Data, Knowledge and Tradition. Biblical Scholarship and the Humanities 2.0. Exodus 19 as a laboratory text

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1. Introduction

The topic I want to address in this paper is the question of what it means for the discipline of Old Testament scholarship to be part of the study of Humanities in general. This question is relevant in the context of the actual discussions about academic biblical research and the role of the Bible in churches and theology, since it appears that two somewhat contradictory movements have been developing.
On the one hand, one can observe that existing paradigms of defining the task of biblical scholarship in a setting of academic theology are in a process of losing credibility. Biblical research as a necessary critical voice within Christian theology seems to have become less urgent, since the general theological debate is moving from the arena of 'historical versus systematic theology' into the arena of 'Biblical tradition or Christian theology versus present day religions'. Hermeneutics and religious views on the meaning of human life are becoming the major themes, rather than a focus on the history of Judaism or Christianity and the texts documenting biblical tradition. An illustration of this movement can be found in comments made by John Collins:[1] in 1990 his article, 'Is a Critical Biblical Theology Possible?,' focused on the classical tensions between critical scholarship and biblical theology, whereas later, in 2005, in his chapter on postmodern biblical scholarship, 'Is a Postmodern Biblical Theology Possible?', he discusses biblical scholarship in the context of today's western culture. He writes:

> *"To a great degree, the old paradigms in biblical studies were theological, tacitly if not explicitly. It is not surprising, then, that the impact of their collapse should be felt especially in the subfield of biblical theology."*

Are we thus experiencing the ending of an era? The phrase expresses some weariness; yet, it also raises the questions that have been addressed during past years' discussions at the OTW (*Het Oudtestamentisch Werkgezelschap*). Should biblical scholars leave their historical critical focus behind and join the hermeneutical turn in theology and the study of religions? Should biblical scholarship become actively engaged in actual debates about society and religion? In any case, taking part in public debate and bringing experience with classical authoritative texts is not a bad idea. After all, that kind of input is fully absent there.[2] However, the movement from theology to social and religious studies is not the only shift that can be observed today.
There is also another shift on its way, i.e., from science, especially from the domain of ICT, to humanities, theology included. Researchers working at the boundary area of computer

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[1]   J.J.Collins, 'Is a Critical Biblical Theology Possible?', in W.H. Propp, B. Halpern, D.N. Freedman, (eds.), *The Hebrew Bible and its Interpreters*, Indiana, 1990; J.J.Collins, 'Is a Postmodern Biblical Theology Possible?', in: *The Bible after Babel. Historical Criticism in a Postmodern Age*, Grand Rapids, 2005 (chapter 6; quote 131).
[2]   See the complete absence of biblical scholarship in, for example, Terry Eagleton, *Culture and the Death of God*, New Haven - London, 2014, and also in more popular books on the topic in Dutch public debate: Guus Kuijer, *De bijbel voor ongelovigen. Deel 2 De uittocht en de intocht*, Amsterdam: Atheneum -Polak en Van Gennep, 2013; Carel ter Linden, *Wat doe ik hier in Godsnaam?* Utrecht, 2013.

technology and culture show a growing interest in the great variety of cultural artefacts, such as painting, music, literary texts. That is rather new. Computer linguists of the seventies and eighties did not, in my experience, exhibit much interest in the computer assisted analysis of ancient texts such as the Bible since, for their statistical linguistic research, our corpora were considered too small and too diverse due to its long period of transmission by manuscripts. However, the next generation of researchers in ICT appears to be intrigued by the historical complexity and the semantic fuzziness of texts dating from far before the invention of printing. These ancient cultural artefacts are now considered an interesting challenge for computer assisted analysis and cognition: can one detect patterns in cultural objects, such as music or ancient texts? Or is every cultural artefact unique, requiring an individual interpretation?

This development presents biblical scholars with a new opportunity to concentrate more on the texts as we have received them (i.e., as part of a long tradition) and to bring biblical and other ancients texts, together with a large variety of historical critical methods of reading, to a new common field of research: Humanities and Computing. On December 14, 2012 Rens Bod, as professor of Computational and Digital Humanities in both the Faculty of Humanities and the Faculty of Science at the University of Amsterdam presented his inaugural address: *The ending of Humanities 1.0.*[3] Concerning this new interaction of humanities and science,[4] he writes:

> *"New in the academic research of these days is the bringing together of science and humanities. Alpha and Beta had grown apart during the 19th century, but technology of the 20th century has brought them together again. This appears to have become a broad and comprehensive development: not only has it managed to bring Alpha and Beta together, but also the hermeneutical and the positivistic schools in Humanities. For that reason this new approach can with good reason be called a breach with Dilthey's monomaniac view of the humanities. This development is Humanities 2.0."* [5]

The research project of Bod and other 'computational Humanists' has provoked a lively debate. [6] At first sight his proposal looks a bit like Dilthey is simply being dismissed, only to be replaced by data and data bases. But that is not the case. It is important to be aware of the fact that none of the participants in this debate simply wants to argue in favour of only one

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[3]   Rens Bod, *Het Einde van de Geesteswetenschappen 1.0. Oratie uitgesproken bij de aanvaarding van het ambt van hoogleraar Computationele en Digitale Geesteswetenschappen aan de Faculteit der Geesteswetenschappen en de Faculteit der Natuurwetenschappen, Wiskunde en Informatica van de Universiteit van Amsterdam*, Amsterdam, 2013.

[4]   My translation. See Bod, *Het Einde van de Geesteswetenschappen 1.0.*, 17-18. : "Wat nieuw is in de hedendaagse wetenschap is het bijeenbrengen van technologie en geesteswetenschap. Alfa en bèta waren uit elkaar gegroeid in de 19e eeuw, maar technologie heeft ze in de 20e eeuw weer bij elkaar gebracht. Deze ontwikkeling is veelomvattend gebleken: ze heeft niet alleen alfa en bèta, maar ook de hermeneutische en positivistische richtingen in de geesteswetenschap bijeen weten te brengen. Deze aanpak mag daarom met recht een breuk met de monomane opvatting van geesteswetenschap door Dilthey worden genoemd. Dit zijn de Geesteswetenschappen 2.0."

[5]   Understandably, though somewhat regrettably, with regard to theology as a discipline Rens Bod has only paid attention to its philological and historical research: Rens Bod, *De vergeten Wetenschappen: Een geschiedenis van de Humaniora*, Amsterdam, 2010; English edition: *A New History of the Humanities: The Search for Principles and Patterns from Antiquity to the Present*, Oxford, 2013

[6]   For example, Marieke Winkler, 'Interpretatie en/of patroon? Over Het einde van de geesteswetenschappen 1.0 en het onderscheid tussen kritiek en wetenschap', *Vooys* 31.1 (2013) 31-41.
        See: http://tijdschriftvooys.nl/wp-content/uploads/2013/04/Winkler-31.1.pdf

option: whether that be calculation or interpretation. Bod himself wants to proceed from Humanities 2.0 (using data bases and techniques for pattern recognition) to Humanities 3.0 (the necessary interaction of pattern recognition and hermeneutics). But he also thinks that it is only through an increasing integration of humanities and methods of ICT that we will be able to re-address the questions of textual analysis, interpretation and history in a fruitful way. One may remain somewhat hesitant about that much optimism, but in my view it is exceedingly worthwhile to do this experiment with the various disciplines of biblical research, covering the full area from grammatical analysis to biblical theology. Theology, exegesis included, tends to depend too much either on views on ancient religion or on ideas about God and the world – concerning this point Collins' remarks are correct – rather than on 'data', i.e., both the archaeological findings and the textual archives and collections with their processes of transmission and appropriation. To me this new cooperation with ICT is not only of importance for assisting biblical studies in occupying their rightful place within the humanities, but I consider it also to be helpful in the theological debate on biblical scholarship and systematic theology and the public debate on Bible and religion. I argued about this in my valedictory lecture: [7]

> *"Could historical critical biblical scholarship, in addition to its careful registration of how biblical texts in various stages and variations speak about God, also say something about the same texts as representing speech by God? In my view that is possible, but only if the methods of modern biblical scholarship are also welcomed into academic theology. That implies a theology that does not take its starting point as the scientific status of our knowledge of God, but rather the nature of our data. On that basis theology can make meaningful statements about knowledge of God in the world of human experiences."*

In this contribution I will try to explain some of the ICT techniques for textual analysis being used for the study of the Hebrew Bible and make proposals on how one could proceed from this analysis to contributions in the area of textual interpretation and biblical theology.

2. Textual analysis and Humanities 2.0. Sample text of Exodus 19

This paragraph will present some of the recent developments in the area of Bible and Computer on which our research group in Amsterdam has been working. One could suggest that this type of text linguistic research implies a test of the question of how far one can get with algorithms and analytical methods. Rens Bod claims that pattern recognition is a basic feature of research in the Humanities, so for that reason alone the use of ICT techniques is meaningful and stimulating. In my view and my own experience, that is correct, even if one acknowledges that texts from Antiquity, on account of their long period of creation and transmission, on occasion strongly resist the expectation of just patterns and system. History

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[7]   E.Talstra, *De Éne God is de andere niet: Theologie en rolverdeling in Jeremia 5: 1-9. Rede uitgesproken bij het afscheid als hoogleraar Oude Testament aan de Vrije Universiteit 7 oktober 2011*, Amsterdam: 2011, 49: "Kan historisch-kritische bijbelwetenschap, behalve nauwkeurig waarnemen hoe de bijbelteksten in allerlei stadia en variaties spreken over God, ook iets zeggen over dezelfde teksten als teksten die het spreken van God representeren? Naar mijn inzicht kan dat, maar alleen als de moderne bijbelwetenschappen ook in methodologische zin welkom zijn in de academische theologie. Dat wil zeggen, in een theologie die niet bij voorkeur de wetenschappelijke status van onze kennis omtrent God, maar eerst de aard van onze data als vertrekpunt neemt. En van daaruit iets zegt over ons kennen van God in de menselijke ervaringswereld."

has had its effects too. But before one raises questions about where the search for patterns and system(s) ends and where the interpretation of individual pieces of classical biblical literature begins, it is worthwhile to try things out and to test. It will teach us a lot about the complex interaction of linguistics, literature and historical change.

Thinking about the creation and the use of text data bases and exegetical methods one has to ask the question: What is it that we would like to know about a text? What is there in the text corpora that we would like to register, sort and categorize, so that the results could help us in answering questions of interpretation? In our research we have chosen to concentrate on possibilities that are beyond *searching* through texts for particular elements. It is equally important to be able to *present* a textual composition in its text syntactic structure and to be able to label, for example, segments of a text as a direct speech section or as a further embedded direct speech section. For translation it is important to be able to identify the patterns that help us label the syntactic functions of particular clause connections or the valence of verbs in interaction with particular sets of constituents. For exegesis it would be helpful to know, for example, whether or not the "you" in one segment of text has the same referent as the "you" or "she" in a next segment. The moment these data can be identified and calculated, these new results can then in their turn be added into the data base. Having these kind of data available would allow us to relate questions of exegesis and translation directly to linguistic patterns.

First, I will present some of our searching for linguistic patterns that is being used in text syntactic analysis and in proposals for a basic translation from Hebrew into Dutch (2.1.). Secondly I will present some of our work on participant tracking in Hebrew texts (2.2.). This demonstrates that entering Humanities 2.0 with our discipline can serve us well. The real question to be addressed, of course, comes afterwards: what about Humanities 3.0? Are we, with computer assisted textual analysis, only creating instruments to be used for a convenient access to well-structured material that we want to study for our task of textual interpretation? Or are we also contributing to the task of interpretation itself (3.1 and 3.2)?

2.1. Pattern recognition at clause level and sentence level. Experimenting with syntax and translation.

The text of Exodus 19 is our test case for the interaction of pattern recognition and syntactic research in Biblical Hebrew. This experimental research takes as its starting point the basic text with a grammatical hierarchy as we have produced it over the years and is stored in our data base. [8] (Figure 1) 'Basic' here means that at this level of research only formal codes of clause relations and linguistic dependencies have been assigned. A major part of these hierarchical relations are calculated and identified by formal codes proposed by programs. During the calculations these proposals can be corrected and complemented in an interactive process, which helps the programs to improve its proposed analyses. As a result, this basic textual hierarchy has the status of a hypothesis about a text's syntax, which we try to make as consistent as possible. The idea is that such 'neutral' codes allow for a first hierarchical

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[8]   E.Talstra, 'A Hierarchy of Clauses in Biblical Hebrew Narrative', in: E.J. Van Wolde (ed.), *Narrative Syntax and the Hebrew Bible. Papers of the Tilburg Conference 1996* (Biblical Interpretation Series 29), Leiden, 1997, 85-118; Eep Talstra - Constantijn Sikkel, 'Genese und Kategorienentwicklung der WIVU-Datenbank, oder: ein Versuch, dem Computer Hebräisch beizubringen', in: Christof Hardmeier, Wolf-Dieter Syring, Jochen D. Range, Eep Talstra (eds.), *Ad Fontes! Quellen erfassen - lesen - deuten. Was ist Computerphilologie?* [Applicatio 15], Amsterdam, 2000, 33-68

presentation of a text's syntactic structure, as yet independent from additional linguistic theory about the functional labelling of all the relationships at the level of sentences or paragraphs. This approach thus allows further research and testing of one's linguistic theories in order to add new analytical results as data. (Figure 3)

The clause connection codes will be explained below, in figure 1. They are presented in the textual hierarchy, together with some empty categories, to be filled in by the actual research. For example, between lines 7 and 8 one finds: <<…>><<427>><<…>> The first empty spot <<…>> will have to be filled in with a label for the function of the clause connection, e.g., "coordination" or "result". The final empty spot <<…>> will be filled in with a proposal for the verbal tense or mood that the clause has in this context.

This is possible only if we can find the syntactic patterns that will help give the proper argumentation.

The research that is being performed is based on the data of the 'basic textual hierarchy.' It is an investigation in patterns of verbal valence (2.1.1) and in patterns of the functional labeling of clause connections (2.1.2). As a further step, I have been experimenting with a number of programs that, by taking these patterns as input, will be able to propose a (very) basic translation of Hebrew texts into Dutch (2.1.3). In other words, it provides you with the linguistic boundaries within which you have to think about restyling the basic translation proposal into proper Dutch. At the moment we are using these possibilities as basic materials to produce a Dutch translation of the book of Exodus.[9] For computer assisted textual analysis this project is an interesting test of the possibilities of pattern recognition of lexical and syntactic items. Patterns found at one level produce the input for the calculations at the next level.

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[9] This experiment is part of a translation project by members of the Amsterdam "Societas Hebraica", supported by the Netherlands Bible Society. See: E. Talstra, 'System and Design. Reading, Computing and Translating Biblical Hebrew into Dutch', in: Athalya Brenner-Idan (ed.), *Discourse, Dialogue and Debate in the Bible. Essays in Honour of Frank H. Polak,* Sheffield 2014, 218 - 235

Figure 1 Selected lines from Exodus 19:1 – 3

Starting point of research: data base with an analysis of phrases, clauses and textual hierarchy

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Line Sentence:Clause  clause label

  1 S:  1: 1    Defc  EXO 19,01 [בַּחֹדֶשׁ הַשְּׁלִישִׁי <Ti>]
 .. .. ..                         | |
  3 S:  1: 1    xQt0  EXO 19,01 . | | \_[מִדְבַּר סִינַי <Co>][בָּאוּ <Pr>] [בַּיּוֹם הַזֶּה<Ti>]
                                  | |
 .. .. ..                         | |<<…>><<472>><<…>>
  7 S:  5: 1    WayX  EXO 19,02 . | \_[נֶגֶד הָהָר <Lo>] [יִשְׂרָאֵל <Su>] [שָׁם <Lo>] [יַּחַנוּ <Pr>] [ וַ-<Cj>]
                                  |   |
                                  |   |<<…>><<427>><<…>>
  8 S:  6: 1    WXQt  EXO 19,03 . | . \_[אֶל-הָאֱלֹהִים <Co>] [עָלָה <Pr>] [מֹשֶׁה <Su>] [ וּ-<Cj>]
                                  |     |
                                  |     |<<…>><<472>><<…>>
  9 S:  7: 1    WayX  EXO 19,03 . | . . \_[מִן-הָהָר <Lo>] [יְהוָה <Su>] [ אֵלָיו <Co>] [יִּקְרָא <Pr>] [ וַ-<Cj>]
                                  |       | | |
                                  |       | | |<<adjunct >><< 64>><<…>>
 10 S:  7: 2    InfC  EXO 19,03 . | . . | | \_[ לֵאמֹר <Pr>]
                                  |       | |   |
                                  |       | |   |<<dir. Sp.>><<999>><<…>>
 11 S:  8: 1    xYq0  EXO 19,03 . | . . | | . \_[ לְבֵית יַעֲקֹב <Co>] [תֹאמַר <Pr>] [ כֹּה <Mo>]
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Clause connection codes:

472 conjunction " וֹ " [4], wayyiqtol [7] in daughter clause, qatal [2] in mother clause

427 conjunction " וֹ " [4], qatal [2] in daughter clause, wayyiqtol [7] in mother clause

 64 infinitive clause, preposition "ל"

999 this clause is the start of a direct speech section

2.1.1 verbal valence

From experience with reading and translation it is clear that only in combination with their surrounding constituents do verbs constitute meaning. An example of this is the verb יָרַד. It occurs seven times in Exod. 19. In only two cases do we find the verb in the imperative form, without any further nominal or prepositional phrases (verse 21 and 24: רֵד *Go down*). The other cases are:

11	יָרַד +לְעֵינֵי+ עַל				come down, in the sight of, upon
14	יָרַד		מִן +	אֶל +	go down, from, to
18	יָרַד	עַל +		בְּ +	come down, upon, in
20	יָרַד	עַל +	אֶל +		come down, upon, to
25	יָרַד		אֶל +		go down, to

In the case of the verb יָרַד + עַל English translations (RSV, NRSV and NIV) render "come down *upon* or descend *upon*", whereas in the case of יָרַד + אֶל they give the rendering "*go down to*". Apparently the patterns describe the movement downwards from a different viewpoint. The other prepositions present do not alter the translation. Research in this field has been started and stimulated especially by Janet Dyk [10] . For this work, lists of particular verbs and their 'satellites' are derived from the existing data, sorted and categorized, and studied in view of the interaction of syntax and semantics. One of the results to be produced are lists of patterns that will be used in further analysis and interpretation of texts. As will be shown below, these kinds of data sets are also needed for the preparation of a basic Bible translation.

As a result of the apparent increase of our lexicological knowledge, this research also contributes greatly to improving the initial grammatical parsing in our data base, because it helps us see what complements to a verb are obligatory, on account of their being part of the meaning of the pattern, and which ones are merely additional.

2.1.2. The functional labeling of clause connections.

Can we find patterns of syntactic clause connections, so that one, using that information, would be able to provide particular clause connections in a text with a functional label? For example, the *wayyiqtol*-subject clause וַיִּחַן שָׁם יִשְׂרָאֵל נֶגֶד הָהָר in line 7 is followed by a *w*-subject-*qatal* clause וּמֹשֶׁה עָלָה אֶל-הָאֱלֹהִים. (See above, figure 1.) The formal relation code is 427 (conjunction "ו" [4], *qatal* [2] in daughter clause, *wayyiqtol* [7] in mother clause). Translations sometimes disregard the *Qatal* and simply translate "And Moses went up to God"(RSV),[11] but this neglects a signal of textual structure. The formal codes can assist us in experimenting. Let us accept the hypothesis that the clause order *wayyiqtol - w*-Subject-*qatal*

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[10]   J.W. Dyk, 'Traces of Valence Shift in Classical Hebrew', in: Athalya Brenner-Idan (ed.), *Discourse, Dialogue and Debate in the Bible: Essays in Honour of Frank H. Polak,* Sheffield 2014, 48 – 65; J.W. Dyk, Oliver Glanz, Reinoud Oosting, 'Analysing Valence Patterns in Biblical Hebrew: Theoretical Questions and Analytical Frameworks', *JNSL* 40/1 (2014), 43-62.
[11]   'Then Moses went up to God' (NRSV and NIV)

signals parallel actions by two different subjects, in this case "Israel" and "Moses".[12] Then the function label of clause 8 will be circumstantial clause, to be translated with "while" or "in the meantime": "While Moses had gone up to the Lord". Searching for more cases with a code 427 in this chapter gives us lines 77 and 78 (verses 17-18): "They (the people) took their stand at the foot of the mountain" וַיִּתְיַצְּבוּ בְּתַחְתִּית הָהָר. "while mount Sinai had become completely wrapped in smoke". וְהַר סִינַי עָשַׁן כֻּלּוֹ [13]

Another example is the syntax of verse 5. In lines 18 and 19 we have the clause order x-*yiqtol* >> w-*qatal* (identical person number gender of the verbs) and in lines 18 and 20 the same clause order (identical person number gender of the verbs). In line 19 the w-*qatal* can be read as a continuation of line 18: "if you listen and keep .." But in line 20 this does not work: "if you listen and keep … and become for me …"

So it seems we have the pattern (x-*yiqtol* >> *w-qatal*) active twice here, but actually there is also a hierarchical pattern active, making sure that in case a range of *w-qatal* clauses follows a *yiqtol* clause (with identical person number gender), the final *w-qatal* clause is not expressing coordination ("and", line 19 to 18), but consecution or result ("then", line 20 to 18).

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Line Clause Type
 18  xYq0   EXO 19,05  |  \_[ בְּקֹלִי <Co>] [תִּשְׁמְעוּ <Pr>] [שָׁמוֹעַ <Mo>] [אִם <Cj>]
                        |  | |
                        |  | |<<coord  >><<<421>>><< 1:pres.tense>>
 19  WQt0   EXO 19,05  |  | \_[ אֶת בְּרִיתִי <Ob>] [שְׁמַרְתֶּם <Pr>] [-וְ <Cj>]
                        |  |
                        |  |<<consec >><<<421>>><< 2:fut.tense>>
 20  WQt0   EXO 19,05  |  \_ [מִכָּל-הָעַמִּים<Aj>] [סְגֻלָּה <Co>] [ לִי<Co>] [הְיִיתֶם<Pr>] [-וְ<Cj>]
                        |  | |
                        |  |
```

If one develops a grammar of such patterns and applies them to these texts, one will be able to insert additional labels into the database. In this research that will be labels indicating the functionality of the clause connection (coordination, consecution, …) and labels that propose the function of the verbal tense (present, future, 'should'…). (See figure 3).

2.1.3. Translation by pattern recognition

Generally speaking, discussions on Bible Translation focus on the question of how much in the language of the source text depends on linguistic system, which is not to be regarded as part of the literary design of a particular text, and what elements in the text go beyond linguistic system and can be regarded as part of a deliberate literary or theological textual design. Further debates on texts in terms of culture and theology are derived from this initial question. Therefore, imitating the translation process, through a program that analyses from lexeme level up to the level of sentence and text, results in an interesting experiment where one will find out more about how and where linguistic system and literary design interact.

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[12] E.Talstra,'Text linguistics: Biblical Hebrew' in: G. Khan (ed.), *Encyclopedia of Hebrew Language and Linguistics III (EHLL)*, New York, 2013, 755-760.

[13] With syntax one can observe much inconsistency in Bible translations: 'And mount Sinai was wrapped in smoke' (RSV); 'Now mount Sinai was wrapped in smoke' (NRSV); 'Mount Sinai was covered with smoke' (NIV)

The procedure is presented below. It is an attempt to do pattern recognition at each linguistic level followed by a substitution [14] of the Hebrew patterns found there with Dutch patterns that are to be used at the same level. This is, of course, mainly a description of processes of pattern recognition into the source language. Only a few transpositions of the Hebrew constituent order are applied to the constituent order in Dutch. For the moment that is sufficient. The main goal of this project is the combination of interests: help translators with automatically generated basic material and use this procedure as a test of the linguistic consistency of our data base.

The following are the levels of analysis and substitution. (See figure 2)

-1. *Words*: from the lexical and grammatical information in the data base of each Hebrew word, the lexeme, a Dutch gloss, and, if applicable, its grammatical features are listed.

 -2. *Phrases*: in a previous run all of the phrases in a text (a book) were collected, sorted and analysed. A first analysis, completely based on lexicon and word grammar will, for example, produce for כָּל יִשְׂרָאֵל בְּנֵי: the translation: 'the totality of the sons of Israel'. This is stored in a list. The list has a second field where one can store a translation in the style one prefers: "all the sons of Israel" or "all the Israelites". The translation program can now substitute the Hebrew phrase with a Dutch phrase from one of the fields in the list.

 -3. *Valence pattern*: search for the verb and the actual constituents in the list of valence patterns (2.1.1). Take the (adjusted) meaning of the verb from there, with the translation of the various prepositions that belong to the pattern.

 -4+5. *Clause; constituent order:* apply the valence pattern to the clause(s) of the text. Substitute the Hebrew constituent order with a constituent order in Dutch, also to be taken from a list of Hebrew and Dutch patterns.

 6. *Sentence and Text*: identify the syntactic clause connection in the actual text with a pattern from a list of patterns produced by syntactic research (2.1.2). This may also imply a change of verbal tense and a change of the rendering of the conjunction. For example, the rendering of ו 'and' may become 'while'.

The results of these analyses in the previous paragraphs are (to be) added to the data base. We are experimenting with an expansion of our data type models:

1. Functional labels of clause connections and verbal valence patterns (language);
2. Labelling clause functions, based on their position in a particular hierarchy (text);
3. A preliminary translation for each clause in a text.

See below, figure 3. For the benefit of the reader of this paper, text lines in Hebrew and some phrases in English imitating the proposed preliminary translation into Dutch have been added.

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[14]   Richard Sproat, *Language, technology and Society*, Oxford: Oxford University Press, 2010.

Figure 2 "Translating" a text line into Dutch

Order of the levels of pattern analysis and the resulting 'translation' [English phrases added]

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EXO 19,03 [W-<Cj>] [MCH <Su>] [<LH <Pr>] [>L H->LHJM <Co>]  (text in transliteration)
          [אֶל הָאֱלֹהִים <Co>]  [עָלָה <Pr>]  [מֹשֶׁה <Su>]  [-וּ <Cj>]
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Lexeme level information (derived from data base: lexicon and word grammar)

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I   LEX:  | וּ W en and | מֹשֶׁה MCH Mozes Moses | עָלָה <LH[Q:opgaan go up pf3ms |
          | אֶל >L :naar/tot towards/to | הָ DefArt | אֱלֹהִים >LHJM/:God{en} God{s} mp:Ab
```

Phrases (taken from a list of phrase patterns with analysis and translation proposal)

```
II  PHR:  |1: en and |2: Mozes Moses |3: hij is opgegaan he has gone up
          |4: naar/tot God  towards/to God
```

Verbal valence (taken from a list with verbal lexemes and their patterns of prepositional groups)

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III VAL:  |<LH עָלָה:opgaan go up + >L אֶל:naar to
```

Clause: apply valence pattern to clause (from III)

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IV  CLA:  |1: en and |2: Mozes Moses |3: hij is opgegaan he has gone up |4: naar God to God
```

Clause: reorder constituents (to word order in Dutch; skip subject marker from the predicate)

```
V   SYN:  | en and | Mozes Moses | is opgegaan has gone up | naar God to God
```

Sentence and text level (calculated from patterns of clause connections [wayyiqtol-X >> W-X-Qatal]*)*

```
VI  TXT:= VoltTijd perfect tense form
          |terwijl while |Mozes Moses| is opgegaan has gone up|naar God to God|
```

Figure 3. Results (1., 2., 3.) inserted into the textual hierarchy
Selected lines. (Hebrew texts and a rendering in Dutch of the translation proposals; English phrases added)

```
 7 S:  5: 1 WayX  EXO 19,02 . | \_en Israël  legerde_zich daar tegenover de berg          וַיִּחַן שָׁם יִשְׂרָאֵל נֶגֶד הָהָר
                              |   | Israel camped
                              |   |
                              |   |<<while  >><<427>><<31:volt.t>>
 8 S:  6: 1 WXQt  EXO 19,03 . | . \_terwijl Mozes  is opgegaan naar God                    וּמֹשֶׁה עָלָה אֶל-הָאֱלֹהִים
                              |     | while Moses had gone up
                              |     |
                              |     |<<coord  >><<472>><<11:verl.t>>
 9 S:  7: 1 WayX  EXO 19,03 . | . . \_en JHWH  riep naar hem vanaf de berg                 וַיִּקְרָא אֵלָיו יְהֹוָה מִן-הָהָר
                              |     | | YHWH called him
                              |     | |
                              |     | |<<adjunct >><< 64>><< 0:       >>
10 S:  7: 2 InfC  EXO 19,03 . | . . | | \_door te zeggen                                   לֵאמֹר
                              |     | |   | by saying
                              |     | |   |
                              |     | |   |<<dir. Sp.>><<999>><< 5:opdr  >>
11 S:  8: 1 xYq0  EXO 19,03 . | . . | | . \_als volgt jij moet zeggen tot het huis van Jacob  כֹּה תֹאמַר לְבֵית יַעֲקֹב
                              |     | |     | Thus shall you say
                              |     | |     |
                              |     | |     | |<<coord  >><<411>><< 5:opdr  >>
12 S:  9: 1 WYq0  EXO 19,03 . | . . | | . . | | \_en jij moet meedelen aan de zonen van Israël
                              |     | |     | | and you shall tell                        וְתַגֵּיד לִבְנֵי יִשְׂרָאֵל
                              |     | |     | |
                              |     | |     | |<<dir. Sp.>><<999>><< 3:volt.t>>
13 S: 10: 1 XQtl  EXO 19,04 . | . . | | . . | \_jullie zelf  hebben waargenomen            אַתֶּם רְאִיתֶם
                              |     | |     | | | You yourself have seen
                              |     | |     | | |
                              |     | |     | | |<<object  >><<522>><< 3:volt.t>>
```

11

```
14 S: 10: 2 xQt0  EXO 19,04 . | . . | | . . | . | \_die/dat ik heb gedaan aan Egypte        אֲשֶׁר עָשִׂיתִי לְמִצְרָיִם
                              |    | | |         |     |     | what I have done
[ ... ]                       |    | | |         |     |     |
                              |    | | |         |     |_|<<macro syn>><<402>><< 0:      >>
17 S: 11: 1 MSyn  EXO 19,05 . | . . | | . . | . \_en nu                                        וְעַתָּה
                              |    | | |         |     | and now
                              |    | | |         |     |
                              |    | | |         |    _|<<0       >><<610>><< 1:tegw.t>>
18 S: 12: 1 xYq0  EXO 19,05 . | . . | | . . | . . \_gesteld dat werkelijk jullie luisteren naar mijn stemgeluid
                              |    | | |           | | assuming you are really listening    אִם-שָׁמוֹעַ תִּשְׁמְעוּ בְּקֹלִי
                              |    | | |           | |
                              |    | | |           | |<<coord  >><<421>><< 1:tegw.t>>
19 S: 13: 1 WQt0  EXO 19,05 . | . . | | . . | . . . | \_en jullie bewaren mijn verbond
                              |    | | |             |       and you are keeping              וּשְׁמַרְתֶּם אֶת בְּרִיתִי
                              |    | | |             |
                              |    | | |             |<<consec >><<421>><< 2:toek.t>>
20 S: 14: 1 WQt0  EXO 19,05 . | . . | | . . | . . . \_dan jullie zullen zijn voor mij een eigendom uit alle volken
                              |    | | |             | | then you will be                     וִהְיִיתֶם לִי סְגֻלָּה מִכָּל הָעַמִּים
[ ... ]                       |    | | |             |
                              |    | | |            _|<<0       >><<101>><< 0:       >>
23 S: 17: 1 NmCl  EXO 19,06 . | . . | | . . \_dezen de woorden                                אֵלֶּה הַדְּבָרִים
                              |    | | |     | these [are] the words
                              |    | | |     |
                              |    | | |     |<<attribtv>><< 11>><<43:moeten>>
24 S: 17: 2 xYq0  EXO 19,06 . | . . | | . . . \_die/dat jij moet spreken tot de zonen van Israël
                              |    | |     that you shall speak                               אֲשֶׁר תְּדַבֵּר אֶל-בְּנֵי יִשְׂרָאֵל
                              |    |_|<<paral  >><<200>><<11:verl.t>>
25 S: 18: 1 WayX  EXO 19,07 . | . . | \_en Mozes  kwam                                        וַיָּבֹא מֹשֶׁה
                              |    | | And Moses came
```

2.2. Text grammar and participant tracking

The next step in this research brings us closer to understanding the structure of a particular text. The questions to study and the programs to experiment with are located in the overlapping area between linguistic and literary study. Can one find patterns that explain how participants in a text are introduced, are referred to by pronouns or by lexical elements, and/or are reintroduced in the same narrative layer or in an embedded direct speech section? It is clear that, in each segment of a text, patterns of introduction and reintroduction are present that are related to the set of participants. For example, God speaks to Moses, commanding him to address the people in order to have them consecrated in preparation for YHWH descending on the mountain.' "Go to the people" (verse 10); "Set limits for the people" (verse 12); "They will/may go up on the mountain" (verse 13). In terms of linguistic features it is clear: the first back reference is done by lexical repetition (people), the second one by pronominal reference, הֵמָּה . Analysing and storing such linguistic phenomena will give us the opportunity to do participant tracking: e.g., who is active in a text? how is someone being introduced or reintroduced? With a data base that allows for participant tracking one would be able to proceed further with linguistic analysis of the full corpus, before turning to the exegetical explanation of a particular text. For example, in Exod. 19, what is the function in verse 13 of a back reference to "the people" by the independent noun הֵמָּה in a fronting position?

Participant tracking is an interesting but complicated type of linguistic research. One does not always know where linguistic system ends and literary composition begins. For example, in the transition from narrative to direct speech sections linguistic patterns are active that allow us to calculate the change of the third person audience in the narrative to the second person addressee in the direct speech. See, for example, verse 3:

Line 9: וַיִּקְרָא אֵלָיו יְהוָה מִן-הָהָר From the preceding line 8 one can calculate that 'him'= Moses. From the clause itself one can derive that וַיִּקְרָא is connected to YHWH.

Line 10 לֵאמֹר being dependent on line 9, is also connected to YHWH.

Line 11 כֹּה תֹאמַר לְבֵית יַעֲקֹב We can derive from patterns of introduction to direct speech, such as the one used here, that in this narrative text YHWH is the speaker and "he" (Moses) is the audience. As the pattern dictates that the audience in the narrative equals the addressee in the direct speech section, we can thus conclude that the you-subject of תֹאמַר equals "he" (Moses). In this way participant analysis will provide us with information about who is who in a text, even in cases where the text itself does not explicitly mark it. However, in a number of situations it is not immediately obvious what kind of additional information is needed to allow the computer to make correct identifications. Here the research reveals a number of cultural, religious or literary questions. The program needs to know, for example, whether in verse 3 the phrase לְבֵית יַעֲקֹב refers to the same entity as the phrase לִבְנֵי יִשְׂרָאֵל . Furthermore, is in verse 3 הָאֱלֹהִים the same as יְהוָה ? Should a researcher make a decision about this, declare it a pattern and thus have the computer always make that kind of identifications? Or should one add it to the database as an option, to be realized only in some linguistic contexts, based on syntactic conditions such as coordinated clauses? After all, if such identifications are of a literary kind, one cannot deal with them as if they were part of the system of language.

It is clear that this research is very much in the experimental stage.[15]. That is, however, only a problem if one is just waiting for the final results to apply them. It is, in my experience, a much more fruitful attitude to accept that this ongoing research to enrich the Old Testament data base is not just data production, but at the same time is also fundamental research in Hebrew language and in Old Testament texts.

The various activities for linguistic research mentioned above have provided us with sufficient questions and material to be able to consider what Rens Bod has called the transition from Humanities 2.0 to Humanities 3.0, i.e., the necessary interaction of databases and computer assisted linguistic analysis with questions of method and interpretation. This transition requires working in two domains: the language *system* of a particular textual corpus (the Hebrew Bible) and the literary *design* of individual textual compositions (such as Exod. 19). Here the dialogue with biblical exegesis begins.

3. Exodus 19 and Humanities 3.0. From System to Design?

Once our experiments with text grammatical patterns have been successful in proposing a text syntactic hierarchy and a preliminary inventory of all who are present as participants in the narrative sections or the direct speeches of a text, we can try also to contribute to the ongoing exegetical discussions about the plot, the segmentation and the themes of a biblical text. To be sure, "Humanities 2.0" (i.e., the presence of data bases and tools for computer assisted linguistic analysis) does not imply or suggest that classical debates about interpretation will now quickly be brought to an end or even leave the scene. Rather, it implies reconsidering the balance of linguistic analysis and literary critical or exegetical analysis; insight in system and patterns will allow us to concentrate substantially longer on language and structure, before turning to questions of history, writers, readers and theology.[16] Exod. 19 is (in combination with chapter 20 and the unexpected position of the Decalogue) a complex text [17] which provides a good reason to choose the chapter here. The use of computers in biblical studies is not an attempt to make things simple, it is an attempt to make things explicit. It is a stimulating experience to enter a discussion between the reading based on the recognition of *system* or patterns in linguistic phenomena and in textual structure and the reading of a particular text in search for *design* in interpreting classical topics such as theme, literary roles and plot. I see two areas of textual analysis where the two approaches can interact:
  - text linguistic structure and literary plot (3.1.) and
  - sets of participants in text segments and themes or literary roles. (3.2.)

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[15]   More details in: E. Talstra, 'The Bible as Data and as Literature: The Example of Exodus 16', in: H. Ausloos, B. Lemmelijn (eds), *A Pillar of Cloud to Guide: Text-Critical, Redactional, and Linguistic Perspectives on the Old Testament in Honour of Marc Vervenne* (BETL 269), Leuven 2014, 549-67.

[16]   While using a different set of arguments, biblical exegesis is familiar with that distinction: R. Rendorff, 'Der Text in seiner Endgestalt. Überlegungen zu Exodus19', in: D. Daniels, U. Glessmer, M. Rösel, *Ernten, was man sät* (Fs Klaus Koch), Neukirchen-Vluyn,1991, 459-470

[17]   E. Zenger, Wie und wozu die Tora zum Sinai kam: Literarische und theologische Beobachtungen zu Exodus19-34, in: M. Vervenne (ed.), Studies *in the Book of Exodus: Redaction - Reception - Interpretation* (BETL 126), Leuven:1996, 265-288; C. Houtman, *Exodus* Vol. 2 (COT) Kampen: Kok, 1989, 383; B.S. Childs, *Exodus. A Commentary*, (OTL), London, 1974, 344.

3.1. Text linguistic structure and literary plot

Speaking of 'pattern recognition', it is interesting to notice that the term 'pattern' is also used in the Exodus commentary by Childs. [18] He recognizes that Moses actually has two different roles in the Sinai texts. Moses is summoned by God to climb mount Sinai where God himself is prepared to emphasize the authority of Moses (Exod. 19:9, 19). Because of this he can then lead the people into covenant (Exod. 24). On the other hand, it is the frightened people themselves who, after experiencing the theophany and the proclamation of the Ten Words, urge Moses to become their mediator (Exod. 20:18-21). Childs speaks of two *patterns* of oral tradition being combined in the texts.

The two patterns being joined in this chapter also seem to have an impact on how Childs perceives the text division. In his view [19] a new section begins in 19:10, i.e., the preparation for the holy event, the theophany. After the words on the covenant in verses 3-9 (pattern 1) we now enter a new section on the consecration of the people. This text division is also present in NRSV, which starts the second section, however, not with verse 10 but with verse 9b. A complication is that Childs himself presents his translation of chapter 19 with a completely different text division: breaks in verses 7, 16 and 18. [20] This illustrates the usually rather loose connection of syntactic analysis and textual interpretation among exegetes.

A computer-made text linguistic proposal for (narrative) textual structure relies on a number of parameters: (1) explicit references to time or location, (2) particular clause types, such as W-X-Qatal clauses and וַיְהִי clauses, and (3) *wayyiqtol* clauses with explicit references to one or more participants. Occasionally, like in verse 19, one finds *yiqtol* clauses marking special sections or a 'peak' within the narrative.

Chapter 19 has two clause initial time references in verses 1 and 16. Paragraph markers of the type W-X-Qatal appear only in verses 3 and 18, where they indicate parallel paragraphs, in verses 3-6 and in verse 18. The majority of linguistic markers of text division in this chapter is given by *wayyiqtol* clauses with explicit mentioning of the participants: Yhwh and Moses. After verse 3 we find *wayyiqtol* clauses with a re-nominalisation of יְהוָה and/or מֹשֶׁה in verses 9, 10, 14 and in verses 20, 21, 23; with מֹשֶׁה and הָעָם in between, in verses 14-15.

Using these markers one can start the analysis of the chapter from a number of smaller units:
1-2: time reference and location.
3-8; 9: JHWH, Moses, covenant, the people and the elders.
10-13; 14-15: Moses; preparation and consecration of the people.
16-19: time reference. Theophany, warning; *Yiqtol* clauses in verse 19: direct presentation of communication between Moses and Yhwh. [21]
20-25: Yhwh to Moses about people and priests.

Using these linguistic markers of textual structure, one can not only analyse Childs' division based on the two roles for Moses, but also a number of translations that easily neglect differences in clause type. For example, the NRSV translates the *wayyiqtol* in verse 9b with

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18   Childs, *Exodus*, 350
19   Childs, *Exodus*, 368-369; Childs mentions 10-24 and 20-25; so 10-24 should be 10-19?
20   Childs, *Exodus*, 341.
21   E.Talstra, 'Syntax and Composition. The use of *yiqtol* in narrative sections in the book of Exodus', in: Riemer Roukema et al (eds), *The Interpretation of Exodus. Studies in Honour of Cornelis Houtman* (Contributions to Exegesis and Theology 44), Leuven: 2006, 225-236

"when Moses had told …" , as if it were some 'conjunction-Subject-*Qatal*' clause, and the *wayyiqtol* in verse 20a with "when the Lord descended …". In contrast to this, the *W-X-Qatal* in verse 3 is rendered as if it were a *wayyiqtol* - "Then Moses went up" - and the *W-X-Qatal* in verse 18 is rendered not with "while" but with "now". The rendering of the *yiqtol*s in verse 19, not as direct communication (" Moses speaks") but by "would speak" and "would answer", as if we are watching a procedure, makes it really difficult to understand the text.

An interesting observation can also be made regarding the difference in translations of the phrase בָּהָר + עָלָה "go up the mountain" in verses 12 and 13. (cf. 20, 26 and Deut.5:5). In verse 12 Childs translates this as "beware of going up the mountain". In verse 13, however, he uses "they shall *come* up *to* the mountain". The change of verb and of the preposition suggests a preparation for the reading of verse 17 where the people do not pass the foot of the mountain and verse 23 where it is said that the people are not permitted to *come* up *to* the mountain: constructed there, however, with לַעֲלֹת אֶל-הַר סִינָי: אֶל (RSV has a similar shift, from "not go up into" (12) to "*come* up to" (13)). One gets the impression of a translation that skips the phenomena of verbal valence and thus somewhat smooths out the tensions in the role of the people in this chapter.

At all of these points within the interaction of Humanities 2.0 and 3.0, a discussion of patterns and interpretation would certainly be helpful in order to produce a more consistent and linguistically independent textual structure and translation.

3.2. Sets of participants, themes or literary roles.

In addition to comparing a linguistic and a literary approach of structure and translation, one also has to discuss the role of participants in the text from both these angles. To a large extant one could even call exegesis a kind of participant analysis: who is who in a text and how do the various participants, the writer and the reader included, interact?
Presentation of the participants active in text segments shows, for example, the changing role of the people in verses 1-15 and in verses 16-25. The promise to be able to climb the mountain contrasts first with the people halting at the foot of the mountain, and, secondly, with the shift from the people into the very few who are allowed to actually climb the mountain (vs 24). We also observe the unexpected introduction of the priests as a separate group in verses 21-25. One actually has to analyse beyond the boundary of this chapter, since in chapter 20, after the proclamation of the Decalogue, the narrative about the role of the people in 20:18 connects back to 19:18.

So we actually have to discuss both the changing roles of the participants in the various text segments and the exegetical tradition of textual reconstruction. The history of research has made clear that there is an end to our search for linguistic patterns and structure. One cannot force the actual text of Exod. 19 and 20 into one consistent structure. [22] But one can continue

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[22] There is general agreement about the assumption that the text of the Decalogue has been inserted in the chapters 19-20. Apart from that, the plot of the chapters does not present itself as a very logical one. Houtman, *Exodus*, 385. Childs, *Exodus*, 344. In this line of thinking it is very likely that Exod. 20:18-21 originally had its position directly after 19:19 and that 19:20-25 is an addition, elaborating on the required consecration initially needed for the theophany, but now also for the proclamation of the Decalogue.

to act as a careful reader and concentrate on the linguistic markers indicating paragraphs and indicating the interaction of participants. From there one can register the changing roles of various participants and enter into discussion with exegetical tradition about the topics being addressed in the chapter and in the book.

For instance, the mentioning of obedience and בְּרִיתִי "my covenant" in verse 5 and the words about the priests הַנִּגָּשִׁים אֶל-יְהוָה "approaching Yₕwₕ" in verse 22 is remarkable, since they do not fit the literary plot. In the composition of the book they clearly come too early. The phrase 'my covenant" has been used before (Exod. 6:4, 5), but only to refer to God's promise to the fathers. One does not find a covenant to be kept by Israel before Exod. 24:7 and 34:10, 27. Regulations about the priests approaching the sanctuary or the altar are not found before Exod. 28:14 and 29:4. Exegetes wonder why these phrases are already introduced in Exod. 19. To Brueggemann [23] the mentioning of 'covenant' here is theologically motivated. He sees 'listening' to the commandments as the basic requirement for Israel in the Sinai episode (Exod. 19 – Num. 10). In his view, the effect is that in Exod. 19:3-8 Israel, not knowing yet the content of the covenant, "*signs a blank check of obedience.*" Regarding verse 22 Childs [24] writes: "*The mention of 'priests' is an old crux*". He proposes to call it *an historical anachronism.*

The question here is whether we are faced with more or less isolated cases of a weakness in the literary plot, something only to be dealt with in terms of the history of text production. To answer this question, the search for patterns, more in terms of literary analysis now, appears still to be profitable. Can we find more cases of topics being introduced seemingly too early within the book's plot? That indeed is the case. In Exod. 15 – 19, the episode from the passing through the Sea until the experiences at mount Sinai, one finds, for example, references to God's regulations: 15: 25 [see 21:1], the Torah 16:4, 28 [25] [see 24:12], and the 'testimony' 16: 34 [see 25:16,21].

Houtman [26] also sees some pattern here and speaks of a period of building trust between God and Israel. So we may need to rethink the plot. This part of the book of Exodus can be read better as an intended mixture of experiences, [27] theophany, [28] and commandments. Reading about God and Israel is reading about real life.

With reference to the introduction to this paper, one may conclude that the observed inconsistency, the complicated plot of the texts as the result of the experiences of multiple generations, is not something to filter out or to overcome, before we can enter the modern debate about God and religion. It is precisely this nature of our text data that is missing in actual debates about God and it is precisely these data that biblical scholarship is able to contribute as necessary input into the debate about God and culture. Much philosophy of religion continues to live in Humanities 1.0 and thus , unfortunately, avoids reflection on the nature of our data.

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[23]   Walter Brueggemann, *Theology of the Old Testament. Testimony, Dispute, Advocacy*, Minneapolis, 1997, 183.

[24]   *Exodus,* 375 n. 22

[25]   One could also begin a little earlier and add the special Torah on Pesach in 12:49 and 13:9

[26]   *Exodus,* 391

[27]   J.L.Ska, 'Exode 19, 3b-6 et l'identité de l'Israel postexilique', in: M. Vervenne (ed.), Studies *in the Book of Exodus. Redaction - Reception - Interpretation* (BETL 126), Leuven:1996, 289-319

[28]   F.Polak, Theophany and Mediator: The Unfolding of a Theme in the Book of Exodus, in: M. Vervenne (ed.), Studies *in the Book of Exodus. Redaction - Reception - Interpretation* (BETL 126), Leuven:1996, 113-148

Linguistic analysis and the use of databases will not solve the fundamental questions in the area of text production and interpretation. Humanities 2.0 will not be able to end discussions of text production and historical context. Classical biblical scholarship, also being reformatted as Humanities 3.0, is indeed a discipline by itself. But we need these new analytical instruments to have a sound methodology. They cannot be missed in the study of language and in presenting textual phenomena within a larger context or even within the composition of an entire book, in order to assist us in testing the arguments used for hypotheses. As a result one makes text features much more explicit, both those of the system of language and those of the complexity of the literary plot.