

on the walls of cavities, but they are of hydrothermal origin (hot mineralizing solutions). The well-known 'stalactitic' rhodochrosite, also included in the book, is a familiar example in mineral collections. There may be a grey area, for the authors write (p. 83) that 'The presence of hematite is usually an indicator of past hydrothermal conditions in a cave. Such an origin explains . . . hematite in Tyuya-Muyun Cave . . .', but once such an origin is admitted, there seems to be no dividing line between such caves and hydrothermal veins, which may often have been deposited in pre-existing cavities.

The authors seem, therefore, to have changed the rules as they went along. They might have done better either to have restricted themselves to cave minerals as closely defined, with a list of doubtful cases, or to have adopted a broader definition which would have allowed them legitimately to include the wide range of minerals covered by the book.

This somewhat detailed criticism need not deter speleologists from getting the book. It is well indexed, so that individual minerals are easily found despite the idiosyncrasies of arrangement, and excellently produced and illustrated, with a section of colour pictures. The mineral names are generally correct. It should be very useful for anyone wishing to study the occurrence and origin of carbonate and sulphate speleothems and follow up the specialized literature. There are occasional hiccups: for example, the captions to figures 70 and 71 are transposed. The very long list of references will form a starting point for anyone wishing to pursue the subject. Again there are a few inaccuracies, and our own friends the M.N.R.C. appear as the 'Mendip Nat. Resources Comm.' (p. 207).

The seventeen-page historical 'introduction' by T. R. Shaw is, in fact, not a history of the study of cave minerals, but an account of the history of ideas on the formation of speleothems. These were regarded by several early scholars as bearing on the nature and formation of matter itself, and hence have greater importance in the history of science than might be supposed.

References

- FORD, T. D. 1955. Blue john fluorspar. *Proc. Yorkshire Geol. Soc.* **30** (1), 35-60.
- FORD, T. D. SARJEANT, W. A. S. 1964. The "stalactitic" barytes of Derbyshire. *Proc. Yorkshire Geol. Soc.* **34** (4), 371-386.

MATTHEWS, P. G. (editor): *Australian karst index 1985*. Melbourne, Australian Speleological Federation Inc. [1986]. 492 pp., paperback, A4. Obtainable from Australian Speleological Federation Inc., P.O. Box 388, Broadway, NSW 2007, Australia, or from Peter G. Matthews, 66 Frogmore Crescent, Park Orchards, Victoria 3114, Australia. Price 35 Australian dollars: plus package and posting 8 dollars surface mail, 17 dollars surface airlift, 30 dollars airmail; Mastercard, Visa accepted; for cheques add 2 dollars.

(reviewed by J. Wilcock)

This weighty volume is the product of 15 years work by the Australian Speleological Federation, and in particular by Peter Matthews, present Chairman of the UIS Commission on Informatics, and Convenor of the ASF Documentation Commission. It is important not only as a record of Australian caves, but as a basis for discussion of the value of computer techniques in speleological documentation. The 1985 *Karst Index* is an update

of the 1968 *Speleo Handbook*, and is now a computerized data base of 6,639 karst features, including 4,825 caves, the remainder being sinks, risings, dolines, towers and multiple cave entrances. The caves are grouped by federal state, and within each state by karst regions. For each cave there is a unique reference number (based on federal state, karst region and type), and a short computer-generated description, including brief details such as the approximate entrance location, potential for exploration, pitch lengths, published surveys and bibliography. Cave surveys and maps are also given a unique reference number based on federal state, karst region and club. There are alphabetical lists by map reference number, by cave name and by author. There are 21 caves longer than 3 km (the longest 16 km), and 50 caves deeper than 100 m (the deepest 373 m); the 'rank' numberings given to these seem unusual, e.g. after two caves ranked third equal, it would be more usual to continue with rank 5.

The index is not intended as a guide book—the computer listing is of course somewhat boring visually, and there are no photographs or surveys included to relieve the tedium. It is a reference work for Australian cavers and those visiting Australia, chiefly to indicate further caving potential, but it should also be of some use to international cave documentation synthesizers. Although surveys are not included, they may be requested from the relevant ASF member clubs, names and addresses of which are supplied. We may note that the work was financed by a grant of 14,000 Australian dollars from the Australian government (is this a precedent for a similar British exercise?), but that beyond this the data base is intended to be self-supporting financially, with the costs being recovered principally from the sale of the book, with minor income from direct use of the data base or the supply of machine-readable data or computer printouts. Although it has taken 15 years to produce, this was simply a request for the supply of all existing data, not a project to document all the caves in Australia.

However, for general readers the most important sections are the accompanying papers which describe the general philosophy of the documentation, the Karst Index System summary, and ASF documentation standards (including terminology, cave naming, cave numbering, map numbering and survey techniques) required before a cave is entered in the index. Whether the complete work is cost-effective for non-Australian cavers is doubtful, but the accompanying documentation standards, descriptions of the computer system, and reference number systems are very important, and it might have been appropriate to publish the material in two volumes, a slim synthesis and documentation standard document, and a thick computer listing, this latter perhaps also available on microfiche.

As a computer professional, a major item of interest to me was the description of the computer implementation of the database. Data entry is the key operation, being based on forms supplied by cavers (NB cave descriptions are isolated from trip summaries, which are more appropriate to club journals; the facts about each cave can then be filed together, rather than being buried almost irretrievably among colloquial descriptions of trips). The data is checked for national consistency (e.g. correct spelling of names and terms) and then entered by skilled data preparation operators. Some data compression has been employed by storing terms as integers, rather than as strings of characters. A free-format system is used so that irrelevant or missing data need not be recorded; even with the consequent overhead of keys, compression to about 14% of the original text is achieved, or to about 8% if common fields for caves from the same karst region are suppressed. However, if further bit storage had been employed, reduction to about 3%

of the original could probably have been achieved (my comment). Of course, a compressed system requires coding of data (this is achieved by use of a check-list form containing all the possible codes) and the data base cannot then be read by the casual user. For output the computer executes the reverse process, replacing the codes by the original terms. This results in a somewhat stylized form of English, at worst just a list of the terms; but by judicious use of conjunctions and keywords the result is perfectly legible. We may note that the output may be in a language other than English, for this only requires replacement of the codes by the foreign language terms, so that summaries in say, French, German, Spanish, Italian and Russian could be produced easily, given a printer with the required typefaces. But note that this is not an intelligent machine-translation system, only a keyword replacement system; any comments included in the data base in free English text remain in English in the foreign language output.

It is indeed sad that the doyen of Australian caving, Joe Jennings, did not live to see this finished work; his glossary of cave and karst terminology (first published in 1979) also appears in the book.

I found the section on naming caves and cave features pretentious. Obviously the Australian character has contributed more than the usual share of colloquial, humorous, obscure, eponymous or trivial names: perhaps there is reason to complain (examples are caves named after politicians, 'A Touch of Class', 'Beer Bottle Cave', 'Big Hole'. 'I'm Stuck', 'Sementite', 'Sharlands Organ' and the usual collection of Tolkien names), but I can imagine the reactions of the average group of Australian cavers over their tubes of Fosters to this pontificating.

The sections by Peter Matthews on the standards for the cave, karst feature, survey and map numbering codes are most instructive: such numbering schemes would be applicable to any geographical features requiring data base cataloguing, e.g. they could be adapted easily to archaeological, geological, hydrological, geomorphological and other scientific sites.

Finally, the section on the ASF cave survey and map standards is particularly worth while: we may note that there is a much wider range of symbols than the set recommended currently by BCRA, and there are some significant differences. I felt that other papers could have been included with advantage, perhaps syntheses of Australian cave flora and fauna, speleogenesis, hydrology, geology and geomorphology.

These comments are intended to be minor criticisms only. This is a remarkable achievement in documentation, one which British cavers would do well to copy. The standard of the written papers is high, the layout is attractive and the standard of printing is good. The *Australian Karst Index* is a credit to the thoroughness and persistence of its contributors, and particularly of Peter Matthews.

RUTTER, N. W. (ed.): *Dating methods of Pleistocene deposits and their problems*. Reprint Series of the Geological Association of Canada, no. 2, 1985, 96 pp. Obtainable from GAC Publications, 111 Peter Street, Suite 509, Toronto M5V 2H1, Canada. Price \$15 + \$3 postage & packing. (reviewed by T. C. Atkinson)

One of the minor growth industries of the past 25 years has been the invention and development of new methods for measuring the age of archaeological and geological specimens. Radiocarbon dating was the first,