

On Editing a Modern Cyclop(a)edia

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The Chambers' Legacy

Encyclopedic works of reference can be traced back to the time of Plato, but the first work which actually used the term as part of the title, in its modern sense of an extensive compilation of information on all branches of knowledge, is little over 250 years old. Even then, this term was not actually 'encyclopaedia' (to use the older spelling), but 'cyclopaedia', the shorter form perhaps being an attempt to get closer to the etymology (Greek *kuklos* + *pedia* together conveying the notion of a 'circle of learning'). The work in question was Ephraim Chambers' *Cyclopaedia: Or, an Universal Dictionary of Arts and Sciences*, published in two large folio volumes in 1728. Chambers, a native of Kendal, was not a scholar by trade (his apprenticeship was served to a globe-maker in London), but his work evidently met a need, for it went through several editions, and was sufficiently impressive for him to be elected to the Royal Society. His idea was original and simple: to present entries on all subjects, alphabetically arranged, with cross-references, in brief dictionary form for rapid consultation. It certainly impressed Dr Johnson, who told Boswell that he had partly based his style upon that used by Chambers in his *Cyclopaedia Proposal*.

Chambers' book established a genre, and is rightly considered to be the precursor of all subsequent encyclopedias. In 1749 the French publisher André Le Breton approached Diderot to make a translation of the *Cyclopaedia*: Diderot agreed, though the speculative, radical and revolutionary *Encyclopédie* which resulted departs markedly from Chambers', both in conception and practice. The articles are more like mini-monographs, for continuous reading. Their approach is consciously contentious. There is no record of Chambers' book ever being attacked by the Jesuits and suppressed by the King! The achievement of the *Encyclopédie*, nonetheless, so impressed a small group in Edinburgh, known as the Society of Gentlemen, that they set to work on a project which they subtitled "A Dictionary of Arts and Sciences, compiled upon a New Plan", and published in 1768, containing some 75 treatises, some over 100 pages in length. Better known by its main title, the *Encyclopaedia Britannica*, the Scottish origins of this great work can be seen only by careful scrutiny of the subtly impressed colophon on the front cover and title page – the thistle (Figure 1).

The trail stays in Scotland, for the next significant step in the history of the encyclopedia. William and Robert Chambers, born in Peebles at the turn of the century (1800 and 1802 respectively), were later to recount their fascination with the *Encyclopaedia Britannica*, which they read as children. They were well aware of the work of their namesake, Ephraim (they were not related in any way – though popular opinion generally assumes the contrary), so much so that they called their 1844 compilation on English Literature a Cyclopaedia, and when they produced their general encyclopedia, nearly 25 years later, they used a subtitle which echoes Ephraim's: *Chambers's Encyclopaedia: a Dictionary of Universal Knowledge for the People* (Figure 2). This work was issued in 520 weekly parts at 1.5d each, between 1859 and 1868, and finally emerged as 10 royal octavo volumes costing 90s. They changed the name from Cyclopaedia to Encyclopaedia probably because of the success of the French and American models. Its 100 contributors were mainly Scots. It had a slow start, but then achieved enormous success, selling 50,000 sets in Britain alone. There was a complete revision in 1874, for the same price.

'For the People', in the subtitle, is significant, for the book had its origins in the cheap-literature movement, which was strong in the 1830s, and which led to the birth of the firm of W & R Chambers and its first publications. Chambers's *Edinburgh Journal* published its first issue a month before the Great Reform Bill, in 1832. William was later to write, in his Memoirs (p.231), "I resolved to take advantage of the evidently growing taste for cheap literature, and lead it, as far as was within my power, in a proper direction", by keeping the level plain, and not "too technical and too abstruse for the mass of operatives" (p.235). He also observes that literature had been for the privileged few, that most people did not read, and comments: "so far as the humblest orders were concerned, it almost appeared as if the art of printing... was only now effectually discovered" (p.230). Ironically, this description, if we accept recent figures about the nation's reading habits by the Book Marketing Council, would seem to be more apt in the 1990s than at any other time in the past 150 years [1].

The Chambers' work was enormously successful, and its reputation increased with subsequent editions. Its second revision (1888–92) had over 1,000 contributors, including such leading names as Gladstone and Saintsbury. The third edition (1923–27) (Figure 3) had articles by Shaw, Chesterton, Gilbert Murray and Daniel Jones. It had a fourth edition in 1935. Why was it so successful? The first reason is that the Chambers brothers chose to start from scratch. They did in fact attempt, at the very outset, to compile their book as a translation and adaptation of a German work which was widely used in Europe, but they found that so many changes had to be made to make this suitable for an English readership that it was easier to start afresh. It was their wisest decision. So many works of reference are adaptations of earlier works of reference. As William Geddie, the editor of the fourth edition, remarked: "In the strictest sense the making of an encyclopaedia is a very rare event; the making, that is, from the beginning. There are indeed

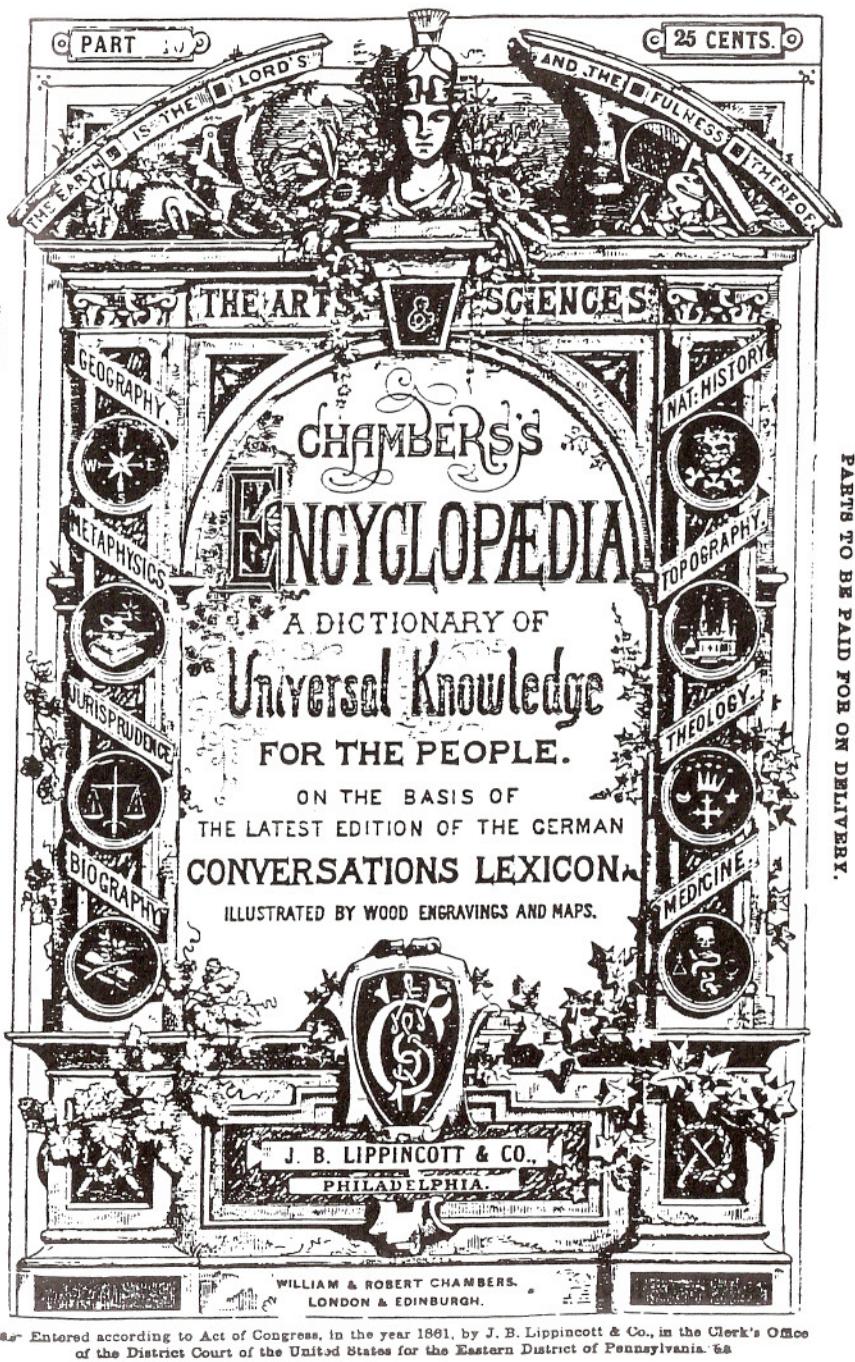


Figure 2 The title page of the first American edition of Chambers's Encyclopaedia.

encyclopaedias that have a beginning and little more; but these are not so much made as made up, or made down, from other encyclopaedias" [2]. He goes on, with some fine alliteration and a splendid example. "Much in them is not made but marred, mistranslated, or misunderstood. A writer in one of them found, in a source which he was using too freely, a picture of a certain animal in side view. Three legs were visible. He said the beast was three-legged."

To start anew, to approach the circle of learning with fresh vision: this should be a *sine qua non* of any publishing house wishing to enter the domain of general reference. Unfortunately, this desideratum often finds itself in conflict with others of a less idealistic and more pecuniary kind – and the production of an old coat under new colours is with us still. There may be no change at all, or next to none. A recent example is the publication of the *Penguin Concise Columbia*, in 1987, which upon examination turns out to be the American *Concise Columbia* of 1983, with little adaptation for a British readership. So, legal cases from US history (such as *Mapp v. Ohio* 1961) are retained, as are minor confrontations of the American Civil War. One exception is a new 8-line entry on *AIDS* (in capitals), which replaces (and of such coincidences are fortunes made) a previous entry on *aids* (in lower-case), referring to a type of feudal due paid by a vassal to his lord.

The second reason for the success of the Chambers' work was its structure. The brothers state that they want to return the encyclopaedia to "its original purpose of a dictionary": "our object was to give a comprehensive yet handy and cheap Dictionary of Universal Knowledge; no subject being treated at greater length than was absolutely necessary". An unsigned article in an issue of Chambers's Journal in 1874 concurs [3]: "an encyclopaedia ought to be nothing more than a comprehensive dictionary, handy in dimensions, easily purchased, and conveniently accommodated in a library". To achieve this, they opted for alphabetical order, short articles, and cross-references – a model which has since been used by the vast majority of works in this genre.

Though not by all. Indeed, this model had its early critics. One such was Samuel Taylor Coleridge, who much preferred the thematic or classified arrangement of knowledge which had been the norm in Europe since classical times. Coleridge's caustic shot across the *Britannica*'s bows has been much quoted: "To call a huge unconnected miscellany of the *omne scibile*, in an arrangement determined by the accident of initial letters, an encyclopaedia, is the impudent ignorance of your Presbyterian bookmakers" [4]. Coleridge himself was at the time working on his own plan for an encyclopedia, the *Encyclopaedia Metropolitana*, which proposed a thematic arrangement of sciences, a chronological arrangement for biography and history, and alphabetical appendices. The work began to appear in 1818, but proved a failure. Nonetheless, thematic works continued to appear, and still do, as the recent *Guinness Encyclopedia* (1990) illustrates. Ironically, even Chambers's was affected by thematisation, in the end. When publishing rights passed to the London

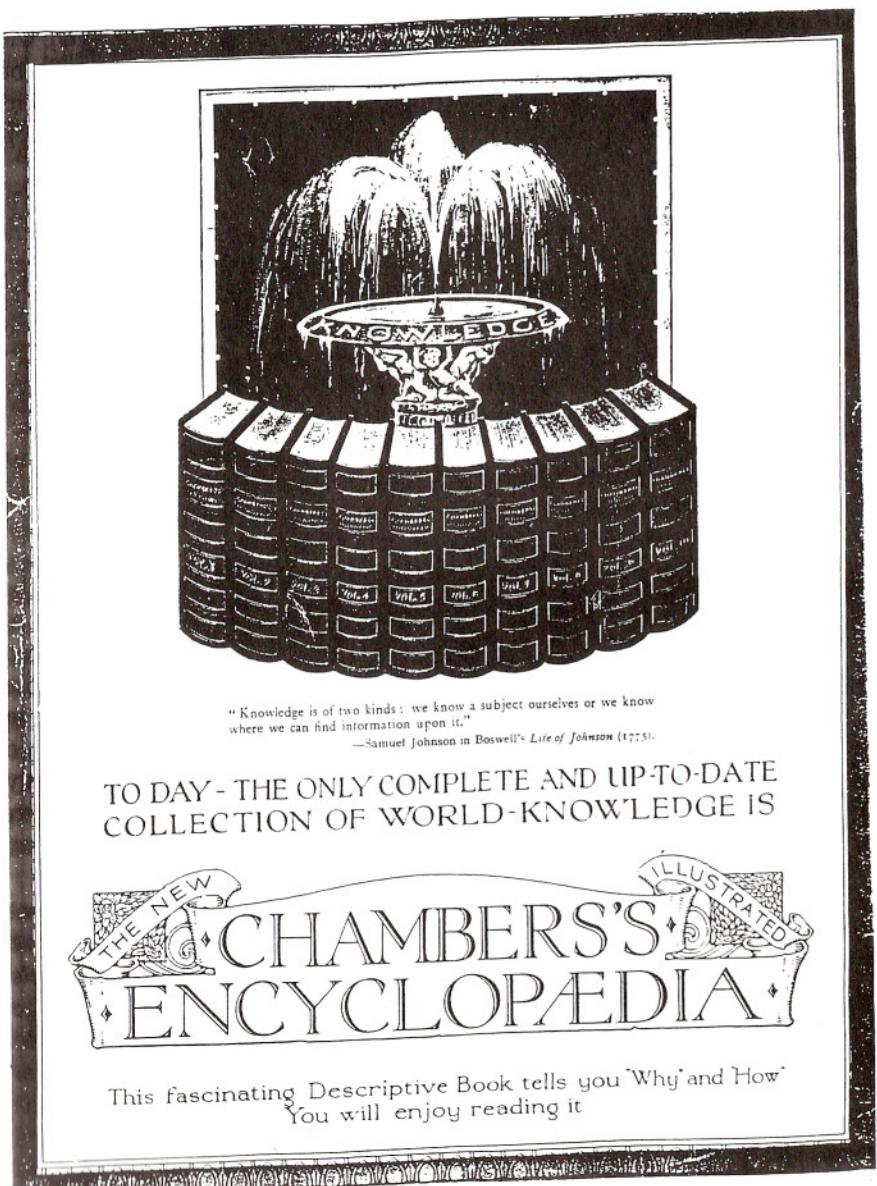


Figure 3 The publisher's advertisement for the third edition of Chambers's Encyclopaedia.

firm of George Newnes in 1944, their new post-war edition (1950) presented a new style, with large articles, and a general index.

I should say at this point that there is, of course, nothing wrong with a thematic approach to knowledge. Indeed, underlying every alphabetical approach is a thematic one. And if you want an overview of a broad subject (such as the history of the Cold War), then a thematic treatment will be the only way to satisfy you. But thematic treatments of broad subjects are available from a wide range of other sources, such as introductions, periodicals, and coffee table books. And if you want anything more specific and systematic than the skim, the browse, the overview, then either the thematic approach proves impossible to work with, or you need the crutch of a full alphabetical index. As Anthony Burgess put it, in a review of the alphabetically organised *Cambridge Encyclopedia* and the thematically organised *Guinness*, which were published at around the same time: "Once we get away from what may be termed holistic alphabetisation the task of consultation is made difficult" [5]. It is undoubtedly the convenience and rapidity of look-up which makes the alphabetical approach so attractive, especially in an age where time means money, and where the ability to answer specific factual questions can make reputations (whether before millions, by winning at *Mastermind*; before your peer group, in the local Round Table or Rotary Quiz; or before the family, by cheating at *Trivial Pursuits*).

Comprehensiveness and Bias

One of the claims made by encyclopedias, whether explicitly or indirectly, from Ephraim Chambers on, is that they are comprehensive, guides to all knowledge, universal. Such a claim is widely accepted. Most people would think of an encyclopedia as a comprehensive and objective entity. But this view does not survive close examination. Any comparison of two such works immediately demonstrates the selectivity and preferences of the editor, editorial board, and contributors. Nor is it always the case that every effort is made to eliminate bias, introduce balanced coverage and opinions, or advise the reader about chosen emphases. Often, the editors seem unaware that bias is there – or, if they are aware of it, they fail to warn the reader of it.

There ought always to be a preface, even in a small one-volume encyclopedia, which draws attention to the emphases and weaknesses of coverage and treatment. In fact, it is unusual to find a preface in the single-volume encyclopedia (unlike in dictionaries). The publisher's blurb is of little value, as it inevitably points to the strengths of the work. You will never read a blurb which says: "We have next to no entries on Japanese history", even though this is a true statement for the majority of the works in this genre. It is, of course, extremely difficult to judge what is missing, in an encyclopedia. If we had a clear concept of everything which could be contained in a circle of learning, then we could do some kind of simple subtraction

sum, to determine what was missing. In practice, we are forced to make *ad hoc* comparisons. Most of us evaluate an encyclopedia, in fact, in a very curious way – not by imposing some kind of deductive system of knowledge, or by some inductive comparison of different encyclopedias, but personally and experientially. Most of the letters of complaint an editor receives are from people who have looked up an entry relating to a topic which they *already know about*, and spot that something is missing or in error. People look up their home town, or their favourite novelist, or a topic within their profession, and judge the book by what they find. The irony, of course, is that this is never how the encyclopedia will be used thereafter. One uses a work of reference to establish that which one does *not* know, or is uncertain about – not to check one's certain knowledge, or to catch the editor out.

The existence of editorial bias has always been part of encyclopedia production, and often remains unnoticed. Circumstances may, however, draw it sharply to your attention. Such a case occurred when the first edition of the W & R Chambers *Encyclopaedia* was sent to the USA for an American edition, to be published by Lippincott, Philadelphia. The Americans were sent duplicate stereotype plates, for simultaneous publication. Chambers were horrified at the extent of the changes which were made. For example, the entry on *free trade* in the British edition begins, "the most important and fundamental truth in political economy"; the American edition begins, "a dogma of modern growth industriously taught by British manufacturers and their commercial agents". The entry on *protection* begins (in Britain), "a practice, now in disuse in Britain, of discouraging, by heavy duties and otherwise, the importation of foreign goods, under the notion that such a practice increased the prosperity of the country at large"; (in America), "a practice, found necessary in the United States, of discouraging, by heavy duties and otherwise, the importation of foreign goods, it having been proved that such a practice increases the prosperity of the country at large". Not even the Queen is exempt. The entry on *Victoria I* includes the following comment (in Britain), "The progress made by the nation in the various elements of civilisation, especially in that of material prosperity, has been unparalleled; and perhaps during no reign has a greater measure of political contentment been enjoyed"; (in America), "The progress made by the nation in the various elements of civilisation, especially in that of material prosperity, has been unparalleled; but a growing discontent under her unequal institutions, and a progress towards republicanism, are plainly apparent" – and the entry goes on to make an apparently intolerable remark about the Prince of Wales.

No editor can ever anticipate the sensitivities of all readers, but at least the worst biases of treatment can be avoided – the avoidance of sexist or racist language; the imputation that Western explorers 'discovered' such places as Australia (when the aborigines had been there for at least 25,000 years); the need to be aware of the implications of the various Acts of Union, so that people are not called British too soon. However, many complaints nevertheless take you

completely by surprise, and you become wise too late. Cases in point are the *Cambridge Encyclopedia* entries on the various branches of alternative medicine, written by an eminent professor of medicine, and models of judicious objectivity (pointing out, for example, the lack of experimental support to demonstrate efficacy). This will by no means satisfy you, if you believe in aromatherapy or homoeopathy. Objectivity then becomes bias.

Because comprehensiveness is impossible, biases of coverage are inevitable. Indeed, I would argue that, if an encyclopedia is to meet the needs of its age, biases – emphases, if you prefer – are positively desirable. From this point of view, the topical subject-matter of an encyclopedia can be divided into two main domains. There is the core, obligatory subject-matter of such areas as history, art, religion, mythology, the world's major cities and sovereign states, chemistry, and natural history. Any general encyclopedia which omitted such notions as, *Judaism*, *Zeus*, *hydrogen*, and *duck* would hardly be credible. There are certain 'natural' levels of basic coverage which have to be achieved – approaching 3,000 entries for fauna and flora, for example. On the other hand, this leaves plenty of scope for editors to select topic areas which they believe deserve special prominence. In the case of *Cambridge*, for example, I made a special effort to give above-average coverage to environmental issues (for example, I included every one of UNESCO's world heritage sites, which I do not think has been done before, in a general encyclopedia). Or again, because of the perceived weaknesses in international coverage among encyclopedias generally, I made an effort to give this area special treatment.

The issue of internationalism warrants further comment, as it identifies a widespread limitation of contemporary encyclopedias. As preparation for my own editorial task, I spent a great deal of time reading: in fact, I read four one-volume encyclopedias completely, before beginning my own project, to try to develop a sense of the scope and power of the genre. One of the points which emerged very early on in this exercise was the paucity of coverage of the life, culture, and institutions of countries other than those belonging to the country in which the work was being published, or to the English-speaking world in general. Parochialism was much in evidence. It is so easy, for example, to have a substantial entry on, say, the British Trades Union Congress, and to say little or nothing about the International Labour Organisation or the International Conference of Free Trade Unions.

A basic principle of my own project, accordingly, was to introduce as much international perspective as possible – a bias which we felt was justified, given the approach of Europe and the way international affairs readily affect our lives. This meant paying serious attention to countries which have been particularly neglected in encyclopedic coverage to date, such as Japan, China, India, the countries of South America and Africa, and – surprisingly – Australia and Canada. I am not talking here about biographical and gazetteer entries (which are generally well represented in encyclopedias), but of cultural and historical topics. For example, in

any work which purported to take Japan seriously, I would expect to find *shogun* and *pachinko* (the pin-ball game played in innumerable arcades). In any work which purported to take Australia seriously, I would expect to find references to the main Australian political parties and trade unions. Yet, to take the very last topic, when it arose out of the comments of our Australian consultant, and I looked in my collection of encyclopedias for some reference to the Australian Workers' Union or the Australian Council of Trade Unions, I could find nothing. The information had to be compiled from local sources, by Australian consultants, from scratch.

This emphasis on information is itself a bias, of course. The point may appear bizarre, for what else is an encyclopedia to contain, if it is not information? The answer, if one examines the genre as a whole, is: a great deal. If you choose, you can fill your work with speculative enquiries and theoretical discussion, literary appreciation and artistic interpretation, the evaluation of positions in philosophy and theology, and the analyses of historical events. The difference is sometimes clear-cut: an entry on *Aquinas* may restrict itself to saying what is known about the chief events of his life and his chief works, or it may launch itself into a summary of his thought and an evaluation of his influence, drawing attention to significant controversies. In the *Cambridge* project, we concentrated on factual matters – though allowing that at times it is not so easy to draw a line between factual information and interpretive commentary (see for example, the entries on *civil rights* or *American Revolution*).

More important, however, is the distinction between information, in the sense of verbal text, and illustration. Some encyclopedias devote a great deal of space (sometimes a third of their total page space) to illustrations, especially photographs – pictures of places, people, paintings. One work illustrates the entry on Giovanni Bellini by a photograph of one of his paintings (in black and white); the picture takes up over half a page (over 800 words-worth of space), whereas the relevant part of the entry is a mere 65 words. Anthony Burgess, in a review of the *Guinness*, which makes a real feature of photographic material, is cruelly ironic on this point, drawing attention to the account of *semiology*, which is dwarfed by the accompanying picture of Sean Connery as William of Baskerville. He goes on: "Are pictures information? Yes, if they show us the comparative sizes of space launch vehicles or centripetal acceleration or the photon nature of light. But the two facing pages on American Literature in the Nineteenth Century have at least a third of their space taken up by illustrations from an Edgar Allan Poe story, a picture of whalers for *Moby Dick*, and Beerbohm's caricature of Walt Whitman, twice as big as the text on the man himself". He concludes: "I am very dubious as to the value of the colour-supplement approach to the serious business of imparting knowledge" [5]. So am I. In the *Cambridge* project we took a radical line, allowing in no photographs at all (apart from in the colour section), and restricting illustrations to those where there was a clear functional need – where an illustration was essential in order to complete the account given in the text itself, such as the structure of a

space shuttle, outlines of ships, and types of dinosaur. The space saved by having no coffee-table type photographs enabled me to include an extra 3,000 entries.

Having decided on your biases and the range of subjects you wish to include, you must now find your contributors. Gone are the medieval days when one person wrote the whole work. Contributors are the norm – 100 at least. They must be authorities, but not too narrowly specialised. Ideally, they should have had some experience of writing for a general audience. They should have some sympathy with the encyclopedist's aim. They have to see the point of dividing their subject into, say, 200 entries, most of which will be between 100 and 150 words in length. They have to *want* to do it – and not for the money, either. Then, finally, they need to have the time to do it. William Geddie's experience is mine also: "In many cases there is some one man [or woman] who is obviously the right man. Fortunate if he is not at the moment exploring the Antarctic" – and he adds, in a voice of ironic despair, "One scholar excuses himself on the ground that he is very busy with his forthcoming book, his wife is ill, and the maid has left. Thus we are trebly disappointed" [2]. Nor must we forget yet another bitter fact of editorial life – that getting a writer is by no means the same as getting an article.

Judging by the results, moments of success far outnumber moments of despair. Certainly this was my own experience. It was a good day, for example, when the senior staff of the Natural History Museum agreed to form themselves into a team to handle the fauna and flora entries in the *Cambridge* – always the largest topic component of a general encyclopedia. It was another good day when we contacted NASA, to see if anyone there had the time to help us handle space exploration, and obtained an enthusiastic response from the Director of the Solar System Exploration Programme. The value of that particular contact became especially apparent three years later, when the work was in its final stage of production. Most people will recall the excitement of the waiting NASA team, as pictures from Voyager 2's encounter with Neptune (24 August 1989) came through. Within a few days, we had those first findings also. At the risk of sending our production manager to an early grave, we held up the relevant pages so that we could make the entries as up-to-date as possible. When such things happen, for a few months you *know* that your work is ahead of the field. It is a position that all editors yearn for. On the down side, it took over 18 months, after many futile exchanges of letters, to find a contributor on textiles; and I finally obtained a response from a cooperative criminologist one month *after* the encyclopedia had begun to print.

Accuracy and Currency

With careful thought about coverage, you can make your book representative of current interests and expectations; with judicious choice of contributors, you can ensure authoritativeness. But there are other criteria, to do more with treatment than with coverage, which need to be respected, notably accuracy and (as we have just

Table 1 Figures for sea areas* in five encyclopedias.

<i>National Geographic Atlas</i>	
1 South China Sea	1,148,000
2 Caribbean Sea	971,000
3 Mediterranean Sea	969,000
4 Bering Sea	873,000
5 Gulf of Mexico	582,000
6 Sea of Okhotsk	537,000
7 Sea of Japan	391,000
8 Hudson Bay	282,000
9 East China Sea	257,000
10 Andaman Sea	218,000
<i>Cambridge Encyclopedia</i>	
1 Coral Sea	1,850,000
2 Arabian Sea	1,492,000
3 South China Sea	1,423,000
4 Mediterranean Sea	971,000
5 Bering Sea	890,000
6 Bay of Bengal	839,000
7 Sea of Okhotsk	614,000
8 Gulf of Mexico	596,000
9 Gulf of Guinea	592,000
10 Barents Sea	542,000
<i>Readers Digest Book of Facts</i>	
1 Mediterranean Sea	967,000
2 South China Sea	895,000
3 Bering Sea	876,000
4 Caribbean Sea	750,000
5 Gulf of Mexico	596,000
6 Sea of Okhotsk	590,000
7 East China Sea	482,000
8 Hudson Bay	476,000
9 Sea of Japan	389,000
10 North Sea	222,000

seen) currency. This issue, surprising as it may seem, turns out to be a can of worms. People are surprised because they think that, if there is one incontrovertible fact about encyclopedias, it must be that such works are books of facts. I am a

Random House

1 Mediterranean Sea	1,145,000
2 South China Sea	895,000
3 Bering Sea	878,000
4 Caribbean Sea	750,000
5 Gulf of Mexico	700,000
6 Sea of Okhotsk	582,000
7 East China Sea	480,000
8 Yellow Sea	480,000
9 Sea of Japan	405,000
10 Hudson Bay	400,000

Encyclopedia Britannica

1 Australian Central Sea	3,140,000
2 Gulf of Mexico and Caribbean Sea	1,670,000
3 Mediterranean Sea and Black Sea	1,150,000
4 Bering Sea	880,000
5 Sea of Okhotsk	590,000
6 Hudson Bay	470,000
7 North Sea	220,000

* All areas in square miles

relative newcomer to the world of general reference, but in my worst moments I sometimes wonder if there are any facts at all. The point emerges most clearly when one attempts to construct a comparative table, such as the 10 highest mountains, longest rivers, or deepest caves. Take the 'largest sea' problem. Excluding the oceans, there is precious little agreement, as can be seen from Table 1.

Depending on your source, so you will allocate first place to either the South China Sea, the Mediterranean, or the Coral Sea. The Mediterranean comes first, third, or fourth, with no agreement about size. The substantial difference of nearly 200,000 square miles, you might think, is explained by whether you include the Black Sea as part of the Mediterranean or keep it separate (as does Britannica, which gives 1,150,000 for both); on the other hand, the 1,145,000 of Random House, otherwise so close to Britannica, seems to exclude the Black Sea, which is given a separate placement (as no.14) further down its list. Similarly, there are vast differences between the sizes of the South China Sea (from 895,000 to 1,423,000 – an increase of over 60%), and not distinguished separately at all in the Britannica's list. And so we might continue, playing games with names and numbers, but rarely approaching facts.

The problems with seas are typical of many categories with indeterminate boundaries. But even relatively determinate entities, such as rivers, are not exempt. Most encyclopedias give the Nile as the longest river, but Petit Larousse gives the Amazon. Random House gives the Mississippi-Missouri as second, but it is fourth in Britannica. The Guinness Book of Records does the only sensible thing: "The two longest rivers in the world are the Nile... and the Amazon... Which is the longer is more a matter of definition than simple measurement" (p.60). The *Cambridge*, likewise, issues a warning to readers to treat such statistics with care. Most reference books do not, and impute a precision to their tables which is disturbing.

Factual problems are by no means restricted to geographical entities. Historical uncertainties abound. Take the apparently simple question, How long did it take to build the Taj Mahal? In a check of six reference books, you may choose between 1630, 1631, 1632, and 1639, for the beginning of the project, and 1641, 1648, 1653, and 1654 for the end of the project. Everything depends on what counts as 'the project'. If you date from the death of Shah Jahan's wife, you will go for 1631 (1630, used by both the Reader's Digest Book of Facts and the Concise Columbia, would seem to be somewhat premature). If you date from receipt of planning permission, as it were, then you will go for 1632 – or 'around 1632', as Britannica puts it, being characteristically precise even in imprecision. As for completion, the mausoleum was finished by about 1643; the mosque, wall and gateway by about 1649; and the rest of the complex, including stables, guardhouse, and other structures, some five years later. Shah Jahan would have given his builders their final stage payment in 1654, but the essence of the project was finished some 10 years before. To reduce all this to a two-date summary, as required for a short encyclopedia entry, will not be easy, nor will the descriptive statement which should accompany such dates.

Some encyclopedias employ people called 'fact checkers', whose job it is to – well, check facts. This job description, with its implication that the exercise is a straightforward, mechanical one, I find disturbing. With historical 'facts', it very much depends on who you talk to. When we were compiling the comprehensive list of rulers and political leaders since 1900 for the Ready Reference section of the *Cambridge*, there were a number of places where conventional sources were incomplete or vague. We resolved that, in cases of doubt, we should write to the Embassy of the country in question. We often received no reply, so we resorted to the telephone. In several cases, notably in some of the post-colonial African states, our telephone enquiry (e.g. "Who was your ruler in 1983?") was greeted with some suspicion. Despite explaining who I was, I recall one press attaché who responded defensively with "Why do you want to know?". In another case, I was actually asked "Whose side are you on?". The impossibility of an answer, at times, can be seen by considering what response I would get if I asked the question "Who is the ruler of Yugoslavia?" in February 1992 of a Croat, a Slovene, or a Serb.

A special case of accuracy is up-to-dateness. An encyclopedia editor is always, to some degree, predicting the future, placing a bet on stability, that situations will not change. Sometimes the editor will win – for example, the date of a death, generally speaking, is an agreed point (though even that needs qualification, as it depends on which dating system you are using). But sometimes the editor will lose, because he or she will be overtaken by world events. There is perhaps nothing surprising in this, as it is the motive for all updated reprints and new editions. The pressure to be as up-to-date as possible is the daily lot of anyone who edits an encyclopedia – and it alters one's behaviour quite dramatically. T.S. Eliot's *Prufrock* measured out his life in coffee spoons. Encyclopedia editors measure out their lives in newspaper obituaries, and the regular current affairs reports of Keesings Contemporary Archives.

While in theory updating is a continuum, in practice it is an infinite series of deadlines, imposed by the exigencies of the publishing schedule. A decision has to be made concerning the timing of an updated reprint or a new edition. Once that decision is made, a well-oiled machine takes over: time has to be booked at the printer, paper has to be ordered, marketing plans have to be arranged, space in bookshops has to be planned. The editorial deadline – the date by which final copy has to be submitted to the publisher – is one about which there is very little flexibility. Nothing short of an event of world-wide significance will alter it. But one thing is certain: a month, or a week, or a few days before this deadline, that event will take place. Thus, my deadline for the first edition of the *Cambridge* was 15 November 1989. On November 9, the East Germans opened the Berlin Wall. The next day, Todor Zhivkov of Bulgaria was deposed. We put the deadline back two weeks, to see what happened. A fortnight later, the Communist Party leadership resigned in Czechoslovakia. We put the deadline back another fortnight! A year later we were in an identical position, as the deadline for the first updated reprint was agreed – the end of October 1990. On October 3, the two Germanies unite – 700 consequential changes to be made, as all contemporary references to East and West Germany go. The deadline is put back to the end of November. On 28 November, Mrs Thatcher resigns, with the consequence that entries on Major, Howe, Hurd, Heseltine and Baker have to be altered. We meet the deadline, but only just.

A year later, and we are still in an identical position, as we prepare for the second updated reprint, and a deadline is fixed for the end of October 1991. On 19 August there is a coup in the Soviet Union. I prepare for the worst. A few days later, the *status quo* is restored. I breathe a sigh of relief. But my sigh is premature. In September, the independence of the Baltic States is recognised. In October the KGB is abolished. We postpone to the end of November. On November 4, almost all Soviet Union Ministries are abolished. The Soviet Union is fragmenting. I see over 1,000 references to the USSR falling around me like autumn leaves. For a brief moment, there is optimism: on November 14, agreement is announced that the

USSR will be replaced by a Union of Sovereign States – editorially, a superb decision, as USSR to USS will mean a change of only one letter. But a week is a long time in encyclopedia editing. On November 25, seven republics refuse to initial the treaty. We postpone the deadline until the end of December. Perhaps USSR will stay? Will there be a change of name? We try to find out, and telephone the Soviet embassy in London to ask what they intend to call the USSR, both in English and in Russian. We are asked if we want a visa. We repeat our question. We are told that it is the Western press which has published the new name (USS), not the Soviets, and that we should phone the Novosti Press Agency. Novosti does not know what the name is either, but opine that if we must go into print perhaps *ex-USSR* will do? The Novosti spokesman cannot help with the Russian spelling, as he does not speak Russian, and in any case the Agency is closing at the end of the month. He gives us the number of the Society for Cultural Relations with the USSR. They are not answering the phone. We phone the Foreign and Commonwealth Office. They advise us to continue using USSR until the end of the year. There will definitely be no change of name before Christmas. A week later the Commonwealth of Independent States is proposed, and on 20 December, Soviet embassies all over the world are told to strike the name 'Soviet Union' from their records. My deadline is 1 January. It cannot be held up any further. I have a busy Christmas eliminating 1,000 references to the USSR. Dare I write an entry informing the readership of the reprinted *Cambridge* in July 1992 that there exists an organisation called the *Commonwealth of Independent States*? Dare I write an entry under 'C'? I dare. In such a manner do encyclopedia editors impose structure on the world. But in July, will this entry be as dated as the entry on *cold fusion*, added in 1989 when the subject was a hot topic, seems to be now?

I tell this story at some length, partly to dispel the notion that editing an encyclopedia is boring (on the contrary: there are few more nerve-racking jobs), but partly to illustrate once again the problems of ensuring accuracy when the chronologies of the political world and the publishing world fail to coincide. Just sometimes, there is a piece of good fortune. A corrected reprint, it must be appreciated, is not a new edition: the changes are kept to a minimum; there are no new entries, and page make-up stays the same. The costs would be prohibitive if a great deal of resetting had to take place. Yet sometimes space *has* to be found for a new entry, if credibility is to be retained. Take Boris Yeltsin, for example – internationally unknown in 1989, when the first edition went to press, and now a critical figure. He *has* to be added, for a 1992 encyclopedia. The spelling of his name saves us. He appears immediately before Yemen. The Yemen page is one of two (the other is Germany) where there has to be a major resetting, because North Yemen and South Yemen have become a single state. The entries are to be conflated, and the space saved is just enough to permit an extra entry on Yeltsin. Thus do the fortunes of great nations and statesmen intertwine.

Treatment and Technology

So far I have talked about matters of encyclopedia coverage. The other major dimension of editing is treatment – how to handle the information, once it is obtained. This involves such issues as the size of entries, the ordering of entries, the style of language used, the use of colour and design, the ease of access to the information, entry intelligibility, and all the issues that sub-editors (and regrettably few others) worry about, such as consistency in spelling (e.g. whether encyclopedia should be spelled with an *e* or *ae*), capitalisation, abbreviations, formulae, and the use of personal titles [6]. Here, no editor can expect to produce a satisfactory work without an appropriate support team, in the form of the copy-editors, proof-readers, and others within the publishing house. Most of these matters involve so many points of detail that it would be inappropriate to illustrate them in the present article, but it is worth drawing attention to one general point.

This is the consequence of the decision to keep entries short – a decision whose ancestry dates back to Chambers. Short entries are valuable because they provide rapid answers to single questions. Readers do not have to plough through a mass of material to find what they are looking for. But what if they are interested in the whole of a complex topic (such as a student writing a project)? To enable readers to reconstruct a larger topic, it is essential to incorporate a good system of cross-references. You look up an entry, and at the end, if you need more information, you are sent to certain other entries. A sample page illustrates the procedure (Figure 4). What must be appreciated is that the selection of these cross-references is by no means a simple, mechanical task. It is not enough to asterisk or arrow every word in an entry which is a headword elsewhere in the book. If you did this, some entries would be full of asterisks, and others would have none. A cross-reference needs to be thought about. In fact – and this is the unexpected point – I spent as much time deciding on the cross-references in the *Cambridge* as I did editing the main text of the entries. There are over 75,000 of them, so the scale of the task is apparent. Often, it involved referring back to the contributor, who might be the only person to determine whether a particular cross-reference is desirable, essential, a distraction, or an irrelevance.

As we saw earlier, some encyclopedias have taken 10 years or more to prepare. The *Cambridge* took just over three. This was in large part due to the availability of electronic technology. In common with all major publishing houses, the encyclopedia was compiled as a computer database. Each entry was broken down into fields (different types of information, such as the headword, the birth/death date, the pronunciation, the cross-references), and each field was comprehensively indexed. A sample entry is shown in Figure 5. It is this indexing, incidentally, which makes it possible to carry out updatings with such speed. To return to my USSR example: the identification of all entries containing the word USSR took only a few seconds. Similarly, it is no trouble to track down the location of all

length 563 km/350 mi; breadth 257 km/160 mi; maximum depth 405 m/1329 ft; area 82 103 sq km/31 692 sq mi, 35% in Canada; connected with L Huron (SE) via St Mary's R (the Soo canals); several islands, including Isle Royale (a US national park); transport of minerals (especially iron ore), grain. » Great Lakes

supernatural » paranormal

supernova A rare and spectacular explosion resulting in the destruction of a massive star. At the endpoint of stellar evolution, the hydrogen fuel in the star core has all been converted to helium. The star therefore cools, and contracts. This is a runaway process, because as the star shrinks, the gravitational force at the surface increases, resulting in an intensification of inwards forces. In stars of a few solar masses, the central core implodes in less than one second, and this triggers an instantaneous nuclear explosion of all the unprocessed material outside the core. At the centre a neutron star, pulsar, or black hole is the endpoint. The exploded atmosphere is blasted into space at about one-tenth the speed of light, and the remnant can be detected for hundreds of years on account of its radio emission. Light emission from it is temporarily 100 million times brighter than the Sun, and the star can be seen for up to two years. Well known examples are the supernova of 4 July 1054 (Crab Nebula), 1604 (seen by Kepler), and 1987 in the Large Magellanic Cloud. They are intrinsically rare: none have been sighted within our Milky Way since the invention of the telescope. » black hole; neutron star; pulsar; star; stellar evolution

superovulation syndrome A condition which occasionally results when infertile women are given human gonadotrophic hormone and/or the synthetic drug clomiphene to stimulate ovulation. Several ova may be simultaneously released and fertilized, with consequential multiple births. » gonadotrophin; pregnancy [1]

superoxide A compound containing the ion O_2^- , formed by the heavier alkali metals, instead of normal oxides. » alkali-suprophosphates Fertilizers containing phosphate as the $H_2PO_4^{2-}$ ion. They are so called because, for a given weight, $Ca(H_2PO_4)_2$ contains more phosphorus than does $CaHPO_4$. » fertilizer; phosphate

superposition » interference [1]

Suprealism » Photorealism

supersonic In fluid mechanics, fluid flow which is faster than the velocity of sound in that fluid, either in the case of an object moving through the fluid, or a fluid moving around a stationary object. Supersonic aircraft fly faster than the speed of sound in air. » aerodynamics [1]; fluid mechanics; sound

superstrings A speculative quantum theory, embracing all the forces of nature, which may avoid the difficulties encountered by early unification schemes involving gravity, proposed by British physicist Michael Green and US physicist John Schwartz in 1984. It is based on a fundamental extended submicroscopic string in place of the usual point particle, plus supersymmetry. It is consistent only in ten dimensions, and has no experimental support. » forces of nature [1]; grand unified theories; supersymmetry

supersymmetry In particle physics, a symmetry relation linking particles of different spins. Theories incorporating supersymmetry predict particles that are partners to observed particles, having the same mass but different spin. No such supersymmetric partners (squark, slepton, photino, and others) have been observed. » superstrings; supergravity

supination A movement of the forearm in which the palm of the hand is brought to face forwards, so that the thumb is directed away from the body. In this position the radius and ulna lie parallel to each other. It is a much more powerful movement than pronation, and as most people are right-handed, this accounts for the right-hand thread on screws and other such phenomena. » arm; pronation

supply and demand An economic concept which states that the price of an article (or 'good') will move to the level where the quantity demanded by purchasers equals the quantity that suppliers are willing to sell. » demand; elasticity (economics); equilibrium; market forces

supply-side economics An economic theory that policy

measures should be taken to boost the supply of goods and services, or output. It contrasts with the Keynesian view of economic management, with its emphasis on policies that would change aggregate demand. The theory was used to some extent in the USA and UK during the early 1980s. » supply and demand

supportive psychotherapy An approach in which an attempt is made to reinforce the patient's defences, thus allowing the suppression of disturbing psychological material. There is no attempt to probe emotional conflicts in any depth. The technique is used in situations where the symptoms are relatively trivial and therefore not meriting detailed investigation, or with patients who are too fragile to achieve greater insight without major and possibly permanent decompensation (psychological breakdown with the possible development of a psychosis). The technique emphasizes reassurance, counselling, re-education, persuasion and suggestion. It is often carried out by non-medical members of a psychiatric team, such as nursing staff. » psychosis; psychotherapy

supralittoral zone » benthic environments

suprarenal glands » adrenal glands

Suprematism A form of modern art based on four simple shapes: rectangle, circle, triangle and cross. This movement was started in Russia c.1913 by Kazimir Malevich (1878–1935), who demonstrated the aesthetic purity of it all by painting a white square on a white ground. » abstract art; Cubism; Minimal art; modern art

Supreme Court In the USA, the highest federal court established under the constitution, members of which are appointed by the President with the advice and consent of the Senate. In addition to its jurisdiction relating to appeals, the court also exercises oversight of the constitution through the power of judicial review of the acts of state, federal legislatures, and the executive. » Constitution of the United States

Supreme Headquarters Allied Expeditionary Force (SHAEF) A force formally established (13 Feb 1944) under US General Eisenhower, with British Air Chief Marshal Tedder as deputy supreme commander, to mount the Allied invasion of occupied Europe and strike at the heart of Germany. » D-Day; Eisenhower; Tedder; World War 2

Supreme Soviet » soviet

Surabaya [soorahbahyah] or Surabaja $7^{\circ}14S\ 112^{\circ}45E$, pop (1980) 1 556 255. Industrial seaport capital of Java Timor province, E Java, Indonesia, at mouth of Kali Mas; Indonesia's second largest city; port facilities at Tanjung Perak; important trading centre since the 14th-c; airfield; railway; university (1954); naval base; oil refining; textiles, glass, footwear, tobacco, rubber. » Java

Surat [soorat] 21 12N $72^{\circ}55E$, pop (1981) 913 000. Port in Gujarat, W India, on the Gulf of Cambay, 240 km/150 mi N of Bombay; rich trading centre of Mughal Empire, 17th–18th-c; first English trading post in India, 1612; headquarters of British East India Company until 1687; railway; university (1967); textiles, engineering; noted for its zari thread work and diamond cutting. » Gujarat

surface active agent » surfactant

surface physics The study of the electronic and structural properties of the surface of matter, i.e. the outermost layer of atoms. Surface properties are important in several domains, including catalysis, corrosion, the emission of electrons from surfaces, optical properties, and friction. Surface layers formed at the interface of two solids are also important, as in semiconductor devices. Experiments rely on such techniques as electron diffraction and field ion microscopy, using samples in ultrahigh vacuums. » field emission; molecular beam epitaxy; photoelectric effect; quantum Hall effect; rheology; secondary emission; solid-state physics; sputtering; surface tension [1]; thermionics; thin films; tribology; vacuum deposition

surface printing A term sometimes used for those techniques of printmaking which do not involve cutting, etching, or scraping the block or plate. The main techniques are lithography and monotype, but the term is sometimes extended to include screen-printing. » lithography; monotype; printing [1]; screen printing

I/I	Deep Space Network
N/I	astrona
E/I	A NASA tracking and telecommunications system used to operate interplanetary spacecraft.
A/I	Stations are located at three widely spaced locations around the world (Goldstone, California; Canberra, Australia; Madrid, Spain) to provide a continuous communications capability in all parts of the Solar System. Each station operates one 70 m/230 ft diameter radio antenna and two 34 m/112 ft antennas, capable of two-way communications with spacecraft to beyond Neptune's orbit. It is operated by NASA's Jet Propulsion Laboratory.
G/I	» psychosis; psychotherapy
C/I	NASA; Solar System; Space exploration
W/I	astrona
Q/I	gb
Z/I	2
Y/I	Deep Space Network (DSN)

Figure 5 A sample entry from the Cambridge database.

instances of Leningrad to replace them by St Petersburg, or of Gorky to replace them by Nizhni Novgorod, and likewise for all other Soviet cities which have reverted to an earlier name. The replacement itself cannot in fact be done automatically, as there are always subtleties of rhythm and phrasing in an entry which have to be carefully considered (often, changes of tense are effected), but to carry out such a search by hand would take weeks. As it was, I was able to complete my USSR task in three days.

As a footnote, at this point, I should report on some of the curious things which happen when one inputs such vast quantities of data. You can scrutinise an entry on a screen late at night, and everything seems in order. You return to it the next morning, and look again, and a typographical error leaps out at you. It is not as easy to see errors on a screen as it is on the printed page. Only by disciplined re-reading – and by more than one person – is it possible to ensure that such embarrassments as the following are eliminated:

Beethoven was handicapped by deadness.

From 1800, until his retirement through ill-health in 1928...

Carthage was refounded by Julie Caesar.

Only in this way are we spared the existence of a Wet Germany or a Wet End of London, the American Civil Wart, and the perfumed approach to the Continent, the Chanel Tunnel. Moreover, one must beware the inadvertent omission. With computers, a careless touch of a key can make a word disappear while you blink. The omission of the word *research* led to an eminent physicist being described as moving to Cambridge "where she carried on in theoretical physics". Even headwords can be omitted, so that two adjacent entries would be printed out to run on. In this way, the entry on Nigel Lawson (at the time, the Chancellor of the Exchequer) began properly, and then due to the inadvertent deletion of the next headword, which happened to be *laxative*, continues: "A drug which causes emptying of the bowels. Except when medically recommended, does more harm

than good". And, to conclude this interlude of just-avoided embarrassments, the most mysterious error of all. As I mentioned, one of the fields in the entry structure gives birth/death dates. On only one occasion did this field become disturbed, so that it was repeated in the coding of an entry. If it had been printed, it would have appeared that the person had died twice. Maybe we should have left it. The entry in question was *Lazarus*.

Despite these minor problems, the future of databases in work on encyclopedias and dictionaries is assured. There is no doubt that the ease with which it is possible to incorporate alterations into a database, to prepare a new edition or corrected reprint, and to launch a fresh publication from the resource material enables an editor to save vast amounts of time, and a publisher vast amounts of money. The procedure is by no means automatic, as I have already suggested. To implement an automatic search-and-replace command, for example, such as would take out all instances of USSR and insert something different (e.g. CIS) would lead to many errors – notably, all historical uses of the term USSR would be wrong. And it is never possible to adapt one reference book for use as another, or as part of another, without major qualitative change, involving a reconsideration of the underlying concepts involved. For example, as part of the source material for the *Cambridge*, I had access to the Chambers' *World Gazetteer*. This had been prepared by a team of geographers, and was meticulous in its cataloguing of geographical divisions, population figures, climate, latitudes and longitudes, and the like. However, it was scanty on social, cultural, or intellectual history. No mention, in the history of the USA, of such matters as Black civil rights or space exploration, for example. It would not have been possible to adopt the entries from that book in a general encyclopedia without considerable reworking, which is what had to happen. But even within the one stable, reworking is necessary. Much of last year was spent preparing the Concise edition of the *Cambridge* for publication. It is half the size. Unlike the concise version of a dictionary, however, a concise encyclopedia should not be thought of as simply a shortened version of the larger work. Or, to put it more precisely, the principles which guide the reduction in size result in a book which cannot be used in the same way. To take one major difference: a 1,500-page work allows space for, and motivates, browsing. There is room for some degree of discursiveness and comment. There is a place for insight, idiosyncrasy, even humour. The *Cambridge* entry on *limericks* is cast in the form of a limerick. None of this is possible in a Concise, where one has to imagine a reader who has a single and specific question in mind – a date, a location, an event. In the absence of market research, it remains unclear who actually buys a Concise, and why. The fact is that large numbers of people do.

Once one has allowed for these qualitative considerations, there is no doubt that the availability of the database in electronic form is enormously helpful in the preparation of a new work, and it raises the interesting question: to what extent will the new medium affect the structure of future reference works [7]. I am not here

referring to the relatively straightforward task of transferring the information in a book onto a CD-ROM disk (as Grolier and McGraw-Hill have done for encyclopedias, and the OUP has done for the OED). This raises few editorial matters of interest. There is no real difference, from the editor's point of view, between looking an entry up on a page and looking one up on a screen. From ergonomic and typographical points of view, of course, there are several interesting factors to consider, such as the relative extents to which information can be efficiently accessed on page and on screen. For example, what typography best suits screen encyclopedia entries, and what problems of 'graphic translatability' exist, as one moves from page to screen? Or again, how do the limited size and dimensions of a screen affect our ability to assimilate entries which are more than 20 or so lines long or more than 80 characters wide? What is the effect on our visual memory of continual scrolling up and down (or from side to side)? With the tiny Sony Discman, which will doubtless have an encyclopedia inside it, the problem is compounded.

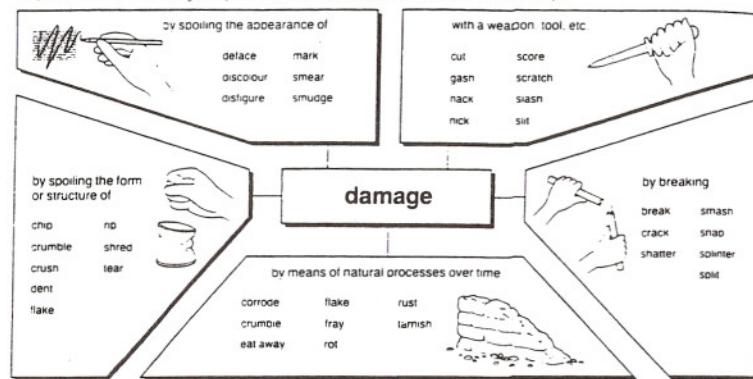
From an editorial point of view, rather more interesting questions are raised about the theory and practice of reference book preparation. How are expert systems best used? I conclude this article by referring to two issues. The first is whether we can use the new hardware and software to devise different kinds of reference book. A walk through any large bookshop shows how complex this domain already is, with encyclopedias and dictionaries sitting alongside glossaries, thesauruses, phrase books, concordances, and other categories. To what extent is it possible and desirable to combine different kinds of information into a single work, whether on paper or screen, to provide fresh help and insight? We can already see the signs of fresh thinking in the dictionary world, where – in a modern volume – you are likely to find a great deal of information about matters other than the individual words, such as articles on grammatical usage, essays on groups of related meanings, and analysis of thesaurus-type phrases. The sample page from the second edition of the *Longman Dictionary of Contemporary English* (Figure 6) shows one such blend. Increasingly, in British dictionaries, we see the influence of the US/Continental tradition, where encyclopedic information is treated alongside the lexical. And similarly, I anticipate that encyclopedias are likely to contain increasing amounts of dictionary information, with pronunciation, etymology, idioms, and sense distinctions becoming incorporated. It is not clear whether such 'encyclicons' or 'lexicopedias' can be coherent works, or whether they are commercially viable propositions, but the potential for innovation in the form of reference hybrids is considerable.

All of which leads to the most basic question of all. For 'commercially viable' read 'Do people want it?'. Indeed, the whole question of why people buy encyclopedias and dictionaries, and what they do with them once they have bought them, remains tantalisingly obscure. In a Radio 4 information survey I carried out a few years ago, over 70% of respondents 'thought' they had a dictionary, but could

dalmatian

258

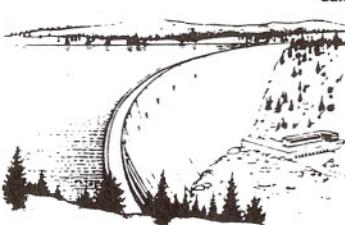
There are many words in English to express ways and degrees of damaging. The diagram below shows some of them. (To find out the exact meaning of any of these words, look it up at its own place in the dictionary.)



with the idea of setting himself up in business. 2 old-fash to seem to want to start a love relationship with (someone), but without serious intentions

dalmatian /dæl'meɪʃn/ n (usu. cap.) a type of large short-haired dog that is white with black spots—see picture at **dog**

dam



dam¹ /dæm/ n a wall or bank built across a river to keep back water; esp. to make a **RESERVOIR**: *the Aswan Dam in Egypt* | *The village was swept away when the dam burst*. —compare **DIKE**¹ (1)

dam² /dæm/ v [T] (up) to keep back by means of a dam: *to dam (up) the water/the river*

dam sthg. → up phr v [T] to control (a feeling, esp. of anger or annoyance) in an unhealthy way: **SUPPRESS**: *to dam up one's resentment*

dam³ n the mother of a four-legged animal, esp. a horse —compare **sire**¹ (1)

damage¹ /'dæmɪdʒ/ n 1 [U (to)] the process of spoiling the condition or quality of something and the harm or loss that results: *The flood caused serious damage to the crops.* | *This will do a lot of damage to her political reputation.* | *He suffered brain damage in the car accident.* 2 [the + S] **infml**, esp. BrE the price, esp. of something done for you: *What's the damage?*

damage² v [T] to cause damage to: to damage someone's reputation: *The building was severely damaged by the explosion.* | *Smoking can damage your health.* | *The incident had a damaging effect on East-West relations.*

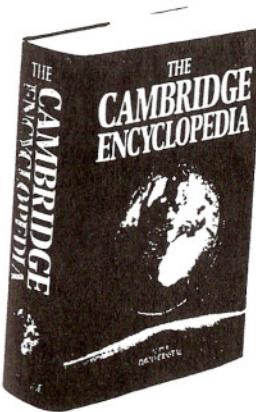
damages¹ /'dæmɪdʒz/ n [P] law money that a person is ordered by a court to pay to another person for caus-

THE CAMBRIDGE ENCYCLOPEDIA

D·A·T·A·S·E·A·R·C·H

A unique free computer service
for all owners of The Cambridge Encyclopedia

Are you completing a project, writing an essay or doing some research? Do you have a particular area of interest? Then **Datasearch** can help you get the absolute maximum from your **Cambridge Encyclopedia** by allowing you to tap into our Encyclopedia database. **Datasearch** will give you a listing of every single entry which refers to the person, place or topic of your choice.



Even though your **Cambridge Encyclopedia** has over 75,000 cross-references — many more than any similar book — its pages are bound to contain more information on any one topic than is immediately apparent — information spread throughout the book that could prove useful to you.

You can get this information from **Datasearch** simply by sending us the word you wish to run a search on. For example, if you choose 'laser', a list of entries will be generated some of which are shown here.

LASER

atomic physics	desk-top publishing	integrated optics
atom trap	directed energy weapons	interference
antitank missile	dye laser	interferometer
bomb	electro-optic effects	ion trap
Bose-Einstein statistics	endoscopy	laser cooling
chemical laser	fax	laser mass spectrometer
coherence	free electron laser	laser printer
compact disc	holography	laser scanning

Armed with your **Datasearch** list, you can then use **The Cambridge Encyclopedia** to explore all related aspects of your subject of interest — some of them surprising and revealing! See over for full instructions on **The Cambridge Encyclopedia Datasearch**.

Figure 6 A sample page from the Longman Dictionary of Contemporary English (1987).

Figure 7 A Datasearch enquiry form for The Cambridge Encyclopedia.

not remember exactly where in the house it was. Hardly anyone could remember when they had bought it, or what edition it was. Of those who did use it regularly, only a handful could say when they had last used it and why. Of those who could, the majority used it to check a point of contention in Scrabble. I know of no corresponding survey, formal or informal, for single-volume encyclopedias. There probably is market research (for example, one US firm has analysed school curricula to find out which topics children look up, and at what age), but publishing houses guard their findings jealously. However, we do know that over a million encyclopedias are sold annually in the USA.

All I can report, from my own limited efforts to discover what motivates people to use an encyclopedia, is that predictions are extremely risky. The latest edition of the *Cambridge* has a Databsearch enquiry form in each copy (Figure 7). The basic idea is to provide a service, by allowing readers access to the database. If, for example, you are writing an essay on lasers, and are using the *Cambridge*, you can look up the entry on *laser*, and its cross-references will lead you to another dozen headwords. But, you might think, lasers must be referred to in other entries, too. By using the Databsearch form, you can interrogate the database. The editorial office will carry out a search of the text for the word *laser* and send the enquirer a list of the headwords representing the entries in which *laser* appears (there are in fact 51 of them). The service has proved attractive, and we currently receive 3 or 4 requests a day. What is interesting will be to analyse these requests, to see what they tell us about encyclopedia usage. Some enquiries are predictable – for example, we have been asked to provide answers to quiz games in newspapers, questions in competitions, and clues in crossword puzzles. Less predictably, we have been asked for etymologies of words and phrases – showing once again the lack of a clear boundary between encyclopedia and dictionary. People have requested very narrow searches (e.g. *druids*) and very broad ones (e.g. *France*). School project topics are very much in evidence (e.g. *industrial revolution*, *energy*). In some cases, we find we have nothing in our database on a fairly obvious topic (e.g. *the kilt*), which leads to a rueful letter and a note for the next edition. All the questions, however, are sensible, and they are already changing my intuitions about what an encyclopedia should contain. I would not have expected such search requests as ‘cruelty to animals’ and ‘fathers with children’, which are interestingly thematic. ‘Coca Cola’ was an unexpected enquiry, and I certainly did not expect ‘yawning’. Nor, it seems, am I alone. I have not yet found an entry on *yawning* in any encyclopedia.

As the age of the electronic encyclopedia dawns, it is essential that we discover more about user curiosity if we are not to miss an opportunity of designing works which will meet a need. If someone is interested in the derivatives of oil (as was one of our enquirers) but only in certain countries and at certain periods, then how is this information best sorted, accessed, and presented? A page-by-page alphabetical method, such as is now available on CD-ROM, is hardly the best approach. More intriguingly, how can we store the information in such a way that

Tarpeia [tahpeea] According to a Roman legend, a Roman woman who betrayed the Capitol to the Sabines, in return for ‘what they wore on their left arms’ (meaning gold rings). In their disgust, they threw their shields on her and crushed her to death. » **Sabines**

Figure 8 The ‘Tarpeia’ entry in the Cambridge database.

it is available to enquirers who do not know what they are looking for – what is sometimes called ‘the librarian problem’. There may indeed be an entry in the encyclopedia which answers the enquiry of the user, but will the enquirer find it? Will the alphabetisation, the cross-references, the ‘X see Y’ entries, or (in a totally indexed system, such as Databsearch) a word search program provide foolproof guidance? Without much more thought being devoted to the conceptual structure of the knowledge represented in an encyclopedia, the answer must be ‘no’.

A good example occurred recently when someone enquired what was the name of the woman in classical history who betrayed Athens to invaders by asking for the bangles which the invaders wore on their arms. I was sure we had an entry but could not remember the name of the woman either. A search for *bangle*, *invader*, and *Athens* produced nothing. *Woman* produced far too many entries to make a search worthwhile. I tried *bracelet*, *Greek history*, and – in a flash of inspiration – *legend*. The entry proved to be Tarpeia (Figure 8). She turns out to be Roman, not Greek, and the city she betrayed was Rome, not Athens – but even if the enquirer had remembered correctly, and asked for *Rome*, I would not have found it, as my entry contains only *Roman* and *Capitol*. *Bangles*, likewise was misleading. All of this raises the interesting question of how many conceptual ways in are there to an entry, and how far can such approaches be structured and principled? Presumably a thesaurus-type classification would have quickly solved the Tarpeia enquiry, as *bangles*, *bracelets*, *rings*, and other such terms would have been grouped together, as would Classical place names, and so on. It ought even to be possible to anticipate the most likely conceptual errors an enquirer might make, much as a spelling-checker detects a spelling error and suggests the nearest correct alternatives – or, of course, as librarians attempt to do as they try to establish the name of the book the borrower is looking for. Is a systematic concept-checker possible?

I am not sure whether it is proper to end this article with such an open question, and yet this is the way of it, with encyclopedia editing. I do not recall any day which has left me with more answers than questions. I imagine it will be ever thus, as fact-weary editors come to exploit the new technology, and search for fresh ways of finding structure in the *kuklos pedia*, the circle of learning.

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