

© 1977 B. Rogers

**FOUR BALCONY PIT CAVE**  
1989

Composite map from surveys by R. Baer and R. Greeley, June, 1970, and B. Rogers, R. & L. Parker, D. & J. McChung, June, 1977  
Grade 5b  
Cartography by B. Rogers & R. Baer

Length: 1526 ft. (465m)  
Depth: 87 ft. (27m)  
Altitude: 4180 ft. (1274m)

**THE SAG RAG ...**  
**VOL. 8 NO 4**  
**JULY-AUG 1989**

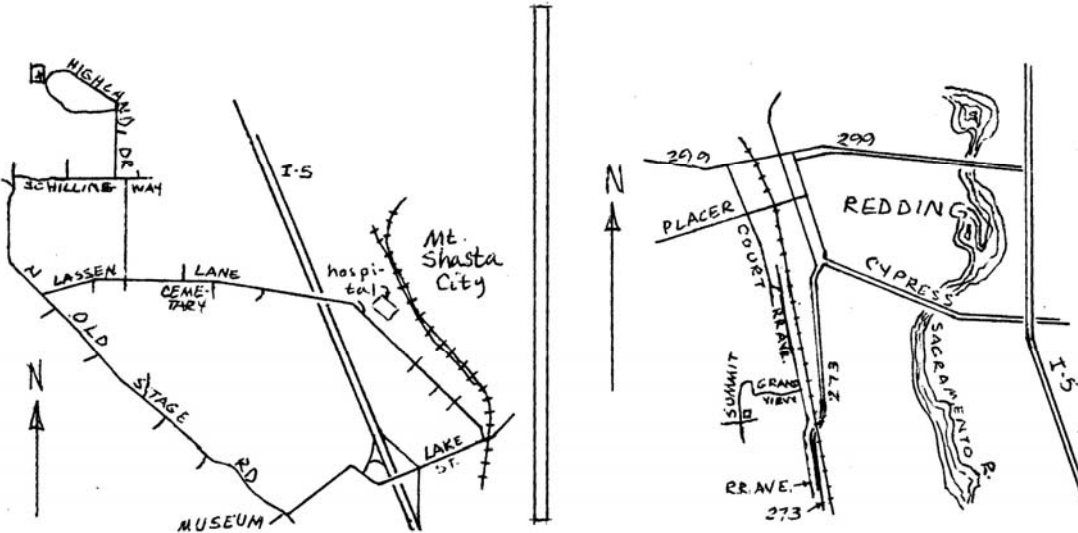
Map: Four Balcony Pit Cave

The SAG RAG is published bi-monthly by the Shasta Area Grotto of the National Speleological Society. Editors: Jim and Liz Wolff, PO Box 865, McCloud, Ca. 96057. Printing: Ray Miller. Grotto meetings are held the second Friday of the month at 7:30 pm. Meeting places are announced in the newsletter. Dues are due January 1, prorated by quarter, \$6. Subscriptions are \$6/year.

### CAVER'S CALENDAR

**Sept. Grotto Meeting** – Jim Kottinger's,  
1922 Highland Dr., Mt. Shasta, 926-3975.

**Oct. Grotto Meeting** – Claude Smith's,  
3645 Summit Dr., Redding, 246-3942.



**July 14th SAG Minutes in Brief** Present: Clarence & Evelyn Horner, Jim Kottinger, Ray Miller, George & Dorothy Reel, Wayne Smith, Jim & Liz Wolff.

**Minutes** accepted as corrected, treasurer's report: \$258.79 balance.

**Discussion** on possible ways to save the Western Region money on Cal Caver publishing. Medford's Ch. 10 News had a review on the Lava Beds with no safety message. June 21 Supersaver carried an advertisement for the grotto.

**Old Business:** Registers were discussed, the first will be installed July 19 in 3 Level.

**New Business:** It was suggested that the SAG take on the clean up of Bobcat Cave.

**Correspondence:** Letters from Henderson and Dan Hills of Georgia about the Ishi Caves; Fantasy Shirts; from Jim Smart an English caver who will be here in August. Phone call from Dick Die of McArthur CA about caves in the area, the SFBC referred him.

**August 11, 1989 Minutes in Brief** Present: Jim & Liz Wolff, Jim Kottinger, Neils Smith, Steve Knutson, Ray Miller.

**Minutes** accepted as corrected, treasurer's report: \$258.79.

**Correspondence:** letter from SFBC with a proposal about the Western Regional dues and **Cal Caver** (see next page); letter from Gary Schouest of Visalia CA asking for membership; reply from Ray recommending he try one of the grottos closer to him; letter from Lisa DeLucia asking for slides for the cover of the guidebook for the Convention; questionnaire from Janet Thorne, NSS conservation chair, on bats.

**Old Business:** None.

**New Business:** Regional at Quaking Aspen Campground, registration forms and maps available. September and October meeting places set.

### San Francisco Bay Chapter Proposal for the Western Region:

The Western Region has run into financial difficulty. The **Cal Caver** is the publication of the region and at present is virtually the only expense. For many years the printing was volunteered, at no cost to the region. Now that free printing is no longer available, so the full cost falls on the region. The dues were \$1/year, then \$2/year, and lately \$5/year. This leaves no money to support the existing funds, so the San Francisco Bay Chapter (SFB) of the NSS has come up with a proposal to bail out the Western Region from its monetary woes with the **Cal Caver** and other projects. Their proposal is in two parts: that the region establish a mandatory basic membership rate of \$1/person/year, payable through the grottos; and that subscriptions to the **Cal Caver** be separate and reflect the actual cost of publication, also payable through the grottos.

The comments for wise use of the dues money included: enlarging the existing Conservation Fund; establishing an Exploration Fund; establishing a Rescue Cache; seed money for regional meetings and educational seminars; reimbursement of expenses; reward for information leading to the conviction of cave vandals; buying equipment for the publication of the **Cal Caver**; fund a patch or T-shirt with a logo for the Western Region; support other conservation efforts such as Save the Whales or other worthy projects.

A copy of the full proposal is available to any interested person (call Jim Wolff, 916 964-3123). The SFBC would like the comments of all interested people. They would like to present the proposal at the regional meeting in October.

### Caving Activities of SAG Members:

- Remapping in Stairstep Dome Cave, Marble Mtns., was done by Peter Bosted, Cynthia Ream, Bob Richardson, Doug ? of the SFBC and J. Wolff over the July 4th holiday. Five hundred additional feet was added to the cave, and the downstream lead continues as a wet stream crawl. At least 25 cavers from all over the West showed up. Work continued in Rainy Cave that weekend with Steve Knutson, Mark Fritzsche and others doing digs in other “insignificant” leads.
- Aspirin Butte lead confirmed! Another cave lead from Jim W.’s bulging leads folder was eliminated. A lava blister on the shoulder of the flow was blowing like crazy, but impenetrable. Seems as tho it was taking surface air too – a dig possibility.

### TERRIFIC NEWS!!!

Steve Knutson has received one of the highest awards that the NSS offers, the Lew Bicking Award for dedication to exploration. Congratulations Steve! You certainly deserve it!

**New NSS A/V Library Program Now Available:** “Sumidero of the Rio Atima, Honduras” (S741) by Steve Knutson. This slide show covers the five expeditions required to complete the first through trip in this challenging vertical stream cave. For information write to the NSS A/V Library or see Jim Wolff at grotto meetings.

**“Shasta Area Grotto Library Is Alive and Well”** Sez Librarian – The SAG library is alive and well at Wolffs’ place. Many members don’t know that they can borrow books from Jim’s shelf most any time. If anyone wants to help out with the librarian-type work, you are welcome to inventory, sort grotto exchanges, etc. Just let Jim know you are interested.

### 1990 Convention Biology Trip Field Checking by Jim Wolff

I was asked by Dave Cowan if I knew of any caves near enough to the ‘90 NSS Convention site that could be visited in half a day. No problem. Then he asked if these had any cave life in them.... well, that narrowed the list down some but, no problem. Then he stipulated that the caves had to have horizontal entrances and near a road to cut down the logistics of getting people in and out in short order. The challenge was up and I bit at the bait.

On the 17th of June I met up with Dave Cowan (Chairman of one of the ‘90 Convention’s featured field trips). Paul Greaves, Tom Briggs, Warren Rauscher, and Darrel Ubick (who are rabid (?) biologists) and Jim Kottinger. We decided we would head toward Gazelle, since the limestone area is near Yreka. I have been to the area three times, in the past and have visited caves that might have life in them, who knows?

The limestone looked very easy to get around in, from the road, but once in the brush it was slower than I remembered it to be. I thought I could lead them right to the first cave, but I was wrong. Lucky that there were plenty of people looking. The first cave goes right through the ridge as a horizontal passage with a blackened ceiling. Was this from smoke or mineral staining? The little cave has life (and death) in abundance – in which the biologists delighted. We found a mummified owl near a rat's nest.

The next cave we were able to see from a distance. One entrance was particularly interesting. It looked like a kite in flight. Little did we know how close an observation that was! In order to get over to the next cave I knew about, we'd have to pass by that interesting hole. The kite-shaped entrance was a dandy. As if it was flying tether-free away from its pursuer, it would take rope and skill to get to it, and certainly hardware that we didn't have for protection of the climber on the overhanging climb. It appeared to ascend past a flowstone cascade into a roomy, "airy" chimney. Just below was a vertical fissure at the base of the cliff with an active honey bee hive about the size of a suitcase, hanging above a blowing hole! Upon careful examination the hole does lead to a large room! A pothunter's 1/4 inch screen lies at the beginning of this opening, indicating perhaps that the amateur "archaeologist" intended to return to the dig. There was some rock removed and stacked to the side indicating the attempt and equipment were abandoned before the job was done. Maybe the person got chased away by the "yellow guardians" a few yards above?

The second cave was a cool retreat from the 90 degree plus heat just outside the south facing entrance. Snake Pit, discovered by Claude Smith several years ago, was found to be very rich in biota, and although no rattlesnakes were found, several interesting critters were discovered. Everyone busied themselves with helping inventory the life in the cave, while others pushed the cave "where none have gone before". Paul found a slot in the floor beyond a formation area that led to a small crawl. He pushed into a 7 or 8 inch wide popcorn-filled crack in the ceiling of a small dome, and "popped out" (sorry for the pun) into another right-angled slot that led to a domepit. The dome extended some 30 or 40 feet above, and the pit about 60 feet below; plus it was filled with long-eared bats! By his description it sounded like it could be a maternity colony. This last happened late in the evening, when we really should be getting down off the hill. We could have tied our two short ropes together, but under my "encouragement" to make this long day a little shorter, they left the cave reluctantly, but happy, for they had found evidence of a wide variety of critters that use the caves...! We had dinner at 10 PM in Weed, CA.

### **Cavin' With Kids** by Ray Miller

It started as an experiment to introduce a fourth grade class at Mt. Shasta to lava tubes. Now it seems to be an annual affair. The system has evolved to the point where the teacher and I both know fairly well what to expect. Of course attempting to outguess a nine year old is always risky business. The secret is to keep flashlights away from the students. This stops the game of burn your buddy's eyeballs with a bright light. Each adult has a fluorescent or gas lantern. The kids stay in the pool of light, and they aren't tempted to engage in freelance exploring.

I always hit cave safety hard while outside the cave. I put on the proper caving gear and explain that I cannot outfit the entire class, so I have chosen a very safe and easy cave. Slowly proceeding underground allows eyes to adjust to the dark. We talk about the kinds of critters that can be found in caves, the formation of caves, and conservation.

After the kids get back to school the teacher asks them to send the trip leader a thank you note. These missives of enlightenment give me an insight on how I have impressed the children, and they are pure fun to read. Turning out all lights while deep underground is always a highlight. As Yelitha explained it "I have never seen pure dark in my life." Troy didn't know bobcats would go into caves. Shawn learned that snakes live at the entrances to caves, and "thats neat how stalagmites and stalagtights grow without sunlight." "I learned that caves get deeper and deeper. Lava runs throgh the tubes and some other lava comes throgh and it has some lines that tell you that lava has gone through many time." – By george Nicole, I think you've got it!

Fortunately my conservation messages generally come through intact. Nicole again: "You don't tell anybody about some caves because they paint on the walls and they throw beer cans in the caves." Niki wrote "It's sad how pepple treet bats." "I understand why you don't tell people about some caves. They destroy them. I wish they would just leave them the way they are." – Thanks Courtney, I couldn't have said it better.

"I learned that spelunking is very dangerous unless you have a helmet, coveralls, flashlight (or lantern) I also learned about stalagmites and stalagtites. Stalagmites hang down because they have mite." – You have the right idea, Gavin – sorta.

Very appropriate to a caving field trip; Brigitte ended her note with "Thank you a hole bunch." Thank you Brigitte and Bobby and Troy and Patti and all the rest of you. I enjoyed our caving trip a hole bunch also.

### 1989 Speleo/ed Seminar, Berkeley Tuolumne Camp – Memorial Day Week-end by L. Wolff

The educational seminar was attended by Jim & Bea Kottinger and Jim & Liz Wolff. We arrived at the camp at about 7pm. Arriving early has its compensations, such as having our choice of tent, view and location. We weren't too far from the dining hall. The food was plentiful and delicious, served buffet style so no waiting. We sat til late talking with friends from many years of caving.

Saturday morning's activities began with hanging pictures and maps for the salons, a welcoming talk by the camp manager and the first of many sessions. The exploration sessions were very good. The rescue readiness session was an eye opener. The 1990 convention session gave us a sample of what the promotional slide show would be like and was open for suggestion and comment. The biology talks were informative. At the conservation session, challenges to underground wilderness was the subject. Letters were written to Congressmen asking them to chose their course of action wisely, for the caves' sake, not the desires of a very small group of people.

A Western Region business meeting was held one evening. It was decided to raise the region dues to \$5 a year effective January 1, 1990. Bob Ehr's proposed guidelines for the Western Region's conservation grants were accepted unanimously. The auction afterwards was a great success, with Billy Post putting in his yearly appearance early this year. Another evening there was a multimedia slide show and, another evening a Lechuguilla show.

Sunday evening held a banquet topped off with cream puffs, fortunately small ones. The guest speaker was Sarah Bishop, a Cave Research Foundation director and an official with the National Park Service. She spoke on the challenges surfacing in the debates on underground wilderness. The outlook is not totally gloomy for underground wilderness, but much needs to be done to insure that it happens.

### The sky Burned, the Earth Shook, and All the Bunny Rabbits Ran Away, part 9: Four Balcony Pit Cave by Bruce Rogers, Regular Fellow.

It was a hot sunny afternoon perhaps 800 years ago when an inquisitive Yokut Indian peered into the darkness under the thin skin of basalt. Taking a handy cobble in hand, he probably performed the Standard Cave Rock Test: he threw it into the darkness. With no growls (a situation to be avoided) or splashes (no water either), he probably shrugged his shoulders and headed for the next lava tube to find some water to slake his thirst.

On another hot and sunny afternoon nearly 700 years later another visitor to the lava fields hunting or trapping paused at the same arched entrance. He too, probably conducted the Standard Cave Rock Test and, hearing no growls or splashes, ambled north to adjacent Tin Pail Cave. Here he knew he could cautiously slide into the twilight zone, lower a 5 gallon square tin pail into the apparently bottomless pit before him and pull it out partly filled with icy cold water. Satisfied, he returned the pail to a ledge under the arched entrance and went his way.

During yet another hot and sunny afternoon in 1970, Roger Baer and Ron Greeley ambled up to that same low arch and disappeared into the darkness with a cable ladder, rope, tape, and Brunton compass. Water or black bears were not their interest; they were out to map the cave. Greeley's studies of photos from both lunar and Martian surfaces had convinced him that those sinuous rills, as they were called, might be collapsed lava tubes of colossal size. Detailed studies of such phenomena on earth might prove such a thesis. To this end he convinced a bright young grad student at the University of New Mexico to study the relatively fresh lava flows surrounding Hambone Butte in Northern California.

The final chapter in the Saga of the hot and sunny afternoons came in 1977, when a group of cavers piled out of their cars and headed into the cave to survey a floor plan of the cave which had two names: Four Pit and Balcony Pit Cave. Some time after completing the mapping project, the cavers learned of the previous name and were presented with a dilemma of which name to use. To be sure, Baers' name was the original, but the new name was also firmly entrenched (no pun intended) in the local caving lore. The solution was simple: combine the names, thus Four Balcony Pit Cave (FBPC) it became.

FEPC is developed in the basaltic Giant Crater member of the Giant Crater Formation. This rock has been lumped with several other groups of volcanic rocks, including those of the Lava Beds and Newberry Crater, into the Modoc Basalt. This group has been found to be transitional between the alumina-rich Cascade volcanic rocks and the alkali-rich Basin Range and Snake River Plains volcanic rocks. The Giant Crater basalt is what's called a two pyroxene basalt. A chip of the rock ground down to the thickness of a human hair and peered at under a microscope would show a felted mass of calcium-rich plagioclase feldspar crystals held in a

ground mass of bronzy-green hypersthene pyroxene crystals. A scattering of stubby dark green augite pyroxene crystals and rounded bottle green olivene grains plus a bit of volcanic glass would complete the major minerals in the black-appearing basalt. Other evidence suggests that this basalt was skimmed off the top of the underlying magma chamber as opposed to the other basalts and andesites derived from the middle and bottom of the chamber. Whew, pretty heady stuff, huh?

The Giant Crater Lava Flow is nearly 18 miles long, dropping nearly 2490 feet from the crater itself which is at an elevation of 6379 feet. The flow was fed by a single tube of which approximately 17% is still intact as lava tubes. Most of the tube has collapsed, not a surprising result as many portions of the tube were thinly-roofed chambers nearly 50 feet wide. (A list of named caves appeared in the June 1980 Cal Caver.) Its exact age is still open to debate; however, it has been assigned a mid to late Holocene age, under 10,000 years old. Tree ring counts made on recently logged Ponderosa and Incense Cedar trees indicate a minimum age of approximately 220 to 320 years before present. It appears from USGS work done within the last few field seasons that an age of perhaps 1100 years old is more realistic. If this is true, then those old Yokuts must have had quite a show when Giant Crater blew its top.

Baer traced the development of the tube in some detail from his observations. These and a few bits of new data are presented here for your education and entertainment. It appears that the flow, and thus the cave, was guided down a shallow stream channel. At several points in the cave pre-flow soil is exposed. Upwards of 6 feet of white, pumice-rich soil material is overlain with reddish soil whose upper surface is in turn overlain by the basalt. A zone approximately 7 inches thick at the soil's top has been bleached by the basalt itself. Although few pebbles and cobbles are found in these soils, a pocket of stream-rounded pebbles up to 2 inches in diameter is found among the breakdown at approximately mid-cave. Whether these pebbles are from the pre-flow stream or from subsequent streams is not known, but it appears the climate has been too arid for such pebbles to have formed since the tube itself cooled.

There appear to be two main levels in the cave. Most of the remaining cave belongs to the upper level. The portions of the cave below and beyond the pit and balcony complex are remnants of the lower, older level. The history of the older portions of the cave is difficult to reconstruct as most of the passages are inaccessible; however, an attempt will be made here. The 87 foot depth of the cave could have only been accommodated by excavation of the loose volcanic soil by the lava flow. The velocity of lava under the center of the flow would have been fastest and thus its cutting power the greatest. Nearly 60 feet of volcanic soil was excavated and carried off by the flow as it coursed down the stream valley. At this depth the cave reached equilibrium and lava quietly flowed down a narrow trench. This trench gradually roofed over with layers of lava, forming a true lava cave.

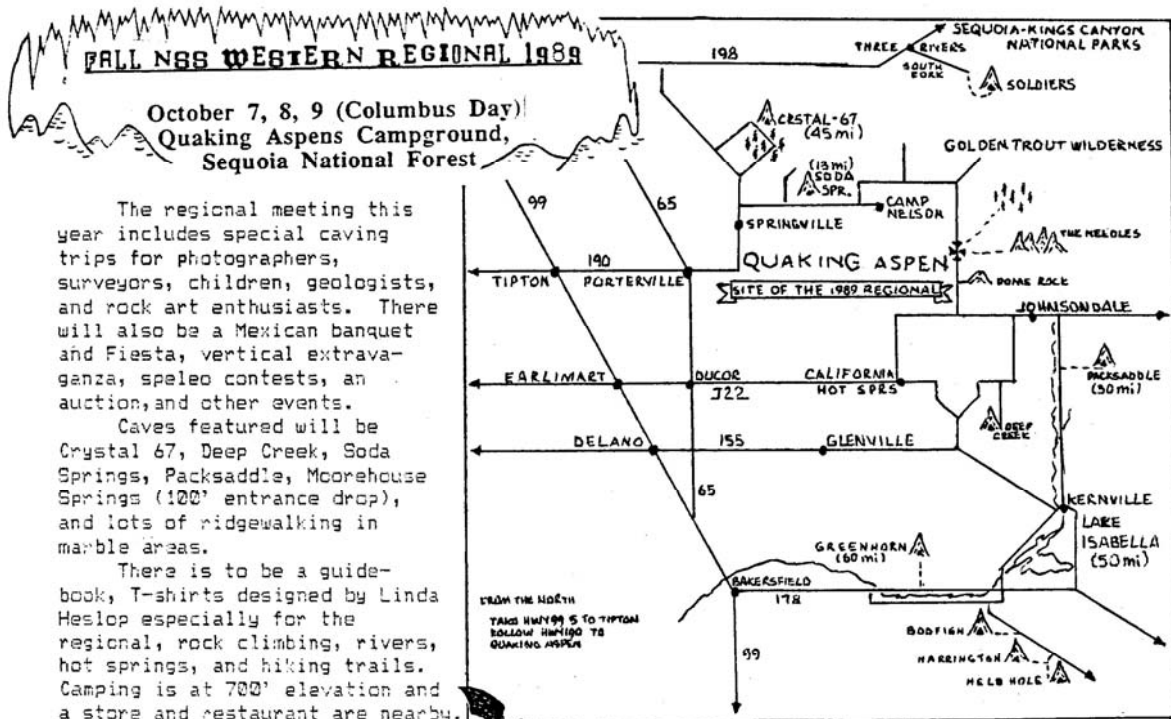
Some time later, the amount of lava coursing down the tube increased and because of either a blockage at the lower end of the tube or just too much lava, the roof of the cave burst open and a new series of flows spread across and down the nearly-filled stream valley. Slowly the flow filled the valley to a depth of approximately 1100 feet. In the center of the valley the resulting trench became roofed over, forming another cave. Throughout all this the lower tube remained filled with incandescent lava moving down slope. Now there were two tubes stacked one above the other conducting lava toward Mayfield Ice Cave.

As the lava coursed down the upper tube, it occasionally ripped huge chunks from the walls or ceiling of the tube's lining and carried them away. Some of these rafted blocks became coated with lava and wedged themselves in the upper passage forming lava balls. At least four such balls are exposed along the upper portion of the cave. Soon this eruptive stage of Giant Crater began to wane and lowered levels of lava cooled along the tube walls forming linings which nearly filled the passage. In the area just outside of the first lava ball and along the soil-walled passage between the first two lava balls one can see just how much of the cave was filled with these linings. As short pulses of lava raised and lowered the level of molten rock in the upper tube, short benches and natural bridges were left along the walls. Finally the flow of magma lessened to the point that the entire upper level drained back down into the lower tube. As the lava drained, a small diameter tube which ran at right angles to the main passage finally clogged with solidifying lava; it can be seen in the walls a short distance inside the entrance. One last thin lining of green glassy basalt left a "bathtub ring" along part of the passage. After the lava drained, collapse formed or enlarged some of the pits connecting the levels.

As the eruption slowly wound down, gasses from the lava flowing through the lower level rose through the upper passages and partially remelted portions of the walls and ceilings. Finally even the dwindling supply of lava flowing down the floor of the lower tube ceased and the sluggish pahoehoe froze into position. As the cave cooled down, the tube linings began to contract, setting up large stresses in the hardening rock. Cracks appeared and blocks broke free from the walls and ceiling, piling up in a carpet of breakdown on the floor. In some places the collapse continued upwards in a domed pattern until it breached the overlying tube's floor and opened up pits to the lower tube. As matters settled down, ground water dissolved calcite from the air-

deposited soils forming above the cave and transported it down along cracks to the passages. The delicate tracery of calcite, gypsum, and silica or "opal" caliche remains from the deposition and evaporation of these waters.

Four Balcony Pit Cave contains a wealth of lava tube features crammed into its relatively short length. The pre-flow soils, lava balls, and multiple linings are all worthy of close inspection to learn more of how apparently simple lava tubes develop through surprisingly complicated histories.



See You There!



**SIMPLE BEASTS**



Shasta Area Grotto/NSB  
 J & L Wolff, editors.  
 POB 865  
 McCloud CA 96057

FIRST CLASS MAIL

**TABLE OF CONTENTS**

Page 1	Four Balcony Pit Cave map
Page 2	Calendar; July and August meeting minutes
Page 3	SFBC proposal for the Western Region; Caving activities; News
Page 3	1990 Convention biology field trip – by Jim Wolff
Page 4	Cavin' with kids – by Ray Miller
Page 5	1989 Speleo/ed seminar – by Liz Wolff
Page 5	The sky burned ... part 9: Four Balcony Pit Cave – by Bruce Rogers