THE ANGLO-SAXON COMPUTATION OF HISTORIC TIME IN THE NINTH CENTURY.

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INTRODUCTION.

§ 1.

The science of numismatography is one that regards the inscriptions on coins and medals as historical documents, and treats them in connection with what is known or surmised about the history of the times with which these documents were contemporary. It is primarily a critical science, which seeks to deal, on one hand, with the actual vehicles of these inscriptions, that is to say, with the coins themselves; while, on the other, it relies upon the judgment of diplomatists and historians in order to marshal its conclusions, and set them in such a position with regard to historical events that the evidence of the coins, and the knowledge we possess of the circumstances in which they were struck, shall throw light upon each other.

The nature of the services rendered to this science by the numismatist differs widely from the nature of those rendered by the historian. Numismatists are very often able to state a clear case: historians, perhaps quite as frequently, present a confused and contradictory one. The numismatist, as we have already observed, deals with original documents; and his conclusions, with respect to the matter and form of a particular inscription, are found to be corroborated, in very many instances, by the evidence of numerous other examples of it belonging to the same reign or period. The historian, it is well known, is mainly dependent upon copies, and is frequently
hampered by conventional views when forming a judgment. The
documents he is desirous of using are rarely at hand, and essential
details, even when given in the originals correctly, are apt to be
corrupted in transcription. This liability to err is, it is true, greatly
diminished by the circumstance that many legal documents of the
period we are now interested in—namely, the Anglo-Saxon period—
have been reproduced in facsimile by the Ordnance Survey, and by
the Trustees of the British Museum. But, though the original
charters of the Anglo-Saxons are more numerous than those of any
other people in contemporary times, still, in scores of instances, these
charters are of no greater assistance to the chronologist than the coins
of King Egbert of Wessex.

This constitutes a serious difficulty, for the historian is constrained
to bear in mind, at every successive point and turn of his argument,
the necessity of observing the strict chronological sequence, not only of
the chief events he is enumerating, but also of their consequences, the
appearance, momentum, and gradual evanescence of which he is
anxious to recognise and describe. On the other hand, the
numismatist qua numismatist is quite free, for the most part, from this
obligation, inasmuch as, for a period comprising many centuries, the
classification of the objects of his solicitude is not dependent upon
chronological knowledge. When, for instance, he is occupied in
arranging the coins of the Anglo-Saxon kings, he is not perplexed by
any notes of time, because the coins afford none. His task requires him
to comment appropriately upon the shape, weight, and ornamentation of
the coins; to identify the metal of which they are made; to decipher

"Facsimiles of Anglo-Saxon Manuscripts, photozincographed . . . by the
Director-General of the Ordnance Survey, Lieut.-General J. Cameron, et al., and edited by
W. Basevi Sanders. Three Parts, 1878-1884. Mr. Sanders prepared an Introduction,
also, and translations. [1707. d.] (I am giving the British Museum press-mark in
brackets.)

"Autotype Facsimiles of Ancient Charters in the British Museum, four vols., 1873-
1878, ed. E. A. Bond. [1705. c. 15].

"Happily, these [original charters] for the Anglo-Saxon period, immensely surpass in
number those of any other country for the same time . . . " R. L. Poole. "The
Teaching of Paleography and Diplomatic," in Essays on the Teaching of History, Cambr.,
1901, p. 19.
the inscriptions they preserve; and to group them in accordance with the proper names of persons and places which these inscriptions, for the most part, consist of. The ability to read these proper names aright is postulated, and it is obvious that the task of the numismatist is performed as soon as he has presented the evidence of the coins in a systematic manner.

When, however, the laudable desire to link this meagre but valuable and indisputable information with the written history of the times makes itself felt, it becomes necessary to quit the solid ground of numismatic fact, and venture forth into the regions of speculation and conjecture. The chronological aspect of all questions touching the inscriptions then takes its place beside the linguistic and palaeographical aspects, and it is perceived that the enquiry must be pursued with the sanction and restraint of chronological science. The result is that, as the need of wider and more critical investigation is experienced by the progressive numismatologist, he recognises that the aid of the historian and diplomatist must be secured, in order that the sequence of events, and the correlation of circumstances believed to be connected with the issue of particular coins, may be determined exactly. With this aid it should become possible to confirm or dissipate the hypotheses and conjectures which crowd the mind; without it, the results of investigation and research cannot achieve reliability.

The help of historians and diplomatists having come to hand, the numismatologist who is concerned with Anglo-Saxon numismata quickly discovers that these authorities disagree among themselves. Moreover, he learns that different historians, when dealing with chronological questions, are alleged to be hampered in their investigations without knowing why, and are frequently found to be discrepant, even though dependent upon records which are believed to be accurate and trustworthy. With such perplexing facts before him, the investigator who is unwilling to take the accuracy of others for granted, and who has been trained to weigh evidence and gauge the relative worth of discordant witnesses, will set out to make himself acquainted with the particular rules of criticism which all historians profess to
be guided by when engaged in the solution of chronological problems. Should he pursue his investigations far enough, he will grow distrustful towards the statements made in the history books; and in the sequel he will come to suspect that historians and diplomatists are unversed in the science of technical chronology, and unreliable and inaccurate in their application of its rules.

"It is to little purpose," said Sir Nicholas Harris Nicolas in the introduction to his work on chronology,\textsuperscript{d} "that early Chroniclers and Annalists should be correct in their Dates, or that Historical Evidences should be carefully preserved, if those who consult them are ignorant of the means of reducing those dates to the present system of computing Time." These words were written seventy years ago, but the opinion they convey is quite applicable to the circumstances of our own day. In early times it was the bounden duty of ecclesiastics to acquire the art of computing dates and periods;\textsuperscript{e} and it is now equally incumbent upon the scholars who undertake to introduce us to medieval authorities, to render themselves acquainted with the complicated methods of chronography employed by those worthies. But the systematic study of this medieval art would seem to be quite neglected in this country; and students of history, together with historical writers and diplomatists, are unfamiliar


\textsuperscript{e} One of the earliest prelates to urge reform in Paschal computation was Paul of Middleburg, Bishop of Fossombrone from 1494 to 1534 (Gams, p. 698), and in his \textit{Parabola de correctione calendarii}, a little book written in 1516 in reply to those who had attacked his larger work \textit{De recta Paschae celebratione et de Die Passionis D.N.I. Chr.} (Forosempronii, 1513), he says: "Scripsit beatus Augustinus computus etatis lune esse necessarium sacerdoti." I do not know which work of St. Augustine’s this occurs in. The late Henry Bradshaw, in an article on the Calendar in the \textit{Dictionary of Christian Antiquities}, remarked: "A knowledge of the Calendar was one of the essential qualifications for the priestly office. It is a frequent injunction in the capitula of bishops—"presbyteri computum discant,' let the priests learn the (Paschal) computus . . .", and the \textit{Capitulare Interrogationis, a.d. 811}, of Charlemagne, I. 68, enjoins—"ut scholae legentium puorum sint; psalmos, notas, cantum, computum, grammaticam . . . discant." Bede, \textit{H.E.}, IV., ii, p. 204, speaks of the throng of disciples taught "metricae artis, astronomiae, et arithmeticae ecclesiasticae disciplinam . . ." by Theodore and Hadrian between 669 and 690, at Canterbury.
with the means of reducing Anglo-Saxon computistical data to modern terms. The consequence is that serious mistakes are made from time to time by scholars of good repute, when dealing with such data. Within the last few years, certain prominent English scholars have publicly furnished examples of the inconvenience resulting from the want of preparation referred to. It will be remembered that the English public men who assumed the duty of celebrating the one-thousandth anniversary of the death of King Alfred the Great, were unable to determine the meaning of the phrases in which the ecclesiastics who were contemporary with him recorded his obit in the Winchester and other monastic chronicles. There was much discussion, and, in the course of it, it became quite clear, not only that those scholars who appeared to speak with most authority did not agree between themselves, but also that they were unacquainted with the elementary rules of Old-English computation. It was, in fact, discovered in the course of the enquiry that the respective authorities on the Saxon Chronicle and the Saxon Charters, namely, the Rev. Charles Plummer and Mr. W. H. Stevenson, did not know at what hour the computistical day began, nor on what day

\[ Vides \ the \ Athenæum, \ 1898, \ Nos. \ 3,672, -3, -4, \ and \ 3,675; \ 1900, \ Nos. \ 3,804, -10, -11, -14 \ and \ 3,817; \ 1901, \ Nos. \ 3,819, -20 \ and \ 3,870. \]

\[ Vides \ the \ Athenæum, \ March \ 19th, \ 1898, \ p. \ 373, \ col. \ 2. \ A \ perusal \ of \ Mr. \ W. \ H. \ Stevenson's \ letter \ will \ show \ clearly \ that \ when \ he \ wrote \ about \ "our \ word \ fortnight," \ and \ deprecated \ further \ argument \ about \ the \ incidence \ of \ six \ nights \ before \ All-Hallowmass, \ he \ had \ not \ the \ slightest \ inkling \ that \ the \ computistical \ day \ in \ Anglo-Saxon \ times \ did \ not \ commence \ and \ end \ at \ midnight. \ In \ the \ Athenæum \ of \ April \ 2nd, \ 1898, \ p. \ 439, \ Mr. \ Stevenson \ pleaded \ that \ his \ views \ coincided \ with \ "the \ normal \ and \ usual \ interpretation \ of \ the \ dates \ in \ the \ Chronicle \ and \ in \ the \ Calendars," \ which \ is \ quite \ possible. \ Professor \ Piper, \ whom \ Mr. \ Stevenson \ speaks \ of \ as \ a \ "distinguished \ chronologist," \ was \ equally \ uninformed. \ Moreover, \ Piper \ assigned \ King \ Alfred's \ obit \ to \ October \ 26th, \ 901; \ see \ his \ Die \ Kalendarien \ und \ Martyrologien \ der \ Angulsachsen, \ 1862, \ p. \ 48. \ [4825. cc. \ 29.] \ When \ laying \ claim \ to \ Piper \ as \ a \ distinguished \ ally \ with \ respect \ to \ the \ calendar \ date, \ Mr. \ Stevenson \ did \ not \ lay \ stress \ on \ the \ fact \ that \ they \ were \ antagonists \ with \ respect \ to \ the \ year, \ which \ he \ had \ given \ in \ the \ English \ Historical \ Review \ as \ 899. \ At \ the \ close \ of \ his \ letter \ of \ March \ 19th, \ Mr. \ Stevenson \ remarked \ that \ when \ I \ referred \ to \ computists \ dating \ Alfred's \ obit \ on \ October \ 25, \ 900, \ I \ was \ obviously \ speaking \ for \ myself \ alone; \ but \ he \ must \ be \ presumed \ to \ have \ been \ unaware \ then \ that \ that \ is \ the \ date \ preferred \ by \ the \ compilers \ of \ the \ Art \ de \ Vérifier \ les \ Dates, \ and \ they \ were \ certainly \ computists, \ as \ well \ as \ chronologists.
the Indiction began; nor in what month of the Julian year the Anglo-Saxon annalistic year began; nor whether the regnal years of the West-Saxon kings were calculated from their accession or their coronation. The result of this was that the public men referred to were constrained to assume that the Anglo-Saxon chroniclers of the ninth century did not differ in chronographical method from ourselves; so they took the dates in the Saxon Chronicles just as they found them, and celebrated the millenary of King Alfred's death on October 26th, 1901, which was a year and a day too late.

With these and similar facts in mind, our President, Mr. Carlyon-

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Britton, suggested to me that I should advance the cause of numismatological enquiry if I were to write out an account of the Anglo-Saxon methods of counting the years, and calculating the occurrence of hours, days and periods. I undertook this task gladly. I trust that the method of arrangement I have devised and adopted in this article will simplify the presentation of an intricate subject, and make it easy to discover and acquire that knowledge of the rules and principles of ecclesiastical computation, without which much of the work of ancient chroniclers must remain an unsolved problem.

§ ii. Computistical Tool-books.

The number of treatises on technical chronology is very great, and I will refer to only a few of them. Among French works the Dissertation sur les Dates des Chartes et des Chroniques\(^a\) is classical. It has formed the basis of most modern French and English books on chronology. It has a prominent failing, which consists in the paucity of instances of chronographical difficulties which its editor, Dom Clément, thought fit to give. The subject-matter naturally comprises French chronicles and diplomas. Hence it would be useless to look for detailed solutions of insular problems in the Dissertation. It is clear, however, that the compilers of the Art de Vérifier les Dates were aware of our difficulties, and that, too, before we had found out for ourselves that we did not know. We conclude this from the facts, inter alia, that they dated Alfred's obit correctly, in apparent opposition to the Saxon Chronicles, and in real opposition to English historians; and that they pointed out that numerous instruments printed in Rymer's Foedera in the reign of Queen Anne and executed in the period between Richard I. and Edward IV., are misplaced in date by one entire year.

The Nouveau Traité de Diplomatique\(^b\) is another French work

\(^a\) L'Art de Vérifier les Dates des Faits Historiques, des Chartes, des Chroniques et autres anciens Monuments depuis la Naissance de Notre-Seigneur, par un Religieux de la congrégation de Saint-Maur, 18 vols., 1818. [2088. a.]

\(^b\) Nouveau Traité de Diplomatique, où l'on examine les fondements de cet art; . . . avec des éclaircissements sur un nombre considérable de points d'Histoire, de Chronologie, de Critique et de Discipline, etc. 6 vols. Paris, 1750 to 1765. [2038. c.]
in which the *minutiae* of computation are dealt with. But, as this work was compiled by two of Dom Clément’s contemporaries, Benedictines of St. Maur like himself, the consideration extended to chronology does not pretend to be exhaustive. An article in it headed “Les Règles particulières sur les Dates,” is instructive and concise.

The latest French work on chronology is Mons. Giry’s *Manuel.* The second book therein is concerned throughout with technical chronology. It is rich in tables, but, like the *Dissertation,* it is too much restrained from giving instances of peculiarities. The computistical part of *Livre II.* is rather perfunctorily compiled. This is particularly the case where Mons. Giry deals with Pingré’s calculations of the dates and times of eclipses. If the early and valuable notices of eclipses in Western Europe are to be properly identified, and rendered useful in the fixation of the dates of contemporary events, the importation of much more method into the analysis than Mons. Giry has supplied is necessary.

Among English treatises I would mention Playfair’s *System.* This is a compilation which is dependent, in so far as the computistical portions of it are concerned, upon the work of the Benedictines. It carries the consideration of particular problems no farther forward than Dom Clément did in his *Dissertation.* The computistical tables selected by Dr. Playfair are printed very clearly, and trigonometrical formulas are furnished on p. 182 for calculating accurately the breadth of the penumbra at a given place during solar eclipses. On the preceding page, other tables are given, which serve to define the extent and limits of the penumbra, by inspection, and approximately only.

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* Manuel de Diplomatique ; Diplomes et Chartes ; Chronologie Technique ; Eléments Critiques et Parties constitutives de la Teneur des Chartes, &c. By Arthur Giry ; Paris, 1894. [2038. c.]

* A System of Chronology, by James Playfair, D.D., Edinburgh, 1784. [210. i. 3].
Nicolas's *Chronology* is a little book which contains a mass of valuable information, hurriedly compiled in its computistical sections, and not well presented. It is frequently misleading and incorrect, but, at the same time, really very useful.

Hampden's *Glossary* contains a great deal which had appeared already in the *Art de Vérifier les Dates*. It is not adequate to supersede the *Dissertation sur les Dates* therein, and does not advance the study of computistics at all.

Prebendary Browne's *Compendium* is the work of a scholar who realised in himself the dictum of St. Augustine of Hippo, quoted already; *supra*, §i, note e. In this compendium we find the essence of computistical science well presented and correctly treated; but the author of it neither sought to apply his learning to the solution of medieval problems, nor attempted to advance beyond those fixed rules which the members of his profession ought to be familiar with.

Hardy's *Introductory Remarks* is one of several valuable treatises prefixed to our *Monumenta*. Whether I am quite accurate in attributing it to Sir T. D. Hardy exclusively, I am not sure. But he was well versed in the intricate matters dealt with in it, on the chronographical side, and he also had the advantage of being in possession of Mr. Petrie's papers. These *Remarks* elucidate several chronological points in the work of medieval writers, which would have remained obscure but for the intimate knowledge of their

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*Medii Aevi Kalendarium, or Dates, Charters and Customs of the Middle Ages with Kalendars from the tenth to the fifteenth century, and an alphabetical Digest of obsolete names of days forming a Glossary of the Dates of the Middle Ages, with Tables and other aids for ascertaining Dates*, by R. T. Hampson, 2 vols. 1841. [2088. f].

*Ordo Saecrorum: A Treatise on the Chronology of the Holy Scriptures, together with an Appendix containing, inter al., i. a Compendium of the principal Institutes of Chronology*, pp. 455 to 509, by Henry Browne, M.A., London, 1844. [1107. h. 29.]

*Introductory Remarks on the Chronology of the Medieval Historians, Monumenta Historica Britannica*, edd. Petrie and Sharpe, 1848, pp. 103 to 128. [2072. g.]
method, and of the manuscripts of their works, possessed by both
the scholars named. The Remarks are neglected or, perhaps,
overlooked by those German scholars¹ who have taken such deep
interest in the History of the Britons since the appearance of
Professor H. Zimmer's *Nennius Vindicatus*. They do not seem
to be read by contemporary English scholars, either.⁶

De Morgan's *Almanacs*¹ is one of a class of works which
a student who wishes to become a computist should not use.
Everything is done in this, and similar books, to encourage the
student to depend on tables. Such books should only be used to
verify results achieved by application of the proper rules. The
accuracy of Professor De Morgan's computations is, I believe,
unquestioned.

Bond's *Handy-Book*⁷ is another work in which no systematic
attempt to teach computistical science is made. It shows keen insight
with respect to the value of data, however; though it has nothing
to tell us about either the incidence of the *feria* and ecclesiastical
calendar-day, or their differences. The charge brought against it
by Dr. Reginald L. Poole," viz., that it is ill-arranged, is not
intrinsically unjust, but it is not by any means alone in exhibiting
that shortcoming.

¹ By, inter al., (a) Professor Heinrich Zimmer himself, (b) Dr. Mommsen, and (c)
Professor Thurneysen: (a) *Vide Nennius Vindicatus*, 1893, p. 206; (b) *vide* notes to
Cf. Ériu. vol. ii., 1908, p. 117; (c) *vide* Zeitschr. f. deutsche Philologie, Bd. xxviii, and
Zeitschr. f. celtische Philologie, Bd. i.

⁶ By, inter al., (a) Mr. W. De Gray Birch, (b) the Rev. Charles Plummer, (c) Mr.
W. H. Stevenson: (a) *vide infra*, Chap. I, § ii, note n; (b) *vide* ibid. note o; (c) *vide*
infra, note u, and text.

¹ The Book of Almanacs, with an Index of Reference whereby the Almanac may be
found for every year whether in old style or new from any epoch, ancient or modern, up to
A.D. 2,000. With means of finding the day of any new or full moon from B.C. 2,000 to
A.D. 2,000. Compiled by Augustus De Morgan, Secretary, R.A.S.; London. 1851.
[8560. a. 27.]

⁷ The Handy-Book of Rules and Tables for verifying Dates of Historical Events and
Public and Private Documents. By J. J. Bond, fourth ed., 1889. [2088. g.]

" *Ut supra*, § i., note c. p. 28.
The Germans also have paid great attention to the art of computation. Ideler's *Handbuch* is known to all investigators. But it is too advanced for the general student, and the method which informs it is historical and not computistical.

Grotefend's *Zeitrechnung* is replete with useful information, which is, unfortunately, presented in the form mistakenly preferred by Hampson, viz., that of a glossary. It is comparatively rich in instances of computistical difficulties, but they are not always successfully elucidated. The same author's *Taschenbuch* is much better arranged, and, if used in conjunction with his *Glossar*, would serve well as an introduction to the study of computistics. There is the same objection to the Thirty-five Calendars, printed in the *Taschenbuch*, as that urged already to Professor De Morgan's Thirty-five Almanacs.

Professor Rühl's *Chronologie* is spoken of by Dr. Poole (u.s., p. 28) as "a very instructive little treatise." But it is not always correct, and acquaintance with Hardy's *Remarks* would have

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*Handbuch der mathematischen und technischen Chronologie.* By Christian Ludwig Ideler. Berlin, 1825-6. [580. e. 27.]

*Zeitrechnung des deutschen Mittelalters und der Neuzeit.* By Dr. H. Grotefend. Erster Band: *Glossar und Tafeln.* 1891. [8562. ff. 45.]

1 E.g., the note "Feria una" (p. 60). "In dem datum feria una post dominicam quasi modo geniti (Alftersche Sammlung auf der Hofbibl., Darmstadt, Bd. 34, S. 181, n. 209) möchte ich statt des una ein una für feria quarta, conjecturiren. Eine falsche Wortwahl für die Zahl r = prima, ist ausgeschlossen, denn warum sollte man dann nicht direkt schreiben dom. misericordia?" The conjecture and the form of the question show clearly that Dr. Grotefend does not understand ferial computation. The Lord's Day called *Quasi modo geniti* ended at Vespers on the civil day we call Sunday, or, as the medieval computists would have put it, *una sabbati* ended on *prima feria*. The *feria* does not end till midnight; consequently, the event dated may have occurred between the tenth hour of the natural day and the midnight hour following. Cf. infra, Chap. iii, § iii.

*Taschenbuch der Zeitrechnung des deutschen Mittelalters und der Neuzeit, für den praktischen Gebrauch und zu Lehrzwecken entworfen.* By Dr. H. Grotefend. 1st edition, 1898; 2nd, 1905. [8563. a. 55.]

*Chronologie des Mittelalters und der Neuzeit.* By Franz Rühl. Berlin, 1897. [8561. dd. 19.]

There is a glaring error on p. 142, § 19—*Die Concurrentes*, where the order of the Sunday letters is given, above the concurrents, as "FGABCDE," instead of *FEDCBAG*; and the ratio of the concurrent days is not explained correctly on the following pages (vide infra, Chap. iii, § xi).
prevented its author from taking up a position, with respect to the different Christian eras, which is neither in harmony with the truth nor consistent with his own testimony."

The Continental works enumerated are often appealed to by English writers on historical matters, and especially the German ones. But it may be said, once for all, that Continental authors are far too busy with their own national problems in chronology to pay that amount of attention to Anglo-Saxon, and other insular ones, which is necessary in order to solve them.

Ferial computation is not treated of properly in any one of these computistical vade-mecums. Moreover, not one of the works mentioned, whether English, French or German, has its matter arranged in such a way that the subject can be surveyed as a

"Professor Rühl remarks, on p. 198: "Ob Dionysius die Geburt Jesu auf den 25 Dezember seines Jahres 1, [a] oder auf den 25 Dezember des vorhergehenden Jahres angesetzt habe, ist für die technische Chronologie gleichgültig, und [b] ebenso gleichgültig für diese ist die früher viel behandelte andere Frage, ob seine Rechnung mit der historischen Wahrheit übereinstimme oder nicht." In a Rühl takes it for granted that Dionysius began the Incarnation-year on the day of the Nativity; he began it on either September 1st or 24th. The second assertion, b, is dependent upon the assumption that no attempts were made by those who alleged error in Dionysius's computation to rectify that error, real or supposed. Now we have eras of the Incarnation differing from that of Dionysius by three, five, and twenty-two years, and it is certainly not a matter of indifference to technical chronology whether Dionysius's fixation is historically correct if later chronographers, who objected to it, published other systems in which events are dated with different numbers but in the same style as they are in the system of Dionysius, viz., ab incarnatione dominica. Mr. W. H. Stevenson trustfully follows Rühl in asserting that these considerations are immaterial. (Vide Notes and Queries, 9th Series, iii, February 25th, 1899, p. 150). In the Zeitschrift für celtische Philologie, Band iii, p. 507, 1901, I have dealt with the difference of three years in numerous dates calculated in an era of the Incarnation divergent from that of Dionysius. For the difference of twenty-two years, in some other computations, see what Rühl himself has to say about Marianus Scotus and Florence of Worcester, pp. 202-3. Both chroniclers dated in two ways, which differed by twenty-two years, the year-numbers in the Dionysian era of the Incarnation being twenty-two less than those in the era of the Incarnation styled secundum Veritatem Evangelii by Marianus. The last-named is quite mistakenly supposed by Bodley's Librarian, Celtic Review, April, 1906, to have been the first annalist or chronicler to make use of this era.
coherent whole, even by advanced students. In view of this, the
distribution about to be made of the data dealt with in this article will
be found helpful, and will, perhaps, smooth the way for any earnest
students who may determine to apply themselves to the acquisition of
a neglected, but by no means negligible, body of facts.

§ iii. Computistical Data.

The modern system of chronography, *i.e.*, the system of writing
down the date of time, is simple and uniform. For instance,
"January 13th, 1901," is a clear and certain date, with an absolutely
definite meaning, among Christians both of the Reformed Churches
and the Latin one, and there is not the slightest difficulty in the
way of the practical application and understanding of this and similar
phrases at the present day. If, however, we go back two centuries,
and copy down "January 13th, 1701," as the date of an event that
occurred in Western or Central Europe, the question of the source, or
authority, immediately comes to the front; because at that period of
time the practice of dating was not uniform in those regions. Hence,
in order to verify, or reduce, such a date to our system, we must know
in which country it was written down, and how the method of
dating practised therein compares with our modern method; for
"January 13th, 1701," might well indicate January 24th, 1702.
Similarly, if we recede for four hundred years, and meet with the date
"January 13th, 1501, according to the computation of the Church of
England," we are able to say that the particular day fell in the Julian
year, 1502; if, that is, we have been apprised that the ecclesiastical
year which was used for chronographical purposes at that period, and
in this country, began on March 25th. On the other hand, if we
ascend in time for eight hundred years, and meet with the isolated
statement "Idibus Ianuariis, anno dominice incarnacionis Messe
Iuno," and are required to equate it, we are constrained to admit that we
are quite unable to do so, inasmuch as the datum *Idibus Ianuariis*
might have covered any event occurring between Vespers on
January 12th, and midnight on the following day; and the annuary
numbers, 1101, might indicate our 1102, or our 1079, or 1080,
according to the style favoured by the datary when writing down the date. In order to reduce such a datum to modern terms, other data must be discovered, such as the day of the week, the Indiction, the lunar day, the regnal year of the king, or the like.

These and similar criteria are recognised as computistical, and the correct use of them enables us to reduce complex dates, given in the intricate systems of medieval chronography, to our own uniform and simple one. In our system, computistical criteria are unnecessary, and can only serve to verify. But, amidst the conflict of methods from which our system has been evolved, the provision of such data was felt to be imperative, in order to ensure exact definition. Early critics were of the opinion that the crowd of dates provided by some computists gave cause for just suspicion as to the genuineness of documents. More recent ones have chosen to regard the luxuriance of computistical terms and calculations, in some diplomas and annalistic work, as a mark of pedantry. But a truer view is, that the conscientious medieval datary was always oppressed by the doubt whether the list of criteria he had provided was sufficiently varied to enable others to determine the date exactly.

Computistical data are either conventional or relative. Relative data fall, naturally, into three well-defined groups. They are primarily either cosmical, or political; and the cosmical group must be sub-divided into two classes—namely, the regular and the variable. The classification of computistical data, therefore, yields the following scheme: 1, conventional data; 2, data that are cosmical and regular in occurrence; 3, data that are cosmical and variable in occurrence; and, 4, political data.

Class 1, which embraces conventional data, includes the name or number of the civil day, or of the lunar day, or of the ecclesiastical day; the groupings of these days in week, octave, month, and year; the notifications of holidays, religious festivals, and Saints' Days, and the like.

Class 2 comprises cosmical data that are regular in their occurrence—to wit, sunrise, high noon, sunset; the phases of the moon; the changes in the seasons; the equinoxes, the solstices, and the solar year.
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Class 3 includes cosmical data that are variable, such as eclipses of the sun and moon; the appearance of comets; atmospheric phenomena; famines and plagues; inundations; high winds, earthquakes, and the like.

Class 4 consists of political data. These are conventional as well as relative, and the group includes the more or less exact data which serve to fix the accession, consecration, and obits of kings and bishops; the incidence of their regnal and official years; the dates of battles, and of sieges; of notable marriages, also; of the foundation of monastic and ecclesiastical buildings; of royal, and episcopal grants by charter; of the giving of laws; and of much more of a kindred nature.

This classification of the objects with which the art of computation is concerned, will help us to realise the complex character of the task which lies before us. It will also enable us to regard the rules of that art in the light of a definite coherent whole. The lines laid down for the study of the subject in the synopsis printed below are the corollary of the method of classification adopted. It is hoped that these lines will be found upon examination to be clear and direct; and it is believed that the application of the method that informs them will lead to definite and reliable results in the tangled fields of chronological research. The synopsis will also serve as an index to this essay.

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SYNOPSIS OF COMPUTISTICAL RULES AND CRITERIA.

INTRODUCTION.

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ii. Computistical Tool-Books.
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* Eclipses are variable in their appearance as data in the annals and chronicles; not, of course, in their occurrence as phenomena in time. The interval of time between two occultations, occurring centrally, of any spot on the earth's surface during a solar eclipse, is very long, amounting sometimes to hundreds of years. E.g., there has been no lunar occultation of London, centrally, since A.D. 1715; and it is believed that the next before that occurred in A.D. 1140.
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b—according to Gospel Verity.

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x. The Year of the Circumcision.
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a—according to Prosper.
b—according to Victorius.
c—according to Gospel Verity.
d—according to Bede.

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Chapter xiii. Earthquakes.

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i. The Anglo-Saxon Names for Earthquakes.

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Chapter xiii. The Predicaments of Computistical Data.

i. False.

ii. Repugnant.

iii. Contrariant.

iii. Discordant or Incoherent.

iv. Indeterminate.

v. Relative or Dependent.

vi. Plenary.

The conventional plays so large a part in the scheme presented that the only datum that a modern enquirer who is not a computist can be said to rely on with safety, is an occasional notice of a solar eclipse. Everything else is set in doubt for him. He will find, to his amazement perhaps, that he cannot even count correctly; and, until he has recognised his true condition, and mastered the elementary rules which directed the methods of ecclesiastical chronography, much of the labour and time he may expend in research must be wasted, or lost outright. We will, therefore, proceed to the consideration of the

For instance, Edmund Halley's reasoning in his "A Discourse tending to prove at what time and place Julius Caesar made his first descent upon Britain" (Philosophical Transactions, 1693, No. 193), is vitiated by the fact that he mis-rendered the ordinal given by Caesar. Cf.—"At philologica ratione Halley peccavit quod Cassarem die 26 August. ascendisse assert quum dicere deberet diem 27 August. Nam ex Romanorum computandi ratione dies quartus post xxvi. non est dies xxx., sed xxix., quod satis constat inter philologos et iureconsultos. Notandum ceterum, quod de numeris ordinalibus ualet, id non deberei transferri in numeros cardinales, neque quadriennio post siue quattuor annis post idem esse quod quarto post anno"; F. C. Wex, C. Cornelii Taciti De Vita et Moribus Cn. Iulii Agricolae liber, 1852, p. 181. Halley's erroneous date of August 26th is reproduced by the compiler of The Annals of England: An Epitome of English History, 1855, i. 17; and it appears in other works. Similarly, Professors Mayor and Lumby in their edition of part of Bede's Historia Ecclesiastica, 1878, Introduction, assigned Bede's obit to A.D. 742, instead of 735, owing to the fact that they were hampered in their calculations through being unaware that the calendar date of the ecclesiastical day was changed at Vespers, and not at midnight; vide infra,
method of counting from a terminus à quo which was in vogue among ecclesiastics in medieval times.

**PROLEGOMENA.**

**Chapter I. How to Count.**

§ i. The computistical Conception of Historic Time.

The conception of relative or historic time, that is at once the most picturesque and the most practical, is the poetical one, which presents time as a flowing tide, ever moving forward and downward and always abreast of the present moment. When this idea is firmly grasped by the mind, the fitness of such phrases as "a high antiquity," "down to the year 850," "a lower date," "a higher date," becomes apparent, and we see clearly why such a phrase as "up to now" is colloquial and improper.

The relationship, in time, between events is threefold: they are either prior to, contemporaneous with, or subsequent to some other events. Of these relative conditions two only can be connected by law, namely, the first and the third. The second—the relationship of contemporaneousness, is accidental, and lies quite apart from the

Chap. v, § ii. These instances might be multiplied almost indefinitely, and I will only give one more, which is attributable to an oversight in treating the change in the year-number. In the *English Historical Review*, vol. xi, 1896, Mr. Stevenson sought to prove the authenticity of an alleged royal charter to St. Martin's-le-Grand; and in support of his argument he assigned the Conqueror's coronation to Christmas Day, 1067, and the coronation of Matilda to the following Whitsuntide, 1068. But A.D. M.IX.VII began on Christmas Day, 1066, the very day of William's coronation, and the Whitsuntide following was not that of 1068. These errors were castigated by Mr. J. H. Round in the *Athenaeum*, No. 3,616, February 15th, 1897, p. 214.


Mr. Plummer speaks of the continuation of the national chronicle—"up to the death of Edward the Elder"; *Introduction, Two Chronicles*, p. cxxii. "The reckoning from Christmas prevails," he believes, "throughout the Alfredian chronicle, i.e., up to about 892"; *ibid*, p. cxv. Professor De Morgan did not carry his almanacs forward to the year 2000, but "up to" that year; *cf. supra, Introduction, § ii*, note 7. Similarly, Dr. Miller renders "ôð ðysne andweardan ðæg" (Bede's nunne usguce), by "up to the present day"; *O.E. V.* of Bede, Praeface, p. 4, l. 25; *Introduction, xviiij, l. 24.*
sequence of cause and effect. It is the duty of the chronologist to determine these relationships exactly. Failure to do so correctly, results in anachronism. If events are dated before their true time the failure is defined as prochronism; if they are dated later than the truth demands, it is parachronism. When the chronologist corrects a prochronism, he retards the appearance in written history of the event connoted, and lowers the date of it. Conversely, when parachronisms are corrected, the appearance upon the tide of historic time of the notices to be adjusted is accelerated, and the date of that appearance is advanced.


As the Christianity of this country was derived directly from Rome, the method of connoting numerical ideas employed herein, in early medieval times, is naturally found to have been the Roman one, which made use of signs and letters. The number of these symbols is small, and we only find four in use: namely, the plain score (I), which was sometimes truncated (I); the X, x.; the C, which was in certain times and places written c; and the M, which was set down as c10, and may have been the Greek sign φ (phi), which stood for one thousand.

In order to indicate all the numbers, these signs were treated in the six ways following:

1. By halving: X into V; C into L; c10 into 10;
2. By geminating: II., XX., CC., M.M.;
3. By grouping: IIII., XXX.; CCC., CCCC.; M.M.M.; M.M.M.M.;

With Mr. Plummer, events dated later than the truth requires are “in advance of the true chronology”: Two Chronicles, Notes, ii, p. 116, l. 23. Similarly, when he alters the given years 902 and 913 to 904 and 914, respectively, he does not “advance” the dates by two years and one year, but retards them; ibid., p. 117, l. 7 and 10. On the same page the Annals of Ethelwold and those of St. Neots are said to be behind the chronology of the Mercian Register, when “in advance” is meant; and in the chapter On the Origin of the Chronicle, ii, p. cii, Mr. Plummer says that a majority of the events from about 750 to 850 are two years, and others three years, behind the true chronology. Here, also, for “behind” we must understand in advance of. Cf. also, Two Chronicles, Introduction, p. ciii, note 3.

4. By prefixing to indicate subtraction: IV., IX., XL., XC.;
5. By subjoining to indicate addition: VI., XII., LXXX., CL., M.C.;
6. By drawing a line above the letter to indicate multiplication
   by one thousand: I., V., X.

C and M are believed to be the initial letters of the Latin words
Centum, 100, and Mille, 1,000; but the long arm of coincidence has
not failed to affect the various systems of explanation devised by
scholars. The cumbersome nature of the Roman method is obvious, and
in one case no fewer than thirteen signs were necessary to connote
a number (sc. 988) that we express by three, viz: DCCCC. LXXX. VIII.

It is not easy for us, who possess a compact and logical system
of arithmetical notation, to realise the difficulties that hampered the early
calculators. But we can see how very unpractical their methods were
by endeavouring to multiply say the signs CXXVIII by the signs
LXIX., without the intervention of modern scientific enumeration. It
was only possible to do this by analysis; thus:—

\[
\begin{align*}
\text{centies ("one hundred times") } & \text{LXIX. = sexies mille et decce.} \\
\text{nicies ("twenty times") } & \text{LX. = mille et cc.} \\
\text{et IX. = c. lxxv.} \\
\text{octies ("eight times") } & \text{LX. = cccc. lxxx.} \\
\text{et IX. = lxxii.} \\
\text{Summa = VILLI. DCCC. XXX. II.}
\end{align*}
\]

This was the actual process employed by medieval computists
when explaining arithmetical methods of multiplication; cf. Bede,
De Temporum Ratione, cap. LIV., 503-04; ed. Migne, Patrol. Cursus,
tom. xc.

The rule with regard to the grouping of signs is that none is to be
repeated more than four times.\(^b\) But this rule is found broken in the

\(^b\) "Nulla autem nota apud Latinos multiplicatur per se magis quam per quatuor uices
aut cum aliis multiplicatur." Hrabanus Maurus, Liber de Compute, cap. v; ed. Migne,
Patrol. Cursus, tom. cvii, col. 673. Mabillon in his De Re Diplomatica (II, xxviii, ii, 223)
speaks of the year 1165 being written MCCLXXV in an agreement of that date.
Migne Patrologia Cursus, tom. xiii, col. 687, cites a list of Roman consuls, ending with
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case of every sign but the plain and truncated score, the $V$ and the $L$. With respect to the digits, a minuscule letter, as well as a majuscule one, appears. It is almost the rule to find that four pot-hooks, or minims were written in Anglo-Saxon manuscripts, instead of prefixing $i$ before $v$. Sometimes these were written $\cdot\cdot\cdot\cdot$, at others $\cdot\cdot\cdot\cdot$. Instead of $lX$, or $ix$, $viii$, or $uiii$, frequently appears. The omission of the apex from above the letter $i$ is a constant cause of error. Thus, $\cdot\cdot\cdot\cdot$ may be either $uii$, or $iii$. Errors of this class are the most

the consul of A.D. 493, in which A.M. $MMMMMXLIV$ appears written. In a short chronicle (inedited) of the Church of Worcester, which was written about A.D. 1250, and which is bound up along with certain MSS. of Pipewell monastery in the Cotton codex, $Caligula A. XII$ (fol. ii–vi verso), “DCCCCXLII” is glossed by nine C’s above the line.

Instances occur in the section $De Computo Ecclesiastico$ in the Leofric Missal written in the eleventh century; see F. E. Warren’s edition, 1883, pp. 35–37. Also, in the Cotton MS. $Tiberius A. VI$, of the $Saxon Chronicle$, Thorpe, Plate II, we get $Annus uiiii$, and $Annus xuiiiii$.

$d$ Cf.—i. Kemble, C.D., v. 64, the council of Cloveshoh is dated “$iii. Id. Oct. DCCCCIII.$” = October 12th, 802–DCCCCIII., a Wednesday. This should be $uii. Id.$, = October 9th, a Sunday, 802.

ii. In $H.A.A.$, § 17, ed. Plummer, p. 394, Ceolfrid’s consecration is assigned to “$iii. Idum Maiarum die,” = May 12th, a Tuesday. This should be $uui. Id.$, = May 9th, which enclosed the vespertine portion of the Lord’s Day, i.e., Saturday evening.

iii. In the Laud MS. of the Peterborough $Saxon Chronicle$, Eardwulfs coronation is dated “$uii. kl. Iunii,” = May 26th, a Thursday. This should be $iii. kal. Iunii, = May 29th, a Sunday. The true year is 796.

iii. In the $Codex Canonum Vetus$, ed. Migne, $Patrologiae Cursus$, lxvii, 227, in the copy of the letter of Cyril of Alexandria to the Church of Africa, Easter is dated “$xuii. Cal. Maias$” for $xuiii. Cal$. Dr. MacCarthy, who cites this letter in his Introduction to the $Annals of Ulster$, iv, cxxxiv, note 5, says that this error, namely, the misreading of $ii$ as $u$, is one of “the besetting scribal mistakes.”

v. A charter of King Edgar to the Old Minster at Winchester (Kemble, C.D., No. 595; Birch, No. 1,307) is dated “evolutis xvii. annis postquam totius nationis Anglice regimen suscepi, attamen primo meae regie dedications”; and Mr. Plummer, $Two Chronicles, Notes$, ii, 161, remarks, “xvii. is evidently a mistake for xiii.”

vi. In the Evesham or Worcester $Saxon Chronicle (D)$, in annal 1023, which was written c. 1050 (p. 150, mid.), “xvii. kl. Iulii” is said to be “on þam eaheteðan dage” from “iii. Id. Jun.”, i.e., June 15th is the eighth day from June 11th. If “iii. Id. Jun.” is correct, we must read $xiii. kl. Iulii$; if “xvii. kl. Iulii” is correct, we must read $uii. Id. Jun.$

A great number of instances of $ii$ :: $u$ [I am using the symbol :: as = “mis-representing”], $u$ :: $ii$, $ui$ :: $iii$, $uii$ :: $iii$, and the converse, are to be met with. In $Notes and Queries$, 9th Series, vol. iii, January 28th, 1899, pp. 70, 71, I pointed out five computistical mistakes which Mr. W. H. Stevenson had made when assigning a date to
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frequent of all those that hinder the progress of the computist. The Visigothic, or Anglo-Saxon ε (C), and the l, are often found mistaken one for the other; and, at times, even u and x collide. The transposing of l, or x, in xl and lx, is another source of confusion.

Most curious of all is the tendency, developed in the eighth and ninth centuries, to use D as an enumerator of the value of quinquies, "five times," in connection with the higher numbers C and M.

the charter alleged to have been granted in 996 by Wulfstan to the monastery at Hampton, and I suggested that "luna xxii." in the date in that document is a misreading of xxu. Mr. Stevenson (ibid. p. 150) objected to this, and he asserted that I was "fond of the notion" that u, the numeral, may be misread as iu; and he declared that the scribes no longer used u for the numeral in royal charters in King Ethelred's time. But he had already denied that Wulfstan's charter was a royal one, inasmuch as he had asserted that it was a forgery. Moreover, he did not indicate what form really was used, and the plea of desuetude in Ethelred's time may be easily rebutted. In Thorpe's facsimile, Plate II, of the Abingdon Saxon Chronicle (B), in the Cotton MS. Tiberius A. VI, at Annus VI, three different symbols of the Latin numeral quinque appear side by side; and this MS. was written c. A.D. 1000, i.e., in about the twenty-second year of Ethelred. These symbols are, first, the u; second, the form which is neither u nor v (q); and, lastly, the true v, which, however, is not quite so symmetrical as the modern one.

c Cf. the interesting error of "D" for ccccl., the date of the Saxon invasion as given at Ripon in A.D. 744 to Sibire, afterwards abbot of Iona. The letters were all read as C's, and the resultant datum ccccl. appears condensed as "D" in the Chartres MS. of the Historia Brittonum; vide Zeitschrift für celtische Philologie, Bd. i., p. 274. In the copy of the Historia Brittonum in the Vatican Library (Reginae, 1964, eleventh century), the original of which was written in England in A.D. 944, and in the fifth year of King Edmund, we read, cap. lvi. (p. 201, ed. Mommsen), that from "anno post domini cccxluii. ad hunc quem nunc scribimus annum dccxluii. [anno] numenratus." For "A. P. cccxluii," we must read cccxluii., and "dc." = 500 (cf. notes h and m, infra), therefore 397 plus 547 = A.D. 944, the fifth year of King Edmund as aforesaid. The same mistake occurs in the Corpus Christi College, Cambridge, MS. No. 183, of the tenth century,—viz. "ccccxlviii. a passione Christi," for cccxcvii., and also in the Evesham Saxon Chronicle where we get an event entered at mlxxx. for mcxxx.; Plummer, Two Chronicles, Notes, ii, 271.

f Cf. Mr. Plummer's remark about "the progressive corruption of the numeral" in annal 755, sc. xxxi. A, B, C; xxi. D; xvi. E; Two Chronicles, Notes, ii, p. 45. Cf. also, "vel potius annis vel tribus," in some MSS. of Bede's Hist. Abbatt., cap. xxij; the scribes mistook xl for the compendium for vel. Plummer, "Bede," i. 386.

E.g., the Vatican MS. cited above, note 5, assigns xl anni to an interval which other MSS. value at lx anni; u.s., cap. xvi., p. 159. For other instances see the same work, p. 145, apparatus criticus.

The death of the usurper Maximus is dated, in two thirteenth-century MSS. of the Historia Brittonum, in "anno mundi v. dcxc."; and Hardy in his Introductory Remarks,
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Thus, at one period of our history, DC. did not mean 600, but 500, and 600 was written thus: DC.C. Similarly, DM. meant 5,000. Petrie and Hardy were aware of this misuse of D. as I have notified; but later scholars have lost sight of the fact, and we find Professor Zimmer, Dr. T. Mommsen, Dr. W. de Gray p. 112, note, says: "This date represents 5590; 500 being expressed, as was not unusual, by the Roman numerals DC. instead of D., singly." There are four ways of treating this method of writing 500: 1, in the eleventh century MS. of the Historia Brittonum in the Public Library at Chartres (No. 98) only one point is used, and it is placed between d and the supernumerary c; 2, in the Vatican MS. of the same work, which was written in the eleventh century, and in the Durham MS. of the same (B. II. 35), which was written in the twelfth century, there is only one point, which is placed immediately after the supernumerary c; 3, in the fourteenth century (inedited) Chronicle of the Cistercian monastery of Pipewell the supernumerary c is raised above the line and the point is placed beneath the letter; 4, in a fifteenth century MS. which contains an epitome of British history, and which was printed by Rees in his Cambro-British Saints, both d and c are followed by a point.

1 The earliest instance known to me is one that occurs in the chronological memoranda written down in the year 737 on the verso of the leaf now numbered 128 of the Moore MS. of Bede's Ecclesiastical History. This MS. is in the Library of Cambridge University (K.K. 5. 16), and the passage as printed in the Monumenta, p. 290, is "anno DCLVII. Ida regnare coepit," etc., but Mr. Henry Sweet in his "Oldest English Texts" (Early English Text Society, No. 83, 1885), p. 149, has printed "anno DCLVII." This annal, in the Chronologia Brevissima, which is printed in the Monumenta, is identical in date with that in the Recapitulatio in Bede's History, and Mr. Sweet's edition shows a serious discrepancy in this particular, but Mr. Sweet is correct. I am indebted to Mr. Francis Jenkinson, the Cambridge University Librarian, who very kindly looked at the MS. for me, for the following explanation: What was written first was dcluiii.; the c was altered to x; and by the original scribe, Mr. Jenkinson feels pretty sure. Now, dcluiii., when applied to Ida, can only mean A.D. 557 as the date of his beginning to reign, and the adoption of that date by English historians would make the different accounts of the reigns in Northumbria before the battle at the Idle tally with each other.

1 E.g., in Ethelweard's Chronicle the death of Ealdferth, king of the Northumbrians, is dated A.M. DMDCCC. = 5,900.

1 Nennius Vindicatus, 1893, p. 206, where Prof. Zimmer is confused by the difficulty already cleared up in Hardy's Remarks, u.s., note h.

"In Dr. Mommsen's edition of the Historia Brittonum the point after C is always ignored. On p. 145 he annotates DC. "/ 5, requiritur D pro DC.," and other instances occur of the supernumerary C on the same page. At the foot of p. 123 he gives a scheme of early British chronology, taken from the Durham MS. B. II. 35, of the twelfth century, of which he remarks that nothing can be gathered from it ("neque quicquid inde colligitur"). I am personally indebted to the kindness of Canon Fowler,
Birch," and the Rev. Charles Plummer\(^6\) confused by it. Even Dr. Pertz appears not to have quite understood it.\(^9\)

§ iii. The Latin Ordinal Number and its Idiom.

Success in determining the temporal relationship between events depends, primarily, upon exact knowledge of the several intervals of time that elapsed between them, and also upon our ability to equate with the year of our Lord's Incarnation the particular year in which one or other of the events to be considered took place. These intervals may consist of hours, or days, of weeks, months, or years, and the operation of counting the number of years, months, etc., in an interval, is regulated by two limits, or termini. These are the *terminus a quo*, which is known, and from which we begin to count, either up or down of Durham, for a diplomatic transcript of these *marginalia*, and the scheme is quite coherent when one has the key, viz. "DC. = 500."

In the *Celtic Review*, April 16th, 1906, p. 371, Bodley's Librarian asserted that "No one who knew the Latin numeral system could possibly write DC for 500, or interpret it as anything but 600." This is in direct contradiction of the facts.

"Dr. Birch, when dealing with the Alfredian charter No. 549, "C.S.", dated DCCC.LXXVIII., did not explain the peculiarity. Dr. Birch cites this charter as dated "979 for 880"; ii, 169. [\(2080. d.\)]

Mr. Plummer, *Two Chronicles, Notes*, ii., pp. 96, 97, speaks of the error of the scribe of the Canterbury MS. of the Chronicle (F), who calendared Bp. Aethelwold of Winchester's death in DCCC.LXXVIII., instead of 984, as "mechanical"; but many instances of this sort are due to confusion, and DC-dating may be the cause of the remarkable errors left unexplained by Dr. Henry Richards Luard, in *Annates Monastici* ("R. B. SS.", No. 36, 1864), vol. iv., where the compiler of the Annals of the Priory of Worcester makes kings of Wessex, who reigned in the eighth and tenth centuries, the immediate neighbours, in time, of Aethelwulf who reigned in the middle of the ninth. Thus: 850, Cenwulf is slain; 851, Adulph grants Peter's pence; 855, Edred of Wessex dies.

\(^6\) Mr. Plummer, *Two Chronicles, Notes*, ii., pp. 96, 97, speaks of the error of the scribe of the Canterbury MS. of the Chronicle (F), who calendared Bp. Aethelwold of Winchester's death in DCCC.LXXVIII., instead of 984, as "mechanical"; but many instances of this sort are due to confusion, and DC-dating may be the cause of the remarkable errors left unexplained by Dr. Henry Richards Luard, in *Annates Monastici* ("R. B. SS.", No. 36, 1864), vol. iv., where the compiler of the Annals of the Priory of Worcester makes kings of Wessex, who reigned in the eighth and tenth centuries, the immediate neighbours, in time, of Aethelwulf who reigned in the middle of the ninth. Thus: 850, Cenwulf is slain; 851, Adulph grants Peter's pence; 855, Edred of Wessex dies.

\(^9\) The first year in the Chronicle of St. Waast's at Arras (*Annales Vedastini*), is A.D. 874, and so Pertz printed it (Scriptores, II., p. 196), but with the annotation—"Cod. [i.e., MS.] DCCC.LXXVIII. et ita deinceps." Pingré speaks in his *Cometographie*, Paris, 1783, of a chronicle of Saumur which dates the comet of 892 in anno DCCCCXII.; i. 359. The death of Werburg, "quondam regina Merciorum tunc uero ablatissa," is assigned by Symeon of Durham, ii, 50, to 782. But she was daughter of King Wulfhere, who died in 675, and widow of King Ceolrêd, who died in 716. Symeon is clearly quite wrong. Perhaps he had *DC.CCXXXII.* before him and misread the third *c* as *l.*
the stream of time; and the terminus ad quem, which may either be known, or be the undetermined object of research. These termini have an important bearing upon computation. There are four different ways of treating them, and three different results follow, severally, upon the adoption of these different methods. To wit—both terms may be excluded; both terms may be included; the prior term only may be included; or the posterior term only. In English computation, we do not include both limits without saying so, and, in the majority of such cases, we employ the cardinal number. For instance: no one has any doubt about the interval of time referred to in the phrase “ten years ago.” As used in the present year that can only mean A.D. 1897; i.e., 1907 minus 10. Similarly, the phrase “every fourth year” indicates in the English idiom that three years intervene between the termini: thus:—4; 1, 2, 3, 4; 1, 2, 3, 4. In Latin computation, however, the ordinal number is used, in the vast majority of cases, and both terms are included in the result. A few examples will make this point quite clear, and show how important it is:

a. In the case of the Julian calendar day: The datum antefiacientia quartu Kalendarum Aprilis, means the third day before the Kalends of April, viz., March 29th.

Thus—March 29th, 30th, 31st; April 1st.


b. The ancient Romans and Albans did not divide their months into weeks, as we do, and the country people were accustomed to go to the city of Rome at regular intervals, the incidence of which was quite independent

"In his Bede, ii, p. 375, l. 1, Mr. Plummer speaks of "two series of dates" differing "by a year if the terminus ad quem from which they are reckoned so differs." What we must understand by this is that the two series of dates will differ by one year if the terminus a quo from which they are reckoned so differ. Conversely, we find Mr. Belfort Bax—in his book on The Problem of Reality, 1892, p. 60—arriving at a terminus a quo. Mr. Belfort Bax's views of what he names—"the double flow of time" (ibid., 125-128) are dominated by colloquialisms such as "the coming time," "the past time," and the like; and he does not distinguish between times (tempora) and Time itself. Times, i.e., dates and periods, are the accompaniment of the idea of Causation and are not Time. The computists who wrote treatises, like Bede, De Temporibus, De Natura Temporum, and Scaliger, De Emendatione Temporum, recognised this.
of the lunar month. "The Nundinae," says Dion Cassius, "were celebrated at Rome every eighth day ("nono quoque die"), and the seven days in between were spent in husbandry." The way of counting adopted includes both termini; thus:

Latin—

Nundinae; Nundinae

English—The 8th day; 1 2 3 4 5 6 7 8
c. When the Alexandrian astronomer Sosigenes rectified the Roman calendar, in A.U.C. 708 (= B.C. 46), he directed that the bissextile day should be intercalated in the first year of every quadriennium, as Censorinus correctly reports. But the phrase Sosigenes used appears to have been misunderstood, and another Latin one—namely, "quarto quoque anno," i.e., every third year—substituted for the correct one. The pontiffs accordingly intercalated in the first year of every triennium. Instead, therefore, of intercalating in series a of the years of Rome, as enumerated below, they intercalated in series b, as follows:

\[a: 709, 713, 717, 721, 725, 729, 733, 737, 741, 745\]
\[b: 709, 712, 715, 718, 721, 724, 727, 730, 733, 736, 739, 742, 745\]

In the last year enumerated, i.e., A.U.C. 745 (= B.C. 9), it was discovered that the bissextile day had been intercalated twelve times since Cæsar's edict, instead of nine times, and the Emperor Augustus decreed that three bissextile years should be passed over, and that the next intercalation should be effected in A.U.C. 761 (= A.D. 8). After that year it was ordered to be made "quinto quoque anno," i.e., every fourth year.\(^6\) Prebendary Browne blamed the pontiffs for this,\(^c\) even though he knew in what respect the Latin idiom was peculiar.


\(^c\) *Compendium*, Introduction, note A, p. 457.
The Anglo-Saxon Computation of Professor Riihl blames Sosigenes but he does not appear to be aware of the computistical and idiomatic fact which lies at the root of the difficulty.

The rule that is necessary to be observed is—Never render the Latin ordinal numerals literally when they occur in a computistical formula, but reduce the numerical value of the datum by unity.

*Chronologie*, p. 17. Professor Riihl cites Pliny, *ut supra*, note b, who says: "Et Sosigenes ipse trinis commentationibus, quamquam diligentior ceteris, non cessauit tamen addubitare ipsem corrigendo."

This idiom is ignored by scholars who deal with the history of Saxon times. *Cf.* Bede, II., v, p. 89, where Ethelbert's death is assigned to A.D. 616: "qui est annum xxvi" ex quo Augustinus . . . missus est." 596 (the date of the mission) plus xxi" = 616. Mr. Plummer, ii, 85, says this is "probably" correct. Bede, IV., v, p. 214, dates the death of King Oswy "anno dominicae incarnationis DCLXXIV", qui est annum secundus ex quo Brittaniam uenit Theodorus. Mr. Plummer, ii, 211, 358, 361, *et al.*, wishes to correct Bede's date for Oswy's obit and to assign it to A.D. 671, and he comments upon this passage, thus: "February 15th, 670, is within the first year of Theodore's arrival, seeing that he did not reach England till May, 669." But annum secundus ex quo really is "the first year after," and Mr. Plummer was wrong to retard Oswy's death to February 15th, 671, which is in the second year after, i.e., anno tercio ex quo. The same difficulty faces Mr. Plummer in *Historia Abbatum* (auct. anonymo), §7, p. 390, where we read that "Secundo fundati monasterii anno Benedictus . . . . architectos . . . . de Gallia Britanniam perduxit." In *Historia Abbatum* (auct. Baeda) §5, p. 368, this introduction of artificers is dated "Nec plusquam unius anni spatio post fundatum monasterium interiecto . . . ." Mr. Plummer dates the introduction in 675 or 676, and says that the difference between the two authors need not be great (p. 358), not more than a month or two (p. 373); he also suggests that as Bede certainly had the *Hist. Anon.* before him we must suppose that he deliberately corrected it. But this is groundless, for there is no difference in date. "Anno secundus ex [anno DCLXXXIII.] quo fundatum est monasterium" is *annus DCLXXV.*, and no other. Several other cases occur in the *Historia Abbatum* of dates computed *ex quo* with the ordinals, but they are all misunderstood. Others, again, occur in connection with the era of the Saxon Advent: *cf.* an article on "The First Settlement of the Saxons in Britain," in the *Zeitschrift für celtische Philologie*, Bd. iii, p. 506, 1901. Of the latter errors one is due to Bede himself. He assigns *annus CLXXX.* to A.D. 627 (II., xiv, p. 113). But "Annus ab adventu Anglorum in Brittaniam circiter CLXXXIV" = 180th + 447, i.e., A.D. 626, and I believe this to be the true year of Edwin's conversion. In the *Calendar of Dates* mentioned in the *Saxon Chronicle*, ii, clxv, Mr. Plummer equates the datum "on pone feowertegan daeg ofer midne winter," i.e., *on the 40th day after Christmas*, with February 3rd, instead of February 2nd. *Cf.* *Notes*, ii, 49, ad ann. 763, where the right date is given.

Ethelwerd dated the coronation of King Edward when "factus uidetur numerus annorum ab adventu Christi . . . nongentesimus pleniter ordo," and when "defluente
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This idiom is not always rendered correctly, even in Dr. Charlton T. Lewis's Latin Dictionary; *v. sub voce* "Nonæ." But he utters the true doctrine, *sub voce* "ante." It is rendered literally, and, consequently, incorrectly, in J. E. Riddle's Latin-English Lexicon, 1849 (*v. sub v.* "quisque"); in Dr. Liddell's Greek Lexicon 1872 (*v. sub v.* "μηρα"); and it is incorrectly explained in Dr. Benjamin Hall Kennedy's *The Public School Latin Grammar*, 1876, p. 154, at foot, and p. 573, "Nonæ."

§ iii. The Computation of the Roman Calendar Day.

Exact knowledge of the Julian Calendar is indispensable for students who wish to deal at first hand with ecclesiastical chronography. The appearance of the tables of the months of the Roman Calendar, which are given in the books on technical chronology, is familiar. These tables seem to make it easy to equate and reduce calendar dates, but numerous errors arise from the use of such crutches.

annorum numero centesimo [MS. centeno] ex quo pro etius Egbyrht continebat praesentia eius regna"; *Monumenta*, i, p. 500. Mr. Stevenson (with "E.H.R.", *u.s.*, Introduction, § i, note g, cf. *Athenæum*, March 19th, 1898, p. 373), professed to date Edward's coronation in June, 900, "on the authority of Ethelwerd," and made two computistical mistakes when doing so, for it is evident that in June, 900, the number of 900 years from the Incarnation was not fully made up; and when Mr. Stevenson says (*Athenæum*, *u.s.*, col. 2) that Ethelwerd fixes the coronation "clearly and unmistakably in the year 900, and as occurring a century after . . . the accession of Egbert in 800," he shows quite clearly that he has not appraised the Latin idiom correctly, for *annus centesimus ex quo* = the 99th year after.

* In Mr. Plummer's *Bede* the following corrections must be made of erroneous reductions into English of Roman calendar dates. Text, IV., xxviii., p. 267, margin, "xii. Kal. Juniurum" is May 20th, not "21st"; IV., xxviii., p. 277, margin, "pridie Nonas Maias" is May 6th, not "5th"; V., xxiii., p. 349, margin, "vii. Iudum Maiarum" is May 9th, not "April 25th"; *Hist. Abbatt.*, B., § 8, p. 372, margin, "Nonas Martias" is March 7th, not "6th" (given correctly, *Notes*, vol. ii.); *Hist. Abbatt. (auct. anon.*) §§ 16, 17, p. 393, margin, "vii. Iudum Maiarum" is May 12th, not "13th," as here and Introduction, p. xiv, l. 13; and vol. ii, *Chronological Table*, p. xxvii, col. 4; and p. 364, *Notes*; introit, l. 3. Mr. Plummer has confused the date of Abbot Ceolfrid's death and burial. The abbot reached Langres on "vii. Kal. Oct.," i.e., September 24th; he died the same afternoon after Vespers on "vii. Kal. Oct.," i.e., when September 25th had ecclesiastically commenced, and he was buried on the morning of "vii. Kal. Oct.," i.e., on September 25th. Mr. Plummer gives the following equations: *Introit.*, p. xv, l. 1, death on September 24th, correctly; *Hist. Abbatt.*, B., p. 386, margin, burial September 26th; *Hist Abbatt.*
Computists, as I have already indicated, ought not to rely upon inspection. The facts I am about to enumerate should be kept steadily in mind, and the use of tables should be eschewed.

1. The Roman calendar month had four sections: the first, of one day only, being the *Kalendae* or Calends. On this day, in pagan times, the number of days forward to the *Nonae* or Nones, was counted aloud by the priest. The second section consisted of either four days or six, and ended with and included the Nones. The third section always consisted of eight days, and ended with and included the *Idus*, or Ides. The fourth, and last, ended on the last day of the month. It comprised 18, 17, 16, or 15 days, according to the length of the month, and the incidence of its Ides.

2. The memory-word *MOMJUL* helps us to remember that in the months of *M*arch, *O*ctober, *M*ay, and *J*uly, the Nones and the Ides fall upon the 7th and 15th day of the month respectively. In other months they fall on the 5th and 13th respectively, the Nones always coinciding with the eighth day before the Ides.

3. The days are enumerated in retrograde order, counting from the special day that the section they belong to ended with, whether *Nonae* or *Idus*, of their own month, or *Kalendae* of the following one. Both terms of the series are counted as it was explained above, Chap. i, § iii.

4. The several days next before the head-days, though called "Pridie Nonas," "Pridie Idus," and "Pridie Kalendae" in classical times, were frequently dated *II. Non.*, *II. Id.*, *II. Kal.*, in medieval ones.

In order to compute the modern equation of a Roman date we must bear in mind the facts of which the memory-word *MOMJUL* is the
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indicator, and also the difference between the Latin idiom and modern custom. On account of that difference, we deduct unity from the date number in the case of dates which fall in either of the two sections of the month ending with the Nones or with the Ides, and we subtract the remainder from the age of the month on either of the two head-days concerned. In the case of dates which fall in that section of the month that expires with it, we deduct unity from the date number on account of idiom, and then subtract the remainder from the tale of days in the month, plus 1 for the Kalends of the following month. For instance:

a. We are required to equate ante diem III. Nonas Martias. March comes in MOMJUL; therefore its Nones fall on the 7th of the month. III. minus 1 (for idiom) = 2; 7 minus 2 = 5; ∴ III. Non. Mart. = March 5th.

b. Again, a.d. VIII. Idus Aprilis is to be equated. April does not come in MOMJUL; therefore its Ides fall on the 13th of the month. VIII. minus 1 = 7; 13 minus 7 = 6; ∴ VIII. Id. Apr. = April 6th.

c. The modern equation of a.d. XVIII. Kalendas Novembres is sought. October has 31 days; 31 plus 1 (for Kal. Nov.) = 32; 32 minus XVIII. (minus 1, for idiomatic difference) = October 15th. But October comes in MOMJUL, therefore its Ides fall on the 15th; consequently the datum is a false or impossible one, and must be rejected.

Conversely, to turn an English calendar date into Latin, we must always bear in mind the word MOMJUL, and the idiomatic difference. In the case of days falling before the Nones, or between the Nones and the Ides, we add unity to the number of the head-day of the section we are dealing with, on account of idiom, and subtract the

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\(^{a}\) Similarly, Florence of Worcester, by a remarkable oversight, dates the death of King Alfred's daughter Æthelfled “xix. Kal. Iulii,” which is impossible, as only January, August and December have xix. kal. mensis subsequetis. Mr. Joseph Stevenson—and this in a modern is less remarkable—proposed to clear up a supposed error in Bede’s Historia by “amending” “xix. Kal. Januar,” the true date of Aldfrid of Northumbria's death, to xix. Kal. Jan. (cf. Plummer, Bede, ii, 306, l. 7).
date-number therefrom. For instance: What is June 6th? June does not come in \( \text{MOMJUL} \), therefore its Ides fall on the 13th. \( 13 + 1 - 6 = 8 \); \( \therefore \) June 6th is \( \text{ante diem VIII. Idus Iunias} \).

Similarly—What is May 2nd in Latin? May comes in \( \text{MOMJUL} \), therefore its Nones fall on the 7th. \( 7 + 1 - 2 = 6 \); \( \therefore \) May 2nd = \( a.d. \ VI. \text{Nonas Maias} \).

The turning of dates that fall after the Ides of the several months is equally simple. To the tale of days in the month, \( +1 \) for the Kalends of the following month, we add unity, on account of idiom, and then subtract the date-number therefrom. Thus—What is November 15th in Latin? November does not come in \( \text{MOMJUL} \), therefore its Ides fell on the 13th. 30 days in November \( +1 \) (for \( \text{Kal. Dec.} \)) \( +1 \) (for idiom) = 32; 32 \( -15 \) = 17; \( \therefore \) November 15th = \( \text{ante diem XVII. Kalendas Decembres} \).

\[ \text{§ u. The Equation of Years in different Eras and in Subsidiary Intervals.} \]

In order to reduce annuary data given in one era, to the count and style of another, it is necessary to know which Julian year is the \textit{nexus} of the two eras. For instance—the era of the City of Rome, according to the calculation of Varro, and the era of our Lord's Incarnation, according to Dionysius Exiguus, find their \textit{nexus} in the Julian year diversely styled \( a.d. 1 \), and \( A.U.C. 754 \); the era of the coming of the English into Britain, as used by Bede, and the era of the Incarnation, according to Bede's earlier custom, find their \textit{nexus} in the Julian year diversely styled \( \text{Annus Sextae Aetatis CCCCL.} \), and \( \text{Annus Aduentus Saxonum in Britanniam I.} \); the era of the \textit{Annales Cambriae} and that of the Incarnation according to Dionysius, in \( a.d. 445 \) and \( \text{Annus I.} \); and the era of Spain and that of the Incarnation, in the Julian year styled \( a.d. 1 \), \( \text{Erae xxxix.} \)

In the case of those series of years which partly antedate the Christian era, the convenient method of equating the proleptic portion of the older era with an infinite series of years enumerated in retrogression as \( b.c. \), or \( \text{ante Christum natum} \), or the like, has long since been adopted. The equation of years in the proleptic portion of
the older eras with years in the infinite series referred to, is achieved by deducting the given annuary numbers from the number of the nexus-year. For instance: \textit{Erae xxxix.} is A.D. 1, therefore \textit{Erae xxxv.} is 39 minus 35, i.e., B.C. 4; and \textit{Erae i.} is 39 minus 1, i.e., B.C. 38. Similarly, A.U.C. 754 is A.D. 1; therefore A.U.C. 750 is 754 minus 750, i.e., B.C. 4; and A.U.C. i. is 754 minus 1, i.e., B.C. 753.

The equation of years counted in other eras than that of the Incarnation, is achieved, in the case of the earlier ones, by deducting the number of the nexus-year, minus 1, from the given year-number: e.g., A.U.C. 754 is 754 minus (754 minus 1), i.e., it is A.D. 1; A.U.C. 761 is 761 minus (754 minus 1), i.e., it is A.D. 8. Similarly, \textit{Erae} 39 is 39 minus (39 minus 1), i.e., it is A.D. 1; and \textit{Erae 100} is 100 minus (39 minus 1), i.e., it is A.D. 62.

When equating years counted in later eras, or in subsidiary intervals, with years computed in the era of the Incarnation, it is advisable to regard the era, or interval, as a group, and to remember that the first year of the group coalesces with the nexus-year. If no allowance is made for this the reduction attempted must yield an erroneous result, and there will be a parachronism of one year. For instance: Annus 1., in the era of the \textit{Annales Cambriae}, is A.D. 445, and Annus iii. is not 445 plus 4, i.e., 449, but 445 plus 4 minus 1, i.e., it is A.D. 448. Similarly, Annus i. in the era of the coming of the Angles to Britain, counted according to Bede’s practice, is A.D. 447, and Annus clxxx. is not A.D. 627, as Bede makes it, in his \textit{Historia}.

\footnote{Mr. E. W. B. Nicholson, when assailing the comments made by my friend, Mr. A. W. Wade-Evans, upon the era-year of the \textit{Annales Cambriae}, in the \textit{Celtic Review} in 1905, remarked (p. 369, n.r., Chap. i, § ii, note m), that “the \textit{Annales} do not give the number 445 at all, while both Mommsen and Phillimore, their latest editor, reckon their Annus I. as 444.” The objection that the “\textit{Annales}” do not give 445 is inconsiderate, for they do not give 444 either. It was J. Williams ab Ithel who gave that number, and perpetuated that mistake by copying earlier editors. If anyone will take the trouble to read the first nine annals in his and other editions, with the necessary attention, he will perceive how the error came to be made, and why Petrie, Skene, Phillimore, Mommsen and Bodley’s Librarian are wrong, and also why Mr. Wade-Evans is right. All editors of the “\textit{Annales}” equate Annus IX. with A.D. 453; consequently, as Annus I. is viii. years before Annus IX., it must be equated with 453 minus viii, i.e., Annus I. = 445.}
The Anglo-Saxon Computation of Ecclesiastica (II., xiii., p. 113), but 447 plus 180 minus 1, i.e., it is A.D. 626. Certain mistakes in recent historical work are attributable to the initial error of adding to a nexus-year all the years of an interval the posterior term of which is required to be equated with a year in the era of the Incarnation.


In the Venerable Bede’s Chronica Minora, which is appended to his Liber de Temporibus, there is a chronological note, prefixed in several MSS. to cap. xxii. of the De Sexta Aetate, which says: “Sexta aetas continet annos praeteritos dccviii. (the Sixth Age comprises 708 past years).” As the Sixth Age, or Christian Era, commences with the birth of Christ, it is obvious that, when Bede penned these words, A.D. 708 was past and gone, and, therefore, that he was writing in A.D. 709; cf. the article cited above, Chapter i, § iii., note e. In the phrase continet annos praeteritos, we have evidence of a method of counting the years from an epoch, which has long since fallen into disuse, and which consisted in ignoring current, and, therefore, incomplete years, and dating by the number of years actually past and completed. When we meet with this peculiarity it is clear that we must turn it into English with care, and add unity to the sum of the anni praeteriti, or completed years, in order to date the current one correctly, and according to modern custom. For instance: in the Paschal Canon of Victorius of Aquitaine, Praefatio ad Hilarum, p. 8 (ed. Mommsen, Chronica Minora, vol. i, M.G.H., i9.) we are told that—“Passum autem Dominum n. i. C. peractis v.c.c.xxviii annis ab orto mundi . . . monstratur.” This does not mean that the Passion of our Lord was shewn by Victorius to have taken place in anno mundi 5228, the usual rendering of the passage, but, when 5228 years had passed away, and, therefore, in a.m. 5229.

Modern scholars would appear to be unacquainted with this

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computation. I have already commented upon Mr. W. H. Stevenson’s mistaken treatment of one passage which is informed by it; v. supra, Chapter i, § iii, note e. Mr. Plummer, too, in the *Saxon Chronicle* misunderstands it, and seeks to correct what is in no need of correction. The same remark applies to the late Dr. Mommsen, and to Professor Rühl. Two or three instances of this

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*At the commencement of the Parker MS. of the *Saxon Chronicle*, ed. Plummer 1892, i, 2, Cerdic’s invasion is dated—“py geare pe was âgan fram Cristes acennesse .cccc. wintra ond .xiii. wintra” = In the year in which 494 winters had passed away since the Incarnation. As 494 years had elapsed, it is clear that the invasion could not have taken place before 495, and that agrees with the statement in annal 495. Mr. Plummer overlooks this, and says that the *Praeface* puts the invasion of Cerdic and Cynric in 494.

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6 V. Bedae Chronica Maiora, ad a. 725; eiusdem Chronica Minora ad a. 703, ed. Mommsen, 1895, *Chronica Minora*, iii, 226, note 3, where that editor did not treat “continet annos praeteritos dcc.viii.” correctly, but rendered it as if it were anno dcc.viii. In his edition of the *Historia Brittonum*, *Chronica Minora*, iii, 145, 146, he dealt with the formula *peracti sunt anni* . . . in the same way. In three MSS. of this work we get:

“Ab Adam uero usque ad passionem Christi anni sunt v.cc.xxviii.

“A passione autem Christi peracti sunt anni dccclxxix.

“Ab incarnatione autem eius anni sunt dccccxii, . . . sunt igitur ab exordio mundi usque in annum praesentem vi.c.viii.”

Dr. Mommsen objected to this (v.s., p. 146, note 1) saying that the year of the Incarnation 912 is A.M. 6107. This confirms the statement it was intended to rectify, for Mommsen did not perceive that A.M. 6108 is the only *annus praesens*, or current year in the *indiculus* of the particular MSS. in question, and that 879 a passione, 912 ab incarnatione, equate 6107 ab exordio mundi, and are all three anni praeteriti, or completed years.

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4 In his *Chronologie*, p. 73, Professor Rühl gives the following passage as an example of dates which cannot be reduced in any way because they convey a contradiction (“auf keinerlei Weise reduziert werden können, weil sie einen Widerspruch in sich enthalten”):

“Evoluto sane ab incarnatione Domini curriculo dccccxxxvm. anni sexta hora dominici diei, xii. kal. Septembriam,” etc. The period of 938 years had elapsed; therefore the year of the era that was current was 939. Professor Rühl, as I pointed out above, Introduction, § ii, note u, denied the existence of other eras, but in the article in the Zeitschrift für cultische Philologie, already cited supra, Chap. 1, § iii, note e, I have given numerous instances of a method of computing the years of the Incarnation which differed from the Dionysian one, and which began to count three years earlier than Dionysius did. It is this method that Rainer, the author of the treatise de *Miraculis S. Gisleni* (“ M.G. SS.,” tom. xv, p. 584), made use of when he computed the date we are considering. Now, 939 = A.D. 936, which has Sunday letters C.B., and xii. kal. Sept. (= Aug. 21st) has ferial letter b. Therefore, as the day was a Sunday, it had Sunday letter B, which is what the data require.
use are discoverable in the ninth-century Saxon Chronicle, and many more are to be found in Ethelwerd. The formulas the latter employs are very numerous, and they are always rendered heedlessly, as if they were equivalent to anno.

\[ \text{§ vii. The Computation of Regnal and other Official Years.} \]

A.

The word "regnal" is used to describe years, or twelve-months, that are current from either the day of a king's accession, or from that of his recognition, election, or coronation. When Sir Nicholas Harris Nicolas examined the use and meaning of this word, he reported that it did not occur in any of the dictionaries of his time: Chronology, p. 283, note. He quoted, as follows, a passage written by Hopton:

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\text{Impletus} \quad \text{Factus} \quad \text{Transactus} \quad \text{Transmeatus} \quad \text{Migratus}
\]

\[
\text{est numerus annorum}
\]

\[
\begin{align*}
\text{ab Incarnatione} & \quad \text{Dominica} \\
\text{a gloriosa Natiuitate} & \quad \text{Saluatoris N.I.C} \\
\text{a Natiuitate} & \quad \text{Saluatoris} \\
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in the dedication of his *Concordancy of Years*, published in 1615, to Lord Chief Justice Coke. Hopton remarks that the chronological inconveniences which beset many enquirers are—

"occasioned chiefly—by the participation of every one regnal year with two ecclesian years; because the year of any prince's reign (as yet) began in one year of our Lord, taking part of the same, ending in the next and participating likewise thereof; by which means when a question is made by the regnal year only, the common doubt is to which year of our Lord it answers unto; or a question being made by the year of our Lord without mention of the regnal year, to know if it answers to the year of the king that did take beginning or ending in the ecclesian year."

The phrase "ecclesian year" indicates the year styled "according to the computation of the Church of England." This year began on March 25th, as I have already remarked, *supra*, Introduction, § iii. The difficulties commented upon by Hopton are always present, even when the enquirer is well acquainted with both the style of year employed and the terminal date (or dates *) of the regnal year he is interested in. This, of course, ought to be his condition in the case of any reign since the Norman Conquest. But, in the case of a reign before the Conquest, these difficulties are greatly increased by the fact that we do not know either the terminal date of the annalistic year, nor that of the regnal year of some monarchs; nor whether the kings of the Anglo-Saxons dated from their coronation, election, or accession. The particular questions, therefore, that we have to decide are—From which of these events did the West-Saxon kings compute the beginning of their reign? And, are all such computations uniform? Unless we can reply to these questions authoritatively, it is useless to draw up a table of the West-Saxon Kings of the ninth century, even approximately. But such a table is a pressing need of all students of Anglo-Saxon history and the various kinds of documents connected with Anglo-Saxon times. Sir Nicholas Harris Nicolas, speaking of the absence

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* E.g., King John's regnal years were computed from Ascension Day in one year, to the eve of that day in the next. As Ascension Day is a movable feast, each regnal year began on a different calendar date; *cf.* Nicolas, *Chronology*, pp. 308, 346.
of such an aid to one engaged in the study of the history of England since the Conquest, remarks, u.s., p. 284:—

"Without it he will often find himself embarrassed by the impossibility of reconciling the date of one instrument, relating to a particular affair, with other documents on the same subject. A suspicion of the genuineness of some of them will be created, and, with respect to circumstances of which the precise time is settled by other evidence, he may be led by such discrepancies into fatal errors. From mistakes in Chronology, effects are confounded with their causes; and deductions are drawn, and hypotheses formed, on imaginary discoveries." These "errors, being diffused and perpetuated by succeeding writers, become part of what is called 'History.'"

Many writers assert that the regnal years of the Anglo-Saxon kings were computed from their accession. But this, at least in so far as the West-Saxon reigns in the tenth century are concerned, is contrary to the weight of the evidence extant. Some, indeed, have, like Mr. W. H. Stevenson, u.s., Introduction, § i, note k, denied the existence of evidence which might teach us whether the regnal years of King Alfred, for instance, were computed from his coronation or his accession. Mr. Plummer's view differs from Mr. Stevenson's, and, in Two Chronicles, ii, 308, he approves the opinion expressed by Dr. Theopold, who freely asserted that these regnal years, generally, were computed from their day of consecration is one of many reasons why he wishes to retard the death of King Oswy of Northumberland, in contradiction or correction of Bede, to February 15th, 671. He writes, "Bede," Notes, ii, 211, "In c. 26 Bede says that Egfrid was slain in May, 685, in the fifteenth year of his reign; but if he came to the throne in February 670, this would be his sixteenth year." Similarly Mr. Plummer says, p. 361, "If Egfrid came to the throne in February, 670, the 9th of the Calends of May in his fifteenth year would be April 23rd, 684... " These calculations of Mr. Plummer's are quite correct; but we must add in each case "from Egfrid's accession." We do not know when Egfrid's coronation took place, and there is not the slightest necessity to correct Bede; hence these calendar dates should teach us that Egfrid was crowned after May 20th, 670. In A.D. 670 Whitsunday fell on June 2nd, and that may have been the date of Egfrid's consecration. Tigernach is very explicit about the dates of the battle of Dunnechtain: he says—"xv° anno regni sui consummato." We might expect that a foreign writer would count the years of the king's reign from his accession, and that a native and ecclesiastical one, such as Bede, would deem it his duty to count from the consecration.
computed from accession. Sir Nicholas Harris Nicolas, also, in his Remarks on the Style and Charters of the Kings of England, u.s., p. 364, controverted Lappenberg's opinion that the Saxon kings dated from their coronation and unction, on the ground that such a proceeding appeared to be contrary to the spirit of "the old Teutonic law"; and he adduced the fact that King Edgar, who was not crowned King of Wessex for many years after his accession, dated in the first part of his reign from his accession, and towards its too-early close used the double date of his accession and coronation. The charter on which Sir Nicholas Harris Nicolas relied is cited above, Chapter i, § ii., note d (v). But the case of Edgar is not quite applicable to the argument, inasmuch as Edgar was probably crowned King in Mercia during the lifetime of his brother Edwy. I have given reasons for the belief that the computist who calculated the West-Saxon regnal periods in the Cotton M.S., Tiberius A. III., fo. 178, reckoned King Edgar's regnal years from Jubilate Sunday, May 10th, 957. This is the year at which the Saxon Chronicles of Abingdon, MSS. B and C, say "Her Eadgar æpeling feng to Myrcna rice," i.e., In this year Edgar the Atheling began to rule over the kingdom of the Mercas, or Mercia. Consequently, there may have been no consecration of Edgar when he succeeded to the throne of Wessex, on October 1st, 959—DCCCCLX., seeing that he had probably been crowned already. Edgar's position, therefore, was not much different from that of his predecessor, King Ethelwulf, who had been crowned during the lifetime of his father, King Egbert. The twofold instance relied on by Nicolas does not, therefore, affect the question either way.

Although Mr. Stevenson denied the survival of evidence, he decided that King Alfred's regnal years ought to be calculated from the death of his predecessor, King Ethelred. There is direct evidence as to the general practice, and it is strongly opposed to the arbitrary view that in no case are the regnal years of the West-Saxon kings computable from the date of their coronation. I have shewn in the Athenæum, u.s., note c to this section, that the confusion and uncertainty which are known and admitted to be present in the chronology of the West-Saxon

\footnote{Vide Athenæum, No. 4,000, June 25th, 1904, p. 819.}
kings of the tenth century, can be dissipated, or at least much reduced, by application to a displaced leaf of the older Abingdon Saxon Chronicle, MS. B. This was written in about A.D. 1000. It was copied from an original contemporary chronicle which is credibly asserted to have come to an end in A.D. 977; cf. Mr. Plummer's Introduction, Two Chronicles, pp. lxxxix.-xc. In this document the total of the periods allotted to four reigns, which filled an interval of 75 years and one month, only amounts to 73 years and seven weeks. This fact and others examined in the article cited, shew conclusively that the regnal years of six kings of Wessex, in the tenth century, were not computed from the day of accession. Moreover, application to detail, and consideration of the length of the periods allotted, have established the soundness of the theory advanced by Lappenberg, namely, that the regnal years of the West-Saxon kings were computed from coronation and unction; and warrant the rejection of the view now entertained by Mr. Plummer and Mr. W. H. Stevenson, that the regnal years were computed from accession.

I reproduce the table printed in the Athenceum shewing the calendar dates upon which the calculations in the document of A.D. 1000 depend. The double-dating of the years is necessitated by the fact that the Old-English year began on September 1st in the South of England. Consequently, events that occurred in September, October, November and December, were allotted to the same year as the following January, and bore the same year-number. The first group of numbers, namely, the Arabic one, is the correct one for us to use; the Roman numerals are those that the events ought to be connoted by in the different MSS. of the Saxon Chronicle. In the third column are the regnal intervals set down in the MS.

The method of counting adopted by the computist of A.D. 1000 rejected both termini. In order to date the consecration exactly, all that is necessary to be done, as I have explained in the article in the Athenceum, is to calculate backwards from the day of the obit until the period of time allotted is passed through, when the next preceding Sunday or festival must be the date sought for. In the case of King

\[d \text{ Cf. infra, Chap. vi, § iii.}\]
## The West-Saxon Regnal Periods in the Cotton MS. Tiberius A. III., fo. 178.

<table>
<thead>
<tr>
<th>Date of the Obit.</th>
<th>Coronation Day.</th>
<th>Regnal Interval.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>a.—in the Cotton MS.</td>
</tr>
<tr>
<td>Alfred</td>
<td>25-26 October, 900-CCCCCL.</td>
<td>28</td>
</tr>
<tr>
<td>Edward</td>
<td>16-17 July, 925</td>
<td>24</td>
</tr>
<tr>
<td>Athelstan</td>
<td>26-27 October, 959-CCCCCLX.</td>
<td>14</td>
</tr>
<tr>
<td>Edmund</td>
<td>25-26 May, 946</td>
<td>6</td>
</tr>
<tr>
<td>Ethelred</td>
<td>22-23 November, 955-CCCCCLVI.</td>
<td>9</td>
</tr>
<tr>
<td>Ealdwy</td>
<td>1-2 October, 959-CCCCCLX</td>
<td>3</td>
</tr>
<tr>
<td>Edgar</td>
<td>7-8 July, 975</td>
<td>18†</td>
</tr>
</tbody>
</table>

* MS. ii. 
† MS. xvi.
Alfred's reign we have two regnal periods in the Chronicles and Florence, and we need have no hesitation in applying the shorter one, namely, 28½ years, which is found in both authorities, to the date of the obit, namely, October 25–26, A.D. 900, in order to compute the date of Alfred's coronation approximately. The longer one, namely, 29½ years, which is given by Florence, only, of the two, comprises the whole period from Alfred's accession, a little after Easter, April 15th, 871, to his death, in A.D. 900.

B.

The statements made by chroniclers and hagiographical writers as to the dates of episcopal consecrations and obits, the duration of episcopates, and other ecclesiastical and personal offices, are frequently very minute, and ordinarily of great value. But the Saxon Chronicles throughout the ninth century are singularly devoid of such notices. For this, and other reasons, the consideration of the personal chronology of the bishops of that time is deferred to a later part of this essay.

CONVENTIONAL DATA.

BOOK I. THE DAY.

II. The Different Kinds of Computistical Days.

The period of twenty-four hours that the moderns call a day necessarily includes the night-season. In ancient times the day commenced at different hours among different peoples. The astronomical day commences at 1 o'clock, p.m., on one day, and ends at 1 p.m. on the next. It is divided into twenty-four hours, which are numbered from 1 to 24. We are only concerned with its ratio in so far as that is connected with the equation of times. The datary, however, is bound to make himself acquainted with the characteristics of the computistical days, of which there are four

*A datary is one who is skilled in dates, and Fuller used the word in that sense: Church History, III, iv, 8. The datarius was and is that officer of the Papal Chancery (the Dataria) who affixes the datum Romae to Papal Bulls and similar documents.*
sorts. These are—the *Dies Naturalis*, or Natural Day; the *Dies Lunaris*, or Lunar Day; the *Feria*, or Civil Day; and, lastly, the Ecclesiastical Day.

These are all computistical days, and we will consider their peculiarities in the order in which they have been enumerated.

**Chapter II. The Natural Day.**

§ 1. The Definition of the Term.

The beginning of all our knowledge of times springs from the recognition of the certainty of the recurrence, in regular order, of the rising up and the going down of the sun. An astronomical writer, who is distinguished by the grace and power of his imagination, as well as by the beauty of his prose style, has sketched for us the supposed feelings of primeval man when he realised the possibility that the light of the setting sun might not return again to enlighten the world. In that early and far-distant period, the only points of time that could have been regarded as fixed were sunrise and sunset. But when mechanical methods of observing the sun’s behaviour in the terrestrial heavens had been devised, it must have been noticed in sub-tropical regions, as well as temperate ones, that these points, or marks of time, were not fixed, either actually or relatively to each other. Then, without doubt, the discovery would be made that the interval of time between these points, starting from a certain phase in the cycle of variation, expands from day to day, until it reaches a maximum length, when it begins to contract and continues to do so until it has returned again to the minimum. After that, the process, with all its phenomena, is repeated and continued. Eventually, when the experience gained from observations carried on through very many centuries had taught astronomers how to lay down the meridional line correctly, it was argued, and accepted as true, that the only fixed point of time was the moment of high noon, when the shadow of the gnomon was not deflected either to the right or to the left of this line.

These considerations limit the number of possible and well-defined commencements of the day to three: namely—sunrise, at which
The Anglo-Saxon Computation of

the Babylonians, Assyrians and Persians, commenced;\(^a\) high noon, at
which it is said the Umbrians and Athenians did so;\(^b\) and sunset, at
which the Egyptian and the Jewish day began.\(^c\) The period during
which the sun is above the horizon was named "Dies Naturalis," by
the Romans.

§ ii. The Course of the Natural Day.

It is obvious that the only commencement of the day proper to
be observed by those who compute the Natural Day is that which
coincides with sunrise. Similarly, the Natural Day must end with
sunset. Among the Anglo-Saxons the period during which the sun is
above the horizon was called "a day": "we hātað xënne dæg fram
sunnan upgange 0ð æfen" (i.e., we call from sunrise to evening a day).\(^d\)

§ iii. The Subdivisions of the Natural Day.

In company with nearly all the nations of antiquity the Romans
divided the Natural Day into twelve equal hours.\(^e\) These differed in
length as the day itself expanded or contracted. Consequently, it
is only at the period of the equinoxes that the nocturnal hours can be
equal in length to the diurnal ones.

The subdivisions of the day, as opposed to night, and their
Anglo-Saxon names, are as follows:—

\(^a\) "Quem [sc. Moysen] Hebraei Chaldae et Persae sequentes iuxta primae conditionis
ordinem diei cursum a mane ad mane deducunt." . . . Bede, De Temporum
Ratione, cap. v., apud Migne, tom. xc, col. 313.

"Apud Chaldaeos ab ortu solis usque ad ortum solis." Bede, De Divisionibus
Temporum Liber, cap. viii.; apud Migne, tom. xc, col. 656.

\(^b\) "Umbri et Athenienses a meridie ad meridiem dies suos computare maluerunt;"
Bede, De Temporum Ratione, u.s. "Apud Hebraeos ab hora sexta usque ad horam
sextam quia noctem non computabant Hebraei." De Divisionibus Temp. Lib., u.s.

\(^c\) "Aegyptii ab occasu ad occasum." Bede, u.s. "Apud Aegyptios ab occasu solis

\(^d\) Bouterwek, Sceadunga, 24, 2.

\(^e\) "Jesus answered, Are there not twelve hours in the day?" St. John xi, 9.

\(^f\) The German Lichttag; cf. Professor Rühl, Chronologie, p. 7.
LATIN.
diluculum ... ... the dawn ... ...
sōlis ortus ... ... sunrise ... ...
māne ... ... morning ... ... meridies ...
ante meridiānum tempus ... fore-noon ... ...
meridiēs ... ... midday ... ... ær-mål.
pomeridiānum tempus ... afternoon ...
sōlis occāsus ... ... sunset ... ...
uesper ... ... even ... ...
crepusculum ... ... dusk ... ...

ANGLO-SAXON.
dagung (795, 802, E).
dæg-rima (1122, ad fin., E).
sunnan upgang.
mergen, morgen, morgen-tid.
ær-mål.
mid-dæg.
sunnan setlangang (773, E).
æfen-tid.
æfen-rima, æfinung.

Chapter III. The Lunar Calendar Day.

§ i. The Definition of the Term.

The term dies lunaris, or "lunar day," is an arbitrary one which has no connection whatever with lunar time. The so-called lunar day is a nominal day, and it is made up of two portions: first, a period of local terrestrial time during the whole of which the sun is below the horizon; second, the period next subsequent thereto during the whole of which the sun is above the horizon.

§ ii. The Course of the Lunar Day.

The Lunar Day, therefore, commences with sunset, includes the night-season and the following natural day, and ends with sunset. Computists are led in this matter by the directions of Moses, who said that the evening and the morning made the day,* and through whom the Israelites were commanded to keep their Sabbaths from evening.


* Cf. Factum est uespere et factum est mane dies primus; Genesis i, 5.
The Anglo-Saxon Computation of

unto evening again. " The lunar days begin in the evening and end in the evening," wrote Q. Julius Hilarianus, a Christian computist of the last decade of the fourth century. In the strictest sense of the word, uesperum, which we render "the evening," does not signify the moment of sunset, but the moment of the appearance of Vesper, the evening star. This word forms an adjective uespertinus, "of eventide," and in ecclesiastical Latin a secondary adjective was formed from that, namely, uespertinalis, "connected with things done, or events occurring, in the evening." For instance, the monastic rule of St. David of Menevia was founded on Egyptian rules of conventual life, and David required his monks after the evening office, the missa uespertinalis, to remain upon their knees in prayer until the stars, beheld in the sky, closed the appointed day:—quoad usque sidera celovisa finitum clauderent diem! By "finitus dies" we are to understand the day divinely appointed, and referred to by Moses. To  Vesperum, which extends from the going down of the sun to the appearance of Vesper, immediately succeeds Crepusculum; "the evening twilight," which yields place, in its turn, to the night-season. In Jewish computation the moment of sunset is enclosed in the

8... a uespera usque ad uesperam celebrabitis Sabbata vestra; Leviticus xxiii, 32.
9 Dies enim lunares uespere incipient et in uespere finiuntur; Quintus Julius Hilarianus's Expositum de die Paschae et Mense, apud Migne, Patrologiae Cursus, tom. xiii, col. 1109.
13 With Bede, Vesperum succeeds Crepusculum, vide the De Temporibus Liber, ed. Migne, u.s., col. 280.
Historic Time in the Ninth Century.

The day kept by the Jews, and the Mohammedans, was also observed by the Athenians, who called it \( \nu\upsilon\theta\varepsilon\mu\varepsilon\rho\o\nu \) (nuclthecmeron). This word, which is very useful to computists, is made up of the root \( \nu\upsilon\kappa \) (\( \nu\kappa\kappa \)), which is cognate with the English word “night,” and \( \varepsilon\mu\varepsilon\rho\alpha \) (\( \varepsilon\mu\varepsilon\rho\alpha \)), “the day: the light of day.”

§ iii. The Characteristics of the Lunar Calendar Day.

The Lunar Day has no computistical parts, or subdivisions, and any portions of the day or night may be connotated by the number of the Lunar Day that envelopes them. This number proceeds in arithmetical order from 1 to xxviii, or xxx, as the length of the particular lunation may require. In English we say the 29th moon, or the 30th moon, and we mean thereby the lunar calendar-day at the end of which the moon of the Tables is 29 or 30 days old. The corresponding phrases in Latin are \( \text{luna uigesima nona} \), or \( \text{luna tricesima} \).

As the Lunar Day commences on one civil day, and ends on the next, it includes portions of two civil days.\(^3\) This is a fruitful source of confusion in dates; cf. infra, § iv.

§ iii. The Proper Names of some Lunar Calendar Days.

Instead of the phrase \( \text{dies lunaris} \) the word \( \text{dies} \) is sometimes found alone. This is commented upon by St. Ambrose (†397), who remarks in one of his Paschal letters,\(^4\) that the word \( \text{dies} \) is used instead of \( \text{luna} \).

\(^3\) See The Antiquities of Israel, by Heinrich Ewald, translated by Henry Shaen Solly, 1876, p. 340.

\(^4\) Cf. Bede, Opera, ed. Giles, vi, 257; \( \text{quomodo lunae dies cadem diversas septimanae devoluitur in ferias} \). Also Ceolfrid's Letter to King Nataan, Bede, H.E., V, xxi, ed. Plummer, p. 337: \( \text{dies septimanae non aequali cum luna tramite procurrit} \). And pseudo-Anatolius's Paschal Canon, cap. iii, ed. Bucher, p. 444; \( \text{Omnis namque dies in lunae computacione non cadem numero quo mane initiatur ad nesperam finitur, quia dies quae mane in luna, id est, usque ad sextam el dimidium horae, viii. unnumeratur, cadam ad nesperam xiii. numeratur} \).

\(^a\) In the Epistle De Festo Paschali, apud Bucher, De Doctrina Temporum, 1634, p. 478, par. 8, l. 18.
in the divine command given in Exodus xii, 5: *Et facies Pascha Domino Deo tuo quartodecimo die mensis primi.*

There are three lunar days to which specific names have been given by computists. These are—luna prima, luna quartadecima, and luna tricesima. (1) *Luna i* is called Neomenia, i.e., "New-Moon-tide." This Greek word makes an early appearance in Latin Christian computation in the *De Idololatria* and *Adversus Marcionem* of Tertullian (†217). (2) *Luna xiiii* is also called Plenilunium, i.e., "Full-Moon-tide." This word was used by Pliny and Columella, among others. Whether the pagan Romans counted luna xiiii as the Plenilunium, is not clear; but it is certain that both Jewish and Christian computists expected to find that lunar calendar day concurring with the Full Moon of the heavens. In tabular lunar computation the phrase *luna x* does not indicate the day of the conjunction of the sun and moon; but the day on which the new moon of the heavens becomes visible, immediately after sunset, as a thin streak of light to the left of the position vacated by the sun. In fine climates, when other circumstances are favourable, it is possible to see the moon-sickle, as the Germans call it, some eighteen hours after conjunction. Consequently, by the end of the 14th moon, if the tabular lunation approximates to the visible phase, the moon of the heavens is at least 14 days and 18 hours old. It was very seldom, however, that the plenilunium of the tables concurred with the visible phase.

(3) The 30th moon, *luna xxx*, was called *Vetus et Nova*, i.e.,

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\textsuperscript{b} This is the first month of the Hebrew year; cf. Bede, *De Natura Temporum*, cap. xi, ed. Migne, tomo xc., col. 341, *De Mensibus*—Primum mensem novorum, qui Paschae ceremoniis sacratus est, Nisan appellantes, qui propter multivagum lunae discursum, nunc in Martium mensem, nunc incidit in Aprilem, nunc aliquid dies Maii mensis occupat. Sed rectius Aprili deputatur, quia semper in ipso vel incipit vel desinit, vel totus includitur, ea duntaxat regula, cuin et supra meninimus, observata, ut quae xv. post aequinoctium luna exstiterit, primum sequentis anni mensem faciat; quae vero, antea, novissimum praecedentis, sicque per ordinem.

\textsuperscript{c} Migne, u.s., tome 1. coll. 269, 182.

\textsuperscript{d} *Naturalis Historia*, IX, xv; *De Re Rustica*, 11, 2, 85.

\textsuperscript{e} Cf. Bede's chapter xliii, u.s., col. 478, *Quaere luna alignoties maior quam computatur appareat.

\textsuperscript{f} Compare the Rev. Lewis Hensley's article: Easter, *Dictionary of Christian Antiquities*, p. 586.
"Old and New." The reason being that, as the value of the true lunar period is about 29 days and 12 hours, the thirtieth day of that period must see the "extinction" of the old moon of the tables and the "lighting up" of the new one.\(^5\)


The *bissextus*, or intercalated day of the Julian calendar, is ignored in lunar computation, and the *biduum*, or two-days' period, which comprises the *VI. Kal. Mart.*, and the *Bis-VI. Kal. Mart.*, has consequently only one moon allotted to it.\(^a\) The matter was arranged in this way so that the course of the lunations, and the dates of the Paschal new moons in the Julian calendar, should not be perturbed by the intercalation of one day from time to time in the latter. This has been the invariable rule in both ancient and modern computation since the time of Theophilus of Alexandria, at least; cf. Chap. iii, §§ vii, viii.

§ vi. The Dating of the Lunar Calendar Day in terms of the Julian Calendar.

Every lunar day envelopes portions of two civil days, except the one that connotes the *biduum* just now referred to. In that case portions of three civil days are included in the nominal lunar day. The regular method of dating the lunar day is by its morning; that is to say, the whole of the lunar day bears the Julian calendar date of the day it ends upon. This method is the one more generally adopted. But, sometimes the lunar calendar-date and the Julian one on comparison being made are found to disagree. Analysis of such

\(^5\) The "lighting up," *incensio*, of the new moon is a computistical way of referring to her first appearance. Thus Bede, in the *De Temporibus Liber*, cap. xii, n.s., col. 285, explains that ... *incensiones earum [sc. lunarum vel lunationum] medio diei et medio noctis semper alternent; non in hoc tamen veritatem naturae, sed calculandi facilitatem vel compendium inquirunt.* For "extinguitur" cf. Bridfert of Ramsey's *Glossae*, ed. Migne, tome xc, coll. 486, 487.

\(^a\) Les calendriers, tant l'ancien que le nouveau, sont arrangés de manière qu'on n'y fait aucune attention aux années bissextiles et qu'on se contente d'augmenter les épactes du nombre 11 comme dans les années communes; the *Dissertation sur les Dates*, in the *Art de Vérifier les Dates*, i, 89.
computistical positions will frequently show that the event recorded and dated was vespertinal, that is to say, it happened in the forenight, after the date of the lunar day had been changed.

Conversely, every civil day, the two days comprised in the biduum excepted, is connoted by two dates drawn from the lunar calendar. The younger of the two marks the interval between midnight and sunset, and the older marks the period between sunset and midnight again. This complex position is exemplified by Epiphanius (†403) where, speaking of the Thursday before the Passion, he says —Quinta feria luna xiii diurnâ, nocturnâ uero xiii, xiv. Kal. Aprilis.

§ 1. The Grouping of the Lunar Calendar Days.

§ vii. The Lunar Calendar Month.

When the word luna is accompanied by a number that gives, as we have seen already, the age of the moon of the Tables upon a certain day. The word lunatio indicates the group of lunar days comprised in the period that elapses from new to new again. The duration of a lunation, that is to say, the length of time taken by the moon in performing one revolution around the earth, was discovered at a very early period to be 29 days and about 12 hours. Later computists who undertook to furnish an equation of the lunations in numbers of Julian years and in terms of the Julian calendar, doubled this period in order to avoid dealing with the fractional part of a day, and assumed that the doubled lunation would tally with the period of time required by the moon in order to make two revolutions from new to new again. The twin periods aggregate 59 days, and this number of nominal days is distributed between tabular lunar months of 29 days and 30 days.

a This is a Scottish word, and its adoption and employment would be advantageous to the computist.

b Some dataries gave to the vespertinal portion of the ecclesiastical day the calendar date of the feria, or civil day, that enveloped that portion; vide “The Old-English Dating of Vespertinal Events,” Athenæum, No. 3870, Dec. 28, 1901, and cf. infra, Chap. iii, § iii., and Chap. v, § ii.

c See Bucher’s translation of Epiphanius’s remarks, Hæresi LI., in his tractate De Paschali Iudaeorum Cyclo, n.s., p. 401, par. 4. Epiphanius was bishop of Constantinia (Salamis) in about A.D. 368.
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The lunation or lunar month of 30 days, is called *plenus*, "full"; that of 29 days, which is about 12 hours short of the actual length of a lunation, is called *cavis*, "wanting."

§ viii. The Notation of the Lunar Calendar Months.

It was the opinion of the Venerable Bede that the lunar calendar month ought to take its name from the Julian calendar month in which its *plenilunium* is dated. But computists decided, at an early period, that the lunations were to be attributed nominally to the Julian calendar month in which they finish or are "extinguished," except in the case of the intercalated month. There is an old computistical rhyme which runs thus:

*In quo completur mensis lunatio detur*—

_i.e., let the lunation be given to the month in which it finishes._

§ ix. The Lunar Calendar Year.

The term *Annus Lunaris* or "Lunar Year," is arbitrary and conventional. It is employed to denote the period of time absorbed by a certain number of lunations. There are two kinds of lunar years—the common, and the intercalary or embolismic. The common lunar year has twelve lunations. Of these six are full, and six are deficient. They are arranged alternately. The aggregate number of nominal days in the lunations in common lunar years is invariably 354. At fixed intervals, and for reasons that will be explained presently, *vide* § xii, another month is inserted. This thirteenth month is called the embolism and the lunar year in which it is intercalated is known as embolismic, or as *annus embolismalis*. The ordinary embolismic year, therefore, comprises 384 days.

_a Vide supra, § iii., note b._

§ 2. The Grouping of the Lunar Calendar Years.

§ x. The two Lunar Cycles of Nineteen Years each.

When the early Christian computists had fixed upon the doubled lunation of 59 days as the measure of lunar movement they sought to find the values of \( x \) in the following equation:

\[
x \text{ lunar periods of 58 days} = x \text{ Julian periods of } 365\frac{1}{4} \text{ days}.
\]

Their ultimate object was the discovery of a method whereby prospective Easter Days could be dated correctly and, at the same time, uniformly. In the second and third centuries of the Christian Era the date was calculated by means of a cycle of eight years called the Octaeteris.\(^a\) It had been found out by inspection, no doubt, that eight lunar years would give the equation required if the lunations were arranged in a certain way. That way consisted in making three of these lunar years embolismic, when the equation stood thus:

\[
(8 \times 365\frac{1}{4}) = (5 \times 354) + (3 \times 384), i.e., 2922 = 1770 + 1152.
\]

This arrangement of the lunations is obviously empirical. After a few revolutions of the Octaeteris it was perceived that the moon of the heavens had broken away from the faulty Tables contrived in the hope of mapping out its course through the Julian calendar, and it was acknowledged that a group of eight lunar years does not keep step with every group of eight Julian years with the commencement of which it may happen to coincide. Various expedients were resorted to, one of which consisted in doubling the Octaeteris and making a long cycle of 112 years, \( i.e., \) of seven periods of 16 years each.\(^b\) But all these expedients were found wanting and were rejected in turn.

Eventually, the Christians of the East were constrained to adopt the true lunar period of 19 years which had been discovered in about 432 B.C. by Meton of Athens, and which was styled the Metonic Cycle.

\(^a\) Compare the article cited above in § iii, note \( f, \) p. 587.

\(^b\) The cycle of \( CXII. \) annum per septem sedecennitates of Hippolytus, \( vide \) Bucher, \( u.s., \) p. 289, sqq.; and Dr. B. MacCarthy \( Annals \) of Ulster, 1901, vol. iv, Appendix A, p. clxiii.
This important cycle was introduced into the Western Church by St. Jerome, who rendered the One Hundred Years' List of Easter Days into Latin. This list had been compiled in A.D. 379, and written out in Greek by Theophilus, the Patriarch of Alexandria, and uncle of the great Cyril. It consisted of five periods of 19 years each, and of five other years taken out of a sixth period. These periods were regulated by the decemnovennal equation of solar and lunar movement referred to above. The application of the decemnovennal principle to Paschal computation was first made in about A.D. 270. Since the year 380 the Alexandrian method of Theophilus and Cyril has been predominant, no better practical equation of the theory of the moon's revolutions, in terms of the Julian calendar, having been devised. The Alexandrian method was slightly modified by Dionysius Exiguus in A.D. 526, and his system was introduced into Kent and Northumbria, together with Christianity, in A.D. 597 and A.D. 626 respectively.

The *Cyclus Lunaris*, like the *Cyclus Decemnovennalis*, is a group of nineteen years. Both cycles are complete in themselves and each is independent of the other. They differ in incidence, the first year of the *Cyclus Lunaris* commencing with the month of January in the Julian year that has Golden Number XVII. A rule respecting mutation of the numbers of the years of these cycles bids us—"change the Lunar Cycle on January 1 and the Decemnovennal Cycle on March 1." The rule about the cycle named last was not applied universally, and

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* The 100 years' list of Easter Days has not survived. Its method is known from numerous references to its dates in fifth-century writers.
* Theophilus was bishop of Alexandria from 385 to 412. He was succeeded by Cyril, who died in 444.
* By Anatolius, bishop of Laodicea, who was born at Alexandria in about 230, and died in 282.
* The two Epistles of Dionysius Exiguus are printed by Migne, *Patrologiae Cursus*, tome lxvii, coll. 19 sqq.
* Sc.—muta cyclum lunarem Kalendis Januarii, cyclum decemnovennalem Kalendis Martiii ; a rule given in an eleventh-century MS. of St. Sergius's at Angers, *Dissertation sur les Dates, n.s.*, xiv., p. 64. Compare, however, the note set down against viii Id. Mart. (March 8) in four of the calendars reproduced by Hampson, *Ancient Kalendars*, vol. i, pp. 401, 424, 437, 451 : *hic mutant* anni [lunares] et concurr[entes] ; i.e., "at this date the lunar years and the concurrents are changed."
sometimes the number of the cyclic year was changed on September 1, antecedent, and at others on January 1, in the same Julian year of grace. Dionysius did not afford a *versus*, or column, to the numbers of the years in the Cycle of XIX, though he did so to the numbers of the years of the Lunar Cycle. Nevertheless he gave a column to the Epacts and set them down, year by year, against the proper year of our Lord.

The discovery of the number of either cyclic year depends upon the application of one of two simple rules:—

I. To discover the year of the Lunar Cycle: From the year of our Lord deduct 2 and divide by 19. The remainder is the year of the Lunar Cycle. If there is no remainder the year is 19.

II. To discover the year of the Decemnovennal Cycle: Add 1 to the year of our Lord and divide by 19. The remainder is the year of the Decemnovennal Cycle. If there is no remainder the year is 19.

§ xi. The Ogdoad and the Hendecad.

The first eight years of the Decemnovennal Cycle form the Ogdoad, or group of eight: Greek ὀγδοάδος (ogdoados), the genitive case of ὀγδόας. The older notion of the Octaeteris would appear to be retained in the Ogdoad. The remaining eleven years form the Hendecad: Greek, ἑνδεκάδος (hendekados), the genitive case of ἑνδεκάς. In some copies of the Decemnovennal Cycle these subdivisions are noted in the margin.* Dionysius Exiguus remarks, in his second Paschal Epistle, *decemnovennalis cyclus per Ogdoadem et Endecadem semper in se revolvitur, i.e.,* "the Decemnovennal Cycle through the Ogdoad and the Hendecad is perpetually revolving on itself." Bede, in the ‘De Temporum Ratione,’ cap. xlii, describes a certain year of the Decemnovennal Cycle as one *qui est ultimus Ogdoadis, i.e.,* "the last of the Ogdoad." By this he meant that the year had Golden

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*e* E.g., in the Paschal Table reproduced in the *Monumenta Historica Britanniae*, i, p. 105.

*b* In Bucher's *De Doctrina Temporum*, 1634, p. 490.

*c* In Migne's *Patrologiae Cursus*, tome xc, col. 475, Λ.
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Number VIII. Similarly, Nennius speaks of the year in which he was writing the "Historia Britonum," namely, the year 837, as \textit{duo anni in Ogdoade}, i.e., "the second year of the Ogdoad." This implies that the year had Golden Number II., which is correct. Compare § 2, in this chapter,

There is a ninth-century quatrain which runs thus:

\begin{quote}
\textit{Huius Cycli pars vocatur Ogdoas anterior,}
\textit{Ac deinde appellatur Endecas ulterior.}
\textit{Ogdoadi deputantur octo anni priores,}
\textit{Endecadis et undena comprobatur series.}
\end{quote}

§ xii. The Golden Numbers.

The years of the Decemnovennal Cycle are indicated in the Julian calendar by means of majuscule Roman letters which number each year from I to XIX. These numbers are set down in the lunar calendar against the Julian calendar dates on which the new moons of the decemnovennal year indicated by the respective number happen to fall. This number is called \textit{Numerus Aureus}, "the Golden Number." It is also known as \textit{Primatio}, "the Prime," because it is the first thing that has to be discovered in Paschal lunar computation; \textit{vide} Rule II, supra, § x. With the help of the Golden Number we can find the age of the moon of the tables on any day in the Julian year.

To find the Golden Number when the a.d. is known: Divide the a.d. plus 1 by 19. The remainder is the Golden Number. If there is no remainder the G.N. is XIX.

The discovery of the G.N. when only the Epact is known is complicated, and must be performed by inspection. The method is as follows: add severally 1 and 11 to the Epact, if it is one of the digits,

\begin{itemize}
\item \textit{Vide} Mommsen's edition, \textit{Chronica Minora}, iii, p. 159.
\item See the anonymous \textit{Liber de computo sine de Kalendario}, written circa 810, and printed in \textit{Anecdot\ae . . . ex Ambrosianae Bibliothecae Codicibus}, ed. L. A. Muratorius, 1713, iii, p. 209.
\item E.g.—in \textit{A Table to find Easter Day}, in The Book of Common Prayer.
\end{itemize}
or to the second figure of the Epact, if it is higher than 9, and select that resultant number which yields the equivalent of the Epact on application of the rule devised for extracting the same from the Golden Number; vide the next section. Thus—What is the Golden Number that accompanies Epact iii? 3 plus 1, and 3 plus 11 = iv and xiv respectively. Of these iv. has Epact iii; therefore IV is the Golden Number sought. Again—what Golden Number accompanies the Epact xxvi? 6 plus 1, and 6 plus 11 = vii and xvii respectively. Of these, XVII accompanies the Epact named.

§ xiii. The Epacts.

The Epact of the lunar year of the Decemnovennal Cycle is the most important of all lunar computistical data. It is the pivot on which turns the adjustment of the lunar calendar to the Julian one, and the lunar theory of the tables is dependent upon it. Its ratio is as follows. A common lunar year, as we have already observed, has twelve lunations and includes 354 days. Consequently, when such a lunar year commences on January 1, in a common Julian year, it ends eleven days earlier than the Julian year that it is concurrent with. That is, it ends on December 20. The first lunation of the next year of XIX begins, therefore, on December 21. It is twelve days old on January 1, and the lunar year introduced by it ends on the following December 9; that is, it ends twenty-two days earlier than the second Julian year does. The next common lunar year of the particular group we are considering commences on December 10; its first lunation is twenty-three days old on January 1; and if it were not eked out by extraneous aid (ἐπακτός—ἐπακτῆς) it would end on November 28, and the new lunar year would begin on November 29. The beginning of each successive lunar year would, consequently, fall continuously and increasingly behind the Julian year, until all relationship between them had disappeared, and computation would have become intricate and difficult. But, at this stage, the theory of the Epacts (ἐπακταὶ—ἐπακταί) intervenes, and the balance of twenty-two nominal civil days, unabsorbed into the two-
preceding lunar years, is called up to the assistance (ἐπάγω—ἐπάγω, "I call in aid") of the eleven civil days unabsorbed into the third lunar year. This particular year, therefore, is augmented by the addition of one lunar month of thirty days. In consequence of this intercalation, the year we are considering has 384 days. It ends on December 28, and the movement of the lunar cycle at this point has left only three civil days unabsorbed. This balance of three nominal days dominates the computation of the next lunar year, and is carried forward and held in suspense, until it can be absorbed into the next lunar intercalation.

As the Decemnovennal Cycle requires a period of nineteen Julian years in which to finish its course, it is obvious that there must be (19 × 11 =) 209 days of Epact, and that this aggregate is most readily distributed into six intercalary months of 30 days each, and one of only 29 days. When all the Epacts have been allotted, and absorbed, their cycle is naturally complete, and the phenomena must recommence with each new Decemnovennal Cycle, and proceed in the same relative order. This completeness is recognised in the phrase Nulla Epacta, i.e., "no Epact," which was imposed upon the first year of the Decemnovennal Cycle by ancient computists, and set down in the Paschal Tables against years that have Golden Number I. Modern computists ignore the fitness of this phrase, and delude themselves by speculation about an alleged Epact of 29 days, to which they add unity, on account, so they say, of the lunar leap.

The Golden Numbers and the Epacts cohering with them are as follows:

<table>
<thead>
<tr>
<th>G.N.:</th>
<th>I.</th>
<th>II.</th>
<th>III.</th>
<th>IV.</th>
<th>V.</th>
<th>VI.</th>
<th>VII.</th>
<th>VIII.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epact:</td>
<td>Nulla</td>
<td>xi.</td>
<td>xxii.</td>
<td>iii.</td>
<td>xiii.</td>
<td>xxv.</td>
<td>vi.</td>
<td>xvii.</td>
</tr>
</tbody>
</table>

The Ogdoad.

<table>
<thead>
<tr>
<th>G.N.:</th>
<th>IX.</th>
<th>X.</th>
<th>XI.</th>
<th>XII.</th>
<th>XIII.</th>
<th>XIV.</th>
<th>XV.</th>
<th>XVI.</th>
<th>XVII.</th>
<th>XVIII.</th>
<th>XIX.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epact:</td>
<td>xxviii.</td>
<td>ix.</td>
<td>xx.</td>
<td>i.</td>
<td>xii.</td>
<td>xxiii.</td>
<td>iii.</td>
<td>xv.</td>
<td>xxvi.</td>
<td>vii.</td>
<td>xviii.</td>
</tr>
</tbody>
</table>

These years are intercalary or embolismic.
The date of the annual mutation of the Epacts, in medieval times, was not uniform, and sometimes the number of the Epact was changed simultaneously with the annual change made in the Julian year-number. When the year began on January 1, some computists changed the Epacts on that day; when it began on September 1, the number was sometimes changed then. The latter date of change was also observed by some who severally commenced the Julian year on either January 1 or on Lady Day. There is an ancient hexameter which runs thus:

*Mars concurrentes September mutat epactas.*

We have already seen that there was another rule which said *muta Cyclum Decemnovennalem in Kalendis Martii,* and when the Cycle of XIX was changed the G.N. and also the Epacts were changed with it.

To find the Epact: Divide the year of our Lord by 19. Multiply the remainder by 11, and divide by 30. The remainder is the Epact. If there is no remainder there is *Nulla Epacta.*

§ xiii. *The Sedes Epactarum.*

In many ancient calendars, against the date *xi. Kal. Aprilis* (March 22), may be read the words "Sedes Epactarum." This means that the equivalent of the Epact is always to be found in the lunar value of that Julian calendar day. The determination of the appropriateness of this position is governed by three considerations. First, March 22 is the date of the earliest Easter Day: consequently, the knowledge of the moon's age on that day is valuable as a guide to the computist. Second, in the year of *Nulla Epacta,* which has Golden Number I, the Kalends of February fall with *luna x.* February 1, *luna x, minus x = January 22, l.xxix,* which calendar-day and lunar date completed the Cycle of XIX. The following day, January 23, l.i.,

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*a Cf. Hampson, Ancient Calendars, ii., 286.

*b Vide supra, § x, note g.

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commences a new Cycle; and, as the lunation current in March–April reflects the one current in January–February, the 23rd of March, also, falls with luna i. The preceding day, therefore, in all other lunar years, reflects the position and lunar value of the last day of a period which has always 365 nominal days allotted to it. Consequently, the lunar age of the last day of such a twelvemonth always equates with the Epact of the particular lunar year. For instance: In the year of Nulla Epacta, which has Golden Number I, the Kalends of April fall with moon 10. April 1, luna x, minus x = March 22, l.xxx, or, as the particular epactal name given to the year implies, nothing over. In the next year, which has Golden Number II, the Kalends of April fall with luna xxi. April 1, l.xxxi, minus x = March 22, l.xi. In the following year, which has Golden Number III, the Kalends of April fall with luna ii. April 1, l.ii, minus x = March 22, l.xxi. Now—nulla, xi, and xxi, are the epactal figures connoting the Golden Numbers I, II, III, and if these calculations be pursued it will be perceived that April 1 is always ten days older than the sum of the Epacts. Third—the age of the moon on March 22 is always equal to the remainder left after dividing the sum of the Epacts by 30. E.g.—at the end of four years there are 11 × 4 days of Epact, i.e., 44; and 44 ÷ 30 leaves 14 remainder. This is the Epact of the year that has Golden Number V, and also, it is the moon's age on the Julian calendar-day connoted as "Primum Pascha" and "Sedes Epactarum."

§ xv. The Termini Paschales.

The Paschal Term is the 14th day of the Paschal Moon of the Tables, and immediately after its occurrence we begin to look for the Lord's Day on which the Easter celebration is to take place. The dates of the Paschal Terms are as follows:
The earliest possible Easter Day is March 22; therefore, as Easter may fall on the 15th day of the Paschal moon, but not earlier, the earliest possible Paschal Term is March 21, which is linked with G.N. XVI. Similarly, as Easter Day may fall on the 21st day of the Paschal moon, and as the latest Paschal Term falls on April 18, which is grouped with G.N. VII, the latest possible Easter Day is April 25.

In ancient computistical works the Paschal Term is found linked with a numeral which is that of the feria, or weekday, on which it fell in the corresponding year of the first nineteen of the 28 years of the Solar Cycle, or Cycle of the Sunday Letters; cf. Chapter iii, § xiii. For instance: the frontispiece to this article is drawn from the eleventh-century Anglo-Saxon computus-book preserved in the Cotton Codex Caligula A XV. The subject of the first icon, or miniature, is the handing over to Pachomius, the alleged founder of Egyptian monasticism, by an angel, of the list of the nineteen Paschal Terms.

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<table>
<thead>
<tr>
<th>G.N.</th>
<th>Epact.</th>
<th>Paschal Term.</th>
<th>Ferial Letter of the Calendar Date.</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.</td>
<td>Nulla</td>
<td>April 5</td>
<td>d</td>
</tr>
<tr>
<td>II.</td>
<td>xi.</td>
<td>March 25</td>
<td>g</td>
</tr>
<tr>
<td>III.</td>
<td>xxii.</td>
<td>April 13</td>
<td>e</td>
</tr>
<tr>
<td>IV.</td>
<td>iii.</td>
<td>April 2</td>
<td>a</td>
</tr>
<tr>
<td>V.</td>
<td>xiii.</td>
<td>March 22</td>
<td>d</td>
</tr>
<tr>
<td>VI.</td>
<td>xxv.</td>
<td>April 10</td>
<td>b</td>
</tr>
<tr>
<td>VII.</td>
<td>vi.</td>
<td>March 30</td>
<td>e</td>
</tr>
<tr>
<td>VIII.</td>
<td>xvii.</td>
<td>April 18</td>
<td>c</td>
</tr>
<tr>
<td>IX.</td>
<td>xxviii.</td>
<td>April 7</td>
<td>f</td>
</tr>
<tr>
<td>X.</td>
<td>ix.</td>
<td>March 27</td>
<td>b</td>
</tr>
<tr>
<td>XI.</td>
<td>xx.</td>
<td>April 15</td>
<td>g</td>
</tr>
<tr>
<td>XII.</td>
<td>i.</td>
<td>April 4</td>
<td>c</td>
</tr>
<tr>
<td>XIII.</td>
<td>xii.</td>
<td>March 24</td>
<td>f</td>
</tr>
<tr>
<td>XIV.</td>
<td>xxiii.</td>
<td>April 12</td>
<td>d</td>
</tr>
<tr>
<td>XV.</td>
<td>iii.</td>
<td>March 21</td>
<td>c</td>
</tr>
<tr>
<td>XVI.</td>
<td>xv.</td>
<td>April 1</td>
<td>g</td>
</tr>
<tr>
<td>XVII.</td>
<td>xxvi.</td>
<td>March 9</td>
<td>a</td>
</tr>
<tr>
<td>XVIII.</td>
<td>vii.</td>
<td>March 29</td>
<td>d</td>
</tr>
<tr>
<td>XIX.</td>
<td>xviii.</td>
<td>April 17</td>
<td>b</td>
</tr>
</tbody>
</table>
The second miniature depicts the angel receiving his instructions from the Lord Jesus Christ. The use to which the tables drawn beneath these miniatures were put was as follows: 1. In col. 1 we find the Numeri Aurei, or Golden Numbers; in cols. 2 and 3 we get the Julian calendar-date of the second day of the second lunation of the lunar year connoted by the particular Golden Number. This day was chosen because it occurs in common years on the same day of the week as the Paschal Term. In leap-years it falls one day earlier. In col. 4 are the feriae, or week days, on which that particular day falls, year by year, beginning with year 1 of the Cycle of Sunday Letters, and continuing for nineteen years. 2. In the second table, cols. 1 and 2 give the Julian calendar-date of the Paschal Terms in figures; col. 3 indicates by the initial letter $c$, or $e$, whether the lunar year is common, or embolismic; cols. 4 and 5 give the Julian calendar-date in words, and the lines conclude with the same ferial numbers as those written in the last column of the first table. Each ferial number is either 11 before or 12 behind its predecessor. In this movement it reflects the procession of the Paschal Terms, each of which is 11 days earlier or 12 days later than its forerunner. Thus—Golden Number I has its Paschal Term on feria v. G.N. II has it on $u$. minus 11, i.e., $u$. minus (11 minus 7) = i. The Paschal Term of III moves 12 days onward in the calendar; hence we get $i$. plus 12 = 13; 13 minus 7 = feria vi, and so on.

In order to use these data in the discovery of the day of the week

---


$^c$ Compare the rule—De Quadragesima: Post vii. Id. Februrar. ubi lunnam ii. inneneris, ibi fac terminum quadragesima; i.e., "make the quadragesimal term where you find the moon two days old next after February 7"; cited by Hampson, Glossary, Ancient Calendars, p. 335. For instance: A.D. 1000 has G.N. XIII.; XIII. occurs at February 9, therefore the moon was two days old on February 10. In A.D. 1000, which was a leap year, the Sunday Letters were GF, and February 10 has letter f; therefore luna ii. fell on Saturday, and the following Wednesday, namely, February 14, was the first day of Lent. Easter Day in A.D. 1000 fell on March 31, month 21; therefore luna xiii., the Paschal Term, fell on Sunday.
on which the Paschal Term fell in any year, we add the ferial number given in the tables to the concurrent day; vide Chapter iii, §xi. E.g., A.D. 532, is year 9 of the Cycle of Sunday Letters, its concurrent day is feria iii, and its Golden Number is I, which is connoted in the table by feria u. Consequently, iii plus u = (ix minus vii, i.e.) feria ii, so that the Paschal Term of A.D. 532 fell on Monday (secunda fera), and Easter Day followed on Sunday, April 11.

§ xvi. The Embolisms.

In certain lunar years the Epacts are gathered together, as it was explained above in § 2, and formed into a thirteenth month. This month is called mensis embolismalis; the years to which it is allotted are known as anni embolismales, or embolismic years; and the intercalation generally, is spoken of as the “embolism.” The Greeks of Alexandria called this month μήν ἑμβόλιμος (mēn embolimino), “the intercalary month” (from ἐμβάλλω—emballo, “I throw in.”) The Golden Numbers of the years in which the embolism occurs in medieval times differ accordingly as the Epacts were changed in September or in January. When the change was made in September the embolismal Golden Numbers were III, VI, VIII, XI, XIV, XVII, XIX. When the change was made in January the embolismal Golden Numbers were II, V, VIII, XI, XIII, XVI, XIX.

The reason for this variation becomes apparent if we reflect that when the embolism falls in any one of the months September, October, November or December its year-number is 1 more in years that begin in September than it is in years that begin in January. Now the embolisms in the January years II, V, XIII, do fall in one of these four months; consequently, when the commencement of the year is advanced regularly to September 1, these particular embolisms fall in the September years numbered III, VI and XIII.

The last year of the Decemnovennal Cycle has the Golden Number XIX, and the lunations comprised in it end on the dates given in the following table. It will be observed that in the case of the first two lunations the name by which it is to be designated is that
of the month in which it finishes, notwithstanding the fact that almost 
the whole lunation in these cases falls in the preceding month. The 
year that has G.N. XIX, is a lunar intercalary year, and the number 
of days in each of its lunations is given below, as well as the number 
of days in the lunations of a common lunar year.

<table>
<thead>
<tr>
<th>The number of days in each lunation—</th>
<th>The lunations in the year XIX end:</th>
</tr>
</thead>
<tbody>
<tr>
<td>in common lunar years is:</td>
<td>in the lunar intercalary year XIX is:</td>
</tr>
<tr>
<td>February 29</td>
<td>February 29</td>
</tr>
<tr>
<td>March 30</td>
<td>March 30</td>
</tr>
<tr>
<td>Embolisminus 30</td>
<td>April 3</td>
</tr>
<tr>
<td>April 29</td>
<td>May 2</td>
</tr>
<tr>
<td>May 30</td>
<td>June 1</td>
</tr>
<tr>
<td>June 29</td>
<td>June 30</td>
</tr>
<tr>
<td>July 30</td>
<td>July 30</td>
</tr>
<tr>
<td>August 29</td>
<td>August 28</td>
</tr>
<tr>
<td>September 30</td>
<td>September 27</td>
</tr>
<tr>
<td>October 29</td>
<td>October 26</td>
</tr>
<tr>
<td>November 30</td>
<td>November 25</td>
</tr>
<tr>
<td>December 29</td>
<td>December 24</td>
</tr>
<tr>
<td>January 29</td>
<td>January 22</td>
</tr>
<tr>
<td>354</td>
<td>383</td>
</tr>
</tbody>
</table>

January 22 in XIX is the last day of the Decemnovennal Cycle.

The ratio of the embolisms is as follows:

a. September Year.

<table>
<thead>
<tr>
<th>G.N.</th>
</tr>
</thead>
</table>
| III. | \(11 + 11 + 11 = 30 + 3\) \(+ 3 + 3 = 6, \text{ to col. 3.}\)  
| VI.  | \(11 + 11 + 11 = 30 + 3\) \(+ 3 + 3 = 6, \text{ to col. 3.}\)  
| VIII.| \(11 + 11 + 6 = 30 - 2\) \(- 2 + 3 + 3 = 4, \text{ to col. 3.}\)  
| XI.  | \(11 + 11 + 11 = 30 + 3\) \(- 2 + 3 + 3 = 4, \text{ to col. 3.}\)  
| XIV. | \(11 + 11 + 11 = 30 + 3\) \(- 2 + 3 + 3 = 4, \text{ to col. 3.}\)  
| XVII.| \(11 + 11 + 15 = 30 + 7\) \(- 2 + 3 + 3 = 4, \text{ to col. 3.}\)  
| XIX. | \(11 + 11 = 29 - 7\) \(- 2 + 3 + 3 = 4, \text{ to col. 3.}\)  

**VOL. IV. X**
The Anglo-Saxon Computation of b. January Year.

<table>
<thead>
<tr>
<th>G.N.</th>
<th>11 + 11 ...</th>
<th>= 30 - 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>II.</td>
<td>11 + 11 + 11</td>
<td>= 30 + 3</td>
</tr>
<tr>
<td>V.</td>
<td>11 + 11 + 11</td>
<td>= 30 + 3</td>
</tr>
<tr>
<td>VIII.</td>
<td>11 + 11 + 11</td>
<td>= 30 + 3</td>
</tr>
<tr>
<td>XI.</td>
<td>11 + 11 + 11</td>
<td>= 30 + 3</td>
</tr>
<tr>
<td>XIII.</td>
<td>11 + 11 + 11</td>
<td>= 29 + 4</td>
</tr>
<tr>
<td>XVI.</td>
<td>11 + 11 + 11</td>
<td>= 29 + 4</td>
</tr>
<tr>
<td>XIX.</td>
<td>11 + 11 + 11</td>
<td>= 29 + 4</td>
</tr>
</tbody>
</table>

- $8 + 9 = 1$, to col. 3.
- $7 + 7 = 0$, nulla epacta.

The embolism of XIX is only 29 days in length as we have already proved by the foregoing table and the remarks in § xiii. Consequently that embolismic year has only 383 days.

The Calendar Dates of the Embolisms.*

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>III.</td>
<td>II.</td>
<td>December 2 to December 31</td>
<td>30</td>
</tr>
<tr>
<td>VI.</td>
<td>V.</td>
<td>September 2 to October 1</td>
<td>30</td>
</tr>
<tr>
<td>VIII.</td>
<td>VIII.</td>
<td>March 6 to April 4</td>
<td>30</td>
</tr>
<tr>
<td>XI.</td>
<td>XI.</td>
<td>December 4 to January 3</td>
<td>30</td>
</tr>
<tr>
<td>XIV.</td>
<td>XIII.</td>
<td>November 2 to December 1</td>
<td>30</td>
</tr>
<tr>
<td>XVI.</td>
<td>XVI.</td>
<td>August 2 to August 31</td>
<td>30</td>
</tr>
<tr>
<td>XIX.</td>
<td>XIX.</td>
<td>March 5 to April 3</td>
<td>29</td>
</tr>
</tbody>
</table>

§ xvii. The "Saltus Lunaris."

In § xiii I pointed out that the numerical notation of the Epact regularly increases by 11, year by year, until 209 days of epact are absorbed and the Cycle is completed. The Epact of the year that has G.N. XIX is xviii, and that is also the age of the moon of the tables on March 22, in that year. But in the next year, that of Nulla Epacta and G.N. I, instead of March 22 falling with luna xviii plus 11,

* Vide Bede, De Temporum Ratione, cap. xlv., col. 488.
Historic Time in the Ninth Century.

sc. with luna xxix, it falls with luna xxx, i.e., xviii plus 12. This augmentation of the figure of the moon's age is called the Saltus Lunae and the Saltus Lunaris. It is effected by cutting off one day from the last lunation of the year that has G.N. XIX. This allows of the first lunation of the year that has G.N. I commencing one day earlier than it otherwise would do. The necessary consequence of this is that all the Julian calendar-dates of that year after February are 12 days older by lunar computation than the days bearing the same Julian calendar-dates in the preceding year.

Modern computistical writers assert that the Saltus is effected by adding a nominal day to the last lunation of the expiring decennovennal period." This assertion is not thoughtful. If we defer the commencement of a lunation by one civil day it is obvious that its days will be only ten days older than the corresponding days in the preceding year, and no more. If we do not interfere with the date of its commencement it will be eleven days older on any given date, according to rule. But, if we advance its first day in the Julian calendar it follows that its thirteenth day, i.e., 1 plus 11 plus 1, will have the same Julian calendar date as the first day of the corresponding lunation in the preceding year after February. And this is actually

" Vide Rühl, Chronologie, SS. 141, 123, 134. Prof. Rühl, at the first place cited, enters upon a lengthy astronomical explanation of the reasons why computists add one day to the customary 11; am Schluss des Cyclus nicht 11, sondern 12 Tage (werden) addiert; i.e., "at the end of the Cycle, not 11 but 12 days must be added." Even the Benedictines are wrong; cf. the oft-cited Dissertation sur les Dates, i, pp. 68, 90: Il faut donc que les computistes [modernes] ajoutent 12 à 29 pour l'année qui suit celle qui est marquée de l'épacte 29. It is noteworthy that Prof. Rühl correctly explains the ratio of the Saltus Lunae without connecting the two considerations. He says, S. 134: Um daher eine vollständige Übereinstimmung zwischen dem Mondjahr und dem julianischen Jahre zu erzielen musste man in jedem Mondzirkel einen Mondmonat um 1 Tag verkürzen. Diese Verkürzung nennt man Saltus Lunae; i.e., "In order, therefore, to bring about complete harmony between the lunar year and the Julian year it is necessary for one lunar month in that lunar cycle to be shortened by one day. This abridgment is called the Saltus Lunae." The last statement is not correct: it is the augmentation of the moon’s age that results from this abridgment that we call the Saltus—not the abridgment itself.

For other erroneous explanations, with Rühl, S. 141, compare Hampson, ii, 111; and the Art de Vérifier les Dates, i, 68. For the error of ancient writers, sc., among others, Alcuin, Dionysius Exiguus, and Victorius, the curious may turn to the De Cursu et Saltu Lunae of the first named; apud Migne, Patrol., tome ci, coll. 986, 987.
The Anglo-Saxon Computation of

the case, as we may see by inspecting a lunar calendar. The second month of I of XIX commences on February 21; on March 5 it is 13 days old, and, on that date in the preceding year the lunation was new.

The Saltus was effected at July 30 by the computists of Alexandria, who began the lunation of August on that date instead of allotting 30 days to that of July. It was effected at November 25, by the Venerable Bede, instead of at January 22, at which date, it is said, mediaeval computists effected it generally. These variations caused divergence in the calendar dates of the lunations, and quasi-lunar data must be used with discretion when they connote a twelvemonth which has the G.N. XIX.

§ xviii. The Lunar Regulars.

In order to discover the age of the moon of the tables on the first day of any Julian calendar month we require to know the lunar epact of the decemnovennal year, and the moon's age on the particular calend in the decemnovennal year that has G.N. I. The series of numbers in which this particular one is comprised is called that of the Lunar Regulars. The first year of XIX, for instance, begins on January 23, and it is 10 days old on February 1. The other numbers follow in due course, but two points in connection with them must be noted: the year I of XIX has its January lunation last of the twelve, consequently the age of the moon on January 1 in the year that has G.N. I is 20 days, and the lunation of January ends on January 11. We cannot use this number 20 as a lunar regular because, in practical computation, we assume that January commences the lunar year always; therefore we make that assumption in this case also, and

Bede, De Temporum Ratione, cap. xx.—Si enim ipsum argumentum inxta Aegyptios a Septembri mense, ubi principium est anni corum, inchoaveris, necesse est ut luna Julii mensis co anno xxix. dies et numquam alius habeat, uno uidelice ratione saltus amisse, et ob id luna Calendarum Augustarum tertia reddatur quae inxta argumenti regulum secunda computabatur. Si vero inxta hoc quod supra decimus, a Januario principium argumenti simere manus, eodem ordine luna in Calendis Decembris vii. incurrit. Where Bede says uno (die) ratione saltus amisse, he makes it quite clear that he understood the reason of the apparent increase in lunar worth of the Julian calendar dates in year I. of 1X., and also the method of effecting it.
assign to January the same lunar regular that we assign to March, namely 9, which equals $20 - 11$. The Lunar Regulars, then, are as follows:

<table>
<thead>
<tr>
<th></th>
<th>January</th>
<th>September</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>years:</td>
<td>years:</td>
</tr>
<tr>
<td>January</td>
<td>9</td>
<td>September 16</td>
</tr>
<tr>
<td>February</td>
<td>10</td>
<td>October 16</td>
</tr>
<tr>
<td>March</td>
<td>9</td>
<td>November 18</td>
</tr>
<tr>
<td>April</td>
<td>10</td>
<td>December 18</td>
</tr>
<tr>
<td>May</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>June</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>July</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>August</td>
<td>14</td>
<td></td>
</tr>
</tbody>
</table>

These numbers have been arranged in such a way that the reader need have no difficulty in committing them to memory.

When the Golden Number and the Epact were changed on September 1, the Epact was increased by 11. Consequently, the Lunar Regulars of the Calends of the last group of four months must be reduced by that number, as in column 4. Those computists who effected the Saltus at July 30 were compelled to increase the Lunar Regular of August by 1, thus making it 15.

§ xix. The Computation of the Date of Easter Day.

Easter Day is the Sunday in the third week of that lunation the plenilunium of which falls on, or after, the ecclesiastical date of the vernal equinox, that is, on or after March 21, xii Kal. April. The third week of a lunation is current from moon 15 to moon 21. *

In order to compute the date of Easter Day two data must be known or calculated: 1, the Julian calendar date of the Paschal Term; 2, the day of the week on which that calendar date falls. We find the date of the Paschal Term (cf. § xvi, supra) by adding 1 to the A.D.

* Cf. Bede's copy of Ceolwulf's Paschal Epistle, H.E., V. xxi., p. 334: Praecipit enim lex ut pascha primo mense anni et tertia eiusdem mensis septimana, id est, XVa die usque ad XXIwm, fieri debet; i.e., "the feast of the Passover ought to be kept in the first month, and in the third week of the same, that is, from the 15th day of the month unto the 21st." The observance of the Christian Easter in the third week of the Paschal lunation is insisted on at p. 334, l. 5, up; p. 335, l. 14; p. 336, l. 1; p. 337, l. 15; p. 338, l. 7; and p. 340, l. 3, up.
and dividing by 19 to get the Golden Number. We multiply that number, less 1, by 11 and divide by 30 to get the epact (cf. § xiii, supra); and we compute the date of the Paschal Term by adding 10 to the epact (which gives us the age of the moon of the tables on April 1), and computing backward or forward to the nearest plenilunium after March 20. Thus, to find the date of Easter Day in A.D. 909:

\[
\frac{909 + 1}{19} = \text{G.N. XVII: } \frac{(XVII - 1) \times 11}{30} = \text{xxvi. days of epact;}
\]

\[(\text{xxvi. } + 10) - 30 = \text{luna } \text{ui., Kal. April.}
\]

\[\text{xiii. minus } \text{ui. } = 8 ; \text{ April 1, luna } \text{ui, plus } 8 = \text{April 9, i. xiii.}\]

We must now discover the day of the week on which April 9 fell in A.D. 909 (cf. Chap. iii, ii, § xiii, infra).

\[
\frac{909 + 9}{28} = \text{year 22 of the Cycle of Sunday Letters.}
\]

The leap years in that Cycle run 1, 5, 9, 13, 17, 21, 25: therefore year 22 follows a leap year. These years have the Sunday Letters FG, AB, CD, EF, GA, BC (in reverse order); hence year 21 CB is followed by year 22 A. The Sundays in April fall one day later in the month than the Sunday Letter falls in the alphabet. Letter A is 1, therefore the Sundays in April fall on the 2nd, 9th, 16th, 23rd and 30th of the month. Our calculation has already allotted the Paschal Term to April 9; consequently the celebration of Easter in A.D. 909 fell on the following Sunday, i.e., on April 16.

\(\text{(To be continued.)}\)
FORGERIES OF PLANTAGENET COINS.

Pl. 1
FORGERIES OF PLANTAGENET COINS.  

PI. II.
FORGERIES OF TUDOR COINS.

Pl. III.
FORGERIES OF TUDOR COINS.

PI. IV.
FORGERIES OF TUDOR COINS.

PL. V.