

BACON'S BILITERAL CIPHER AND ITS APPLICATIONS.



WERE it not for the controversy which has arisen as the result of Mr. Mallock's article in 'The Nineteenth Century' for December last, it would hardly be necessary to attempt a formal refutation of the theory that Bacon's biliteral cipher was used by him to write a secret history into a number of works published during his life-time, and even now one cannot but half expect that Mrs. Gallup and her English champion will in the end turn upon their assailants and dub us all fools for taking this latest-born of Baconian booby-traps seriously. So far, however, the controversy has been largely confined to vague generalities concerning the probability or improbability of Bacon having written Shakespeare or to doubts concerning the truth of the secret history, the disputants having, with the exception of Mr. Mallock, apparently failed to perceive that *à priori* arguments of this nature cannot by themselves finally disprove a theory which rests upon certain clear and verifiable statements as to matters of typography.¹ Indeed, so far from the usual anti-

¹ Some have entered the arena for the sole purpose apparently of displaying their own astounding ignorance. Thus one letter in 'The Times' suggests that the Secret History is an obvious American forgery, since *honour* is spelt without the *u*! This statement has, I am informed, also appeared in one of the weekly papers.

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Baconian arguments being in any way pertinent in the present case, it would be perfectly possible to admit the truth of every word in Mrs. Gallup's book, and yet to argue that the only thing proved was, that some insane person connected with the printing trade from about 1590 to about 1630 introduced into a number of works printed during that period a cipher containing a vast mass of involved and at times unintelligible nonsense written in a vile imitation of the Chancellor's style.

I propose, therefore, to investigate the question of the cipher itself, and to determine, so far as may be, what possibility there is of its existence, and also upon what methods Mrs. Gallup has proceeded in deciphering it.

The cipher is fully described on pages 306 to 309 of Bacon's '*De Augmentis Scientiarum*' of 1624,¹ and on pages 264 to 269 of the English translation by Gilbert Wats of 1640. It consists in having two forms of every letter, both capital and minuscule, and using them to form an alphabet of two dissimilar things, such as that formed by the dots and dashes of the Morse code. In the case of the cipher, however, since it is impossible to mark the division of the letters, it is necessary that they should consist of groups of the same number. Since twenty-four letters are needed (*i, j*, and *u, v*, are of course the same), the smallest group which will give the requisite number of mutations is five ($2^5 = 32$), and we consequently find Bacon arranging his alphabet as follows :

¹ So Mrs. Gallup's facsimile ; B.M. copy, 1623.

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A = <i>aaaaa</i>	B = <i>aaaab</i>	C = <i>aaaba</i>	D = <i>aaabb</i>
E = <i>aabaa</i>	F = <i>aabab</i>	G = <i>aabba</i>	H = <i>aabbb</i>
I = <i>abaaa</i>	K = <i>abaab</i>	L = <i>ababa</i>	M = <i>ababb</i>
N = <i>abbaa</i>	O = <i>abbab</i>	P = <i>abbba</i>	Q = <i>abbbb</i>
R = <i>baaaa</i>	S = <i>baaab</i>	T = <i>baaba</i>	V = <i>baabb</i>
W = <i>babaa</i>	X = <i>babab</i>	Y = <i>babba</i>	Z = <i>babbb</i>

Bacon then proceeds to give an example of the cipher. For this he transcribes a portion of the first Epistle of Cicero, into which he inserts or, to use his own word, 'involves' the famous 'Spartan Letter,' the classical example of the 'Scytale' or staff cipher. This specimen was cut on a block, not set up from ordinary type, and has been reproduced in facsimile to illustrate the present article. The most casual inspection will at once reveal the existence of the duplicate forms of the letters, and any schoolboy who has ever amused himself in class by concocting secret writings, will, with the help of the alphabet given above, have no difficulty in deciphering it in the course of half an hour or so. It is merely a question of noting the forms of the different letters, and then deciding which to call *a* and which *b*. This latter question presents little difficulty in Bacon's alphabet, so long as we have a sufficiently long cipher-passage to work from, since the proportion of *a* to *b* forms is 68 to 52 or 17 to 13, with a tendency in favour of *a* forms, due to their predominance in letters of frequent occurrence, A, E, etc. Thus we merely have to call the more frequent form *a*, the less frequent *b*.

For comparison with this specimen a passage has been reproduced in facsimile from the 'Novum

Ego omni officio, ac potius pietate erga te;
 cæteris satisfacio omnibus: Mihi ipse nan-
 quàm satisfacio. Tanta est enim magni-
 tudo tuorum erga me meritorum, ut quoni-
 am tu, nisi perfectâ re, de me non congrue-
 ti; ego, quia non idem in tuâ causâ efficio,
 vitam mihi esse acerbam patem. In cau-
 sâ hæc sunt: Ammonius Regis Legatus
 aperte pecuniâ nos oppugnat. Res agitur
 per eosdem creditores, per quos, cum tu ade-
 ras, agebatur. Regis causâ, si qui sunt,
 qui velint, qui pauci sunt, omnes ad Pompe-

Organum,' in which Mrs. Gallup finds the same cipher. The comparative uniformity of the letters will be at once obvious, but we shall be told, and told quite truly, that if Bacon did not wish his secret to be read at once he could not adopt the same glaring differentiations as in his specimen. Nevertheless, it must be admitted that there were many grades of concealment possible between the very obvious dimorphism of the specimen and the type of the other passage here reproduced, in which, as regards many of the letters, the most competent experts have completely failed to distinguish more than one form.

The position with regard to the founts is as follows. It has always been obvious to those familiar with old printing that there are two forms of most of the italic capitals, a plain form and an ornamental form, which were used to a large extent indifferently. So, too, with a few of the lower case letters, such as *v* and *w*. Mrs. Gallup assumes that these differences run through the whole alphabet, both upper and lower cases. This, however, is precisely what nobody has yet succeeded in demonstrating, while there is considerable reason to suppose that it is not the case. Mr. Mallock proposed to institute experiments in the way of photographic enlargements of the type, and it appears from a letter in 'The Times' of January 3rd, that such experiments have actually been carried out by Mrs. Dew-Smith at Cambridge, and have signally failed to give any results supporting Mrs. Gallup's theory.¹ Little

¹ Since the above was written an elaborate typographical investigation has been published in 'The Times' of January 6th,

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indeed was to be expected from a process which would merely tend to exaggerate the inevitable irregularities of type imperfectly cast, often worn and battered, unevenly inked, and impressed on rough paper. Moreover, unless the differences are capable of detection by a careful examination with the naked eye they are useless for the purpose of the cipher. Even Bacon, it must be remembered, knew nothing of the process of photography!

In the majority of cases Mrs. Gallup does not give sufficient information to make it possible to check her deciphering; she tells us neither where she begins, what forms of letters occur in the particular types used, nor to which fount she assigns them. Yet not one of these three important points is constant. The only passage in which she fairly allows us to see her at work is in the specimen transliteration from the 'Novum Organum,' for that from Spenser's 'Complaints' is too short to be of much use. Here she gives facsimiles of two printed title-pages and the seven pages of the 'Præfatio,' a table of the different founts, and an elaborate transcription of a portion, showing to which fount she assigns each individual letter.¹ It is to this passage, therefore, that I shall confine my investigations, which can be readily followed by anyone who has the work before him. In order, however, to obtain a wider basis of comparison

the results of which are still more unfavourable to the cipher-theory.

¹ The founts used in this to represent the dimorphism of the original habitually *reverse* the distinctions there observable, and should be entirely disregarded.

than the two pages of continuous italic type transliterated in detail, I have taken the continuation of the deciphered story as printed on p. 86 and put it back into cipher, thus obtaining the values assigned to all letters on pages 3 and 4 of the 'Præfatio.'

In the first place let us consider the question of the alleged dimorphism of the lower case italic fount, as it appears in the facsimile here given of the first page of the 'Præfatio.' It will be readily seen that there are two forms of *v* (cf. *validi* in l. 9 with *virtutem* in l. 12), and it is also possible that there are other dimorphous letters. Thus there are two forms of the circumflex accent over the *a* (cf. ll. 1 and 2), and it is not impossible that there are two forms of long *s* (see *ausi sunt* in l. 3), though personally I believe that in all cases the differences are such as might be caused by the type getting bent. Attention has already been called in an article (not by the present writer) in 'The Pilot,' to the three instances of the termination *-erunt* in lines 10, 11, and 12 (*fuerunt*, *profuerunt*, and *nocuerunt*). These are transliterated by Mrs. Gallup as *aabab*, *baaba*, and *abaab* respectively, that is to say in no case is the same value attached to the same letter in all three cases. And yet the passage, I am informed, has been carefully and impartially examined by the most competent typographical experts, who agree that not only are there no differences visible, but that there are minute peculiarities which reappear in all three cases. This is sufficiently damaging to Mrs. Gallup's theory, but it still falls short of absolute



*Vi de Naturâ ; tanquàm
de re exploratâ, pronuntiare
ausi sunt ; suis hoc ex animi
fiduciâ fecerint, suâ ambi-
tiosè, & more professorio ;
maximè illi Philosophiam,
& Sciencias detrimentis af-
fecere. Ut enim ad fidem
faciendam validi, ita etiam ad inquisitionem extin-
guendam & abrumpendam efficaces fuerunt. Ne-
que virtute propria tantùm profuerunt, quantum in
hoc nocuerunt, quòd aliorum virtutem corruperint, &
perdiderint. Qui autem contrariam huic viam ingressi
sunt, atque nihil prorsus sciri posse asseruerunt, siue
ex Sophistarum veterum odio, siue ex animi fluctuatio-
ne, aut etiam ex quadam doctrinæ copîâ, in hanc opi-
nionem delapsi sint, certè non contemnendas eius ratio-
nes adduxerunt ; veruntamen nec à veri initijs sensen-
tiam suam derivârunt, & studio quodam ; atque af-
fectione prouecti, prorsus modum excefferunt. At
antiquiores ex Græcis (quorum scripta perierunt)*

PART OF PAGE FROM BACON'S 'NOVUM ORGANUM,' 1620, IN WHICH
MRS. GALLUP FINDS A CIPHER.

proof. It is not a physical or logical impossibility that Mrs. Gallup may be possessed of a power of detecting differences in and consistently distinguishing forms of letters which appear to be identical to all those most competent to judge in this country. We must therefore proceed with our inquiry.

In a Table printed in her book, Mrs. Gallup has assigned the different forms to the two founts, and on reference to this it will be noticed, with regard to the capitals, that on the whole the plain forms are assigned to *a*, the ornamental to *b* fount, but that the distribution is not entirely consistent. Thus, to take only cases where patently distinct forms occur, we find the plain forms of *A*, *E*, *G*, and *V* assigned to *a* fount, while the ornamental forms, *Ä*, *Ê*, *Ĝ*, and *Ŭ* are assigned to *b*. On the other hand the plain form of *I* is assigned to *b*, and the ornamental form *Ț* to *a* fount. As regards *M*, the plain form is given, with very slight and questionable modification, both as *a* and *b*, the ornamental *ℳ* as *b* only. Of the other upper case and of nearly all the lower case letters, I will only say that the differences are such that the very slightest damage to the face of the type would at once convert one form into the other, or at least make them indistinguishable.

With regard to these inconsistencies, however, it may plausibly be argued that they were merely introduced by Bacon in order to make the deciphering of his story a less easy task, and that they in no wise affect either the general principle or the particular application. Let us come, then,

to the really crucial question and see whether those letters, the forms of which can be readily distinguished, have been assigned consistently or not in the process of transliteration.

For this purpose I shall divide the facsimile from the 'Novum Organum,' given by Mrs. Gallup, into three portions, first the printed title-pages in which the italic fount is largely of the upper case; secondly, ll. 1-47 of the 'Præfatio' (ll. 1-21 of which appear in the facsimile accompanying the present article), of which Mrs. Gallup gives a full transliteration; and thirdly, ll. 48-108, which I have checked by reconstructing the cipher from the deciphered story on p. 86. I number the lines of the two title-pages continuously, those of the 'Præfatio' separately.

To test Mrs. Gallup's method I selected the following letters, in which the two forms are clearly distinct: *A*, *Ȧ*; *E*, *Ȧ*; *J*, *I*; *M*, *Ȣ*; *V*, *U*. I also took the two forms of *Œ*, of which the wider and more sloped is assigned in the Table to *a*, the narrower and more upright to *b* fount (see ll. 5 and 7 of the facsimile respectively).

In the title-pages there are nine upper case italic *A*'s, all belonging to the plain or *a* fount. Six of these are transliterated as *a*, while two (the first in l. 10 and that in l. 24) are transliterated as *b*. Of the *E*'s, seven belong to *a* and three to *b* fount, and all are correctly transliterated. Besides these, however, there are three cases of the ligature *Æ*. A careful examination of the original has failed to reveal any differences in these, both components of which belong to the *a* form. Yet they are trans-

literated *aa*, *ab*, and *ba* respectively (ll. 3, 12, and 25).¹ The *I*'s, of which there are nine, all belong to the plain fount, which in this case is called *b*, and are correctly transliterated. *M* occurs four times, always of the plain fount, and no reason is apparent why two should be transliterated as *a* and two as *b*; this, however, is consistent with the Table of Founts. *V* occurs seven times, always plain, and correctly transliterated as *a*.

Turning to the first 47 lines of the 'Præfatio,' we find the *A*'s (three times, *b* fount), *E*'s (three times, *b* fount), *I* (once, *b* fount), and *M*'s (four times, *b* fount), all correctly transliterated. It is, however, not so with either the *V*'s or *Œ*'s, and I am glad to be able to illustrate the point from the annexed facsimile. *V* occurs twice, once in its plain form in l. 1, and once in its ornamental in l. 8; yet, in both cases it is transliterated as *a*. So again it will be noticed that in ll. 5 and 7 occur the two forms of *Œ*, of which that in l. 5 belongs, according to the Table of Founts, to *a*, that in l. 7 to *b*. Yet both are here transliterated *a*. The *Œ* occurs sixteen times in the 47 lines we are examining; twelve times in the *a* form, once incorrectly transliterated *b*, and four times in the *b* form, twice incorrectly transliterated *a*.

Lastly, let us take the passage (ll. 48-108), for

¹ Several inconsistencies of transliteration were noted by Mrs. Dew-Smith in her letter before mentioned, but she is mistaken as to the question of ligatures. There is no reason why the two components should belong to the same form of letter. It is just as easy to cast *ab* as *aa* on the same body; but it would necessitate four forms of the ligature, namely, *aa*, *ab*, *bb*, and *ba*, instead of two forms as in the ordinary type.

which I reconstructed the cipher. I confess that when I did so, I fully expected to find all attempt at consistency abandoned; but I was mistaken. Four *A*'s (1 *a*, 3 *b*), four *I*'s (2 *a*, 2 *b*), and one *V* (*b*), are correctly transliterated. There are five *M*'s, one plain, transliterated *a*, and four ornamental, of which two are incorrectly transliterated *a*. Again there are fifteen *a* fount *Œ*'s, of which two are incorrectly transliterated *b*, and seven *b* fount ones, of which four are incorrectly transliterated *a*.

Besides these upper case letters there are the lower case *v* and *w*, which are clearly dimorphous. In the 'Præfatio,' both in the part for which the transliteration is given, and that for which I reconstructed it, the two forms of *v* are correctly transliterated. The *w*, of course, does not occur in Latin, but its forms also are correctly transliterated in the passage from Spenser.

To sum up, then: not only is no evidence forthcoming to make the assumption of two distinct founts for the whole lower case alphabet in the least plausible; not only are the recognisable forms assigned to the two founts in a perfectly arbitrary manner, but the forms are in many cases not even consistently differentiated in the process of transliteration. These are points which must be met before anyone has the right to assert that Mrs. Gallup has made out any *primâ facie* case for her theory.

One point remains. In the transliteration the italic capital *S* of the word *Secundo*, occurring in the fifth line of the title-pages, has been omitted, apparently by accident, certainly without explana-

tion or authority. Similar omissions may occur elsewhere, though I have not noticed them; one case is, however, fully sufficient. If the cipher were genuine the deciphering would necessarily go wrong from this point, the fact that it does not do so is conclusive evidence that the cipher is not genuine.

I do not wish to assert that the book is an intentional fraud: I do not think it is. On the other hand, I have no wish to speculate upon the mental condition of any person who proposes to extract a cipher on the absolutely illogical and inconsistent method which I have endeavoured to expose above, or who is prepared to accept the result of such work as meriting serious attention without having himself troubled to take the most obvious means of testing its accuracy.

It is unnecessary to call attention to the many absurdities involved in the theory of the cipher—not among the least of which is the fact that the insertion of it would have placed Bacon's life in the hands of every printer's devil—for if it is possible to demonstrate that the cipher does not exist anywhere but in Mrs. Gallup's imagination, it is obviously useless to dwell upon the improbability of its existence. So far, I see little prospect of the fulfilment of Mrs. Gallup's hope, expressed in her quotation from Bacon, which adorns the cover of her book—a quotation I would print in this wise: *I am in good hope that if the first reading move an objection, the second reading will make a' answer.*

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