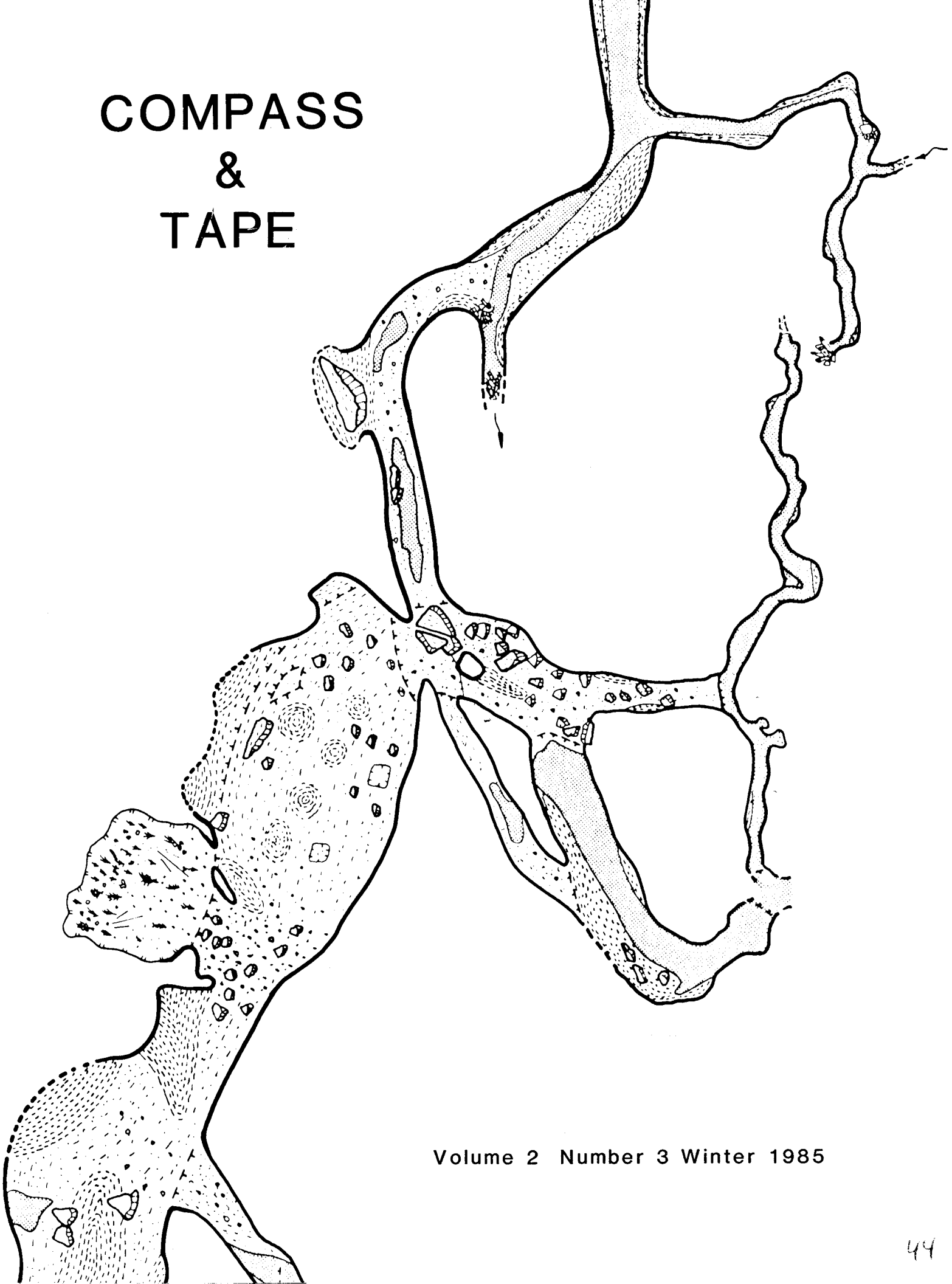
COMPASS & TAPE



Volume 2 Number 3 Winter 1985

COMPASS & TAPE Volume 2 Number 3

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COVER: Dickenson Cave, Todd County, Kentucky. Scale is about 50 feet per inch.

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The Uncharted Waters of Sea Cave Surveying

by Carol Vesely

Cavers with suntans are always suspect: after all, when most people think of caving, they think of spending hours underground in typical limestone caves. Very few cavers have ever been sea caving and even fewer have mapped sea caves. I am writing this article to let others know how interesting sea caving can be, and what things need to be considered in surveying sea caves, in the hopes of convincing those cavers who manage to get to the coast occasionally to try some sea cave mapping.

Although there must be thousands of sea caves along the west coast, there had been no large scale systematic survey of these caves before the formation of the Southern California Sea Cave Survey (SCSCS). The SCSCS was started by Dave Bunnell and me in 1981 for the purpose of exploring and mapping sea caves in Southern California. Originally a small group of cavers from So Cal Grotto, the group has since expanded to include cavers from the San Francisco area. Our caving region has also grown to include caves as far south as Baja, Mexico and north to Mendecino County, as well as the Channel Islands.

While I had always enjoyed surveying caves, after moving to California, I didn't feel I had enough to map. However, I must admit that I was somewhat skeptical when Dave suggested that we undertake a project of mapping sea caves. I figured the caves would be small, not very challenging, and the maps would be particularly boring due to a dearth of interesting features to portray. But since most of the other caves in California had already been surveyed, I decided to give it a try. With only a few references from CAVES OF CALIFORNIA, we visited our first sea cave, Caverns of Mystery, and I drew a rough sketch. When we began to realize how many sea caves there are, and just how big and varied they can get, we began to take our survey more seriously and developed mapping standards and new symbols and techniques to deal with the uncharted waters of sea caves. We have now surveyed more than 100 caves (33 of them over 100 meters long, with the longest at 374 meters), but there is much more to do.

Traversing the caves

There are a number of differences between surveying an average limestone cave and surveying sea caves. The first difficulty to contend with in sea caving is getting to and traversing the cave. While there are many sea caves that you can simply walk, rappel or climb into, the particularly tricky ones are those that require some sort of buoyancy device and careful

timing to avoid the full force of the waves. I imagine the closest comparison in limestone caving are river caves as in Mexico, but in sea caves the water is much less predictable. It is best to go at low tide and when the seas are calm, but waves can still catch you off guard and totally douse you and rip your gear from your hands. We've tried everything from boats to rafts to kayaks to inner tubes to boogie boards in search of the ultimate sea caving transportation. It depends on the cave, but boats and boogie boards are preferred.

Protection from the ocean

Because of the unpredictabilitu of the ocean and the detrimental effects of salt water it is necessary to protect yourself and your gear.

We use a survey tape with a loop of webbing tied onto the plastic casing of the tape. The loop is put over the head and shoulder so that the hands are free to brace against walls and rocks in the event of a large wave. Twice we have used other people's survey tapes which did not have the webbing loops and waves have ripped the tape from the surveyor's hands and carried it out to sea. Because of this possibility, it is useful to carry a second tape so that you can continue the survey. Luckily, in both cases we did have a second tape, but we were still out 20 bucks for a new one.

The same big wave that carried off the tape also escaped with Peter Bosted's glasses. Somehow Peter managed to sketch without them, but a "nerd strap" to hold your glasses on is advisable. Even the seemingly high and dry beaches in the backs of caves are not always safe, as Dave found out the hard way when a big wave crashed over his camera and tripod and washed away his flash unit sitting in his ammo box. Dave usually carries the instruments in his ammo box as well, although another way is attached to a string around your neck and then tucked in your wetsuit. This will protect them from being washed away or completely doused by an occasional wave, but is not sufficient for very wet caves which require swimming. In short, when sea caving it's best to make sure that nearly everything is securely attached to your body and not to underestimate the ocean.

I typically protect the survey book by placing it inside multiple plastic bags inside my pack when traversing the cave. The real danger occurs when you take the book out to survey. Since many sea caves are small enough to be viewed from one location, typically I find the safest, dryest spot from which to sketch. However, when you have your nose buried in yourbook,

waves tend to catch you by surprise. When caves are completely water-filled and it is necessary to boogie board, I find it easier to paddle along with the book encased in plastic bags and held between my teeth rather than try to take it in and out of my pack. This leaves my hands free and allows easier access to the book.

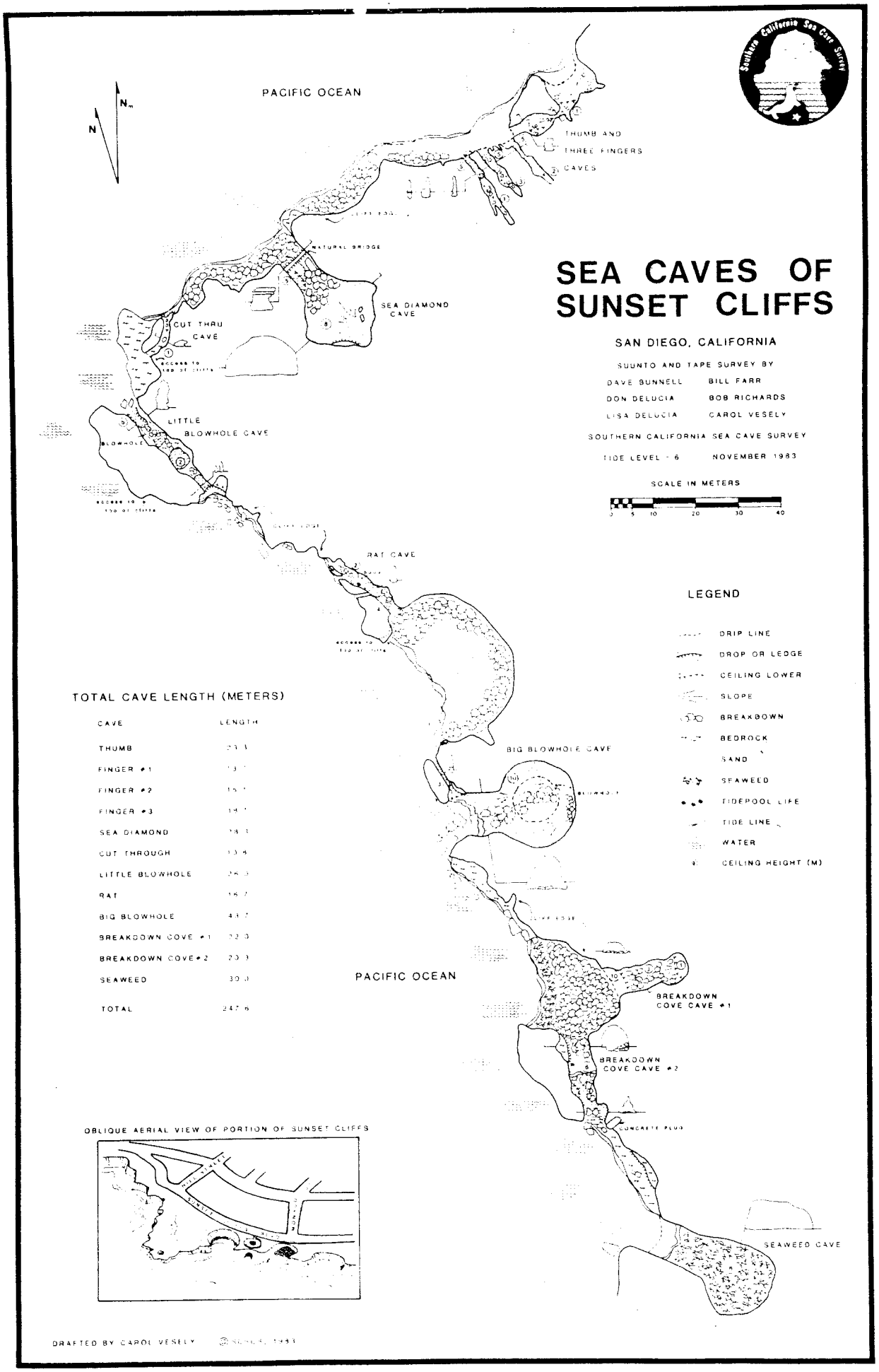
Surveying the caves

Many sea caves have multiple entrances and not all of the passages that you can fit through are traversable at all times. This can make surveying more difficult, although we typically try to plan trips at negative tides and when the sea is calm. Nevertheless, sometimes the tide is just too high or the ocean too rough for anyone to volunteer to take the tape through. In these cases, it is usually possible to survey to the beginning of the passage, take a compass reading looking out towards the ocean, then survey out another entrance and tie in the non-traversable entrance with a surface survey. When the map is plotted, the length of the untraversed passage is added to the total length of the cave. Although there are several divers in the SCSCS, so far we have not attempted any major surveys of underwater passages.

In surveying sea caves, inclinations are seldom needed, so often we just level the tape. This is usually easy enough, except in water-filled caves where incoming swells cause you to bob up and down several feet. It is possible to maintain a stable position by holding onto the wall, but if the waves are breaking this is the last place you want to be. It's best to make your shots quickly to minimize these problems.

It is important to note in your book what the tide level is when you survey the cave. If you aren't certain, you can write down the time and look it up in a tide chart later. The tide level can greatly affect your estimate of the amount of air-filled vs. water-filled passage (water depth and ceiling height) and is useful in determining whether or not the cave is traversable at high tide. The tide also dictates how much of the cave floor is visible for sketching. It is often possible to tell the average low tide level by the distribution of algae or other sea life on the walls. This can be noted on the sketch.

In sketching the cave I find it next to impossible to write anything legible while bobbing up and down in the surf. Once I tried sketching while clinging to my boogie board, and nearly lost my book, pencil and board all at the same time. It is possible to sketch from a boat or raft, but the best place is undoubtedly from shore. Fortunately, most sea caves are small but in large caves this really limits your view. I am working on my ability to carefully observe and remember passage details as I swim by. I note the shape of the passage on the way in, then draw what I remember, then carefully observe on my way out and make any needed corrections. While this is not ideal, it is better than risking your book by trying to sketch while swimming. Some


PACIFIC OCEAN
N
THUMB AND THREE FINGERS CAVES
NATURAL BRIDGE
SEA DIAMOND CAVE
CUT THRU CAVE
ACCESS TO TOP OF CLIFFS
LITTLE BLOWHOLE CAVE
BLOWHOLE
RAT CAVE
BIG BLOWHOLE CAVE
PACIFIC OCEAN
BREAKDOWN COVE CAVE #1
BREAKDOWN COVE CAVE #2
CONCRETE PLUG
SEAWEED CAVE
SEA CAVES OF SUNSET CLIFFS
SAN DIEGO, CALIFORNIA
SUUNTO AND TAPE SURVEY BY
DAVE BUNNELL BILL FARR
DON DELUCIA BOB RICHARDS
LISA DELUCIA CAROL VESELY
SOUTHERN CALIFORNIA SEA CAVE SURVEY
TIDE LEVEL - 6 NOVEMBER 1983
SCALE IN METERS
0 5 10 20 30 40
LEGEND
DRIP LINE
DROP OR LEDGE
CEILING LOWER
SLOPE
BREAKDOWN
BEDROCK
SAND
SEAWEED
TIDEPOOL LIFE
TIDE LINE
WATER
CEILING HEIGHT (M)
TOTAL CAVE LENGTH (METERS)
CAVE LENGTH
THUMB 23.3
FINGER #1 13.7
FINGER #2 15.7
FINGER #3 14.7
SEA DIAMOND 28.3
CUT THROUGH 13.6
LITTLE BLOWHOLE 26.3
RAT 16.7
BIG BLOWHOLE 41.7
BREAKDOWN COVE #1 22.3
BREAKDOWN COVE #2 23.3
SEAWEED 30.3
TOTAL 247.6
OBLIQUE AERIAL VIEW OF PORTION OF SUNSET CLIFFS
DRAFTED BY CAROL VESELY

items to note on the sketch include: tide pool life (e.g. anemonies, starfish, sea urchins, etc.), entrance drip line, cliff edges, masses of seaweed or driftwood, and possible fault lines. If you are doing a surface survey between caves, it is important not to neglect any features found outside the caves as well, since these details should be included on the final map. Because surveying outside the cave is easier than inside, there is a tendency to survey faster when outside. If your survey team is anxious to move on, a good trick is to call their attention to some interesting tide pool critter and suggest that they take a photo. This diversion gives you more time to sketch and avoids mutiny.

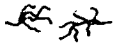
The largest sea cave we have surveyed thus far is Painted Cave, on Santa Cruz Island. Because this cave has been well-known for a long time, many estimates have been made of its height. People had speculated that it was anywhere from 100 to 200 feet high. We wanted to make sure that our survey was accurate. Ernie Garza came up with the ingenious idea of tieing a string to two helium filled balloons and releasing them to the ceiling to determine its true height. Because the only way to get to the cave was by boat, we were able to transport the balloons in their fully-inflated state. We had a few problems with breezes at the entrance, but by maneuvering the boat directly under the balloons we obtained a reasonably accurate reading of 130 feet. This was the only cave in which we took balloon readings of ceiling heights, but on a more recent trip we discovered a cave entrance larger than Painted Cave's. We may do a balloon measurement of this entrance on a future trip.

Drafting the map

Because sea caves contain features not found in limestone caves, Bob Richardson and I found it necessary to create some new map symbols. We use a small star or asterisk "*" to represent tide pool life in general, since anemonies, star fish, urchins, etc. are radially symetric. An irregularly branching, tree-like symbol is used to represent abundant seaweed. Water depths are displayed in small diamonds. Recently, Bob decided to represent cliff edges as a thick line with thinner "x" marks on the high side of the cliff. The drip line at cave entrances and tide line are also included on every map. (See table of map symbols and typical map included with this article.)

Some Sea Cave Symbols


Tide Pool Life


Seaweed


Tideline


Cliff Edge

Water Depth

Many individual sea caves tend to be relatively small: however they often occur in close proximity, sometimes along parallel joints or faults. To make the map more interesting and meaningful several caves can be included on the same map. This allows small features that would otherwise be unnoted or lost to be included in relation to the major caves. It also gives a more complete picture of an area. Thus if the caves are developed relatively close together we often do a surface survey between them. Although it is generally desirable to put neighboring caves on the same map it is important to consider the ratio between the average cave length and the distance between the caves before deciding whether one large map or several small maps are needed. If the caves are short compared to the distance between them , they will get lost on the map and you'll be left with only an outline of the coast. In this case an alternative way to show the relationship of caves to one another and the terrain is to include a small area map with the cave(s) marked on it as an insert on the main map. Because sea caves are not very threatened by vandalism there is little danger to showing their locations on an area map.

One dilemma we've encountered in surveying sea caves is determining their length. While some may argue that determining the length of sea caves is pointless or pompous, we nevertheless do enjoy keeping a list of long sea caves. To keep our length figures uniform we always begin surveying at the dripline. We also found radiating passages from a big room to be a problem when determining length, so we typically subtract any part of the survey distance that seems redundant (i.e. multiple shots across the room to the beginning of the passages). We've considered that volume might allow for more meaningful comparisons but havn't collected enough data to calculate this for most caves. Typically we include the cave length on all our maps.

I have included a map of the Sea Caves of Sunset Cliffs as an example with many of the features discussed in this article. I encourage anyone interested to try sea cave mapping if they happen to be in the neighborhood. Dave Bunnell and I eventually plan to publish a book on sea caves of southern California. We welcome any information on sea caves of anywhere for our files.

Why We Need To Grow

While I'm not generally a proponent of "bigger is better" views, the present state of the Survey & Cartography Section is an exception. Our present membership is about 150, which I think is quite good. However, our postage has just increased by 5¢ per piece. If we could increase our membership to 200, we would be able to get a non-profit permit and our postage cost would plummet to about 1/6 what it is now. This would allow the savings to be put into more pages and larger maps-- something that I think we would all like to see. The potential for growth is there: in reading newsletters from all over the US, I notice that less than 1 in 5 cavers who are reported to be mapping caves are members of SACS.

So I'm not asking anyone to do any "hard selling" of our Section and this newsletter- just show it to people to whom it may be of interest and encourage them to join us. We'll all benefit. And, please pay your dues with the envelope and form included in this issue. -- John Ganter.

Survey Reduction with the HP-15C

by Timothy H. Heaton

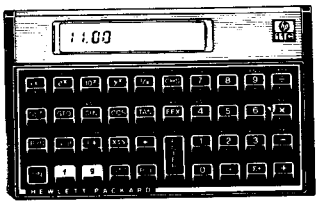
The HP-15C is a 5" by 3" by .5" calculator that can easily fit in a shirt pocket, but which has extensive capabilities and is widely used by scientists and students. It is available for about $100, which includes a large handbook de scribing in detail how to use the calculator. The program here described takes raw survey data and converts it to accumulated rectangular coordinates which allows survey points to be easily plotted on graph paper. The program allows for branches in the survey and will distribute closure error in single loops. It will also back up to the previous survey point
in case an error has been made.

For additional information about this program, or for a modified version which gives the distance along a chosen cross section angle in addition to the other coordinates (but at the expense of giving the station numbers), contact the author at the following address: Timothy H. Heaton, Museum of Comparitive Zoology, Harvard University, Cambridge, MA 02138.

▻ A complete listing of the program steps and thorough instruction on how to use the program may be obtained free on request from the Editor. (John Ganter, RD 3 Box 742, Bedford, PA 15522).

▻ Tom O'Holleran and Gordon Dayton presented a three part series on survey reduction with the larger HP-25 in the NITTANY GROTTO NEWS between 1979 and 1981. The specific issues are Vol 27:1 (Fall 1979), Vol 27:2,3,4 (Summer 1980), and Vol 28:3 (Spring 1981). The programs were designed for the HP-25, but the authors include extensive coverage of theory (particularly on loop closures), references, and examples of use. Copies of this series can be requested free from the Editor.

Another program for hand calculators was presented by Phil Lucas in THE WEST VIRGINIA CAVER, Volume 1: 1, Feb. 1983. Phil set up his TI (Texas Instruments) 59 with a "target program" to aid cavers in locating a specific point on the surface above Fountain Cave (VA), in the hopes of finding another entrance. If you'd like a copy of this, you'll have to contact that publication's editor, George Dasher, who happens to be our Secretary; my copy is barely legible--Ed.



Mapping the Tiny Cave

by George Veni

With all that has been written about the techniques, degree of detail , data manipulation, generation of lead lists and cartographic problems of surveying miles-long cave systems, I thought I'd address the issue of surveying the tiny cave.

First, how small is a "tiny cave?" In Texas (where I've done most of my surveying), a cave is defined as being any humanly enterable natural cavity that is 25 feet long or longer, or 15 feet deep or deeper, with no dimension of the entrance exceeding the cave's length or depth. Tiny caves are therefore, by my definition, any cave which barely meets the above criteria. They are usually less then 50 feet long or deep, but sometimes up to around 100 feet depending on total cave volume.

How do you survey tiny caves? The same as you survey a larger cave except you travel much lighter. Generally, only a flashlight is needed in addition to the survey gear, and sometimes a light is not needed at all. Packs and extra lights are unnecessary with daylight around the corner- besides, you just end up shoving them ahead of you or dragging them behind, and they usually obstruct the survey's line of sight. Sometimes a small pry bar is useful in pushing a lead, but most times you can find a rock at the dig site suitable for use as a tool. If not, the entrance is not far away.

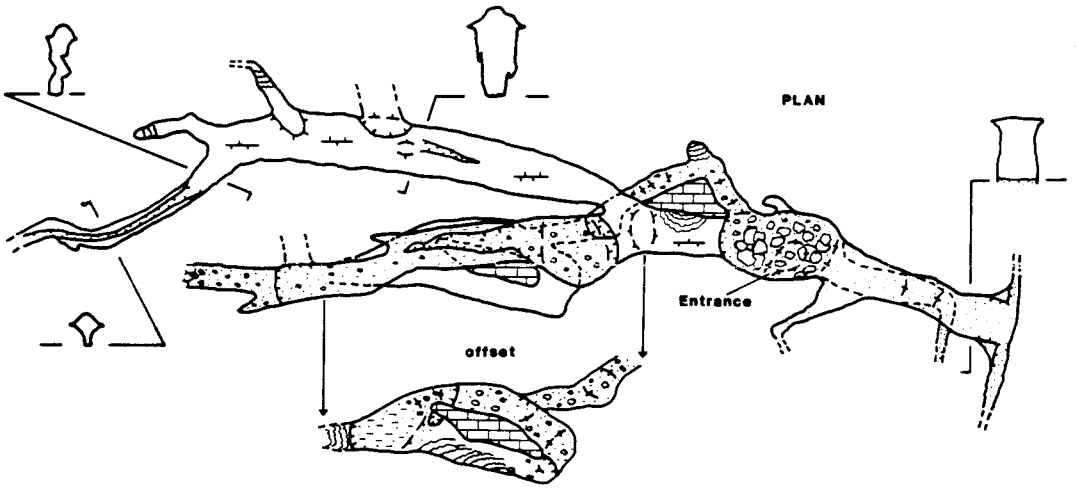
What the tiny cave requires, even more than a large cave, is persistence in pushing all its leads and potential leads. With a big cave there is the momentum of miles of known cave which pushes you to push. In the tiny cave, you have to supply your own drive and momentum. Don't be discouraged by lack of airflow- push on! You might only find 5 feet of new cave (if anything). but it IS a new discovery and thus worth the effort. The surveyor of the tiny cave must learn to appreciate each cave and passage for what it is and not scoff at it, or be disappointed because it doesn't compare to Central Kentucky or Mexico.

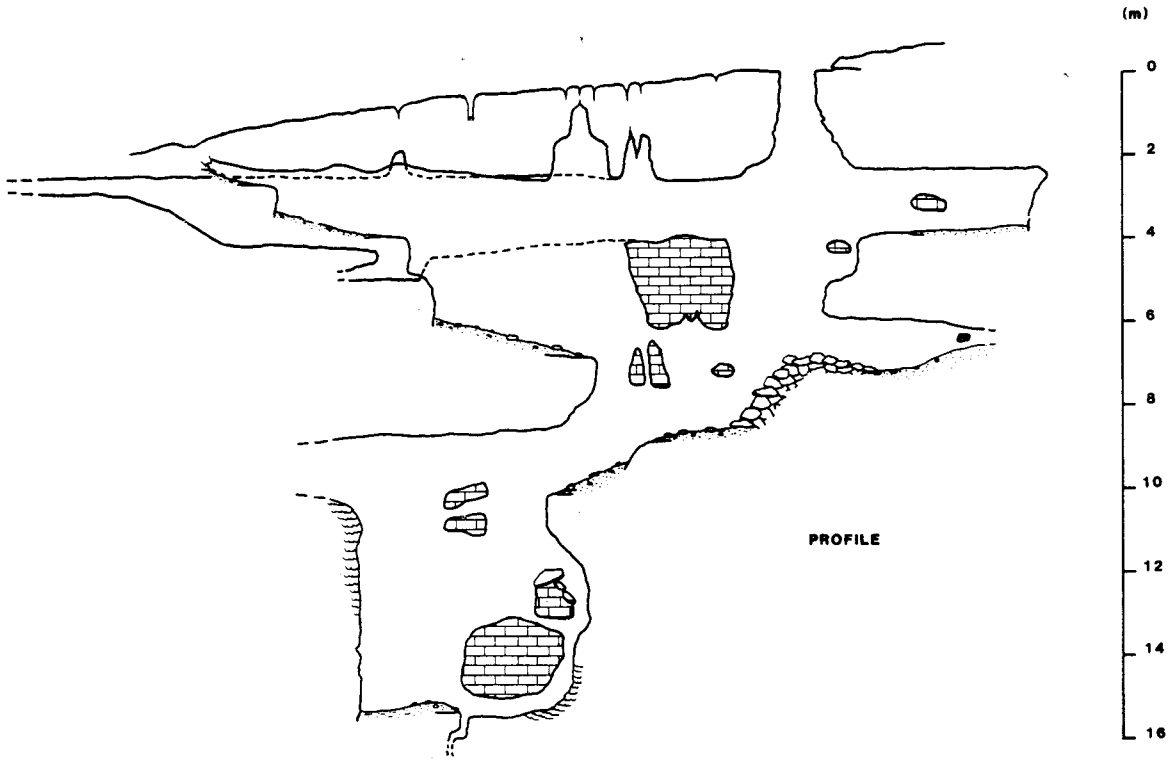
Lastly, the most common question is, "Why bother surveying the tiny cave?" "Because it's there." No, that's evading the question. Each surveyor must examine his or her motives for surveying. If one of the answers is to expand the speleological data base of a particular cave or karst region, then the tiny cave survey supports that end. A large cave will provide more information than a small one, yet many tiny caves can sometimes provide more insight into a region than a single large cave. I don't advocate ignoring large caves, but rather to pay more attention to small ones. Surveying tiny caves takes a little more time than just exploring them, and it may provide some critical information in finding that big cave system below.

KAMIKAZI CRICKET CAVE
BEXAR CO., TEXAS

Length: 80m Depth: 16m

Suunto & Tape Survey, 3 October 1984:
Duane Canny, Joe Ivy, George Veni (draft)





Medville's "Thoughts on Cave Mapping" was published in the Spring, 1984 C&T and later reprinted in ROCKY NOUNTAIN CAVING. Well-known Colorado caver Donald Davis airs his views on the subject...

A Rebuttle to Medville

by Donald Davis

Doug Medville's article promoting surveying as you explore puts his case well. Medville has the courtesy not to take a superior moral position and to let those who dislike surveying "go in peace and do their own thing." I'd like to speak for the viewpoint that puts exploration first.

Personally, I do dislike surveying. The slow pace bores me and keeps me wondering impatiently how much more I could be seeing if I could just keep moving. Also, I find it difficult and often frustrating to try to reduce a complex 3-dimensional void to a 2-dimensional paper representation, as well as to adjust to the remarkably variable standards and practices of different survey leaders. Nevertheless, I have at times involved myself in mapping-- sometimes through peer pressure, but also in cases where I thought a map would tell me something specific about a particular cave. But I am far from convinced that cavers should routinely and rigidly survey as they explore-- or necessarily survey at all.

Survey-as-you-go advocates often contemptuously call non-mapping exploration "scooping." This putdown suggests an insidious tendency to infuse a work ethic into caving-- an implicit assumption that we have, in some sense, a DUTY to survey caves. I see no good grounds for assuming such a duty, provided that we agree that caving itself is not done from a sense of obligation.

Why, in fact, should caves be surveyed? I can think of reasons in four general classes: (1) Esthetic; (2) Practical Orientation; (3) Management and related politics; (4) Science. How does each of these relate to "compulsory" surveying?

(1) Medville emphasizes the esthetic element; the pleasure taken in the surveying process and the creative satisfaction in the resulting map. These are strong for people of his affinities, but are very much matters of personal taste, and in no way justify the superior moral position often taken by other surveying advocates. (Medville, incidentally, likens the pleasure

of exploration accompanied by surveying to "a long slow screw." To me, a better sexual metaphor would be a long slow screw with a condom! The surveying procedure imposes a distracting barrier to focusing intensely on the cave itself.)

(2) In finding your way through caves, the utility of maps is obvious, but it is possible to do well in surprisingly complex caves without a formal survey. I routinely wear a military wrist-compass; using this and marking intersections with tempoary cairns where necessary, I have explored miles of intricate virgin cave, including much of Groaning, without having to survey to keep from getting lost. In the 1950's and 60's, using rough compass readings and estimated distances, I drew sketch maps from memory of Hubbard's and Spanish caves which were almost as useful as the later survey for route-finding and enormously easier to make. More accurate maps are certainly useful for determining the best areas to concentrate on for leads, bypasses, etc., but this is not important in the early phases of pushing a cave.

(3) Cave managers like to have maps of caves to define the "resource," and cave surveyors often take advantage of this to gain access to caves which would otherwise be closed to them. Yet, ironically, in managed caves large sections are sometimes omitted from maps given to visitors-- as at Fort Stanton and Horsethief Caves-- to protect closed areas, thus implicitly recognizing a negative side of mapping.

(4) Another impression promoted by cave surveyors, in their own interest, is that surveying is virtuous because it is scientific. Mapping does provide a vital base for much scientific work; yet-- as Cave Research Associates pointed out in CAVE NOTES more than 20 years ago-- surveying is, IN ITSELF only a rudimentary element of cave science, a mode of data collection which, in its raw form, yields nothing more scientific than comparisons for record lists. On the other hand, it is quite possible to do significant cave science-- to derive principles and explanations of phenomena-- with little or no reference to maps of specific caves.

The one aspect of caving in which we DO have a soundly established duty-- cave conservation-- is generally negatively affected by surveying. More or less obtrusive marks are inevitably left at stations (too many surveyors still consider it acceptable to leave smoke dots or other defacements), and sightings are often best made from places off the normal path, disturbing spots which would otherwise be left untouched. More important, when an area is mapped, the map usually spreads into

wide circulation, causing increased visitation and impact. Vulnerable features are likely to be best preserved if they are not mapped at all.

Finally, not all passages are equally worth visiting -- or surveying. Mapping while you explore works best in very large and long caves where surveying goes fast and where most passages that are entered will tell you something of substantial interest about the cave. This is much more true of Kentucky or Mexico than of Colorado. In the unpredictable and often small-scale mazes of Deep Creek, it is a waste of time to map into every lead, only to find most are slow, nasty, dead-end crawls or fissures. If this had been done in Groaning, we would still have seen only a small fraction of the main framework of the cave. My caving life isn't long enough to fritter away with such lack of discrimination.

A sensible compromise between surveying and not surveying is to scout ahead of the survey some distance to determine the most rewarding route to take. Better still is to learn an area through a few unencumbered exploration trips before deciding whether and where to map. And remember, there is no law, human or divine, that your caving must be reduced to paper to be worthwhile.

Good caving is like a dance, not a job, and not all of us want to dance in the same style.

Bill Storage

I agree almost totally with both Medville and Davis. I like to survey. I do most of my surveying with Doug and I like his style. His article well represents my tastes, but Davis accurately points out undeniable truths. That the caving society tries to convert the personal tastes of the majority into rules and ethics disturbs me, as it does Davis. Note that both cavers have avoided taking a superior moral position.

Face it. We have no duty to survey, to publish, or to conceal or divulge entrance locations. A ridiculous cartoon in the December, 1984 NSS NEWS depicted the "Cave Wizard" as saying that caving is a privilege, not a right. Bull. Who grants the privilege? Who makes the rules? (ed. note: The "Cave Wizard" hails from Texas: in those parts you are either granted this privilege by the rancher, jefe or presidente or you are in big trouble.)

Again I return to what you've heard me say before, i.e this country's founders had some good ideas that provide guidance. Things like the individual's rights, the government existing to secure these rights (not to rule men), and the idea of society not making claims on people's lives. Now look at these ideas in terms of the caving society. Here we are, the surveyors, telling the individual what HE OUGHT to do, because it's what WE LIKE.

(from a letter to John Ganter, December 1984)

Joe Saunders

I have a few comments in response to Don Davis' reply to Medville. First, Don displayed an embarrassing amount of egocentrism. Even though he notes that in Colorado "we have less new cave than cavers to see it," and "obligatory surveying greatly slows the speed of exploration," he fails to see that obligatory surveying is a fairly evenhanded way of rationing discovery, of distributing it to a greater number of individuals over a greater length of time. A philosophy of scooping serves mostly the scooper, and denies numerous others the pleasure of discovery of those passages. Don notes that his "caving life isn't long enough to fritter away," as if the enjoyment of caving will terminate upon his death.

Secondly, Don contends that it is quite possible to "do significant cave science" with little or no reference to maps. But I submit that the lack of documentation or the inability for others to verify such cave science will render it insignificant.

(from the February, 1985 D.C. SPELEOGRAPH, where the Medville/Davis articles were also reprinted.)

EDITORIAL: The Cart Salon

The annual NSS Cart Salon is a marvelous opportunity for cavers to study maps from far outside their geographical regions, and to see the maps critiqued and awarded. I feel that there are presently two problems which keep this event from being even more beneficial to the caving community.

The first is a lack of specific feedback from the judges to the entrants. A map either wins an award or it does not. Each cartographer needs to know SPECIFICALLY what the judges did or did not like about his or her map, as well as suggestions for improvement. This type of unbiased, constructive criticism is practiced constantly by professional cartographers, and is essential to producing maps that communicate effectively. How are we to make better maps if we do not know what is wrong with them? The judges do, interestingly enough, fill out a comment sheet on each map. These sheets are not being returned to entrants by the Salon Chairman.

The second problem is similar to the first: announcements of Salon winners are consistently late. This past year (1984), the situation was aggravated by the NSS NEWS editor losing the results, but I had to go to inordinate lengths to obtain results for publication in the Fall, 1984 C&T (back page.) The result of these delays is that the Cart Salon results appear long after those of the Graphic Arts and Photo Salons. Our event and it's winners are being denied the recognition they deserve.

We have the opportunity to make an even better Cart Salon and to benefit more from the evaluations and suggestions it produces. If you have an opinion on this matter, I suggest you convey it to Ernst Kastning, the Salon Chairman. ---John Ganter.

Ernst Kastning
Chairman, NSS Cartgraphic Salon
P.O. Box 575
Storrs, CT 06268
203-429-0849

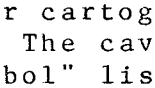
MAP REVIEWS

TOPOGRAPHIC MAP OF SKYDUSKY HOLLOW, Bland County, Virginia

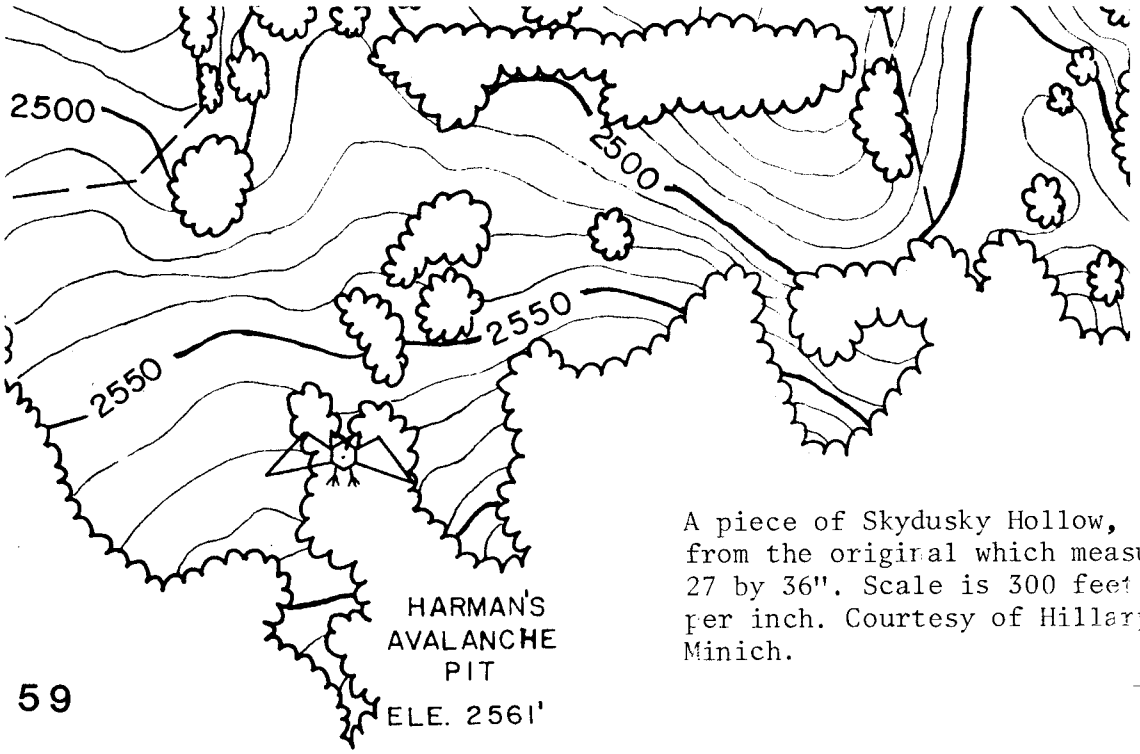
by Hillary Minich in THE TECH TROGLODYTE, Virginia Polytechnic Institute Grotto. Vol.24, Number 1; Fall, 1984. (VPI Grotto, Box 558, Blacksburg, VA 24060; no price stated.)

This impressive large scale topographic karst map is the result of Hillary Minich's dual interest in caves and Civil Engineering/Surveying. Skydusky Hollow,VA has about 8 major caves with close to 20 miles of combined passage. This map will eventually be used as a base for an overlay showing actual cave passage, but at present only topography, culture and cave entrances are shown.

Minich details the process by which she produced the map in her article: searching for aerial photography of the area, establishing horizontal and vertical control by ground surveying, and using a stereoplotter to actually make the topographic map. She has attempted to make this discussion understandable to the average caver, but this is probably an impossible task. To really understand the article one will have to do outside reading, but anyone can skim it and get some idea of the amount and complexity of work which goes into making a topographic map. The copy of the map with the article is of 8.5 by 11" size and thus completely illegible: conservation and landowner concerns are partially responsible for this.

The full-size version that I obtained reminds me of maps produced by contractors for highway and other planning agencies. There are a few minor cartographic slips, but in the end it's a good engineers map. The cave entrance  is definitely one for the "unusual symbol" list!

Overall, "Topographic Map of Skydusky Hollow" is a fine effort and Minich's article should be considered required reading by anyone considering a similar project. --- J. Ganter



A piece of Skydusky Hollow, from the original which measures 27 by 36". Scale is 300 feet per inch. Courtesy of Hillary Minich.

CAGLE CHASM COMPLEX Marion County, Tennessee

by John Smyre in SPELEONEWS, Nashville/Chattanooga Grottoes. Vol. 28:5, October, 1984. (Brad Neff, Editor, Rt. 2 Box 394, Lebanon, TN 37087. No price stated.)

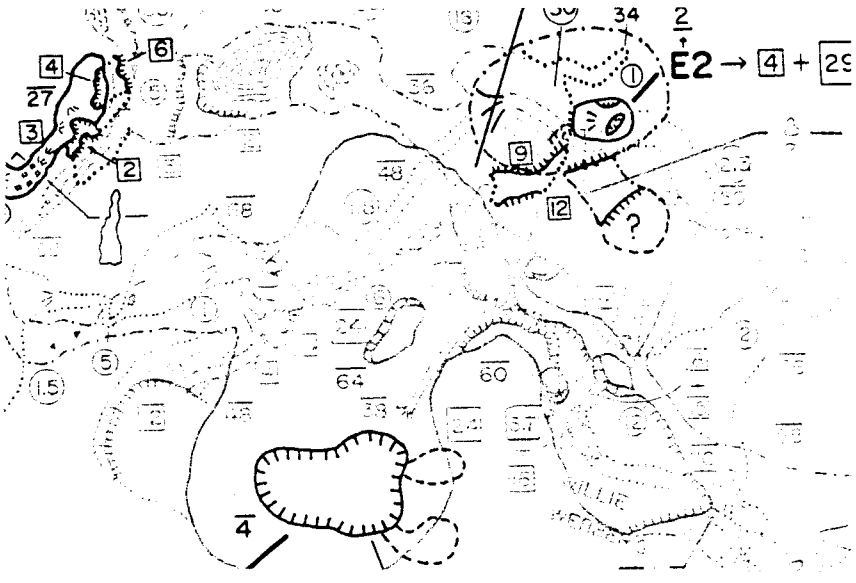
Color cave maps are something of a rarity due to their high reproduction cost and the difficulty of preparing them. John Smyre has given color a try in his map of Cagle Chasm, a well-known dome and pit complex in Tennessee. The map consists of two 11 by 17" foldouts showing plan and profile.

Smyre's idea was to differentiate elevations in the cave by the use of color, an idea which, unfortunately, does not work. The reason is that he has misinterpreted the problem to be solved. His premise is that we have trouble understanding Cagle Chasm in terms of the elevations of it's parts. His solution is thus to color code all of the information on the map (passage walls, numerical data, etc.) depending on its elevation. However, this information can be communicated quite readily with a simple profile IF passages can be differentiated. The problem in the case of Cagle Chasm is that the passages overly and intertwine to such an extent that they are very difficult to see as separate entities.

In designing his map, Smyre has, unfortunately, concentrated both on his color coding and an enormous amount of numerical information like drops and ceiling heights: the map looks like it's in a blizzard of data. Trying to trace the route of one passage is an exercise in frustration. While I find elevations and the like interesting, they do nothing unless the passages to which they refer are clear.

Smyre spent about $265 of his own money on 500 copies each of the plan and profile. This is very commendable and he discusses the reasons why in his accompanying article. He contends that present cartographic efforts need to be greatly increased in order to depict complex caves like Cagle Chasm. This is undoubtedly true, but more attention will have to be paid to conceptand design before we use exotic techniques like color.

--- J. Ganter



A piece of Cagle Chasm. Colors are red, green, blue and black. Scale is just under 40 feet per inch.

Cave Lists: Science or Pseudo-Science ?

by Raymond deSaussure

Cave after cave has been "collected" and added to a general list in the name of science. It is certainly time for science to question the actual benefit of these lists.

Speleologists increasingly recognize that such lists lead to damage and wreckage by the general public. Ten years ago, this concept of damage was completely alien. Ten years from now, these conservation principles will be firmly established by the present trend. Unfortunately, the damage will have then been done. Can we not act in advance for once, instead of having later regrets?

Too many persons incapable of original scientific work find an outlet and, at present, a fame of sorts in the indexing and publishing of cave lists. This is not to say that lists have not been published by serious workers. West Virginia, Virginia and Missouri, for example, have lists gathered by such workers. We may still question their effect on the caves. Many other lists appear to represent nothing more than a desire to rush into print. The serious worker should think twice about associating himself with these projects.

All of these general lists are open to criticism for their damage to cave sites. For every valid study on cave distribution or entrances, there are a dozen sites rendered unusable for geology, archeology, biology or other studies.

Today, these lists are often produced by public organizations using public funds to do a disservice to the public. Many of our state recreation and mineral departments fall into this category. Sometimes, through lack of knowledge or because of vociferous pushing, they are ill-advisedly pressured into spending excessive funds in the publication of damaging cave lists. Those same organizations would be well advised to consult directly with local specialists and museums on the advisability of publishing cave lists. The serious workers are not usually those clamoring for lists, especially if they have spent time studying caves and have seen the effect of vandalism.

Today in the US many cave lists are being compiled. These projects should be carefully re-examined for their actual, rather than claimed, scientific value.I firmly maintain that those of a general nature do not have enough advantages to outweigh their disadvantages. It is time that serious organizations and personnel raised a protest against the destruction of their field laboratories.

(from CAVE NOTES, Cave Research Associates, Nov/Dec 1960.)

Cartographic Salon

NSS Convention, Frankfort, Kentucky June 23-29, 1985

Once again, the time approaches when cave mappers from all over display their masterpieces and view the works of others. Entries can be brought to Convention on the first day or mailed directly to the Salon Chairman. A $1.00 entry fee is required for each map and the length of the cave should be indicated somewhere. A more detailed announcement should appear soon in the NSS NEWS. Also, see the Editorial this issue.

Ernst Kastning
Chairman, NSS Cartographic Salon
P.O. Box 575
Storrs, CT 06268
203-429-0849

SACS Session

If you would like to present a paper on any facet of cave surveying or cartography, please send an abstract soon to :

Paul Hill
SACS Session Chair
607 South 11th St.
Salt Lake City, UT 84102
801-582-4178

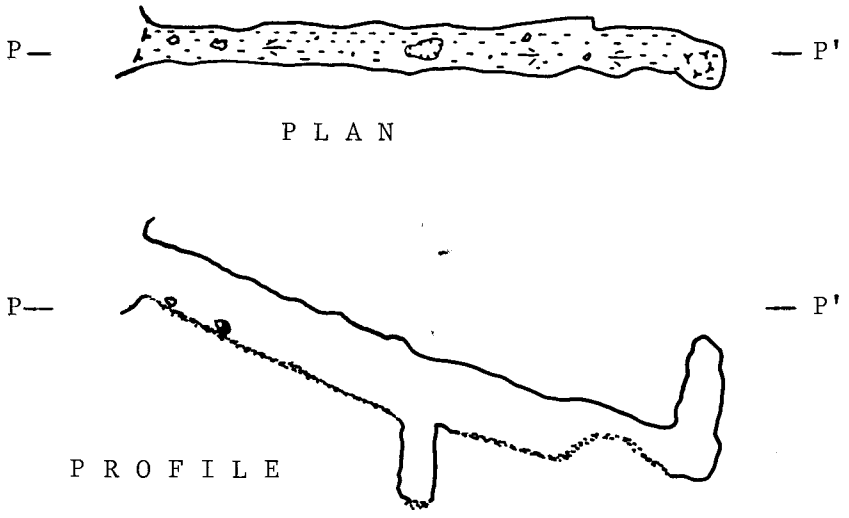
Suunto instruments (taped together back-to-back) carried in a Nalgene jar. This type of jar, sold by outdoors stores and also Forestry Suppliers, is made of polyethylene, but cracks and is not waterproof. Wrapping with duct tape and wrapping the instruments in rags helps to eliminate these problems, and absorb shock and leakage.

Drawing Profiles

by John Ganter

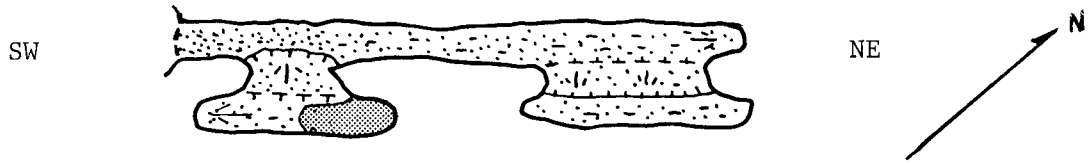
Caves are quite often complex three-dimensional spaces-- can we really expect to represent them adequately from one perspective or view? Many cave mappers seem to think that they can, or else they don't consider the question at all. Drawing one or more profile views takes extra time and effort, but in many cases it will be time well spent; the finished map will communicate considerably more information than a "plan only" view.

The first decision one must make is how to look at the cave. Study the plan view of the cave and the mental image that is in your brain. Consider how you can communicate the complex relationship that YOU know is there to other people. If the cave in question is essentially linear, a single side-view profile may be quite effective.



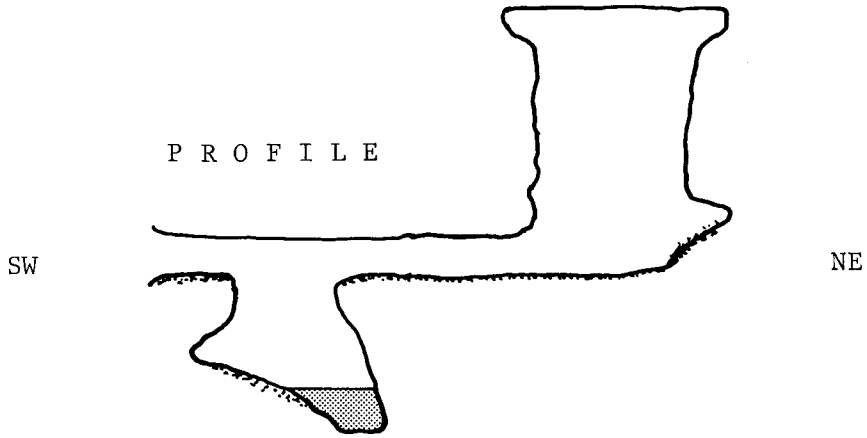
I call this an "axial profile", since it is along the long axis of the cave. Notice that in this and succeeding examples I'm using various means to show the map reader how he or she is looking at the profile. You can do this in any number of ways, but test it out on others to make sure that they understand what's going on. One practice which should be outlawed is running profile/cross section lines THROUGH the plan. This is completely unneccessary and it looks horrible.

Suppose you have an innocent looking plan like the one below; it looks like there are some drops and other odd vertical changes in there- would "billiard balls" or little squares with numbers in them help you to understand the cave? Perhaps.

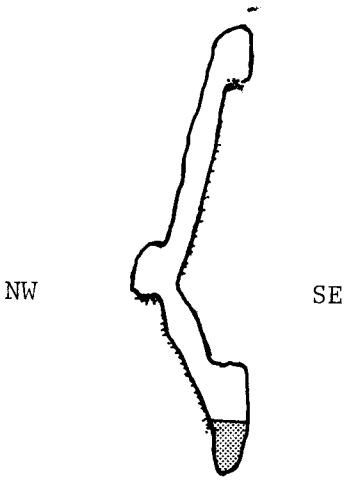


PLAN

Let's look at an axial profile:



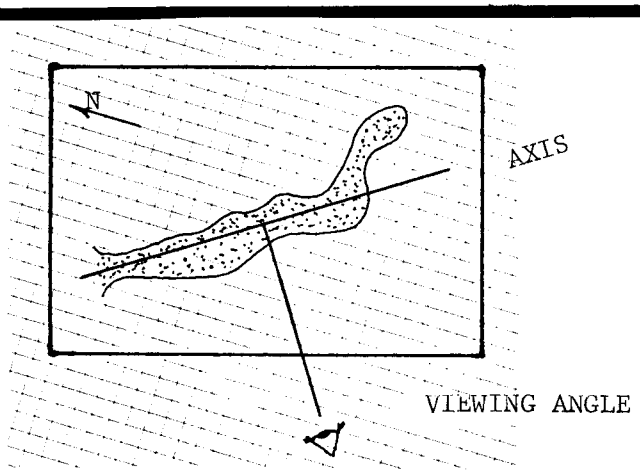
Look at that; a number of spatial relationships have just become tangible distances. Add what I call a "radial profile" (distances radiating from the axis) and still more information is displayed.



Distances and relationships which would often be left as numerical data or "local profiles" (cross sections), has now been expressed much more effectively. If you like, add numerical information but be wary of clutter and excess.

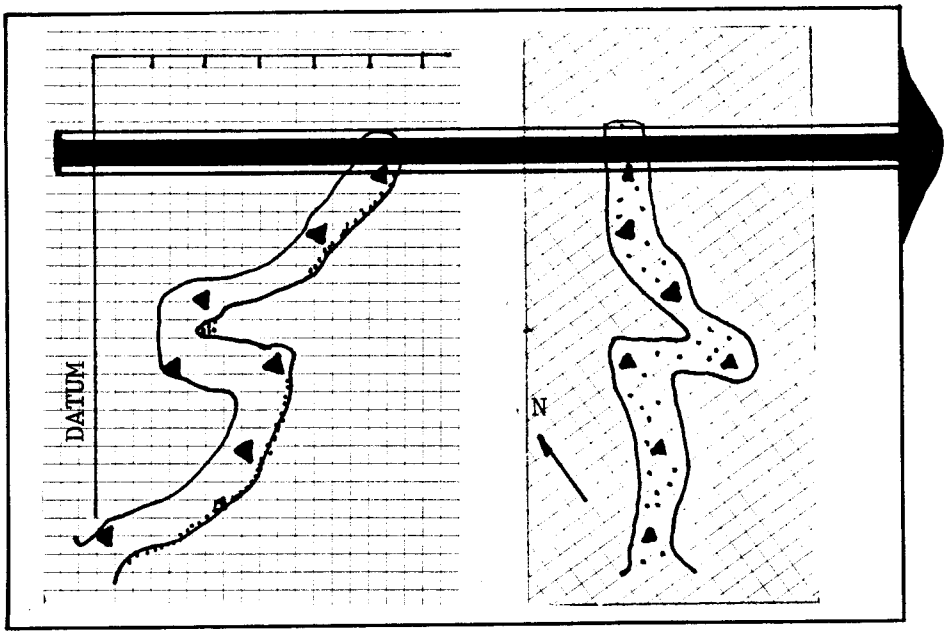
PROJECTING THE PROFILE

Assuming that you want to draw a profile, how do you go about it? The first step is to choose the axis of interest. Draw this axis as a light line on your draft copy, then use a triangle to make another line at right angles to it- this is your viewing angle. (Below)



Now, if you have access to a computer program like CMAP 13, ELLIPSE or SMAPS, just tell the machine which angle you want, the scale, and the rotation and let it do the work while you sit back and ponder the plan view, considering other possibilities.

Otherwise, get out your T-Square and reduced survey data. Align the axis so that it is parallel to the edge of your drafting surface, then simply use the T-Square to "project" the points of the plan onto the profile. The relative position (up or down) is determined from the station elevations in the reduced survey data.



PROFILE PLAN

When the stations are plotted, use your notes again to draw in the passage detail. (Incidentally, cave mappers who are really into profiles will often keep a plan AND profile sketch while in the cave; I'm trying to learn this, but it's not easy!) At this stage you will have to make many decisions on how to show obscured passages, drops parallel to the axis, etc. but that's what drawing maps is all about.

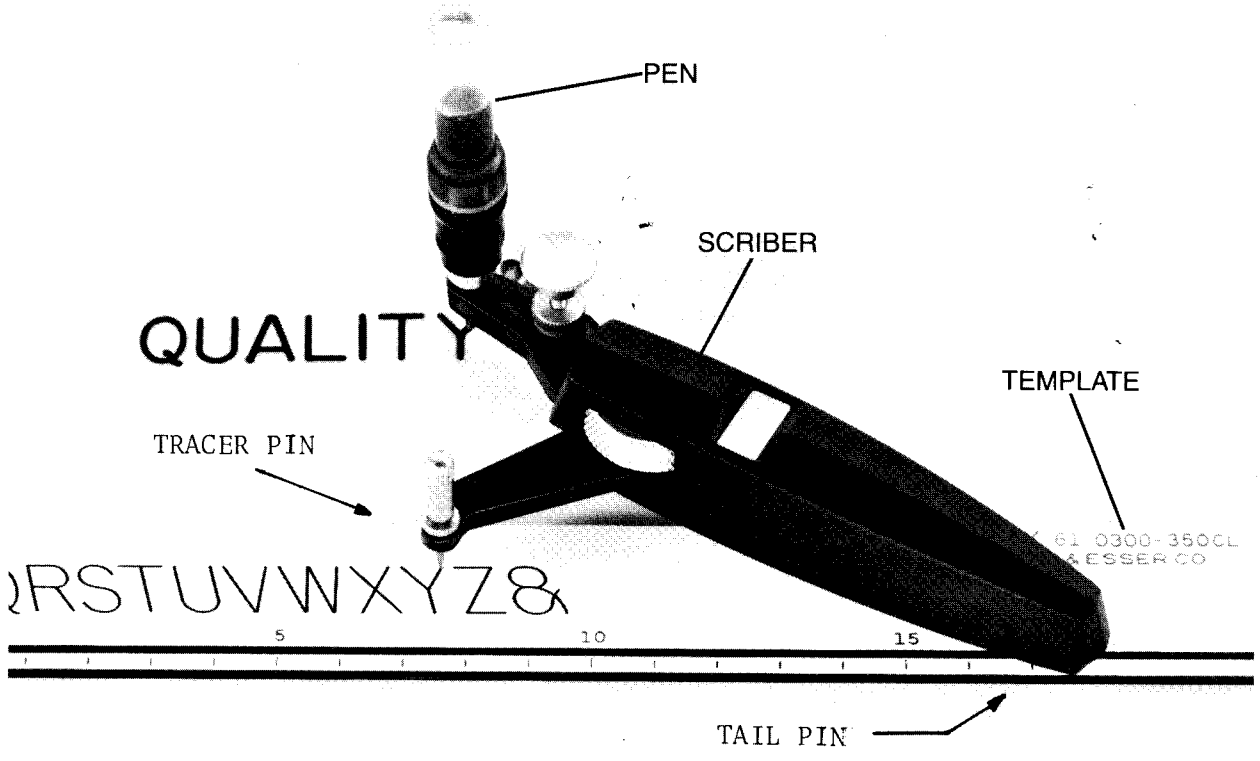
Now ask yourself and others; is the map communicating? You may wish to try profiles along other axes and test their effectiveness. With some practice I think you'll find profiles powerful and fun.

Remote-Template-Controlled Lettering

by John Ganter

This somewhat strange title refers to what is commonly called "Leroy" lettering. Since "Leroy" is a tradename of K&E (Keuffel & Esser Co.), and nearly identical equipment is sold by Koh-I-Noor, Alvin, Teledyne-Post, et al, I'll refer to it all as RTCL: Remote-Template-Controlled Lettering. It is CONTROLLED lettering in that the writing implement is guided to form characters. It is REMOTE-controlled lettering to differentiate it from templates where the implement is stuck THROUGH the template and supposedly guided around to form the characters. (I have never had much success with this approach and don't recommend it.)

The illustration below shows how RTCL works. The template is laid along a straightedge, and the scriber, fitted with a chosen pen, is set on the template. The "tail pin" of the scriber moves along a groove that runs the length of the template, while the "tracer pin" traces the outline of the character which is engraved deeply into the template.



With a little practice, this works quite well-- good-looking lettering is produced in relatively little time. By loosening a thumbscrew on the scriber, the arm holding the tracer pin can be adjusted to produce lettering slanted at any angle from vertical to 22 degrees off vertical. Other features are a finger-operated "kickstand" which keeps the pen up off the drafting surface when you're not using it, and another thumbscrew which adjusts the

height and pressure on the pen point. A good adjustable scriber will cost $25 to $30; cheaper non-adjustable models are also available.

Like everything, RTCL has its advantages and disadvantages. Some are:

ADVANTAGES

1) Don't break down or run out of tape.
2) Are never loaded with bad tape.
3) Are never closed when needed, asuming you own them.
4) Lettering is as durable as the other linework.
5) Small investment compared to KROY.
6) Nothing "perishable", i.e. ink can/should be cleaned from pens.
7) No backing material to show up on reproductions, hold dirt, etc.
8) Slant and boldness of letters is easily adjustable.
9) Widely used by engineers, architects, planners, geologists, etc.

DISADVANTAGES

1) Fairly large initial investment.
2) Trying different styles and sizes requires substantial investment.
3) "Standard" style is rather plain and readily identified as RTCL.
4) Spacing is not automatic like KROY.
5) Lettering can not be easily moved around and tried in different places.

AVAILABILITY AND COST

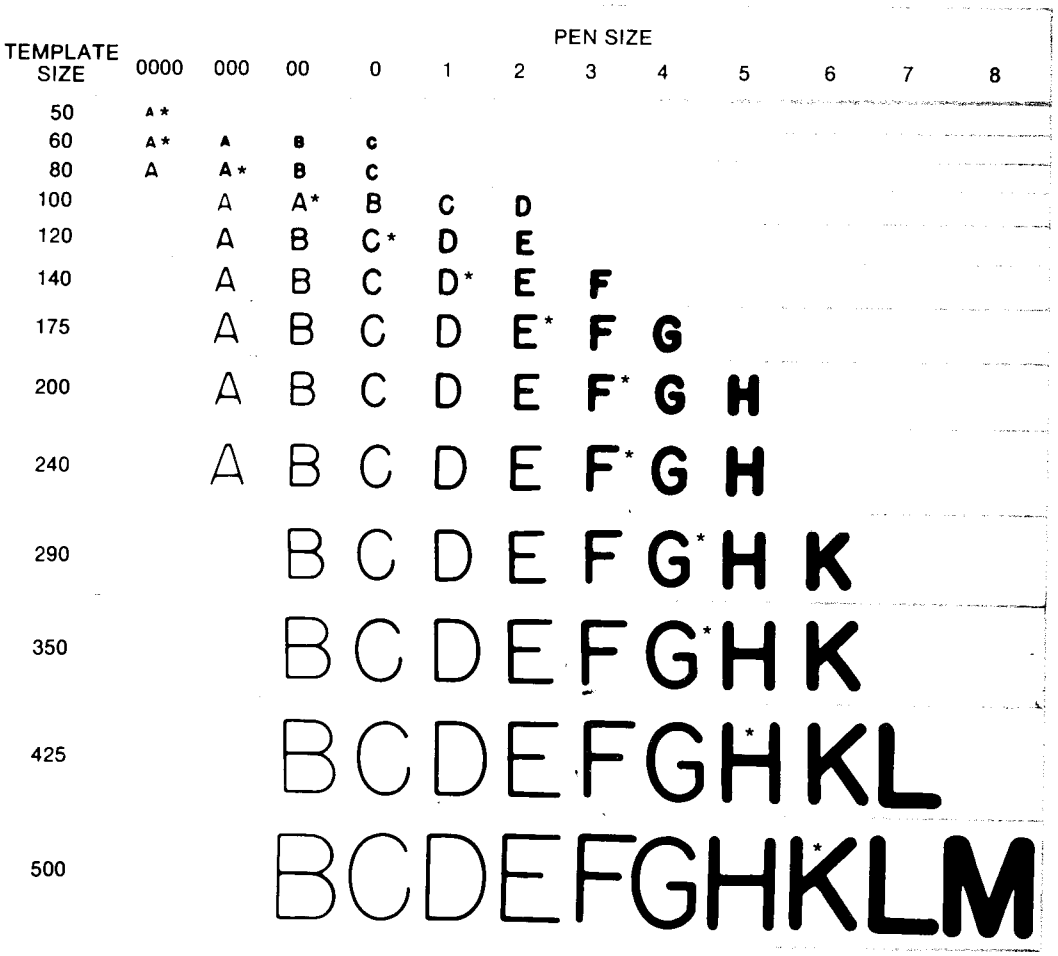
RTCL is used by a lot of people and this is one major advantage; you may be able to borrow a set or at least try one out. If you decide you like it, you'll have a system which is vastly better than hand lettering, although quite a bit more expensive.

I have three templates (CL 100, 140 and 240) and a scriber; this cost me about $70 from Forestry Suppliers. However, this investment effectively solved my need for newsletter-quality lettering. With a minimal investment in transfer letters, I can tackle larger projects, too. If you are concerned about cost, use tranfers for awhile; you can usually buy 10 sheets for the cost of one template.

STYLES & SIZES

The most common RTCL template is the plain "Modern" style, but there are others available on order from a distributor . Still, the process can't form letters like "Century Schoolbook", etc. which have serifs, and you're talking $15 to $20 per template. (Incidentally, if you can find a distributor with a showroom, you can often get a 15 to 30% discount off the price at

a retailer.) Special scribers are available which will shrink/expand letters, but these look like they would be a pain to use; I've never tried one. The "spacing scale" at the bottom of the template is a mystery to me; I just space by eye and erase (polyester film is a necessity of life) when I mess up. A "lead clutch" is available if you'd like to letter in pencil.



Light Medium Bold Demi-Bold

WEIGHT YOUR T-SQUARE

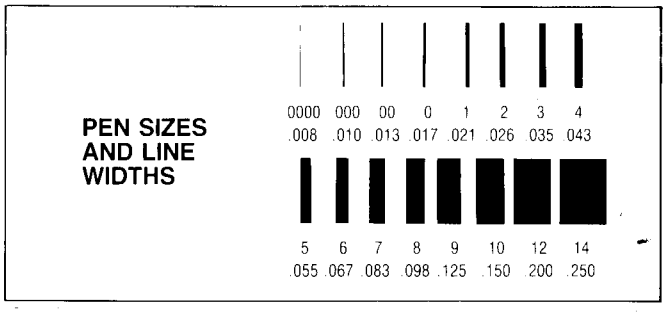
If you plan to do any amount of controlled lettering, you'll need a weight to place on your T-square to hold it still. I first became aware of this fact by watching students in a cart lab heft large "hockey pucks" of turned and polished steel rod around on glass light tables. Miraculously, none were ever dropped. I later made my own facsimile by pouring lead into a tuna can: the seams promptly melted and molten metal leaked over the stovetop,

but that's another story. You can try this, have a machinist turn you a "hockey puck", or buy a leather "shot bag" paper weight from K&E.

CONTROLLED LINES

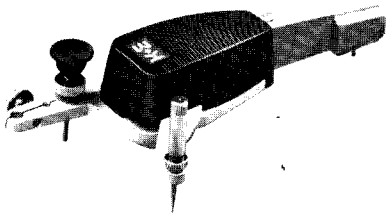
One of the handiest uses for a RTCL is in drawing smooth, curving lines, like passage walls or isolines (contours). Just stick the tracer pin in the "." hole, set the pen down on your drawing surface and smoothly glide the template along using both hands and your torso. This will greatly improve line quality and make line splices easier to perform. For long curves, a French or flexible curve will work better.

TIPS 1) Use clean pens.
2) If a letter looks bad, erase it and draw it over.
3) Templates under about CL 100 will become unreadable when reduced even slightly.



Relationship between Leroy Pen Size Number, size in inches and actual thickness or weight of line. Other brands are different.

(Illustrations are from K&E Leroy Advertising brochures)



Older style of Leroy Adjustable scriber. Produces letters slanted from 0 degrees which is vertical or Roman, to 22.5 degrees: Italic.

KROY

The address for KROY machines (made by 3M Company) is:
KROY National Telemarketing Center, Scottsdale Airpark, P.O. Box 5557, Scottsdale, AZ 85261. Toll-free: 1-800-328-5769. In AZ: 602-951-2000.

The Ultrapod

by Toni L. Williams

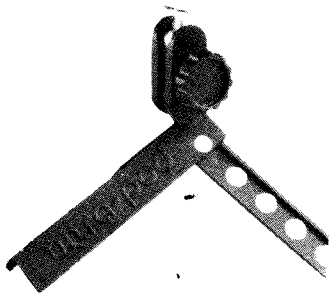
In the first issue of C&T there was a note asking about non-ferrous tripods. I knew of one, but had managed to lose mine on a trip, and wanted to wait til I had replaced it so I could test to be sure it really wasn't ferrous. Got a new one for Christmas and it really is non-magnetic.

As you can see from the enclosed description, the tripod is very small and light. That makes it nice for overburdened cavers and just great for crawlways, etc. Some people would undoubtedly prefer a taller item, but they could adapt it by just attaching longer legs. I havn't used this tripod for surveying yet because my compasses don't have tripod adapters, but I have used it for underground photography, and have been quite pleased. It's small enough to work in the little awkward places, and I've often set it on a rock, ledge, etc. where there was more room.

➪ Adapting a Suunto instrument to fit on a tripod should be a snap. Simply get a machinist (or anyone with a drill press) to drill a hole in the body on one side of the viewing tube, and tap it (i.e. put threads in) to the correct size and pitch. The instrument will then mount quickly and securely with no added bulk or weight. --Ed.

Our 2-oz. Ultrapod lets you shoot perfect time exposures and self portraits anywhere, without lugging a heavy tripod. Just unfold its 4" legs for sturdy shooting on rock, snow, or forest floor. Or fasten to ski pole or tree limb with the 12" Velcro® strap. Aluminum ball joint & nylon hinge adjust camera to any angle; turn of the knob locks it in. Fits any 35mm camera. 1X1½X4" folded

Ultrapod,™ No. 32-7214 ..... $9.95



Early Winters Ltd.
110 Prefontaine Place S.
Seattle, WA 98104

Surface shipping for 1 or 2 tripods: $2.95

INSTRUMENT REBUILDS

Suunto KB-14 Compass: $26.50 plus shipping (Plastic KB-20 not rebuildable)
Suunto Clinometer: $26.50 plus shipping

Sending $2.00 should cover shipping for one or two instruments. Rebuild means complete replacement of capsule and viewing lens. Questions? Call Mike Machost or Ann Bradshaw, Forestry Supplier's repair technicians, toll-free at 1-800-647-5368. A large, free catalog is available on request: this company sells everything from water testers and dissecting kits to survey tapes and theodolites. Their prices are usually a couple dollars under the Speleo-dealers.

Forestry Suppliers Inc. 205 West Rankin St. Jackson, MS 39204-0397

More Things To Buy

by John Ganter

RAINCHART MAP COATING: Need to keep maps whole under wet conditions while still being able to write on them? This coating may solve your problem. It is painted on, whereupon it soaks deep into the paper and dries. The map remains flexible, but has greatly increased wet strength. About $6.00 per pint, which will coat several maps. Available from REI, Early Winters, etc. Manufacturer: Martenson Co., Rainchart Division, P.O. Box 5310, Northville, MI 48167.

PLASTIC GRIDS: These come in several sizes, with various line spacings. I find them incredibly useful when laying out typography, especially on a light table. Temporary colored guidelines can be sketched in with "permanent" overhead projector markers, which can later be erased with an ink eraser. If you don't have a light table, the grid can still be seen through mylar or polyester if you put a piece of glossy coated poster board underneath. Price: $1.00 to $5.00, depending on size, available at most drafting/graphics dealers. Manufacturer: C-Thru Ruler Corp., Bloomfield, CT 06002.

PURAPLAST ERASER: Need to erase pencil guidelines, etc. without disturbing ink? This amazing eraser will do it. Don't wet the eraser, or try to prove me wrong, but I've never had it hurt ink yet. Made by Staedtler-Mars, available at most dealers for around $1.

KOH-I-LAR DRAFTING FILM LIQUID ERASER: For BIG erasing jobs on film, this stuff is quite effective. Just spread it around, let it sit awhile, and rub gently with an eraser while dabbing up the dissolved ink with a paper towel. If you have some ethanol and ammonium hydroxide lying around, you can probably make your own substitute, which would be nice since it costs about $1.25 for 3/4 ounce, which lasts a long time. Available on most Koh-i-noor displays. Manufacturer: Koh-i-Noor Rapidograph Inc., Bloomsburg, NJ 08804. (What on earth, by the way, does "Koh-i-Noor" mean ?!)

SPRAY ADHESIVE: This stuff is a very useful substitute for rubber cement and other traditional mounting substances. It is, however, rather expensive. Expect to pay $6 to $8 for a 12 ounce can. To mount things, you just spray it on, let dry for a few seconds, position, and press. If you blow it, the bond can usually be gently persuadad to release. Just try THAT with rubber cement! Some cautions are in order. First, the volatile vehicle which carries the actual adhesive is highly effective at breaking the bonds which keep shading film, transfer lettering, photocopier

"ink", graphics tape, etc. in place. Thus, you must be very careful not to disturb these items until the vehicle has evaporated. Also, there may be some lingering effect-- the best bet is to test carefully. But the thin adhesive film is really good for doing critical mosaicing, etc. so there are advantages. Another problem is that the vehicle will give you a very unpleasant "buzz", accompanied by interesting central nervous system irregularities if you breath much of it, so use LOTS of ventilation. Overspray is to be avoided if pets or small children are about, they will stick to the carpet. Perhaps the best buy in spray adhesive is 3M Super 77. You get a big 17 ounce can for about $8.00, this includes two interchangable spray tips and supposedly covers 163 square feet. It may be a little hard to find, since it's aimed for the professional market. 3M Company, Adhesives, Coatings and Sealers Division, St. Paul, MN 55144.

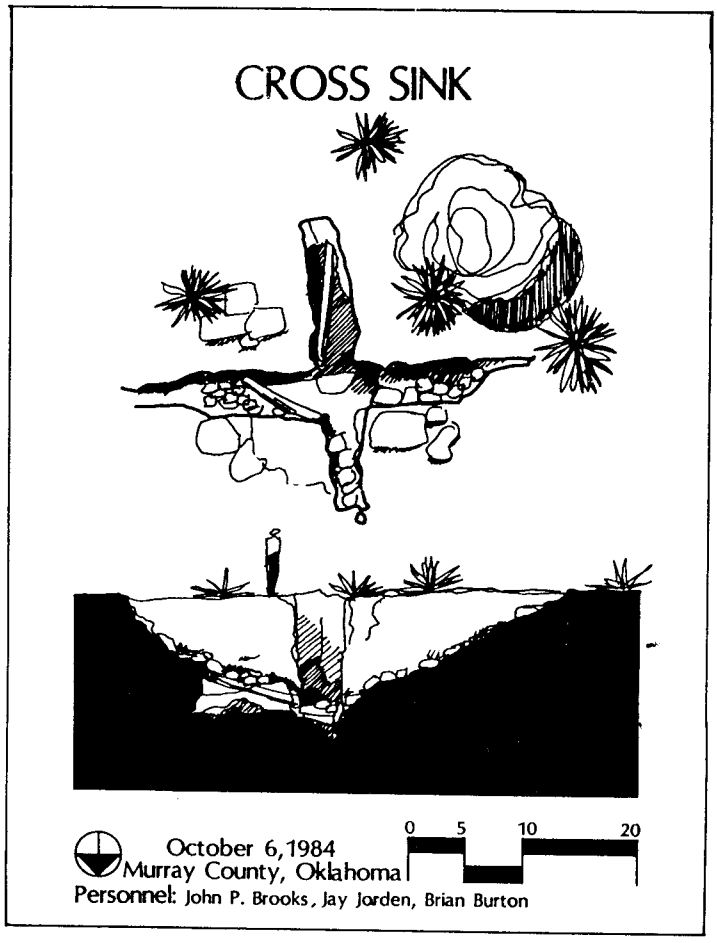
STICKIES: Not pastries, but photocopies. This transparent material can be run through most modern plain paper copiers, then cut up for placement on maps.

A number of useful things can be done with this material. First, you can lay out lettering of any type, without getting near your precious original map. After everything is ready, you use opaqueing fluid on any remaining glitches, then shoot the whole mess onto a nice clean sticky. I have not had problems with the sticky showing up on diazo copies; I wish I could say the same thing for KROY tape! Notice that many copiers now have "zoom" features? You're beginning to get the idea: reduce or enlarge to the size you like on plain paper, then run a final copy on the sticky-back. Also, material that is used repeatedly can be duped very easily. This is nothing new, but doing it without a darkroom is. One brand is Ozalid Adhesive Backed Polyester Copier Film, which I have to pay 70 cents per 8.5 by 11" for. Ozalid Corporation, 1000 MacArthur Blvd., Mahwah, NJ 07430.

KOH-I-NOOR 3084 RAPIDRAW LATEX BASE INK: This is the best ink I've ever used on film. It dries very fast and really grabs, yet is easily erased. It does, however, contain a weak acid to slightly etch the film surface and thus should not be left sitting in pens for very long, i.e. several weeks. The best policy is to put small amounts of ink in your pens and wash them out after use. 3/4 ounce, about $1.50 in a plastic dropper bottle. (see address above.)

POUNCE: Your author originally thought that this white powder was cocaine, then just another gimmick to make money for drafting suppliers. Fortunately, I was prevailed upon to try it and have been a believer ever since. When sprinkled on film or vellum and rubbed in with the attached pad, Pounce fills irregularities and allows smoother lines. Sounds crazy-- try it. I can't draft without the stuff now. Remember to re-apply after erasures and to thoroughly brush excess away (with a brush, not your oily hand or dank breath) after rubbing in. About $2.00 for a 5 ounce dispenser with felt applicator; sold by K&E, Dietzgen, Alvin, et al. (Does anyone know why it's called "Pounce"?!)

COMPASS & TAPE
Survey & Cartography Section
of the National Speleological Society
RD 3 Box 742
Bedford, PA 15522

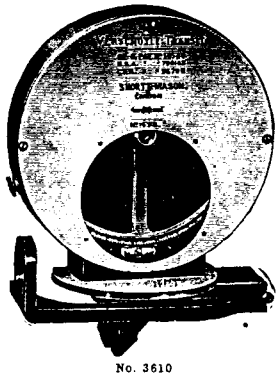


John P. Brooks has had some rather unusual, if not "avant garde" cave maps in the TEXAS CAVER recently. Cross Sink (LEFT) from the February, 1985 issue was called "mutant architectural graphics" by my consultant in that field, but I think it's an interesting and promising approach.

Rick Banning sends the advertisement below, which he found in the 1912 catalog of the Mine and Smelter Supply Co. I think my Suunto instruments are sometimes "liable to derangement" !

THE VERSCHOYLE POCKET TRANSIT

IN ALUMINUM BODY

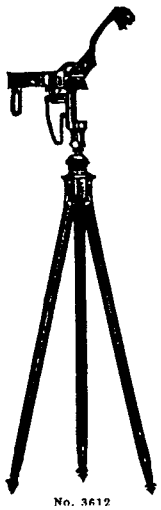


No. 3610

Weight of Instrument	9 oz.
Length	4½ in.
Width	3⅜ in.
Depth	11-13 in.
Length of Sight Arm when opened	5½ in.
Length of Needle	2¾ in.

This instrument combines the useful features of Abney Level, Prismatic Compass, and Clinometer. Designed by a mining engineer of practical experience in the use and possible application of the various forms of instruments intended for preliminary survey.

The distinguishing feature of the instrument is that, owing to its novel construction, only one observation is necessary to obtain both the magnetic bearing and the vertical angle of any distant point. It is also specially adapted for use in difficult positions, such as are always liable to occur in filling in the rougher details in a mining survey. For rapid topographical work and working in constrained positions, the fact that half the labor is saved should be of interest to those who have to use this class of instrument.



No. 3612

Another important point is that its efficiency is not determined by the length of the diameter of the compass, as is the case with the ordinary prismatic compass. With even a small instrument the same length of sight is obtained as would be obtained with a 6 or 7-inch prismatic compass.

As a thoroughly serviceable instrument it is worthy of special notice.

It is not a complicated delicate instrument liable to derangement or deterioration.

There are no reflectors or mirrors used other than the prism, which is protected and fastened in a secure manner.

3610 Verschoyle Transit for hand use, in sling leather case ..... each $35.00

3612 Same as 3610, but with Angle Piece and collapsible metal tripod, ball and socket fitting ..... each 44.00