Intertextuality and Joyce's "Oxen of the Sun" Episode in *Ulysses*: the Relation between Literary and Computational Evidence

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Résumé. Douze sections de *Oxen of the Sun* sont comparées à des extraits de l'œuvre de dix-sept auteurs ou groupes d'auteurs que Joyce a imités. L'intertextualité est considérée avec référence au contenu littéraire et à l'imitation du style. La discussion du style fait usage de « *Principal Component Analysis* » qui est appliqué à la fréquence d'usage des trente mots les plus communs dans *Oxen of the Sun*. Cette technique permet de faire une discrimination entre les imitations et les auteurs originaux et démontre que Joyce réussit ses imitations.

Keywords: James Joyce, *Ulysses*, intertextuality, literary and computational evidence.

Mots-clés : James Joyce, *Ulysses*, intertextualité, évidence littéraire et computationnelle.

On 25 February 1920 Joyce wrote to Harriet Shaw Weaver about the difficulty of writing the "Oxen of the Sun" episode of *Ulysses*.[1] He had begun to write the episode that month and on 20 March described his plan for it to Frank Budgen:

> Am working hard at Oxen of the Sun, the idea being the crime committed against fecundity by sterilizing the act of coition. Scene, lying-in hospital. Technique: a nine-part episode without divisions introduced by a Sallustian-Tacitean prelude (the unfertilized ovum), then by way of earliest English alliterative and monosyllabic and

[1] GILBERT (Stuart): 1966, ed. *Letters of James Joyce*, Vol. I (New York: Viking), p. 137.

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> Anglo-Saxon... then by way of Mandeville... then Malory's *Morte d'Arthur*... then the Elizabethan chronicle style... then a passage solemn, as of Milton, Taylor, Hooker, followed by a choppy Latin-gossipy bit, style of Burton-Browne, then a passage Bunyanesque... after a diarystyle bit Pepys-Evelyn... and so on through Defoe-Swift and Steele-Addison-Sterne and Landor-Pater-Newman until it ends in a frightful jumble of Pidgin English, nigger English, Cockney, Irish, Bowery slang and broken doggerel. This progression is also linked back at each part subtly with some foregoing episode of the day and, besides this, with the natural stages of development in the embryo and the periods of faunal evolution in general.[2]

The procedures that Joyce adopted in order to arrive at this range of styles are most fully documented by Robert Janusko. Two of the principal volumes that Joyce used were George Saintsbury's *A History of English Prose Rhythm* and William Peacock's *English Prose from Mandeville to Ruskin*. As he read through volumes such as these, Joyce jotted down quotations, which he sometimes emended; he might note down a single word, or a phrase, or occasionally a sentence. The notesheets that Joyce used in this process were transcribed by Phillip Herring. Many, but not all of the notes, are crossed through, usually an indication that Joyce had incorporated the note into his text. The "Bunyanesque" section contains a large number of notes almost exclusively taken from his reading of Bunyan. Again, notes from Defoe dominate the Defoe section. But in this process of incorporating notes into the text, Joyce did not always respect the section divisions that he had chosen and that he had described to Budgen. For example, the Mandeville section contains, in addition to notes from Mandeville, many notes from Malory and a couple from Wyclif; conversely, the Malory section has many Mandeville notes in it. Later in the episode, the paragraph beginning "To revert to Mr Bloom" (14:845), that Gifford (428) identifies as an imitation of Burke, takes its notes from a much greater number of authors: Johnson, Chesterfield, Hume, Gilbert White, South, Reynolds, and Bolingbroke, as well as from Burke. Indeed, it appears that there are only two Burke notes incorporated in the paragraph. So whilst some imitations are clearly based on a single author, others combine a range of authors not one of whom could be said to dominate that particular imitation.

Because the quotations that Joyce recorded on the notesheets were usually fragments they belong less firmly than do full sentences to any particular textual

[2] ELLMANN (Richard): 1966, ed. *Letters of James Joyce*, Vol. II (New York: Viking), p. 464.

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origin, but the strength of their relation to the origin varies considerably. A name such as Doady recalls *David Copperfield* but even unusual words, such as "anastomosis", "tester", and "leman" cannot be associated with a particular author. Other quoted words are not so striking but might well typify a particular text, such as Sterne's use of "affected" in *A Sentimental Journey through France and Italy* (in Joyce as "affecting" 14:762). Clearly, however, most of Joyce's quotations were not especially characteristic of an individual author and could have been used by many authors in many historical contexts. Macaulay's phrase "There the historian of the Roman Empire", which became on Joyce's notesheet "historian of Rome" (19:52), would not appear to be language distinctive of Macaulay. Similarly, the single word "voluptuous", on notesheet 19:53, from Macaulay's "There appeared the voluptuous charms of her to whom..." and which appears in Joyce's phrase "image of that voluptuous loveliness" scarcely points to Macaulay more clearly than to other authors. But another kind of quotation on these notesheets points to quite different Joycean strategies. Reading Macaulay's "Neither military nor civil pomp was wanting" Joyce writes on his notesheet (19:130) "neither *x* nor *y* was wanting". This quotation departs from the original by removing the content words, Joyce prompting himself to select his own presumably different words for *x* and *y*. Quotation, by moving words from one text to another always revises meaning to some extent, but quotation of this kind distorts radically, preserving only an element of syntactic structure. This shows Joyce's willingness to approach what we now call intertextuality through the use of syntactic structures stripped of the content words that were their most obvious conveyors of meaning. Joyce's quotation both obliterates the original meaning and yet preserves something of the original style. This strategy creates intertextuality of a kind fundamentally different from the quotation of a distinctive or striking content word.

How extensively did Joyce's writing reflect the strategy pointed to in the phrase "Neither *x* nor *y* was wanting"? Clearly, he tried to do more than pepper his text with uncommon words and phrases that might evoke a Bunyanesque, Gibbonian, or Macaulayan flavour. This article argues that by looking at the thirty most common words in "Oxen of the Sun", rather than the uncommon ones, readers can understand the extent to which Joyce's imitations distinguish between the stylistic features of the various targetted authors. Using statistical analysis of these common words this article will test the hypothesis that Joyce imitates his targetted authors with such subtle and fine attention to the details of language that his imitations can be discriminated from each other on the basis of these common words. For this purpose we have first selected twelve sections of "Oxen of the Sun" (listed in table 1).

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Table 1
Imitations and principal targetted authors

I	14:123–263	Mandeville, Malory, Berners, North
II	14:334–473	Bunyan
III	14:529–581	Defoe
IV	14:651–737	Addison, Steele
V	14:738–844	Sterne, Goldsmith
VI	14:845–941	Hume, Johnson, Junius, Chesterfield
VII	14:942–1009	Gibbon
VIII	14:1038–1109	Lamb, De Quincey
IX	14:1110–1173	Landor
X	14:1174–1222	Macaulay
XI	14:1223–1309	Huxley
XII	14:1379–1439	Ruskin, Carlyle

The primary evidence used to delimit and label these sections comes from the notes and quotations that Joyce incorporated into his text as well as from his own descriptions given to Budgen. Because of the way the Mandeville and Malory notes were used (as described above), and because notes from North and Berners, in particular, were also added, these imitations have been treated as one section. (For convenience we label this section JMandeville/ Malory.) Also because our methodology involves word frequencies we have either selected the longer imitations or sought to combine the shorter ones into groups, such as the eighteenth century group principally comprising imitations of Hume, Johnson, Chesterfield, and Junius. The shortest sections to stand alone are those that imitate Gibbon and Macaulay, but as Plot 4 shows, those two imitations are nevertheless located remarkably close to their targetted authors. In order to compare Joyce's imitations with his targetted authors, we have used the extracts from which Joyce made his notes, occasionally adding to them to make longer samples. Most of these extracts come from Peacock's anthology and Saintsbury's book. All of the texts are prepared for the computer programs by the separation of homographs, *i.e.* the distinguishing of the various forms of *that* (demonstrative pronoun, relative pronoun, conjunction), and *to* (preposition and infinitive). Following the method pioneered by Burrows, and also used by Craig, the texts are subjected to a technique of multivariate statistics known as Principal Component Analysis "which finds in order of importance the sets of weightings for the variables that account for the most significant variations in the data, sets of weightings that in effect isolate the most important 'dimensions' in it. The first two Principal Components can be plotted against each other to give a graph showing relationships between the variables in the data [see our Plot 1]; they can in turn form the basis of a map

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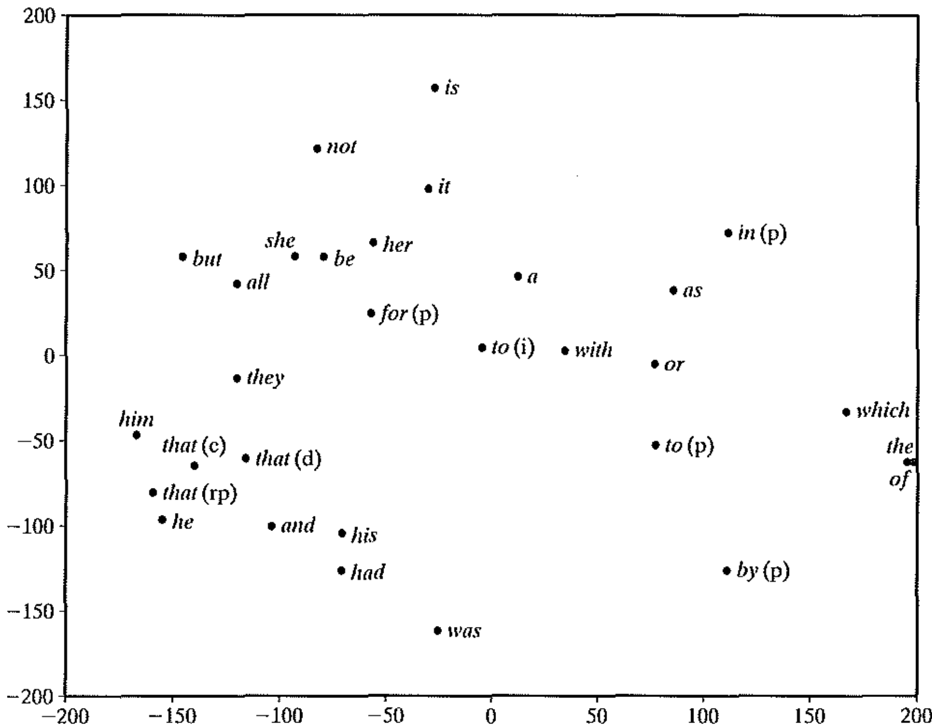

Plot 1.– Twelve Joyce Imitations and Targetted Authors
(for the 30 most common words of *Oxen of the Sun*)

of the samples" [see our Plots 2, 3, 4] (Craig 200).[3] In this present analysis the variables used are the thirty most common words in "Oxen of the Sun".

Plot 2 selects only seven of the sections and compares them with the targetted authors. The seven sections used in Plot 2 are those in which Joyce comes closest to the targetted authors; it ignores those sections where Joyce imitates less successfully. With these seven sections Joyce shows an ability to imitate very successfully each of the targetted authors. The plot reveals a striking pattern in which the imitations and targetted authors appear in the same west-east sequence so that although the chronological sequence is interrupted by Sterne's appearance between Bunyan and Addison/Steele and by Macaulay's location

[3] See Burrows: 1987, and Craig: 1992. The techniques of statistical analysis used in the Centre for Literary and Linguistic Computing, University of Newcastle, NSW, use Minitab (Univ. Pennsylvania); descriptions of the techniques appear in Burrows: 1992 a and 1992 b, and in Craig: 1992. The plots are produced using DeltaGraph, from DeltaPoint Inc., Monterey. For descriptions of Principal Component Analysis, see Chatfield and Collins: 1980, chapter 4.

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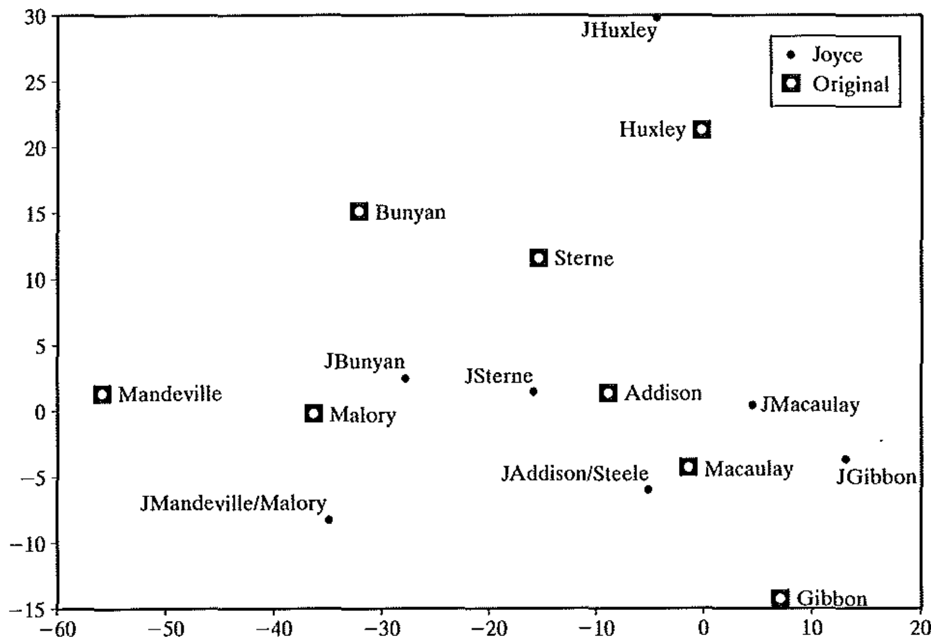

Plot 2.– Seven Joyce Imitations and Targetted Authors
(for the 30 most common words of *Oxen of the Sun*)

just to the west of Gibbon the Joyce imitations follow their targets into the "wrong" locations. The Huxley original and imitation both stand well apart in the north-east of the plot. For the older authors—Mandeville, Malory, Bunyan, Steele/Addison—Joyce's imitations always appear south of their targets, whilst with the later authors—Gibbon, Macaulay and Huxley—Joyce's imitations consistently appear north of their targets. In Plot 3 the twelve Joyce sections appear not alongside the targetted authors but alongside some of Joyce's own work: "The Dead", divided into six sections of approximately 2,500 words; and the first six episodes of *Ulysses*, divided into fourteen sections ranging from 2,000 to 3,500 words. This plot shows a clear discrimination between the styles of "The Dead", the early episodes of *Ulysses*, and the selected sections of "Oxen of the Sun". Three entries on this plot disrupt the pattern: the Landor imitation lies amongst the sections of "The Dead"; the Lamb/De Quincey imitation lies alongside the early episodes of *Ulysses*; and the fourth section of "The Dead" moves back towards the eighteenth-century sections—in our divisions this fourth section includes Gabriel's speech at the dinner table, a speech stylistically quite different from the rest of the story. Plot 4 shows more detail and

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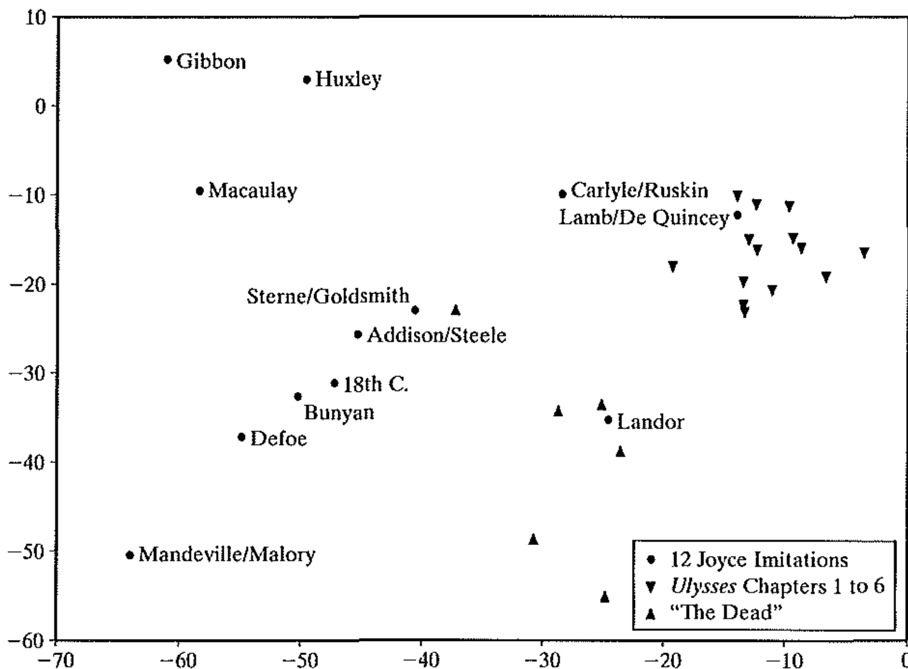

Plot 3.– Joyce as Author and Imitator
(for the 30 most common words of *Oxen of the Sun*)

more complex interrelations. In Plot 4 all twelve of the selected Joyce imitations are compared with the targetted authors (individuals or groups).

In his successive imitations of English prose Joyce brings various texts into a complex set of interactions, and "Oxen of the Sun" becomes a particularly rich example of intertextuality. In a passage such as that based on Macaulay (14 : 1174–1222), Joyce's text written in the Paris of 1920, set in the Dublin of 1904, evokes the Victorian context of Macaulay's own writing, specifically his account of the trial of Warren Hastings, which also evokes the late eighteenth-century, the period of the trial of Hastings, particularly relevant for its context of empire and colony; and, as throughout *Ulysses*, Joyce's text evokes the Homeric world of *The Odyssey*, here primarily the original "Oxen of the Sun" episode. The forms of relationship between Joyce's text and the other texts introduced by it vary considerably. The intertextual relations include quotation, as emended or not, allusion, parody, and stylistic imitation of an especially detailed kind. It is intertextuality of this last kind that the computer-based analyses of this article will concentrate upon. To demonstrate the detailed intertextuality of "Oxen of the Sun" the Macaulay imitation will serve as an example of the intricate

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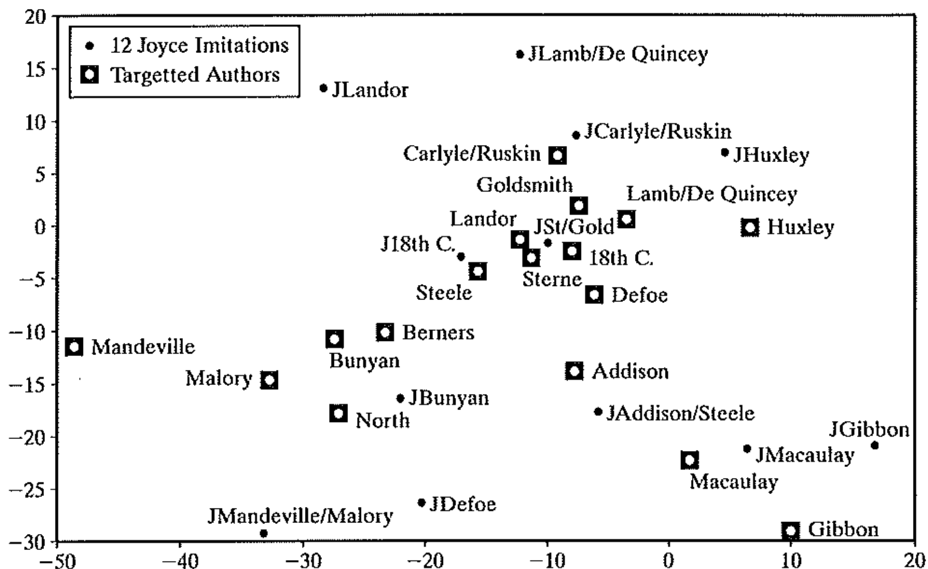

Plot 4.– Twelve Joyce Imitations and Targetted Authors
(for the 30 most common words of *Oxen of the Sun*)

Table 2

	the			*of*			*by*			*which*		
	Ratio	rk/12	rk/17	Ratio	rk/12	rk/17	Ratio	rk/12	rk/17	Ratio	rk/12	rk/17
MANDEVILLE	23.5		17	31.5		14	233		15	∞		17
MALORY	22		14	32.5		15	143		=5	715		16
JMand/Malory	25	12		23.6	7		91	2		191	8	
BUNYAN	17.5		8	36.9		16	340		16	262		12
JBunyan	20.4	10		28	10		116	4		102	4	
DEFOE	17.3		7	27.2		9	143		=5	118		4
JDefoe	17.3	6		29.4	11		120	5		240	9	
GIBBON	8.1		1	12.9		1	66		1	163		7
JGibbon	9	1		13.9	1		55	1		96	3	
MACAULAY	9.6		2	16.8		3	107		2	103		3
JMacaulay	11	2		16.9	2		148	6		74	1	
HUXLEY	12		3	15.3		2	208		13	63		1
JHuxley	14.2	4		20.9	5		114	3		79	2	
LANDOR	18.9		13	50.2		17	189		11	410		14
JLandor	18.4	8		36	12		173	7		288	10	

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Table 2 (continuation)

	that (rel.)			*that* (dem.)			*that* (conj.)			*and*		
	Ratio	rk/12	rk/17	Ratio	rk/12	rk/17	Ratio	rk/12	rk/17	Ratio	rk/12	rk/17
MANDEVILLE	63		1	97		1	53		1	12.1		1
MALORY	98		3	119		2	83		3	18.5		4
JMand/Malory	53	1		117	2		100	1		21.2	1	
BUNYAN	131		4	226		3	79		2	25.9		9
JBunyan	134	3		124	3		158	5		23.5	2	
DEFOE	453		10	386		14	109		4	24.9		8
JDefoe	105	2		152	4		129	4		26.2	3	
GIBBON	923		14	oo		17	308		16	17		2
JGibbon	∞	12		109	1		255	7		34.8	7	
MACAULAY	1548		15	258		7	141		9	24.2		6
JMacaulay	297	8		198	8		593	9		31.2	6	
HUXLEY	519		12	231		4	159		11	26.6		11
JHuxley	1025	11		1025	11		128	3		38	8	
LANDOR	2454		16	1230		16	205		14	23.7		5
JLandor	216	5		288	10		∞	=11		50.8	11	

The words, authors, and imitations included here are those most relevant to our accompanying discussion. Targetted authors are printed in capitals; Joyce's imitations are printed in lower case and prefaced by J.

Ratio: Words in text per occurrence of a particular word, *i.e.* the first column indicates that Mandeville uses *the* once in every 23.5 words in his text.

rk/12: Rank order of Joyce's twelve imitations based on word frequency counts. The first column shows that JMand/Malory (Joyce's imitation of Mandeville, Malory, North, and Berners) is ranked 12th amongst the imitations, *i.e.* it has the lowest use amongst the imitations.

rk/17: Rank order of seventeen targetted authors or groups of authors based on word frequency counts. The first column shows that Mandeville, ranked 17, uses *the* less than any other author or group of authors in this study.

Scores up to 50 include the first decimal point. With higher scores the decimal has been rounded up or down.

relationships that Joyce sometimes created between the *content* of his own text and that of his targetted authors, and this discussion will be followed by another detailing intertextuality as repetition of the most common linguistic detail. To illustrate this, our article will concentrate upon two parts of Plot 4: the authors in the south-eastern corner, Gibbon and Macaulay, and those in the south-western corner, Mandeville and Malory; it will focus on some of the words that most strongly influence their respective locations: for the south-east—*the*, *of*, *which*, *by*—and for the south-west—*and*, *that* (relative, demonstrative, conjunctive). Table 2 provides data on these words for selected authors and imitations.

In preparing for the Macaulay section Joyce read passages of Macaulay's prose both from Peacock's anthology (an account of the death of Charles II) and from Saintsbury (on the trial of Warren Hastings). Although Joyce made notes from both texts, those incorporated into his Macaulay section were almost

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all from Saintsbury and so it is Macaulay's account of the Hastings trial that has been used as Joyce's targetted text here (though we have used a longer section than that quoted by Saintsbury). Joyce's Macaulay section, especially the second paragraph, recalls Macaulay's original in several ways. In setting the scene for the trial of Hastings, Macaulay begins by asserting that "The place was worthy of such a trial", and he emphasises the long tradition of great occasions that had taken place there. He describes the royalty, aristocracy, ambassadors, and political leaders present, and he introduces those who will assume the principal roles in the trial—occasionally doing so not by mentioning a name but rather by mentioning attributes that will enable the informed reader to recognise the individual: "There appeared the voluptuous charms of her to whom the heir of the throne had in secret plighted his faith"; and "There the historian of the Roman Empire". Joyce emulates this strategy with successive references to "the young poet who found a refuge from his labours of pedagogy and metaphysical inquisition", to "that vigilant wanderer, soiled by the dust of travel and combat and stained by the mire of indelible dishonour", and to "the image of that voluptuous loveliness" (14 : 1214–22). This absence of names more easily enables Joyce to hint at links between his own characters and those in Macaulay's text: first, the reference to the wanderer Bloom alludes perhaps to Hastings (travel in India, the lasting damage of the accusations despite his innocence), and second the repetition of "voluptuous" which links Molly, who has enjoyed a not-so-secret liaison with Boylan, to the lady who has enjoyed a "secret" betrothal to the King.

Like Macaulay, Joyce sets the scene for what he claims will be an important debate and his parodic effect gains from the Hastings trial: "Neither place nor council was lacking in dignity", but this is the maternity hospital not the "great hall of William Rufus"; it is merely "the high hall of Horne's house" and an "establishment" quite different from the establishment assembled for the trial of Hastings. The lofty theme to be pursued by Joyce's debaters, the "keenest in the land", and in a language "so encyclopædic", exists in tension with the political significance of the Hastings trial, the eminence of those debaters, and the eloquence of their oratory. The "encyclopædic" language of Joyce's debates (*spermatozoa*, *nemasperms* and so on) no doubt contrasts with the rhetoric of men such as Burke and Pitt. Legal vocabulary—*proceedings*, *fact*—appears in Joyce's text, and legal rhetoric also influences the long sentences, such as that at 14 : 1190–97 where the attempted grandeur and multiple clauses merely narrate Bloom's care not to spill the beer he poured. The parody here encompasses not just the pretentiousness of Stephen and his companions but the inflated legal discourse and verbosity of those participating in the Hastings trial, which became notorious for the length of speeches delivered. The grandeur of the

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trial, suggested by the detail of the walls "hung with scarlet", is most pithily parodied in Bloom's staring at the Bass beer label, a label "calculated to attract anyone's remark on account of its scarlet appearance" (14:1184–5).

This relationship between the content of Macaulay's text and that of Joyce's complements the relationship between the most common words in their texts. To turn now to these most common words, Gibbon and Macaulay are easily the most frequent users of *the*, whilst Malory and Mandeville are amongst the lowest users. The rates of use of all four authors are matched with remarkable similarity in Joyce's imitations. The use of *the* ranges in the targetted authors from once in 8.1 words (Gibbon) and once in 9.6 (Macaulay) to once in 23.5 (Mandeville); in the imitations it ranges from once in 9 (Gibbon) and once in 11 (Macaulay) to once in 25 (Malory/Mandeville). If the comparison is extended to the third ranked user, Huxley, at once in 12, this rate is matched by the third ranked imitation at once in 14.2. As for *of*, in the imitations the highest ranked sections are the Gibbon and then the Macaulay; in the targetted authors the highest ranked users are again Gibbon and then Macaulay. The lowest user is Landor; the lowest use in the imitations is again in the Landor. The figures for the individual uses are remarkably similar: (figures represent words per occurrence of *of*) imitations—Gibbon 13.9, Macaulay 16.8, Landor 36; authors—Gibbon 12.9, Macaulay 16.8, Landor 50.2. This selection of figures shows that Joyce's pattern of use in the imitations often follows very closely that of the targetted authors.

The prominence of *the* in Gibbon and Macaulay as well as in Joyce's imitations of them relates to a descriptive prose providing a detailed historical account and considerable information. Just as Macaulay sets the scene for the trial so Joyce sets the scene for the debate, and of Joyce's two paragraphs on Macaulay, which are virtually identical in length, it is the second, on the setting for the debate that contains sixty percent of this imitation's use of *the*. In Joyce's Gibbon imitation, there is again a lot of information as the text details the range of topics discussed. Gibbon's account of the Roman emperor Commodus also bolsters use of *the* by the extra detail that comes from parallel noun phrases, or "antithetic balance" (Saintsbury 285): "the dignity of the emperor and the sanctity of the god". Gibbon, and Macaulay too, use these structures rather than the possessive form: the emperor's dignity and god's sanctity. Gibbon describes not the ostrich's long bony neck but rather "the long bony neck of the ostrich". Joyce employs these structures—"the voice of Mr Canvasser Bloom" (14:952), "the chair of the resident" (14:1209–10)—and by using a descriptive phrase either instead of a name, or sometimes with a name, adds to the frequency of definite articles: "the young poet", "the Scotchman", "the squat form of Madden" (14:1214, 1208, 1209). Prose of this kind clearly increases

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the frequency of *of* as well. These words do not exist as discrete entities, and the frequency pattern of one word bears upon that of others. Relationships of this kind strengthen the capacity of word frequencies to discriminate between styles, even when the texts used are as short as some of those in this study.

With the preposition *by*, the highest user is Gibbon, once in 66 words, and the Gibbon imitation is easily the highest user from amongst the imitations at once in 55. Macaulay is the second-ranked user at once in 107 words, but Joyce's imitation is the fifth-ranked imitation at once in 148 words. Oddly, Joyce's second highest use of *by* occurs in his Mandeville/Malory imitation, once in 91 words, even though Malory uses it once in 143 and Mandeville only once in 232. Part of the reason for this imitation's high frequency of *by* is that when Joyce identified a particular feature he sometimes responded to it by using it more frequently than did his targetted authors: he emulated Malory's use of "by cause", where modern English would use because, having written down on notesheet 7:27 "by cause of... but by cause". He used the phrase three times in his short imitation, as in "maugre his word by cause he still had pity" (14:264). He also wrote down Malory's "what by water and what by land" (notesheet 7:41) but used this phrase for the "what... what" structure as in "what with argument and what for their drinking" (14:216–17). With the exception of the "by cause" usage, all of Mandeville's and Malory's uses of *by* are followed by noun phrases. Joyce's imitation does likewise, whereas in other imitations he follows his authors' use of *by* with, for example, participles, or relatives ("by which"). In the most common use of *by* to designate an agent or instrument, it is accompanied by a noun phrase. Gibbon only uses it with noun phrases; his agents are mostly collective—Chinese, 400,000 soldiers, Moguls, foreign missionaries—and his instruments, which are more frequent, are more likely to be related to activities such as revolt, command, and overthrow, or concepts and qualities such as tradition, ambition, weakness, and power. Joyce's imitation matches Gibbon's frequency, but his agents are singular rather than collective, except for the Brandenburghers, and his instruments are of a different kind: impassioned plea, delinquent rape, mutual consent, preternatural gravity. In the Mandeville/Malory imitation, however, Joyce carries his imitation further by naming agents and instruments similar in kind to those named in Mandeville and Malory. Their agents and instruments include a goddess, or supernatural power such as enchantment, and are mostly abstract qualities such as subtle deceits, subtlety, craft, counsel of Merlin, adventure, grace, faith, advice, and greater reason. Natural forces such as sea, land, and water are also designated as well as objects such as spear and brother's hands. Joyce evokes a similar context with agents and instruments such as God, demons, warlock, magic

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(twice), potency of vampires, and aid of spirits. He names natural instruments such as wind, horn, and spear.

With the relative pronouns, Joyce's imitations are not so consistently successful. In general he uses *which* and *that* more frequently than do his targetted authors, and this is so, for example, in the particular case of Macaulay. The Macaulay section uses *which* more frequently than any other section, once in 74 words, compared to Macaulay himself, second highest of the targetted authors, at once in 103. The Huxley and Gibbon imitations have the next highest frequencies, the Huxley imitation at once in 79 well matched by Huxley's own frequency of once in 82 (the top ranked use amongst the targetted authors), and the Gibbon at once in 96 less well matched by Gibbon's own frequency of once in 163. Relative *which*, on the eastern side of the word-plot, marks the more modern authors rather than the older ones—it is infrequent both in North, once in 363, and Berners, once in 467, nonexistent in our Mandeville text, and rare in Malory, once in 715 words. All of Malory's uses occur with the definite article, as in "I shall give him the Table Round, the which Uther Pendragon gave me", a structure produced by Joyce in "moved by craft to open in the which lay strange fishes withouten heads" (14:150–1).

As for relative *that*, it is negligible in Macaulay, Gibbon, and Huxley as well as in Joyce's imitations of them. Despite a tendency to overuse relative *that*, Joyce avoided any significant discrepancy in these imitations. Relative *that*, on the western side of the word-plot, marks the older writers much more than the later ones, being frequent in Malory, once in 98 words, and most frequent of all in Mandeville, once in 63 words. Joyce's imitations recognise this by including relative *that* most frequently in the Malory/Mandeville imitation, once in 52 words, a frequency higher, however, than the highest use in the targetted authors (Mandeville's). Joyce overdoes it most, however, with Defoe, who uses relative *that* very little, once in 453 words, whereas Joyce's imitation uses it once in 105 words. Relative *that* is thus one of the words pushing Joyce's Defoe imitation far to the west of the original. It affects the Landor imitation in a similar fashion: Landor uses relative *that* negligibly, only one occurrence in our 2,454 word passage, whereas Joyce makes his Landor imitation the fifth highest user from amongst the imitations at once in 216 words. The heaviest users, such as Mandeville and Malory, use it for non-restrictive as well as restrictive relative clauses and Joyce's imitations also do this. A striking proportion, almost a third, of Malory's uses occur after antecedents that include a superlative: "the marvellest battle that", "the goodliest person that... the meekest man and the kindest that ever". Joyce borrowed this structure in "the goodliest guest that ever sat in scholars' hall and that was the meekest man and the kindest that" (14:182–3), and used it again in "he was the most drunken that" (14:194).

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With demonstrative pronoun *that*, Joyce's imitations generally use the word more often than the targetted authors. The older authors are the heaviest users: Mandeville once in 97 words, Malory once in 119, Bunyan once in 225, and North once in 243. Joyce's most frequent use occurs in the imitations of Mandeville/Malory, once in 117, Bunyan, once in 124, Defoe, once in 152, and Gibbon, once in 109. The Gibbon imitation errs in this usage since in our Gibbon texts not one usage occurs. The Defoe imitation also errs, using the word considerably more often than Defoe himself, who uses it once in 386 words—it's another word helping to push the Defoe imitation west of its target.

The pattern of use for conjunctive *that* is similar in that Mandeville, once in 53 words, and Malory, once in 83, are again high users; Joyce's Mandeville/Malory imitation has his highest use at once in 100 words. Bunyan is also particularly high in use of conjunctive *that*, once in 79 words. Gibbon is low, once in 308, matched by Joyce's imitation at once in 255 (but this represents only three uses). Joyce's imitation of Macaulay contains only one use, whereas in our Macaulay text conjunctive *that* occurs once in 141 words. This needs further comment. Saintsbury suggested that Macaulay had "two styles, which he sometimes mixed, but also sometimes kept apart" (370–71). He gives examples of both. The second example includes *that* used as a conjunction; Saintsbury's first example, the setting of the scene for the trial of Hastings contains not a single conjunctive *that*, and it is, we believe, this first style that Joyce sought to imitate (the notes he incorporated were almost all from this example). Our Macaulay text for this analysis takes paragraphs from both before and after Saintsbury's text, and in them, especially in introducing reported speech, Macaulay uses conjunctive *that* and so arrives at the frequency recorded.

With the conjunction *and*, Joyce again follows his targetted authors closely. Saintsbury (64) pointed out Mandeville's habit of starting sentences with *and*, and in the passage he quotes most sentences do begin with *and*, and the others with *for* or *but*. In the first three paragraphs of the Mandeville/Malory imitation, almost every sentence begins with *and*; one begins with *also*, another with *but*, and one more with *thanked*. Mandeville is the most frequent user, once in 12.1, followed by Berners, once in 17.3, Gibbon once in 17, and Malory once in 18.5. Joyce's most frequent use in the imitations occurs appropriately in the first one, the Mandeville/Malory imitation. His imitations also stay very close to the relatively high frequencies in Bunyan, once in 25.9, and Defoe, once in 24.9; Joyce imitates them respectively with once in 23.5, and once in 26.2. The odd man out is again Gibbon. He does not start sentences with *and*, nor does he very often start a new clause with *and*, but he very frequently uses *and* to join two verbs "prayed and fasted", or two nouns "demand and denial", or two noun

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phrases or adjectives. Joyce's imitation responds to this to some extent, his use of *and* being much higher for Gibbon than for any other eighteenth-century author he targetted, through uses such as "miscarriages and infanticides", "ardently and ineffectually entertained", "juridical and theological dilemma", "unanimous exhaustion and approbation". As with Gibbon, it is primarily used to join two nouns, noun phrases, or adjectives.

In order to explain the whole of our text-plots and word-plot, an analysis of each of the thirty words in each of the imitations and targetted authors would be required, because each word contributes to the final locations of each imitation and targetted author, but the selected details provided here demonstrate just how sensitive Joyce's imitations are to the basic syntactic structures and common words used by his targetted authors. The intertextual tensions extend beyond allusions, parodies, quotations, commentaries, beyond the relationships that our cognitive processes can most readily recognise, and embrace some of the most common elements of the various discourses, spread out across several centuries, that Joyce imitated.

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Bibliography

BURROWS (J.F.): 1987, *Computation into Criticism: A Study of Jane Austen's Novels and an Experiment in Method* (Oxford: Clarendon).

BURROWS (J.F.): 1992 a, "Computers and the Study of Literature", in BUTLER (C.S.) ed. *Computers and Written Texts* (Oxford: Blackwell).

BURROWS (J.F.): 1992 b, "Not Unless You Ask Nicely: The Interpretative Nexus Between Analysis and Information", *Literary and Linguistic Computing*, vol. 7 n° 2, pp. 91–109.

CHATFIELD (Christopher) and COLLINS (Alexander J.): 1980, *Introduction to Multivariate Analysis* (London: Chapman).

CRAIG (D.H.): 1992, "Authorial Styles and the Frequencies of Very Common Words: Jonson, Shakespeare, and the Additions to *The Spanish Tragedy*", in *Style*, Vol. 26, N° 2, pp. 199–220.

GABLER (H.W.): 1984, *Ulysses* (New York: Garland).

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XXX, 1 à 4, 1994. C.I.P.L. - Université de Liège - Tous droits réservés.

GIFFORD (D.) and SEIDMAN (R.J.): 1988, *Ulysses Annotated: Notes for James Joyce's Ulysses* (Berkeley: University of California Press).

HERRING (Phillip F.): 1972, ed. *Joyce's Ulysses Notesheets in the British Museum* (Charlottesville: University Press of Virginia).

JANUSKO (Robert): 1983, *The Sources and Structures of James Joyce's "Oxen"* (Ann Arbor: UMI Research Press).

PEACOCK (W.): 1903, *English Prose from Mandeville to Ruskin* (London: Oxford University Press).

SAINTSBURY (George): 1912, *A History of English Prose Rhythm* (London: Macmillan).

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