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The Bible in the civilization of the electronic writing: an evaluation (1985-2004)

Leuven 23 Juillet 2004

Abstract

Preparatory to the *First International Colloquium on Bible and Computer* , held at Louvain-La-Neuve University (Belgium) in September 1985, I presented a paper entitled “L'Université biblique de l'an 2000” [(Biblical University in the year 2000) *Interface* , 85/16, Été 1985, pp. 1-3.]. In 1985, I had already been working for fourteen years in the field of Bible and Computers.

It may be of interest to summarize the steps made during the past twenty years in the field and to give an evaluation of what I wrote in 1985, providing a new formulation of the status of the Bible, Bible message and Bible studies in 2004.

Summarizing first the 1985 paper (published in French), I will speak about the way we saw computers and their use in the field of the Bible (memory, speed, validation, versatility, universality of a new writing process), more and more seen as one element in a larger communication system; about specific fields where computers should help (bibliography, text processing, text analysis, statistics, multicriteria search, publication, methodology, epistemology of the textuality); about the prophetic description of what could happen in the year 2000 and the necessary critical attitude to utopian views both in terms of evolution and of human and religious consciousness.

In the second part, I will try to take a fresh look at the whole scene in the light of the preceding evaluation and to point to some new problems (intellectual creation and property and personnalism; ethic of communication; education; new anthopology; new morality; Bible as “weakness” of God; building of religious nerve centres serving the whole planet, etc.).

Following Paul (1 Cor. 6.12) and the conclusions of a conference by Jacques Ellul quoted in my 1985 paper, the ultimate questions could be: “What is really useful for mankind and for God? What builds mankind? Are the various artefacts created in the electronic world, promoting a mankind in the image of Christ's freedom for God?”

In 896, Marconi introduced us to the use of electric power for human communication. ENIAC came into service on 14 February 1946 and on 1 September 1971 I found myself in a lecture room at IBM Belgium, with nothing on my desk but the celebrated logo of Big Blue and a single word: “Think”!

In 1984 in Chicago, the Computer Assisted Research Group (CARG), which was founded in 1979 following contacts which we had initiated with interested exegetes at the SBL meeting, presented, at the instigation of Bob Kraft, the first exhibition /demonstration of information technology products which could be used by “portable” computers (IBM, Apple-II, CP/M) or terminals linked to central mainframes in relationship with the Bible domain.

In September 1985, the Association Internationale Bible et Informatique (A.I.B.I.) met for its first International Conference at the Catholic University of Louvain-la-Neuve. On that occasion I took into account all our experience over almost 15 years to try to predict what I expected the basis and trends of computer-assisted Biblical work to be by the year 2000 [R.-F. Poswick, L'Université Biblique de l'An 2000, *Interface* , 85/16, Summer 1985, pp. 1-3].

Now, almost twenty years later, I would like to present my assessment of this view of the future (I).

Afterwards (II), I would like to assess the road which has been followed during the last 20 years in the application of information technology to the Bible. We will be aided in this by the six volumes of Conference Documents of the Association Internationale Bible et Informatique (1986, 1989, 1992, 1995, 1998, 2003), the “Offline” essays by Bob Kraft and followers (1984-2000) and publications such as *Interface* (1981-2004ss), *Revue* (since 1965; online since 2001), *Computers and the Humanities* (since 1966), *Literary and Linguitic Computing* (since 1975), Le *Médiéviste et l'Ordinateur* (Avril, 1979-2003), *Notes on Computing* (since 1984), *Bits, Bytes and Biblical Studies* (1987) by John-J. Hughes, Ian Lancashire's, *Computers Yearbook* (1998-1991), *Guide to Digital Resources for the Humanities* (Oxford, 2000).

Finally I would like to present my own thoughts on research trends and the applications of electronics and information technology in the field of Biblical studies (III).

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"What is really usefull for mankind and for God?

What builds mankind?

Are the various artefacts created in the electronic world, promoting a mankind in the image of Christ's freedom for God?"

Jacques Ellul

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1. “Biblical University in the year 2000” (1985): my assesment of this view 20 years after

2. The road traveled during the last 20 years
The AIBI Conferences
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3. My current thoughts about trends in the application of computing technologies to the Bible domain

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The Bible in the civilization of the electronic writing:
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1. “Biblical University in the year 2000” (1985):
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The Bible in the civilization of the electronic writing: an evaluation (1985-2004)

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Part 1. “Biblical University in the year 2000” (1985): my assesment of this view 20 years after

1.1. A vision of the computerized information technologies and of its evolution: the electronic writing

1.1.1 From “computing machines” to “electronic writing” (or “inscription”)

Our vision of information technology is still the key to the applied work which has been done, but which has not yet borne all its fruit.
The main development has been a new awareness that a machine originally designed only to perform calculations (“a computer”) can be used for human communication in general. These are therefore not “arithmetic machines”, but “electronic logic machines”. These machines create the possibility of a new mode of writing: electronic writing.
This type of writing is based on the mastery of electric power, magnetic fields and other waves to which an increasingly large number of meanings have progressively been attached, transforming them into a “signal”. They are not only energy media.

1.1.2. Rules for writing with electronic

The rules for using this new means of communication are still in development: international technical workgroups, legal entities and standardization offices try to follow technical development.
The main rules (or level of rules) for this electronic writing can be divided into three categories:

1. Technical conventions: e.g. dimension of hols made by a laser beam to engrave a CD or DVD

In those days the issue was the definition of “registers” which could process series of 8, 16 and 32 different magnetic positions.
Today the battle rages in areas such as data storage standards: for example, the agreement/disagreement between the two rival groups, with Philips and Sony on the one hand and Toshiba and the Hollywood film industry on the other, concerning a high-density CD standard (DVD), or the slow but sure development of the USB-1, 2, etc. standard or silicon chip production technologies.

2. Logical conventions: e.g. coding from ASCII to UNICODE

In those days it was units of seven and eight bits which were used, mainly to represent figures, alphabets (preferably English) and a few special symbols… and very slow and complex programmes were needed to achieve more or less what was required.
Today , UNICODE on 16 and then 32 bits (1990-1994-2003[1]) offers new possibilities of directly addressing the equivalent of 2^{32} real analog bytes.

1 *The Unicode Standard* , version 4.0, Addison-Wesley, 2003, 1464 pp

3. Descriptions: e.g. programming from ASSEMBLER or COBOL to

In those days descriptions were limited to a few structures which could be handled by low-level programming languages (ASSEMBLER), and, using high-level programming languages (COBOL, FORTRAN, PASCAL), these could be used to solve virtually all problems from the management of graphics to sorting non-Latin alphabets!
Today, the extension of “possibilities” (despite or due to the development of technical and logical conventions) has provided pre-defined tools whose limits it is at times impossible to exceed, and which are monopolised by a few powerful operators, with a mixture of programming languages currently dominated by C++, Visual BASIC, JAVA or Linux depending on the plateform for which one leads the commercial fight.

At that time we took as our example, the processing of Masoretic Hebrew. We had just published the Concordance de l'Exode with our colleagues from the Werkgroep Informatica of the V.U. Amsterdam (1983) and we were working with Brooklyn's Mikrah computing to create COMPUCORD (1984-1985), the first serious programme for processing Masoretic Hebrew, when Van Dijk Parunak, using the linear model which we had proposed as a basis, recorded the text which was to become the text of the CATTS and Westminster Seminary (Philadelphia). This question of “code” was to continue to be a topical issue at every level during the ensuing years.
Today, the recommandations of the T.E.I., the predictions of UNICODE and the practical transmission schemes proposed by the Scholars Press team all overlap and complement each other, which fortunately in turn creates unlimited scope for all forms of coding or translitteration[1]. Numerous graphical representations exist, but, as soon as one attempts to manage a database in a non-Anglo-Saxon script coherently, the line between code and representation sometimes becomes indirect and difficult to establish[2].
Morphologically analysed versions of the Hebrew text are available from a number of producers, either under Macintosh or Windows. However, it is probably products such as GRAMCORD (1979), BIBLE-WINDOWS or BIBLEWORKS which are most reliable and most widely used in research today.

1 See *Offline* 54, RSN sept. 1996, 31.

2 A recent study of the management of Syriac characters made at our place showed the complexity of what is now on offer; the same can be said about the use of fonts with UNICODE formats as we tested it in 2002.
See also Ian Tresman, *Multilingual PC Directory*, 1991, 1994; *Multilingual computing & technology*, 1989ff.

1.1.3. The main caracteristics of the electronic writing applied to memory, reasoning and communication: Validity (control); Versatility (access); Speed (light speed; instantaneity); Volume (compact, illimited and interconnected) Universality (planetary and multisensorial: image, sound, graphs)

The characteristics of information technology/electronics as a tool which can be applied to all sectors of knowledge are worth mentioning because they shape the work in any specific domain, here the Bible.
We had described these in a French mnemotechnical form, based on the alphabet: VA-VE-VI-VO-VU (Validation - Versatility - Vitesse [speed] - Volume - Village Universel [global village]). We had attempted to measure the implications of electronics in three main areas where it is applied to knowledge: Memory, Reasoning and Communication.

1) As regards Memory, the reliability (validation) of data increases in line with the reliability of the medium (CDs, DVDs, USB keys, etc…). There are still full and instantaneous facilities for making changes (versatility) - the problem is now determining strategies to “fix” certain “states”. The speed at which data is recorded is still a bottle-neck, and depends on the level of quality which is required for the resulting databases. The question is, however, what critical weight should be given to one version rather than another. Unlimited storage volumes are now available at very reasonable prices - people now usually speak of Gigabytes - or Terabytes[1] in relation to processing images (which still require millions of bytes to store in high definition, despite compression techniques, which are still being developed) and with the shift, dictated by commercial considerations, from 8 bits code to 16 and 32 bits code (UNICODE).
This increase in volumes is compensated by an increasing miniaturisation and the development, also commercially inspired, towards total electronics[2].The Village

U niversel (Global Village) is exploding in multi-sensory multimedia (characters, sounds, images and, even “smells” or “tastes”) and also in the virtually infinite possibilities of 32-bit code (UNICODE3).

2) In the area of Reasoning , the principle of va lidating processes to ensure that they work properly has been somewhat undermined by very commercial software packages intended for the “general public”. Here it is accepted that there will be a number of “bugs” at the outset, in direct proportion to the huge number of different programmers who are usually assigned to work on these projects. Testing and validation tools are, however, developing and it is still true that a well-designed and well-programmed logical path can always be reliable in new environments.
Furthermore, the algebraic and mathematical complexity of certain new approaches (neural programming) means that this type of programming is still reserved for a small élite of researchers. The good old COBOL language is, however, far from dead when it comes to major applications – even on PCs – although Visual Basic, C++ or Linux have swept away the fashion for PASCAL, ADA and other languages which were looking so promising twenty years ago.
Programming has not improved at all in terms of flexibility (versatility) during the last ten years, as the “ready-made” programs offered by commercial producers have often restricted the options for users who do not know how to adapt their tools at programming level. Here is one example from the field of electronic phototypesetting: twenty years ago we could programme virtually all the photo-typesetting interfaces of major printing presses in COBOL. The “proprietary” systems of 1990s versions limited the options and exceptions which could be programmed (except at the cost of serious “commercial” negotiations with the manufacturer: Siemens, Linotronic or others). Now, in 2004, printers use the products which are marketed for commercial users. These are quite powerful, but they cannot guarantee correct display on complex pages with marginal notes or mixtures of Latin and non-Latin characters, etc. The inflexibilities and limitations associated with transferring an application written under DOS to Windows and from one version of Windows to a new one are so terrifying that many small companies which had a good product under DOS have not had the resources to make the migration, and have preferred to stop their development process (thanks to Microsoft!). On the other hand, the processing possibilities which are available, if one can allow oneself the luxury of controlling processes at the level of the base programming language (C++, Visual BASIC, JAVA, LINUX) are opening up new horizons, the most promising of which is the real use of images. The techniques of artificial intelligence and expert systems have not really come to the surface in the areas of literature or Biblical studies, just as they have not borne their full fruits in other areas.

Speed (vi tesse) is still progressing in line with the processes which are available from the market. The Pentium and MegaHerz levels allow all kinds of functionalities. People are getting used to instantaneous results and often do not have the patience to wait for long procedures. The aim is always to “save time”… only to lose it again while waiting for a slow response from an Internet overloaded with viruses, hackers and piracy! The volumes which can be processed, even on a PC, have become a negligible problem. And the universal character of the code still encounters some difficulties associated with the idiosyncrasies of motherboards or connections to peripherals. It is important to make these choices carefully because “imitations”, which are virtually fully compatible, are often more difficult to unmask and result in the loss of valuable time in non-productive tests.

3) The great “boom” has clearly, since the impulse received from the Clinton administration (1992), taken place in the area of Communication . Globalism (Universalité) is even the foundation of the INTERNET concept. This is a very real issue, but there are questions which need to be asked about it: is globalism only for the rich? What is the “global value” of the concepts and the information which is available there?

Va lidity continues to depend on the quality of telephone lines and the available bandwidth. Remote medical manipulation is a test of validity. If this sort of information has to be transmitted, we are right in thinking that a stray “bit” in the transmission of a variant of the Hebrew Bible can no longer be a scientific catastrophe! Transmission on CD or DVD is even more reliable, but it is subject to the limitations of managing a CD or DVD library, which is no easier to control than the stacks of diskets used by the first PCs without hard disks. Jukeboxes of various capacity are more and more needed, adding access time and complexity to the hardware configuration. Migration of the many files according to the evolution of standards is a heavy burden for serious mid- and long- term preservation of an electronic writing.

Transmission speeds [vi tesses] are advancing everywhere, but the lines are still clogged during working hours! If CD or DVDs still have slightly slower access speeds than hard disks, it is because our demands for instantaneous results are progressing at the speed of changing technologies.

Printing is, however, still a bottle-neck. The quality obtained from laser or ink-jet printers (black and white or colour) has increased to almost rival print quality (although not everybody has typographical training, so the average quality of printed publications has fallen significantly). But we have no guaranties that documents printed with ink burned in the laser processing or heating can last for decades. This ink may return to dust on a life-span!

1 1,000 billion bytes. N.b.: The Masoretic Text amounts about one Megabyte; the Septuagint amounts about three Megabytes; the Greek New Testament is about one Megabyte; a French Bible with the Catholic Canon (Bible de Jérusalem) amounts about seven Megabytes (included introductions and notes).

2 As an example, one could mention USB keys where amount of storage reaches today more than a Gigabyte.

3 With almost 25,000 of the 50 or 60,000 Chinese characters with direct adressing; but with still a problemfor Masoretic Hebrew for which “Shin” and “Sin” have to be distinguished by programming on two different addresses (see R.-F. Poswick, *Informatique et Écriture Sainte* , in Un debattito sulle nuove tecnologie, Rassegna di Pedagogia, LX, 3-4, 2002, p. 152)

1.2. The application of the electronic writing to the Bible domain(s)
1.3. Global trends derived from the nature of the electronic writing and its application to the Bible domain(s)
Part 2. The road traveled during the last 20 years :The AIBI Conferences; The CARG/SBL meetings; Publications in the field
Part 3. My current thoughts about trends in the application of computing technologies to the Bible domain
Part 4. General Conclusion

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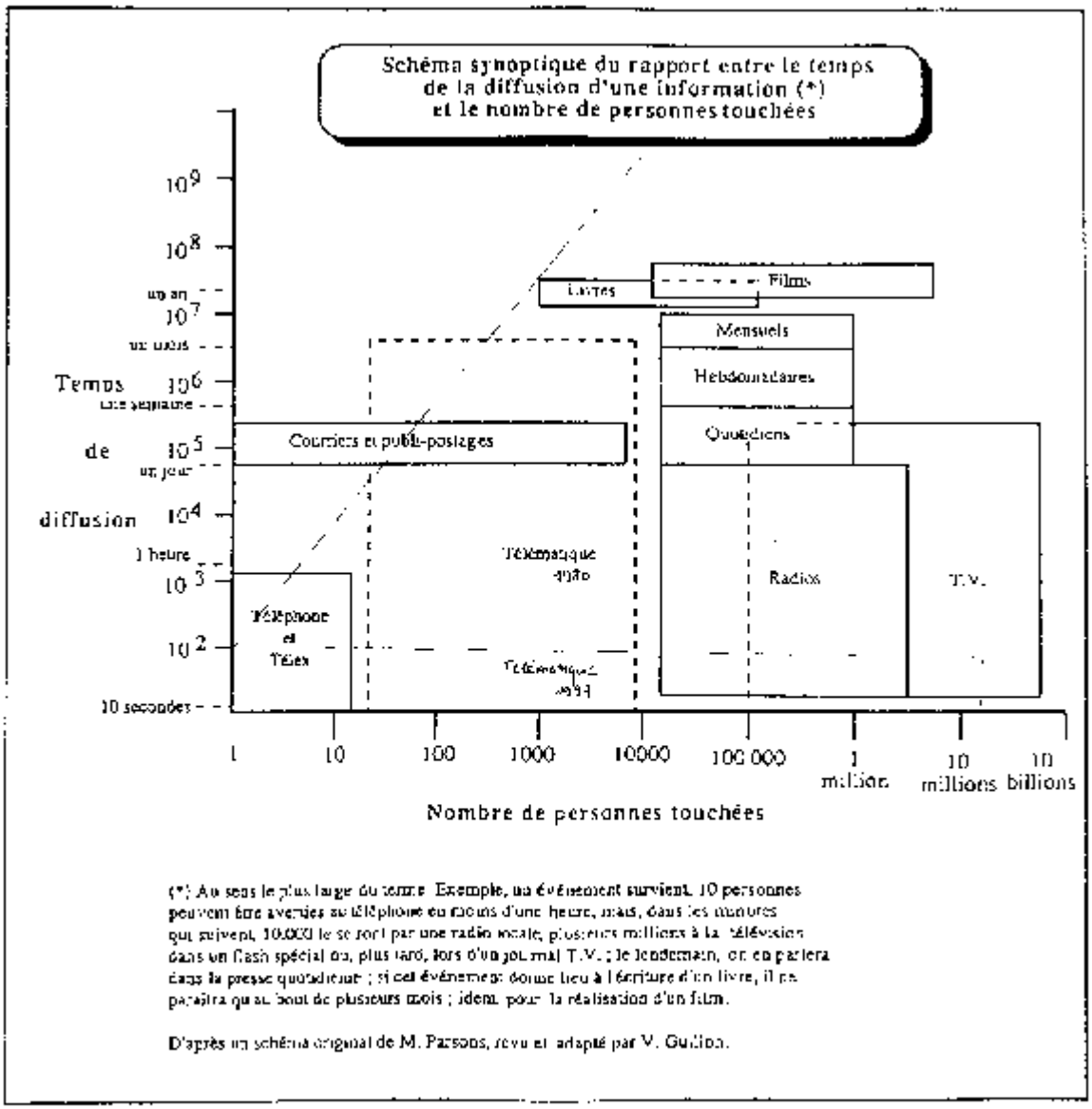

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Part 1. “Biblical University in the year 2000” (1985): my assesment of this view 20 years after ▶
1.1. A vision of the computerized information technologies and of its evolution: the electronic writing ▶

1.2. Application of the “electronic writing” to the “Biblical domain”:

Bibliography
Manuscript's Study
Textual criticism
Unity, authenticity, chronology of Biblical writings
Philological analysis (from morphology to meaning)
Statistics
Concordances, lexica, dictionaries
Linguistic, literary, sociocultural criticism
Editing - Publishing
Methodology
+
Archeology

1.2.1. Bibliography:

at Maredsous we have not systematically followed the bibliography of the Bible and Information Technology beyond G. Servais's contribution at the first AIBI Conference[1], and this work has been completed by the bibliographies of Chr. Delcourt, *1986 en Belgique* in *Revue* 23, 1987, pp. 239-250 of J.-J. Hugues[2], Ian Lancashire[3] and J. Adamo[4]. Access to CD-ROMs of Biblical bibliography[5], and the huge numbers of catalogues which are available on-line[6], are making bibliographical research easy and it is even becoming “overwhelming” due to the number of works available. There is still a need for classification and, above all, critical evaluation of this impressive mass of data, and it is increasingly being seen as an area where serious work will be needed in the future.

1 G. Servais, AIBI-1, Louvain-la-Neuve, Actes, pp. 311-321.
2 *Bits, Bytes & Biblical Studies* , Zondervan, Grand Rapids, 1987, 603-616 & passim.
3 *The Humanities Computing Yearbook* , Clarendon, Oxford, 1988, 1991.
4 *Bibliografia di Informatica Umanistica* , Bulzoni Ed., Rome, 1994.
5 ATLA, Biblical Studies, Indexing of Journals, Articles and Essays, 1949-1994, 1995-2004 (CD-ROM).
6 See, as a good example the Rutgers Bibliographical tool at http://religion.rutgers.edu/vri/bible.html. Two web sites in Europe develop Biblical bibliography: BIBIL at Lausanne University and TEOLDI(BILDI) at Insbruck University.See also J. Oesch, Literaturliste zur 'Computer Assisted Analysis of Biblical Texts', in *Homepage RüdigerHeinzerling* (3.7.2001).

1.2.2. Manuscript study:

progress with automated catalogues of manuscripts in the field of Biblical studies is slow,

since the computerization process often requires new descriptions and hence laborious preparatory work. Several projects have been carried out on deciphering manuscripts using image analysis technology, particularly on the documents from the Judean desert. Some progress seems to have been made, however, on the relationship between different copies of a single text[1].

1 G. P. F. Farthing, Detailed Textual Stemmata by means of Probability Theory, in *Proceedings of the 4th International Conference Bible and Computer* : Desk and Discipline, Amsterdam 15-18 August 1994, Paris Slatkine-Champion, 1995, 214-222; G. P. F. Farthing, “Community of error” may or may not mean community of origin… in *Proceedings of the 5th International Conference on Bible and Computers, Aix-en-Provence, 1-4 Sept. 1997* , Paris, Champion-Slatkine, 1998, 391-405. See also M. Spencer, K. Wachtel and others, Representing multiple Pathways of Textual flow in the Greek Manuscripts of the Letter of James Using Reduced Median Networks, in Computers and the Humanities, 38/1, Febr. 2004, 1-14.

1.2.3. Textual criticism:

When it comes to establishing a critical text, the computer is often used as a super word processor, obviating the need for transcriptions and rewriting of characters during the research process leading up to a publication. This is the case in the Biblical Societies' project to create a *Biblia Hebraica Quinta* [1]. There has been little progress in cataloging the variations between existing classical “critical” editions.
Even the theoretical questions associated with comparing different versions of texts do not appear to have advanced[2]. The real issue today, is how to decide what to call a “critical text”: is it the best imaginable reconstruction by a knowledgeable and competent individual, or is it permanent access to the “critical file” with its different hypotheses[3]?

1 J.A. Sanders, *The Hebrew University Bible* and *Biblia Hebraica Quinta* , JBL 118/3, 1999, pp. 518-526.
2 J.M. Lancashire, *The Humanities Computing Yearbook 1989-1900* , 405-409 (with description of software like Collate or URICA); W. Ott, Computers and Critical Editions, in J. Hamesse, ed., *Méthodologies informatiques et nouveaux horizons dans les recherches médiévales* , Turnhout-Paris, 1992, 139-157.
3 D. Trobisch, From New Testament Manuscripts to a Central Electronic Database, in *Bible and Computer, Proceedings of the 6th AIBI Conference* , Stellenbosch 17-21 July 2000, Leiden, Brill, 2002, 427-433.

1.2.4. Dates, authenticity and unity of writings

The phonering work of A.Q. Morton in Edinburgh aimed at discriminate the authenticity for the Pauline Letters.
A vast amount of statistics has been applied to Biblical text[1]. None, however, has taken the risk of a general critical application, which can be set against the results of classical exegesis.

1 See notably G.K. Barr, A Computer Model of the Pauline Epistles, *Literary and Linguistics Computing* , 16/3, 2001, pp. 233-250.

1.2.5. Morphological analysis:

the texts of the Bible (Hebrew, Aramaic and Greek), are available in several morphologically analysed versions. Questions still need to be raised on the base text which has been chosen and the grammatical theories underlying the processes of lemmatisation and morphological analysis, since the comparison between these analytical databases may result in divergences. These are not very significant for most users, but they could lead to diverging results at research level[1]. The oral form of the Biblical texts still has not benefited from the possibilities opened up by a computerised approach.

1 H. Hane, Avoiding the pitfalls of Computer-Assisted New Testament Grammatical Analysis, *Proceedings of the Fourth International Colloquium Bible and Computer: Desk and discipline, Amsterdam 15-18 August 1994* , Champion, Paris, 1995, pp. 223-233.

1.2.6. Other levels of analysis

(notably: syntax, discourse analysis, semantic, pragmatic, etc.) These can be found in GRAMCORD and, to a considerable extent, in the work of Amsterdam Werkgroep

Informatica for Masoretic Hebrew. However classical Biblical exegesis would not appear to be benefiting as yet from the results of this type of analysis. It is true that the questions raised by computerised formalisation go beyond simply changing the interpretation of details: they concern the very idea of grammar, the concepts of language and writing and the legitimacy of its nomenclature[1].

1 See the work of H. Schweitzer, *Metaphorische Grammatik* , Eos Verlag, Einsiedeln, 1981; Introduction to the Hermeneutical Concept of the *Third AIBI Conference, Tübingen, 26-30 August 1991* , Paris-Genève, Slatkine-Champion, 1992, 33-44; Ch. H.J. van der Merwe, Towards an electronic Biblical Hebrew Grammar, in *Proceedings of the 4th AIBI Conference, Amsterdam, 15-18 August 1994* , Paris-Genève, Slatkine-Champion, 1995, 419-429.

1.2.7. Mathematical statistics:

If the use of statistics in Biblical Studies is not yet systematic, despite the useful reference models which are now available in the field of literature, there are more and more application of those tools in the Bible domain[1].
On the other hand, we must report on a strong gematric renewal taking place in the Cabbalistic tradition. This movement, which is centred in Israel, seeks to base interpretations on the numerical structure of the Hebrew alphabet,… and has all the dangers of fundamentalism inherent in a system which claims to go beyond small literary units[2].

1 R.-F. Poswick, Si la Bible m'était comptée, in *4e Journées d'Analyse Statistique des Données Textuelles* , CNRS, Nice, 1998, 517-527; A. Machet, *La voie des Nombres, Comptes de la Bible grecque* , Lyon, P.U. Lyon, 1996; F. Andersen and A.-D. Forbes, *The vocabulary of the Old Testament* , Rome, Pont. Ist. Biblico, 1989.
2 F. Langlamet, Arithmétique des Scribes et texte consonantique…, in *Revue Biblique* 90, n° 3, 1990, 379-413; and F. Langlamet, Secrets numériques de la Bible, in *Revue Biblique* , 109/2, 2002, 306-308.

1.2.8. Concordances and lexicons

have flourished during the last few years, with the new YOUNG compiled by Whitaker for Eerdmans[1]. Even more revolutionary, because it is an absolute cultural and religious novelty in the Romance languages, is the analytical concordance of the T.O.B., which has been produced at I&B-Maredsous[2].
The printed version of all these tools have become obsolete, since they are too difficult to use for long, slow searches based on a single criterion. The databases of Biblical texts allowing multiple-criteria searches will soon be the only tools which are used in this area. The range of products available on the market is constantly being renewed, extended and enhanced (particularly in the English-speaking world).
If tools which use to be reserved for exegetical specialists are made available to a wider public, our texts may come to be seen in a new light.

1 The Eerdmans Analytical Concordance to the R.S.V. of the Bible, compiled by Richard E. Whitaker, Eerdmans, Grand Rapids, 1988.
2 Concordance de la Bible TOB, Paris, 1993; electronic version under Heuriciel ®, CIB-Maredsous, 1996-2004. The first Concordance of this kind ever published in the roman linguistic field!

1.2.9. Linguistics and literature

The work of E. Nida[1] in the area of linguistics applied to the Bible and the efforts of the correspondants of the SIL in Dallas[2], are pointing to possible directions of formalization in these areas.
The general use of word processing and some control programs to facilitate auxiliary work in translation practice are progressively replaced by toolboxes programmed for the help to translators. Their concern is to standardize procedures to help not to duplicate works already made in other translation fields[3].

1 E. Nida, The Contribution of Linguistics and Computers to Bible translating, in *Proceedings of the 5th AIBI Conference* , Aix-en-Provence, 1-4 Septembre 1997, Paris, Champion, 1998, 27-38.
2 See their *Notes on Computing* , since 1984.
3 See notably D. Rowbory, ShoeShop and Merging Shoebox Databases, *Notes on Computing* , vol. 21/2,2002, p. 16-21. D.F. Coward (ed.), The Shoebox Container, *Notes*

on Computing , vol. 21/1, 2002, p. 8-14.

1.2.10 Editing

To a large extent, in the area of Biblical research, the book (Gutenberg) is still the economic network which is supporting electronic publishing (Marconi). Gutenberg is still paying for Marconi. Electronic publishing has made a leap forward, with the advent of CD, DVDs and the INTERNET, but it will still be some time before the sources which are really important for Biblical research are available in a full and reliable electronic Form. While hundreds of commercial products are available in the market, they have seldom been produced on a truly critical basis.
The choice has to be made between products aimed at "the general public" and products aimed at "professionals" – with all the associated economic consequences.
The same has to be said about a very large number of Websites offering texts of the Bible (even in the original language) and helps for the study of the Bible. To get some critical view on the offer takes time. But the Internet is the place where the Biblical University of 2000 flourishes strongly.

1.2.11. Methodology

"Guides" are still flourishing. Among the most useful of these are those published by the CTI Centre for Textual Studies in Oxford[1]. These open the way to a pedagogical rationalisation of this area: Gregory Bloomquist[2] attempted to take this necessity into account. Should methodological considerations, however, be limited to a pedagogical re-arrangement? The fourth Conference of the AIBI (Amsterdam 1994) indicated this shift away from the tool and towards the organisation of the material being studied, without providing any real thoughts on a new methodology for Biblical studies[3]. After the publication in the U.S.A. of guidelines for higher education by the Committee on Information Technology Literacy, under the title *Being Fluent with Information Technology* [4], one has to take for serious the need of a higher standard knowledge in the field for Bible scholars[5].

1 *Resources Guide* , 1994, L. Hugues and S. Lee ed. CTI, Oxford Univ. Computing Services, 1994; *Guide todigital resources for the Humanities* , Oxford, 2000.
2 G. Bloomquist, SBL-meeting, Chicago 19-22 Nov. 1994, *Offline 47* , RSN, Nov. 1994, 32-33.
3 Concerning the application of pedagogy in the field of literature see: *Computers and Teaching the Humanities* ed. By M. Popham and Lorna Hughes, CTI, Oxford Univ. Computing Services, 1996; P.W. Flint, The Bible and the Dead Sea Scrolls, in *Proceedings of the 6th AIBI Conference, Stellenbosch,17-21 July 2000* , 323-336; R.-F. Poswick, L'informatique a-t-elle renouvelé le travail des exégètes de métier? in *Lumen Vitae* , Vol. LVI/4, 2001, 423-434.
4 Washington D.C., National Academy Press, 1999.
5 R.-F. Poswick, I *nformatique et Bible - 2003* , in *Ruch Biblijny i Liturgiczny* , Vol. XXXV, 2003 (issue in honour of Professor Jerzy Chmiel, Pontifical Academy of Theology in Cracow).

1.3. Global trends derived from the nature of the electronic writing and its application to the Bible domain(s)
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Leuven 23 Juillet 2004

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1.3. Global trends

The third part of my article in 1985 first attempted to describe what I expected the Biblical University of the year 2000 to be like and also to outline a theological debate on the status of the Biblical message in the new environment.

a) Hope of a shared research: it is begining only with the interconnexion since a decade

The creation of strong "links" between Biblical centres which have become servers and high- speed telematic connections between them, with an agreed international division of work, is still not a reality, despite the progress of the INTERNET. The main programmes which will be used to learn Biblical languages, consult bibliographies, carry out research at all levels and states and translate texts, are not yet accessible to all. BBSs, Forums and other electronic systems are creating new links between some scholars, but it cannot be said that there is any concern or desire to share these results (which are often in a very rough form) with a wider circle… except, sometimes, much later in an occasional printed publication.
Access to this research for all – students, believers and pastors – is a possibility for those who have time to surf on the INTERNET… provided that their judgement is formed (by whom? and how?) to allow them to discern what is valid and what is not and, above all, to discern everything which is not for serious use among the available material.

Flat office screens, integrated into the work surface, did not appear in a diversified and real form until CEBIT (Hannover) in March 1996.

Many other elements in my story have not yet become a reality.

b) Hope of a theological debate on the consequences of the use of the electronic writing in the fields of the Bible and its message

As for the theological debate… it does not seem to me to have made much progress at all – at least not under the specific angle of a confrontation of the Biblical message coming to the information culture.
Pope John Paul II gave a message at the world Catholic media day in 1990 on this subject with as title: "The Evangelical Message and the Information Culture"… but it took a lot of holy intrigue even to get permission to show him a Bible on a PC! The problems which are arising relate more to the new anthropology which is being developed by the media culture in general[1]!

1 See R.-F. Poswick, Pour une conception chrétienne de la Culture électronique: vers l'Homo Creativus, *Interface* , 90/38, 1990, 4-5; Message chrétien et culture informatique, *Esprit et Vie* , 20, 17 mai 1990, 273-280. … and, among others, the followings works:

- D. Lockhead, T *heology in a Digital World* , Toronto, U.C. Publ. House, 1988.
- J. Berleur, Langage Naturel et Intelligence Artificielle: Quelques Réflexions épistémologiques, in *3e Conférence de l'AIBI, Tübingen, 26-30 Août 1991* , Paris-Genève, Slatkine-Champion, 1992, 377-408.
- J. Courcier, Bulletin de Philosophie des Sciences: Herméneutique, Sciences et Écritures, *Revue des Sciences Philosophiques et Théologiques* , 75 (1991), 257-300.
- J. Habermas, *Morale et Communication* , Paris, Cerf, 1991.
- H. L. Dreyfus, *What Computers still can't do* , Boston, M.I.T. Press, 1992.
- J. Hamesse, ed., *Méthodologies informatiques et nouveaux horizons dans les recherches médiévales* , Turnhout-Paris, Brepols, 1992.
- Traitement Automatique des Langues (T.A.L.), *Spécial Trentenaire* , Vol. 33, 1-2 (particularly: R. Schank, Knowledge, Memory, Learning and Teaching, 175-190).
- Ch. Arthur, ed., *Religion and the Media* , Univ. of Wales Press, Cardiff, 1993.
- R. Debray, *Traité de Médiologie* , Paris, Fayard, 1993.
- B. Brandon Scott, *Hollywood Dreams and Biblical Stories* , Minneapolis, Fortress Press, 1994.
- M. Simon, ed., *La peau de l'âme, Intelligence artificielle et neurosciences* , Paris, Cerf, 1994.
- R.-F. Poswick, article in *Lumen Vitae* quoted above, 2001
- R. K. McIver and M. Carroll, Experiments to develop criteria for determining the existence of written sources, and their potential implications for the Synoptic problem in *Journal of Biblical Literature* , 21/4, 2002, 667-687.
- K. Bulkeley, The Gospel according to Darwin: The relevance of cognitive neuroscience to religious Studies (reviews), *Religious Studies Review* , 29/2, April 2003, 123.

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2. The road travelled since 1985

Three main sources of observation:

2.1. The Acts of the A.I.B.I. Conferences (since 1985)

2.2. The CARG meeting at SBL (since 1979)

2.3. The publications, mainly the Offline and ***Interface*** bulletins

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Part 2. The road travelled since 1985

Three main sources of observation:

Developments at the CARG within the SBL meeting have taken place practically in parallel, although following an annual rythm, with the Conference cycles of the Association Internationale Bible and Informatique (A.I.B.I.) which was founded in Namur in 1982. These two meeting-points can be seen as indicative of the developments which have taken place over the last twenty years.

2.1. The Acts of the A.I.B.I. Conferences (since 1985)

Five themes highlight the progress which has been made in Biblical research:

a) The Text: Louvain-la-Neuve, 1985 (Acts published in 1986)

this included the creation of databases, either computerised or in the process of being computerised, for the Masoretic text, the Greek text of the LXX, the Peshitta or the modern versions, alongside the first presentations on microcomputer. Some rather limited trials of exegetical and methodological results were also presented. The call for international collaboration did not really bear fruit during subsequent years.

b) Methods, Tools, Results, Jerusalem, 1988 (Acts published in 1989)

the quantitative analysis of textual elements was well represented at this conference, with a call not only to compare linguistic phenomena, but also to find standards for semantic analysis. Various tools were exhibited, which can be used for the analysis of manuscript images, for automatic textual correction and for the transcription of textual variants. Research software packages for microcomputers were presented, alongside the large databases being created at CATTS, in Amsterdam and in Stellensosch. Telematic access to a major Biblical studies database through the French Minitel network, with the first search being carried out in Jerusalem through this channel, marked the arrival of the Bible in the world of electronic telecommunications. CD-ROM and Smart- or e-Book made an appearance in experimental form, and the importance of electronic mail for researchers was emphasised.

c) Interpretation, Hermeneutics, Expertise, Tübingen, 1991 (Acts published in 1992)

The “text” was still the main foundation of Biblical studies, but textuality was called into

question by the tools which can be used on computers. The many different facets of textual transmission have met the virtually infinite possibilities of computerised manipulation. As a result, and at the instigation of Prof. Harald Schweizer, research has to concentrate on the roots of significance through all the other layers within the text. Semantics and hermeneutics were at the heart of the debates at the Tübingen Conference.The rather brutal transition to the widespread use of microcomputers has slightly slowed down pioneering heavy information technology work, but it has at the same time produced an almost anarchic explosion of works, among which it will take some time to sift out what is truly excellent.
The discussions focused on the automatic processing of natural languages and the epistemological status of language in the environment created by artificial intelligence. It became clear that there was no “reference framework” for the various works which were seeking to apply IT tools to the field of Biblical studies, and in particular to the “word” of the Bible.

d) Desk and Discipline. The impact of computers on Bible Studies, Amsterdam, August 1994 (Acts published in 1995)

The title itself marked the development in people's thinking: what information technology was bringing about was no longer simply a series of minor changes. The scope, the principles and the purpose of the research (the Biblical message or the Biblical text) were also being transformed.
Information technology is generating a new concept of Biblical Studies. Like a telescope or a microscope, it does not modify the object observed, but it does call into question all the theories which have been established through an ordinary vision of the same material.

e) Translation and Transmission, Aix-en-Provence, 1997 (Acts published in 1998)

This title demonstrates a new awareness of a domain which needs to be analysed, above all, in the context of a theory of communication and of cultural embeddedness. There is no text without a context, and no meaning without a cultural tradition. More and more one has to take into account that computer science linked with telecommunication generates a new culture in which the Biblical culture has to develop its meaning. How to translate the Bible today in an electronic and multimediatic writing?

f) The Bible from Alpha to Byte, Stellenbosch, 2000 (Acts published in 2002)

This Conference adressed quite all the fields of Biblical research made with the help of computer's science or technology: new ways in Biblical research (A. Pietersma); grammar of Biblical languages; statistics; discourse analysis; manuscripts and text-criticism; textual criticism; multimedia and education to the Bible; translation and commentaries; search engines on the Bible and Bible domain; electronic publishing; pragmatic; etc.
It shows a “ripe” field of research, ready for international collaboration through the help not only of the personnal use of computers, but in relationship with others using Internet.

Conclusion and Trends

Thus, the move was from the Text considered as unique possible base for Biblical studies with the help of computers, to an explosion of new virtualities for exploring any kind of data from manuscripts or archeological materials to meaning (semantic). Understanding the communication's frame where in the Bible Text and Message, and the Computer's technics have to be seen, is a shift of paradigm from exegesis based on a philological approach, to hermeneutic based on a linguistic and socio-linguistic approach.
Transmission of the Text within its cultural contexts become more and more important and begins to be handled on by very large hypertextual and multimediatic databases around the Biblical Text, pointing to a new kind of “ *Glossa ordinaria* ”.

2.2. The CARG meeting at SBL (since 1979) ▶
2.3. The publications, mainly the Offline and ***Interface*** bulletins ▶
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2.1. The Acts of the A.I.B.I. Conferences (since 1985)

2.2. The Sessions of the CARG (1979-2003)

1979

- A Hebrew-Greek lexicon of the Septuagint (Bob Kraft)
- Statistics (H. Van Dyke Parunak)

In 1979, we had presentations by Robert A. Kraft, J. Abercrombie (Univ. Pennsylvania) and Raymond A. Martin (Wartburg Theol. Sem.) within the framework of the I.O.S.C.S. with a feasibility study for a Lexicon of the Septuagint, and the first fruits of work on a descriptive Hebrew-Greek lexicon. At the same time the first session of the Computer Assisted Research Group, headed by John C. Hurd, presented the work of H. Van Dyke Parunak (Univ. Michigan) on linguistic density[1], and that of Timothy Friberg and Peter Paton (Univ. Minnesota) on some statistical tools for exploring the New Testament.

1 Published in two volumes (XXVII-A and XXVII-B) of *The Computer Bible* a series initiated by J. Arthur Baird in 1971.

1980

- GRAMCORD GREEK N.T. (Paul A. Miller)
- The "Maredsous" Hebrew text (R.-F. Poswick)

In 1980, Paul A. Miller (Indiana University) and James L. Boyer appeared with the initial outline of their GRAMCORD Programme for New Testament Greek.
At the same time Van Dyke Parunak continue to explore the Biblical lexicon with the help of statistical tools.

1981

- Hebrew Dictionary (Francis I. Andersen and D. Forbes)
- The "Michigan" Hebrew text (H. Van Dyke Parunak)

With John C. Hurd still in the chair, Francis-I. Andersen (Queensland, Australia) and A. Dean-Forbes presented, in 1981, the Hebrew Dictionary which they were creating, and Van Dyke Parunak spoke about the electronic Hebrew text which he had decided to create at the University of Michigan. At the same time, a forum of projects at hand was inaugurated. For a number of years, this was to be a focal point of information on the progress of computer-assisted work.

1982

- "Tools for the Study of the Septuagint" (Bob Kraft)
- A.I.B.I. presented (R.-F. Poswick)

The 1982 CARG session was entirely and primarily centred on the University of Pennsylvania's project “Tools for the Study of the Septuagint”, directed by Robert A. Kraft. At the same time we were asking ourselves whether there was not a need for an institution outside the SBL, bringing together everyone interested in the area, as well as a specialized periodical and a bibliography of work at hand. It should be noted that it was in 1982 that we had the opportunity to present, at CARG, the creation of the Association Internationale Bible et Informatique (A.I.B.I.) as well as the bibliography of the area, published in the booklet *Centre: Informatique et Bible* [1].

1 Brepols, 1981, pp. 88-164

1983

- Epigraphic sources in Hebrew
- Peshitta New Testament

The epigraphic sources of Hebrew and the New Testament Peshitta represented the main presentations at the 1983 CARG.

1984

- Bob Kraft chair the CARG meetings
- COMPUCORD HEBREW DATA BASE on PC (Maredsous and Mikrah)
- Religion Index (ATLA)

1984 saw two changes: from now on Bob Kraft chaired CARG, and for the first time, with the help of his team, he organized demo booths in Chicago from 8 to 11 December 1984. Mikrah, Gutenberg, MacHebrew, ATLA Religion Index, Kurzweil, and IBYCUS all showed off on a variety of office computers. The “focus” of the CARG meeting was on the use of micro-computers, whilst Paul A. Miller's projects on the New Testament and those of the University of Pennsylvania on the Septuagint represented the lion's share of the presentations.

1985

- Computer services for the humanities
- CATSS = “Computer assisted tools for Septuagint Studies” (Talmon, Tov, Kraft)

The theme of the 1985 meeting at Anaheim was the centralization of computer services for the area of human or literary sciences (humanities), spearheaded, as always, by Bob Kraft's team. This team had also made contacts with the Hebrew University of Jerusalem, in the persons of Shemaryahu Talmon and Emmanuel Tov, who made their contribution to the creation of CATSS (Computer Assisted Tools for Septuagint Studies). However, the hard core of persons active in the area consisted of researchers like Abercrombie, Carson, Fox, Hurd, Miller, Martin, Pastis, Parunak, Poswick, Segal, Whitaker, Wright, and Zahavy.

1986 - Archeological applications (3-D images)

In 1986, the CARG meeting was more technical. The concern was on archaelogical applications (3-dimensions images), management of ancient characters, and making use of the potential offered by video disks to add sounds and images to characters. Outside the CARG Bob Kraft also presented, in a debate with Gene M. Tucker, the basic problems posed by the arrival of the computer in Biblical sciences under the title: *Reshaping Research Habits: The Role of the Computer in the Function of Biblical Studies* .

1987

- Computerized workstations for research, teaching and publication
- The Bible in Ancient and Modern Mediagroup “Paradigm Shifts and Media Change in the History of Biblical Interpretation” (E. Boomerschine)

At the 1987 CARG meeting in Boston, we looked at possible models for fully computerized workstations for research, teaching and publication work. In addition to presentations and demos, a very large number of “projects” presented themselves and reported on their research: Brigham Young University, Jeffrey W. Gilette (Duke University), Centre Informatique et Bible (Maredsous), Packard Humanities Institute, Pennsylvania University

CATTS, University of Toronto, M. Stone (Armenian Inscriptions Database), John J. Hugues (Bits & Bytes), Hebrew University, Westminster Theological Seminary, Trinity Evangelical Divinity School (Carson and Miller), Harvard University, and the University of Stellenbosch (J. Cook).
Another session focused on videodisk technology, described as the “new papyrus”.
In the same year, the SBL Meeting's *Bible in Ancient and Modern Media Group* section received two major communications, which were largely discussed. One was Thomas E. Boomerchine's *Biblical Megatrends: Paradigm Shifts and Media Change in the History of Biblical Interpretation* which showed how the application of electronics to the Biblical area was likely to produce an upheaval in the cultural relationship whithin the Biblical area. The other was Ronald W. Roeschke's *Dream/Brain/Text: The Media-Brain Connection in Mental Processing Texts* , which attempted to report on the latest advances in our knowledge on the mechanisms of the brain and memory, in order to find the matrix of textuality.

1988

- Hypertext and Data-Bases on CD-ROM the CD-Word Library (Robin Cover)
- Syntactic analysis of Hebrew by the werkgroep Informatica of Amsterdam (Eep Talstra)

1988 brought a session of the Association for Oriental Research devoted to applications of computer sciences to archaeology. The CARG topic for the year was Hypertext in the context of database consultation on CD-ROM. This session was chaired by Robin Cover (Dallas Theological Seminary) who was already working on his *CD-Word Library* . Among the “projects” or centres represented at the session, we saw the Werkgroep Informatica (Vrije Universiteit Amsterdam), Princeton Theological Seminary, and the University of Sheffield. The syntactic analysis of Hebrew on the one hand, and the corpus of Qumran text on the other appeared to constitute the most advanced projects.

1989

- The “Scanner”
- Oxford Text Archive (Susan Hockey, Lou Burnard)
- Thesaurus Linguae Gracae (Ted Brunner)

At the 1989 meeting in Anaheim the “scanner” was the focus of attention, and we also spoke of electronic text archive centres. Susan Hockey and Lou Burnard from the *Oxford Text Archive* and Theodore Brunner from the *Thesaurus Linguæ Graeæe* contributed to what was becoming increasingly a forum for computer applications to literature, with the Bible as the main element.

1990

- Computer Aided Instruction (CAI). (Alan Groves)
- Humanities Computing in the Academy (Ray Harder)
- The Text Encoding Initiative: T.E.I. (Robin Cover)

1990 saw two sessions. The first, chaired by Alan Groves, looked at Computer Aided Instruction (CAI). Picking up the title of my 1985 article, Raymond Harder proposed “ *Humanities Computing in the Academy: Visions of the University of 2000* ”. We saw the Hypercard projects (Biola University – Ron Pierce), presentations of the Biblical manuscripts (CATAB, Lyon – Philippe Cassuto), the Armenian database (University of Leiden – J. Weltenberg), linguistic and literary research (SECLAR, S.I.L. – Dallas – Steve De Rose), Mesopotamian materials (Univ. of California – Giorpio Buceltati), Greek syntax (Univ. of Manchester, U.K. – Gordon Neal), and again the first traces of the *Text Encoding Initiative* (T.E.I. – Robin Cover)[1]. The second session was devoted to a panel on *Text Linguistics and Computing* , chaired by Walter Claassen (Stellenbosch).

1 This was developped to a very important standardization proposal in the line of SGML. See *Guidelines for Electronic Text Encoding and Interchange* , by the TEI Consortium, Guidelines P4, 2 vol., Oxford, etc., March 2002, 1068 pp.

1991

- On-line databases: RELIGION, HUMANIST, IOUDAIOS
- American Bible Society multimedia Bible pilot project (Th. E. Boomershine)
- Intellectual property and the Bible in the USA and Europe

1991 saw academic networks and the exchange of electronic information with the start-up of RELIGION, HUMANIST and IOUDAIOS. The Rutgers and SBL Electronic Archiving Centres were presented. A working session on telecommunications access was also offered.
In the *Bible in Ancient and Modern Media Group* , we looked for ways and means of transfering the Bible into a multi-media environment with the *American Bible Society* (ABS) pilot project presented by Thomas E. Boomershine (United Theological Seminary). A CARG session was devoted to the *Text Encoding Initiative* (T.E.I.) for ancient texts.
Another very challenging session, which also pointed to quite substantial divergences between American and European practices, examined the problems of copyright and intellectual property in the computerized environment. Most of the major players from the North American side were present and represented, and agreed almost unanimously in wanting the ancient text to be made available free of charge for the purpose of research.

1992 - Accessibility of academic databases in networks

CARG asked itself about the manipulation and role of electronic images and the accessibility of academic databases in networks. A session on network distribution was led by the main CARG players for participants of the parallel group of the American Academy of Religion (AAR). The University of Ottawa was strongly present in the persons of Gregory Bloomquist and Michael Strangelove. We attempted to develop a model for “academic” publications in telecommunication mode.

1993 - Multimedia teaching (Th. E. Boomershine, David L. Bars, Phil Mullins)

At the session of the SBL's *Bible in Ancient and Modern Media Group* , held in Washington in 1993, Thomas E. Boomershine demonstrated the multi-media programme using the pericope of the Gerasene demoniac. With his respondents David L. Bars and Phil Mullins, a critical reflection began on multi-media as a teaching instrument and as a tool of methodological reflection.

1994 - The Electronic Massorah (Ray Harder)

CARG discussed Ray Harder's *Electronic Massorah* project in one session, and “Standards and Methods” for electronic texts in another, where I defended the pragmatic approach of R. Schanck, who believes that the future of text research should be based on the principle of *Case-Based-Reasoning* (CBR), and not on *Rule-Based-Reasoning* .

1995 - Joint AAR and SBL CARG meeting on scientific periodicals on-line

The joint AAR and SBL session under the aegis of CARG was interested in the publication of scientific periodicals in the religious area in electronic network form (Philadelphia, 1995). The group on the Greek Biblical lexicography included reflections on the use of electronic resources for work in this area. At the same time, with Ray Harder in the chair, CARG attempted to evaluate the contribution of the WEB and networks to religion courses and, again, defined standards (T.E.I.) of coding and presentation for Hebrew and other Biblical languages.

1996
- Standardization of texts according to the T.E.I. (Winfried Bader, R.-E. Whitaker)
- The Bible as Electronic Text (Fowler, Poswick, Roschke, Blayone, Mullins)

1996 stressed the proposals of standardization for text presentation made by the Text Encoding Initiative (T.E.I.) with Winfried Bader (German Bible Society). Another session presided by R.E. Whitaker tried to go further in the definition of standards for Encoding and transcripting texts in Biblical scholarship. The panel got inputs from John A.L. Lee, James R. Adair, Patrick Duruseau, Kirk E. Lowery and others. Parallely, a joint-session of the Bible in Ancient and Modern Group and the CARG discussed *The Bible as Electronic Text* under the presidency of R.W. Fowler. I had the opportunity to present there a first version of the present paper. The whole session had to be published as one issue of Semeia, but never was!

We had interesting proposals from Ron Roschke (*Beyond the Page: A Hypertextual Model of Textuality*), Todd J. B. Blayone (*Computer-mediated Christian Tradition: Towards a Theory of Transmediatization*), Phil Mullius (*Meaning and the Bible in Electronic Culture*) with an interesting discussion on all those topics on the basis of response by Robert A. Kraft and Thomas E. Boomershine.

1997

- Electronic Texts for Scholars (Whitaker, S. Hockey, P. Robinson)
- Encoding Hebrew syntax (Kirk E. Lowery)

In 1997 there was at the SBL meeting, a special seminar “Electronic Standards for Biblical Language Texts” again presided by Richard E. Whitaker with inputs from Susan Hockey (*An overview of Electronic Texts for Scholars*), L.M. Barth and B.A. Taylor (on the T.E.I. for Hebrew or Greek), Peter Robinson (The Future of Critical Texts). A second version of the same Seminar brought together a large pannel of participants creating working groups “to formulate proposed standards for encoding primary and secondary materials and critical aparatus for Biblical langage texts”.
The CARG under presidency of J.H. Hunt discussed proposals of Kirk E. Lowery for encoding Hebrew syntax; when a second session examined Multimedia and *Network Applications to teaching a Research in Religion* under presidency of J. Schofer.

1998

- Teaching the Bible through the Web
- The Electronic Standards for Biblical Language Texts (Dick E. Whitaker)
- The use of XML (Steven Holzner)

Teaching the Bible through the Web, was the main topic of the CARG first Session in 1998. When D.P. Schmidt presided another CARG session introducing a discussion about the use of XML (Steven Holzner). On another part, the Seminar on *Electronic Standards for Biblical Language Texts* continued its reflection under the presidency of Dick E. Withaker.

1999

- The Perseus projet (G. Crane)
- Tools for teaching (A. Benney)

This last discussion was continued in the same seminar in 1999 under presidency of Susan Hockey, examining the *Perseus project* (G. Crane) and the *Markup Systems* (A. Renear). When the CARG puts its attention on the *Tools for teaching: Where is the teacher in the multimedia(ted) Classroom?* (A. Benney). The Seminar on Electronic Standards for Biblical Language Texts continued also its work with quite the same group of people.

2000 - The Johamine Literature Website (Felix Just)

In 2000 Kirk E. Lowery delivered a reflection on “ *The Cyber Scholar in the Brave New Millenium* . At the same session of CARG Felix Just presented *The Johannine Literature Website* as a “model for subject specific research sites”. The second CARG session was again devoted to *Teaching with Technology* .

2001 - Collaborative and Distributed Scholarship (Keith Reeves)

At the 2001 session of the *Bible in Ancient and Modern Media Section* there was an evaluation of the last ten years of *Experiments in New Media Translation* under presidency of Robert M. Fowler. When the CARG under presidency of Keith Reeves explored *Collaborative and Distributed Scholarship* , various collaborative projects were presented. The Seminar on Electronic Standards continuing its work under R.E. Whitaker presidency. Another CARG session presided by Jimmy Adair presented various ongoing projects notably a program to evaluate the quality of data in databases (K.A. Wilkerson).

2002 - The Quest for a Unicode Tenach (Kirk E. Lowery)

I point in the 2002 CARG meeting that Kirk E. Lowery was struggling with *The Quest for a Unicode Tenach* among other presentations.

2003

- The Hypertext Bible Commentary (Tom Berkeley)
- The All-in-One Biblical Resources (M.S. Goodacre)
- BIBIL database of Lausanne (Thomas Naef)

2003: The “Computer Assisted Research Section” focused on research and pedagogical web applications, notably *The Hypertext Bible Commentary Project* presented by Tom Berkeley (Auckland), the *All-in-One Biblical Resources Search* of M.S. Goodacre (Birmingham, UK), or Thomas Naef (Lausanne, Switzerland) about the BIBIL database. In another session we had contributions of Bob Kraft on papyrology and P. Dureseau on technological standards in the field, notably.

Conclusion and Trends

With its annual cycle searching for the last technological breakthrough, the CARG sessions since 1979 and other seminars since 1996 followed closely the commercial development of hard- and software.
Encoding of Hebrew and Greek texts, specialized databases (epigraphy, Armenian, etc.), first use of micro-computers for Bible related data, dominance of the CATSS team with its Hebrew-Septuaginta parallel text, 3-D images for archeology, hypertext, CD-ROM, text archives, scanning technics, encoding standards (T.E.I.), network access for research, multimedia prototypes, pedagogical use of electronic tools… were among the topics adressed, with, some reflection on “reshaping research habits”, “paradigm shifts in Biblical interpretations”, “intellectual property issues”, “towards the new university”.

2.3. The publications, mainly the Offline and ***Interface*** bulletins
Part 3. My current thoughts about trends in the application of computing technologies to the Bible domain
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The Bible in the civilization of the electronic writing: an evaluation (1985-2004)

Leuven 23 Juillet 2004

Part 1. “Biblical University in the year 2000” (1985): my assesment of this view 20 years after
1.1. A vision of the computerized information technologies and of its evolution: the electronic writing
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2.3. Publications

Mostly the ***Off-line*** Bulletin and the ***Interface*** Bulletin

2.3.1. Previous bibliographical sources

No attempt will be made here to indicate all the literature which has appeared following the bibliographical supplements to our basic bibliography[1] completed by G. Servais in 1985[2], by John J. Hughes in 1987[3], and by Ian Lancashire in 1989[4] and 1991[5].

1 Centre Informatique et Bible, Brepols, 1981, pp. 88-164.
2 AIBI-1, Louvain-la-Neuve, Actes, pp. 311-321.
3 J. J. Hughes, Bites, Bytes & Biblical Studies, Zondervan, 1987, pp. 605-616.
4 I. Lancashire ed., The Humanities Computer Yearbook, 1988, Clarendon, Oxford 1989.
5 I. Lancashire ed., The Humanities Computer Yearbook, 1989-1900, Clarendon, Oxford, 1991, pp. 18-22 and passim.

2.3.2. Offline 1984-2000

But “the” chronicle in this area has been Robert Kraft's *Offline* pages, from 1984 to 1994; he was followed by Patrick Duruseau and James R. Adair in printed form up to February 2000.
At the start, one agreed on the vocabulary of the area, and were concerned to code the transliteration of Hebrew and Greek. One asked what was the best computer. One prepared and reported on the work of the CARG within the SBL meeting. One attempted to locate resource persons. The variety of micro-computers on offer required to call, in 1986, for volunteers to advise about Apple-II, Apple Macintosh, Commodore 64, Compaq, Dec Rainbow, Epson QX10, IBM (PC, XT, AT), KAYPRO, OSBORNE, (CP/M), SANYO MBC 555, TELEVIDEO (CP/M), TRS80, Zenith Z-100, etc.!
The CCAT (Center for Computer Analysis of Texts) CD-ROM was obviously at the centre of proposals and advice.
In 1987, for the F.A.Q. (Frequently Asked Questions) Bob Kraft referred to the book by John J. Hugues (*Bits, Bytes & Biblical Studies* , Zondervan, 1987, pp. 605-616) who joined him in preparing his no. 18 *Offline* chronicle.

Back from the joint ALLC/AIBI conference in Jerusalem in 1988, Bob Kraft gave his impressions: emergence of the *Text Encoding Initiative* (T.E.I.), computer-assisted

publication, development of significant databases, problems posed to textuality by hypertext, and the appearance of the “Smart Book”, where data can be placed on a credit card.

Later, it was the increasingly commonplace use of word processing in universities which struck out the chronicler (*Offline* 22, March 1989) whilst the effort to create electronic text archive locations, such as the *Oxford Text Archive* , merited everyone's attention.

Increasingly, the chronicle was extending its field to the computer treatment of the literary domain in general. But the scene was developing, as Robin Cover brought home to us preparatory to the 1991 CARG session. Researcher's needed to look beyond their own areas. Not only were the changes taking place making there productions a much more powerful tool in electronic than in printed form, but the very nature of research and its quality criteria were likely to change (*Offline* 33, 1991).

The fields of study and interest were extended to include papyrology in general and egyptology (*Offline* 39), and also to the Arabic domain (*Offline* 38).

In 1992, access to INTERNET was via university computing centres, by COMPUSERVE, MCiMAIL, THE WELL, THE WORLD, PORTAL, NETCOM, AMERICA ONLINE, SINGLE SOURCE, PANIX, HOLONET, HALCYON, CONCERT, CLEVELAND FREE-NET, FIDONET, for no more than USD 100 registration fee and USD 10 to 30 a month (*Offline* 39).

The same year, at the end of the CARG meeting, *Offline* 40 announced the AIBI-L forum edited by Gregory Bloomquist, working from the University of Ottawa. Michael Strangelove listed sixteen sites at which Biblical resources were available in network mode, whilst R. Weiss described *The Online Bible* also available in network, and at that time considered as one of the most complete electronic Biblical resources, even if the sources are often old editions.

Bob Kraft pressed readers to experience for themselves the network revolution and to allow themselves to be submerged by its fluctuating diversity, in order to find new paths for research (*Offline* 42). In September 1993, the push by the Clinton Administration, transforming the “Net” into the “Information Superhighway”, was perceived as an opportunity for the scientific and educational community (*Offline* 43).

The 44th edition of *Offline* (Febr. 1994) celebrated the 10th anniversary of Bob Kraft's chronicle. In it he announced that he was “passing the baton for his chronicle”. Increasingly, *Offline* was reflecting only priority happenings in the networking area. Homage to Bob Kraft for his many years of patient educational work was given, before the new *Offline* 45, in the May 1994 edition of *Religious Studies News* , which also recognized his fathering of the IOUDAIOS electronic forum.
Patrick Duruseau took over coordination of the chronicle, emphasizing the large diversity of levels: from the person discovering the area for the first time to the UNIX specialist!

The INTERNET phenomenon dominated editions of *Offline* from late 1994 onward. A small status report was given by the new co-editors, James R. Adair and Patrick Duruseau in *Offline* 50 (Sept. 1995). They reminded us that, when Bob Kraft predicted that the computer would replace the typewriter, DOS dominated, and one had to tell people that one was working in MS-DOS, whilst CP-M and Apple-II operating systems still florished. The reference to the USA, in the Biblical area, was the work of John J. Hugues and we worked in BASIC or PASCAL. Everything was done with 5 1/4 diskets and 360K. Ten years after, INTERNET was a flourishing reality and one megabyte of hard disk cost nothing, printers give almost printshop quality and Bill Gates has become the richest man in the world. For them, the future will take the form of a move from ASCII to UNICODE (32 bits), single platform computers for all types of operating systems (Windows, MAC/OS, OS/2, etc…), machines operating at over 200 Mhz and disks able to stock terabytes (billions of Gigabytes) as well as quadruple CD-ROM's containing 100 times as much as today. The INTERNET or its successor will be a complete communication tool (image, sound, characters) in real time and in high quality, and even books will be consultable online from libraries.

The latest editions of *Offline* (51 to 68) available to me pose once again the basic questions of text encoding with a view to online communication: taking into account the format proposed by the T.E.I. and of all possible forms of access. The “text” here can even become the manuscript sources themselves, as in James J. Tanker's (University of Western

Australia) *Electronic New Testament Manuscript Project* .
In fact, it was continued up to number 68 (February 2000) with mostly news and evaluation about various websites or portails of interest to humanities, religion and Bible studies.

Electronic journals in the Biblical and religious domain are now available online, such as *Religious Studies News, Semeia, Biblical Archaeologist, Critical Reviews of Books in Religion, Journal of the American Academy of Religion* … a joint project by Scholars Press (a very active agent behind all these developments) and Emory University Libraries under the name of SELA[1]. Paper publication have been mostly abandoned after 1998 or 2000[2].

1 *Religious Studies News* , May 1996, pp. 3-25.
2 *Biblica* from the Biblical Institut of Rome offers the full text of its publication in the web since n° 79 (1998) – without the *Elenchus of Biblica* .

Conclusion and Trends

The *Offline* chronicle confirms all the steps already seen in the CARG meetings.
Just as he made for the computer's field at large and the world of the micro-computers since 1982-1983, Bob Kraft dedicated himself to jump into the networks and BBS flood to prove by example the validity of those new ways for research, and specially in the field of Biblical studies.

Presence into the media is necessary to know the real virtualities and limitations that brings the electronic writing to give a new shape (and even new objects) to scholarship, education, culture and the way we may see the world… and… God!

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Part 3. My current thoughts about trends and challenges in the application of electronic writing to the Bible domain

We have seen:

1. What was the vision of the application of electronic writing to the Bible Domain in 1985, mostly: tools to help in the various subfields of scholarship

2. How research developped since 1985: the Internet took over and gave its real dimension to the electronic writing using quite all its caracteristics

In this final section, I would like to point to some of the areas of reflection that constitutes for me the new context for Biblical studies and Biblical scholars. I will deal with: intellectual property, communication ethics, education, anthropology morality and, finaly, the proposal of a new theological view on the place of the Biblical texts in the dynamic of an electronic writing's culture.

3.1 Intellectual property

Intellectual property is quite a recent way of dealing with human creativity[1]. Despite the difference in the vision which North American and European legislators have on the problem of literary property and copyrights, there are reasons to think that Theodore Holm Nelson's forecasts in his *Xanadu project* [2], which seemed at the time utopian, are in the process of becoming a reality. Nelson foresaw that the whole of “humanist” creation, involving all the “arts” (including “literature”) would be managed economically on the model of the major sound and image medias. This means registration of creators or producers in copyright associations, and payment of the same authors or producers through taxes on distributors.
In this perspective, the whole network system becomes one large market in which every new “entry” is ascribed a value in proportion to its use. With all the risks of commercialization going out of control, with the risk that marginal elements which demand an effort and interest, or a commitment of faith, could become even more marginal, crushed by the “access meter” which will replace TV audience monitoring services. Reducing cultural value to its robotic and virtual equivalent on the market and to its selling value is a real danger.
The Bible and the whole culture which it presupposes and which it represents, is in danger of finding itself, more than in the 500 glorious years of the Gutenberg era, totally marginalized, in the same way as Jews and Christians are once again becoming a minority

in a planetary world united by the same network techniques.
Cooperative work through networks will be (and is already) a way to give an impact to Bible studies in the new culture.
But who own all the basis of culture? Commercial entities? The owner of large communication and computers companies?

1 See the discussion refered to in 2.2. above, and the text by Doug Brent (Calgary) in *E-journal* , Vol. 1/3,Nov. 1991 (French translation in *Interface* , 93/49, 4-6; 93/506-7) and, as an example, the interestingpublication of *Sacred-Texts Copyrights* in the Rutger's Religion Index online.
2 T. H. Nelson, *Literary Machines* 90.1, Mindful Press, Sansalito, CA, 1990.

3.2 Communication ethics

The boundaries between “research” in the strict sense of the term and “dissemination” are becoming increasingly less clear-cut. The development of tools to verify the validity, pertinence and credibility of information are going to become essential in a context in which anyone can bring masses of information presented in good media (and ludic) format, whitout any relationship with the content proposed.

Just as a “code” of correct behaviour (“netiquette”) appeared very quickly on the networks – which does not mean that this code is observed nor that it is the best possible code – in the same way procedures for evaluating and “advice” on the level and quality of information will develop.
This applies eminently in the Biblical and religious area, where it appears that networks (and production) are more rapidly occupied by small esoteric or marginal, if not sectarian groups.
Moreover, this phenomenon is likely to increase in so far as, through the networks, it is difficult right now to obtain a true overall view of a phenomenon, of a geography of relationship, of the exact sources of information, of the qualifications of a discussion group, and of the people involved (unless one knows them personally).
The breaking down of academic groups and major research networks into small select or specialist groups will become an increasingly important reality. Where will coherence come from?

All this calls for very large and very critical communication ethics, based on a sense of the “common good”. The fact is that we will have to wait a long time for a global authority (other than the communication “standards”) to regulate communication at the world level.
Between the freedom to think and say everything anywhere and to anyone, without any regulation on the one hand, and inquisitorial police control on the other, we need to develop patterns of healthy communication, in the spirit of the Biblical message itself: a normative word which promote liberty, justice and charity, and the electronic inscription of this word which carries the same truth for everyone, in his/her cultural difference.

3.3 Education

In order to attain this objective, it is certain that computerization will have to be seen as a major process for new education. In any situation it is changing all the educational habits of the past. The greatest “revolution” is perhaps to be found at this level.
But have those responsible for religious education and Biblical training looked beyond the simple changes in technical methodology (desk) and taken into account what has been changing in the very vision of their area (discipline) and in the psychology of people educated in increasingly electronic and multi-media environments? [1]
The changes most frequently pointed to are those of practice: distance learning, ludic teaching software, self-evaluation and individual progress, the involvement of the family and a proximity circle in the learning process, multi-sensorial control of knowledge. But there are also changes at the level of mental structuring: reduction of memory (memorization) in favour of memories (recall of earlier experiences); development of creativity and intuition to the detriment of reasoning and logic (now widely available in the form of algorithms encapsulated in computer programmes); the development of a de-grammaticized language moving, on the one hand, towards the global language-logo (the prototype of which is the “window” of the cartoon strip, or a new kind of pictogram system) or global multisensorial language[2].

In such an evolution, it seems very difficult to transmit a “revelation” or “word of God” which is locked into a literary corpus (even with fully guaranteed “canonicity”).

This means that Biblical studies will take increasingly into account the whole set of human factors of which the Bible text provides a trace which is certain and historic, but which is fragmentary, fragile and partial compared with a larger, multi-sensorial and fully human presentation of revelation3. Hermeneutics will have to be extended and find areas for criticism which are very different from those related to source criticism, historical criticism and literary criticism. With the powerful microscopes of computers, research will have to place more attention on the receiver (audience criticism) and on the criticism of transmission, than on the sender of a message. “Reading the Bible today requires an increased sensitivity, not only to the Biblical text within its original context, but also to the present context of our actual approach of the Bible. Personnal, political, economic, cultural and ecclesiastical situations condition our reading of the Bible. The neglect of an attentive and correct 'reading' or analysis of our present life context will lead just as surely to a fundamentalist reading of the Bible as the neglect of the elementary rules of form criticism”[4]. The major disciplines of recent decades will become auxiliary disciplines, the hypotheses of which will also be strongly called into question through the immediate presentation of almost exhaustive dossiers on Biblical texts from the original manuscripts (in improved direct vision) to the latest interpretations and critical hypothesis. What we shall see is transmission in a multi-media language, where only the comparison of several “interpretations” (as in the case of music) will be able to give the sense of the real message.

1 Sh. Turkle, *The Second Self* , Simon Chuster, New York, 1984 (Trad. franç. *Les enfants de l'Ordinateur* , Denoël, Paris, 1986); see also the global and critical reflection in an important issue of the *Journal of Communication* , 1996, 46/1.

2 As reported by P. Babin in *Évangélisation et médias* , Symposium of the 4th World Religious Videomarket and Multimedia Forum, OCIC, Köln, 28 Sept. 1996, quoting A. Mehravian: “7% is in the message, 38% in its expression (voice, selection of words, rythm), but 55% is in the body language (gesture, eyes, body position)”. See also: P. Babin and A. Zukowski, *The Gospel in Cyberspace* , Chicago, Loyola Press, 2002 (first published in French *Médias, chance pour l'Évangile* , Paris, Lethielleux, 2000).

3 See here the remarkable document of the Pontifical Bible Commission in Rome: *L'interprétation de la Bible dans l'Église* , 18 Novembre 1993.

4 *Reading the Bible in Context* , contribution of the Southern-European group to the 5th Plenary Assembly of the Catholic Biblical Federation, Hong-Kong, 2-12 July 1996. See also: Th. P. Osborne et R.-F. Poswick, éd., *Bible et Cultures* , coll. Bible et Vie Chrétienne, Paris, Lethielleux, 2001.

3.4 Need for a new anthropology
3.5 ... and a new morality
3.6 A new theological view of the Bible as “weakness” of God
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3.4 Need for a new anthropology

Over and beyond these pedagogical evolutions (which at times will touch on certain elements which appear to us today to be linked to the very nature of the Biblical message, just as, in a epoch of a dominant Græco-Latin culture, the vision of man “composed” of body and soul imposed its pattern on the Biblical message), a new vision of man will take shape.

I have described this new *anthropos* , human being elsewhere[1] as a *Homo creativus* , taking over from the *Homo faber* and the *Homo sapiens* . After mastering physical forces and extrapolating them into machines, man is now developing his mental forces and extrapolating them into electronic cybernetics.

With this double mastery, the man of the future will develop his brain faculties well beyond what has been possible until now, and in directions which he himself will be able to decide on, according to Marvin Minsky[2]. The mastery of his environment and his inter-dependence with respect to the society of which he is part will make him first and foremost a creator: not just in terms of image, sound, and art, but also for developping models of the planet, and beginning a systematic exploration of the solar system… and beyond.

This human being inhabits the planetary village. The great challenge now becomes that of maintaining genuinely “personal” life within an envelope in which “body” has a very different weight and quality compared to our current feelings, partly because its virtual image will be more and more present in a realistic way.
It is here that I see the specific contribution of the Biblical message: a structuring of mankind and of life in society which uses the new masteries and the new electronic resources to strengthen personality and at the same time reinforce social mediation – against to the natural trend of informatics to develop individualism or even an existence evanescencing in virtuality and hence, in parallel, the anonymous inclusion in the mass and/or in the media (mass-media!)[3].

Man's greater mastery of his evolution and of the future of the planet places him more solidly in his role of co-creator, conferring on him responsibilities which will demand a

growth of consciousness and social structuring which is fairly close to the visions of Teilhard de Chardin in this area… with critical and scientific verification as well.

Does this growth concord with the "plan of salvation" revealed by the Biblical message – or are we in danger of arriving at the impasse which Jacques Ellul denounces in his works[4]?

1 R.-F. Poswick, Message chrétien et culture informatique in *Esprit et Vie* , 20 May 1990, p. 273-290 and *L'adieu à Gutenberg* , Interface e-86 (Juin 2002)

2 M. Minsky, Why people Think Computers Can't? in *The Computer Culture* ed. D.P. Donnelly, Ass. Univ. Presses, Cambury, 1985.

3 This was the topic of the reflections developped throughout the *Journées de réflexion sur l'informatique* (Namur, 1982, 1984, 1986, 1990), the Deeds (Actes) of which have been published by the *Presses Universitaires de Namur* and of the *Journal de Réflexion sur l'Informatique* (no. 34, February 1996) whichwe have founded together with the Facultés Universitaires de Namur. See also the current reflexion around the *Matrix* trilogy.

4 See notably: J. Ellul, Questions que l'on peut poser à l'informatique et se poser au sujet de l'informatique à partir de la Bible, *Journées de réflexions sur l'informatiqu* e, Namur 21-23 mai 1982, PUN, 1982.

3.5 ... and a new morality

All these modifications of the human being, in his person, in his means of apprehension of real life, in his relationship with others and the world, will necessarily contribute to changing life "codes".
Already at the level of the elementary ethics controlling the use of electronic data and relations within telecommunication networks, we have seen a whole series of practices progressively develop.
The notion of property in general will probably evolve in the same way as that of intellectual property, as a function of a new step, or indeed of a new degree of socialization of humanity.
The line of reflection which has marked the widest Christian tradition, and which has developed around concepts of "sin" and "redemption", will progressively give way to a much more Biblical, richer and more positive line, that of the axis of "creation" and "resurrection"[1].
The notion of "individual salvation" will be untenable if it is not integrated into a new vision of community. Solidarity will be one of the main virtues, as, in its wake, will be the quality of relations with others and the quality of man's relationship to the environment.

1 M. Fox, *Original blessing* , Bear & Company, Santa Fe, 1983.

3.6 A new theological view of the Bible as "weakness" of God

What will the Bible and the Biblical message become within this global evolution? If we view the present change in the system of writing in the same way as the move from pictogramic and hieroglyphic cultures to the phonetic and alphabetic culture started 3000 or 4000 years ago, is there not a danger of sweeping away 2000 and 4000 years of culture?
Was not Scripture " *Holy* " only because it became the basis of culture, the ultimate reference point, the "regula" (line of ordered characters)?[1]
Fortunately not so. Ultimately the Jewish, and subsequently the Christian tradition, have always given the last word to the oral Torah, to tradition, and to the life of the Spirit.
This means that the present upheavals due to the adoption of electronic writing are going to require us to call into question any concept linked to the "letter" (in the alphabetic sense).

It is in this way that I would like to propose that today we consider the Bible as one of the concrete signs of this weakness of God who expressed himself personally in the person of Jesus (for the Christian or for the person who believes in the Law of incarnation as the central revelation of the God of Abraham, Isaac and Jacob).
This perspective is probably the only true way, today and tomorrow, of referring to the message (and the "text" of the Bible). This is because it gives full force to a Law which encompasses both the message and the text, coming down on the side of meaning and hence of the finality of what the believer sees as being "revelation".
Confucius said: "Words are in the King's power. If words change their meaning, the empire is in danger".
For the Jew as for the Christian, God has taken the risk of a human word, and this word progresses and develops, like children moving towards maturity. For this reason, our

tradition is not afraid of words changing their meaning. The electronic culture will give them a new meaning. But the inscription of the message in words from different times, as the testimony of men who have born mankind's relationship with the one God, becomes the very sign of God's own message: the weakness which calls for relationship and which we call “love”.

1 See: Regis Debray, Dieu, un itinéraire, Paris, Odile Jacob, 2001.

Part 4. General Conclusion

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Part 4. General Conclusion

After more than 30 years' of work to apply computer science and technology to the Biblical text and message, I continue to uphold the evaluation I made in 1985 on the evolution of this area of research and of cultural life. Just as I continue to stand by the 12 questions which I put to those in charge of the media in the Catholic Church as far back as April 1983[1].

Tendencies which were perceived then have all confirmed themselves, even if the questions put to those handling the Biblical area and to the communities which take the Bible as their basis have not yet received satisfactory answers.The evolution of hardware and software have made the use of electronic writing commonplace. The use of telecommunication as the locus of the most recent and most promising developments of this form of written communication give to this way of communication a new social dimension.

In this environment, the development of Biblical research will therefore move from the Bible as “text” to the Bible as “communication”. That is, from research limited to a culture centered on the Biblical text to research which is hypermediatically linked to non-textual aspects and to extra-Biblical cultures, and from the accumulation of electronic texts to the construction of hyper-textual links between them with all the cultural data which permit their interpretation.

In the USA, one figure has dominated and has guided this whole development, our friend Bob Kraft, an indefatigable teacher. At times seemingly lost on the informatics flood, he has always returned to the ark. The fact is that there is still no solid ground on which the ark can rest!
We must therefore scan the horizon for signs of calming and stabilization.

I see some signs in a certain disappropriation of the text and of the Biblical message by those who, for centuries, have viewed themselves as the jealous depositories of the same.

This text and this message will be able to continue their action only if they are seen as a normative word which promises liberty, justice and charity for everyone.

This engenders the need for an education which takes into account the total communication and the whole human personality as a vector of the “revealed” message.
An education which sets out to achieve the *Homo creativus* , with a higher degree of consciousness and integrated into society in a more structured fashion, so as to be able to take charge of his own evolution and that of his environment as a genuine co-creator.
Only a theological reflection on the creation-resurrection axis can provide the framework for such a development.
At the same time the Biblical message will be seen increasingly as this trace of the incarnation which expresses the very heart of the message of a God (measureless) who wants to enter into a dialogue of love with his creature (limited).
Like the colours of rainbow, these few juxtaposed ideas form a sign only for the person who wishes to decipher a message from it. They form the background to the “logo” of the Centre Informatique et Bible at Maredsous.

1 R.-F. Poswick, *Les Églises et l'informatique* , Meeting of European bishops responsible for the media (Bad Schönborn, April 1983), *Interface* 84/14, Summer 1984, p. 2-3.
See also R.-F. Poswick, *Globalité multimédiatique et universalité chrétienne*