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Equidistant Letter Sequences in Tolstoy's "War and Peace"

In [WRR1], Witztum, Rips and Rosenberg found a surprising correlation between famous rabbis and their dates of birth and death, as they appear as equidistant letter sequences in the Book of Genesis. We make a smaller or equal number of mistakes, and find the same phenomenon in Tolstoy's eternal creation "War and Peace".

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1. Introduction

Our inspiration comes fully from reading the paper [WRR1] by Witztum, Rips and Rosenberg (WRR). The outline of the story in [WRR1] is as follows:

- WRR (along with Prof. S.Z. Havlin) prepared a list of very famous rabbis and a list of dates that pertain to these rabbis, and found that equidistant letter sequences (ELSs) for certain appellations for these rabbis appear relatively near to ELSs for their corresponding dates in the Book of Genesis. To make their research completely objective, they chose the appellations and dates using a rigid procedure that leaves little or no choice. They specified all selection, identification and spelling rules in their paper [WRR1]. (We note that in [Hav], written more recently, Havlin acknowledges making many mistakes in preparing the list and says that if he were to do it again, he would have done it differently. Some further comments on the inconsistency and absolute arbitrariness of the WRR-Havlin list and on [Hav] were made by Prof. Menachem Cohen of the department of bible in Bar-Ilan University. See [Co1]).
- Just to be sure, a referee who read [WRR1] asked that a second list of famous rabbis (and corresponding dates) be made, using exactly the same procedure. WRR did just so (again with help from Prof. Havlin), and noticed the same unlikely proximity of ELSs for appellations and for dates, using the same method of study as in the case of the first sample of rabbis.
- A statistical study of the proximities for the second sample of rabbis gave a significance level of $4/10^6$

(using their "P_4-score"). There is no way WRR (or Prof. Havlin) could have produced these results by fine tuning the choices of names and spellings, as these choices were made following rigid procedures that were established and refereed before a referee suggested making the second list. So, believing all that, we are forced to conclude that something truly unusual is going on in the Book of Genesis.

The purpose of this note is to show that WRR-Havlin still had some choice in applying their "rigid" procedures - enough choice to generate comparable significance levels in War and Peace. We do this by purposefully constructing our own list of appellations, staying within the WRR-stated rules or breaking them by about as much as they did. If one can find a list of appellations that works well on War and Peace (and pretty badly on Genesis), the only remaining reason to believe WRR-Havlin is personal trust in the cleanliness of the procedures they used to determine the list of appellations (and the other aspects of their experiment). While many beliefs are founded on trust bestowed on a very small group of prophets or apostles, such beliefs are often false, contradictory or absurd, and are definitely outside what one would normally call "science".

1.1. Acknowledgement

We wish to thank Maya Bar-Hillel, Menachem Cohen, Alec Gindis, Gil Kalai, Elchanan Reiner, Shlomo Sternberg, and the others who helped, for their suggestions and support.

2. Their choices, our choices

In [WRR1], WRR write:

> The list of appellations for each personality was provided by Professor S.Z. Havlin, of the department of bibliography and librarianship at Bar Ilan University, on the basis of a computer search of the "Responsa" database at that university.

Contrary to what is suggested by the above quote, many of the appellations WRR do not even appear in the Bar-Ilan Responsa database [Re]. Thus in addition to the Responsa database [Re] we will also refer to the Margalioth Encyclopedia [Marg], used by WRR to select the rabbis, and to the highly-regarded Encyclopedia Hebraica [Heb] used by WRR in several of their other investigations. We (like WRR) also use other sources as needed.

2.1. Modifications to specific appellations

1. We've added the appellation ראב"ד שני for Rabbi II-1 (the first rabbi in WRR's second list of personalities), Rabbi Avraham, Av-Beit-Din of Narbonne. A variant of this appellation that includes the definite article, הראב"ד השני, is the header of Rabbi Avraham's entry in [Az] It separates Rabbi II-1 from Rabbi I-1 (the first rabbi in WRR's first list of personalities), הראב"ד, the Ra'avad of Posquieres.
2. The word המלאך (the angel) is an adjective, and not a last name. It is used in relation to several rabbis and even more often, it is used in relation with "real" angels (the angel of death, the angel Gabriel, the angel who struggled with Jacob, etc.). By itself, the word המלאך does not refer to Rabbi II-3, Rabbi Avraham. It is inconsistent to use this as an appellation for Rabbi Avraham, while at the same time not using החסיד (the Hasid, the pious) for Rabbi I-11, Rabbi Yehuda haHasid (the word החסיד at least always refers to a human...). Thus we remove the appellation המלאך.
3. Rabbi II-6, Rabbi Eliezer Ashkenazi, is sometime called after his book titled "מעשי ה". The variant מעשי י/ה/ו/ה is never written or pronounced, so we have removed it from the WRR lists and instead inserted the widely used appellations מעשי ה and בעל מעשי ה.

4. According to [WRR1], they use grammatical orthography, כתיב דקדוקי, for the spelling of Hebrew words. This rule cannot be applied to the last name of Rabbi II-7, Rabbi David Oppenheim, whose origin is in the Yiddish or German language and not in Hebrew. Yiddish words are spelled in Hebrew letters, and, WRR say, "there is no need to transliterate" them. Hence we replace their אופנהים (Oppenhim) with the commonly used form, אופנהיים, which is used in their source encyclopedia [Marg]. In Responsa, אופנהים appears once, while אופנהיים appears over 50 times, including a number of times as Rabbi David Oppenheim's own signature! See also [Az] and [Ab, page 40, 1st col., bottom].
5. Widely used acronyms sometimes acquire the status of a word, and are used as if they were a word. A good example is the acronym/word AIDS. When reading it, we do not expand it to "Acquired Immune Deficiency Syndrome". Following common practice, WRR use such "pronounced" acronyms as appellations. Rabbi I-29, the Rambam, is best known as הרמב"ם, and not by his full name, and it is reasonably included as an appellation in their first sample. But they are inconsistent about the use of acronyms that did not attain the status of a word. They have used הראב"י, בעל הלק"ט, הריעב"ץ, א"ח הע"ר and a few other such acronyms, but they have left out acronyms such as הרב ז"א, מהרי"ם, מהרח"א, etc. We have done the same, removing one of their acronyms and adding two new ones: we have removed הריעב"ץ (Rabbi II-24, the Yaabez), and added המהרח"א and מהרח"א (Rabbi II-10, Rabbi Haim Abulafia). The last acronym appears very often in the Bar-Ilan Responsa Database [Re], it is used in [Az], and its omission in [WRR1] is especially questionable.

The convergence of המהרח"א and his date of death, ו ניסן, in War and Peace.

6. In [Hav], Prof. Havlin described the methodology he employed in producing the list of appellations. In his report he acknowledged a few omissions he made in the original list. One of those omissions is the appellation הרב חבי"ב for Rabbi II-11, Rabbi Haim Benvenist(e). Thus we have added הרב חבי"ב to our list, with and without the definite article ה. We have also added the widely used הרב החבי"ב.
7. The appellations בנבנשת and בנבנשתי are both used for Rabbi II-11, Rabbi Haim Benvenist(e). WRR chose בנבנשת, we choose בנבנשתי. (Incidentally, בנבנשתי appears in Responsa more than בנבנשת, in roughly a 3:1 ratio).
8. The last name of Rabbi II-12, Rabbi Haim Capusi, can be spelled either כפוסי or כאפוסי (In Responsa, they appear in an 8:3 ratio, which indicates quite clearly that both spellings are valid). WRR state explicitly in [WRR1] that in such cases they use both spellings. But in their list they took only the first form. For our list, we make the opposite mistake and take only the second form.
9. The two forms בעל נס and בעל הנס are most often associated with Rabbi Meir, whose grave is near Tiberias, rather than with Rabbi II-12, Rabbi Haim Capusi. The vast majority of references to בעל הנס in Responsa refer to Rabbi Meir and not to Rabbi Haim Capusi, and we found no references to Rabbi Haim Capusi as "בעל נס". (Responsa does refer to this Rabbi often; see the previous point). We note that on several occasions Havlin ruled out an appellation for a certain personality because it was more closely associated with some other personality (see [Hav]). Hence we remove the appellations

בעל נס and בעל הנס.

10. Rabbi II-15 is Rabbi Yehuda Hasid Segal. WRR omitted the appellation יהודה סג"ל, his first name + his last name (notice that according to [WRR2], WRR always take appellations of this form, when it is available). So we add יהודה סג"ל to our list. See also [Marg].
11. We add the appellation הר"י טראני to Rabbi II-19, The Maharit, along with the variations ר"י טרני, טרני הר"י, and ר"י טראני. This puts the Maharit in a similar status with the Yaabez.

The convergence of טראני and his date of death, י"ד תמוז, in War and Peace.

12. We've added the appellation מימונגיל for Rabbi II-21, Rabbi Yaakov Beirav. It is his last name by his own testimony, see [Be, ס' א']. See also the article [Gr], where the same source ([Be, ס' א']) was used to determine Rabbi Beirav's last name. [Gr] says the name is מיאנגיל. Given the explicit "מימונגיל" in [Be, ס' א'], the "מיאנגיל" in [Gr] must be a typographical error.

The convergence of הריב"ר and his date of death, ל בניסן, in War and Peace.

13. The last name of Rabbi II-22, Rabbi Israel Yaakov Hagiz, can be spelled either חגיז (as in [Heb] and as in the biographical section of [Re]) or חאגיז (as in [Marg]). But WRR use only חאגיז, contrary to their explicit convention that where א is used as a "mater lectionis", they take both forms. Thus they fail to use the appellations מהר"י חגיז and ר"י חגיז (both appear in Responsa). We allow ourselves to make the opposite mistake, taking the appellations מהר"י חגיז and ר"י חגיז and omitting חאגיז. We note that even though the WRR computations are restricted to appellations totaling 5-8 letters, we can tell

which 'short' appellations (such as חגיז, עמדן, or מולן) they consider as valid either by checking whether they have used longer appellations that contain the shorter ones as substrings or by reading their "blue preprint" [WRR2], in which the short forms are also listed.

14. For Rabbi I-31, The Shach, WRR use both the appellation שבתי כהן and the appellation שבתי הכהן. We follow suit, and for Rabbi II-23, the Maharil and Rabbi II-25, Rabbi Yitshak Horowitz, we use both לוי and הלוי. Thus for Rabbi II-23 we add the appellations יעקב לוי and מהר"י לוי on top of the existing הלוי יעקב and מהר"י הלוי, and for Rabbi II-25 we add יצחק לוי on top of the existing יצחק הלוי.
15. In the case of Rabbi II-24, the Yaabez, we do not use appellations based around the spelling עמדן for two reasons. They appear less often, and we wish to follow the precedent set by WRR when they did not use the form מולן with Rabbi II-23, the Maharil. (The appellations יעקב מולן, מהר"י מולין, etc., appear often in Responsa, more often than forms with עמדן, and were omitted in [WRR1]. See also [WRR2]).

    We note that there may be a case for removing the name עמדין altogether, for it is just the name of a town were the Yaabez was briefly a Rabbi, and not his last name. The Yaabez himself wrote in [Ya],

    ...הטרוד יעקב ישראל מכונה יעב"ץ ס"ט לא נקרא מעולם יעקב עמדין
    (כאשר עשה מכ"ת אדרעס ע"ג האגרת כמו שהרגיל התועב שר"י בפי
    הבריות) ידוע שאינני מבני עמדין לא נולד בה ולא מצפה לראות' אך
    מבקש טובת' ותועלת' כמאז ומקדם בהיותי רובץ תחת משאה, ככה עתה
    אני שוקד על תקנת'...

    In free translation to English, this reads:

    > ... The busy Yaakov Israel known as Yaabez good omen was never called Yaakov Emdyn (עמדין) (as has done the honourable in the address on this letter as is the deplorable habit in the tongues of the people). It is known I am not from the people of Emdyn, was not born there, do not expect to see it, but am looking after its welfare and benefit as in the former times when I was under it's load, [and] so also am I now diligent for it's remedy. ...

    Little did his plea help, and the Yaabez has several common appellations which are variants of the word עמדין. We keep them in our list.
16. WRR are inconsistent about the use of the definite article, ה. For example, they use הר"י עמדן and הר"י עמדין for Rabbi II-24, but omit ר"י עמדן and ר"י עמדין. (The latter two forms appear in Responsa more often than the former two!) We fix this mistake and allow ourselves to make a parallel mistake, and omit the appellation המהרש"ש for Rabbi II-31, Rabbi Shalom Sharabi, while keeping the appellation מהרש"ש.
17. The last name of Rabbi II-25, Rabbi Yitshak HaLevi Horowitz, is spelled הורוביץ by both [Marg] and [Heb]. We thus replace הורוויץ by הורוביץ.
18. The Krochmal Story: We suspected that there's something wrong with the name קרוכמל for Rabbi II-26, Rabbi Menachem Mendel Krochmal, author of the responsa book צמח צדק and of the biblical commentary פי צדיק. So we started searching. The word קרוכמל does not appear in the Bar-Ilan Responsa database [Re]. The only variation of קרוכמל that does appear there is קראכמאל, which appears only twice. But in both appearances it is the Yiddish word for starch, and not a Jewish surname. And it is not because [Re] doesn't care about Rabbi Menachem Mendel; the Rabbi appears in [Re] many times, but only under his other common designations. In [Marg], קרוכמל is in the header of Rabbi Menachem Mendel's entry, but no explanation for the origin of the name is given. In [Heb] Menachem Mendel doesn't even have an entry, though the index mentions him twice. Looking inside the text, we got no further clues. His books are signed מנחם מענדל and מנחם מענדיל, and no קרוכמל is mentioned in them in any form. An eulogy for him [Shm] mentions only his first name(s), מנחם מענדיל, and the titles of his books. So where did "קרוכמל" come from? [Az] was of no help. In the 19th century bibliography [B-Y] one of Krochmal's books is listed under קראכמעל. In a 19th century biography [Du] of David Oppenheim, Krochmal is mentioned in passing, and his name is given as קראכמאל. We are

almost certain we also saw קרוכמאל and קרוכמעל, but after a long day in the Israeli National Library in Giv'at-Ram, the stairs leading to the photocopy machines seem very steep and the pencil becomes really heavy, so we don't have references for these two forms. The 19th century Rabbi Nahman Krochmal spells his name קרוכמאל. All of that taken together indicates clearly that Krochmal was not spelled "קרוכמל" in the 19th century, but it doesn't help us find how Krochmal was spelled when Rabbi Menachem Mendel lived, in the first part of the 17th century.

At this point we got the advice of two wise men. One suggested that we look at [Hei], a book on the Jewish laws in the state of Moravia, where Rabbi Menachem Mendel was the state's Rabbi. From the other wise man we learned to check the citations in the footnotes. One footnote, on page 111 of [Hei], he checked himself. It lead to an article [Marx], that contain a letter written by the son of a nephew of Rabbi Menachem Mendel in the late 17th century, only a few dozen years after Rabbi Menachem Mendel died in 1661. In that letter Rabbi Menachem Mendel's surname is given as קראחמאל. The following day (and a continent away), we checked the footnote on page 102. It lead us to two articles, [Har] and [Ka], devoted to our Rabbi and his descendents. Both articles use the spelling קראכמאל extensively and not just in passing, and the latter one even explains where the name comes from! It relates the name קראכמאל to a certain earlier Dayan, Rabbi Jonah Krochmals in the city of Cracow, where Rabbi Menachem Mendel was born. A transcript of the tombstone of Rabbi Jonah Krochmals is given in [Zo, page 180] and Krochmals is spelled קראכמאלש there. Thus there is no doubt that the original spelling of the name Krochmal is קראכמאל and we remove the appellation קרוכמל from our list, putting קראכמאל instead.

Note that here we corrected new to old, while in the case of Rabbi II-25, Rabbi Yitshak HaLevi Horowitz we corrected old to new. Whatever inconsistencies WRR have we are allowed to have too.

We also note that once it is clear that קראכמאל is an acceptable spelling for Krochmal, the usage of this spelling is mandatory according to the WRR rules, which state explicitly that Yiddish names are spelled as in the original Yiddish. Recall that קראכמאל is a Yiddish word.

19. The last name of Rabbi II-27, Rabbi Moshe Zacut, is זכות, and not זכותא or זכותו. See his own signatures in his book קול הרמ"ז, see his biography [Ap], and see [Marg], [Heb], and [Az]. Hence we remove the appellations זכותא, זכותו, משה זכותא, and משה זכותו.
20. Often great rabbis are called after their books. Thus we add the appellation הון עשיר for Rabbi II-30, Rabbi Immanuel Hai Ricchi. We comment here that the appellation הון עשיר appears often in [Re], while the appellation ישר לבב does not appear there at all, not even in its correct form, יושר לבב (the phrase יושר לבב does appear several times, sometimes even in reference to Rabbi Ricchi's book. But it is never used as an appellation).
21. The story of the appellation א"ח הע"ר of Rabbi II-30, Rabbi Immanuel Hai Ricchi, is particularly telling. First, we couldn't find it anywhere, and nobody we asked could tell us what it meant. When we inquired with Doron Witztum, he said Rabbi Ricchi used it as his signature in some of his books, and that it expands to "אני חי, הצעיר עמנואל ריקי" (I'm alive, the young Immanuel Ricchi). We think the inclusion of such an acronym is extremely silly. It is a signature; not an appellation. Nobody should refer to Rabbi Ricchi by this name other than himself, not even the author of the hidden codes in the Book of Genesis (see a parrallel in [Ab, page 40, 2nd column, top]). Anyway, it seems that nobody does refer to Rabbi Ricchi by this name, for we could find no such references and we could find no one who even knows what it means! In particular, it is not "pronounced", נהגה.

The story doesn't end there. When we tried to find א"ח הע"ר as a signature in Rabbi Ricchi's books, we failed. What we did find was a different permutation of these letters, אהע"חר, which appears with its expansion, אני הצעיר עמנואל חי ריקי (me the young, Immanuel Hai Ricchi). We note that in Hebrew the latter expansion makes much more sense than the former, and that the dictionary of acronyms [AY] lists the latter acronym but not the former. Including "אהע"חר" as an appellation is senseless for the same reasons as above, but it still makes more sense than including "א"ח הע"ר". So we deleted "הע"ר

א"ח" and inserted "אהע"חר".

After the first version of this note was widely circulated, we finally found a single reference to the variation א"ח הע"ר, in [Shi]. That source refers to an acronym that appears as a signature on an addendum, only available in Zurich, to Rabbi Ricchi's book "מעשה חושב". Neither the original edition of that book, nor any of his other books that we checked, contain that acronym; the original edition of "מעשה חושב", like many of Rabbi Ricchi's other books, contains אהע"חר. We don't have the resources to check the manuscript in Zurich, so at the moment we don't know if the acronym א"ח הע"ר really appears there or if [Shi] copied it with the ח misplaced. However, we can see two things clearly: if the acronym א"ח הע"ר exists at all it is a signature and not an appellation, and the WRR claim to have admitted only widely used pronounced acronyms is false.

22. The sources [Heb], [Marg] , [Az], and [Re] never refer to II-31, Rabbi Shalom Sharabi, as שר שלום, and we found at least 7 other rabbis that carry the name שר שלום (and that are referred to by this name extensively). Some of these 7 are much earlier than Rabbi II-31. Thus the appellation שר שלום certainly does not identify שר שלום and hence we remove it. WRR do the same in similar situations; see [Hav].
23. The appellation מזרחי for Rabbi II-31 is identified with a Rabbi from the Rishonim. We remove it. Notice that מזרחי is not the last name of Rabbi Sharabi, and is related to him just like the name אשכנזי relates to Rabbi I-6, Rabbi Gershon Ashkenazi and to Rabbi II-6, Rabbi Eliezer Ashkenazi. In both those cases WRR did not use the appellation אשכנזי.
24. The last name of Rabbi II-32, Rabbi Shelomo Chelma, can be spelled either as חלמא or as חעלמא. See the header to his entry in WRR's source encyclopedia, [Marg], and see his biography [Br] (one can say that Rabbi Chelma's last name is חעלמא, and that the letter ע is "mater lectionis"). Thus we wish to add the appellations חלמא, חעלמא, שלמה חלמא, and שלמה חעלמא. In practice we only add חעלמא and שלמה חלמא, for the other two appellations do not fit within 5-8 letters.

The convergence of חעלמא and his date of death, בתמוז כ"א, in War and Peace.

2.2. Modifications to the list of personalities

We make the following additional changes to the list produced by WRR:

- We remove Rabbi II-20, Rabbi Yosef Teomim. His entry in [Marg] has less than 1.5 columns, contrary to the selection criteria of [WRR1].
- We add to our list a new Rabbi, Rabbi Meir Eisenstadt. His entry in [Marg] has exactly 1.5 columns, and by the criteria of [WRR1], he should have been included. His common appellations are רבי מאיר, איזנשטט, אייזנשטאט, איזנשטאט, and מהר"מ א"ש. His date of death is the 27th of Sivan, written in the forms כ"ז סיון, בכ"ז סיון, and כ"ז בסיון.

- We remove Rabbi II-4, Rabbi Avraham Saba and Rabbi II-8, Rabbi David Ha-Nagid. Both rabbis have no dates attached. Keeping them means adding random noise, and random noise is not what we are trying to measure.

2.3. Our list of appellations

The resulting new list of appellations is given in the table below:

The old and new lists, a comparative table				
#	Original entry	we remove	we add	new entry
1	האשכול, הראב"ד, הראב"י, הרב אב"ד, רבי אברהם		ראב"ד שני	האשכול, הראב"ד, הראב"י, הרב אב"ד, ראב"ד שני, רבי אברהם
2	זרע אברהם, יצחקי, רבי אברהם			זרע אברהם, יצחקי, רבי אברהם
3	המלאך, רבי אברהם	המלאך		רבי אברהם
4	אברהם סבע, צרור המר, רבי אברהם			--- completely removed ---
5	רבי אהרן			רבי אהרן
6	מעשי השם, מעשי י/ה/ו/ה	מעשי י/ה/ו/ה	בעל מעשי ה', מעשי ה'	בעל מעשי ה', מעשי ה', מעשי השם
7	אופנהים, רבי דוד	אופנהים	אופנהיים	אופנהיים, רבי דוד
8	דוד הנגיד, רבי דוד			--- completely removed ---
9	דוד ניטו, רבי דוד			דוד ניטו, רבי דוד
10	רבי חיים		המהרח"א, מהרח"א	המהרח"א, מהרח"א, רבי חיים
11	בנבנשת, רבי חיים	בנבנשת	בנבנשתי, הרב החבי"ב, הרב חבי"ב, רב חבי"ב	בנבנשתי, הרב החבי"ב, הרב חבי"ב, רב חבי"ב, רבי חיים
12	בעל הנס, בעל נס, כפוסי, רבי חיים	בעל הנס, בעל נס, כפוסי	כאפוסי	כאפוסי, רבי חיים
13	המהרח"ש, חיים שבתי, מהרח"ש, רבי חיים			המהרח"ש, חיים שבתי, מהרח"ש, רבי חיים
14	חות יאיר			חות יאיר
15	רבי יהודה		יהודה סג"ל	יהודה סג"ל, רבי יהודה
16	מהר"י עיאש, רבי יהודה			מהר"י עיאש, רבי יהודה
17	רבי יהוסף			רבי יהוסף
18	מגני שלמה, רבי יהושע			מגני שלמה, רבי יהושע

The old and new lists, a comparative table				
#	Original entry	we remove	we add	new entry
19	המהרי"ט, המהרימ"ט, טראני, יוסף טרני, מהרי"ט, מהרימ"ט, מטראני, מטרני, רבי יוסף		הר"י טראני, הר"י טרני, ר"י טראני, ר"י טרני	המהרי"ט, המהרימ"ט, הר"י טראני, הר"י טרני, טראני, יוסף טרני, מהרי"ט, מהרימ"ט, מטראני, מטרני, רבי יוסף, ר"י טראני, ר"י טרני
20	פרי מגדים, רבי יוסף, תאומים			--- completely removed ---
21	הריב"ר, יעקב בירב, מהר"י בירב, רבי יעקב		מימונגיל	הריב"ר, יעקב בירב, מהר"י בירב, מימונגיל, רבי יעקב
22	בעל הלק"ט, חאגיז	חאגיז	מהר"י חגיז, ר"י חגיז	בעל הלק"ט, מהר"י חגיז, ר"י חגיז
23	המהרי"ל, יעקב הלוי, יעקב סג"ל, מהר"י הלוי, מהרי"ל, מהר"י סג"ל, מולין, רבי יעקב		יעקב לוי, מהר"י לוי	המהרי"ל, יעקב הלוי, יעקב לוי, יעקב סג"ל, מהר"י הלוי, מהרי"ל, מהר"י לוי, מהר"י סג"ל, מולין, רבי יעקב
24	היעב"ץ, הר"י עמדין, עמדין, הר"י עמדן, עמדין	הריעב"ץ, הר"י עמדן	ר"י עמדין	היעב"ץ, הר"י עמדין, עמדין, ר"י עמדין
25	הורוויץ, יצחק הלוי, רבי יצחק	הורוויץ	הורוביץ, יצחק לוי	הורוביץ, יצחק הלוי, יצחק לוי, רבי יצחק
26	צמח צדק, קרוכמל, רבי מנחם, רבי מענדל	קרוכמל	קראכמאל	צמח צדק, קראכמאל, רבי מנחם, רבי מענדל
27	המהרמ"ז, המזל"ן, זכותא, זכותו, מהרמ"ז, מהר"ם זכות, משה זכות, משה זכותא, משה זכותו, קול הרמ"ז, רבי משה	זכותא, זכותו, משה זכותא, משה זכותו		המהרמ"ז, המזל"ן, מהרמ"ז, מהר"ם זכות, משה זכות, קול הרמ"ז, רבי משה
28	מרגלית, פני משה, רבי משה			מרגלית, פני משה, רבי משה
29	רבי עזריה			רבי עזריה
30	א"ח הע"ר, ישר לבב	א"ח הע"ר	אהע"חר, הון עשיר	אהע"חר, הון עשיר, ישר לבב
31	המהרש"ש, מהרש"ש, מזרחי, רבי שלום, שרעבי, שר שלום	המהרש"ש, מזרחי, שר שלום		מהרש"ש, רבי שלום, שרעבי
32	רבי שלמה		חעלמא, שלמה חלמא	חעלמא, רבי שלמה, שלמה חלמא
33	--- new Rabbi ---			איזנשטאט, איזנשטט, אייזנשטט, מהר"ם א"ש, רבי מאיר

We have shown our list of appellations to Professor Menachem Cohen, of the Bible Department at Bar-Ilan University, Israel. In reference to our list and to the original WRR-Havlin list he wrote in [Co2]:

... I see no essential difference between the two lists for the purpose of using them for skip experiments in any text.

3. The Results

The table below contains the permutation test ranks obtained by running our list against the same list of dates as in [WRR1] (with the addition of כ"ז סיון, בכ"ז סיון, and כ"ז בסיון for Rabbi Meir Eisenstadt), on an initial segment of War and Peace which is of the same length as Genesis, using the same four computation methods (P_1-P_4) used in [WRR1]. For comparison, we also include the scores obtained by running our list on Genesis and the scores reported by WRR in [WRR1] for their list on Genesis.

Permutation test ranks out of 10^6

	P_1	P_2	P_3	P_4
our list on War and Peace	620	19	31	2
our list on Genesis	201,278	13,099	294,296	9,524
the WRR list on Genesis	453	5	570	4

Comparing the first and the last row, we see that our list does as well on War and Peace as the WRR list does on Genesis. Tolstoy would have enjoyed knowing that. Some of the numbers in the middle row are "middle of the way", smallish but not very small. They are "smallish" because our list is still highly correlated with the original WRR list, on which it was based. The fact that they are not very small needs to be explained by WRR, not by us. Why is it that an equally valid list of appellations (our list) does so much worse than their list on Genesis?

Comment: The computations of the significance levels for our list was carried out using a program WRR gave us, `els2.c`. We modified it to work under Unix and re-wrote the permutation test part, but made no modifications to the main part of the code. The text we used was also given to us by WRR, and consists of the first 78,064 letters (the length of Genesis) of a Hebrew translation of Tolstoy's War and Peace.

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