THE NSS BULLETIN
QUARTERLY JOURNAL
OF THE
NATIONAL SPELEOLOGICAL SOCIETY

VOLUME 41 APRIL 1970 NUMBER 2

CAVE MAP SYMBOLS

NSS Standard Cave Map Symbols. 1976
Contents

NSS Standard Map Symbols, 1976 .............. NSS Section on Cave Geology and Geography 33

Cover Drawing: Cave features symbolized (Bob Thrun).

MANAGING EDITOR
James Hedges
Big Cove Tannery
Pennsylvania 17212

CONSERVATION EDITOR
Thomas Lera
5550 Amesbury Dr., Apt. 2103
Dallas, Texas 75206

LIFE SCIENCES EDITOR
Francis G. Howarth
Bernice P. Bishop Museum
Box 6037
Honolulu, Haw. 96818

SOCIAL SCIENCES EDITOR
Stuart Sprague
School of Social Sciences, UPO 846
Morehead State University
Morehead, Ky. 40351

EXPLORATION EDITOR
Barry F. Beck
Geology Department
Georgia Southwestern College
Americus, Ga. 31709

EARTH SCIENCES EDITOR
William B. White
Materials Research Laboratory
210 Engineering Science Building
The Pennsylvania State University
University Park, Pa. 16802

ANTHROPOLOGY EDITOR
Maxine Haldeman-Kleindienst
162 Beechwood Avenue
Willowdale, Ontario
Canada M2L 1K1

OFFICE ADDRESS
National Speleological Society
Cave Avenue
Huntsville, Alabama 35810

The NSS Bulletin is published quarterly, in January, April, July, and October. Material to be included in a given number must be received at least 90 days prior to the first of the month in which publication is desired. The subscription rate in effect 1 August 1975: $10.00 per year.

Discussion of papers published in the Bulletin is invited. Discussion should be 2,000 words or less in length, with not more than 3 illustrations. Discussions should be forwarded to the appropriate editor within three months of publication of the original paper.

The photocopying or reproduction or recording by any electrical or mechanical process of more than two pages of any issue of this journal still in print is a violation of copyright. Requests to purchase back numbers will be speedily fulfilled.

Copyright © 1979 by the National Speleological Society, Inc.

Entered as second-class matter at Huntsville, Alabama and at additional mailing offices.

Printing and Typography by
Adobe Press
Albuquerque, New Mexico
THE 1976 NSS STANDARD MAP SYMBOLS

Standing Committee on Cave Map Symbols*
NSS Section on Cave Geology and Geography

INTRODUCTION

Cave Maps are the basic documents of speleology. An adequate map shows not only the widths and trends of the passages. It contains, also, the location of the cave, directions for reaching it, a geological summary, an outline of hydrology and meteorology, data on biota and their ecology, notes on history, an indication of the scenic value of the cave, and advice on the skills and equipment required to explore it. In short, the map must be a concise, encyclopaedic form of printed maps, must be communicated through time as well as across space. Effective communication depends upon symbols the definitions of which are uniform throughout the world and unchanging through time. Neologisms should be introduced only when needed to express new concepts or to record new perceptions; in no case, should new symbols conflict with those previously adopted. Individuality is preferred in layout, draughting, and lettering: it must be foreseen absolutely in regard to the symbols used in the map, in order to protect the primary information-transfer function of the map.

Maps intended for permanent reference should be surveyed to CRG Grade SB, Level 2 standards (or higher) and published at a scale of not less than 1:240. Such a map, sometimes called an “Accurate Outline Survey,” shows all of the passages in their proper (compensated) trends, widths, slopes, and interrelationships. It is a skeleton, only, but will serve as a reliable base to which specialists may later add their own data. Maps drawn from less precise surveys or published at smaller scales must be regarded as special-purpose maps and usually are wasted effort. They cannot meet the needs of specialists and will have to be done over in the future.

Cave cartographers, like other information specialists, are severely handicapped if limited to only a small vocabulary of symbols with which to formulate and to express their ideas. A complex care can no more be represented by a dozen symbols than Basic English can accurately convey the nuances of Shakespeare. Twenty-nine of the most-often used symbols are presented separately on pages 36 and 37 as a vocabulary of “basic cave map symbols,” but they are meant as an aid to beginning cavers, just as a pocket dictionary is meant for beginning language students. Cave cartographers cannot conceptualize and execute highly informative maps until they acquire a large vocabulary of symbols.

The 19 panels of 1976 NSS Standard Map Symbols which follow are largely compatible with lists of symbols published by AMCS, CRF, MSS, and other active mapping organizations in the United States. The Committee has obtained lists of symbols published elsewhere in the Americas, in Europe, and in the Near East; the NSS symbols are in many cases compatible with these symbols, also. We have made a deliberate attempt to achieve uniformity with the symbols proposed by the Union Internationale de Spéléologie1, but this has been neglected in a few cases (viz., “breakdown”) where other symbols are so deeply ingrained in North American usage that attempts to change them would be futile.

PRESENTATION

Once a map has been surveyed, draughted, and field-checked, it becomes the pleasure of the cartographer to render the data in a clear, concise, and attractive fashion. The cave cartographer should entertain a passion for his work, but altogether too many maps reveal a love that languished. They are poorly laid out, hastily executed, and unequal to their calling.

The style in which a map is drawn is a matter of personal choice. All symbols proposed in this report remain clear and unambiguous, regardless of the materials and techniques used. A computer print-out can be as satisfying as an ornately hand-crafted map, providing that it is sufficiently detailed, has an open and legible construction, and is pleasing to behold. There is no conflict between utility and art; there are conflicts both between haste and utility and between haste and art.

The pencil layout and inking of each panel of map symbols in this report involved about 4 hours of work. No cave map should be attempted in less time, not even the smallest. We hope that the recently instituted annual NSS Cave Map Salon will encourage more careful work by cave cartographers.

Most care cartographers, especially inexperienced ones, would be well advised to use guides and adhesive transfers rather than pen-and-ink. Good map design can partially compensate for the rigidities of draughting aids, and professional-appearing work can be produced after a few hours of practice. However, all serious cartographers should consider that pen-and-ink methods, once learned, are the cheapest, quickest, and most versatile of all. The most complex maps can be executed on an ordinary table with only a few dollars worth of pens, a style book, and a bottle of ink. Symbols and lettering can be easily adapted to the scale of the map and to the space available if done free-hand, but require a large investment in materials if done with guides and transfers.

The reader may consult Brod (1962), Hedges (1975-76), and Hosley (1971) for extended discussions of cartographic philosophy and techniques. The Geographical Institute of the University of Wroclaw (Poland) offers an MA program in cave mapping.

THE STANDARD MAP SYMBOLS

The 1976 NSS Standard Map Symbols were adopted by the Board of Governors on 2 July 1976. They may be freely copied by anyone for non-profit use and should be distributed as widely as possible. Maps newly draughted for publication in The NSS Bulletin should follow the 1976 NSS Standard Map Symbols; they may not include symbols conflicting with these. Older maps can be published as originally drawn.

* James Hedges, Bill Russell, Bob Thrun, William B. White

1 The latest UIS report on map symbols, “Signes Spéléologiques Conventionnels” by Fabre and Audoin, is available for 25F (postpaid) from: CERGA, B.P. 5060, 34033 Montpellier Cedex, France. Bank foreign-exchange fees are roughly four times the cost of the publication, however. We recommend that it be obtained from Tony Oldham (Rhyndwyer, Cynonych, Dyfed SA41 3RB, U.K.) or another bookseller who will accept payment in dollars.
Twenty-nine of the most frequently used

**Basic Cave Map Symbols**

from the

NSS Standard Map Symbols, 1976

**Passage Features**

- entrance
- passage
- sketched passage
- underlying passage
- ceiling height
- slope
- pit
- dome
- floor ledge
- ceiling ledge

**Speleothems**

- stalagmite
- stalactite
- small column
- large column
- soda straws
- flowstone
- rimstone dam

**Floor Materials**

- bedrock
- clay or silt
- sand
- gravel or cobbles
- small breakdown
- large breakdown

**Miscellaneous**

- cross section
- stream
- water
- survey station
- elevation above datum
- elevation below datum
PASSAGES

Entrance

Drip line

Passage

Vertical entrance, depth

Cross section

Pillar (bedrock)

Underlying and overlying passages

Unmapped passage

Slope

Measured slope

Vertical drop, depth

Artificial floor ledge, height

Ceiling ledge, height

Passage height (air-filled)

Water depth

Artificially enlarged passage

Change in grade of survey
**SPELEOTHEMS**

- **Large stalagmite (peak)**
- **Stalagmites present**
- **Stalagmite with stalactites**
- **Stalactite over stalagmite**
- **Large stalactite**
- **Stalactites present**
- **Column** (only narrowest part is black)
- **Columns present**
- **Stalactiflora / stalagmiflora**

**Traversine blockade**

- **Alluvial blockade**
- **Breakdown blockade**
- **Vegetal debris blockade**
- **Detrital fill blockade**
- **Continues, low**
- **Continues, narrow**
- **Indeterminate wall**
- **Floor elevation ± datum**
- **Strike and dip**

Dashed line shows limit of exploration.
SPELEOGENS

Bedrock floor

Joint-controlled cavity

Natural bridge (bedrock)

Ceiling channel/floor slot

Scallops specify form and flow

Anastomoses

Vertical shaft

Pit

Dome

Echinoliths

Splash cups or drill holes

Mud cracks
HYDROLOGY

Intermittent stream

Small stream

Large stream

Conjectural stream

Intermittent lake

Lake, with depth

Small rapids

Large rapids

Waterfall

Submerged ceiling

Intermittent sump

Sump

Fluctuating lake

Resurgence perennial/seasonal

Sink

Diffuse sink
Water, pure/unsafe

Wall seepage

Roof seepage

Current velocity

Lowest known discharge

name units of measurement

Highest known discharge

pH

Water temperature

GREEN PLANTS

MOLD

FUNGI

SEEDLINGS

ROOTS
ACKNOWLEDGEMENTS

While this report lists four people as "authors," our "work" consisted largely of collecting the ideas of others and arranging them neatly on paper. All of the persons listed below made substantial contributions to this report.

Juan José Aguirre (Grupo Espeleológico Vizcaíno), Maurice Audétat (Société Suisse de Spéléologie), Roger Baroody (West Virginia Speleological Survey), John Bowles (Central College), Lang Brod (Missouri Speleology), Claude Chabert (Union Internationale de Spéléologie), Kenneth Christiansen (Grinnell College), Ray de Saussure (Cave Research Associates), Guilhem Fabre (Centre d'Études et de Recherches de la Géologie et de ses Applications), John Fish (McMaster University), Derek Ford (McMaster University), Gerry Forney (National Speleological Society), Richard Graham (Upsala College), William R. Halliday (Western Speleological Survey), Peter Hauer (American Spelean History Association), John Holsinger (Virginia Cave Survey), Paul Horick (Iowa Geological Survey), Bob Hosley (Natural Sciences Resource Studies Group), Dave Irwin (Cave Research Group of Great Britain), George Knudson (Luther College), Carl Kunath (Association for Mexican Cave Studies), Phil Lucas (West Virginia Association for Cave Studies), Marshall McKasick (State Archaeologist of Iowa), Larry Matthews (Tennessee Cave Survey), James F. Quinlan (Mammoth Cave National Park), Richard Schreiber (USAF), Holmes Semken, Jr. (University of Iowa), A. Richard Smith (Texas Speleological Survey), Otakar Stelcl (Geograficky Ustav, CSAV), Antony Sutcliffe (William Pengelly Cave Studies Trust), Glen Thompson (Elizabethtown College), Bill Torode (National Speleological Society Library), Hubert Trimmell (Bibliographie für Speläologie), Franco Urbani P. (Universidad Central de Venezuela), Bill Varnedoe (Alabama Cave Survey), R.A. Watson (Cave Research Foundation), Thomas Wolfe (McMaster University), and Gregory Yokum (Missouri Speleological Survey).
BASIC REFERENCES


Hedges, James (1975-6) — Que es lo que debe Mostrar un Mapa de Cueva?: El Gudcharo 8-9:66-111.


SUPPLEMENTARY READINGS


Burckhardt, R.; P. Rysavy; M. Skoupy; and J. Vodicka (1951) — Speleokartografické Smernice: Ceskoslovensky Kras 4:67-78.

Cave Research Foundation (1966) — Flint Ridge Cave System Map Folio: Columbus, Cave Research Foundation, 34 sheets.


National Speleological Society
Cave Avenue
Huntsville, Alabama 35810