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UDC 811.124'276.4

CAESAR'S MATHEMATICAL CODE TECHNIQUE

Abstract: A close scrutiny of a short passage in Caesar's Gallic War reveals it was composed according to some highly artistic principles more reminiscent of poetry than of narrative prose. Caesar utilized this technique to introduce certain personal messages unrelated to the surface text. Surprisingly some of his messages seem to mention Scandinavians although this nation is not attested in history till 500 years later.

Caesar composed at least one chapter of his Gallic War according to mathematical principles. He used this technique to introduce some code messages of a highly private nature. His messages mention a couple of Scandinavians.

Chapter 5 in the first book of Caesar's Gallic War (ed. du Pontet, OCT) contains 105 words, of which 43 begin with a vocalic letter (*AEIOV*). If just one word is changed from possessing a vocalic initial to having a consonantal one, then the proportion between the two sets of words therefore would be 42:63 = 2:3. Such a conjecture is possible in one passage only (1.5.4): *Persuadent Rauricis et Tulingis et Latovicis...* If here one *et* were changed into *cum*, the meaning would be the same as there is practically no semantic difference between 'and' and 'together with'. The aim of the present paper is to show that Caesar undoubtedly composed his text according to certain mathematical principles, but that his principles sometimes collide, resulting in an aberration as the one just mentioned.

The figures for the various vocalic initials are:

<i>A</i>	<i>E</i>	<i>I</i>	<i>O</i>	<i>V</i>
9	14	6	6	8

If the emendation proposed is accepted, the figures are:

9	*13	6	6	8
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which gives this proportion: *AEI:OV* = 28:14 = 2:1. In that case the overall distribution of vocalic vs. consonantal words in the four sections is:

	<i>voc</i>	<i>cons</i>	<i>total</i>
(1)	5	11	16
(2)	13	10	23
(3)	8	20	28
(4)	*16	*22	38

which results in the following proportions:

$$\textit{voc} \ (1+2):(3+4) = 18:24 = 3:4 \text{ and } (1+4):(2+3) = 21:21 = 1:1$$

$$\textit{cons} \ (1+2):(3+4) = 21:42 = 1:2 \text{ and } (1+4):(2+3) = 33:30 = 11:10$$

$$\textit{total} \ (1+4):(2+3) = 54:51 = 18:17$$

all of which are harmonious in the sense that they represent either the type $n:n = 1:1$ or $n:(n+1)$ (*ratio superparticularis* or *epimorion*). If on the other hand the emendation is not accepted, then all such harmonious patterns disappear. Consequently the emendation stands a good chance of being correct.

Anyhow, the sum total of words is 105, a figure which has a very regular numerical structure, it being the product of the first four odd members of the sequence of natural numbers (1·3·5·7). Therefore it is possible to formulate a working hypothesis that Caesar in his literary composition used methods involving both absolute numbers (such as divisors) and relative numbers (proportions). Support for this hypothesis may be found in various other peculiarities of the text.

In section 4 the following passage is found: *suis uti eodem usi consilio oppidis suis vicisque exustis una cum eis*. The word-initials are SVEVCO SVEVCE, i.e. two sequences with a remarkable degree of phonetic similarity: SVEVC followed by a vowel. Since an alternation *o/e* is known from certain grammatical paradigms, this looks like a case of a dative (or ablative) followed by a vocative. However, no such noun as **suvecus* is attested in classical Latin. On the other hand a very similar combination of word-initials is found at the end of the first section: *conantur ut e finibus suis exeant*. The initials are CVEFSE, which may be rearranged as SVFECE. The possibility remains that Caesar tried to introduce into his text allusions to a trisyllabic ghost-word the pronunciation of which he was not quite sure of. The first syllable is *su-*, the second syllable begins with a labial fricative either voiced (*u*) or voiceless (*f*), while the third syllable is *-cus*. In all three cases the word is written as an anagram. In two cases, only the two middle letters have been transposed. In the third case (CVEFSE = SVFECE) the order of the plaintext letters is changed into 5-2-4-3-1-6, i.e. the encoding is

based upon a symmetrical pattern of a mathematical nature ($5+2 = 4+3 = 1+6$).

Caesar's text contains towards the end a clear example of a code word written as an acrostic: *Noreiamque oppugnarant receptos ad se NORAS* = *noras* 'you knew'. The six words immediately preceding are: *incoluerant et in agrum Noricum transierant*, which may be taken to represent two anagrammatic words: IE *IANT ei nati* 'for him (or her) there are children'. The whole sense of this code message thus seems to be: *ei nati noras* 'he (or she) had children, you knew (that)'.

Whereas most of the Gallic War is written in a very impersonal style, it thus seems that at least certain passages contain textual elements of a much mere personal or even intimate nature. These messages differ from the ordinary text primarily in their use of verb forms in the second person singular, such as *noras*. Another verb of the same type may be observed in the beginning of section 4: *Persuadent Rauricis et Tulingis et PRETE terpe* (Greek imperative) 'satisfy'. Since this verb is transitive, an accusative might be expected in the proximity.

Immediately preceding the Greek code word these three words are found: *domo efferre iubent*, the initials of which may be read as an acrostic: *DEI dei* 'of the god'. A few words earlier one reads: *subeunda essent trium SET set* (= *sed*) 'but'. Immediately before that the missing accusative occurs: *sublata paratiore ad omnia pericula SPAOP popas*. The entire code message then runs: *popas set dei terpe* 'but satisfy the temple servants (or the girls) of the god'. The syntactical structure of the message is clear. Unfortunately the same cannot be said for its semantics as the noun *popa* is at first glance ambiguous.

A third verb in the second person seems to occur in the first section in a fairly complex code message: *eius mortem ... Helvetii id quod ... conantur ut e finibus suis exeant. Ubi iam se ad eam rem paratos esse arbitrati EM HIQ CVEFSE VISAER PEA me hiq* (= *hic*) *Sufece* (= *Suvece*) *iveras ape* 'here you had gone for me with a bee, Suvecus'. For the meaning of the 'bee', cf. below.

After this message the following sequence of words occurs: *oppida sua omnia numero ad duodecim ... ad quadrungentos, reliqua privata aedificia incendunt ... secum portaturi erant comburunt ut OS ONAD AQ RPAI SPECV os dano aq* (= *ac*) *pari pecus* 'a kiss for the 'danus' and his equal, you fool'.

It seems then that the text of BG 1.5 contains the following four code messages whose elements are written either as acrostics or anagrams:

	<i>voc</i>	<i>cons</i>	<i>total</i>
(1) <i>me hiq Sufece iveras ape</i>	11	9	20
(2) <i>os dano aq pari pecus</i>	8	9	17
(3) <i>popas set dei terpe</i>	7	9	16
(4) <i>Suveco Suvece ei nati noras</i>	14	9	23
<i>total</i>	40	36	76

That these four messages form a coherent textual system is evident from the fact that they conform to a common pattern: each message consists of 9 consonantal letters and an exact average of 10 vocalic letters. Thus the numerical mean of the four totals is 19, which is a prime number. Since this equation (numerical mean = prime number) is in perfect accordance with a formula that may be seen as a compositorial principle in much Latin poetry both in Antiquity and the Middle Ages (cf. Jensen: 1970 and 1983), it is beyond any reasonable doubt that Caesar composed at least this chapter of the Gallic War according to the rules of poetry rather than prose.

The lexical entities of the four messages are partly evident, partly open for discussion.

(1) *Me* of course offers no difficulty. *Hiq* is written in the same way as *aq*. As both notations are acrostic, the decoding is beyond doubt. It may be an indication of the fact that the original text contained illustrations ('here' = 'in this picture'). *Sufece* *Suveco* and *Suvece* are unintelligible from the point of view of classical Latin. They may represent a foreign (i.e. Germanic or Celtic) word. Although the suggestion might seem anachronistic, one is tempted to interpret this gloss as *Suecus* 'Swede'. *Iveras* is grammatically parallel to *noras* which supports this analysis. An *apis* is mentioned very often in similar code messages found in the anonymous work *de Bello Alexandrino*. It seems to be an instrument used to inflict pain during sexual intercourse, cf. below.

(2) *Os* in the sense of 'kiss' is poetical parlance. If *Suvecus* means 'Swede', then *Danus* may safely be interpreted as 'Dane'. As regards *aq*, cf. *hiq* above. *Pari* is a dative parallel to *Dano*, so these two interpretations support each other. *Pecus* may be used as a term of abuse ('cattle' = fool, like German *Vieh* or Danish *kvaj*)

(3) Since both *os* and *apis* seem to belong to the erotic sphere, the interpretation of *popa* as 'girl' is more probable than the translation 'temple servant'. The notation *set* for *sed* is abundantly attested. *Dei* offers no difficulty because it is written as an acrostic. Caesar like any other educated Roman was well-versed in Greek, so the (slangy?) expression *terpe* offers no difficulty.

(4) For *Suveco* and *Suvece* cf. above. *Ei* is a dative parallel to *Suveco*. *Nati* is the only possible Latin decoding of the sequence IANT.

The entire code text may then be taken to contain three instances of one very peculiar noun in two different case forms (*Suf/vecus*). Similarly it contains three verb forms, all of them in the 2. person singular (*iveras terpe noras*). It contains two nouns with a common semantic component (*Suvecus Danus*, both of them Scandinavians).

With all due reservations the following hypothesis may be formulated: Caesar's BG 1.5 contains a coherent series of four code messages. They are directed at a Swede, who is mentioned in two vocatives. They mention another Swede, who is said to be the father of some children, plus a Dane. Caesar is cross at the Swede because he has taken no regard of the fact that the other Swede was a father of children. He should rather have satisfied the 'girls of the god' (= temple whores?). Moreover the Swede addressed has kissed the Dane and his 'equal', which may mean the other Scandinavian, i.e. the other Swede.

In another Latin text of approximately the same period, the *de Bello Alexandrino*, a number of encoded messages likewise are found. One of them contains the word for Swede: (BA 45) *demittique antemas iubet et milites armari et vexillo sublato quo DA IE MAEVSQ da ei Sueqam* (= *Suecam*) 'give him the Swedish woman'.

The word *Danus* on the other hand occurs in several code messages:

(BA 12) *posse, si classe ipsi valerent ... cotidianosque usu a pueris exercitati ad naturale ac domesticum ... profecissent sentiebant; itaque omni studio ad parandam classem incubuerunt* PSCIV CVAPE ANAD PSIO SAPCI *cupis pecua Dana Piso capis* 'you desire the Danish cattle, Piso, and you get them'. The word *pecu* is here used with the same derogatory meaning ('idiots') as *pecus* above.

(BA 18) *Neque vero diutius ea munitione se continere potuerunt, etsi erat non dissimile atque Alexandreae NVDEM SCPEE NDAA nudem pec(c)es Dana* 'I shall undress, you shall sin, Danish woman'.

(BA 25) *duce assumpta Alexandrini nihilo ... Romanos animadverterent eludentibusque ... infirmitatem magnum dolorem acciperent neque se ... exsisterent magna Caesari praesidia terrestri itinere ex ... DAAN RAE IM DANS EM CEPIT Dana era mi dans me cepit* 'the Danish lady giving (herself) to me took me'.

(BA 34) *duas ab Deiotaro, quas ille disciplina atque armatura nostra compluris annos ... equitesque C(entum), totidemque ab Ario-barzane sumit DA DQI DAAN CA ECTAAS da q(u)id Dana ac taceas* ‘give something, Danish woman, and may you shut up!’.

(BA 35) *decederet; neque enim aliud ... substitisse, persevereare coepit, ut eo DNEA SPCVE Dame pecus* ‘you Dane, you idiot!’ (for this meaning of *pecus* cf. above).

(BA 53) *id non dubitaret, accurrit ... et secundae ... odio sciebat praecipue Cassium esse ... tollitur a multidudine INDA ES OSPCE TAM Dani es posce tam* ‘you belong to the Dane, desire (him) so much’.

(BA 60) *interposita quod is in aequum non descenderet ... persuadet ut se IQI IAND PVS qii (= civi) Dani pus* ‘I have stirred up the sperm of the Dane’.

(BA 69) *missi Caesarem adeunt atque imprimis deprecantur ne eius adventus ... Pharnacen quae imperata essent MCAAII DNEA PQIE Caiam Dane qepi (= cepi)* ‘Dane, I have taken the woman belonging to Caius’.

Thus there can hardly be any doubt that both *Suecus* and *Danus* were quite normal Latin words already in antiquity.

As for the specific sense in which the word *apis* is used, cf. the following passage: (BA 76) *sunt potiti. Interfecta multitudine omni suorum aut ... attulisset liberius profugiendi, vivus in Caesaris potestatem adductus esset SPIMOSA ALPVIC PAE spimosa (= spinosa) placui ape* ‘I satisfied by means of the thorny *apis*’.

Another context may equally have an erotic sense: (BA 4) *Interim dissensione orta inter Achilan, qui veterano ... praeerat et Arsinoe IDO IAQV PEA dio qavi (= cavi) ape* ‘I took care of the divine man by means of an *apis*’.

The same holds good for the following chapter: (BA 5) *causa vicatim ex privatis aedificiis specubus ac puteis extracta CVEPAS APE cupeas (= cupias) ape* ‘you shall desire by means of an *apis*’.

Thus the *apis* most probably is an instrument able of stinging like a bee and used in sado-masochistic intercourse.

The text in its entirety contains the following initials:

(1) *p E M n m H I Q c f C V E F S E* (16)

(2) *V I S A E R P E A s O S O N A D u A Q R P A I* (23)

(3) *f o p q S P E C V d r s S P A O P S E T m m c s q D E I* (28)

(4) *P R E T E l f S V E V C O S V E V C E p b q t r I E I A N T N O R A S s s a* (38)

The quantities of words in each section possibly is intentional, aiming at illustrating various numerical categories: there is a square number (16), a prime number (23), a perfect number (28), and an 'ordinary' number (38). The notion of perfect number is utilized by Caesar in 'the Swedish connexion' as well. The word *Suvece* is written by means of the following six words *suis vicisque exustis una cum eis*. They contain 28 letters. The word *Sufece* is written by means of the following six words *conantur ut e finibus suis exeant*. They contain 28 letters. In both cases the vocative is being expressed by means of six words containing 28 letters. Both 6 and 28 are perfect numbers. Thus it would seem that Caesar was to some extent influenced by Pythagorean thinking.

Nevertheless he was no dogmatic. In the final version of his text he sacrificed the strict mathematical harmony for the benefit of his private messages. If indeed the word *cum* had been substituted for *et*, then the imperative *terpe* would have been lost.

LITERATURE

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