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Abstract

In the first half of the 20th century, visionaries imagined electronic access to all of human knowledge. The Internet and WWW initially focussed on text and born-digital materials. Since 2000, there has been a trend to digitize existing documents and increasing attention to an internet of things. This is pointing towards a new book of nature. Some see an upcoming trend towards brain-interfaces, whereby computing as we know it today will soon be obsolete. As a result interface design tends to focus on connecting: a) with an outside world, and b) directly with an inner world of thoughts.

This paper explores the need for another domain for interface design, examples of the inner world that have been expressed in historical documents and other resources in memory institutions. These can give us new access to earlier systems of thought and alternative systems of knowledge. There is a need to search for letters, symbols, images, schemas, charts as well as words. A creative future requires that we learn to access and see old records in new ways. An internet of things is a first step towards an internet that includes no-things: reflecting the threefold human body, mind and spirit.

1. Introduction

In the first half of the 20th century, visionaries introduced the metaphor of a Global Brain (*Gehirn der Welt*) and imagined electronic access to all of human knowledge. The first decades of the Internet and the WWW, while acknowledging images and multimedia formats, focussed on text and born-digital materials. Since 2000, there has been a trend to digitize existing documents and increasing attention to an internet of things.¹ Ironically, the move towards electronic “bitification” of the world is accompanied by trends towards reification, as if to counterbalance the trends towards the virtual, virtualization, the nano- and the invisible.

In the first two decades (1969-1989), the Internet brought c. 1 million users. In March, 2012 there were over 2.2 billion fixed line Internet users² and 1.2 billion mobile internet users,³ with predictions that these will rise to 5 billion by 2017. Hence, within five years, the Internet will be used by more than 70% of the world’s population and this could expand to almost 100% within a generation. Increasingly, computers and especially mobile devices are also connecting to embedded systems.⁴ Hence, the emerging network which is connecting people, is pointing also to a new interactive Book of Nature.

Some trends in computing bypass human beings. IBM has predicted that an artificial brain can be achieved within a decade.⁵ Other trends are towards brain-interfaces,⁶ whereby computing as we know it today would soon be obsolete. As a result, interface design is increasingly focussed on connecting: a) with an outside world, and b) directly with an inner world of thoughts. This paper explores the need for another domain in interface design, namely: earlier systems of thought and alternative systems of knowledge. This requires a reorganization of knowledge and new access at the level of individual letters.

2. A New Book of Nature

An earlier essay (2007)⁷ described trends towards a new book of nature. It identified four major developments: 1. capturing and mapping the world (remote sensing); 2 reconstructing the world (CAD); 3. recognition of the world (cf. facial recognition); 4. embedding the world (sensors) and explored the implications of their integration. In the past, knowledge of the world was recorded in manuscripts and books stored in memory institutions. Increasingly mobile electronic devices with cameras allow us to record the physical world and link it with recorded knowledge such that the physical world becomes an interface for our knowledge.

These developments promise new efficiencies in terms of practical operation in the physical world, especially for tele-operation, tele-presence, advertising. The trend towards an internet of things brings a trend towards present-day interfaces, with new emphasis on the now, on contemporary knowledge and information, on social networks which reflect current reactions, views, and opinions. At the same time, this trend also threatens our historical understanding of the human condition. Traditionally, human beings were seen as threefold: homo triplex⁸ summarized by the word SAL (salt as siel, anda and lekamen or body, mind and spirit). This was reduced to a matter - spirit or a body - mind dichotomy.⁹ The new trend brings a danger that humans are seen only in material terms, as body, actions. Hence, there are new challenges for interfaces to introduce new access to our past and keep alive our threefold awareness.

3. Earlier Images and Systems

In theory, the past is already integrated within the Internet and major search engines rely on words as their interface to the past. This approach is inadequate. Entering the term “timeline” leads to 20,200,000 hits in Google without any indication of accuracy or thoroughness. One automobile timeline begins in 1769. An American site on automobiles begins in 1901.¹⁰ How is a student who wishes to learn about the history of a familiar object to distinguish between them and learn “the facts”? Wiki allows users to rate pages but provides no criteria for identifying the qualifications of those who give the ratings. Google Scholar provides 733,000 hits for Plato and yet, aside from one citation, the first three pages list none of his books and give no hint that the teacher of Aristotle was one of the greatest Western philosophers.

Major political leaders and artists of the past are easily found (Appendix 1) and yet they remain problematic. In the past decade, the hits of Alexander the Great have grown from 26 to 33 million. Those of Hitler have grown from 8.5. to 137 million. The names Hitler, Adolf Hitler and Adolph Hitler all variants of a single name, produce dramatically different numbers of hits, as do different versions of Mao or Polykleitos. Why have Charles V’s hits less than doubled while Napoleon’s hits increased tenfold? Neither is producing new work. Why does an artist such as Salvador Dali have more than six times the hits of Picasso and three times the hits of Leonardo and Michelangelo? None of us has time to sift through millions of hits. How can these be reduced to manageable numbers? We need tools to distinguish primary and secondary literature, scholarly studies (monographs, articles) from discussion lists and blogs. We need interfaces that integrate variant names (who); that visualize studies chronologically (when), and spatially (where); that distinguish between physical products (what), methods (how), and theories (why).

On the surface, the integration of earlier images and systems is well underway in the form of digital library projects¹¹ ranging from international initiatives such as the World Digital Library and Europeana to Google's project to scan 130 million books within the next decade. Such projects reproduce analog books, manuscripts and documents from the past in digital form. This is a fundamental first step and also merely a prelude to what is possible.

3.1. Levels of Knowledge

The long history of libraries and memory institutions introduced clear distinctions between levels of knowledge: e.g. definitions in dictionaries, explanations in encyclopedias, studies in articles and detailed studies in monographs. These distinctions are reflected in search engines such as Google but not integrated systematically. For instance, a search for encyclopedias produces 47,800,000 results. Encyclopedias French produces 8,540,000 results, while the subset, encyclopedias French 17th century produces 18,400,000 results of which the first pages list no actual names of encyclopedias. In the case of dictionaries, there are 131,000,000 results. Dictionaries French gives 58,300,000 results. Dictionaries French 17th century gives about 1,700,000 results. This is a considerable contrast to Garnier's great corpus of 24 French language dictionaries from the 9th to the 20th centuries,¹² which are online, but only accessible via subscription. Direct, free access to standard reference works is not yet evident. Indeed, reference works needed to access historical knowledge are increasingly a domain controlled by commercial companies such as ProQuest, with subscriptions not available to individuals.

4. Letters vs. Words

We have dictionaries for the meanings of words and we have etymological dictionaries for the history of individual words. Search interfaces are primarily based on words although there are recent trends towards using images as a starting point for queries (e.g. Google Image). The early internet evolved from notions of hypertext, again based on a principle of a link between a word in one document and a word in another document. Such links underlie the current World Wide Web and their value is obvious. Needed is a new level of granularity where the history and meanings of individual letters can be traced systematically.

4.1. Letters and Alphabets

Simple linking for individual alphabet letters is already found in Wikipedia and Wiktionary.¹³ Needed is a more systematic treatment of the meanings and history of individual letters¹⁴ that allows us to trace their history through different alphabets and links with cosmological systems. By way of an example, Xi (uppercase Ξ, lowercase ξ) also written ksi is the 14th letter of Greek with a gematria of 60. It is related to Phoenician Samekh (𐤍). A Slavic version of ksi clearly shows a star and the path of sun (figure 1a). The curving descending line is marked 1. The line ascending to the star in the upper right is marked 2. Xi is much more than an abstract letter: it is a record of the annual cycle of the sun. The star is the invincible star linked with Indian mansion of the moon 20 (Nakshatra. Purva Ashada) and specifically with Delta Sagittarii. Hence, the straight line leading back to the star is along the Gemini-Sagittarius axis which marks the sun's moving away from the centre of the galaxy in Gemini (summer solstice) and then back towards the centre of the galaxy in Sagittarius (winter



Figure 1. Ksi (Old Slavic), Jud, Iud (Chaldean), Exi (Coptic), symbol for sublimation in alphabet of Magi.

solstice). Indian mansion 20 is ruled by Shukra (male Venus).

This theme of the annual cycle is not limited to the letter Xi. It is found in letter Ziph of the first Phoenician alphabet (according to Theodosius Ambrosius) and recurs in letter 10 as Jud and Iud in two versions of Chaldean¹⁵ (figures 1b-c). In Jud, the curved line is like an S in early Greek versions of Sigma and Stigma, while the straight line is like a Z. In Iud, the S shape is more pronounced while the straight line is topped by a circle recalling the star of Slavic ksi. Comparison of the letters in different alphabets reveals their context.

In Coptic, the equivalent letter is Exi (figure 1) related in shape to the symbol for alchemical process 7, sublimation, in the alphabet of the Magi and associated with Hebrew letter Lamed as well as the zodiac sign Libra. Hence, the shape of the letter Xi or Exi is also linked with alchemical processes as are 11 other letters in the Alphabet of the Magi.

In the Christian tradition, Greek letters Digamma (Stigma), Xi and Chi as letters 6, 15 and 24 with a gematria of 6 60 600 are linked with the number of the Beast and with evil. Letter Xi, especially, is associated with evil, the devil and Satan. In the Indian tradition, mansions of the moon 6, 15, and 24 are linked with Ketu, known in the West as head of the dragon (caput draconis) or the Northern node of the moon, connected with eclipses, associated with danger, and disaster. Hence, the Christian numbers which seem arbitrarily connected to evil, have a deep rooted rationale once we understand their context. We have interfaces that display letters. We need interfaces that show the history and interconnections of letters.

4.2. Letters and Elements

An important dimension of these connections of individual letters relates to the elements. In Sanskrit, the first five (consonant) letters (ka kha ga gha na) are linked with the 5 elements (Earth Water, Fire, Air, Space). The further sets of 5 letters become linked with the 5 sensations, the 5 instruments of action, 5 instruments of sensing etc. The combination of 25 letters with elements or principles (tattvas) in the Samkhya system¹⁶ provides a context for understanding why the letters of the Greek alphabet were called elements or principles (Greek: στοιχεῖον).

In India, the Sanskrit letters are also aligned with the zodiac signs in the rasi chakra. In the Hebrew tradition, the 3 mother letters (A M S, Aleph, Mem, Shin) become aligned with 3 elements (air, water, fire). In the Arabic tradition, Ibn Arabi links 4 elements with mansions 18 19 20 21 and specifically with the zodiac signs Scorpio and Sagittarius in a space above the mineral, vegetable, animal, angelic and human realms.¹⁷ During the Renaissance, the four last

letters of Hebrew, (19 20 21 22 or Qoph, Resh, Shin, Tav) become aligned with fire, air, water, earth¹⁸ and link directly with physical air, water and earth. Thus, there is a whole history of the spatializing of alphabet letters in different cultures.

Such a history reveals both parallels and differences between Eastern and Western alphabets. Both East and West linked letters with elements and principles of nature. In India, the physical elements (*mahabhutas*) are a starting point in creation that culminates in a conscious human being linked with the Universal Being. In the Arabic tradition, the cycle of letters follow the annual cycle and culminate in humanity (mansion and letter 27) and “The Hierarchy of the Degrees of Existence, not their manifestation” (mansion and letter 28). In the Hebrew tradition, the letters are associated with the Sephiroth and paths and in the Zohar only letter B (Beth) is associated with physical creation.¹⁹ Hence, although letters are directly connected with the Hebrew creation story, their connection is more with abstract physical principles than with living human beings. Indeed the 22 letter alphabet ends with the letters Q R S T associated with the 4 elements and omits the animal, mineral and vegetable kingdoms.

4.3. Cosmology of Letters

These differences between East and West offer insights into the background of Western alchemy and later science. The Greek tradition adopted an idea of two energies: of life and of matter. These became associated with a heavenly Niter and Salt and combined with the elements Fire-Air, Water-Earth respectively to produce three substances: sulfur, mercury and salt (figure 2). There are multiple versions of this schema. In some cases, the generation of things (differentiation) comes through a meeting of nitrum (a circle with a vertical line, also a version of letter A, male, active, light), with salt (a circle with a horizontal line, also a version of letter B, female, passive, darkness) and leads to 3 heavenly substances: sulfur, mercury and salt which combine with 4 elements and leads to the process of integration (*corruption rerum*) and the reborn universal steam symbolised by a hexagram.²⁰ In other versions, the combination of air and fire is on a descending diagonal of a pentagram, while the combination of earth and water are on an ascending diagonal of a pentagram topped by spirit. Alternatively, the descending diagonal is also linked with volatile niter and the ascending diagonal with stable salt.

The parallels between descending curve of sun - ascending line to star in figure 1 and the descending niter - ascending salt in figure 2 are no-coincidence. They mark a shift from an astronomical/astrological cosmology towards an alchemical/chemical/physical cosmology. Here our concern is not with the interim period that often brought an obsession with alchemy: searching for the gold of philosophers, a universal stone and an elixir of immortality. Rather it is with the frameworks that connected letters and systems of the heavens.

Three initial planets, Venus Mercury, Moon, also linked with the 3 heavenly substances or 3 alchemical principles (sulfur, mercury, salt), become linked with planets and heavens 5 6 7 as well as letters and mansions 15 16 17 in the system of Al Arabi. The elements 1 2 3 4 become linked with mansions and letters 18 19 20 21 in Al Arabi and with letters 19 20 21 22 in the

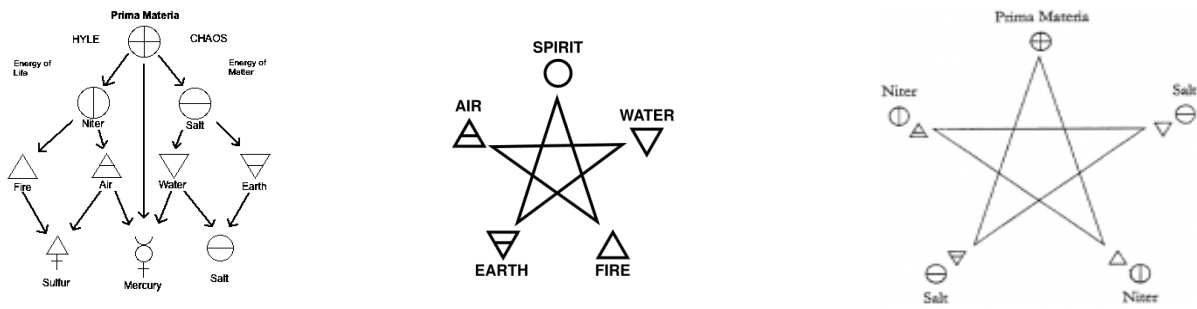


Figure 2. Sulfur, Mercury and Salt, Pentagram and the Elements, Pentagram, Niter and Salt.

Hebrew system. This shift of 1 number is partly explained by the shift from a 28 to a 22 letter alphabet. It also helps us understand why (the abode of) Adam is connected with mansion 17 in Al Arabi and why Adam is connected with number 18 in Hebrew. When aligned with Egyptian decans, the Hebrew numbers 19 20 21 22 correspond to the 3 decans of Cancer and the first decan of Leo. Hence, the cut-off point of the alphabet is aligned with the star Regulus associated also with the Merkabah.²¹ Later this cut-off becomes linked with λ Scorpio.

Shapes 15 16 17 are also the final shapes of the Arabic alphabet²² associated with letters W H I (waw, ha, ya) with a gematria of 6 5 10. In other versions, this order is changed to ha waw ya with a gematria of 5 6 10.²³ In the Hebrew tradition, this becomes ha va ya (Heh Vav Yod) and the basis of the tetragrammaton of Heh- Heh on the descending line and Vav - Yod on the ascending line, now associated with the image of the Wheel of Fortune²⁴ on Tarot trump 10. Hence, the emphasis on the sequence of letters 10 5 6 5 (Y H V H), which became the sequence I E U E in the mediaeval tetragrammaton Alfonsi, are clearly much more than four letters in the history of theology, the trinity and monotheism. They are a chapter of a much larger story that entails the heavens (astronomy), as well as earth (alchemy, chemistry).

The so-called war in heaven that replaces the morning star (Shukra, Venus, Lucifer) with the Sun or Jupiter is much more than a New Testament parable. In the old scheme, Venus is linked with creative energy of life and with the female. Venus is linked with letter and mansion 15. Indeed, numbers 15 16 17 18 are all closely related to the female: 15 is Sa. Mother of all Life; 16 is Female generative power; 17 is Creative Female Power and 18 is Female Essence. In terms of the abjad, they are the letters of sa'fas. The demonification of Venus as Satan and Devil linked with the head of the dragon and of letter 15 as part of the sequence 6 15 24 and gematria 6 60 600 (666), is part of a programme which replaces the female Aquarius-Leo axis, linked with the descent of the sun (Imbolc-Lughnasadh in the Celtic tradition) with an Heh-Heh axis and changes the ascent to the star along the Gemini-Sagittarius axis (Beltane-Samhain in the Celtic tradition) with a Vav-Yod axis.

Hence, the Iud and Jud of Judaism are much more than letter 10 in an alphabet. They introduce a new order where the female is no longer central. Letters 15 16 17 18 diminish in significance. The emphasis is shifted to letters 19 20 21 22, the letters Q R S T of qarashat in the Arabic tradition. They begin with 19, the number connected with mansion 19, the Root, called mula (moola or more precisely, mUla) in Sanskrit connected with Lambda Scorpio, the

tail of Scorpio, called mala in Sanskrit, which also means original sin and is the etymology of the Latin word malus (evil).

There is much more to this story. The five points of the pentagram or pentacle become associated with 5 vowels. In some alphabets, these become the letters 1 5 10 15 20. In Greek they become aligned with U G E I A, as in the goddess Hygieia,²⁵ and Hygeine and with the letters S A L U S as in salutory. In the Celtic tradition, the 5 vowels become associated with the names of the 5 tribes of Genesis: Acab, Ose, Ura, Esu, Jaichim, which then become Jacab, Jose, Jura, Jesu, Jaichin, the Hebraic versions of Jacob, Joseph, Jerah, Joshua, Jachin, standing for the vowels A.O.U.E.aI.²⁶ Gradually, the link with vowels is forgotten and the corresponding letters are treated as consonants.

The details of this story are clearly beyond the scope of this paper and are being explored elsewhere.²⁷ Nonetheless, the examples outlined above should suffice to explain the needs for i) a history and etymology of letters; ii) a new kind of granularity linking letters at multiple levels; iii) links with astronomy, alchemy and gematria; iv) links with letters in different alphabets and cultures, v) links with images, schemes, of other knowledge systems; vi) new interfaces that enable us to see temporal and spatial dimensions of these links, relations and associations.

5. Knowledges

New media tend to focus on the latest news, developments, latest knowledge and information. The quest for an Internet of things is practical, object-ive in more than one sense and focusses the current status quo. These trends also focus on what exists: the visible in the physical world. The developments in brain interfaces promise to eliminate the need for earlier interfaces but effectively connect us with a possible future rather than the present. At worst they blur our distinctions between possible and actual whereby even our thoughts become treated as actions, a theme explored in films such as Minority Report.

The internet of things and brain interfaces threaten a future-present without a past. Their memory may include operations, actions, and transactions with commands for stopping and starting, but they include no memorable actions. Their interfaces are ultimately without history and their content excludes the collective knowledge of our memory institutions (libraries, museums, archives).

In terms of current day knowledge, there is nothing to connect letters 15 and 16 with the female, letter 17 with destruction, or the letter 19 with the root. And yet, for centuries these associations existed. If we dismiss earlier thought systems as mystical, magical, superstitious and non-scientific, we lose awareness of our own roots, of the alphabets whereby we communicate and the bases of culture. So the challenge is to go beyond scanning the past and to reconstruct previous knowledge systems, or knowledges as Francis Bacon called them. We spend billions in a search for life on Mars or for a God particle using a Hadron Collider, and yet we have no billion dollar projects to understand our own past.

6. New Interfaces

The initial internet was an Internet of bits. It led to producing and reproducing words and images on screens (figure 4). The Internet of things integrates cameras into the process and focusses on outer things. Needed is an Internet that includes inner worlds, or more precisely, inner worlds that have been recorded in the form of books, manuscripts, drawings, diagrams, schemas, figures, visible records of systems of knowledge, thoughts, ideas.

The first two Internets involve one-way hyperlinks mainly between words, whereby clicking on a hyperlink links only to one other resource. Needed are hyperlinks that include temporal and spatial dimensions, whereby clicking on a word, image or letter will eventually link to all known related resources, subsets of which can be found by limiting authors, dates, places. Hereby, every word and every image becomes a link to its own etymology and history. The links thus become pointers to all relevant resources in our collective memory institutions.

In most cases, we do not want to know everything about a subject or even about a word or a letter. So we need filters that help us narrow our scope, including levels of knowledge, and indications of levels of sources. Today, search engines such as Google are exploring our search patterns in order to create adaptive filters that limit searches before we even start a new query. This makes sense in the case of everyday topics: e.g. a person can have a default for weather, and traffic in their own city (cf. Google Now). In the case of study and research, where the quest is to learn the unknown, the filters need to be adjusted personally.

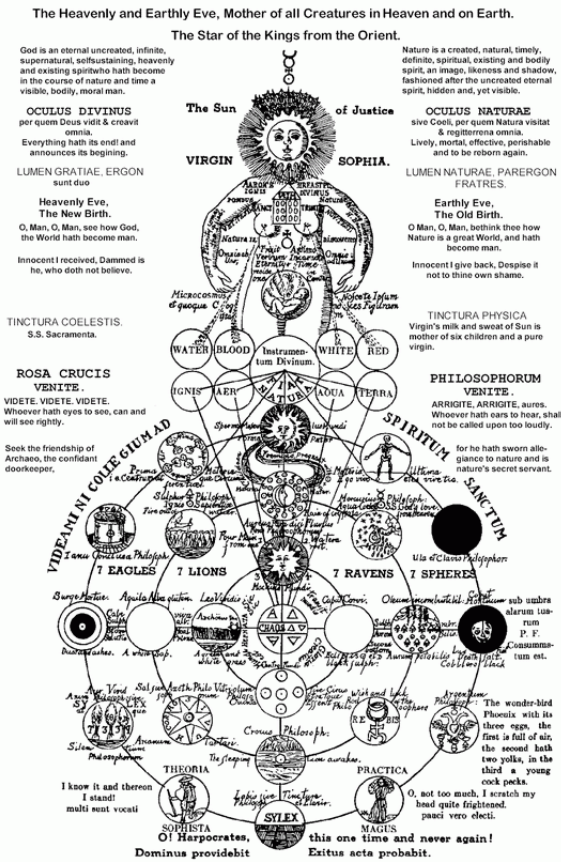
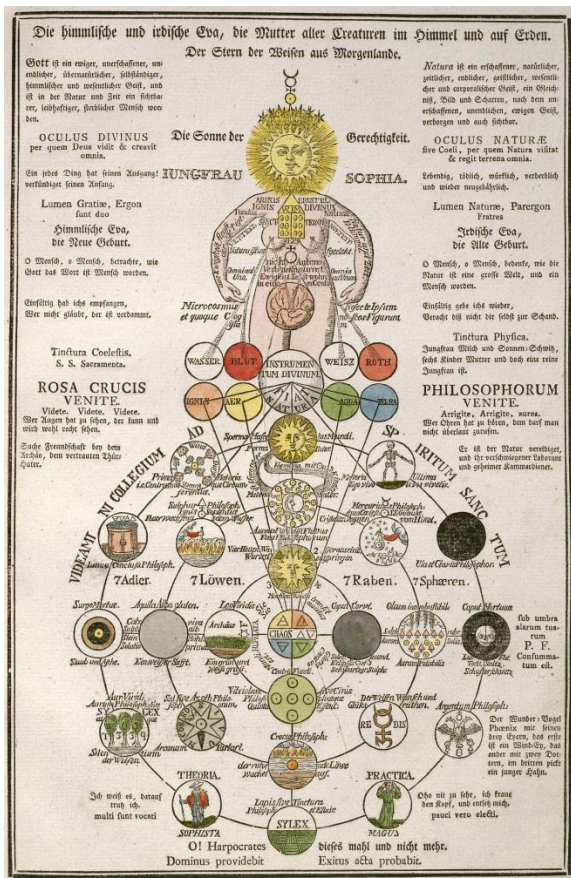


Figure 3. Heavenly and the Earthly Eve. Virgin Sophia

Steps	Interface	Components
1 Internet of Bits	Computer Screen	Words, Images
2 Internet of (Outer) Things	Computer Screen, Camera	Words, Objects
3 Internet of Inner Worlds	Computer Screen, Camera, Images Augmented, mixed reality	Words, Objects, Letters

Figure 4. Three domains of the Internet, with interfaces and components.

Augmented Reality interfaces are increasingly being applied to objects and persons in the physical world (cf. Sight,²⁸ Google Glass²⁹). The same principles need to be applied to objects from the inner world in our memory institutions. For instance, I find a map of the town of Erbil in a library or online. The system reminds me that it is also called Arbil, Arbila, Irbil, Hewlêr etc. I use augmented glasses to see what it looks like today and then link with Google maps or an equivalent to see where it is situated in Iraq. In future, I could call up other historical maps and drawings and access other resources on the history of Arbil.

This same principle can be applied to mental and symbolic maps. For example, I encounter a picture of the Heavenly and Earthly Eve (figure 3) in German and Latin. The system can, of course, provide a translation. It can also search and display historical translations (figure 4b). Using a combination of pointer and augmented reality glasses the system can isolate individual features such as the central sphere with symbols of the 4 elements and explain them in different levels of detail. Focussing on the last 8 words of the title will lead to an explanation that the Star of the Magi also had a cosmological significance in the 17th century. Focussing on the words, 7 eagles, 7 lions, 7 ravens, 7 spheres takes me into the history of symbolism connected with each of these. In the past, a picture was worth “a thousand words.” In future, complex pictures such as the Virgin Sophia can become a herald for Philosophia, and a veritable portal to an earlier philosophy, which included religion and alchemy and serve as new starting points on the journey towards knowledge, understanding and wisdom.

7. Conclusions

The earliest Internet focussed on bits and on born digital words and images on computer screens. The Internet of things is linking the electronic world of computers with objects in the physical world. These advances lead to a focus on the external world in the now. The champions of brain interfaces promise access to an inner world in the now and the imminent future. While the attraction of such developments is obvious with respect to entertainment, recreation and consumerism, both of these trends tend to bypass, ignore or dismiss the past as literally passé.

This paper has outlined the need for new interfaces for products of the inner world that are the contents of our memory institutions. This requires much more than merely another app. It requires a re-structuring of the Internet as we know it today. It needs to go beyond linking single words with single resources to linking individual letters, words, pictures, and other relevant resources generally. In the age of books we made indexes for single books. In the age of a world digital library, we need an index of all extant resources. Present day links are indiscriminate. Future links need to be tagged as relating to persons (who), things, ideas (what), spatial (where), temporal (when), procedural (how) and causal (why).

Scanning existing documents and resources is an excellent first step. Making reference tools universally accessible is an important next step. But these are only preludes to what is potentially possible. If our facial recognition software is accurate enough to identify enemies of the state, it can also be used to recognize and access those who brought us to our present state of culture and civilization.

We need a GIS of the mind, in the sense of products of earlier minds, which helps us see other ways of ordering and understanding; not just the latest news but also the oldest knowledge. An internet of things is a first step. But we also need an internet of no-things: an internet of body, mind and spirit. Images of a Trinity, of three-fold being, of 3 channels (nadis), 3 stages, 3 phases of time, 3 worlds may merely be metaphors and non-material. But metaphors are also the key to humans going beyond the limitations of a body of flesh. If we were merely material we would need no memory institutions, memories would be worthless, and we would lack dreams, and visions. To have confidence (faith) in the present and hope for the future we also need a love for the past. New interfaces are needed to make these contexts of knowledge visible and usable as we explore other cultures and civilizations in order to understand ourselves.

Appendix 1. Ten Political Leaders

	2004	2012
Charles V	29,600,000	53,400,000
George W. Bush	27,800,000	59,400,000
Alexander the Great	26,500,000	33,200,000
Hitler	8,560,000	137,000,000
Adolf Hitler	6,950,000	36,500,000
Adolph Hitler	12,800,000	23,600,000
Napoleon	8,410,000	98,900,000
Charlemagne	1,350,000	16,200,000
Mahatma Ghandi	1,120,000	28,800,000
Genghis Khan	374,000	8,170,000
Mao Tse-Tung	374,000	2,560,000
Mao Zedong		5,360,000
Tamurlane	886	110,000
Tamerlane		1,980,000

Ten Artists

Polykleitos	81,800
Polyclitus	31,700
Polyklitus	318
Phidias	1,200,000
Giotto	15,900,000
Michelangelo	38,100,000
Raphael	19,100,000
Caravaggio	14,700,000
Leonardo da Vinci	39,700,000
Lorenzo Bernini	980,000
Rembrandt	24,600,000
Pablo Picasso	18,900,000
Vincent van Gogh	17,200,000
Salvador Dali	128,000,000

Figures

- 1a. Ksi Slavic: http://st.free-lance.ru/users/IceTeam/upload/f_4804c30e36ebe.gif
1b-c. Jud, Iud (Chaldean): Claude Duret, *Tresor des langues de cet univers*, Cognoy, 1613, pp. 344-345: http://archive.org/details/fre_b1886963.
1d. Exi (Coptic): http://en.wikipedia.org/wiki/Coptic_alphabet
1e. Symbol for sublimation in alphabet of Magi: <http://www.quadibloc.com/other/tarint.htm>
2a. 3 Principles (Sulfur, Mercury and Salt): <http://alchymie.ca/3princ4ele.htm>
2b. Pentagram and the Elements: http://openclipart.org/people/kuba/five_elements_and_pentagram.svg
2c. Alchemical Pentagram: <http://4.bp.blogspot.com/-VbzF3Koi5IM/TnuX78Mr0hI/AAAAAAAAACsU/MrvUDQGP6uw/s1600/Alchemical%2BPentagram.png>
3a. Himmlische und Irdische Eva: <http://upload.wikimedia.org/wikipedia/en/7/7c/SophiaMystical.jpg>
3b. Heavenly and the Earthly Eve: <http://www.crcsite.org/Images/VirginLg.gif>

Notes

¹ Internet of Things: http://en.wikipedia.org/wiki/Internet_of_Things. Aspects of the internet of things are RFID, Near Field Communication (NFC), and augmented reality.

² Internet World Stats: <http://www.internetworldstats.com/top20.htm>. On 31 March 2012, the number of Internet users was: 2,279,709,629.

³ Global mobile statistics 2012 Part B: Mobile Web; mobile broadband penetration; 3G/4G subscribers and networks, MobiThinking: June 2012: <http://mobithinking.com/mobile-marketing-tools/latest-mobile-stats/b>

⁴ “Could RIM’s ‘Secret Weapon’ Put BlackBerry Back in the Black?”, Blog post by Steve Kovsky, Jul 7 2012: <http://www.enterprisemobilehub.com/blogs/skovsky/could-rims-%E2%80%9Csecret-weapon%E2%80%9D-put-blackberr>. Cf. Les produits électroménagers de plus en plus connectés: <http://www.bulletins-electroniques.com/actualites/70758.htm>

⁵ Blue Brain Project: http://en.wikipedia.org/wiki/Blue_Brain_Project

⁶ Next 5 In 5: IBM Predicts Mind-Reading Computers Of The Future (VIDEO): http://www.huffingtonpost.com/2011/12/20/next-5-in-5-ibm_n_1160955.html

⁷ Kim H. Veltman, “The New Book of Nature“, *eARCOM 07. Sistemi informativi per l’Architettura Convegno Internazionale*, Con il Patrocinio di UNESCO. Ministero dei Beni Culturali, CIPA, Regione Marche, Ancona-Portonovo Hotel La Fonte, 17-18-19 Maggio 2007.

⁸ See: Stephen E. Flowers, Johannes Bureus and the Adalruna, Runa-Raven, 1998.

⁹ Some claim that this model was reduced to body and mind on 869 A.D. at a council of the Catholic Church. See: <http://wn.rsarchive.org/Lectures/StudyMan/19190901a01.html>:

¹⁰ Automobile Timelines: <http://www.xtimeline.com/timeline/History-of-the-Automobile>;
<http://www.greatachievements.org/?id=3880>

¹¹ There is still a great contrast between the aims and realities of such projects. Great collections such as the British Library may describe themselves as The World’s Knowledge, but what is readily accessible online is still only a small fraction of what their holdings. The Library of Congress has a World Digital Library (WDL) with 6,142 items: <http://www.wdl.org/en/>. The World Public Library has 2 million books: <http://worldlibrary.net/>. The Internet Archive offers access to 3 million public domain books and other resources:

http://en.wikipedia.org/wiki/The_Internet_Archive. Europeana has 10 million digital objects: <http://en.wikipedia.org/wiki/Europeana>. Perhaps the largest project is Google Books: http://en.wikipedia.org/wiki/Google_Books

For an earlier survey of projects see the author’s: From Recorded Worlds to recording Worlds: Opening keynote: Rahmen-bedingungen der digitalen Langzeitarchivierung aus politischer und wissenschaftlicher Sicht, “*Digitale Langzeitarchivierung. Strategien und Praxis europäischer Kooperation, Deutschen Nationalbibliothek, anlässlich der EU-Ratspräsidentschaft Deutschlands*“, 20-21 April, 2007: http://files.d-nb.de/nelson/eu/2009-04-20_Veltman_TEXT.pdf; http://www.sumscorp.com/new_media/knowledge/memory_institutions/news_198.html

For developments see the journal: World Libraries: <http://www.worlib.org/>

¹² Garnier: <http://www.classiques-garnier.com/numerique->

[en/index.php?option=com_content&view=article&id=93%3Agreat-corpus-of-dictionaries-9th-20th-c&catid=33%3Acatalogue-bases-dicenc&Itemid=30](http://www.classiques-garnier.com/numerique-en/index.php?option=com_content&view=article&id=93%3Agreat-corpus-of-dictionaries-9th-20th-c&catid=33%3Acatalogue-bases-dicenc&Itemid=30)

¹³ A in Wikipedia and Wiktionary: <http://en.wikipedia.org/wiki/Alpha> and <http://en.wiktionary.org/wiki/%CE%91>

¹⁴ An example of a partial treatment of English letters is an excellent site by Dr. Diane Tillitson: Histories of Individual Letters: <http://medievalwriting.50megs.com/scripts/letters/letters.htm#letterindex>. An introduction to meanings of individual letters is found at: Rune, Arabic, Persian, Sanskrit & Tibetan Alphabet Meaning: <http://www.essene.com/B'nai-Amen/ABCD.htm>.

¹⁵ Claude Duret, *Tresor des Langues de cet Univers*, Cologne, 1613, pp. 344-345.

¹⁶ This is expanded to 35 or 36 letters and principles in the Vedanta and tantric systems.

¹⁷ Arabic Mansions: <http://www.yeatsvision.com/mansions.html>

¹⁸ Cosmos and Hebrew: <http://0.tqn.com/d/altreligion/1/0/W/-/-/spiral.jpg>

¹⁹ Ben Shahn, *The alphabet of creation: and ancient legend from the Zohar*, New York: Schocken Books, 1979.

²⁰ Universal Reborn Steam: <http://imageshack.us/photo/my-images/23/goldencc3.jpg/sr=1>

²¹ Kircher, Egyptian Zodiac: http://htmlgiant.com/wp-content/uploads/2011/01/kircher_zodiac.jpeg

²² See Pantographia: Arabic 2: <http://www.fromoldbooks.org/Fry-Pantographia/pages/p004/>

²³ Arabic Gematria: http://numerical19.tripod.com/numerical_value.htm

²⁴ Wheel of Fortune: [http://en.wikipedia.org/wiki/Wheel_of_Fortune_\(Tarot_card\)](http://en.wikipedia.org/wiki/Wheel_of_Fortune_(Tarot_card))

²⁵ Also Hygiea or Hygeia, Greek Ὑγιεία or Ὑγεία, Latin *Hygēa* or *Hygīa*: <http://en.wikipedia.org/wiki/Hygieia>

²⁶ Vowels: http://www.well.com/~mareev/portal/prehistory/ancient_prehistory_timeline7.html

²⁷ Cf. a monograph *Alphabets of Life*, as part of *New Models of Culture*:

http://www.sumscorp.com/new_models_of_culture/

²⁸ Sight: <http://mashable.com/2012/08/25/sight-augmented-reality/>

²⁹ Google Glass: http://news.cnet.com/8301-11386_3-57410443-76/googles-project-glass-you-aint-seen-nothin-yet/