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Cave Research Foundation Newsletter, Volume 20, No. 2, May 1992

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MAY 1992

VOLUME 20, NUMBER 2

CRF Newsletter

CAVE RESEARCH FOUNDATION



CRF NEWSLETTER Volume 20, No.2
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The CRF NEWSLETTER is a publication of the Cave Research Foundation, a non-profit organization incorporated in 1957 under the laws of Kentucky for the purpose of furthering research, conservation, and education about caves and karst. For information about the CRF, write to: Mel Park, CRF President, 1541 Peabody Avenue, Memphis, TN 38104-3831.

Cover Illustration : Front Cover—Entrance room of Da Chao Kou, 73 m high. Photo. by Ian Baren
See *China 1991-1992*, p.11.

BULLETIN BOARD

Deadline for next issue is July 1. Although some leeway can be allowed for high priority items, we would greatly appreciate receiving material for the August issue by the above date. MS/SH.

Address Corrections: Please send address changes to Dave Ecklund, 1910 Sunshine Circle, Aiken, SC 29803-9296.

Address Change: Dr John Walker and Ms Roberta M. Burnes are pleased to announce that they are now residing at the same address: 2925 Scotland Road, Memphis, TN 38128. Ph: 901-358-1803.

WKU Cave and Karst Field Studies Schedule:

Karst Geology: Art Palmer, June 7-13

Exploration of Mammoth Cave: Stan Sides, June 14-20

Speleology: Roger Brucker, June 14-20

Karst Hydrology: Will White, Nick Crawford, and Chris Groves, June 21-27

Advanced Cave Exploration: John Mylroie and Richard Zopf, June 21-27.

Write to: Center for Cave and Karst Studies, Dept. of Geology and Geography, Western Kentucky University, Bowling Green, KY 42101.

Membership Certificates: It seems that some Members of the Foundation may have never received their membership certificate. If this is the case, or if your certificate has been misplaced, send a note to the Secretary, John Tinsley, 1040 Oakland Avenue, Menlo Park, CA 94025.

CRF Mammoth Cave Field Headquarters fund raising drive: Help make the planned Mammoth Cave field headquarters a reality. Send your tax deductible donations to the treasurer, Roger McClure, 4700 Amberwood Drive, Dayton OH 45424. Funds are also solicited for the International Exploration Fund.

Personnel Manual: Kevin Downs is coordinating an extensive revision of the CRF Personnel Manual. Anyone willing to help, or wanting input into specific subjects should contact Kevin: 3212 Springfield Drive #1, Louisville, KY 40214.



Congratulations to Maggie and Tom Brucker, who are the proud new parents of Nathan Andrew, born on January 28th.

Board of Directors Meeting

The CRF Board of Directors met in McKinney, Texas on March 28. All directors were present except Jim Borden, who was moving house that day. The Board regretfully accepted the resignation of President Ron Bridgemon, with many thanks for a job well done. Among other milestones, Ron's presidency saw the expansion of CRF activities to the highly successful Lava Beds project in northern California and to the caves of China.

Mel Park was elected CRF President (see p.4) and John Tinsley was elected Secretary. Jim Borden has replaced Mel as Operations Manager at Mammoth Cave. The Board accepted the resignation of Tom Brucker, who has served as a voice of wisdom on the Board for the past several years. Elected to the Board were Dick Venters and Mick Sutton. Dick is deeply involved in Guadalupe area survey and has served as Guadalupe Area Operations Manager since November, 1988; Mick is active in the Mammoth Cave cartography program, runs the Mammoth Cave narrative description project, leads the Missouri biological inventory, and co-edits the *Newsletter*. The Board caught up on a large backlog by electing a record ten JVs to Membership in the Foundation (see p.4).

The options for building a proposed Mammoth Cave field headquarters within Stan and Kay Sides' recently acquired Flint Ridge property were discussed at length. Also discussed were future possibilities for expanding the facilities into a CRF National Headquarters. Also discussed was the ever expanding list of projects from the various areas of operation. The date and place for the 1992 Annual Meeting were set for November 13-14 in Albuquerque, New Mexico.

JOHN FLOYD BRIDGE 1933-1992

In 1978, John Bridge climbed Mt. McKinley with the Ohio State Mountaineers. During their 35-day climb, John had severe gastrointestinal problems, which subsequently were diagnosed as having been caused by giardia. How John was able to move upward day after day and reach the summit was a marvel to all his team members. Years later he commented that climbing McKinley was one of those times when one had to turn one's mind off to pain. It turns out that what was diagnosed as giardia was probably Chron's disease, which eventually resulted in colorectal cancer.

During this past year, John again turned his mind off to pain as he underwent three surgeries and two chemotherapy regimes, and he again amazed those who knew him with the power of his will. The week before he died the pain had gotten so bad that John was unable to remain in the same position for more than a few minutes, but that did not stop him from laughing as he told a friend how on one of his trips to the mountains he had fed a bird so much trail food that it could not fly. As another friend commented "John was noble in death--that we should do as well."

John Floyd Bridge was born on 27 December 1933 in Sioux City, Iowa. In 1955 he received his BS degree in Mechanical Engineering from Iowa State University. In the U. S. Navy, he toured the Mediterranean and Far East and achieved the rank of Lieutenant Commander. During this period, he developed a love for sailing and got his pilot license. John went to graduate school at Ohio State University (OSU) where he received his MS and in 1963 his PhD in Mechanical Engineering. John remained at OSU as a faculty member.

His first cave trip was in 1964. He, Joe Davidson, Casey Cronk, and Chuck McLarnan (deceased), all of whom were active in CRF at one time or another, visited caves in Carter County Kentucky. Joe invited John to Flint Ridge, where he made trips to Bedquilt and rediscovered several long-forgotten historical parts of the cave. And so John was hooked, and remained so for the rest of his life. He did make cave trips to places other than the Ridge, but not many.

During the 1960s and early 1970s OSU was alive with CRFers, and CRF activity centered in John's and Joe's offices. Many people remember this period as the Golden Years of Flint Ridge caving--the days of the Spelee Hut, Worthy Washington, the Q survey, miles of virgin passage on every trip (at least, that is how it is remembered), and stories told by the master story teller

(pipe in hand) John Bridge. John had a marvelous memory for detail and had no rivals within CRF when it came to spinning a tale or giving directions to some remote unexplored passage. Years after visiting a lead, he still had a picture of the passage in his mind's eye and could recount vivid details. John could recount for hours the history of Mammoth Cave. He was the first to determine that Stephen Bishop had discovered Hanson's Lost River (of Flint-Mammoth connection fame), and he wrote a superb introduction to the Zephyrus Press edition of Ralph Seymour Thompson's (1879) *The Sucker's Visit to the Mammoth Cave*. John had an impressive cave book collection. These will be available for use in a future CRF library.



In 1966, John went rock climbing with a group of CRF people at Seneca Rock in West Virginia. Again, John was hooked. Over the years, he climbed with CRFers all over the western U. S. and Canadian Rockies and was on three expeditions to Alaska, where he made several first ascents. He was a member of the American Alpine Club and the Alpine Club of Canada, and was one of the first people to explore the caves of Montana's mountainous Bob Marshall Wilderness.

John's professional interests were in fluid mechanics and biomedical engineering. He developed a number of practical solutions to heat transfer problems. His enthusiasm for new and complex problems inspired many students, who valued John not only as an understanding advisor but also as a thoughtful and encouraging friend. There are many people who attribute their professional success to John's friendship.

John never hesitated to say or to do exactly what he wanted; yet he was very sensitive. During the height of the Vietnam conflict, he became concerned over the plight of Vietnam refugees and sponsored a family that was relocated in Columbus, Ohio. He became a mentor of the children in their pursuit of academic interests.

We will probably never know how many people John introduced to CRF nor how many people's lives were changed because of him, but there were a lot--at least four marriages probably would not have occurred if not for John. As a friend recently wrote, there was only "one disadvantage to John: his pipe, or rather, the foul smell that it emitted....But John proved to be such a good and willing companion that we all put up with it." We will miss John. The times that we were with him in the cave, on the mountain, and in the den sipping beer were some of the best times of our lives.

Charles (Scooter) Hildebolt

From Mel Park, New CRF President

Who am I, you might ask, to be assuming this job after just 4 1/2 years as a JV? Although I am a relative newcomer, in many ways I have been around a long time. There is a tradition of people being fascinated with CRF and with the Caves Beyond. Former CRF president Stan Sides was in medical school when he started coming to Flint Ridge, but he had already memorized as much of the cave as he could from books. I, too, remember reading and re-reading *The Caves Beyond* and *The Longest Cave*, staring at the maps for hours, trying to work out the route to Floyd's Lost Passage and trying to match the passages portrayed with the routes described in the book. Even earlier, I remember finding my father's *True Magazine* with the article on the C3 Expedition. Years later, in 1985, I finally got to Floyd's Lost Passage and was beside myself with eagerness as I ticked off those parts of the route I knew from my earlier studies.

Such is born an abiding interest in caves. When I did arrive at Flint Ridge the first time as a JV, I was to learn something more important: the people that make up this organization equal or better the cave as something to be loyal to. We have learned to merge our skills, talents, and personalities to produce a whole that is larger than the sum of its parts. The efficiency of a survey party, the ways we know to get parties to distant points in a system, the way we dispense with the meaningless and get down to the important work, these are a few examples of qualities I have seen with you people and nowhere else.

Professionally, I am involved in mapping the brain and studying brain stem circuitry. Mapping the brain is not unlike mapping the world's longest cave. In both there are paths to be discovered and connections to be found. In the brain, we use microscopic dye tracing techniques just as a hydrologist uses dyes to trace underground conduits. Some of the concepts that I've introduced into the computer management of CRF's survey data are being used in my brain mapping work. So, while I am not from one of the scientific branches that have traditionally done cave science, in my computer work I have found a cave science niche that has allowed me to make some professional contributions.

As the presidency moves east, the president, the board, and all of us are looking west. Great things are happening out there. For one, the projects at Lava Beds and Lilburn in California, and at Carlsbad and the Guads in New Mexico are models of how the Foundation can function as a group of willing volunteers and professional scientists working with informed land managers.

What's ahead? Research is our middle name. We are not, as some people jokingly say, a caving club using the guise of research to gain access to caves on government land. Our past is filled with scientists, as well as prominent science administrators, who have made cave science a legitimate academic pursuit in North America.

We want to continue to be the kind of people to whom these scientists can send their students, and we want to find more like them. We also want to see science grow and prosper within the federal agencies we work with. That is not so easy in a time of shrinking federal dollars, but we can still support these agencies as they pursue mandates in science. We have a lever, too: a reputation among land managers. We are known as ones who, given \$5000 dollars of incentive, return with \$50,000 of work. We are the people that get the job done, and we should be proud of that.

Finally, we need a home. Outgoing president Ron Bridgemon speaks of a CRF National Headquarters, and we have an opportunity to build one in central Kentucky. This, however, depends totally on you, the Joint Venturers who are CRF. We cannot build a home for the Foundation unless you have the collective will to do it and to then run it. First, though, comes money. We are going to have to dig deep into our own pockets plus find ways of gathering money from outside sources. Will you do that? This will be our biggest task in the next few years.

CRF Welcomes Ten New Members

At the March 28 Board of Directors' meeting, ten JVs were elected to Membership in the Foundation—possibly a record number.

Joel Despain. Joel has been a JV for five years with the Lilburn cartography project, where he quickly graduated to the position of party leader. He is a resource management specialist at Sequoia-King's Canyon National Parks, and is the author of their recent cave management plan, which is a milestone in setting management goals for the 125 caves within the parks. Joel is also a member of the Yucca Creek Conservation Task Force, which manages the exploration and conservation of Hurricane Creek Cave.

Bill Devereaux. Bill has been the spark plug for the most intense and time consuming part of the Lava Beds National Monument project—the general resources inventory, which he co-leads with Janet Sowers. He has provided the drive and enthusiasm which has resulted in the completion, on schedule, of all twenty-four cave inventories. Bill has been a caver since 1968, has chaired two NSS regions, and is presently secretary of the Willamette Valley Grotto.

Kevin Downs. Kevin, a Kentucky native, is the most recent addition to the roster of Mammoth Cave cartographers. He has been one of the most regular participants at Mammoth Cave for four or five years and has spent considerable effort in maintaining the CRF facilities. He continues to serve as maintenance officer at Maple Spring.

Bill Farr. Bill, one of the strongest cavers within CRF, has been a mainstay over the past six years of the Lilburn cartographic efforts, where he has concentrated on mapping the complex Attic area. Most recently, he

has initiated an program of cave diving at Lilburn using modern mixed-gas techniques, a program which is already producing exciting results. Bill is internationally well known as co-leader of Projecto Papalo in Mexico, a contender for the North American and perhaps the world depth record.

Paul Hauck. Paul's involvement with CRF cavers goes back many years to the days when he led the survey of Crevice Cave, Missouri's longest. Since becoming involved with the Mammoth Cave survey five years ago, Paul has pursued the goal of producing a Pohl Avenue area map with admirable single-mindedness and dedication.

Jan Marie Hemberger. Jan has been a major collaborator in CRF archeological activities at Mammoth Cave since 1984. She is especially credited for her keen observational skills and ability to process data. Jan has also served for several years as camp manager at the Thanksgiving expedition, has served as log keeper and is the current supplies coordinator.

Frank Reid. Frank's expertise at building and using radio-location devices has long assisted the Mammoth Cave survey effort, both in the siting of entrances and in enabling remote areas of the cave to be precisely fixed relative to the surface. The Mammoth Cave survey would be significantly further behind without Frank's contributions.

Bruce Rogers. Bruce has been a JV for many years, contributing to the Lilburn and Lava Beds projects. He conducted a cave inventory for Sequoia-King's Canyon National Parks, resulting in a two volume report and 180 maps. He is Principle Investigator for two of the current Lava Beds projects: mapping, which he co-leads with Mike Sims, and mineralogy. The Lava Beds and Lilburn projects owe much to Bruce.

Mike Sims. Mike has been a major force in the Lava Beds inventory, and worked with the Monument for many years before CRF became involved. He is Principle Investigator for three of the CRF projects at Lava Beds. He co-leads the mapping project with Bruce Rogers. Mike is a low-key person who gets things done. He is the one project leader who is never late with a report. Mike's contributions include participation in the Lilburn Cave project from 1968 to 1974, and directorship of the Klamath Mountains Conservation Task Force of the NSS from 1973 to 1988.

Dave Weller. Dave has been a mainstay in the Mammoth Cave area since 1979. Without his efforts, the knowledge of Mammoth Cave beyond the park boundaries would not be anywhere near where it is today. His contributions in gate making and entrance construction have provided essential access and protection to entrances outside the park. Dave has also worked with the local community to help them recognize that cavers can be good neighbors. (See interview, p. 14).

Carlsbad Cavern Superintendent Wallace Elms to Retire

The National Park Service announced the forthcoming retirement on May 30 of Wallace B. Elms, Superintendent of Carlsbad Caverns National Park. Mr Elms has served as Superintendent at Carlsbad since June, 1989, and he is retiring from the same park where he began his career in 1956. In the interim, he served in nine different NPS units, including a post as Management Assistant at Wind Cave National Park and Jewel Cave National Monument. He served as supervisor at three different National Historic Sites before returning to Carlsbad as Superintendent. Mr Elms is a native of Carlsbad, and he and his wife Mary will continue to reside there. The Cave Research Foundation greatly appreciates Mr Elms' interest, enthusiasm, and support for the CRF survey and exploration program within Carlsbad Caverns National Park, and wishes him the best for his retirement.

Also retiring from the Carlsbad staff is Supervisory Ranger Manuel H. Cortez, who has spent the last 26 years of a 36 year NPS career at Carlsbad Caverns National Park.

National Geographic Society Cave Movie

The National Geographic Society (NGS) recently filmed within Mammoth Cave, Carlsbad Cavern, and Lechuguilla Cave for a forthcoming hour-long television special tentatively called *Mysteries Underground*, which will include scenes from caves around the world. The program will focus on caves and their exploration.

Filming at Mammoth Cave included interviews with CRF cavers Richard Zopf, John Wilcox, Pat Wilcox, Roger Brucker and Tom Brucker who took part in the historic 1972 Flint Ridge-Mammoth Cave connection trip. The NGS crew left a video-camera with CRF in order to get coverage of some of the connection route. Richard Zopf later led a crew with the camera out as far as the Tight Tube (see p.8). Ken Tankersley and other archaeologists worked with the National Geographic crew on pre-history and early history, including enactments of aboriginal activity and the Stephen Bishop story. Joyce Hoffmaster, Roger McClure and Richard Zopf spent two days with the crew filming typical CRF activities underground. CRF was involved with National Geographic for over two weeks on a daily basis, though actual footage used will likely be less than 15 minutes.

The filming within Carlsbad Caverns National Park was supervised by noted British cave film photographer Sid Perou. The NGS has a long-standing interest in Carlsbad Cavern going back to the NGS-sponsored Willis Lee expedition of 1924. National Geographic filmed at a number of other sites across the country, including the NSS headquarters. Airing of the special will be sometime in 1993.

EXPEDITIONS

MAMMOTH CAVE

New Year, Dec. 27, 1991-Jan. 1, 1992

Leader. Kevin Downs

A total of 36 people attended the New Year's expedition. Unseasonably warm weather allowed for easy access around the park, with the exception of heavy rain on Saturday, which caused cancellation of trips to Hawkins Logsdon River and to Sides Cave. Although the main focus of the expedition was cartography, a great deal of geological and biological work was also attended to. A total of 2300 ft. was surveyed in the cave, 770 ft. of which was new survey. There was also some surface survey.

Flint Ridge: The Pohl Avenue map was brought closer to completion with a trip to map the maze-type leads near Lower Crouchway. The party found a crack between breakdown blocks leading to a largish chamber below, but it will need a skinny, double-jointed person to check it. A second crew went to Pohl Avenue and mapped a passage to the left at Black Onyx waterfall, before it became too tight for this group. They then surveyed 400 ft. nearby in a low, tangled area of spaghetti.

Art and Peg Palmer led a geology trip to Ebb and Flow Falls in Crystal Cave. While Peg remained at the Falls, measuring and interpreting geologic sections of the Aux Vases and related strata, the others descended into an "unmapped tangle of passages" to map strata. Smoked initials and rusty tin cans showed that this area had been visited by the old timers, but other than one survey put in during the '70s, this area has been largely ignored. The canyons are hydrologically significant as major tributaries to the Frenchman's Pit and Lost Paradise drains, but casual visits are not encouraged because of slippery climbs near the base level.

Mammoth Cave Ridge: A party went to Marion Avenue to clean up leads in the understory in the vicinity of Katherine's Domes. They replaced a poor sketch, fleshed out the survey with spray shots around the dome, and mapped some small leads. They found a 4 x 5 inch fish jaw imbedded in the ceiling. This area continues to provide lots of leads, some of which will require slings and perhaps aid climbing to enter.

A party went to McGown Way off Fox Avenue for clean-up survey of a low, narrow canyon that parallels the main passage. The canyon continues, and there are additional leads in this complex area. This trip got off to a great start when party members poked out the compass reader's contact lens, and took turns setting fire to her hair.

A party surveyed cutarounds in the eastern end of Belfry Avenue, then went to the D-survey crawl off Jeanne's Avenue on the half-day tour to assess the sketch around Felicia's Domes. They concluded that a

rope descent of the domes would provide the fastest route to this end of Belfry; next day, there was a short trip to rig the drop for upcoming work in the area. Other crews worked on wet cutarounds farther west in Belfry and on low, muddy leads in the same area. There was a photography trip to Mammoth River and Belfry Avenue.

River: The geology crew went to the newly discovered upper level trunk, Kaemper Avenue. On the way they examined the large "Finnegan's Forest" in the T-survey route, and reported that evaporation appears to have played a role in its formation. They also looked at the L-survey and concluded that the ceiling undulations are primary, not a result of later flooding. Art Palmer reports that the "undulating tube began vadose down-cutting in the highest parts of loops, so the initial tube was enlarged least there. The result is a series of high, narrow canyons with almost no tube at the top, alternating with low, wide canyons with wide tubes at the top."

Kaemper Avenue itself is at least half filled with stratified sediments typical of all other passages at a similar level. Kaemper Avenue is in the F2 and F3 units of the Ste. Genevieve formation. Where sediment has been removed, the passage can be seen to extend down into the St. Louis limestone, with no bedrock floor in sight. The sequence of passage development "is rather obscure, thanks to the fact that the passages were formed in several stages, with at least one major episode of sediment fill. Correlation with other passages is unclear..."

Another party replaced a worn rope on the X-15 Pit route to Kaemper Avenue, and did some resketch in the T-survey trunk around the Morrison Cave junction. They then climbed the rope up into Morrison Cave and surveyed a short canyon loop to an overlook of the T-Survey. At the top of another canyon, the party found a low tube, which continues. This whole area needs to be surveyed. A resketch party went to the end of the L-survey and sketched back out for about 2000 ft.

Etc: Ed Lisowski went to some off-park caves to collect heliomyzid flies for a research project. The heliomyzid population ranged from zero in Dogwood Cave to 30+ in Hogan's Cave. At the last cave, they encountered a collection of *Rednecktes kentuckiensis*, in the process of "treasure hunting" by hacking on the cave walls with a hatchet. The biologists decided that discretion was the better part of valor, and left. Next day, Ed found lots of flies in the arid trunk passage of Indian Cave.

A theodolite crew surveyed from the New Hope church to try to finish up the surface survey that has been in progress for the last couple of years. They nearly completed a traverse from the Khan Entrance of Roppel to a nearby benchmark, but the benchmark could not be found.

Next day, the theodolite crew did some survey on the new Sides property, setting up on the highest point and shooting radially to many features in the area over the sandstone caprock. They then resumed the Toohey Ridge traverse, tying in both the Roppel and Weller entrances to the survey net.

A special thanks goes to Larry and Charlie Pursell for camp managing on Saturday and Sunday. I would also like to thank Sue Ecklund for her help in the kitchen. Thanks to Walter Johnson for helping to open and close camp. Bob Osburn did a good job managing camp on Tuesday.

Survey Crews: *Lower Crouchway*—Paul Hauck, Sue Ecklund, Rick Hoechstetter; *Pohl Ave.*—Paul Hauck, Gail Wagner, Art Seabury, Pam Duncan; *Crystal Cave geology*—Art Palmer, Peg Palmer, Paul Rubin, Richard Zopf; *Katherine's Domes*—Bob Osburn, Peter Gray, Walter Johnson; *McGown Way*—Gail Wagner, LaJuana Wilcher, Cheryl Early, Norm Gibbet; *Belfry Ave.*—1) Kevin Downs, Alex Hicks, Pat Stephens; 2) Kevin Downs, Dick Market, Joyce Hoffmaster; 3) Gail Wagner, Brice Leech, Sue Ecklund, Jerry Davis; 4) Jerry Davis, Roger McClure, Peter Gray, Art Seabury; 5) (photography) Kevin Downs, Sheila Sands; *Kaemper Ave. geology*—Art Palmer, Peg Palmer, Richard Zopf, Rick Olson; *T-Survey*—Bob Osburn, Dick Market, Dave Ecklund, Peter Gray; *L-Survey*—Bob Osburn, Rick Olson, Walter Johnson, Dave Ecklund; *Helioomyzids*—1) Ed Lisowski, Walter Johnson, Howard Kalnitz; 2) Ed Lisowski, Walter Johnson, Art Seabury; *Surface survey*—1) Richard Zopf, Jim Borden, Dick Market, Paul Hauck, Kevin Downs; 2) Richard Zopf, Jim Borden, Gail Wagner, Ed Lisowski.

Valentine's Day, Feb. 14-17

Leader, Howard Kalnitz

The Valentine's Day expedition followed the long tradition of almost all February expeditions—a rough, rocky road to travel, in this case the back road to Maple Springs as the ferry was out with a broken drive train, a problem which will take some months to correct. In addition, heavy rain closed off Logsdon River trips and forced parties away from high footage areas into other work that needed to be done. A total of 35 people braved the back roads and rain.

Flint Ridge: There was another in a series of trips to Pohl Avenue. The crew first went to the Malott Avenue junction area to clean up leads; one possibility was left, which will require a ladder. They then turned their attention to the Union Shafts area, where the passage they began to map degenerated into a continuing water crawl.

Mammoth Cave Ridge: There was a trip to Marion Avenue to resketch Christopher's Dome and map a low portion of Dan's Avenue that was bypassed by earlier surveys, and another to the Bottle Hall area to clean up tight, difficult leads. A party went to Cutliff's Way. After some difficulty finding the proper passage, they managed to knock a gypsum crawl cutaround off the leads list.

A vertical crew went to Cathedral Domes to map several "repulsive little passages". They noted some areas of unstable rock which should be left well alone.

Knockin' on the Backdoor—Howard Kalnitz

"Not again," I thought as I looked into the entrance of Sides' Cave. The entrance is two foot high and three wide. James Wells moved up behind me and looked over my shoulder. "This is the most water I've seen in this cave." There was quite a bit of water falling into the entrance. Not only that, but a tree had fallen across the sink, knocking large rocks into the entrance; an auspicious start to my second trip into the cave.

James leapt into the entrance and cleared the rocks away. I took a breath, a last look at the beautiful day we were leaving, and plunged forward. First the tight entrance and then the tighter squeeze just inside. I manage to keep my carbide lit—bonus! It opens (a little) and crawling goes much easier. James and Alan Cannon enter behind me. Then it's non-stop crawling in the water, 1450 ft to be precise.

It suddenly starts losing elevation and Presto! through the Bobstacle and into Safety Dome. High tube with deep canyons, pretty dry—a good place to wait a storm out if need be. I inspect the small cache of emergency gear stored here.

We decide to pick up the F survey which is running towards Mammoth Cave. Alan is having a good time placing survey points in fun locations (I love to shoot compass with my feet hanging over 90 ft. pits).

As we move down the passage a stream is heard roaring off in the distance. Near F25 I can hear it almost directly below us. We climb down to a clean passage with a stream running a good amount of water. We decide to come down to

this level to survey the stream passage. After six stations we lose the stream through a small hole. Once again we are climbing over a big pit. On the other side we can climb down; we head back to the pit and find the water in a side lead. James scouts it out; it goes, but will need wetsuits.

We continue to survey, now through a gypsum canyon. Down a small drop, then another large pit, this one dry. James believes it is a mid level of Erin-Goes Pit. This and the previous pit both have good natural anchors. The survey ends here as there is no way around.

We move back to the beginning of the stream survey and start putting in a survey upstream. We pass through the K-9 dome and a few stations later survey fatigue sets in. After finding a good permanent station, we route for Safety Dome.

We eat, BS, and do whatever we can to delay going back into the water crawl. I bust an old cyalume and, to my surprise, it works. I tie it around my neck. When we run out of things to say I head into the crawl. Farther on I dip my lamp and put it out. With the others behind me I have no good way to relight. I decide to move on just with the light of the cyalume, finding the travel interesting this way.

At the entrance the beautiful day has been replaced with a cold night. I hear grunting and groaning. Alan is coming out, with James behind him. On the way to the car, Alan's knees cramp up. He once said he could tell a good trip because he never wants to cave again—he remarks that this is the best trip he's been on yet.

A party continued the survey of the McGown's Way side passage begun in January; there is one more lead for small cavers.

Four trips supported historic interpretation. These groups are making a photographic record of historic signatures in Pensacola and Gothic Avenues. There was a short trip to the Booth's Amphitheater saltpeter works to do a preliminary check for a proposed project to study nitrate regeneration in Mammoth Cave soil.

Small Caves: A small-cave crew spent two days on the North Shore, mostly in the Dry Prong area. They found Cades Cave #1 and a few others, and were able to report that many reported locations were in fact not caves. Running Branch Cave received another visit, but isn't finished yet. The party did some resurvey and found a new piece of passage at the top of some loose breakdown. In the Cedar Springs valley, two promising entrances were found, one with an active stream in it.

Thanks to Ed Lisowski, Chris Gerace, and John Korabik for help above and beyond, but most of all to Pam Duncan for doing a great job with menus, buying, and cooking.

Survey Crews: *Pohl Ave.*—Paul Hauck, John Henderson, Sheila Sands, Chris Cannaley; *Christopher's Dome*—Bob Osburn, Scott House, Stan Sides; *Bottle Hall*—Neil Hammond, Terri Hammond, Mike Michalick, John Korabik; *Cutliff's Way*—Dick Maxey, Cheryl Early, Nancy Korabik; *Cathedral Domes*—Rick Olson, Randy Jackson, Todd Kramer, Mark Gottlieb; *McGown's Way*—Paul Cannaley, Mel Park, Jenny Becker; *Gothic Ave.*—Charles Swedlund, Dick Young, Dan Essig, Trent Fultz; *Pensacola Ave.*—Larry Pursell, Jan Spenser, Chris Conway, Jemma Wise, Mark Gottlieb; *North Shore Caves*—Scott House, Bob Osburn, Mel Park; *Running Branch Cave*—Paul Hauck, Nancy Korabik, Art Seabury, Mike Michalak; *Cedar Springs Valley*—Howard Kalnitz, Christine Gerace.

Sides Cave, Feb. 29

An off-week trip to Sides Cave resulted in 1050 ft. of new survey, starting at the top of "Erin Goes Pit"—see *Knockin' on the Back Door*, previous page.

Survey crew: James Wells, Howard Kalnitz, Alan Cannon.

March 13-16

Leader, Paul Cannaley

Thirty-two people braved the ferry-less park for the March expedition, amassing 1260 ft. of new survey and 500 ft. of resurvey.

Mammoth Cave Ridge: The new south-flank map progressed with a trip to Blackstone Avenue to make a detailed lead list and begin surveying side passages. A good amount of footage is available in this area, as long as you don't mind small, tight, cherty crawlways! There was another trip to Marion Avenue to mop up leads; nearly 400 ft. of new survey was completed, and a wet, drafting drain was left for next time.

Cutliff's Way was visited again when a crew went out to check and survey the 17 known leads in the area. They completed or eliminated ten of the leads, totalling

325 ft. of survey. A Jessup Avenue crew mapped 200 ft. in side passages. They left a climbing lead at Washington Dome and several others for very small people.

A party went out Minna's Way to push the drain and canyon leads at the bottom of 110 ft. deep Alfred's Pit. The drain became 6 inches high after only 20 ft., but a good canyon lead was discovered. The whole area was moving a lot of water, and the crew was soaked. Next day, a party returned and mapped 110 ft. in the canyon, with the passage continuing 2 ft. square with a lot of water. A wet-suit crew will be needed to push this passage.

The "Names Without Faces" historical interpretation continued in Pensacola Avenue. Over 800 names have been collected so far. The group tried leap-frogging two teams with little success and left early to work on a grid system. Next day, they checked the grid overlay with locations in the cave, and collected over 200 names within the grid area.

Flint Ridge: A party took a National Geographic video camera to tape famous places along the 1972 connection route. They made it to the Tight Tube beyond Candlelight River before turning around. Richard Zopf says that, although the camera is heavy, a trip with it through the connection route would be practical.

River: A party went to the X-15 Pit area (Southern Highlands—T-survey connection) to complete ties between surveys on different levels, with a total of 160 ft. of new survey. They also discovered a good but very wet lead. Paul Rubin continued his geological and paleohydrological study of Kaemper Avenue; scallops were measured and sediment stratigraphic columns constructed.

Biology: Ed Lisowski did biological survey in some small caves outside the park, and in the Mammoth Dome and River Hall areas in Mammoth Cave. Animals located in the small caves included a few crickets, beetles, and bristletails. In Mammoth, numerous white springtails and cave carabid beetles were seen, along with many flies—unfortunately, these were chironomids (midges), not the heliomyzids Ed was hoping for.

Etc.: Mel Park and Bob Osburn spent a day painting the newly refurbished cottage on Sides' Farm.

Camp managers are a rare breed. Monica Cannaley drove down late Friday night and cooked all day Saturday and Sunday morning before driving home. Nancy Korabik caved all day Saturday then cooked all day Sunday. My appreciation and thanks for the sacrifice these people made.

Survey Crews: *Blackstone Ave.*—Kevin Downs, Chris Cannaley, Chris Beck, Daryl Adkins; *Marion Ave.*—Paul Cannaley, Randy Jackson, Richard Wallace; *Cutliff's Way*—Roger McClure, Nancy Korabik, Tom Black, Charles Bugh; *Jessup Ave.*—Norm Rogers, John Korabik, Marek Wierbowski, Art Seabury; *Alfred's Pit*—1) Norm Rogers, Lillian Novela, Mark Ohms; 2) Lillian Novela, Bill Putnam, Chris Beck; *Pensacola Ave.*—1) Larry Pursell, Karen Early, Jan Spencer, Chris Conway; 2) Larry Pursell, Chris Conway,

Jan Spencer; *Candlelight River video*—Richard Zopf, Joyce Hoffmaster, Randy Jackson; *Kaemper Ave.*—Paul Rubin, Walter Johnson; *Biology*—Ed Lisowski, Marek Wierbowski.

GUADALUPES

Carlsbad Caverns NP, December 28-30

Report by Fritz Hardy

A large party of CRF and NPS personnel inventoried Goat Trap Cave, a small, dry, decorated cave between Midnight and Slaughter Canyons. It had been fully mapped, but no survey tags were found; the mystery was solved by the newest caver, who found "a whole pile of them". Evidently, the local pack rat had saved them all in one neat pile; so much for relocating survey stations in that cave.

A surface survey crew located surface positions above the E-F Junction, Apricot Pit, and the Great White Way in Lechuguilla Cave.

There was a trip to the Guadalupe Room to familiarize new-comers with that area, while Tom Rohrer and others continued with Rohrer's light survey work.

Participants: *Goat Trap Cave*—Gralin Coffin, Walter Feaster, Kash Heitkamp, Duke McMullan, Barbi Barker, David Ek (NPS), Drew Schenck (NPS), Ken Bigley (NPS), Chris Ek (NPS); *Surface Survey*—Tom Rohrer, Gralin Coffin, Walter Feaster, Kash Heitkamp, Duke McMullan, Barbi Barker.

Carlsbad Cavern, President's Day Feb. 15-17

Leader: Pat Helton

Thirty-five cavers volunteered their services for the President's Day expedition at Carlsbad Cavern. The emphasis was on adding new survey to the Cavern. More than half the participants were first-timers. Despite a stomach flu bug making the rounds, the expedition was very productive, with a total of 3600 ft. surveyed.

Left Hand Tunnel: At Lake of the Clouds, a team searched for a by-pass on the SE wall. No significant passage was located; however, they surveyed a chimney and loop. In the Right Hand Fork, a 150 ft. long passage which had escaped mapping for years was finally surveyed, and a new pit was found in the same general area. Next day, the pit was descended, and the crew pushed east for 325 ft. in highly decorated passage. This may be a new easternmost point for Carlsbad Cavern. Much more remains to be done here.

Mystery Room and Lower Cave: A survey training session took place during a survey of the south wall perimeter of the Mystery Room. A significant lead in the ceiling was located. Another party surveyed down the Cable Slot pit. The south passage at the bottom was surveyed into Lower Cave past Nicholson's Pit, tying the Mystery Room survey to Lower Cave. Two parties coordinated to shoot a survey line from the Mabel's Room balcony down into the Mystery Room.

Two parties entered Lower Cave. One crew encountered tight crawlways in a boneyard area, and did not attempt a survey. The crew exited after a large rock fell

in an unstable area. Another party checked leads in the Nautivoid Passage area, but all were short.

Guadalupe Room: A crew surveyed a pit and breakdown area in the eastern end of the room. They found new leads and pits. Next day, a party surveyed a 60 ft. long gypsum crawlway in the Pit area near the south wall. The passage featured 12-18 inch long gypsum

In Right Hand Fork, a 150 ft. long passage was finally surveyed, and a new pit was found. The pit was descended, and the crew pushed east in highly decorated passage. This may be a new easternmost point for Carlsbad Cavern.

flowers. Another party mapped 200 ft. in the West End pits. A party went to close out the 62-180 Room survey; a total of 230 ft. was mapped, but they also found unsurveyed leads for the next expedition.

One of the Guadalupe Room cavers was downed by the flu bug. Rescue teams were organized and equipped, but the stricken caver regained his strength and came out under his own steam.

Main Corridor, etc. In the Secondary Stream Passage/ Blue Webbing Lead area, a crew surveyed going passage and a vertical drop. They returned with a trash-bag of litter from below the visitor's trail bridge. An old purse and other possibly historical material was turned over to Carlsbad Caverns Resource Management for examination. A team went to the Main Corridor boneyard near the "Boneyard" sign. They surveyed 170 ft., and encountered several hundred feet of large boneyard which they did not map, as it had survey marks. It was later determined that these marks were from the early Willis T. Lee survey, which is not included in the current survey compilation. The party also entered a lead near Iceberg Rock and climbed down into an apparently virgin room 50 ft. by 80 ft., and 70 ft. high.

A party went to the unsurveyed God's Condo and added 500 ft. of new survey. Historic smoked arrows were found. Much work remains in this area.

Participants: Barbe Barker, Mary Caress, Ralph Clark, Pat Copeland, Sharon Darnell, Dave Dell, Dick DesJardins, Mark Evans, Kevin Ferguson, Beth Gillia, Kevin Glover, June Golaz, Gerald Gwartney, Dave Hamer, Chawn Harlow, Fritz Hardy, Pat Helton, Susan Herpin, Tony Jones, John McLean, Don Mittan, Ann Ness, Rich Ness, Pam Oczkowski, Carl Pagano, Wayne Pierce, Jennerer Portfield, Adam Read, Virginia Seiser, Noble Stidham, Deb Street, Terry Sweet, Daniel Valerta, Rich Wolfert, Spenser Woods.

Lechuguilla Biological Inventory

(an independent project, involving many JVs)

Leader, Diana Northup

Two teams participated in the January Lechuguilla expedition, and accomplished the following: 1) obtained fungal samples from corrosion residues in the Western Borehole and Southwestern branch, 2) retrieved the final set of scanning electron microscope mounts from Western and Southwestern branches, 3) obtained water

samples from pools for bacterial culturing and for water chemistry analysis 4) collected samples of sulfur for bacterial culturing, 5) censused sites for the hair and lint study (hair and lint accumulations along travel routes have been colonized by fungi in places). In addition, air samples were taken for Kiym Cunningham's helium release study, and two tours of Bat Cave in Carlsbad Cavern were given for park rangers.

Participants: Jake Turin, Larry Sturdivant, Andy Messer, Todd Keay, Dick DesJardins, Bob Roe, Brian Mahon, Jeff Walker, Diana Northup, Cal Welbourne.

MISSOURI

January through March

Report by Mick Sutton

Almost all Missouri field trips over the winter were in support of the U.S. Forest Service mapping and biological inventory program.

New Liberty Cave, a long-standing mystery entry in the Missouri cave files, turned out to be substantial. The owners have always forbidden trips into the cave, but were willing to allow entry for survey and inventory. Four survey crews completed the mapping of a half mile of passage, some of it quite large. The small amount of water in the cave yielded two undescribed species of amphipod; both species have been collected from other area caves, but this is the only site where they have been found together. Our USFS coordinator, Jerry Gott, was a guest on one of these trips.

On the Eleven Point Ranch, where the USFS holds a scenic easement along the National Scenic River corridor, three crews worked on the biological inventory of Posy Spring and Cascade Spring. The former is a major stream cave and a rich site for aquatic biology, with populations of southern cave fish and Salem cave crayfish in addition to the usual amphipods and isopods.

There was an attempt to complete the survey of Brawley Cave in the Hurricane Creek valley, but the crew instead discovered an unentered side passage which continues. A large crew mapped Statue Cave in the aptly named Spring Creek valley. The cave consists of 720 ft. of stream crawl, most of it fairly unpleasant. It ends in a breakdown collapse, which turns out to be directly beneath a side valley—the cave is a classic case of stream piracy, short-cutting the downstream part of the tributary.

Farther up Spring Creek, a closely similar case was discovered at Cropper Cave which ends in a syphon directly beneath the stream bed of a tributary valley. When visited in the autumn, this site was a spring with zero air-space, but after a long rainless spell, the entrance was completely dry. A survey crew mapped 600 ft. of mostly wet passage varying from comfortable walking height to very low, and confirmed that the cave is a Salem cave crayfish site; the crayfish shared the pools with a number of sculpins. Cropper Cave is a

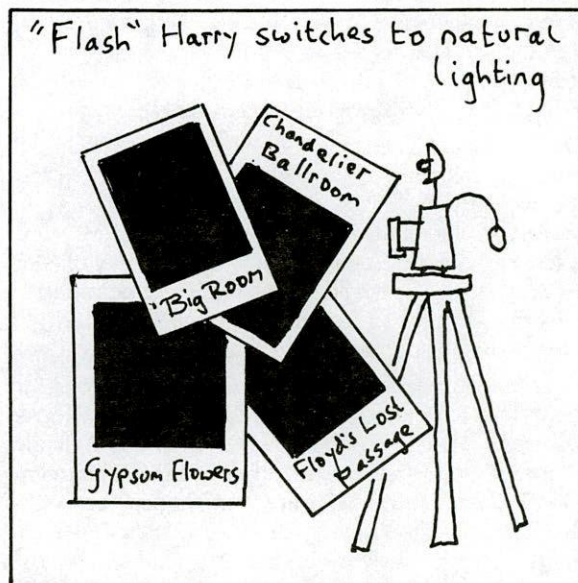
definite flood hazard—it would take less than a two foot rise in the cave pool to syphon the entrance shut.

Thrasher Ford Cave, an important gray bat maternity site overlooking the Eleven Point River, was inventoried. A small cluster of bats had apparently overwintered in the cave; bat biologist Rick Clawson states that this is not unusual during exceptionally mild winters. Finally, Cat Cave, an uninspiring 200 ft. long crawlway, provided a good work-out for a trainee survey crew.

Two closely related troglobitic amphipods are turning up in most of the area stream caves. *Stygobromus onondagaensis* is an Ozark endemic that is a candidate for listing under the federal Endangered Species Act. The other species is currently being described by amphipod taxonomist John Holsinger. The ranges of the two overlap considerably within the study area. Another currently undescribed amphipod species has turned up at a couple of sites. These rather large amphipods have been collected only from small drip pools, where they have apparently washed out from the interstitial zone.

There was one non-inventory trip, to continue the survey of Still Spring, a major stream cave on the USFS Willow Springs District. The crew did 200 ft. of mop-up survey and extended the main line for 250 ft. to what appeared to be an end. However, a very low, wet bypass was discovered, leading into continuing 5 ft. high passage.

Survey Crews: *New Liberty Cave*— Scott House, Mick Sutton, Sue Hagan, Tim O'Dell, Cathy O'Dell, Bruce Black, Bob Osburn, Jerry Wagner; *Posy and Cascade Springs*— Mick Sutton, Sue Hagan, Rick Olson, Tim O'Dell, Cathy O'Dell; *Brawley Cave*— Jim Kaufmann, Steve Irvine, Scott Palmtag; *Statue Cave*— Scott House, Doug Baker, Tim O'Dell, Mick Sutton, Bruce Black, Cathy O'Dell; *Cropper Cave*— Mick Sutton, Sue Hagan; *Thrasher Ford Cave*— Sue Hagan, Mick Sutton; *Cat Cave*— Tim O'Dell, Cathy O'Dell, Bruce Black; *Still Spring*— Doug Baker, Steve Irvine, George Bilbrey, Lillian Novela, Steve Olson.



China 1991-92 by Ian Baren

China is full of holes, a fact noticed, commented on, painted, coped with, and exploited by the Chinese people for millennia. There are the ancient Buddhist cave paintings of Dun Huang, walled fortifications in cave entrances, and scores of niter works. Massive blocks of limestone were erected in many cave mouths and carved with the emperor's edicts describing the types and quantities of stalagmites and cave crystals to be mined and sent for medicinal use in the emperor's boudoir. Cavers in China today may not taste medicine quite so special, but in a country that is more than 1/5th karst and limestone the opportunities for discovery are plentiful.

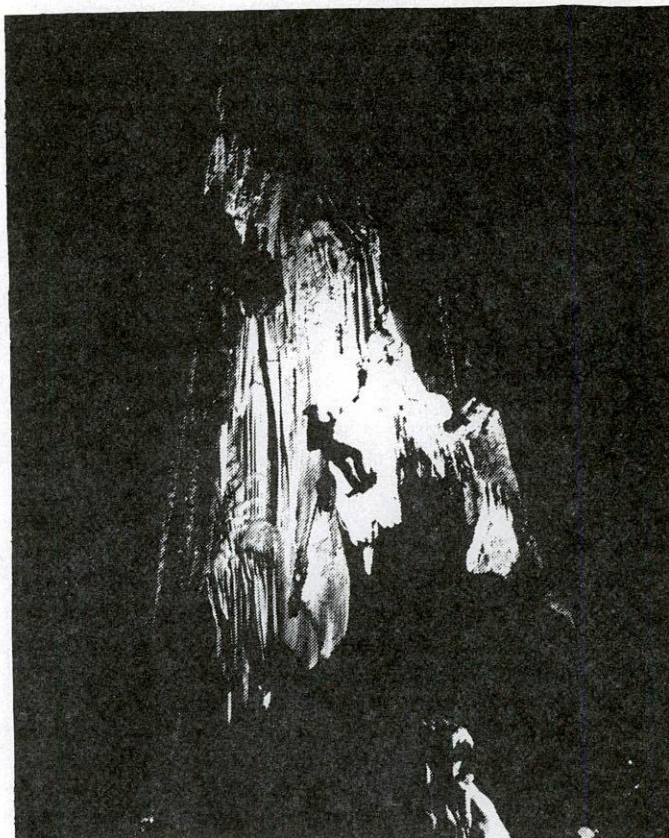
Following the 1988 CRF/NSS expedition to China (detailed in *South China Caves*), Tom Stockart, Mike Taylor and I made a CRF-funded return visit to northern Guangdong Province in 1990. We continued the survey of Swallow Cave, mapped the "huge room" left at the bottom of the map, and found more than 3000 bats in a large dome. We returned to the 100 meter deep pit, Tong Tian Lou (Basket Facing Heaven) and found two tight but blowing leads on the forested bottom. We also dropped a 33 m pit in nearby Deer Cave.

Armed with an introduction from Professor Mo Zhongda of the Speleology Society of South China Normal University, Tom and I flew from Guangdong Province to Guiyang, capital of Guizhou Province. Guizhou Province is more than 73% karst—more than 170,000 square kilometers—with limestone up to 1000 m thick. British, French, New Zealander and Australian expeditions since the mid '80s had returned with stunning initial finds. We were able to spend only six days in Guizhou, but our hastily arranged tour of potential sites gave us ample reason to want to come back.

In the late summer of 1991, Mike Taylor secured support for a full expedition from the Smithsonian Magazine to explore what we had seen in Guizhou. Eight of us left the U.S. on December 19: Pat Kambesis (cartographer), Mike Newsome, Tom Stockart, Kevin Downey (photographer), Chris Stine (photo assistant), Don Coons (equipment and rigging), Mike Taylor (writer), and myself as leader and interpreter.

After a day in Hong Kong to recover from the flight, we departed by train for Canton, in Mainland China. A quick plane flight later, we landed at Guiyang where we spent three days at this capital of Guizhou Province and home of our hosts at the Normal University Geology Department. We gave a day of SRT practice to the students and faculty and were treated to a 27-course banquet on Christmas Eve.

On Christmas morning, after a stunning drive through karst gorges, we pulled up to the guesthouse attached to the Dajidong tour cave, our home for the next week or so. Dajidong, (Shoot the Chicken Cave), is the 7th most popular tourist attraction in China. The town of Daji is undergoing a big improvement program



Tim Stockart ascending out of Chui Feng Dong (Blowing Wind Cave), Ping Ba County. Photo. by Ian Baren

in preparation to hosting a field trip from the XI Congress of Speleology in Beijing in 1994. The tour cave is only a taste of the caves in the area, though, and from the site of the spiffy new hotel being built for '94, one can gaze out over the spectacular 300m deep Zhijin River gorge that was our first objective.

Zhijin River disappears into a blimp-sized entrance, sees daylight sometime later in a deep karst window, flows under a natural bridge, and through 1.5 km of gorge with sheer 250-300 m high walls, finally disappearing into a gaping entrance before resurging somewhere in the Liuzhong River about 3 km away.

The day after arriving, the eight American cavers and three cavers from the University (Xiong Kangning, Tan Ming, and Chen Xing) set off on the hike to the bottom of the gorge below the village to tackle the final insurgence, Da Chaokou (Big Slot Opening). The Chinese component of the group varied during our time in the field as their teaching and work load demanded. We were joined later by Zhu An and Liang Hong, as well as more senior faculty who helped with smoothing out arrangements with local town governments.

At the dipline of Da Chaokou, we started to survey the 73 m high entrance, and it took more than three hours to move the survey anywhere near the end of

daylight. Not only is there a well-worn path to the entrance, but there is much evidence of old niter works, stone steps and other evidence of human use of the cave.

By this time, the Chinese cavers were cold and unimpressed by our slow mapping and exploration technique. Don Coons and I went with Tan Ming down the passage to see if it went or sumped. As we walked in the rushing water, the passage got narrower and the water deeper. We floated along the walls of the river passage for about 600 m to a small rocky sandbar. There, in a slightly bowl-shaped room, the cave sumped, with an intriguing but unreachable lead visible about 8 m off the water. Soaked and chilled, we trudged upstream and rejoined the rest of the team in continuing the survey, which was completed a few days later.

Over the next two days we were taken by a local guide to Heidong (Black Cave) on the north side of the Zhijin River. The cave is a fossil upper level of the

Don impressed us one day by free climbing a particularly nasty wall, while next to him a boy of ten shouted that Don was taking the wrong route and proved it by climbing the same wall without taking his hands out of his pockets.

present river course, about 100 m above river level. We found many niter works, small canals cut in the mud floor to transport water for leaching, and a crenelated wall well into the cave, once used by the locals as refuge from taxes, warlords and political instability. The passage was 4-20 m wide, 15-30+ m high, and well decorated in places. One room was large and foggy enough for several of us to get lost. The total mapped length stands at 4 km.

On a day when our team split in two, both found caves that were called Long Qidong (Dragon's Breath Cave) for all the steam blowing out of the entrance. Pat, Tom and Mike Newsome surveyed a really well decorated cave 600 m to a second entrance, then looped the survey line back on the surface for closure.

The same day, Chris, Kevin, Zhu An, Liang Hong and I hiked up to Dragon's Breath Cave II south of the village. While gearing up in the entrance, we heard noises from inside. Shortly, three women appeared wearing large water-carrying backpacks each holding about 5 gallons, and sharing a single kerosene lamp. A tough way to get water, but still easier than hiking all the way down into the Zhijin River gorge. The women wore threadbare sneakers to climb a trail that not a few of us had slipped on while using fancy hiking boots.

In many encounters like this, we all gained a deep respect for the persistence and skill that the local population showed in using the caves for water, for washing clothes, even for food, by gathering birds' nests. People in worn shoes and one layer of cotton pants would follow us deep into river caves, following the strange Westerners in their yards of neoprene, leather and nylon. The nitrate workers and people who built the many in-

cave fortifications that we saw went through real hardship to defend themselves, using caves as a vital resource for survival. Don impressed us one day by free climbing a particularly nasty wall, while next to him a boy of ten shouted that Don was taking the wrong route and proved it by climbing the same wall without once taking his hands out of his pockets.

Dragon's Breath Cave II went about 100 m to a 26 m drop. From there we surveyed to a confusing dead-end serpentine passage, then set off in the opposite direction from the drop. It lead down a movie-set perfect dry passage with some very pretty crystals on the walls and ceiling. After about three hours of productive survey, Zhu An stopped and said, "It is time to go to dinner. We are meeting the jeep in half an hour". With large going cave ahead of our lamps and snow and rain outside the cave, it was hard to leave. But group caving in China is not like in the US. Food is very important, and the words "safety" and "security" are used to mean anything from eating three meals a day and not caving too late at night to not telling us the group's plans. This was the biggest frustration during the expedition, but as our two teams work together in the future this should become less of a problem.

Dragon's Breath Cave II was eventually surveyed to 1900 m, but it exacted a price. On the last trip, Mike Newsome was plagued by an unexpected slide down a steep scree slope, getting stuck in a vertical crawlway, and having a nut in the rope rigging pop out. Mike absorbed all the bad spirits of the cave, which by Chinese caving custom we should have chased off with fireworks set off in the entrance before starting. This important safety technique was soon undertaken with zeal, except in caves that seemed to be taking air.

In the next three days we rappelled into the gaping karst window upstream of Da Chaokou, a free drop of 170 meters. We surveyed from the insurgence, through the natural bridge and into the cave upstream for about 1 km before emerging next to a very well-kept hydro-electric station practically in the mouth of the cave.

One morning four of us had a meeting with the director of the Shoot the Chicken cave, Mr. He Shirong, to report on our findings and comment on the status of conservation in the cave. Pat displayed the maps she had drafted. We talked about ways visitors could be better managed to have less impact on the cave environment, as well as more "natural" lighting, and suggested more conservation messages be included in the cave's displays and published material. We had anticipated the meeting as just one more meet-and-greet with uninterested officials, but left very much impressed with Mr. Shi and his staff's interest and concern.

We finished our work in Zhijin County on January 3rd, and left for Anshun, a large industrial town where we stayed a day, cleaned up a bit, and then all except Kevin and I left for Pingba County, the second area of our exploration. Kevin had a stomach virus that sent

him to bed for two days, and I stayed to interpret for him. All of us suffered from colds, flu-like symptoms, and other ailments. The weather was partly to blame, perhaps along with the food which ranged from the merely unusual (noodles in lard) to the truly exotic (dog stew and raw giblets over noodles).

In our 45 days in China, we had three sunny days, the rest being rain and snow with temperatures rarely rising above 40. Still, the weather was to our advantage. The caves Tom and I saw in our 1991 reconnaissance were all taking big water in November, so this year we came in December and January to take advantage of the lowest annual water level. The idea worked well; the water was below the raging torrent level we saw so much evidence of: tree trunks wedged high, and organic matter plastered 20-30 m up the walls.

In Zhijin, the guesthouse was fitted with a little ceramic coal brazier for warmth and at least partly drying our clothes. However, they spewed coal and sulfur fumes right into the room, and opening a window only served to lose the modest heat output. So, using cardboard, duct tape, and sections of stovepipe, we vented the killer fumes out a window.

When Kevin recovered, we joined the rest of the crew in Guadou village. Our first day, Kevin and I went with Chen Xing to look at a cave with archeological significance. After a two hour jeep ride, we entered the cave and saw a sight that took a few minutes to fully comprehend. More than 700 wooden coffins were stacked up. Many were broken, and bones, ribs, vertebrae and skulls were all over the place. The site has been in continuous use for more than 1000 years by a single clan of the Miao Minority people. When the coffins get crowded, every 300 years or so, the clan sets fire to them to make more room.

The others had already started the survey of a cave Tom and I had poked into in 1990, Doubin Dong (Hiding Soldiers Cave). As in many areas of China, from earliest history until the mid 1940s, army enlistment was often less than voluntary. Local people commonly hid in caves and on karst pinnacles to avoid being taken by the press-gang.

Doubin Dong's entrance looks out over the San Cha River and appeared to be the most likely resurgence for two or three large insurgencies to the south. Surveying through a switch-back maze passage, we found the remains of an early explorer who had fallen from an upper level passage. Most of the skeleton had scattered but one thigh bone had somehow become encrusted in flowstone on the side of a nearby column. After 1200 m of winding passage, we hit helmet-high water that require the use of inner-tubes. Xiong Kangning, Liang Hong, and two American cavers followed the water for 1 km south to an upper-level, dry maze in which it was easy to get lost. This promising lead had to be left for another trip.

We surveyed downstream into all three of the insurgencies south of Guadou. All still have going cave. The first, Hua Ta Dong, featured a spring used for clothes washing above the entrance. We followed a large stream passage through a wide sandy passage, seeming to end in a sump. On the last day, Don and Chris found a possible bypass, so this is still promising.

YouCai Dong had some of the clearest water encountered in an area where yellowish streams are the rule, but after only 500 m it changed from easy walking stream passage to a deep stream. We had forgotten the inner tubes, so we moved on to the most promising looking of the three insurgencies.

XiaoLu Dong started with an impressive walled fortification in the 50 m high entrance, and slowly got smaller and smaller. Cavers from the University had explored it a few years ago and had been stopped by a waterfall. We set bolts along the wall to redirect the rope out of the heavy water and Chris rappelled 8 meters into a swift stream in a slot. He came right back up, muttering something about bringing more than a farmer john wetsuit next time. Tom and I went down, tied on 40 m of handline, and let the current take us downstream. Just as the line ended, we found walking passage that quickly lead to another waterfall. We were out of rope, so left another cave that will need more work.

A fiercely blowing hole yielded the best decorated cave of the trip. Chui Feng Dong (Blowing Wind Cave) started as a two by two foot hole in a hillside within walking distance of the government office that we were staying in. Don and Chris compared the wind to that coming out of Lechuguilla. A 23 m drop led to a room completely covered in hanging flowstone, a second drop, a lake that Don swam across, and a third drop to a section of world-class boot-sucking mud. This led to some nice white stalagmites, a fourth rope drop, and a wall of drapery that nearly cut off the passage. In two days of survey, the team mapped 700 m to a small lake, beyond which is still another pit. The wind in the entrance disappears inside, but the cave shows every sign of continuing.

With three days left, one of the guides from the village took us to Laowadong (Old Eagle Cave). This was a surface pit about 100 m across, and 80 m deep. Chris was the first to hit the bottom and quickly saw that there had to be a walking route; the trees and shrubs had been cut for firewood and there were stone steps in steep areas. The team followed his shouts and hiked down. We surveyed into a zig-zag vadose passage with a flat mud floor. The passage was 20-30 m wide and just as high. 560 m was surveyed before we had to turn back to town for our farewell banquet.

We left Pingba County for three days of meetings and tourism in Guiyang. To the University leaders, we showed our maps and described what we hope to accomplish with future expeditions. All agreed that the first

joint CRF-Normal University cooperation was successful and productive, with more than 112.5 kilometers mapped in 13 caves. Rather than concentrate on one cave or system, we made a sometimes painful effort to map a useful distance in as many caves as possible so as to get a better sense of overall cave development.

This summer, four cavers and faculty members from Guiyang Normal University will visit the US. They plan to explore caves of the Appalachian Karst and visit Mammoth Cave before attending the NSS convention in Indiana in August. President He Caihua invited the CRF

to send a return expedition, tentatively scheduled for March-April 1993. This will build on previous exploration and will study more closely the geology, hydrology, biology and possibly the archeological potential of the Guizhou karst.

The 1991-92 CRF Team would like to thank the faculty and staff of Guizhou Normal University for all their preparation and hospitality, the Smithsonian Magazine for supporting travel costs, the NSS Research Advisory Committee which granted the China/USA Caves Project status as a NSS project, and the Met and the Northern New Jersey Grottos.

Have you seen this fern? The Hart's-tongue fern (*Phyllitis scolopendrium*) may be found in the eastern U.S. within sinkholes and "cold trap" entrances, and near entrances that blow air. It should be between 15 cm and 70 cm tall in the Kentucky and Tennessee region. The plant is rare, and some botanists believe it to be extinct. If you have seen this fern (or anything that looks like it), please contact Phil DiBlasi, Dept. of Archeology, University of Louisville, Louisville, KY 40292 (502-588-6724).

Digging in Your Own Backyard: An Interview with Dave Weller

by Kevin Downs

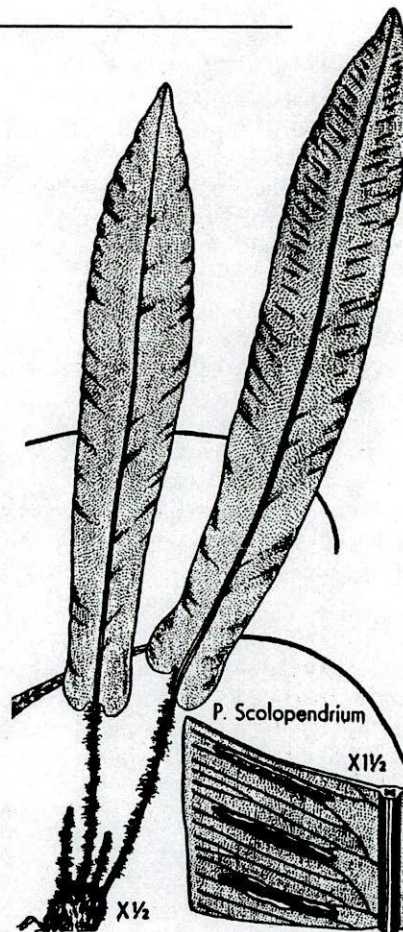
It is a moist March evening. The streets are still wet from the rain that we've had most of the day. I have never been to Dave's house before. He lives about ten miles from me on the opposite side of the county and I'm looking at the house numbers as I drive down his street. Suddenly, from the next block down, I see a blue flash against the evening sky. The trees have an eerie electric glow like ground-based lightning, the kind seen in science fiction movies. But this is no movie—the blue glow comes from an arc welding torch. There's no doubt which house is Dave's.

Dave Weller is well known as a regular attendee at many CRF expeditions and is a long-standing member of the Central Kentucky Karst Coalition. He was recently elected to Membership in the Cave Research Foundation.

Dave is most famous for his work on many successful entrance digs in and around the Mammoth Cave region. Currently he has four entrances to his credit, three of them into the Roppel section of the Mammoth Cave System: Weller, Khan and the new Downy Avenue Entrance (in progress at this writing). He has also engineered the opening of the entrance to Hicks Cave (a downstream section of Hidden River Cave), gated the Ferguson Entrance to Mammoth Cave and gated the entrance to Xanadu Cave in Tennessee.

His record for digging manmade entrances to Mammoth Cave, is rivalled only, perhaps, by George Morrison in the 1920's and '30s. Dave's techniques are impressive indeed. He has a collection of digging tools that is vast: drilling machines, air compressors, a tractor, an earth mover, a backhoe, hammers, chisels, rock drills, conveyers, welding machines, cutting torches, diving equipment. Standing in front of his garage I am overwhelmed by the incredible array of tools before me. Never have I seen such a collection in one person's garage. He even has his own machine shop in back.

Dave is in the process of welding an extensive system of ladders to use in his entrance when it is completed. As I approach he hands me a spare welding hood. The interview begins.



When did you start caving?

About 1948. I was small and in summer camp at Otter Creek Park. My first trip was in Daniel Boone Cave, overlooking the Ohio river. I did a lot of commercial type trips until the late fifties. Most of my caving has been done since I was married.

When did you join the NSS?

I joined because I wanted to be an officer in the Louisville Grotto. Back then people would smoke their NSS numbers all over the caves. I think they changed when they became aware that caves were fragile and were slowly being destroyed. I think the attitude towards conservation by NSS members is much better today. I don't like the politics, however; politics spoils caving.

How did you get involved in the CKKC?

I met Bill Walter at a Cumberland Caverns Christmas party in 1978 and came to Roppel in March of '79. We met at the old field house back then. Pete Crecelius brought me down because I had no transportation. Pete would drive all the way down from Muncie, Indiana. The first trip was so hard that on the way back I slept all of the way to Louisville.

On that first trip we got into Lower Arlie Way and Crecelius Dome. We saw one end of Kangaroo Canyon which we ended up by-passing because we thought it looked like a crawl. We got to Weller Canyon which I turned around in. Anytime somebody turned around in something in Roppel it would get named after them. That was the first time I saw the underside of what is now my farm. We were surveying North Crouchway. Jim Borden didn't believe I would come back after that.

Were there other memorable trips?

I was in the cave the night the big flood hit. We didn't know it was going to rain when we went in—it came down unexpectedly. There was a nice stream coming out. When we got to the door the water was thirty inches deep on a 36 inch door. The door was in farther then and when we got through we found the entrance room was full of water.

What were your first trips in Roppel like?

They were seventeen hours long, we were surveying the S survey, and the popcorn was still new. The S survey has been tamed since then; its no longer full of sharp popcorn all over the place.

What prompted you to come back after your first trip?

I just don't give up on anything.

Would you say Roppel was where you learned to cave?

No, before that I was working in Rockcastle County with Jim Reddin. We were doing some rope work. There were a bunch of caves we worked on, such as Mullen Springs. We would go down on camping trips. This was back when my daughter was born, 22 or 23 years ago. I was living in Louisville and would take off on Friday and cave Saturday and Sunday.

When did you first get into the cave modification aspects of exploration?

Working in Roppel. About a year after my first trip we started working on the Weller Entrance. I spent about a year and a half working on that. We would go down every other weekend, sometimes during the week.

Was that the first entrance you worked on?

Yes. I had a lot of help from a lot of friends on that.

What was the hardest part of digging that entrance?

Carrying five-gallon pails of rocks out while you were bent over double. And keeping it up week after week. I couldn't work but one day at a time. Sometimes laying in there digging at the end of it I would go through one carbide lamp and someone would slide another one in after it on the sled. I have some sleds I made up special. You clip a rope and a carabiner on them. They are about 5 inches wide and slide around you as you dig.

How far did you have to dig?

We started at the surface. I couldn't fit through it but Jim Borden had squeezed through there. Then we got into a room where I could dig and we started from there. Generally there was about an inch to 3 inches of space anywhere around you, but the rest was dug out, some of it to walking height.

Those things can drag out for so long. A project like that goes by little by little. We had a champagne party the night we got through with stemware set out on the rocks. That was October, 1981. There are some pictures in the NSS News. All of my really good slides are gone now; they were stolen from the Roppel Field House. The only copy of one picture I have is in the NSS News.

Did the Weller Entrance open Roppel for exploration?

No. The discovery of the S Survey did, but then it started slacking off again because the trips were so long. After it opened up, one year we surveyed 11 miles. Another year we surveyed ten. We had some good years after that, and then it got until it was five or six hours one way. That was when we were working out Khan and then way down the River. The next big thing was the Mammoth Cave connection trip. That I enjoyed. That was September 10, 1983. We planned it at Old Timers and then got everything ready for the next weekend.

We went in over at the Ferguson Entrance. I was with Jim Borden, the Bruckers, Don Coons, and Sheri Engler. Four others went in the Weller Entrance, Bill Walter, Roberta Swicegood, Dave Black, and John Branstetter.

What was the hardest part of the connection trip?

It really wasn't a very hard trip. It was only about 15 hours and it was all through stuff that I knew so that made it easy. It was all downhill from the entrance. I

think Sheri was the only one who carried her gear all the way for the whole trip. The rest of us left our vertical gear and wet suit packs at the entrance, and then the other crew picked it up. When I put my wet suit on I left my sleeves unzipped and got sand in them—I paid dearly the rest of the trip. My arms were really raw.

What was the rest of the trip like? Was it mostly in walking cave?

On the Roppel side of the sump, no. It's waist deep and you're sinking almost to your knees in mud. The ceiling is low so you're bent over, too. I've got a lot of pictures of that.

When did you join CRF?

I'm not sure. I really don't remember if it was after the connection or before. I'd been going over to Flint Ridge and I'd already built the door at Ferguson with CRF people. Ferguson was open and we just dug and opened it up a little more to put the gate in. That was

On one of those trips we tried to put the first four feet of concrete in. I went in at 2:30 in the afternoon and came out at 2:30 in the morning. I was on rope the whole time; I was forty feet down and forty feet off the floor.

done in one week. We discussed it on a Roppel trip and went over and measured it. In that week's time we turned in a bid to the Park, got it accepted, ordered all the steel and prefabbed the gate. We put it in the next weekend.

Was all of the gate built here in your workshop?

Yes, word had gotten out that there was an entrance to the cave outside the park. The Park paid for the expenses and even paid a crew to come over and help.

After that what did you start working on?

The entrance to Hicks Cave. It had been abandoned when the originators had failed to open it six years before. We actually got that entrance opened in six weeks. That one went pretty good. In one weekend I drove 600 miles while working on the entrance.

Did you blast from the surface or from inside the cave?

We went down. The original crew started going up but we went down using the existing holes. It was five hours back into the cave, under ideal caving conditions—when you could get in. The entrance was done primarily with Phil O'Dell, Tom Ahlers and Duke Hopper. Don Coons came over, too. We had to keep the entrance completely covered up because it was so close to houses and the main road. Most of that work was done on a rope with a belay because we already had about an eight or ten inch hole that was funnel shaped, closing in at the bottom. If you slipped and fell you could end up wedged down in there. A belay would at least enable people to pull you back out. We lost a few tools down the hole which are still there.

On one of those trips we tried to put the first four feet of concrete in. I went in at 2:30 in the afternoon and came out at 2:30 in the morning. I was on rope the whole time; I was forty feet down and forty feet off the floor. The only reason we finally quit that day was the concrete mixer wanted to go home—he was tired. They had to climb through the fence and carry five-gallon pails of water all day so I guess they were pretty tired. The hole we dug for that entrance makes the hole we are digging now look small.

Looking at the Hicks entrance today it appears it was done well; the culvert is stable and the lid is very secure.

The culvert is secure because there are 25 yards of concrete around it. That tends to permanantize things. We formed it and then poured a bottom in there and then put a four-foot length of pipe down to the bottom. We let that set and came back and set two lengths of culvert on top of that. We also put rebar in the concrete. It's a pretty good entrance.

It's a fun entrance to use.

I've been in it once.

All that work and only one trip!? Is the satisfaction in the actual work of putting the entrance in?

I enjoyed it. I've had a key to it and I've been invited on many trips. I just haven't gone back.

It seems that this part of caving has no instant gratification.

Well, when I finish one I start another. When we finished that one, we started working on the gate for Xanadu. Sometime after that we finally got permission to start working on the Khan entrance. We had been shut out of using the Weller entrance because of new landowners. I caved with CRF a little more, but we still wanted to get back into Roppel. We had actually started digging once before and the entrance would have been in a different spot had we continued with our first location.

I've seen that other hole up there.

Well, that's partly natural. While we were digging you could hear them down in the cave. Then we radio surveyed it. The radio survey station became obliterated by some unknown circumstance so we lost our reference to where it was. After that I went over and decided I didn't like the spot. So I used the old tried and true way like you witch for water except instead of using a willow stick I went out with empty hands and right in the middle of our rubble pile it looked like a good spot. So that's where we started.

Well, it came in exactly on the edge of the room. You couldn't have guessed it any better.

We walked right out there, looked at it, and said “that's a good spot.”

So it was just luck?

Yes and no. We hit rock on that dig at three inches below the soil. It was a slow dig; we were going

through sandstone cobbles and lots of other rock. We couldn't have had a better crew; Dick Market and the guys from Evansville Grotto were the help behind that project. They made it a lot of fun. Khan had to be fully timbered because it was ready to cave-in at any minute. The culvert and lid were made at my house and taken down when the dig was finished.

After we got the entrance completed and sealed, I got kind of burned out. I got involved on my farm then. I spent four years negotiating on that property and finally got it in December of 1990, right during the Christmas holiday. It was raining the day I bought it and it continued to rain for about a solid month. It was so soggy you couldn't get in the place.

When the new Downy Avenue entrance is operational do you think it will usher in a new era of exploration in Roppel Cave?

I think things will get back closer to normal. I don't know if it will ever get back like it was because Lechuguilla is now the "in" project, and we've lost a lot of our people that were in college and have graduated and no longer cave. We had lots of Canadians that would come down back then, van loads of them. But we still have a lot of good people. The key to the Roppel project has been primarily the efforts of Jim Borden, who calls people on a regular basis and helps keep everybody in touch.

Do you think there are more discoveries to be made?

Definitely. There's lots of cave that has been walked right by.

What do you like about owning your own entrance?

I always wanted to own a cave. Sometimes I'm sorry it's part of Mammoth because it's such a big system. It would be nice to have a little cave, one that's all yours and not lost in the whole thing. I don't want to do anything that will cause the cave to be damaged and obviously I don't want anybody to get hurt. Then again it's something I can enjoy.

How many hours do you think you have tied up on this particular entrance?

Quite some few hundred already and I'm not finished yet. I've spent well over a hundred hours drilling.

Do you think you'll dig another entrance when you finish this one?

I have no plans for another one but I'll wait and see. There is no need to put another entrance into the system anywhere close at this time. Sometime, I would like to put a house down there at the cave.

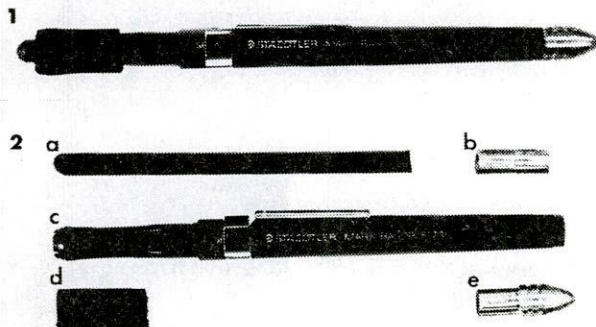
For a retirement home?

I don't know. There are some things I like about the neighborhood and some I don't. The old story about getting lost in the basement could certainly come true.

A Survey Station Labeling Pencil

Rick Olson

At Mammoth Cave, survey stations have been primarily labeled with the flame of a carbide lamp ever since the current era of exploration began. In dry upper levels these station labels can be considered permanent; in the flood zone they are not. Where mud banks exist, moderately long-lasting labels can be incised with a fingertip, and especially important stations are designated with a poker chip. A recently devised alternative uses a graphite woodless pencil* as the lead in a simple mechanical



Above: the assembled pencil. Below: a) graphite lead from woodless pencil, b) aluminum rod hammer, c) holder, d) slip-clamp, e) aluminum stylus.

pencil adapted from a Staedtler eraser holder (Mars Razor 52730). A press-fit aluminum stylus plugs the back end of the pencil and has multiple functions. It serves as a backstop for an aluminum rod hammer that is used to drive the lead forward, the stylus will write in aluminum on black manganese coated rock, and it can also be used to incise labels in weathered limestone surfaces or on mudbanks. On mud covered limestone, the stylus can cut away the mud before labeling with graphite. This yields a bolder label than writing in mud alone.

Naturally, this pencil works best on smooth limestone, but it performs adequately on rough surfaces as well. The best results are obtained by making multiple passes over the rock while pressing lightly. Pressing heavily tends to push the lead back in. To advance the lead, release the slip-clamp and shake the pencil back and forth so the aluminum rod inside will pound the lead forward, then resecure the clamp.

This pencil was developed so that a caver with electric lighting could set stations, but even for cavers with carbide lighting, using the pencil means fewer refuelings, and the choice of reflector is not restricted. However, the greatest advantage of this station labeling pencil over lamp soot is that it does not easily wash off whether applied to wet or dry rock.

*Holland # 8620 Bruynzeel design woodless pencil (7 mm diameter). I chose grade HB because it wears well.

CALENDAR

ANNUAL MEETING IN ALBUQUERQUE

This year's Annual Meeting will take place November 13-14 in Albuquerque, New Mexico. Fuller details will be published in the August *Newsletter*

GUADALUPES

Memorial Day, May 23-25. Carlsbad Caverns NP. Jason Richards 505-281-1961

June 13. Carlsbad Cavern. Pat Helton, 806-796-0973

June 21-27. Carlsbad Cavern Restoration. Dick Venters, 505-892-7370

Independence Day, July 3-5. Fort Stanton Cave. John Corcoran, 505-892-9651

July 18. Carlsbad Cavern. Pat Helton, 806-796-0973

Mid-Summer, Aug. 1-2. Carlsbad Caverns NP. Bruce Baker, 405-234-2963

Labor Day, Sept. 5-7. Carlsbad Caverns NP. Bernie Szukalski, 714-798-5986

Fall, Oct. 11-17. Capitan Mountains. Dick Venters, 505-892-7370

Thanksgiving, Nov. 26-29. Carlsbad Caverns NP. Dennis Helffenstein, 303-360-9428

Notify the expedition leader, the area manager (Dick Venters, 505-892-7370), or the supplies coordinator (Fritzi Hardy 505-345-1709) at least one week in advance.

MISSOURI

June 13-14. Doug Baker (314) 878-8831

July 18-19. Steve Irvine (314) 291-8495

August 22-23. Scott House (314) 287-4356

September 19-20. Mick Sutton (314) 546-2864

October 24-25. Bob Osburn (314) 772-5813

November 7-8. Doug Baker (314) 878-8831

December 12-13. Scott House (314) 287-4356

Most trips originate from Alley Center in the Ozark National Scenic Riverways but others may be held at Forest Service campgrounds. Please call the expedition leader a week in advance.

LILBURN

May 22-25. Bill Farr, 818-357-6927. Possible dive, sedimentology, sinkhole surveys, geological recon. of southern Redwood Canyon.

June 27-28. Howard Hurt and Joel Despaigne, 209-266-0521 (HH), 209-565-3341 (JD). Cartography.

July 24-26. Peter Bosted 415-366-5061 (H), 415-854-3300 x2755 (W). Cartography, sedimentology.

Sept. 5-7. Bill and Perri Frantz, 408-356-8506. Sedimentology, cartography, hydrology, diving.

Oct. 10-12. Cindy Heazlit and John Tinsley, 408-259-3874 (CH), 415-327-2368 (JT-H), 415-329-4928 (JT-W). Sedimentology, cartography, hydrology, possible dive.

Jan. 23, 1993. Mike Spiess, 209-434-3321 (H), 209-431-8100 (W). Organizational meeting in Fresno; site to be selected.

MAMMOTH CAVE

Memorial Day, May 22-25. Jim Borden, 606-223-2677 (H); 606-243-1826 (W).

Independence Day, June 26-July 6. Scott House, 314-287-4356; if no answer, try 314-598-4310.

Summer, August 7-10. Mel Park, 901-272-9393 (H); 901-528-5984 (W)

Labor Day, September 4-7. Bob Osburn, 314-772-5813 (H); 314-956-6666 (W)

Columbus Day, October 9-12. Neil Hammond, 317-786-2092.

Thanksgiving, November 25-29. Phil DiBlasi, 502-588-6724 (office) or 502-551-6920 (mobile) 7 am-4 pm; 502-968-3576 (home 4 pm-9 pm—phone is turned off after 9 pm) or leave a message at 502-589-2340.

First and last dates are arrival and departure dates. Notify the expedition leader or Operations Manager, Jim Borden, 606-243-1826 (W; can leave recording outside work hours). two weeks in advance.

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