JUDITH FLANDERS

A Place for Everything

The Curious History of Alphabetical Order

PICADOR

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Preface

Writing, from its earliest days, has been thought of as a gift from the gods: in Egypt it was given to humanity by Thoth, the god of culture; in Babylonia, by Nebo, the god of destiny; in Sumeria, it was bestowed by Nabû, the 'scribe of the gods'. The Greeks sometimes thought writing was granted to mankind by Hermes, the messenger of the gods; at other times they reported that it was given by Zeus to the Muses. Odin bestowed the gift in Norse legend; in India, the elephant-headed god Ganesh used one of his tusks as a pen; while the Mayan Itzamna, a creator–god, first named the objects in the world, and then gave humans the ability to write those names down. The Jews were taught that God had handed the skill to the world through his intermediary, Moses; in the Qur'an, Allah is he who 'taught the pen'. As late as the fifteenth century, *han'gul*, the newly created script of Korea, was said to have been produced by 'the revelation of heaven to the mind of the sage king'.[1]

How writing came to be, it appears, is a question that has been explored for almost as long as writing itself. And therefore what writing does – it enables us to read, to gather information and to pass that information on – seems so obvious that we barely consider the magnitude of this ability. Yet reading, and writing, and what we do with those things, are not obvious at all. As we will see, the world broadly divides into two types of writing systems: alphabetic and syllabic; and ideographically based methods. The alphabet, as far as we can tell, was written from its very earliest days in a set order. Why, we don't know, although ease of memorization seems possible, even likely. Non-alphabetic writing systems, by contrast, were organized in a variety of ways – by sound, by meaning, by written structure or shape.

To readers and writers of an alphabetic language such as English, the assumption I just made above – that the elements that make up a writing system, the characters, must be ordered, must be sorted or organized in some way – is automatic, and unquestioned. Equally, it has become automatic to assume that, once our writing systems evolved, writing was used to give permanence to thoughts and ideas; and then, that methods were devised to enable us to return to those thoughts and ideas, whether ours or someone else's. For writing is a powerful tool – not merely a tool that permits Person A to notify Person B that such-and-such occurred, or will occur, or some other piece of information, but a tool that enables Person B to be notified of these occurrences centuries after Person A has died.

Writing is powerful because it transcends time, and because it creates an artificial memory, or store of knowledge, a memory that can be located physically, be it on clay tablets, on walls, on stone, on bronze, papyrus, parchment or paper. And for centuries, that is how it was used. Words were written, and stored. We can guess from what has survived that it was expected that these items would be referred back to. But how, and why, did we learn this art, or science, of reference, of 'looking things up'? How did we learn to find what we needed when we needed it, in the mass of written words that have surrounded us daily for a millennium and more?

It is hard today to imagine not being able to look something up – not to know how to use an index, a dictionary or a phone book. It is harder still to imagine a world in which there are no indexes, no dictionaries or phone books. Ordering and sorting, and then returning to the material sorted via reference tools of various kinds, have become so integral to the modern Western mindset that their significance is, at one and the same time, almost incalculable, and curiously invisible. For categorizing is what we do every day of our lives, frequently every hour of every day, and not just through paper. We use dozens of products every day without ever considering that they have been specially designed for our perpetual sorting needs, to enable us to locate material swiftly and without effort.

Thus, a wallet has a pocket for coins, longer slots for banknotes, shorter ones for credit cards; handbags have loops for mobile phones, zipped pockets for keys, flaps for bus passes. These of course are personal sorting categories: I might put my phone in a pocket someone else uses for a wallet, and vice versa. Other items need to be sorted in ways that are comprehensible to a wider audience. A newspaper separates articles reporting on internal political events from articles dealing with world news, those on sports from arts reviews or editorials. This is not done for the ease of the newspapers' producers (a single journalist might write articles across several fields), but to assist their readers. The displays in supermarkets, by contrast, are in part dictated by technological constraints – until recently, chilled and frozen foods were almost always found against the shops' walls, where the cabinets could be plugged into electrical outlets – but otherwise they use broad categories: meat, fish, fresh fruit and vegetables, just as furniture stores such as IKEA sort their items by room – bedroom furniture here, kitchen equipment there.

These methods are so obvious to us, we barely think of them as organizing or sorting, and yet of course that is what they are. They are ways of enabling someone searching for information, or physical objects, to locate what they need. Yet what all these methods rely on is some, even if limited, previous knowledge on the part of the person doing the searching. A reader has to know that an article on the French Open tennis tournament will be categorized by the game being played, rather than by the country in which it takes place, in 'sport', rather than 'world news'. Similarly, supermarket shoppers are expected to look for their tomatoes in the vegetable section, even though they are technically fruit; and that dill, if it is dried, will be found in the herbs and spices section, and if it is fresh, with the vegetables.

Almost all sorting systems similarly require some level of familiarity on the part of their users. To modern eyes, printed lists and alphabetical order are in essence synonymous – alphabetical order, we assume, is and always has been humanity's default sorting method to enable us to locate most things that are written

down. But it turns out that this is simply not the case. A range of other sorting methods – geographical, chronological, hierarchical, categorical – were favoured over alphabetical order for centuries. Sometimes there is no visible organizing method, the order of things being so essential that it is simply remembered. For a medieval clergyman, what would have been the point of putting the books of the Bible in alphabetical order? To him, it was obvious that Genesis comes before Exodus, just as, to us, it is obvious that Monday comes before Tuesday, September before October. In fact, if you ask someone to put the days of the week or the months of the year into alphabetical order, you will most likely be met with a long pause. It is surprisingly difficult to do, because the days and months have a 'natural' order, one that is not alphabetical.[2]

Other types of categorizing and sorting that were natural to generations past today seem as peculiar as April heading a list of the months of the year because it begins with A. Yet in a world more stratified than our own, sorting things hierarchically was once a natural impulse. The Domesday Book, that summary of land occupancy in England and parts of Wales produced for William the Conqueror in 1086, assessed the values of 13,418 places, organizing them first by status, then by geography, then by status again, and finally by wealth. The king came first, followed – broken down by region – by the great clergy, the powerful barons, and lastly each district's most humble tenants.

But of course, for the information in the Domesday Book to be accessible to later readers, they had to know the regions of England and Wales, and the orders of hierarchy – who outranked whom. For, in all the millennia of reading and writing, only one major sorting system has evolved that requires no previous knowledge from the searcher: alphabetical order. To use alphabetical order, the only thing searchers need to know is a list of approximately (depending on the language) two dozen characters, in an established order. They do not need to know on what continent a city is located to find it in an atlas, nor if a bishop outranks a cardinal to find him in a list of participants at a clerical summit. Neither do they need to know whether the English Civil

War preceded or postdated the American Civil War, to locate it on a chronological list of 'Wars through History'; nor, indeed, do they need to know whether a tomato is a vegetable or a fruit, to search for it in a seed catalogue.

Alphabetical order is in this way entirely neutral. Someone whose name begins with A is at the start of the list not because they are a great landowner, nor because they have more money, or were born before the others on the list, but simply because of a random quirk of the alphabet. This lack of inherent meaning, of preordained value, makes alphabetical order a sorting tool that does not reflect back to its users the values of its creators, nor even an image of the world in which it was created. In 1584, the compiler of the first French bibliography included a dedication to the king, apologizing for his use of alphabetical order and acknowledging that his choice had upended hierarchy, allowing the possibility that entries for lesser men might well appear before those of their social superiors, children before their parents, the ruled before their rulers. 'Certainly,' he wrote, 'I have felt the impropriety of having thus observed an alphabetical or A, B, C order', but he had nonetheless persisted with this system not, as we might assume today, to make the entries easier to find, but 'to avoid all calumny, and to remain in amity with everyone': that is, to ensure he did not trespass unknowingly against hierarchy by setting a less prominent person ahead of a greater one.[3] In 1584, therefore, alphabetical order was still a fallback to some, a way of avoiding a social faux pas in print.

Two hundred years later, in the late eighteenth century, Harvard and Yale Colleges still used hierarchy and status as their primary sorting filter for their students, with enrolment lists ordered first by the students' families' social position and wealth, then subcategorized by whether or not their fathers had attended the same college. The students' own performance powered their rise or fall in the class lists as the year progressed, but at formal events social status remained the sorting tool for the order in which students entered rooms, and for seating arrangements.[4] Today, it is unimaginable to contemplate ranking students by their

parents' wealth, or by their race or gender, or by the colour of their hair or their perceived level of attractiveness to their fellow students (at least, not overtly). Nor do we, in our democratic age, group students by their grades, even though 'Will the smart people sit at the front, please' was once routine.

The very benefit of alphabetical order, to our eyes, is that it says nothing at all about the people or objects being sorted: 'The alphabet can help in finding [or organizing] things, but not in understanding them. It cannot tell you why a whale has more in common with an elephant than a shark.'[5] It is value-neutral, simply guiding those using it to the places where they can learn meaning or value for themselves.

And yet, when looked at from this angle, alphabetical order seems oddly useless. That very value – that it is neutral – also means it is devoid of meaning, and therefore it is rarely the sorting system of first resort. Phone books, which appear to a modern eye to be entirely alphabetical, use at least two preliminary sorting filters: first by country, then by region or city (both geographical), then by type, residential or business (occupational), before finally getting down to alphabetical. Schools that use alphabetical order to record their students in registers first divide the attending children by classes (age), and only then by the alphabet. Bookshops and libraries, too, rarely, if ever, rely purely on an alphabetical organizing system. My last name begins with F, and so does F. Scott Fitzgerald's. This coincidence would tell readers nothing about our respective books, were they to see them sitting next to each other on a shelf. Which is why in virtually all bookshops, Flanders and Fitzgerald are separated: Fitzgerald in fiction; Flanders in non-fiction (primary sorting level). Then, Flanders is in 'history', Fitzgerald in, perhaps, 'twentieth-century fiction' (secondary); after that, European history versus short-story writers (tertiary); and only then might the books be sorted Fa, Fe, Fi, Fl . . .

Of course, once these same books are taken home, there is no reason why Fitzgerald and Flanders might not be shelved side by side if their owners decide to use alphabetical order as their

primary sorting system. Or if the system is to be used by a single or a limited number of searchers, more idiosyncratic or value-laden systems can work efficiently, based as they are on previous knowledge held by the searchers: all books with a yellow spine together, or books given to us by our mothers, or sorted into geographical or chronological order by place or date of purchase.

The short-story writer and essayist Jorge Luis Borges gave the most memorable, and picturesque, reminder of the reality that all sorting methods by their very nature obscure: as the world is random, so too must be the methods that seek to categorize, and thus rationalize, the world. 'Obviously,' he wrote, 'there is no classification of the universe that is not arbitrary and conjectural . . . the impossibility of penetrating the divine scheme of the universe cannot dissuade us from outlining human schemes, even though we are aware that they are provisional.' He mocked a natural philosopher of the seventeenth century who had attempted through categorization and classification to invent an artificial world language, highlighting its 'ambiguities, redundancies, and deficiencies', and claiming that they reminded him of a (probably imaginary, and invented by Borges) Chinese encyclopedia, which classified all animals by dividing them into the following groups: '(a) those that belong to the Emperor, (b) embalmed ones, (c) those that are trained, (d) suckling pigs, (e) mermaids, (f) fabulous ones, (g) stray dogs, (h) those that are included in this classification, (i) those that tremble as if they were mad, (j) innumerable ones, (k) those drawn with a very fine camel's hair brush, (l) others, (m) those that have just broken a flower vase, (n) those that resemble flies from a distance'.[6]

Classification, and the sorting tools we have created to enable it, may never be quite as bizarre and as memorable as Borges' mythical encyclopedia, but the history of how we moved from the arrival of the alphabet around 2000 BCE to the slow unfolding of alphabetical order as a sorting tool some three thousand years later, in the thirteenth century CE, is filled with nearly as many surprises and wonders.* For sorting is, ultimately, magical – indeed, the word 'abracadabra', that invocation of magicians from

classical times onwards, is a word built on the first four letters of the Latin alphabet.[7] This magical tool, the alphabet, bestows the ability to create order out of centuries of thought, of knowledge, of literature, scientific discovery and history. Sorting, and classification, allow us to locate the information we need, and disseminate it in turn. Without sorting, all the knowledge in the world would lie in great unsifted stacks of books, themselves unfindable, unread and unknown.

Despite this, alphabetical order has remained almost unrecorded for most of its history. Its arrival was remarked on as it was laboriously invented and reinvented, explained and re-explained. But once it was assimilated, it swiftly faded into the background, becoming so much part of the scenery that everyone ceased to notice its existence. A historian of the development of the alphabet lamented the lack of study given to his discipline: there was no academic school of study called 'history of writing', he mourned, no museum, nor even a section of a museum, devoted to it. Instead, his field was divided up between, among others, anthropology, archaeology, Assyriology, Egyptology, ethnology, Mesoamerican studies, palaeography, philology and Sinology, to list them alphabetically.[8] (Although since that was written, the University of London has overseen a flourishing Museum of Writing Research Collection.) But at least there are disciplines for all of these things. Historians of Early Modern Europe are now beginning to study archiving and organization as they emerged in the Renaissance, but for most of history, to learn about classification was to be forced to read between the lines, to search out how people sorted by working backwards, from end results, where those have survived, to our best guesses as to their intentions.

It may be that classification more generally, and alphabetical order in particular, have been rendered invisible in part because of another automatic assumption, one we make about reading: that when we talk about reading, we are talking about narrative prose. Whether it's a romance set in Siberia, a history of the Roman Empire or a government report on the after-effects of a hurricane, our notion of reading presupposes that we are being told some sort

of story, one where events happen in a careful arc, one after the other; and they have a meaning or, if not, the point is their lack of meaning. Readers are expected to start at the beginning of an essay, a newspaper article or a book, then continue through the middle to the end, at which point that particular reading episode is over. Yet there are so many other types of reading that we do daily: we browse, entering a text randomly until we find something that captures our attention; we search, jumping through a text to isolate a specific point or piece of information we need; we study, reading one text intensively, but breaking off to check the endnotes, to follow up a digression, to source a quote in another book or look up a definition or explanation in a reference work; and we revisit, returning to a text to reacquaint ourselves with something we already know.[9]

Even these different kinds of reading, however, make up just a tiny percentage of most people's reading lives. We also read maps and SatNav or GPS directions; we read the letterhead on office stationery; we read advertising copy in camping-gear catalogues; we read train or bus timetables; we read highway signs and street signs and signs that tell us when we can park our cars; we read the opening hours of shops, whose signs bearing their names we also read, to distinguish them from the shops next door; we read the instructions on bottles of prescription pills, and directions on how to turn on the oven's self-cleaner; we read menus, and our list of appointments each day. And, of course, we scan many lists in alphabetical order for information: address books and phone books and contacts lists; indexes to books or maps; or lists of people named 'Brown' on Wikipedia. Much of our reading, therefore, is not remotely narrative, not destinational, but instead is directed towards retrieving a single piece of information, which is often found by searching a list that is ordered alphabetically.[10] But this form of reading is never written about in books and magazines, nor studied in universities. Frequently, it is barely considered even to be reading. And yet at home, at school and at work, we make notes, which are ordered into shopping lists, reports, articles, letters, budgets or other office documents; we

compile lists – for our insurance companies, to build an address book, to inventory our possessions or a library, or an office filing-cabinet.

A Place for Everything is a look at the history of this ordering and classification, at how sorting came to be, in particular via the alphabet. Much of our lives is spent creating archives of documents, and then developing ways of finding those documents. The word 'archive' itself comes from the Greek *arkheion*, meaning a magistrate's residence, a place that housed not only government documents, but also papers lodged there by private citizens as a place of safe storage. And from there, as one of the earliest alphabetical list-makers, Isidore of Seville (see here), noted, it came to encompass a chest or strongbox (*arca*), an archive (*archivum*), as well as mystery (*arcanum*).[11] An archive (the room) and an archive (the papers it contains) are both the container and the thing contained, while classification, whether alphabetical order or any other system, is the tool we use to navigate them, our map to guide us through this mysterious and secret world of paper. The chests used to store papers for most of history – the arks – subliminally return us to the Bible, to the Ark of the Covenant and to Noah's Ark, containers of God's word and of humanity and the animal kingdom. Arks are mere wooden boxes to hold books and documents, and yet as such they symbolize the wisdom of the ages, of God's promise for humanity.[12]

Bill Gates once identified the development of the transistor in 1947 as 'a key transitional event in the advent of the information age'. Other key moments, according to historians, include the invention of writing, of double-entry bookkeeping, printing, the telegraph and the computer. What is notable in this list is that none of these are inventions that created new knowledge themselves, but are instead inventions that created new ways of *accessing* knowledge. It was not the machines – not the telegraph, not the printing-press, nor even the computer – that revolutionized the world, but the processes behind those machines: they were the software to the hardware of the printing-press or the telegraph or the computer. To enable these new types of software to function, systems of

organization, and especially the alphabet – that ABC that was devised so many thousands of years before – were needed to guide them to a new world of order. How it happened is the story that follows.

1

A is for Antiquity

From the Beginning to the Classical World

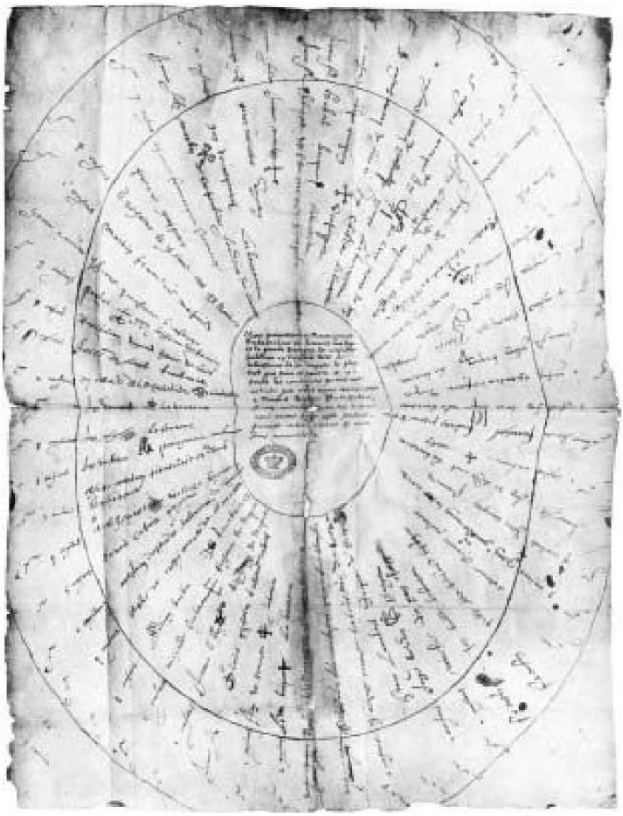
The earliest 'writing' was not writing as we recognize it today, in many languages. It was not built on a series of symbols, which we call 'letters', that represent sounds, and which when combined make up words. Instead, the earliest writing consisted of images painted on rock, probably representations to be used in the service of ritual beliefs, rather than to communicate abstract thoughts or concrete objects. After these came pictographs, where a single standard image became the representation of an object. Pictographs emerged independently around the world, from the Middle East to Australia, and in many parts of the Americas. These were followed by ideographic writing, where pictographs were used to represent, not a thing, but an idea associated with a thing: a circle might denote 'the sun', or 'light', 'brightness' or 'day'. This form of writing was also found across the globe, from China to North and Central America, to Africa, Australia and Siberia.[1]

The world's first complex writing form, Sumerian cuneiform, followed this evolutionary path, moving around 3500 BCE from pictographic to ideographic representations, from the depiction of objects to that of abstract notions. Sumerian cuneiform was a linear writing system, its symbols usually set in columns, read from top to bottom and from left to right. This regimentation was

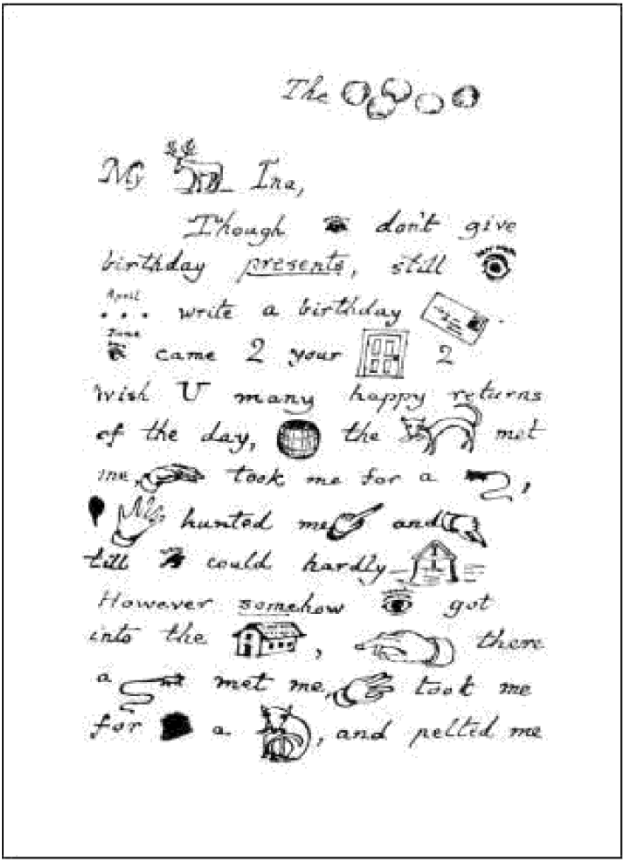
another form of abstraction: the world is not a linear place, and objects do not organize themselves horizontally or vertically in real life. Those early rock paintings, thought to have been created for ritual purposes, were possibly shaped and organized to follow the walls of the cave, or the desires of the painters, who may have organized them symbolically, or artistically, or even randomly. Yet after cuneiform, virtually every form of script that has emerged has been set out in rows with a clear beginning and endpoint.[2] So uniform is this expectation, indeed, that the odd exception is noteworthy, and generally established for a specific purpose, such as those 'round robin' letters of complaint to higher authorities, in which the complainants sign in a circular fashion to ensure that no ringleader can be singled out.

Sumerian writing then made another conceptual leap, by originating a method of representing grammatical parts of speech using the symbols for words that already existed and that shared the grammatical element's sound. This sound/sign system is more easily explained to English-speakers who are familiar with its use in the rebus, a traditional puzzle game. In a rebus, a picture of an eye, for example, might represent the word 'I', a picture of a sheep ('ewe') the word 'you' (see here).

In Sumeria, writing became a bureaucratic tool during a period of rapid urbanization, as a powerful upper class oversaw large-scale civic construction, as well as the creation and expansion of the complex distribution networks needed to feed the inhabitants of these new cities. Yet while the skill was widely recognized, at the same time it was accessible only to the elite. Learning to write Sumerian cuneiform required both time and intelligence: there were around 300 basic symbols to memorize, as well as another 1,000 less frequently used ones. In addition, many were then combined to create further meanings: for example, the symbol for 'mountains' also meant 'foreign place', and when it was used together with the symbol for 'woman', the compound character meant 'slave'.[3]



A round robin letter of 1621, petitioning for the right of Huguenots to settle in the New World. The petition is in the centre, reading conventionally, top to bottom and left to right, while the signatures deviate from this standard pattern to obscure the petition's originators.



The first page of a letter in rebus form from Lewis Carroll, the author of *Alice's Adventures in Wonderland* (1865). Note that 'and' is represented by a picture of a hand, presumably with the dropped H common in many English dialects.

By around 3000 BCE, trading routes between Mesopotamia and Egypt were well established. Ideas, as well as goods, travelled along these routes in both directions, and one of those ideas was a phonetic writing system. Initially, the new Egyptian hieroglyphics were pictographic, representing objects, but within a century Egyptian writing had made the same conceptual leap as cuneiform had done, incorporating rebus-like wordplay to convey abstractions. By around 2000 BCE, 700 standard hieroglyphic signs were in use in Egypt; two thousand years later, the number had grown to over 5,000. Eventually, Egypt had four types of writing:

hieroglyphics themselves; a simplified form of hieroglyphics known as hieratic, or sacred, script; and two cursive scripts, which were written more fluidly. Both the cursives and the hieratic script were quicker and easier to write than the original hieroglyphics, although these latter continued to be used for inscriptions, on monuments and for civic or religious displays; the cursive scripts were kept for letters, business transactions and other day-to-day affairs, where speed was more important than appearance.

Old Babylonian clay tablet, *c.*1900–1700 BCE, inscribed with a proverb written by a teacher (left), and copied onto the rear of the tablet by a student (right).

In many ways, the societies of Egypt and Sumer evolved along parallel routes. Both developed densely populated urban centres; new ways of irrigating land; and, between them, invented or elaborated on methods of dividing years into weeks and hours into minutes. Sumeria probably also saw the invention of the wheel, of sailing ships, of brick manufacture and, perhaps most importantly, the idea of making marks in wet clay which, when the clay dried, preserved the information that the marks conveyed for later reference. By contrast, writing in Egypt began on an entirely different scale: glyphs dealing with matters of religious importance were painted onto walls, or onto large banners designed to hang across the façades of buildings. ('Hieroglyph' means 'sacred carving'.) Over time, these glyphs were adapted for

smaller-scale use, diminishing from building-sized to hand-held as they began to be inked onto papyrus scrolls.[4]

The simplest hieroglyphs were ideograms, where a symbol represented a concrete object: a picture of a bull meant 'bull'. Then came phonograms, where a symbol stood for a sound that had some connection with that symbol: a glyph representing a female hare did not mean 'female hare', but the sounds 'w' and 'n', which were the consonants that made up the word 'female hare'. Symbols today referred to as determinatives, placed after a word, indicated what class or category that word belonged to: glyphs for plants were followed by a determinative meaning 'grass', to show that the glyph that preceded it fell into the plant category; similarly, all symbols followed by a 'pen' symbol fell into the realm of ideas. Egyptian writing could be inscribed either in columns, read top to bottom, or in rows, which could be read in either direction: readers knew where to start by looking at the faces in the human and animal pictograms, which always faced the beginning of the text. As with Sumerian cuneiform, Egyptian hieroglyphs and hieratic and cursive scripts were all complex, and required long periods of study before any skill could be demonstrated by a would-be writer.[5]

Writing was altogether a complex business, and across the world was most likely invented at the very most half a dozen times – one historian believes that it might have been independently invented just three times in all of humanity's existence.*[6] China was one of the first civilizations to generate a writing form. Early prototypes of inscribed writing had appeared there by the last quarter of the second millennium BCE; by around 1200 BCE, divinations were scored onto the ox bones and turtle shells called oracle bones. (Fragments with incised markings date back to *c.*4800 BCE, but these incisions cannot authoritatively be called writing.) The script used in China today is a descendant of a writing form that originated in the Shang or Yin dynasty (*c.*1600–1046 BCE). It is logographic, with each word represented by a character. In its early form, some of the characters were representations of concrete objects; some were rebus-like, the logograph standing in for a similar-sounding

word; still others were related not by sound, but by meaning. As with Egyptian hieroglyphics, the characters were followed by determinatives to clarify their category.[7] By 100 CE, this system had nearly 10,000 characters.

Then there was the writing system of the Maya of Mesoamerica, whose first surviving glyphs date from around the third century BCE. These, however, are most likely the descendants of an earlier writing system, or systems, about which we know nothing. It is thought today that the Mayan glyphs were ideograms, partly pictorial, but no one really knows. Later glyphs were logograms, which represented entire words, used in conjunction with glyphs representing single syllables. These were incised, carved and painted: into stone, wood, onto walls and, more portably, onto both pottery and bark paper.[8]

All of these systems were difficult to learn, requiring a great deal of both time and resources. The appearance of a new method of writing, one that had fewer than thirty symbols, was to prove a revelation – and, ultimately, a worldwide revolution. Writing, if not given to humanity by the gods, was nonetheless a skill that was carefully guarded by the priestly and elite classes: control of writing was a component in the control of religion, the control of government, the control, even, of much of business. The new writing system, however, did not emerge from the temples or the princely courts, nor even from an urban centre. Instead, we think that it was born in the Western Desert of Upper Egypt, somewhere between the cities of Thebes and Abydos, along a route that was heavily used by both traders and soldiers, especially mercenaries from across the Middle East. These people shared no mother tongue, nor were they from an educated, literate elite. Of necessity, therefore, they communicated in a creole, a hybrid of their many native languages. And yet these rude, uneducated, disregarded people most likely invented what became the ancestor of all the world's alphabets. For while it is possible that writing was invented fewer than half a dozen times, the very idea of an alphabet was so completely novel in its level of abstraction that it is thought that in all of human history it was invented only once:

at this time, in this place. As far as we know, every alphabetic script derives from this single source.

The central innovation of alphabetic writing is that it reduces every word to smaller units by representing each individual sound, without any connection to a word's meaning. This novelty has been compared to the creation of money, which dates from about the sixth century BCE, in Lydia.[9] Both alphabet and money are abstractions: money is a symbol of value, not something of value itself; letters are symbols of sounds, not the sounds themselves. It is difficult for us today to understand how the alphabet changed everything through its extreme abstraction. Yet alphabetic writing altered the way we think. If the word 'god' is read backwards, it becomes 'dog'. It isn't simply that this type of inversion is impossible in a writing system without an alphabet. If that were so, it would merely be a game, a charming quirk. But in a writing system without an alphabet there is no 'backwards'. Spoken words have an ephemeral, fleeting order as they are uttered, and until words are written down they are not fixed one after the other. But once they are written down in an alphabetic writing system, words do have an order, and so do their individual components, letters. The component elements of Chinese graphs, for example, cannot be taken apart and individually reversed and read backwards – there is no meaning, even, to that concept.[10]

However radical the alphabet might be understood to be in retrospect, its ease of use in practice – memorizing twenty or thirty symbols instead of thousands – meant that this new system spread rapidly among the desert travellers: many dozens of rock inscriptions have been found in the Western Desert, at Wadi el-H.ôl, which are thought to date from around 2050–1550 BCE. They have not yet been definitively deciphered, but they bear a close resemblance to the later alphabet of what is known as North Semitic script, which flourished around 1800–1700 BCE. It is likely that the inscriptions were carved by foreign mercenaries who had seen Egyptian hieroglyphics, in particular the symbols the Egyptians used to transcribe foreign words and names phonetically. The Wadi el-H.ôl carvings are visibly based on these

hieroglyphics, although they do not represent the same sounds – further evidence, perhaps, that the people who carved them were familiar with, but not part of, Egyptian society.[11]

The linguistic group that included the Canaanites, the early Hebrews, the Phoenicians and Aramaeans used a form of North Semitic script, which had twenty-two letters and was an abjad, an alphabet consisting entirely of consonants, with no vowels. We know that Old Hebrew used the same order of the letters as North Semitic, because an excavation has uncovered a late ninth- or early eighth-century BCE carving – virtually graffiti – of the first five letters of the early Hebrew alphabet, and they are in the same order. The Book of Psalms, too, in the Old Testament, contains psalms in the form of acrostics, in which every line of verse begins with a word that starts with each successive letter of the alphabet, again confirming that the order of the alphabet had been established by the sixth or fifth centuries BCE.

This writing form, which required its users to remember only two dozen symbols, could be learned relatively swiftly, at least in comparison to the lengthy study periods needed for cuneiform and hieroglyphics, and thus ensured that it was readily adopted by merchants and traders. And so the alphabet made its way from hierarchical Egypt to the relatively egalitarian land of Israel. (It was not egalitarian in our modern sense, yet was a place where lower-caste prophets, at least according to the books of the prophets in the Old Testament, railed publicly and without retribution at the upper echelons of society, who regulated both religion and law.)[12] It then moved on to Greece via Phoenician traders, to the civilization that was to turn sceptical thinking and inquiry into a philosophical value.[13] The alphabet may have appeared in Europe as early as the eleventh century BCE, although it would be at least a couple more centuries before it was widely used.

Another descendant of this early alphabet developed independently: surviving inscriptions show that by the sixth century BCE a forerunner to Arabic script was in use in a trading colony in the southwest of the Arabian peninsula, where languages

that are collectively referred to as Old South Arabic, an offshoot of Canaanite, were spoken. The direct ancestor of the modern Arabic script, however, was to emerge in Petra, the centre of the Nabataean kingdom, in the second century BCE, a place where a dialect of Aramaic was spoken.[14]

Greek and Arabic alphabets both adopted, and adapted, the Semitic names for each of the alphabet's letters, the European versions of the alphabet in addition acquiring vowels, while the Arabic alphabet remained an abjad. It is presumed that early non-alphabetical writing systems used the word or idea each pictograph stood for as its name: the pictograph of an ox was probably called 'ox'. With an alphabet, that no longer worked. Early on, the name of each individual letter had been based phonetically on the word the letter represented, as children's books today explain that 'A is for Apple', but by the time of their wider dissemination they no longer meant anything at all, and the Romans reduced them even further.* Early Greek retained the Semitic outlines of the alphabet: it was arranged in mostly the same order, apart from some letters that had been added to accommodate the different sounds of the Greek language; the letters were almost the same; and initially the reading direction was the same. After 800 BCE the Etruscans then adopted, and adapted, the Greek alphabet, making their own changes to suit their language and pronunciation; and from there came the Latin alphabet, as the Etruscans were assimilated into the early Roman republic sometime after the fourth century BCE. The Latin alphabet appropriated twenty-one of the Greek letters, dropping *zeta* as unnecessary and adding 'g', then later reincorporating 'z' as well as 'y', in order to be able to transliterate Greek names.

But all this time, no one had as yet used the word 'alphabet', which made a surprisingly late appearance. The Romans said '*literae*', or '*elementa*', letter, or element, a direct translation from the Greek. It was around 200 CE that the theologian Hippolytus of Rome wrote the phrase '*ex Graecorum alphabeto*', meaning 'from the Greek alphabet' – the first surviving use of the word. By the fourth century St Jerome was using the word as though it were well

known: his aim was '*alphabet hebraicum discerem*', 'to learn the Hebrew alphabet'.[15]

Learning the alphabet, however, even learning it in a set order, is not the same as using alphabetical order. The alphabet, as we have seen, was – give or take the odd letter – established in a fairly fixed order from the start. But it took some time before anyone thought that order might be useful for anything other than memorizing the names of the letters, to help students learn to read – up to three thousand years, in fact.

In 2350 BCE, Sumeria was conquered by the Akkadians who, as conquerors often do, adopted many of the elements of the civilization they had defeated, making them their own. To continue to maintain the very fine Sumerian bureaucracy that they had commandeered, the Akkadians needed clerks who could read Sumerian. Sumerian, however, was a non-Semitic language, while Akkadian was a Semitic one. Faced with the reality of two unrelated languages, the Akkadians drew up numerous word lists, early precursors to dictionaries, with Akkadian vocabulary facing its Sumerian equivalent. The earliest surviving example of one of these word lists is the Urra=hubullu, a set of twenty-four vocabulary tablets dating from the second millennium BCE. The words they contain were grouped by subject: words relating to the law, to government administration and to objects – everything from different types of naval and land transport, to domestic, farm and wild animals. Within these categories, items were ordered by the material they were made of: for instance, there were tablets covering the vocabulary for trees, and therefore anything made of wood, such as ships and carts; another listed items made of clay.

This sort of word list, an early version of the topically ordered vocabulary lists in modern phrasebooks, became a standard tool, especially among traders and merchants, who regularly dealt with people from other parts of the world. These lists, however, might be organized by any of a number of different principles. Around Phoenicia, in Ebla (near modern-day Aleppo), for example, word

lists have been found that sorted entries by the sound of the first syllable of each word.[16]

A more general form of organizing and categorization can be seen in the discoveries at Kanish (the modern Kültepe, in central Anatolia), where around twenty thousand cuneiform tablets have been excavated. There, tablets bearing different kinds of information were carefully stored in different places, organized by type or subject. Some still carry small clay labels on which were inscribed descriptions of their contents: 'messages of A', 'tablets of the city', 'tablets which are copies of . . .', 'tablets of the will of PM', 'testimony of PN', and so on.*[17]

In other locations, the letters of the alphabet were used as reference marks in construction and carpentry. In Nimrud in the ninth century BCE, ivory pieces that were to be inlaid as decorative motifs in furniture each had a letter of the alphabet on the reverse side, to signal the order in which they were to be fixed, indicating that even workmen knew the alphabet in order. Similarly, six centuries later, letters were incised into the wooden beams of a ship, to guide the carpenters, just as we see on the instruction sheets for modern flat-pack furniture. And at Petra in the first century CE, great blocks of hewn stone also carried letters, again, presumably, to show the order in which they were to be erected in a temple.[19] Thus the alphabet was being used as an organizing tool, but it was not yet used as a sorting tool. It indicated a process (beam A was to be erected before beam B), but not that all items beginning with the letter A should go *here*, while all those beginning with the letter B should go *there*. At this point in history, it appears that there was no need.

In classical Greece, the writing was literally on the walls, inscribed into stone. After *c.*650 BCE, laws were sometimes also written down in more portable form: the Prytaneion, the place of the executive, had writing tables where oral decrees were recorded in more permanent form.[20] Yet how they were stored afterwards, and if they were sorted, is unknown. We have only a handful of examples from these centuries that might tell us something about how the

classical world looked at sorting, and at categorization. The two earliest surviving long lists in Greek literature both appear in Book II of the *Iliad*, dating from the eighth or seventh century BCE: one is a catalogue of 1,186 Greek ships, and the other a list of those who fought for Troy. Both are (mostly) divided by geographical origin. Four centuries later, a geographical division was also the choice for an official list of Athenian citizens, which was organized by *deme*, or district.[21] In the sixth century BCE (probably – the date is uncertain) *The Catalogue of Women*, often ascribed to Hesiod, instead used genealogy as its primary sorting system.

By subject, material, geography, genealogy: compilers of the ancient world, it is clear, saw sorting as a complex business, with a range of possibilities to select from as they were faced with ever larger amounts of information. Yet before we look further at the systems they chose, a technological digression is necessary.

Papyrus was commonly used as a writing surface in Egypt in the fourth millennium BCE. The reeds from which it was made were widely available, it was inexpensive, and could be produced with different finishes and in different qualities, and thus it spread around the Mediterranean. Its main drawback was one that only showed itself over time: papyrus begins to deteriorate after a century, and disintegrates completely within two. By contrast, parchment, made from animal skins, has a much longer life. Manufactured initially in the fourth century BCE in Pergamum, from which the word 'parchment' ultimately derives, by the second century BCE the skins were in wide use, and increasing over the next couple of centuries in great part for their longevity. For works originally written on papyrus to survive into modern times, they had to have been important or popular enough to have been copied several times in order to reach the period when they could finally be copied onto a more durable writing surface such as parchment.[22] It is therefore important to remember that surviving writings from the pre-classical period have with few exceptions been copied and recopied, and thus later hands may well have intervened in the organization and meaning of the texts.

From our vantage point, it appears unremarkable that in the fourth century BCE Aristotle arranged his *Constitutions* and *Politics* in some measure of alphabetical order. But now we must consider what those works were written on, how many times they would have been copied, and, possibly, amended, adapted – and reordered. For there is no evidence at all that permits us to know when the order of these texts was established – no evidence that the order and organization that we know today were set down by Aristotle himself, or even if any reordering occurred in the earliest centuries when his work was disseminated. The first mention of the *Politics* being organized in alphabetical order comes from a text written several centuries later, by an author active in Alexandria, in Egypt – a fact that may not be coincidental. Because it was Ptolemaic Egypt, that dynasty founded in 323 BCE and ending with the death of Cleopatra in 30 BCE, that was the sole place, and time, when alphabetical order was in use in the Mediterranean world in any sustained way before the High Middle Ages.[23]

In the late fourth or early third century BCE, the scholar and poet Philitas of Cos produced a glossary, of which only tiny fragments have survived. Its title has been translated as *Rare Words in No Particular Order*, which suggests, first, that the entries were random; but that, as a corollary, the author thought that words do have a set order, which he chose to disregard. However, other possible translations of this title include *Miscellaneous Glosses* and *Disorderly Glosses* – that is, it was the words themselves that were 'disorderly', the glossary covering dialect words, not that their arrangement was poor.[24] Yet the possibly crucial detail that gives weight to one meaning over the others is the knowledge that Philitas lived in Alexandria, where he was tutor to the boy who was to become king of Egypt, Ptolemy II Philadelphus (308/9–246 BCE). Philitas' glossary may have been disorderly, or miscellaneous, or dialectical; or it may have been called 'disorderly' because it was not organized in alphabetical order. For it is possible, even likely, that Philitas may well have known about alphabetical order. One of his later pupils, the grammarian Zenodotus, who around 285 BCE

became the first librarian of the Great, or Royal, Library of Alexandria, certainly did.

The Library of Alexandria was founded around 300 BCE, and it thrived under Ptolemy I (*c.*367–283/2 BCE), the father of Philitas' pupil Ptolemy II. Ptolemy I was a rabid collector: he not only requested books from foreign rulers, but he also demanded that every traveller arriving in Alexandria by land or sea hand over all their books temporarily, so that copies could be made for his library. Such was his passion that many suspected that it was the copies that were returned, while the originals were kept for the library. Whether the library housed originals or copies, no one knows how many scrolls it ultimately contained, but estimates range up to nearly half a million. (Scrolls, it should be noted, are not compact, and it took many scrolls to encompass the material that would now fill a single printed volume.)

This unprecedented quantity of scrolls in one location created a need for an ordering principle. Scientists today suggest that experts in any one field can routinely remember up to a few hundred items devoted to their own speciality. Once the numbers rise above that, however, memory prompts become necessary. The arrangement of scrolls in the Library of Alexandria is a subject that has been much examined, but perhaps the most important thing to say about it is that we simply don't know anything for sure. We have some information, and more has been put forward as supposition to fill in the gaps, but ultimately it is all speculation built out of fragments and hints.

Many histories name the poet and scholar Callimachus (*c.*310–240 BCE), who worked at the library, as the author of a catalogue of its holdings entitled the *Pinakes*, or Tables, which has been called the world's first library catalogue.* But there is a lot in that sentence that needs to be examined. Callimachus did not work at the library in the sense that he was employed there; he was a member of the Mouseion, followers of the Muses, an institution that housed notable scholars who by virtue of their eminence had access to the scrolls. And he may, or may not, have been the actual author of the *Pinakes*: his name might simply have become

associated with it because of his renown. It was Zenodotus, pupil of Philitas, who was the actual librarian. He too may, or may not, have had something to do with the *Pinakes*, or the ordering of the scrolls on the library shelves.[25] The *Pinakes* themselves have not survived; our knowledge of their content, and its arrangement, is based on later reports; and its full title, *Tables of Men Illustrious in Every Field of Learning and of Their Writing*, hints that the work might not have been a library catalogue at all, but a bibliography. (A library inventory lists what a library owns; a library catalogue, both what it owns and where those items can be located. A bibliography is a compilation of all works on a single subject, or by a single author, or from a specific place or, later, printer.)

Whatever the *Pinakes* contained, whether it was a list of works owned by the Library of Alexandria or of works that its author thought were important, it is likely that the entries were grouped first by genre: verse, divided into the subcategories of epic, lyric, tragic and comic poetry; history; philosophy, which also included natural philosophy, or what today we call science; medicine; law; and then a miscellaneous grouping. After this primary classification, it seems possible, based on an extract from the *Pinakes* that survives from the third century, that the scrolls in each genre were shelved in first-letter alphabetical order: authors whose names began with A in one section, those whose names began with B in the next. For while today we do not think of alphabetical order as something that can be partial – entries are either in alphabetical order, or they are not – historically, alphabetical order developed incrementally.

The Library of Alexandria probably used, at most, first-letter alphabetical order, where all the letters after the initial letter are disregarded. It was in the Middle Ages that second-, and then third-letter alphabetical order appeared. No longer might Aristotle, for example, be listed before Alcestis, or Demosthenes after Dionysus. From the ninth and tenth centuries, entries were alphabetized by ordering words using the first two letters: Cato, Calpurnia, Catullus was perfectly acceptable. As alphabetical order moved on to third-letter ordering, this list would have been

adjusted to read Calpurnia, Catullus, Cato, or Calpurnia, Cato, Catullus: either would have been correct. It was to be several more centuries before absolute alphabetical order, where all the letters of a word were taken into account, became the norm, and the order Calpurnia, Cato, Catullus was the only possible one for a list to be described as alphabetical.

And even so, alphabetical ordering would fail to account for up to three-quarters of the Library of Alexandria's scrolls, which were likely to have been compilations, with each scroll containing the works of several authors. How these were ordered remains unknown. For, as we saw in Greece, alphabetical order, when it was used at all, was just one system among many. Zenodotus and Callimachus both compiled glossaries, or word lists. Callimachus' *Local Terms* was probably ordered by subject categories; Zenodotus' *Rare Words* was said to be alphabetical. And a glossary of post-Homeric Greek produced by a pupil of both men was almost certainly organized by subject.[26]

While the evidence we have for the organizing principles of the Library of Alexandria is both minimal and inconclusive, there are surviving documents from this period and region that show alphabetical order was known, which adds to the possibility that the *Pinakes*, and the Library of Alexandria, used some form of first-letter alphabetical order. Several examples can be drawn from the collection known today as the Oxyrhynchus Papyri.* These include a tax register that has a partial list of the plays of Euripides in first-letter alphabetical order on its reverse side. There is also a list of merchants, one for each letter of the alphabet, in order; and a potsherd from the second century BCE from Karnak, with a Greek or Roman name for each letter of the alphabet, again in alphabetical order. Some surviving tax and census records and poll-tax payment receipts also contain sections in first-letter alphabetical order.[27]

Yet for every one of these alphabetically ordered lists there are hundreds more where alphabetical order could have been used, but was not. Three book lists from this period have survived, only one of which is alphabetical.[28] Similarly, the word lists, or glosses,

that have survived from ancient Egypt were most commonly organized by subject, gathering words into groups in order to present a picture of an orderly universe: first the sky, sea and land; then people, divided into court and occupations, classes and tribes, and so on. Other lists were ordered by sound, that is, using a system similar to, if not the same as, alphabetical order.[29]

All the same, knowledge of, and consequent use of, alphabetical order were not entirely confined to Egypt. Examples have been found as far as the Greek islands of Cos, Kalymnos and Rhodes, and, on the mainland, around Boeotia, near Thebes, where it was used in the same intermittent fashion as in Ptolemaic Egypt: one list of the names of the participants in the cult of the Delian Apollo grouped them first by tribe, then gender, then age, then location, but gathered the entries within each category into first-letter alphabetical order. A list of salt-water fish, possibly a merchant's price list, was also laid out alphabetically. And a century afterwards, a stone carving on Rhodes included a fragment of a list of books in first-letter alphabetical order.[30]

These are worth noting individually, simply because they were so rare. The Greeks, and more particularly the Greeks of Ptolemaic Egypt, knew how to organize material into alphabetical order, but they evidently found it to be not terribly useful, and generally overlooked it. The Romans turned to this method even less frequently, the government organizing material primarily into geographical categories. And, like Greek public inscriptions, Roman inscriptions rarely used alphabetical order. Of the several thousand surviving inscriptions from the seventh century BCE to the fifth century CE found across the Roman Empire, just four are alphabetical.[31]

Instead, it seems that the alphabet was often less a tool, more something to be treated symbolically, or playfully. Nine of the Psalms in the Old Testament are acrostic poems, where each line or series of lines or each verse begins with a subsequent letter of the alphabet. The first two lines of Psalm 9, for example, both begin with *aleph*, or A, the next two with *beth*, or B, and so on: here the completeness and order of the alphabet symbolized the

completeness and order of God's creation, the universe. In the secular classical world, the alphabet was more of a game. In one work, the second-century BCE poet Nicander spelt out his own name via an acrostic. The Roman playwright Plautus (254–184 BCE) used acrostics in his comedies, and elsewhere incorporated alphabetical order for comedic effect: in one play, a wife finds her husband with another woman, and says, 'Well! So that's why he's always going out to dinner. He tells me he's going to see Archimedus, Chæreas, Chærestratus, Clinias, Chremes, Cratinus, Dinias, Demosthenes . . .'[32]

Other Roman writers actively rejected alphabetical order. The grammarian and antiquarian Varro (116–27 BCE), a Hellenist, did use alphabetical order – which, as we have seen, was used far more commonly in Greece and Greek Egypt – when organizing a list of writers in his *Res rusticae*, On Farming, or Agriculture. But when another Roman author copied his list, he reordered the writers geographically, either because he didn't know what alphabetical order was, and so Varro's order made no sense to him, or simply because he thought it pointless. A few other Roman writers were more appreciative of Varro's systems of organization. Pliny the Elder's *Natural History* (77–79 CE) drew on Varro for its list of those who were to receive meat from a sacrifice: thirty-one names, all in first-letter alphabetical order. Elsewhere in Pliny, what is or is not listed alphabetically can seem random, and it could be that Pliny followed whatever style his sources used: if they used alphabetical order, that was the way he reproduced it; if they did not, neither did he. In literature, Virgil (70–19 BCE) used alphabetical order for his list of heroes in the *Aeneid* (with one analphabetic intrusion in the middle): Aventinus, Catillus, Coras, Caeculus, Messapus, Clausus, Halaesus, Oebalus, Ufens, Umbro and Virbius.[33]

By the second century CE, alphabetical order had established itself in two distinct fields: medicine and lexicography. Galen (129–200/216 CE), a physician whose profound influence on medical thought remained paramount for more than a thousand years, right up to, and sometimes beyond, the Renaissance, may have used alphabetical order in his *Interpretation of Hippocratic Glosses*,

where the text promises that 'the arrangement of [this] work shall be according to the order of letters with which the glosses begin'. This implies both that Galen ordered his work in first-letter, or at most second-letter, alphabetical order, and, from the awkwardness of the phrasing, that he did not expect his readers to have much, or possibly any, experience of that type of ordering.

But we cannot be certain that Galen knew of it either. The *Interpretations* has survived only in later copies, which are in almost absolute alphabetical order, where all the letters of the word are taken into account when ordering, a level of alphabetization that was barely known until the ninth and tenth centuries.[34] It may well be, then, that Galen set his glosses in rudimentary first-letter order, describing them in that cumbersome manner, and the entries were reordered by a scribe centuries later. Or it may all be a later addition, for other works by Galen show a range of categorizing methods. In *On the Properties of Food* the material is divided topically, with a section for cereals and pulses, another for plants, others for fish and for meat. Then within these sections Galen used a subjective order, beginning with foods he considered to be 'the most useful' or 'the most nourishing'.[35]

It is difficult, so many centuries into the age of print, to keep at the forefront of our minds how fluid manuscripts were, how easily they could be transformed from copy to copy, from scribe to scribe, intentionally or by accident. So many works that are today described as being alphabetically organized we know only from later copies, which might well have been rearranged into ordering systems substantially different from the originals. While retrospectively we say that dictionaries and word lists were among the earliest examples of routine alphabetical order, in reality we know little about how pervasive the use of that system was. One example is the first Latin dictionary that we know of, *De verborum significatu*, On the Meaning of Words, by the Roman grammarian Verrius Flaccus (55 BCE – 20 CE), which has survived only in so far as extracts were copied by Festus (Sextus Pompeius Festus, late second century CE) into a work of his own. That work, in turn, also

survived only in fragments, copied this time by an eighth-century Benedictine scribe, Paul the Deacon. He may have copied them directly, or he may have reordered the text at this stage, as it appears in part alphabetized to the third letter, in part to the first.[36] When the history of such a work is laid out like this, it becomes clear that we can know nothing at all about the arrangement of the original.

Thus we are forced to acknowledge that in Europe at this point we have little hard information about current systems of classification. And yet, nevertheless, alphabetical order continued to make its shadowy presence felt, often quite literally in the margins of manuscripts. A glossary from the end of the second century CE, another Oxyrhynchus fragment, lists about twenty words beginning with the syllable *mu* in Persian, Lydian and Chaldaean: they appear in absolute alphabetical order, possibly the first time this was ever done.[37]

On the other side of the globe and in an entirely non-alphabetic writing system, in China during the Han dynasty (206 BCE – 221 CE), organizing principles were far in advance of the West as far as government administration was concerned. Emperor Cheng (51–7 BCE) commissioned an inventory and catalogue of all documents in the imperial archives. Three imperial libraries were built and catalogues were drawn up, organized into subject categories: general summaries, the Confucian classics, philosophy, poetry, warfare, divination and medicine.[38] Dictionaries were also compiled. *The Cangjie Primer* (*c.*220 BCE) was intended as a textbook to teach children their Chinese characters. It has not survived, but was said to have categorized the characters by meaning and by their structure. So 'madness', 'blemish', 'sore head' and 'burn' were grouped together, all being related to the character for 'illness'.

This was followed by the *Erya* (*c.*200 BCE), which has been called the first Chinese dictionary. It too was divided topically, by subject, with linked words grouped together within each category, although the connections are not necessarily ones we recognize today: roads and bridges were considered to originate from the court of the emperor, and thus they appear under the heading

'Interpreting the Court'; warfare too was the province of the ruler, who was divinely ordained, and thus it fell into the section dedicated to 'Interpreting the Heavens'. In around 100 CE the *Shuō wén jiě zì* dictionary, containing some 9,500 characters, originated a sorting system based not on meaning but on the manner in which a character was written. Each was defined as either a single unit or a compound character, and then categorized by 540 elements, called radicals, which might be semantic elements of the character or might be graphic ones – the direction of a stroke, for example. Each character was then listed under a single radical, which came to define it for lexicographical purposes.[39]

In Europe, nothing of this level of sophistication had been attempted. And where alphabetical order was used, in many cases it was considered not as a tool of reference but as one of recall, a way of imprinting a series of items onto the memory in a culture that continued to rely heavily on oral transmission. It may be for this reason that the second-century *Sentences* of Sextus, 123 maxims on how to live a philosophically good life, were arranged in alphabetical order. Or it may not have been: once again, all we have are later copies, which might well have been reordered. (And, it must be added, the named author, Sextus the Pythagorean, is unlikely to be the actual author of the work.)[40] We know this type of reordering was routine. Fables by an author named Babrius, some of which are today collected under a generic authorship as *Aesop's Fables*, survive in copies that were organized by the first letter of the opening word of each fable. Yet an Oxyrhynchus fragment of the same fables, dating from the second century, shows that at least one earlier version was not in this order. The purpose of the reordering may well have been to help listeners remember the stories so that they, in turn, could retell them. For memory was a recurring component of alphabetization: the Greek grammarian Athenaeus listed eighty-one species of fish in first-letter alphabetical order, 'in order that what is said may be easier for you to remember'.[41]

Even so, it must be said that most types of ordering remained unusual. The most common form of organizing in the second

century was one seen in the rhetorician Julius Pollux' *Onomasticon*, a thesaurus of terms in Attic Greek, the Greek spoken in earlier centuries, which by this date was partly incomprehensible to the author's contemporaries.* Here the reader is told: 'I shall take my beginning from exactly where the pious should, from the gods; as for the rest, I shall arrange matters as they occur', ordering his work first hierarchically, from greater to lesser as defined by religion and society, and then by subcategories that were arranged along a lifespan. The vocabulary for women followed the vocabulary for men, because men were considered to be more important than women; in the section for women, words used for all women head the list, followed by those for young women, then mature women and finally old women.[42] (At least, once again, we think so: what we know of the *Onomasticon* comes from manuscripts produced from an early tenth-century epitome, or abridgement.)[43]

Even as copies vanished, were destroyed or disintegrated, reading technology itself was changing. Scrolls were well suited to continuous reading, but they actively impede the practice of looking things up. To read a scroll, readers rolled it open to the unread portion, rolling up the finished sections behind as they went along. By the first century CE, therefore, they were gradually being replaced by codices, which were initially wooden tablets bound together with leather ties, then parchment sheets tied together. This new format gave readers of antiquity the flexibility that we expect from books today: codices are designed to be opened at any point, and readers can move backwards and forwards with ease.* No longer locked into the rolling and unrolling of scrolls, they could now begin in the middle, or break off and check something earlier in the codex, or towards the end. It makes sense, therefore, that some of the earliest texts to be transferred to codices were technical works and the Bible, which reward non-linear reading.[45]

Simultaneously with the appearance of this new reading technology, then, came a raft of glosses and materials designed to assist comprehension of other works, materials that today we call

Libraries like these were not established to display the riches of the monasteries to the world, but as functional collections for the purpose of supplying their community members with religious sustenance. At Tabennisis, the monastic rule dictated that every evening the monks were to return the books they had been reading that day to a designated brother, who counted them to ensure no losses had occurred, before locking them in the *fenestra*, often a barred niche in a stone wall.[2] (*Fenestra* most commonly translates as 'window', but it could also mean a breach or opening in a wall.)

And so began a millennium of monastic learning. St Benedict (480–543/7) drew up a series of precepts known as the Rule of St Benedict, to ensure a harmonious religious communal life, the chief of which was *ora et labora*, 'Pray and work'. Reading was a spiritual occupation, and the brothers were required to spend set hours at their books. At Lent, Benedict decreed, each brother was to 'receive a book apiece from the library, and read it straight through', which strongly suggests that Benedictine monasteries expected to hold a sufficient quantity of books to supply all the members of the order simultaneously. By 831, the library of the Benedictine Abbey of St Riquier in northern France contained 250 volumes, which were listed by category: divinity, grammar, history, geography, sermons and service books; the library of the Benedictine Abbey of St Gallen, founded in 720 in what is now Switzerland, used similar categories.[3]

Many other libraries also organized their book lists, and most likely the books themselves, in a hierarchical order. The first, and most important, group consisted of copies of the Bible; then came the writings of the Church Fathers;* then theology more generally; followed by homilies or sermons; the lives of the saints; and finally secular works, a category that was sometimes further subdivided into works by Christian authors, who were given precedence over works by pagan writers.

One notable exception to the religious dominance of libraries was the palace library in Aachen, at the court of Charlemagne, although even this princely library was overseen by a member of

the clergy. In 782, Alcuin (735–804), an English cleric, writer and teacher who had been educated in York by students of the Venerable Bede, was installed as master of the palace school, and there he oversaw an expansion of the court library, turning it into a renowned centre from which learning, and manuscripts, were disseminated widely. Under Alcuin the palace library appears to have included not just the standard theological texts, but secular works, and even books in German, as well as Latin.[4] Despite the literary riches found at this centre of Western civilization, Alcuin remained nostalgic for the York library of his student days, producing what amounts to a dream catalogue – not a real one, for we know that York did not at that date hold all the books he listed – which he organized much as a monastery library would have been, in hierarchical order of importance:

> Here shines what Jerome, Ambrose, Hilary, thought
> Or Athanasius and Augustine wrought.
> Orosius, Leo, Gregory the Great,
> Near Basil and Fulgentius coruscate.
> Grave Cassiodorus and John Chrysostom
> Next Master Bede and learned Aldhelm come,
> While Victorinus and Boethius stand
> With Pliny and Pompeius close at hand.
> Wise Aristotle looks on Tully near.
> Sedulius and Juvencus next appear.
> Then come Albinus, Clement, Prosper too,
> Paulinus and Arator. Next we view
> Laetantius, Fortunatus. Ranged in line
> Virgilius Maro, Statius, Lucan, shine.
> Donatus, Priscian, Probus, Phocas start
> The roll of masters in grammatic art.
> Eutychius, Servius, Pompey, each extend
> The list. Comminian brings it to an end.
> There shalt thou find, O reader, many more

Famed for their style, the masters of old lore,
Whose many volumes singly to rehearse
Were far too tedious for our present verse.[5]

This sort of idealized catalogue had at least one predecessor. A century and a half before, an equally imaginative cataloguing method had been used by Isidore of Seville (*c*.560–636), one of the Church Fathers, for his own personal library.* Few had as impressive a private collection as Isidore, whose volumes filled fourteen bookcases and were organized by author, but in neither alphabetical nor hierarchical order. Instead, the archbishop dedicated individual shelves to seven theologians, four Christian poets, two ecclesiastical historians, Gregory the Great, Isidore's brother St Leander, three jurists and two medical writers. One historian has noted that the works of several of these writers were too slight to fill the spaces allocated to them, and he suggests that Isidore might have named each bookcase after a representative author as a mnemonic device, filling the shelves with works on related subjects.[7]

That Isidore might have kept his books in a way that reveals a deep interest in ordering and arranging diverse materials is not unexpected, for in his writings he pioneered what was to become one of the supreme forms of organizing knowledge: the encyclopedia. The stated aim of his *Etymologiae*, Etymologies (begun 600 CE), could not have been more ambitious: a summary of everything that could be known in the universe, based not only on Christian theology but drawing also on classical literature. Isidore divided his work into twenty books, the first five following the *trivium* and *quadrivium*, the seven liberal arts of classical education. (See here, in the colour picture section.) The *trivium*, or threefold path, taught the basics: grammar, rhetoric and logic; the *quadrivium*, or fourfold way, covered mathematics, geometry, music and astronomy. The two combined were considered to be the foundation from which a student could then progress to the greater fields of philosophy and theology.

From there Isidore progressed to other areas of knowledge: theology, of course, and medicine and jurisprudence, both of which were considered to be mechanical rather than liberal arts, as well as geography and the study of the natural world. Isidore's work, novel in itself, was prefaced by another novelty: a list of the topics explored, in the order they appeared in the book – what we call a table of contents. The *Etymologies* became a standard work: copies circulated extensively, so much so that in the following two hundred years virtually no major centre of learning was without one. More than a thousand manuscript copies survive today, indicating just how many were once in existence.[8] Thus, what were then innovative information and organizational tools – the encyclopedia itself and the table of contents – became familiar to many.*

These were not the only original contributions made by Isidore. Book 9 of the *Etymologies* dealt with people and kingdoms, and Book 11 with mankind and 'portents', both structured in a traditional subject-based manner. But in between, Book 10, where Isidore covered 'Vocabulary', is suddenly different, its contents sorted first into first-letter alphabetical order; then, within that order, by the words' etymology; and, finally, by a third organizing principle, Isidore's own subjective judgement, with words having benign or positive meanings being given precedence over those which held negative associations.[9]

For Isidore was a man facing in two directions. With his table of contents and his first-letter alphabetization, he was looking ahead to a system of organizing texts that would not flourish until the end of the twelfth and into the thirteenth centuries. At the same time his encyclopedia, which aimed to hold up a mirror to a world that was, as he saw it, designed as a part of God's plan for mankind, made him very much of his own day.

In the twenty-first century, we consider many things to be neutral that to the medieval European mind had symbolic meaning; things that we regard as entirely fixed in meaning were, in the Middle Ages, just as entirely fluid. Then as now, a day and a night spanned twenty-four hours, but how those hours were

divided then was radically different from our own twenty-four equal units. There were, according to medieval understanding, twelve hours of daytime and twelve of night, and therefore an hour in summer was substantially longer than an hour in winter in southern Europe, while in northern Europe those twelve summer night hours passed by in a flash. And time itself was not purely a measure, but had meaning: the symbolic value of the numbers, as a reminder of God's eternal being, was often given precedence over their expression as the time of day. Numbers more generally also represented more than mere quantity. Three was a key number, representing as it did the holy Trinity; six was perfect, because God created the universe in six days; the number seven was important too, for God rested on the seventh day; ten stood for the number of the commandments; forty, for the days Christ spent on earth after the Resurrection.*[10]

Medieval encyclopedists naturally partook of this worldview, and utilized it when organizing information. We think of an encyclopedia as a reference tool to be dipped into, to enable us to locate a single piece of information. To the great encyclopedists of the Middle Ages, and to their readers, this format, which thrived from Isidore's day to the thirteenth century, was instead, as Augustine put it, 'an instrument of education, whose aim was [to build] a life happy through the knowledge of God'. Happiness, and knowledge through religion, were inextricably entwined: you could not have one without the other. Furthermore, it was impossible to understand the world without understanding God's plan for it, and any well-constructed encyclopedia had to explain the world by reflecting God's plan in its organizational structure, as well as in the information it contained. In the thirteenth century, *De rerum proprietatibus*, On the Nature of Things, by Bartholomew the Englishman (before 1203–72, and who, despite his name, lived and wrote in Paris, and whose country of origin is unknown), set out the order of the great chain of being: from God, to man, to animals, to inanimate objects.[12] God had created a hierarchical world, and those who followed him reflected that hierarchy in their work. Alphabetical order looked like resistance,

For the most part, however, we must once again remind ourselves how little information we have on the original arrangement of these glossaries, for they were copied and recopied, and it is those later manuscripts that have survived. Whether the originals were in alphabetical order or their contents were rearranged later, is unknown.[18] Moreover, when scholars state that the Such-and-Such Glossary was in alphabetical order, what they generally mean is that some copies are in alphabetical order, or perhaps even just one. For example, a glossary known as the *Glossarium Affatim*, Sufficient [or Ample] Glossary, probably dating to around 760–80, which survives in a manuscript in St Gallen, is in second-letter alphabetical order; another copy, probably created a little later, in the late eighth or early ninth century, and now in Amiens, is in first-letter order.[19] For even when alphabetical order was used, it was not a simple progression, with early manuscripts using first-letter, then later copies second-letter and so on until a pinnacle of absolute alphabetical order was achieved.

In the non-Christian world in the Middle East and Europe, in the same period, the sixth and seventh centuries, Hebrew scholars were also producing glosses, typically as interlinear or marginal explanations, like their Christian coevals. Some also produced separate word lists in alphabetical order, although their purpose is uncertain. One comprised all the two-letter words in the Bible, yet supplied no references to enable a reader to locate those words: it was seemingly drawn up for information only. By the ninth century, however, many Hebrew codices appended lists of words at the end of a manuscript: early versions of the index.[20]

The Rav Saadiah Gaon (882–942), who headed a rabbinic school in Babylonia, compiled the first Hebrew dictionary that we know of, entitled the *Kitāb 'Usūl al-Shi'r al'Ibrāni*, Book of the Elements of Hebrew Poetics, fragments of which were discovered in the nineteenth century. By the third century, Hebrew had died out as the spoken language of the Jews of the Middle East, most commonly replaced with Aramaic or Persian; by the tenth century these had been replaced in turn by Arabic, and the written

language of Hebrew scholars had become Judaeo-Arabic – Arabic in language, but written in Hebrew characters. This was what the Rav Saadiah Gaon used, dividing his work in two parts, both alphabetical: one by the first letter and one the final letter, to enable novice poets to find appropriate rhymes – possibly the world's first rhyming dictionary. In the tenth century in Córdoba, Menahem ibn Saruq, a doctor at the court of 'Abd el-Rahman III, was the author of a dictionary of biblical Hebrew, *Mahberet Menahem*, Menahem's Notebook, which alphabetically glossed 1,600 words in the Tanach, the Hebrew Bible.[21]

But alphabetical order continued to be one system among many. Aelfric (*c.*950–*c.*1010), Abbot of the Benedictine Abbey of Eynsham, in what is today Oxfordshire, produced his *Nomina multarum rerum anglice*, The Names of Many Things in English. He divided those many English things into eighteen categories, beginning with God, followed by the heavens, angels, the sun and moon, the earth and the sea; then men, women, parts of the body, family relationships, professions, trades, diseases, seasons and times of day; then colours, animals (themselves divided by whether they lived on land or sea, walked or flew), plants, household goods, weapons, cities, metals and gems; and concluding with a round-up of general terms, divided into abstract and concrete.[22] After the Norman invasion of England in 1066, an Anglo-Norman glossary, the *Nominale sive Verbale in Gallicis cum expositione eiusdem in Anglicis*, French Vocabulary, Translated into English, explained words and their meanings to the mutually uncomprehending conquerors and conquered. The work was divided topically – weather and storms, names of trees and fruits, and even '*La noyse de ditz Bestes*', the noises that animals make.[23]

The shift in organizing principles from subject categories to alphabetical order was more than a move from an unwieldy to a more convenient system (our perception, of course, not theirs). It required an altered perspective, from seeing words primarily in terms of their meanings, to seeing that in addition to words having meaning they were also composed of individual letters of the alphabet that in and of themselves were meaningless. To modern

eyes, *deus* means God; it is also a Latin word and it is in addition made up of four letters, d-e-u-s, which are a linguistic construct, created by humans, that hold no inherent meaning or value. To Isidore of Seville, however, the word *deus*, even spelt out on a page in his *Etymologies*, was indissoluble with the abstract idea the word represented. It took a shift in perception for medieval thinkers before locating d-e-u-s under D, rather than at the head of the text, caused no profound sense of transgression.

That shift began slowly, and little obviously changed until 1053, when Papias the Lombard completed his *Elementarium doctrinae rudimentum*, Teaching the Basic Elements. Papias today can fairly be described as the first Western lexicographer, for his dictionary was a revolution: the first Latin dictionary of any substantial length, arranged in third- and sometimes fourth-letter alphabetical order. In his preface, Papias explained the ordering system he had chosen – or, rather, from the painfully elaborate way he phrased it, the ordering system he believed he had invented: 'Anyone who wishes to find anything quickly must also notice that this whole book is composed according to the alphabet not only in the first letters of the parts but also in the second, third and sometimes even in the further determinative arrangement of the letters.' His manuscript marked the first word of each letter with a large A, B, C, etc.; each change of second-letter order (from Ab to Ac, for example), with a medium-sized B and C, etc.; third-letter shifts (from Aba to Abb) with a small a and b, and so on.

And even with all this care, Papias felt obliged to warn his readers, 'Even in these first, second and third steps the relationship will sometimes vary because of the writing of different letters. For example, hyena is written by some with an i, by others with a y, or with an aspiration [that is, an *h*]. And the plant that some call verbena others call berbena.'*[24] For, lacking standardized spelling, which in almost all parts of Europe was another half-millennium in the future, dictionaries could only gesture towards an absolute order. And while Papias worked hard to explain his method, many of the scribes who copied his work either failed to understand it, or thought it was unnecessary:

surviving copies show that, until the twelfth and thirteenth centuries, when alphabetical order began to be used more widely, they frequently disregarded his layout and marginal orderings.[26]

While there was yet a dearth of tools to help people 'look things up', the Latin Middle Ages had inherited from the classical world a system of epitomizing, of summarizing and extracting to provide the essence of a book, or a theological argument, or other core material of a specific text. (See, for example, here, for the survival of Julius Pollux's *Onomasticon* through an epitome.) Much of Isidore of Seville's encyclopedia consisted of summaries and précis of his classical reading, although at first he was the exception; by the late eighth and the ninth centuries, however, references and citations from classical authors were increasingly appearing in works presented by churchmen. Aristotle, in the fourth century BCE, had outlined his preferred method: 'We should select from the written handbooks of arguments, and draw up sketch-lists of . . . several kinds of subject, putting them down under separate headings, e.g., "On Good", or "On Life".'

This concept of headings was to become more influential than Aristotle could ever have imagined. The headings, or, as he called them, *topoi*, or topics (literally, places), were to become one of the primary units of sorting and reference for adult readers as well as for schoolchildren in Europe for nearly two millennia. The Roman statesman Cicero (106–43 BCE), famed for his oratory, had advised those who wanted to copy him to have 'in readiness sundry commonplaces which will instantly present themselves for setting forth [your] case'.* Many classical writers became famous among their contemporaries and for centuries afterwards for their collections of commonplace extracts: Quintilian's *Institutio Oratoria*, On the Education of the Orator (*c.*95 CE), was quoted by Isidore of Seville as early as the seventh century, and it continued to be considered of such significance that it was cited by Alexander Pope more than a thousand years later; in the fourteenth century, Chaucer knew the third- or fourth-century writer Dionysius Cato's *Disticha de Moribus*, Musings on Death, as did Benjamin Franklin

four hundred years after him, finding it so profound that in 1735 he reworked it into rhyming couplets.[27]

As the world of authorship moved from the classical to the medieval, from secular to religious, Christian anthologies of commonplace extracts, known as florilegia – literally, gatherings of flowers, in the sense that the compiler had plucked, or extracted, the choicest blossoms of thought – became popular.* These generally included extracts from the Bible and, especially, the Church Fathers. One of the earliest medieval florilegia was the *Liber scintillarum*, The Book of Sparks. Dating to the second half of the seventh or the early eighth century, it was organized by subject, with headings based on the virtues and vices, or aspects of Christian life such as confession and marriage. Within each topic, the extracts were ordered hierarchically, always beginning with the Gospels, followed by the writings of St Paul and the Apostles, then the remainder of the Bible; after that came the Church Fathers, with lesser authorities trailing behind.

The *Sacra Parallela*, Sacred Parallels, said to have been compiled by John of Damascus (*c.*675–749), a Syrian monk, was another such florilegium, of which three manuscript copies have survived, the earliest dating from the mid-850s. From these and a few fragments of other copies, scholars have concluded that the original work fell into three parts, dealing with God, mankind and the virtues and vices. Each part was divided into twenty-four chapters, one for each letter of the Greek alphabet, and each with a subhead beginning with that letter. Again, within each heading a hierarchical system was used: first came biblical citations, then the Church Fathers and finally two secular commentators: Philo of Alexandria (*c.*20 BCE – *c.*50 CE), a Jewish philosopher (and indeed based in Alexandria), and Flavius Josephus (37–*c.*100 CE), a Roman–Jewish historian from Jerusalem. The scriptural extracts were presented in the order in which they appeared in the Bible, but the rest were sometimes in alphabetical order.[28] This even partial alphabetical organization was unusual. A few florilegia ordered their extracts by, say, the first letter of the names of the Church

Benedictine monastery libraries in the German-speaking world contained more than a couple of hundred volumes: the Abbey of Lorsch, under the patronage of Charlemagne, possessed nearly six hundred manuscripts; St Gallen, founded under Irish influence, had over four hundred, as did Reichenau, near Lake Constance, but there were few others.[3]

By the tenth century, these and other Benedictine monasteries had become the centres of education in Western Europe, followed in the coming century by hundreds of other monasteries, many of them Benedictine houses, others established by orders such as the Carthusians (founded 1084) and the Cistercians (1098) that were springing up as part of a new wave of religious and missionary fervour. By the end of the Middle Ages, there were approximately 350 Benedictine monasteries in the German-speaking lands alone.[4] The spread and plenitude of monasteries meant that education was more readily accessible to many working men and boys; by joining these orders, they could now learn to read and write.

For reading and writing were becoming more important in the world outside the Church, in turn driving an increased demand for the education available within it. The secular world – the world of government, of jurisprudence and of trade – was beginning to privilege the written over the spoken word. The *Pandects*, or digests of Roman law, which had been compiled under the Eastern Roman Emperor Justinian (reigned 527–65), were a model of the same extracting and précising system that had produced florilegia. To create the *Pandects*, more than three dozen scholars had gathered the many sources of the law, compared them, resolved their contradictions while removing repetitions, and so produced a final version that would become, for the Eastern Empire, *the* law. In the ninth century, the code was revised and updated into sixty volumes as the *Basilika*, or Royal Laws, under the Emperor Basil I (reigned 867–86) and his successor, Leo VI (reigned 886–912); in the mid-tenth century the *Synopsis basilicorum maior* condensed these into just twenty-four sections, organized not thematically, but in absolute alphabetical order.[5] This law code became widely

known over the next centuries, surviving today in more than fifty manuscript copies.

In Western Europe, beginning as early as the sixth and seventh centuries, the Merovingian rulers of Gaul were similarly focused on codification and systematization. Increasingly, legal transactions were being confirmed by written documents rather than by spoken oaths, as had been the case for centuries in Gaul, and continued to be practised even longer elsewhere. Thus, the upper echelons of society now required men who could read and write to do their legal work and, as a corollary, they also required systems that allowed those literate men to locate a single document from among hundreds, if not thousands, of similar documents. Such ordering systems had yet to be imagined, much less established, and thus it became necessary to devise legal procedures for the not uncommon situations where deeds or charters no longer existed or could not be found.[6]

Over the following centuries, therefore, individual clerical or governmental offices were obliged to create their own organizational systems. In Italy, the Benedictine Cardinal Deusdedit (d. before 1100), a canon lawyer, compiled a list of some eight hundred subject headings, in effect what we think of as a subject index, to help him search his more than thousand texts. He might well have known Papias' alphabetical Latin dictionary, but he seems not to have considered that the same system of organization, by letter of the alphabet, might be adapted to his own needs. Instead he used a 'rational' order – that is, an order that made sense to him, based on his own interests, rather than an order that might be grasped by anyone reading his notes at a later date.[7] While the cardinal's method could not be universally applied, his list can retrospectively be seen as a precursor to the index, indicating the need for a more universal sorting system created by increasing secular and religious bureaucracy.

While the cardinal was renowned for his use of archives in his legal writings, we have no firm information as to when papal records began. Documents before the ninth century had frequently been written on papyrus, and thus many of those papal registers

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