celebration of the Olympic Games. This was very ancient, and lost in the obscurity of primitive times, so that only uncertain traditions of it remained. In process of time it had become customary, however, to erect statues and public monuments, in honor of the combatants, who won the prize at those games, and thus they had in these monuments an unbroken series of combatants, and consequently a mark of the successive games that had been celebrated. Coroebus is said to have been the first, to whom a statue

was erected, and the celebration, in which Coroebus had been the victor, was now regarded by chronologists, as the first in the series. The four first years, therefore, after the crowing of Coroebus constituted the *first Olympiad.*

The year in which he gained the prize, and consequently the *first* year of the *first* Olympiad, fell the year 776 before Christ.

For converting Olympiads into our mode of reckoning from the birth of Christ, the following rule will serve.

Let the 3d year of the 6th Olympiad be given.

Multiply the five full Olympiads by 4 will give 20 years, and add to this sum the 3 years of the yet unfinished 6th, and we have 23.

Subtract these 23 years from 776, and we find the 3d year of the 6th Olympiad correspond to the year 753 before Christ.

To convert a given number of years before Christ into Olympiads, proceed as follows.

Let the year 753 be given.

Subtract this from 776 leaves 23, which divide by 4, and the quotient gives the number of finished Olympiads=5, while the remainder=3 is the 3d year of the yet current 6th Olympiad.

But we must remark that the Olympic games commenced with the first new moon after the summer Solstice, and consequently in the month Hecatombaeon, which was the 7th month in the Attic year. (See above § 19.) An Olympic year, therefore, embraced the six last months of one and the six first of the following Attic year. And since the Attic year began at the winter Solstice, or about the time, when the Julian year begins, the Olympic year has nearly the same relation to this also, or embraces about six months of one, and six months of the following Julian year. (Dodwell de vet. Graecor. ac. Romanor. Cyclis Dissert IV.)

The following table will show in a few examples, how the years of the Olympiads—those before the birth of Christ—and those after the building of Rome, correspond with each other. The numbers written in the form of fractions designate the last half of one, and the first half of the following year.

Olympiads.		Before Christ.		From the building of Rome.
VI.	3.	= $\frac{754}{753}$	=	1.
	4.	= $\frac{753}{752}$	=	2.
VII.	1.	= $\frac{752}{751}$	=	3.
	2.	= $\frac{751}{750}$	=	4.

	3.	=	$\frac{750}{749}$	= 5.
	4.	=	$\frac{749}{748}$	= 6.
VIII	1.	=	$\frac{748}{747}$	= 7.
	2.	=	$\frac{747}{746}$	= 8.

43. *The Cecropian Era, and Parian Chronicle.*

The Cecropian Era, i. e. the year, in which Cecrops is said to have come from Egypt to Athens, has been, since 1628, regarded by the learned, as an important, an authentic, and well defined Epoch in Grecian history. Important, since with the arrival of Cecrops, according to Greek tradition, the progress of civilization in Greece commenced; and regarded as authentic and well defined, on the following grounds.

An Earl of Arundel, a friend and patron of literature and the arts, sent a man of learning, William Petty, into the Levant to collect manuscripts and ancient works of art. Petty came back to England in 1627, and brought with him, among other ancient monuments, a tablet of Parian marble, on which was engraved a short chronicle of Grecian history. The celebrated Selden published, in the year 1628, the inscriptions contained on those marbles, under the title of Marmora Arundeliana. In the civil wars under Charles I. these marbles were dispersed. After

the war much was again collected, and given by the grandson of the Earl to the University of Oxford.—Among the fragments recovered, and still found at Oxford, is the tablet of Parian marble, which on account of its inscription, is called the *Parian Chronicle.*

Since Selden two new editions of this Chronicle, as well as of the other inscriptions, have appeared, the one by Humphrey Prideaux, 1676, the other by Richard Chandler, 1763, both under the title Marmora Oxoniensia.

When this Chronicle was entire, it ended with the Athenian Archon Diognetus. Such was the case, when it was copied by Selden. But afterwards, in the troubles of the civil war, some of the lower part of it was broken off.

The dates of events are given in it in years *before* the Archon Diognetus, reckoning backwards from this, as the fixed point, so that the Chronicle would seem to have been made under this Archon.

Since then it is proved, that this Diognetus was Archon in the year 264 before Christ, it is easy to convert all its dates into the corresponding ones of our mode of reckoning. Thus, according to this Chronicle, the battle of Plataea took place 216 years before Diognetus, and therefore 480 before Christ.

This Chronicle begins with Cecrops, and dates his coming into Greece 1318 years before Diognetus, consequenly 1582 before Christ.

Chronologists supposed, that in this Chronicle they had found the most safe guide in Grecian Chronology. But in 1753 a treatise appeared in London, in which the anonymous author called in question the authenticity of it, upon apparently strong grounds. Its title was, "The Parian Chronicle, or the Chronology of the Arundelian Marble, with a Dissertation concerning its authenticity." The views of this writer were controverted, not only by several learned men in England, but in the Goettingischen Anzeigen (1790, No. 60..) For the same purpose of defending the authority of the Chronicle, a work was published by Dr. Wagner, at Gottingen, 1790.

Yet the influence of the anonymous writer and of his doubts has been such, that the Chronicle and its authority is appealed to with hesitation, and its authenticity may be regarded as at least doubtful.

The author of the English treatise was for a time supposed to be Dr. Parr, but is now known to have been Joseph Robertson, whose learning and critical ability are celebrated in the Monthly Magazine for March 1802.

44. *Important historical Epochs in the history of the Greeks.*

1. *The Legislation of Solon.* Not only because by this Athens received that form of organization, which was so celebrated among the ancients, (the first Republic, of the constitution and organization of which we have full and definite accounts,) but also, because in the time of Solon Grecian culture attained its period of peculiar and characteristic beauty.—The promulgation of the laws of Solon fell in the year 594 before Christ, or according to Newton only 502.

2. *The great war against the Persians*, especially against Xerxes. This was one of the most important Epochs for the whole of Europe, and indeed for the whole human race. For had the Greeks been brought under the yoke, the Grecian culture, on which that of all Europe in later times depended, would have been annihilated in its first bloom. The fate of the war was decided, in the great battles of Salamis and Plataea, fortunately for Greece, for Europe, and for all that we term intellectual cultivation. The battle at Salamis took place 479, that of Plataea 478 before Christ. According to the Parian Chronicle, however, they happened a year earlier, and this date is adopted by many modern Chronologists and historians.

3. *The beginning of the Peloponessian war*, 431 before Christ. At this period it had become obvious, that a free and prudent union, on which alone the independence of the Grecian republics depended, was impossible, and it could already be foreseen, that the preponderance of a warlike State would at some period decide the fate of Greece. In this respect the Peloponessian war may be compared with the thirty years war in Germany.

4. *The battle of Chaeronea*, 338 before Christ.—This was for Greece what some battles in our own times have been for Germany.

45. *The Era of the Seleucidae.*

This is important for the history of Asia, after the time of Alexander the Great, through the whole period of the middle ages, and also for the history of the Christian Church, since the Fathers sometimes made use of this mode of reckoning.

The Epoch, with which this mode of reckoning commences, falls in the first year of the 117th Olympiad, which again embraced the last six months of the year 312, and the first six of the year 311 before Christ.

Seleucus, afterwards called Nicator, one of the most bold, skillful, and successful of the generals of

Alexander, obtained in this year a great victory over his opponents. The results of this victory were the conquest of Babylon, and the founding of a powerful monarchy, which was ruled by the posterity of Seleucus, and therefore called the kingdom of the *Seleucidae*. It was otherwise called also the *Syrian* kingdom.

In the countries pertaining to the monarchy, it was customary in historical writings, and perhaps in civil transactions to number the years from the conquest of Babylon, and this mode of reckoning was thence called the Era of the Seleucidae.

The use of this occurs in the Books of the Maccabees, and is found in the Christian fathers of the first centuries, in the Syrian, and in Arabian authors.

The Arabians term it the Era of the *two-horned* (Dhul-Karnain.)

This two-horned was uudoubtedly Seleucus and the occasion for the epithet was furnished by coins struck during his reign, on which his head was represented with two horns upon the forehead. Statues also, erected in honor of him, had the same, and these are said to have symbolized his physical strength. Seleucus seems to have been peculiarly flattered by an admiration of his personal prowess.

Of the coins, which so represented him, Eckhell treats Vol. I P. III. p. 210. Those coins, which

were current among the oriental nations, explain most naturally, why the above epithet was used among them.

Others have supposed, that this epithet was applied by them to Alexander himself. Such is indeed the case in the Koran, and an Arabian author, Abulpharagius, has explained the two horns to signify the two continents, which Alexander subdued.

It is not improbable, that the latter Orientals, and Mohammed himself, considered Alexander as intended by a designation, then known among them only by tradition. They were by no means skilled in ancient history, and confounded persons and dates to such a degree, as not to distinguish the dominion of the Romans in Asia, from the antecedent reign of the Greeks, and even held the Roman empire to be a continuation of that of the Seleucidae. The later Orientals called the Era of the Seleucidae indeed the Era of the empire of Rome.

Ulug Beg, grandson of the celebrated Tamerlane, prince of Samarcand, about the year 1430, wrote an astronomical and chronological work in the Persian language, in which he speaks of the Era of the Seleucidae, and even he calls it the Roman, while at the same time he derives it from Alexander.

46. *Civil mode of reckoning time among the Romans. The Consular Era.*

The Romans had no other mode of reckoning in the business of civil life, but the succession of the two annual Consuls. They employed neither in their laws, nor in their treaties with foreign nations, nor upon public monuments, any other means of designating the year when any events took place, than simply to name the two individuals, who exercised for the year the supreme powers of the Consulate. The names of these Consuls being, then, as they succeeded each other from year to year, recorded in their year books or Calendars, (fastis annalibus,) or preserved upon public monuments, they had, in the succession of Consuls, the means of numbering the years, from the expulsion of the kings downward, in their proper order. Chronologists term this mode of reckoning among the Romans the Conular Era (Aera Consularis.)

It began with the year 245 of the city,=508 before Christ. This Consular Era was retained under the emperors, Tacitus designates years only by the names of the Consuls. Even after the Consular office had ceased to confer any thing but an empty title and rank, with the burthensome duty of giving a costly festival to the people, the year was still named after the Con-

suls, and we might suppose, that the custom of so designating the year was the only reason, that under the emperors the office was not entirely abolished. In the constitutions of the Emperors in the Roman Codex, the Consuls, under whom the constitutions were given, are always named. The Consulate was first formally discontinued by an ordinance of the Emperor *Leo the Philosopher*, who reigned from 886 to 911. The reason assigned by him is, that in process of time the office, once so exalted, had fallen into contempt. Quum, qui omnia, temporis cursus hanc etiam Consularem magnificentiam e pristina gloria et amplitudine in objectam speciem transformavit.*—(Imp. Leonis Nov. Const. XCIV.) From this time the above mode of reckoning ceased of itself.

47. *The Historical mode of reckoning from the building of the City.*

The mode of reckoning *from the building of the City*, (Aera sive annus urbis Conditae, written with the initials A. U. C.) was never the civil Era among the Romans, nor used either in their laws, or treaties, or on their public monuments.

For a long period the Romans were themselves as

*Because the lapse of time, which changes all things, has reduced also the Consular magnificence from its pristine glory and dignity into an abject form.

ignorant, as they were indifferent, in regard to the age of their city. The elder Cato, who died 148 before Christ, was the first, and Varro in the age of Augustus was the next, who instituted inquiries respecting the year of the building of Rome. According to Cato's computation it was the first year of the seventh, according to Varro's the fourth year of the sixth Olympiad. Chronologists have preferred Varro's account, and the fourth year of the sixth Olympiad, which was the year 753 before Christ, is received by all historians, as the year of the building of Rome.

Newton doubted the correctness of the computation on the following grounds. It is assumed in it, that the sum of the reigns of the seven kings, from Romulus to the last Tarquin inclusive, was 245 years. But we do not find, that the Romans had any other source of knowledge than tradition in regard to the reign of their kings. No public documents, no monuments, no witnesses are named, which designated a definite number of years to the reign of each. The times were disorderly, and two of the seven kings, according to tradition, were murdered, two others are represented to have died an unnatural death, being struck by lightning, though it is propable, that they also were murdered. Newton, therefore, considers it very improbable, that among so turbulent a people

seven kings in succession should have reigned s great a length of time. He thought this therefore a case, in which his rule should be applied, according to which the average reign of a king is estimated, as being at the highest no more than twenty years. Taking this rule then the seven kings would have reigned only 140 years, and the building of Rome would fall about 626 before Christ.

The building of Rome, however, is at best an obscure point in history. This is not the place to treat of it more at large, but we thought it necessary to mention Newton's opinion on the subject.

48. *Civil mode of reckoning in the Greek Empire from the Era of the Creation.*

The theologians of this Empire, in the year 681 of the Christian Era, at an oecumenical or general Council, assumed it as a fact proved, that the world was created on the 1st September, 5508 years 3 months and 25 days before the birth of Christ. This Era was adopted by all the Oriental Churches in affairs of religion. It was also, after the rejection of the Consular Era, employed by the Greek Emperors at Constantinople in public documents, and introduced into the business of civil life. Our method of reckoning from the birth of Christ was never adopted by the Greeks, perhaps

for no other reason, but that it was first conceived and introduced in the Western or Latin Church. Two hostile Churches are very prone, even in things that have little concern with religion, to reject the better course, if adopted by their opponents.

This mode of computation is called by chronologists the Aera Constantinopolitana, or sometimes also the Annus Graecorum civilis, or civil year of the Greeks.

The Greeks however only designated the number of the year, without adding, that it was the year of the world, or of the Creation. Thus, in a constitution of the Emperor Heraclius, an ordinance of Alexius Comnenus is introduced, and its date given simply anno 6589. (Imperatoriae Constit.)

From Constantinople this mode of reckoning was received along with Christianity into the Russian Empire. It continued in use among them till Peter I. in the year 1700 discontinued it, and introduced the Christian Era already in use in the rest of Europe.

49. *The Cycle of Indiction.*

In the Roman Empire, about the time of Diocletian or Constantine I., (for the precise time is uncertain,) there was introduced a tax on property. Every fif-

teen years a new ordinance was promulgated, solemnly subscribed by the Emperors, in which it was fixed, how much of this tax each Province, each District, City or Commune should contribute. During the fifteen years from the publication of the ordinance, every local division in each Province, and each individual inhabiting that division, must pay the amount levied upon them, whether during that period they become poorer or richer. Only after the fifteen years had elapsed, or the forming of the new ordinance, could any regard be had to the change, that had taken place in the pecuniary condition of the taxpayers.

The ordinance, by which the Emperor imposed the tax, was properly called *Indictio*, (a charge, a proclamation,) but the tax came also to be designated by the same name.

Even in the ordinances written in Greek by the Emperors at Constantinople the Latin word *Indictio* was used, though sometimes it was translated by the word επινεμησις.

In process of time the practice was introduced at Constanstinople of dating imperial ordinances also by naming the current year of the Indiction. Thus of the ordinance of the Emperor Alexius Comnenus mentioned above it is said, it was given Indictione 4, that is in the fourth year of the current Indiction.

The Popes at Rome imitated this custom, and dated their Bulls and ordinances also by Indictions, yet with some variations in the form, for they added the *number* of the current Indiction, which the Greeks did not.

The Popes moreover assumed in doing so, we know not for what reason, that the Indictions, or tax ordinances, had their commencement *three years before the birth of Christ*, though, as was remarked above, they first came into use in the time of Diocletian or Constantine. The Papal formula was consequently e. g. anno 4 Indictionis LIII. which means, that 52 full Indictions of 15 years each = 780 years, and four years of the 53d had elapsed, or 784 years, from the assumed commencement of the Indictions, or 781 from the birth of Christ.

When Charlemagne caused himself to be crowned Roman Emperor in the year 800, he adopted this mode of dating in his documents, and the German Emperors have retained it. In the ordinance of Maximilian I. for the instruction of Notaries, they are directed to use this form in their public records and documents.

The tax on property however, to which this formula had reference, had in the mean time, in all those countries, in which it was levied, ceased to exist since the downfall of the western Empire, and was perhaps

too so entirely forgotten, that the meaning of the word was no longer known.

[This seems to be the most proper place for inserting a concise account of some other cycles and terms connected with them, which though not perhaps necessary for the student of history, and so not given in the original work, are yet often referred to in the intercourse of life, and important to be understood.

The *Solar cycle*, so called, seems to have received its designation, not, as the name would imply, from any relation to the periodical revolutions of the sun, but from its being the period, in which sun-day (dies solis) and the Dominical letter, which designates that day in the Calendar, completes the series of its changes in relation to the day of the year and the month. Since, as mentioned in section 15, there are in common years, one, and in leap years, two days, more than an even number of weeks, successive years do not begin on the same day of the week but a series of changes takes place. If there were no leap years this series would be completed in seven years, but as every fourth year, being leap year, contains an excess of two days, the series becomes more complicated and can only be completed in 4 times 7 or 28 years. This period of 28 years then is the Solar cycle.

The use of the Dominical or Sunday letter, as connected with this cycle, may be explained as follows. The seven first letters of the alphabet have been used to correspond with the seven days of the week, beginning with the year and repeated. One of these of course answers to Sunday, and in our Almanacs, ephemerides, &c. is printed, in a capital form, against Sunday throughout the year, to designate it as the Lord's day (dies Dominica.) This letter is not always the same, but follows the series of changes above represented. If we suppose January of a particular year to begin on *Sunday*, and A. to be the Dominical letter, then, if it be a common year, the next will begin a day later in the week, or on *Monday*. Beginning the repetition of the letters with A then, as before, from Monday the first day of the year, the letter corresponding to Sunday will be G. The Dominical letter, which is thus found for designating the first Sunday in the year, is used, if it be a common year, to mark all the Sundays through the year. But in leap year it is used only to the last of February, when the additional day is intercalated, and Sunday falls back another letter. If it was G in those two months, it would be F, for the rest of the year, the next year E, the next D, &c.

It is customary to consider the Solar cycle as com-

mencing in the ninth year before the Christian Era, which was a leap year and began with Monday. From these data rules are easily framed, for determining on what day of the week New Year's day will fall, and consequently what will be the Dominical letter, for any year, either according to the Julian or the Gregorian Calendar.

The *Lunar Cycle* is a period of 19 years, first brought into notice by Meton, as mentioned in section 19, and hence sometimes called the Metonic cycle. As the Solar year exceeds twelve revolutions of the moon, or the Lunar year, by about 11 days, the relation of one to the other will vary through a series of changes, which is found to be completed and return into itself, or very nearly so, after 19 Solar years. Thus on the 2d January 1813 there was a new moon, which occurred again on the same day of the year, only after the above period, or in 1832. Taking these data it is easy to prepare tables, which will show the days of the new moon in all the years included in such a cycle. It is only necessary to observe, that, for the commencement of such periods, we refer back to a year, in which there was a new moon on the first of January, and this was the case with the 1st year before Christ.

This cycle was deemed so important at Athens,

that it was engraved upon a tablet in golden letters, and hence the number, designating what year of the Lunar cycle any year is, is called the *golden number*.

As the new moons fall on the same day after every period of 19 years, so the differences between the Lunar and the Solar years will be the same in each successive period of 19 years. This difference is always to be added to the Lunar year to render it equal to the Solar, and is therefore called the *epact*, (from the Greek επαγω, to bring in, to intercalate,) as given in our Almanacs. Tr.]

50. *The Christian Era.*

It is a matter of wonder, that Christians for seven or eight centuries, though they had many festival days in memory of the most important events in the life of Christ, and laboriously enquired out the days, on which those events happened and which were therefore to be observed, as, for example the day for the celebration of Easter, and though they even celebrated the birth day of Christ, should yet, in regard to the year of his birth, have been alike ignorant and incurious. Especially does it seem strange, that the theologians of the Greek empire, who were so fond of learned investigation, and wrote church-histories so industriously, those too, who in a numerous assemblage

fixed the year of the Creation, should never once have proposed the question, in what year Christ was born.

A monk, who lived in obscurity at Rome about the year 530, from a country, too, then so unknown, that he was regarded as a Scythian, the monk *Dionysius*, surnamed *exiguus* (the little,) he it was, that in the obscurity of his cell, first attempted to ascertain, by chronological computation, the year of our Saviour's birth. The year too that he fixed upon in the result of his enquiries, was the same, which we reckon from at the present day, as that of the birth of Christ. At that time, however, men were far from conferring upon Dionysius the honour of adopting his mode of reckoning. It was two hundred years later, about 720, than an Anglo-Saxon monk, the venerable *Bede* (Beda venerabilis,) recommended to Christians to make the birth of Christ, as computed by Dionysius, an Epoch for chronological purposes. Bede himself introduced and made use of it in his own historical works.

But it was Charlemagne, who, after he was crowned Roman emperor in the year 800, first used this Era in dating public documents. Since that time it has been in general use, as the mode of reckoning time n Christian Europe.

In this mode of reckoning, it is assumed, that Christ

was born in the year 753 after the building of Rome, such having been the conclusion of Dionysius.

Some modern enquirers however regard this as not strictly correct.

In the life of Christ, as given in the four Evangelists, certain circumstances are so determined in relation to time, as to make it appear, that Christ was born in the 750th, rather than the 753d year of Rome.

In Luke (chap. 3,) it is said, Jesus was baptized by John in the 30th year of his age, and in the 15th of the reign of Tiberius. To find the year of his birth then, we must enquire what year of Rome was the 15th of the reign of Tiberius. But here a circumstance occurs, which has occasioned a division of sentiment. Augustus, two years before his death, adopted Tiberius as his Colleague, or rather, by a decree of the Senate, a participation in the government of the Provinces was conferred upon him. Are the years of the reign of Tiberius then to be reckoned from this period, or only from the death of Augustus? Augustus died in the year of the city 767. The reign of Tiberius, therefore, may be reckoned from the year 765, or from 767. The 15th year of his reign would be accordingly either 780 or 782 a. U. C. and deducting 30, as the age of Christ at that time, the year of his birth would fall in the year 750 or 752 after the building of Rome.

In the Gospel of John, (chap. 2.) it is stated, that in the 30th year of the life of Christ, the Jews said to him. "This temple has been forty six years in building." &c. Reference is had here to the building, which Herod the 1st had commanded. The year of Christ's birth was therefore in the 16th year of the building of the temple. Herod gave the order for building it in the 18th year of his reign, and this commenced in the year of Rome 717. The 16th year of the building of the temple therefore, and so of the birth of Christ, was the 750th of the Roman Era.

Finally Jesus celebrated the Passover with his disciples on a Thursday in the 34th year of his life. Now Astronomers have ascertained by calculation, that the feast of the Passover for a long series of years, before and after the death of Christ, could fall on Thursday only in the year 784 of Rome. This was the 34th year of his life, and therefore he was born in the year of Rome 750.

51. *The Julian Period.*

After the restoration of learning and science in the 15th and 16 centuries, historians saw clearly, that without a determinate and certain chronology there could be no true and proper history. Chronology therefore was zealously pursued as a study by many

l earned men. They soon saw, that in ancient history it must be a primary object to fix upon a uniform and generally applicable mode of reckoning, to which all the diverse modes of the different nations of antiquity could be reduced.

For such a general mode of reckoning they conceived nothing would answer better, than *first* to reduce the forms of the year of all ancient nations to the Julian year, and *second* to assume the Creation of the world, according to the account of Moses, as the Epoch, from which to commence the computation of time, i. e. to reckon *according to the years of the world.* But in regard to the year of the world itself inquirers were not agreed. From the creation to the birth of Christ some reckoned a greater and others a less number of years. From such conflicting opinions and systems perplexity again arose, one saying that Rome was built in the year of the world 3196, another in 3231, another still in 3250. In order to understand the account of each, one must first know how old he assumed the world to be, or how many years he reckoned from the Creation to the birth of Christ.

To shun this inconvenience, Joseph Justus Scaliger found out a period of 7980 Julian years, i. e, years of the Julian Calendar. Scaliger, who died

1558, was not of course acquainted with the improvement of the Calendar by Pope Gregory.

On account of the Julian year, which Scaliger adopted for his period, he called it the Julian period. It was an error, therefore, when in later times it was supposed by some, that the *Julian* Period was named from its finder. The error arose from confounding the name of the father Julius Scaliger, who was also a celebrated scholar, with that of the son Joseph, who was author of this chronolgical device.

Scaliger assumed, that the world was created 3949 years before the birth of Christ, but commenced his period 764 years before the Creation. Christ was therefore born in the 4714th year of the Julian Period.

Petavius, who lived after Scaliger, reckoned from the Creation to the birth of Christ 3984 years, and must therefore commence the Julian Period 729 years before the Creation.

Finally Usher computed from the Creation to the birth of Christ 4003 years, and must accordingly place the beginning of the Julian Period 710 before the Creation.

This Julian Period answered the purpose of relieving chronologists from the necessity of giving the year of the world, in which an event occurred, ac-

cording to all the different systems, in order to be understood by those who adopted them. It was now sufficient to give the year of the Julian Period, and every chronologist could readily find the year of the world according to his own view of that Epoch.

The grounds, on which Scaliger took 7980 years for his Period, and considered it as beginning 764 years before the creation, were taken from the science of Astronomy. The mere historical chronologist may omit the consideration of these without disadvantage to his studies.*

This Period so ingeniously devised by Scaliger, and for a time of so much use, continued however to be useful to chronologists, only so long as they reckoned from the Era of the Creation, and disagreed about its true time. Since that unsettled mode of reckoning has been laid aside, and the more convenient and certain mode of reckoning from the birth of Christ has been generally adopted, the Julian Period is no longer of any necessity or use.

*It may be observed however in a word, that the number was obtained by multiplying together the Solar cycle of 28, the Lunar of 19, and the Roman Indiction of 15 years, and the Period was conceived to begin, when the number of each of these Cycles was *one*, or when they began together. Thus if from the present year of the Julian Period 6550 we subtract the present years of those three cycles 26, 14 and 10, and divide the several remainders by 28, 19 and 15, the truth of the statement will be shown. Tr.

52. *Mohamm edan Era.*

All the Mohammedan nations have the same mode of reckoning. The Epoch, from which they commence in numbering their years, they call the *Hedjira*, an Arabic word signifying a *flight*, having reference, as here used, to the flight of Mohammed from Mecca to Medina.

This flight took place, according to accurate chronologists, on the 16th July of the year 622 of our Era.

Since the Mohammedans make use of the Arabian Lunar year, and 33 of these are only equal to 32 Solar years, (See § 12 and 34 above) this will give us the rule for converting years of their Era unto the corresponding years of the Christian Era.

1. If the number of the Mohammedan years is less than 33, I have only to add to it the 621 years from the commencement of our Era to the flight of Mohammed. Thus the 20th year of the Hedjira would be the 641 of the Christian Era. For within the first 32 year after the Hedjira, the Christian Solar, and Mohammedan Lunar years, have still a general coincidence. Yet in the more accurate comparison of particular days we must have regard to the different forms of the two Calendars, Since the Lunar year is 11 days shorter than the Solar, events, which happened in the first 11 days of the second Lunar, must be reckoned in the first Solar year.

2. If the number of the Mohammedan year to be compared be greater than 32 it must be divided by 33, and the quotient subtracted from the number of years. Thus if the number 1222 of the Hedjira be given, it gives, when divided by 33, the quotient 37. This, subtracted from 1222. gives 1185 Solar years since the Hedjira. For 37 times 33 Lunar are equal to 37 times 32 Solar years. Those make 1221 Lunar years, and these 1185 Solar.

To the Solar years thus found must be added the 621 years before the Hedjira, and we thus find 1222 of the Hedjira, to be 1806 of the Christian Era.

To convert years of our Era into years of the Hedjira we must subtract 621, divide the remainder by 32, and add the quotient to the given number, because 32 Solar years of our Calendar are equal to 33 Lunar years of the Mohammedan. Thus, if the year 1806 be given, 621 subtracted leaves 1185. This divided by 32 gives 37, which added to 1185 is 1222, or 1806 of the Christian is 1222 of the Mohammedan Era.

Yet if the months and days are to be accurately given, we must bear in mind, that every Lunar year of their Calendar falls short by 11 days of our Solar year, and consequently, that events, which happen in the first 11 days of the next Lunar, belong to the 11 last days of the first Solar year.

The following table shows how the first ten years of the Hedjira correspond with our reckoning.

Hedjira.		Christian Calendar.			
1. year from	July 16,	622	to	July 5,	623.
2. — =	July 6,	623	—	June 25,	624.
3. — =	June 26	624	—	June 15,	625.
4. — =	June 16,	625	—	June 5,	626.
5. — =	June 6,	626	—	May 25,	627.
6. — =	May 26,	627	—	May 15,	628.
7. — =	May 16,	628	—	May 5,	629.
8. — =	May 6,	629	—	April 25,	630.
9. — =	April 26,	630	—	April 15,	631.
10.— =	April 16,	631	—	April 5,	632.

We here close our Introduction to Historical Chronology. In omitting to say any thing of the chronological systems of the Bramins, or the Chinese, and other nations, we are governed by what seem to be sufficient reasons. These are in part, that those systems are obscure and uncertain, and in part, that, in order to form a judgment of them, it is requisite to have great skill and readiness in astronomical calculations, connected with chronology, and an accurate acquaintance with the lierature and history of those nations. But as we can little expect to find such skill and knowledge among those, for whom this work is written, so we confess ourselves to be in this particular in the same condition with them.

APPENDIX.

REMARKS ON THE USE OF EPOCHS IN GENERAL HISTORY.

I take the word *General*, or *Universal History* here in its common and generally understood signification, without entering into a more precise determination of the conception, and of its distinction from the *History of Humanity*.

When I consider the Epochs, which the celebrated teachers of General history have assumed, I find

1. That almost every one has chosen them in accordance with his own ideas. Schroeckh has chosen one Gatterer another, Schloetzer a third, Beck a fourth, &c. There must therefore be something arbitrary in the selection of such Epochs.

2. Epochs are often chosen from views, that are contradictory. That, which determines it, is now a Moses or Solon, now a Cyrus, an Alexander, or a Ginghis Khan; here a Legislator, a founder of religious institutions, or of the regulations of civil and social life, there a destroyer, an oppressor and conqueror.

* * * * * * * *

General history may be presented from very different points of view, and *ought* to be exhibted from all points, but not from all at once, nor in the same picture. It must unavoidably be a very confused picture,

if each of the leading figures, which crowd the canvass is presented from a distinct point of view.

One or another single point must be chosen, and from this, and this alone, the whole presented, with the consequent degrees of distinctness, which that point permits.

There are many distinct points of view, each of which has its peculiar interest.

Among these we may mention that, in which every thing is contemplated from its relation to *political power*. From this point of view we contemplate many free or independent nations, as existing at the same time; we trace the growing superiority of one; the subordination of many to the power of a single nation; the predominance of one overcome and broken by another; universal empires established, and these again shattered in pieces, while in their place rise up again free and independent nations.

Again history may be viewed relatively to the *progress of cultivation*. Here we see at first rude and savage nations; one or two cultivated and surrounded by others which yet remain in their original rudeness; diffusion of culture, either by voluntary imitation, or by the extended dominion of the cultivated. Again the first dawning of cultivation, its progress, obstacles in its way, return to barbarism, destruction, restoration.

Religious point of view. Nations cleave to traditional sayings, and inherited modes of representation. Individuals establish and diffuse new ideas, either from their own conviction, or for moral or political ends; nations improve received ideas, and receive new ones, either by persuasion or force; one religion

becomes predominant, another is rejected and eradicated.

Commercial point of view. There was once an isolated condition, in which each nation knew scarcely its nearest neighbors; the different branches of the human race were wholly foreign and unknown to each other; one nation began to carry on trade with another, and more and more extended it, first by land, and then also by sea; trade became the fixed employment of particular nations, (commercial nations and States.) The extended commerce of the world is carried on by only a few nations, and is extended from one to another.

I cannot believe, that children and young persons are interested in learning much of the deeds of an Alexander, a Cæsar, an Attila, and studying minutely, at what periods these heroes performed their great exploits. For young and uncorrupted minds there are other views, and Epochs more alluring in General history.

Why, for example, has not the extension of agriculture been selected with a view to its historical Epochs?

Agriculture was the first and most necessary condition, on which the intellectual improvement and perfection of the human race depended. Without agriculture there would be no towns, without towns no sciences, no arts, no trade, no industry.

Where Ceres had not come, there Apollo and the Muses did not venture themselves.

The invention of agriculture would be the most important Epoch in the history of mankind, did it not belong to those primaeval and obscure times, from which no distinct notices have come down to us.

But of the diffusion of agriculture five pleasing Epochs may be noticed.

About 2000 *years before the birth of Christ* agriculture was still limited to *middle Asia.* In the most ancient (Hebrew) accounts, we find probable grounds to suppose, that the Euphrates was yet the western limit of agricultural nations. On this side of it still wandered nomadic hordes. Egypt alone formed an exception. Whence such an advantage was derived to this isolated country, we have not the means of fully explaining. But beyond the Euphrates agriculture was by no means universally diffused. Northern Asia was still filled with herdsman and hunters, who, to the misfortune of southern and civilived nations, were always savage, and lived by plunder and violence. Only southern Asia beyond the Euphrates had, by means of the plough, become the abode of cultivated nations. This was the *first Epoch.*

About 1000 *years before Christ* Asia Minor, Greece, Italy, and the North coasts of Africa were brought under cultivation, forming the *second Epoch.*

Under the dominion of the Romans—perhaps by means of this—agriculture was extended over the provinces of Gaul, Spain, Britian, as far as the Rhine, and Danube, and Southern and Western Europe became a partaker of the gifts of Ceres, about *the time of the birth of Christ.* This is the *third Epoch.*

Along with the Christian Religion, agriculture was extended over Germany, Denmark, Norway, Sweden, Poland, Prussia, Courland, Livonia. The morasses and forests of Northern and Northeastern Europe were converted to agriculture, *about the year* 800, forming the *fourth Epoch.*

Finally a fourth continent was discovered, which had hitherto been left to the wildness of nature, and cultivated by no human hands. This, brought under cultivation by European Colonists, bids fair to be one day the abode of happier nations, than the history of the older continents can exhibit. This is the *fifth Epoch.*

These several Epochs might be exhibited on as many Charts, showing the progress and extension of agriculture over the Earth, as the rise and progress of the great monarchies has already been.

Such Charts, connected with the first instructions in general history, would to young minds be more interesting and delightful, and more productive of useful reflections, than those, in which political power, and the rise of Empires, form the point of view, from which the condition of the race at different periods is contemplated.

* * * *

Trade and navigation again form an important feature in the general history of mankind. It is by these, that we have become acquainted with the race itself as a whole, and in its various branches, and with the face of the Earth, in its whole extent, and in its several parts. Without trade and navigation Geography would never be brought to perfection.

In the earliest times each nation, knowing little or nothing of any other, regarded itself as the whole human race, or at least as the most important part of it, and the soil, which it inhabited, as the whole earth.

About 2000 years before Christ, some commercial intercourse arose among a few nations of Middle and Southern Asia, but chiefly on land, by means of cara-

vans. Navigation however commenced on the coast of the Red Sea, on those of the Persian Gulf, and on those of India and Eastern Africa. This formed the *first Epoch.*

About 1500 years before Christ, the Mediterranean Sea was navigated in all parts by the Phoenicians, and a regular trade began to be carried on between all the countries lying on its coasts. Enterprises in navigation also were pushed even into the Atlantic ocean. This we may consider *the second Epoch.*

About 80 years before the birth of Christ, by the discovery of the monsoons, the ocean, which separates India from Africa, was subjected to navigation. It was then that voyages were first made from the harbours of Egypt to the East Indies. The man, who first discovered by observation the periodical regularity and direction of those winds, and made such use of them, was Hippalus. Its effect in promoting intercourse and improvement was such, as to give him a rank with Prince Henry of Portugal, Vasco de Gama, Columbus, Magellan and Cook, among the benefactors of the race. It may be regarded as *the third Epoch.*

It was in the 12th century, that the Baltic and North Seas were first navigated for the purposes of commerce by the people of the Hanse towns, and navigation carried on between these seas and the Mediterranean, forming *the fourth Epoch.*

Between 1400 and 1500 commenced the more extended enterprises of the Portuguese and Spanish navigators. Such have been the consequences of these, that now no ocean, no bay, no country or island of the earth can remain unknown. This is *the fifth Epoch.*

Charts representing these Epochs of trade and navigation, like those before proposed in relation to agriculture, would be of similar service in the first instructions in general history.

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Great political revolutions, and changes in the relative power and independence of nations, are still important Epochs in General history, and without an account of these revolutions, and a designation of the Epochs, which they form, history would be very imperfect.

But we ought accurately to determine the character of the events, that are to be regarded as forming such Epochs. These are not properly, such as prepare the way for a revolution, by merely planting the seeds of future empire, but those, which are *decisive*, and so establish the power of a single nation, as to make the subjugation of others inevitable.

In this view of the matter, the mere *building of Rome*, of an individual city, which for several centuries ruled only over its own narrow demesnes, cannot be regarded as an Epoch. It was indeed destined to the attainment of universal empire, but only at the distance of centuries. In the same manner Macedonia, still also a small power, was destined to future empire. Yet we do not make the organization of the Kingdom of Macedon an Epoch ; why should we the building of Rome ?

The event that *decided* the power of Rome, and rendered precarious the independence of so many other nations, was the termination of the second Punic war, or the peace with Carthage in the year 200 before Christ. This peace, as it appears to my own

view, was a truly great Epoch in the history of the world.

Of similar importance as an Epoch, was the battle of Actium, 30 years before the birth of Christ. By this it was decided, that from that time the fate of a great portion of the human race, the fortunes of all civilized nations, from the Atlantic ocean to the Euphrates, were to depend on the arbitrary will of one man.