

# Memory Palaces: The Revolutionary Function of Libraries

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*For thousands of years, the library represented a fortress of closely guarded knowledge, a private citadel of information that its builders viewed as both precious and dangerous. Among the foremost targets of a conquering army would be a great city's library – to be either carried away as booty or put to the torch, in an effort to tear the heart from an alien civilization. In our own time – even after the efforts of the Carnegie Foundation, the Dewey Decimal System, and the World Wide Web – there are still those who find the idea of so much freely available knowledge an abomination – who would do anything to try to put the genie back in the bottle, the fruit of knowledge back on the tree.*

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## *The Growth of Memory Palaces*

**W**RITING is really a way of transferring the storage of an idea from the brain (its natural resting place) to a non-biological medium. Ideas start in the brain, where they traditionally resided throughout most of human history. Preliterate peoples had to rely on their personal powers of recall to preserve knowledge. They sometimes counted on specialists, such as shamans and bards, to do this

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for them. But even these specialists had to depend on their own biologically given memory capacity. This locked them into rigid forms of oral remembering, such as ritual incantation or rote recitation. When writing was first invented, it was used simply to reinforce these ancient oral skills. When the Homeric myths were first written down, it was to preserve the oral tradition, not to revise it. The revolutionary consequences of writing took time to reveal themselves, but they did; writing became the basis for trade and government. It also gave us systematic philosophy, poetry, and astronomy, but only after millennia of radical social change.

The truly revolutionary function of writing is to allow us to construct elaborate palaces of memory. These are intricate mental universes, created by manipulating and re-arranging written symbols, and organizing them into systems that nudge the reader's brain toward certain prespecified states of knowledge. Thus, in having literacy skills, a human mind becomes open to very precise external programming. Symbols jerk us around, and twist our minds into various shapes, often against our will. Writing created a whole new class of humans, who might be thought of as cognitive engineers. They encoded, interpreted, and created our collective memory banks. They held sway over a vast hierarchy of institutional structures that amounted, if one wants to be entirely honest about it, to a system of cognitive governance, and often to an official mechanism for mind-control.



THE course of this revolutionary development can perhaps be traced, by examining the history of libraries. The oldest known large-scale library resources were the Egyptian palace records of personal property, astronomical cycles, trade, crops, and census counts. The Egyptians also held very ancient written records of a variety of religious and liturgical rituals, including spells, rites for the dead, omens, prayers, incantations, and a variety of other ritualistic and theological materials. Protected by the priesthood, manuscripts gradually accumulated to the point where they demanded a special place for their storage and use. One such place, the largest in ancient times but not

necessarily the first, was in the Ramesseum, built near Karnak around 1200 BC. It contained materials that undoubtedly dated back at least another millennium, since the Egyptian theocracy preserved ancient traditions literally and very strictly. Thus the birth of libraries can be placed well before 2000 BC. The immensity of the Ramesseum, whose ground plan covered a floor area close to that of the New York Public Library, reflected the traditions of a society that had long immersed itself in symbols, and had a well-established habit of record-keeping and written composition.

The size of the Ramesseum's holdings can only be guessed at, since the perishable papyri it once contained were nowhere to be found when it was excavated from the sands of the desert. But judging from its design and area, it has been estimated that it might have contained as many as 100,000 rolls of papyri, roughly equal to 50,000 modern books. This may not compare with the holdings of a modern library, but it is still a very large number. There were other Pharaonic libraries in ancient Egypt, apparently of comparable size, for instance those at Denderah and Edfu. The inscriptions over the portals indicated their religious function, and the fact that papyri were a monopoly of priests.

The first great libraries of record in the West were in ancient Greece. About 500 BC writing became fairly common in Greece; even slaves were allowed to become literate, and the graffiti left by Greek mercenaries serving in Nubia testify to the widespread diffusion of writing. Books were still fairly rare; only the wealthy could afford them in any number, since they usually had to employ a professional scribe to transcribe any material they wanted copied for their own libraries. Nevertheless, there were a sufficient number of bibliophiles that the manuscript trade grew, and there were public markets in Athens that dealt mainly in these. There was eventually a booming export trade in Greek manuscripts. The first true public library was founded in Athens in 330 BC, apparently as a result of surging popular demand for the scripts of the better-loved dramas of the time (movies often have a similar effect on book demand today); but in Greece, scholarly libraries were still mostly in private hands.

This situation changed in the Hellenic world order created by Alexander the Great, when the Macedonian kings created the Pergamum, and Alexander's reputed half-brother Ptolemy Soter founded the greatest library of classical times, the Alexandrian Library, in 306 BC, under the supervision of a Greek named Demetrios of Phaleron. The Alexandrian library was largely housed in a building called the Museum (literally, the place of the muses) at

Alexandria, a multi-purpose scholarly building that included facilities for scholars, and cells for transcribing, copying, and translating manuscripts. Translators were needed because the chief librarians of this great institution tried to acquire all the written wisdom of the known world, editing and verifying Persian, Hebrew, Hindi, Ethiopian, and older Greek manuscripts. Excluding duplicates, by 235 BC their holdings included about 530,000 rolls, peaking at about 700,000 rolls in the first century BC, and covered subjects as diverse as ancient poetry, history, philosophy, oratory, and mathematics. The city of Alexandria itself contained, in addition to the Museum, the accumulated spoils gained from the conquered cultures of Babylon, Assyria, and Persia.

There is evidence that the Alexandrian library was partially looted and damaged by the Romans, in sieges by Aurelian in AD 272 and Diocletian in 296 and then further damaged by the Christians, after the Edict of Theodosius dictated that the cultural remnants of "Paganism" be destroyed. It is believed, on the basis of Arabic historical records, that the contents of the library were finally destroyed completely in 640 by the systematic burning of manuscripts, ordered by the Islamic Sultan Omar.

Early Romans had no libraries. But in 168 BC Rome conquered the Hellenic civilization that had followed Alexander; the Romans took a generation to realize what they had conquered, and then Greek culture conquered them in return. Greeks became the omnipresent tutors, scribes, librarians, and scholars of Rome. Romans began to collect books and manuscripts; the most famous case was Sulla's acquisition of Aristotle's personal library (which had been buried under a basement floor for 187 years to keep it from being seized by the Ptolemies). Sulla hired two learned scholars to document, restore, and organize it, and added to it; Sulla's collection eventually became the heart of the first Roman public library, founded in 37 BC. The emperor Augustus subsequently founded two large state libraries in Rome, the Palatine and the Octavian Libraries; Trajan followed in AD 110 with the greatest Roman library, the Ulpian Library, which contained two magnificent buildings, one for Greek, the other for Roman writings.

During Augustus's reign the book trade became established in Rome. At the time of Cicero (106-42 BC) there were no bookshops in Rome; but by about 30 BC there were numerous manuscript dealers and traders, and publishing became established as a separate profession. Cheap publications were mass-produced by dictating a manuscript to as many as 100 slave-scribes simultaneously. The resulting product was inferior because the copy usually contained phonetic

errors, since the slaves had to copy what they heard, and didn't have time to revise. Better editions were hand-copied visually, one at a time. Imperial editions were copied onto superior grade parchment and often enclosed in jewelled cases for storage. Rare book dealers and professional grammarians specialized in separating the good from the poor editions, and importantly, in reassuring the serious purchaser that a given manuscript was authentic. Original sources were valued highly.



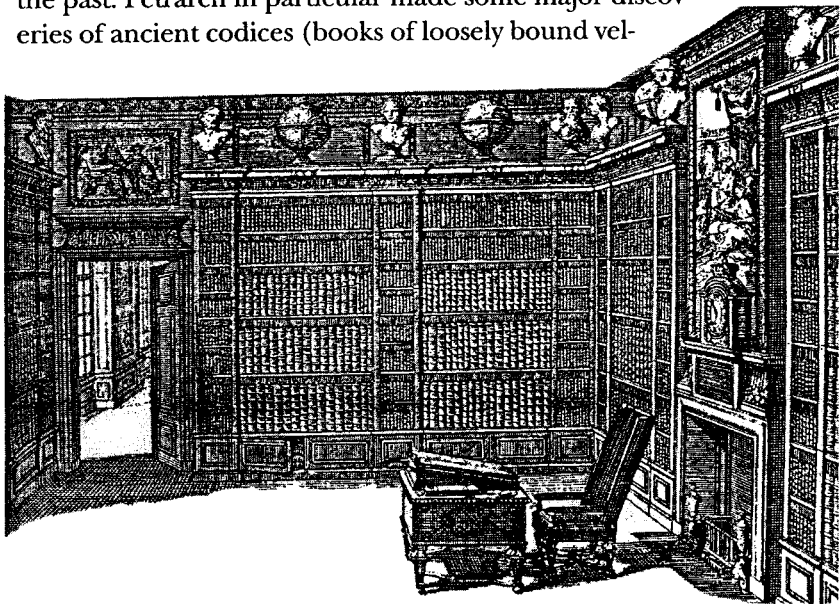
UNFORTUNATELY, this early growth of literate culture was interrupted numerous times, and each time had to be painstakingly rebuilt. The last great library of antiquity, the Imperial Library established by Constantine the Great at Constantinople, never reached the size of the Alexandrian Library, but nevertheless had a collection of 120,000 volumes at its peak; it was destroyed by fire in AD 477. Subsequently, various European rulers like Charlemagne tried to build libraries, but they were collecting on a much smaller scale, under primitive conditions. The treasures of antiquity had been lost to Europeans because of the incessant sackings, sieges, and book-burnings that

afflicted Rome and other major cities from the fifth to the tenth centuries. Every populist invasion and revolt, whether Christian, Muslim or "pagan," singled out the great libraries for destruction. The Museum at Alexandria was whittled away in successive invasions. The Imperial Library at Constantinople was dismembered by Muslims, Christians, and Turks. The great Roman libraries, the Ulpian and the Palatine, had been sacked earlier, by various waves of barbarians.

The rise of Muslim culture led to another important chapter in the history of libraries. The Arabs were illiterate when they conquered Constantinople. But, like the Romans, they were conquered culturally by their victims. They absorbed Persian culture first, and Persia had already accumulated an important literature. Gradually, as their empire spread and literacy became common among the upper classes, the Arabic-speaking peoples began to build great libraries. In Cairo in 1171, Saladin founded a palace library that eventually rivalled that of

Constantinople in size. He had agents scouring the Near East, Egypt, and Europe for manuscripts, and managed to locate a number of important Greek and Roman works, as well as to collect the literary products of the Persian and Arabic languages. The library at Cordoba eventually grew, it is said, to half a million volumes. Every major Muslim city from Baghdad to Tunis had a library, and because of this some of Western literary culture survived. However, when Christian Europe finally drove the Muslims from Spain, once again the books were burned. In 1492, when the last Sultan left his beloved Cordoba, the Spanish put all Arabic books to the torch. Some may have survived in North Africa, but in the sack of Tunis in 1536, Charles V probably got the rest. The libraries, and the symbolic soul, of Muslim civilization were destroyed.

Perhaps the most dramatic example of the effect of visually stored ideas on a culture is the fourteenth-century Italian rediscovery of the Greek and Roman classics. The destruction of libraries in the major cities of Europe and the Middle East had been so extensive that the European rediscovery of the literature of antiquity had to come mainly through the scouring of obscure monastic libraries from every region of Europe, and from the remains of the library at Constantinople. The Italians were in the vanguard of this effort. Prominent Italians of this era, from Dante and Petrarch to Boccaccio, collected classical manuscripts with a passion; indeed, a century before the European discovery of America, the focus of discovery was on the greatness of the past. Petrarch in particular made some major discoveries of ancient codices (books of loosely bound vel-



lum pages) containing some lost material from Cicero's major orations. Boccaccio rediscovered Tacitus for a new generation, and also some important works of Martial and Varro. Neither Petrarch nor Boccaccio read Greek, but they enlisted the help of a few Italians who could, and Boccaccio eventually produced the first complete Latin translations of the *Iliad* and the *Odyssey*.

Less famous, but more important, figures from that era included Poggio Bracciolini, who travelled throughout Europe, from monastery to monastery, with papal support, collecting manuscripts and bringing them back to Florence. German scholars such as Nicolas of Cusa, a personal friend of Poggio Bracciolini, also brought treasures to Italy. Florentine book dealers established contacts with well-known bibliophiles and collectors all over the known world, including the Orient. Gradually the idea of collecting and reading Greek manuscripts spread, and various Italian princes took the initiative in building the greatest libraries of the time (while monastic libraries simultaneously went into decline). Paramount among these were Lorenzo di Medici and the Duke of Urbino; their collections were not large by either our standards or those of high antiquity, but they were highly concentrated in terms of the quality of the material collected. Much of the redundancy, and most of the trivia, that inevitably formed part of the largest ancient collections, had been filtered out; only the best had been endlessly copied, and only the best survived, although some major works, like the poetry of Pindar, were never recovered.

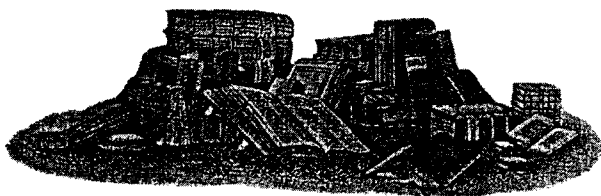
Thus ancient thoughts from the previous millennium gradually gained a new foothold in a living culture. The result was electric: a rapid change of awareness, a new urbanity, and a new sophistication, and a passionate reawakening of the desire for knowledge. Nothing could better illustrate our complete dependence on our memory palaces; in less than a century the city-states of Italy had been transformed, not by some qualitative leap in raw intellectual capacity, and not by rethinking and reinventing all that the Greeks and Romans had discovered, but by recovering their written records, verifying and decoding them, and making them more widely accessible. Just as the Arabs had discovered Persia, and Rome had discovered Greece, and Greece Babylon, the Italians of the Renaissance heard voices from the past, and rebuilt the delicate apparatus of external memory. The rest of Western Europe quickly followed, and the growth of a literate culture, after so many reversals, once again became a possibility.

These great libraries involved much more than collecting manuscripts; the existence of such a concentrated collection always implies

the presence of a scholarly class, and various ancillary industries ranging from publishing and trading to authenticating, collecting, and exporting knowledge. In our terms, the real work of this class of people was the organization and maintenance of memory palaces. The apparent power of these structures – especially their ability to cause a very large agglomeration of people to function as a unity – meant that they were, from the start, intertwined with priestly magic, imperial ritual, privilege, and elitism; thus it was not surprising that conquerors always made the destruction of libraries one of their first priorities.

With the invention of the printing press in Germany in the fifteenth century, this all changed. Books became ubiquitous, and it was no longer feasible to attempt to destroy all of them. With printing, literate culture achieved a widespread diffusion and stability that it had not previously enjoyed. Libraries proliferated and differentiated into a host of specialized institutions serving particular fields of inquiry: thus we suddenly had separate institutions housing academic, national, agricultural, medical, and scientific libraries, to name a few. Museums and art galleries also differentiated themselves from the mother institution (classical libraries had contained these as well).

Modern libraries are more difficult to track and evaluate in any simple way, because there are so many of them, in so many languages. But some idea of their expansion can be gained by considering the growth of national libraries, which often attempt to retain a copy of every book or pamphlet produced in a given language. The first Royal Library of Britain was established a century after the invention of printing, about 1570; and in France a major library was founded about 1650 under Louis XIV, although Charles V had started a small royal library in 1365. The first imperial libraries of Vienna and Paris, the late medieval libraries of Oxford and Cambridge, and the German town libraries were also eclipsed by major new national collections, or absorbed into them. By the late eighteenth century, collections of one or two hundred thousand manuscripts and books were not uncommon, and although these numbers still sound smaller than the holdings of the greatest libraries of classical antiquity, a volume of printed material holds much more information than the scrolls of the





Alexandrian Library; thus holdings of 200,000 printed volumes (roughly the size of the national library of Poland in 1795) already represented larger collections than those of the largest ancient libraries.



**M**ODERN national libraries reflect the extraordinary growth of our memory palaces during the last two centuries.

English now dominates, and the rate of growth in the storage of knowledge and information in the English language has been dramatic. There are over 60,000 regularly published serials and periodicals in English. In the US alone there are approximately 56,000 new book titles every year, not counting mass-market paperbacks. In addition, 2,000 works written in other languages are translated into English. Thus, in one recent year, the US produced twice as much new writing as the whole of Europe

did in the first fifty years after the invention of the printing press. Despite the dominance of English, other linguistic groups also produce and warehouse prodigious amounts of library material. The national library of Russia supposedly contains about 40,000,000 items, and those of France, China and Japan about 20,000,000 each.

The enormity of these collections has demanded a revolution in methods of access and cataloguing. There has also been a proliferation in the number and variety of symbolic technologies, and these are revolutionizing the creative process itself. As a result, libraries are continuing to experience fundamental changes in their mode of operation and social function.

The numbers are hard to absorb; the number of items *formally* stored (this does not count billions of privately held informal mementoes, photographs, paintings, diaries, and temporary creations such as private business records or working notes) has grown to the point where our collective memory apparatus defies comprehension. Symbols now surround humans at every stage of development, set the agenda for schools, determine the options available to governments, and drive most of the fastest growing industries on earth. It is as if a rapid chemical reaction had been activated in the last three centuries, and the gradual, unstable growth of the cultures of mind that preceded

has been followed by an explosion of external memory, a virtual encrustation of the entire globe with manufactured symbols, so that in the modern world, the individual mind is born to an environment quite unlike anything our not-so-distant aboriginal ancestors would have recognized.

The holdings of libraries are increasingly connected to computer networks and the World Wide Web. Indexing services are extending their tentacles around the world and changing the way intellectual work is done. An important case in point is the US Federal Library and Information Network, associated with the National Translations Center. It makes over fifty different information retrieval services available to its many users, and includes the archives of the Associated Press, United Press International, *Time*, the USNI Military Database, and a variety of other networks connected to a wide range of information systems. Increasingly, archives and libraries are linked together so that users can search the catalogues of many libraries, rather than being restricted to any single site.

Search facilities are equally impressive. The MEDLINE system of the National Library of Medicine at Bethesda, Maryland, is a case in point. It comprises more than 25 online data bases, and gives workers in health research from around the world access to some 20,000,000 items. It indexes more than 21,000 medical research serials and periodicals in 45 languages. There are comparable services available in many other fields of scholarship, and their use is increasing at a rapid rate.

The importance of these electronic search services lies in their effective consolidation of many collections into a single network. The number of items available to single users of libraries and archives has increased to the point where electronic searches are the only efficient way to survey the system. Physically searching through stacks and shelves is less productive than it was when collections were smaller and more restricted in content; and in the case of larger libraries, it is out of the question. Even flipping through old-fashioned card catalogues is slow and cumbersome when compared to the power of modern indexing and searching techniques. Given the number of items to search through, electronic systems are the only feasible way of gaining universal access to them.

This revolution in electronic storage and retrieval technology has penetrated the multinational world of business to a degree that can only be guessed at by the average citizen. Global corporations are linked by means of a whole variety of communications systems.

Financial institutions now track the stock markets of the world 24 hours a day, and transactions that would have taken weeks as recently as ten years ago now take only milliseconds. The same applies to governments, espionage, and international bodies like the European Economic Council or the United Nations.

As for estimating the size of our collective memory banks, the question has finally become irrelevant. The records are, if not infinite, virtually limitless and uncountable.

### *The Core Curriculum*

**T**HIS raises the question of what to do with this exploding global storehouse. How can we use it in the education of the young? The

global web is both exciting and intimidating. Overload is a fact of life. How much of this massive memory bank is really important, and how does the average person find out what is important? As our holdings continue to grow at what appears to be an exponential rate, what new skills do our young people need, and how should our teaching strategies be changing? Some would say that we have to reduce the emphasis on old-fashioned skills like rote memorization and specialized disciplinary training, and move back toward a general-purpose education that instills sophisticated evaluative skills and a flexible, broad background to equip students to move deftly about in the midst of this growing complexity. Others recommend the opposite approach, believing that we should focus training more and more, and specialize even more narrowly, since a person without specialized knowledge cannot possibly understand anything important about the modern world. This presents educators, especially those working at the high end of the system, with a tremendous dilemma. The Web will not go away. Nor will the new media. Surely every literate person should feel at home in the modern world. How can we educate people to handle the sheer immensity of our global memory palace?

In the ancient world, out of the thousands of records held, there were relatively few that could be considered central to any culture, in the sense that they were necessary for the maintenance of that culture. For instance, in Periclean Athens there were perhaps five dramatists, five or six poets, half a dozen philosophers, and a few historians whose work can be considered “core” material. There were also a few scientists and anatomists of note, whose work formed the nucleus of

those more specialized fields. Any educated person would have been expected to study those works, in order to participate fully in Athenian civilization.

The same could be said of most literate societies prior to the twentieth century. Rome, Imperial China, Renaissance Italy, Elizabethan England, Imperial Spain, and Napoleonic France each had a fairly limited set of books that were basic to the literate culture of the time. There were also a limited number of works that were critically important in any given profession, whether medicine, history, law, engineering or architecture. Even professional scholars, whose work demands a much greater immersion in the contents of these memory records, were left with very few core items to master. For instance, the rediscovery of ancient Greek and Roman classics by early Renaissance scholars involved the reconstruction and absorption of at most a few hundred important literary works.

But all this changed by the late twentieth century. Although revolutionary in their impact, the classics uncovered by the early Renaissance amounted to much less than an average month's output by the proliferating journals of most modern scientific fields. For example, in medicine about 350,000 new scientific articles are added each year, and an equal number in biology and chemistry. That means over a million new, sophisticated, informationally dense, tightly written studies every year. In many other fields the volume is equally high; in aerospace, electronics, geology, history, economics, whatever the field, the amount of research and scholarship is so much larger in scale than anything in the past that it is difficult even to conceptualize it succinctly.



This is complicated by the appearance of a supplementary layer of literate culture, one which fills the bookstalls with trivia and entertainment media that are specifically designed not for the scholar, but for the barely literate person: books for those who don't like to read, advertising for the semi-literate. There are more challenging aspects to popular culture, but these are as elite as ever, written for the few, despite their label of "pop culture." The number of symbolic encounters in a person's life has multiplied incredibly. But not all of them are illuminating or enlightening. More and more, they also distract and confuse.

In such a situation, our classical strategies for teaching and managing knowledge must surely change. Is it feasible to expect individuals to really master their new global culture? What is their true culture? Can it be defined in terms of the old-fashioned nation-state, or can it even be restricted to one language, given the speed and ease of translation? Is old European "high culture" in the sense taught just a few years ago salvageable as a major social force? What religions, what playwrights, what poetry, what cinema, indeed, what aspects of popular culture will be the foundation of a new international culture? What philosophical systems will attract the young in the future, linking us electronically to all the literate cultures of the world, and perhaps even to the illiterate ones? Where will the intellectual and spiritual governance of our new world be found?

### *Conclusion*

ONE could argue that the chaos that has overtaken the intellectual world in the past few decades is not specifically due to historical revisionism, deconstructionism, post-modernism, or any other "ism." It is the product of fundamental change in the institutions and technologies that constitute our collective memory palace. Information used to be filtered through an extremely fine cloth. Literacy was an elite skill; books were rare and precious, and knowledge changed and accumulated very slowly. Intellectual structures were closely held within each culture. This created a stable structure, a shared universe of discourse, and a common set of values and ideas that held together a culture.

In earlier societies, our cumulative cultural holdings may have outgrown the capacity of the individual, but they were still held tightly under control by the social hierarchies of church and state, by what

Lewis Mumford referred to as the “megastructures” of human society. Control of these in turn was won by the greatest intellectual gladiators of ancient times. The palaces of memory may have been held corporately, but those corporations were controllable, comprehensible; they had tangible form.

But in modern society control is no longer held by such institutions, and there is no way back. As it has grown with accelerating and frightening inevitability, the technology of memory has broken the system wide open. There are no censors or priests, no royal academies of the mind with real power to shape and select. The gladiatorial combat of the intelligentsia continues, often without a known or knowable audience, lost in a flood of changing representational structures. The memory palace of humanity expands without apparent purpose or direction, without a shaping intellect, or group of intellects, behind it. It abounds with contradictory traditions and histories, impossible numbers of facts, compelling images, and entire universes of esoteric codes. Individual minds, who invented the palace in the first place, seem to be shrinking in its shadow.

Intellectuals, the proud monadic weavers of this wondrous fabric of mind, inventors and keepers of the codes, are sputtering in circles, overloaded and confused. They hide, they run, they deny their loss of status, but above all these lost descendents of the priests of the old religions are worried because *no one is in control*. The rest of society sleeps and dozes through the lurchings and reelings of the memory structures upon which its survival depends. But the keepers of the structures are disoriented. They find themselves in unknown terrain.

One might want to argue that a virtually infinite and ungoverned palace of memory is a good thing because it gives the curious mind more rooms to explore than the smaller, closely controlled palaces of the past. And the fall from grace of the intelligentsia might be an even better thing, because it removes the guards from the palace, leaving visitors free to roam as they please. On the surface, this seems a net benefit. But the downside is a serious loss of structure. A growing mind still has the same basic need for structure as it ever had. Cultural astronauts need a home planet before venturing into representational space. They need a map and a guide, at the very least, and some rules.

Which raises the question of educational leadership, inconceivable without a new apparatus of control. Our palaces of memory are where we live, our intellectual home. But if the structures and symbols of record proliferate to the point where recovery of control is impossible, where will we be? Indeed, where will we be?

