

SPREAD THE WORD - COME NORTHWEST IN '71 - FOR VARIETY!

THE CASCADE CAVER

Official publication

of the

Cascade Grotto of the

National Speleological Society

Volume 9 no. 4

Editor: Dr. William R. Halliday

April 1970

Coming events:

- March 30 (Monday) Planning meeting for Mt. Rainier Summit Caves trip
8 PM Hallidays; all expecting to make the trip July 4 should attend.
- April 4-5 (Saturday night-Sunday) Paradise Ice Caves. Call Charley Anderson
between midnight and 8 AM 624-9046 (new number)
- April sometime. Jackman Creek scouting trip. Call Jan Roberts, PR 88503.
- April 11-12. Mt. St. Helens trip. Call Bob Brown, RO 3-9094.
- April 18-19. undecided. Call Bob Brown as field trip shairman.
- April 20. Regular grotto meeting, Hallidays, 8 PM.
- Memorial Day. Papoose Cave, Idaho.
- July 4 weekend. Summit Caves.
- Labor Day weekend. Regional convention in eastern Nevada.
- August 1971. (If approved by the NSS Board in May 1970). N.S.S. Convention
at White Salmon!!! SEE BELOW.

OREGON GROTTO OFFERS TO SPONSOR
1971 N.S.S. CONVENTION

Most of the grotto has known that the Oregon Grotto voted to sponsor the 1972 NSS Convention in White Salmon some weeks ago, if the other Northwest grottos would help - and all have responded enthusiastically.

Originally it was understood that a promising offer to sponsor the 1971 Convention had come from the Midwest - it was the Midwest's turn in 1971 after the Far west in 1969 (Lovell, Wyo.) and East in 1970 (State College, Penna.) Your editor met with Charley Larson, Oregon Grotto chairman, and civic leaders of White Salmon on Feb. 23, in order to be able to provide proper information to the NSS Board; I was most impressed. Wonderful camping site alongside the new high school now in construction just outside town, fine room facilities, adequate hotels and motels, nice supermarket, swimming pool in town and great warmth and friendliness. They'll even put on a special climb of Mt. Adams for us!

Then just before the highly successful potluck banquet on March 7, word came that the midwest offer had been withdrawn, and no other offer from that area seems likely. SOo o o... .. It's up to the NSS Board now, but chances are excellent that we'll get the convention - in '71!

Inside is Charley Larson's original proposal. The only fault yr. editor finds with it is that it is badly understated. This looks to me like the makings of the greatest of all time. So spread the word:

Come Northwest in '71 - for variety!

PH P.100

1972 CONVENTION SITE QUESTIONNAIRE
 DEADLINE: DECEMBER 31, 19__

GROTTO OR REGION Oregon Grotto

CONVENTION CHAIRMAN Charles V. Larson

WE WILL SPONSOR THIS SITE: NAME White Salmon LOCATION Washington

Population 1620

CONVENTION DATES: Aug.17,1972 TO Aug.26,1972

SUB CHAIRMEN: (8 OR 10 KEY WORKERS): NAMES AND ASSIGNMENTS (REVERSE)

William R. Halliday-Editor

EDITOR AND MAPPERS FOR GUIDEBOOK: James Nieland- Mapper (REVERSE)

STATE EXPERIENCE WITH REGIONAL OR SIMILAR MEETINGS (REVERSE)

DISTANCE TO NEAREST: CAMPGROUNDS at headquarters, HOTELS over

CAPACITY OF CAMPGROUNDS 250-300, HOTELS over

NUMBER OF CAVES over WITHIN _____ MILES.

MEETING ROOMS (LARGEST 175 TO 200) NUMBER over CAPACITIES _____

BANQUET ROOM FOR 300 TO 400: EXX at hdqtrs. LOCATION _____

PROJECTION AND PA EQUIPMENT (SPECIFY): 2x2 slide, 16 mm, P.A., tape recorder

HEADQUARTERS LOCATION (SPECIFY): HOTEL _____, LODGE _____, ARMORY _____

UNIVERSITY BUILDING _____, OTHER High school and campus

LOCATION OF LOCKED ROOM FOR PUBLICATIONS AND DISPLAYS at hdqtrs.

LOCAL SUPPORT FOR YOUR PROPOSAL: C. OF COMMERCE, ~~XXXXXX~~, GOVT. AGENCY.

ACTIVITIES FOR NON-CAVING FAMILY MEMBERS over

OTHER ADVANTAGES OF SITE _____ over _____

YOUR PRESENT GROTTO OR REGIONAL MEMBERSHIP 64 grotto members as of 2-24-70

OTHER SUPPORTING GROTTOES AND REGIONS Cascade, Gem State & Xanadu grottos plus pledged

support of several NSS members not assoc. w/grottoes.

PLEASE INCLUDE MAPS, PROMOTIONAL LITERATURE, AND SIMILAR MATERIAL.

COMMENTS over

PLEASE RETURN BEFORE DEADLINE TO:

SUBMITTED BY:

DAVID R. McCLURG
 Box 2282
 MENLO PARK, CALIF. 94025

NAME Charles V. Larson
 ADDRESS 13402 N.E. Clark Rd.
 CITY Vancouver, Washington
 STATE _____
 DATE 2-24-70

USE OTHER SIDE FOR ADDITIONAL INFORMATION.



Sub Chairmen:

Field trip coordinator	Charles Baker
Trip leader	Jim McEland
Trip leader, Dynamited Cave	Steve Knutson
Trip leader	Dave Jones
Publications	Jim Wolff
Food	Lyn Halliday
Registration	Jo Larson, Jackie Buisman
Campground Mgr.	Ben Buisman
Helmet dec. contest	Barbara McCleod

My experience:

I have been leading cave trips of as many as 25 people for the past 3 years. I was vice chairman Oregon Grotto 1 year, Chairman 3 years. I have been Sec. of the Northwestern Regional Assoc. for 2 years.

I organized the 1969 Northwestern Regional Convention at Trout Lake Washington.

My employment has been largely in organization and administration, my last position having been Chief Engineer for Jarman Co., Portland, Oregon,

Hotels & Motels:

Hotel - 18 rooms - $\frac{1}{2}$ mi.

Motel - 8 rooms - $\frac{1}{2}$ mi.

Motel (Posh) - 5 mi. - 64 rooms plus restaurant plus \$1.00 round trip bridge toll.

Caves:

25 miles to center of Mt. Adams lava cave area containing approx. 50 recognized lava caves and including Dynamited Cave which is a multi-level, vertically complex, cave and good for vertical techniques. Dead Horse Cave, recently found, has large stream flowing through part of it's length.

47 miles to Falls Creek Cave and associated smaller caves. Falls Creek, 6000 ft. mapped and a very large cross section.

66 miles to center of Mt. St. Helens group of lava caves, about 12 worthy of mention. Here will be found a lava cave system 28,000 ft. long, composed of four caves end to end, one of which at 2.5 miles is the longest unitary lava cave known.

Pre-convention; Hells Canyon and Salmon River Canyon karst areas.

400 miles East is Papoose Cave, limestone approx. 700 feet deep, well decorated in some sections, many drops, good for vertical.

300 miles East is Red Fish Cave and limestone 1300 ft. thick with many many openings not yet checked. Red Fish has Indian pictographs inside the entrance and is rather well decorated with speleothems further inside.

Post convention;

3 hour drive to Paradise Lodge and the trail head to Paradise Ice Caves recently publicized by William Halliday and Charles Anderson. The scenic beauty of Mt. Rainier is not matched anywhere in the world and I've been told this by people who have seen the Swiss Alps.



Meeting rooms:

- In the high school; (1) Gymnasium designed to seat 1200.
(1) Instruction room to seat 150
(1) Cafeteria/orchestra room to seat 125
(6) Classrooms (more if we need them)
- At the Elk's Club (1) Banquet room seating 75
- At the Bank (1) Meeting room seating about 60 - offered as a place for the ladies to meet and coffee.

Non-caving activities:

A competently led climb of Mt. Adams, 12,307 ft.

A Geology trip.

One day trip of scenic and historic sites including the "Stonehenge" and the Maryhill museum of fine art.

A trip to the huckleberry fields, for picking as they are ripe in late August.

A boat trip down the Columbia thru the very impressive Columbia River Gorge.

Other advantages of this site:

Headquarters would be in the new high school, a campus about 10 acres in extent, with beautiful modern separate library and gymnasium. Grassy grounds about 5 acres in extent, surrounding a football field, will be available for campsites. Restrooms at one end of the field and rest rooms plus many showers at the other end will adequately handle 250-300 campers.

Large, roofed and glassed in mall areas which connect groups of rooms will provide good places for registration and photo salon.

The local school board has already voted to allow us to use virtually all of the facilities. As compensation they ask reimbursement for utilities and whatever janitorial service is required.

The local USFS District Ranger has conceded the use of a campground nearby for the GGG bash.

1 hour 20 minutes from a major airport (Portland, Oregon) and transportation will be provided.

White Salmon, perched as it is on the edge of the Columbia River gorge, offers a seldom rivaled view of one of the greatest scenic spectacles in the U.S.

Grotto news

In view of this big news, the grotto history will be postponed a while.

At the March meeting, it was evident that the Northwest Cave Rescue Association is making an impact in the Seattle area. Out of 25 attending the recent Industrial First Aid course, 12 were caver-members of the NCR. The NCRA has now formally applied for membership in the King County Search and Rescue organization.

On Feb. 28, our glorious leader Chuck Coughlin made it to the top of Cave Ridge on snowshoes and found Cascade Cave open. Came back with some tremendous photos of the location of some of the others under feet of snow.



Humor

PULSAR PSEUDOKARST

by Bill Mixon

The controversy about the importance of volcanism in shaping the moon's topography has led to conjectures in the speleological literature that there might be lava tube caves on the moon^{1,2,3}. It appears that this question is now subject to direct investigation. It also appears, however, that the earlier authors may have set their sights too close to home.

The discovery of pulsars⁴ in 1968 has given great encouragement to the theoretical study of neutron stars. Pulsars are objects within our galaxy which emit precisely timed, short, and intense pulses of energy, with periods of between roughly .1 and 5 seconds. The number of such objects known increased rapidly, and theoretical investigations led to the conclusion that the objects are probably neutron stars formed as supernova remnants. The period of the pulses is connected with rapid rotation of the star. Reviews of these developments can be found in references 5 and 6.

A typical neutron star has about one solar mass ($\cdot 10^{33}$ gm) compressed into a volume about 10 km in radius. The energy in the pulses comes from the rotational energy of the star. The bulk of the mass of the star consists of a fluid of perhaps 99 percent superfluid⁷ neutrons and 1 percent superconducting⁸ protons and electrons. Of more interest to us, however, is the possible existence of a solid crust.

At the pressures existing near the surface of a neutron star, ordinary nuclear matter, mostly iron nuclei, can exist. Since a neutron star will cool to a temperature of about 10^8 degrees in 10^4 years due to beta-decay processes⁹, the iron nuclei can solidify to form a body center cubic crystal structure. (The binding energy of this material is several MeV per nucleon, corresponding to a melting temperature of 10^{10} degrees¹⁰.) A neutron star of one solar mass might typically have a solid crust 500 meters thick^{7,11}.

Now among the prominent phenomena related to the earth's crust are volcanos and earthquakes. Volcanos could be the source of local hot spots on the pulsar's surface needed to explain the narrowness of the observed pulses and can also account, as will be seen, for possible quakes, the effects of which have been observed as abrupt changes in the periods of pulsar PSR 0833-45 (references 12, 13) and the Crab pulsar.

A possible description of such a volcano is given in reference 14. From the bottom of the crust (density 10^{14}) fluid rises and expands until it

reaches the surface with a density of only 10^8 . A volcano putting forth lava at a rate of 10^{19} gm/sec could uniformly add material to the whole surface at a rate of 10^6 gm/cm²sec or about $3 \cdot 10^{13}$ gm/cm² per year. If the mean density of the crust is 10^{13} , a settling of the crust by about 1 cm per year is required for equilibrium. An abrupt (seismic) shrinking of a neutron star by 1 cm would yield the observed^{12,13} speeding up of its period of rotation of 2 ppm. Where there are volcanos, there may be lava tubes.

A comparison with terrestrial lava flows may be interesting. A reasonable value for the production of lava on land in historic times may be 1 km³/year or about 10^9 gm/sec, compared to 10^{19} gm/sec for a pulsar volcano. (Lava production at the sites of sea floor spreading is neglected here, because it is of little interest to the speleologist.) Of course a pulsar lava flow will not, because of its higher density, give rise to 400 cubic mile flows such as are present in the Columbia River area of the northwestern U.S., and certainly the accumulation like the 35,000 cubic miles of lava that underlie the Columbia River Plain would be out of the question, since the entire volume of the pulsar is only 1000 cubic miles. Nevertheless a crust 1500 feet thick could support respectable lava tubes.

Assuming such lava tubes exist, safe exploration will pose a number of problems. The high gravity (some 100 billion times that at the earth's surface) accounts for some of them. For instance, a typical nylon caving rope loses much of its strength at temperatures well below 100 million degrees, and even at its best it could not safely hold a caver weighing some 10 billion tons. It appears likely that entirely new vertical techniques will have to be developed. (It should be noted that vertical techniques may not be needed at all, since the compression of the crustal material by a factor of a million as the depth increases to 1000 feet will no doubt cause lava tubes to become impossibly small at moderate depths.)

Falling rocks will also be a distinct danger. A rock an inch in diameter that has fallen a foot will weigh 1000 tons and be moving at more than 500 miles a second. Hardhats will probably need redesign to take this sort of punishment. Falling rocks are quite likely, since, while the strength of the material is about 10^6 stronger than ordinary lava, gravity will be 10^{11} stronger than here, so roofs may be unstable.

Being caught on a pulsar when a quake occurs may be dangerous. An abrupt drop of 1 cm will be worse than a fall from infinity onto the earth in terms of impact velocity, so broken bones might reasonably be expected.

Some hazards, however, may be absent on pulsars. For example, there will be no need to fear being left in the dark by failure of your lights, since the



walls will glow brightly. In fact, since the peak emission of walls at 100 million degrees is in the x-ray region, even your companions are not likely to block your view. (This is not an unmixed blessing, since it may be hard to keep a party of invisible cavers together.)

Some may fear that dizziness will result from being on an object 10 miles across which is spinning twice a second. But the gravitational forces will be much greater than centrifugal forces, just as they are on earth, so that footing will be quite steady and motion not apparent, as least when you're underground out of sight of the sky.

A conventional compass should work very well on a pulsar, since the magnetic field is expected to be about 10^{12} gauss, a million million times stronger than that of the earth. However, for the same reason, a Brunton may vigorously resist being turned on its side, so a separate inclinometer will be needed. Because of a pronounced tendency for surveying tapes to sag, some sort of range-finder may be the most practical distance measuring device.

Transportation to and from the caves will be difficult. Pulsars are thinly spread, being separated from each other (and us) by distances on the order of 100 parsecs ($2 \cdot 10^{15}$ miles). And because of the high gravity, leaving a pulsar for the return trip will require energy amounting to 10^{20} ergs/gm; the escape velocity corresponds to an energy of about 100 MeV per nucleon, an energy which current technology cannot give to even molecules, much less men. The engines of a Saturn 5 moon rocket could not lift themselves off the surface unless a way could be found to reduce the earth weight of the rocket to under one thousandth of an ounce.

In our galaxy there is one supernova every 30 years¹⁵. If all of these give rise to a neutron star and the active life of a pulsar is some 10^7 years¹⁶, then there may be 100,000 volcanic neutron stars in the galaxy ($1/3 \text{ pc}^3$ or one per 10^{49} cubic miles, approximately). If even 1 percent of these contain a lava tube, the number of known caves of this sort would be greatly increased by their exploration.

The possibility of the existence of volcanos on pulsars has not been definitely confirmed theoretically. This must await further research into the properties of nuclear matter of the sort expected in a neutron star crust. My own investigations along these lines will be submitted to the Bulletin of the NSS in due course.

It is well known that the Soviet Union has many cavers and a vigorous space program. Because of the great potential speleological discoveries that might be made, the necessary preliminary theoretical calculations should be diligently pur-

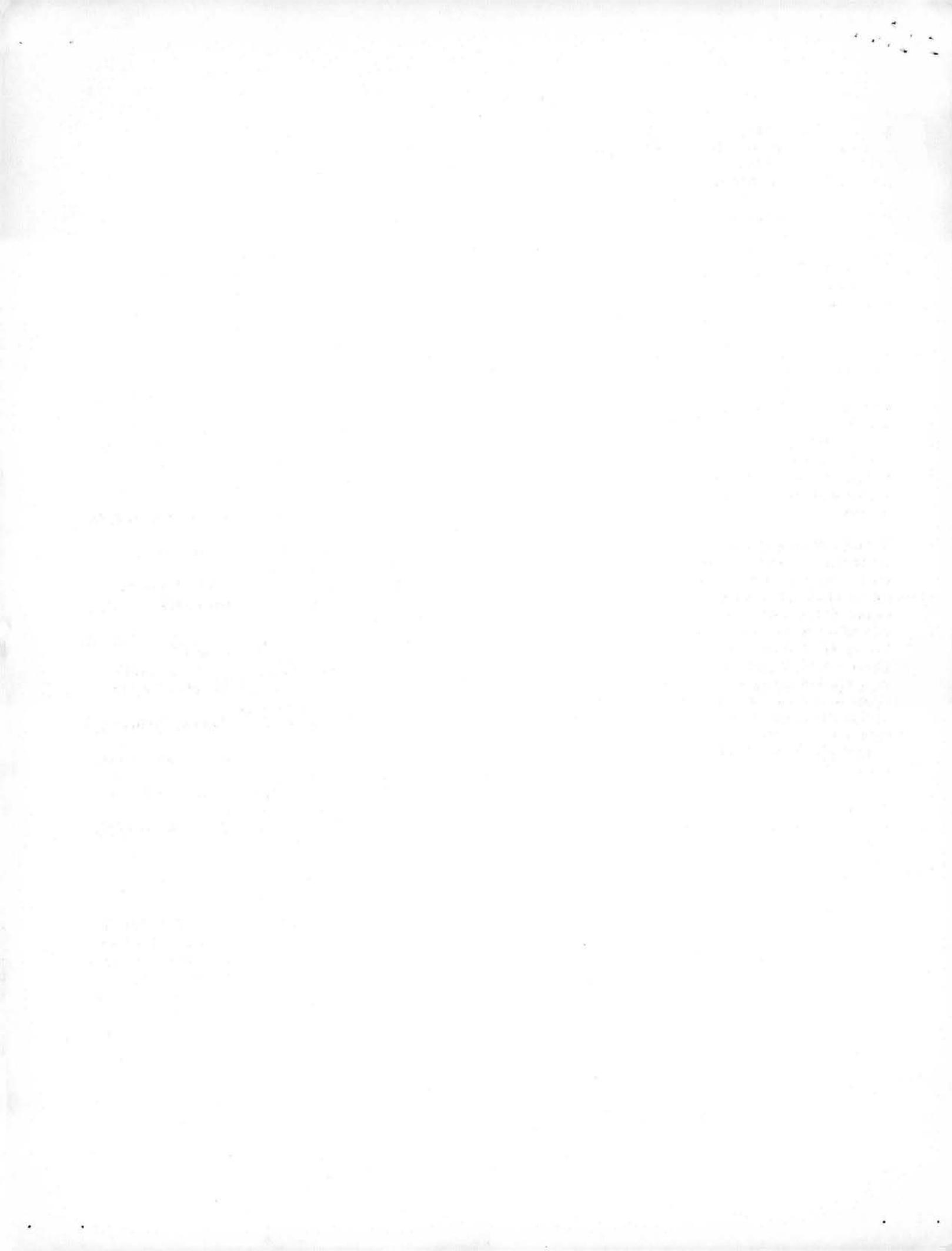
sued in order that a recommendation can be made whether to undertake as a firm national commitment to solve the technical problems and maintain our lead in this area by exploring these caves.

References

1. W.R. Halliday, *Interplan. J. Vulcanospeleo.* (The Cascade Caver) May 1966, June 1966.
2. W.R. Halliday, *Bull. Nat. Speleo. Soc.* 28, 169 (1966).
3. J.L. Fisher, *Bull. Nat. Speleo. Soc.* 29, 115 (1967); W.R. Halliday, *Bull. Nat. Speleo. Soc.* 29, 117 (1967).
4. A. Hewish, S.J. Bell, J.D.H. Pilkington, P.F. Scott, and R.A. Collins, *Nature* 217, 709 (1968).
5. S.P. Maran and A.G.W. Cameron, *Earth and Extraterrestrial Sciences* 1, 3 (1969).
6. V.L. Ginzburg, V.V. Zheleznyaleov, and V.V. Zaitsev, *Astrophys. Space Sci.* 4, 464 (1969).
7. M. Ruderman, NYU Technical Report 6/69 (1969).
8. V.L. Ginzburg, *Comments Astrophys. Space Phys.* 1, 81 (1969).
9. J.N. Bahcall and R.A. Wolf, *Phys. Rev. Letters* 14, 343 (1965); *Astrophys. J.* 151, 1254 (1965).
10. H. van Horn, *Astrophys. J.* 151, 227 (1968); *Phys. Letters* 28A, 706 (1969).
11. M. Ruderman, *Nature* 218, 1128 (1968).
12. V. Radhakrishnan and R.N. Manchester, *Nature* 222, 228 (1969).
13. P.E. Reichley and G.S. Downs, *Nature* 222, 229 (1969).
14. F.J. Dyson, *Comments Astrophys. Space Phys.* 1, 62 (1969).
15. P. Katgert and J.H. Oort, *Bull. Astron. Inst. Neth.* 19, 239 (1967).
16. J.P. Ostriker and J.E. Gunn, *Nature* 223, 813 (1969).

Editor's Note:

Although the above article is now badly out of date (see *Interplan. J. Vulcanospeleol.* Feb. 1970), it is presented here (cribbed from the indicated journal, otherwise known as the *Windy City Speleonews*) as an example of the mainstream of thought among Windy City vulcanospeleologists. The presence of the bold-faced word above the title, however, seems inexplicable.



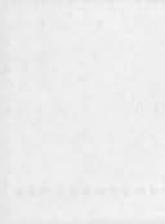


The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that every entry should be supported by a valid receipt or invoice. This ensures transparency and allows for easy auditing of the accounts.

In the second section, the author details the various methods used to collect and analyze data. This includes both primary and secondary research techniques. The primary research involved direct observation and interviews with key stakeholders, while secondary research focused on reviewing existing literature and industry reports.

The findings from the data analysis are presented in the third section. It highlights several key trends and patterns that emerged from the study. These findings are crucial for understanding the current state of the market and identifying potential opportunities for growth.

Finally, the document concludes with a series of recommendations based on the research findings. These suggestions are designed to help the organization address the challenges it faces and capitalize on the identified opportunities.



The author of this report is [Name], who has extensive experience in the field of [Field]. The research was conducted over a period of [Duration] and the results are presented in the following sections.



New cave found near Gardner Cave
- by Tom Miller

In October, 1969 I found a new cave about 3 miles southeast of Gardner Cave. It occurs in calcitic limestone more than 98% pure on the east side of the top of a hill NE of Hoage Lake in the SW $\frac{1}{4}$ NE $\frac{1}{4}$ of T40N, R43E, Metaline Quadrangle.

The entrance is a sink about ten feet in diameter and depth. The cave is along a fissure tilted about 45 degrees. At the bottom of the sink, two small squeezeways lead to a small room, the only place where it is possible to stand upright. At the bottom of the end room are two interconnecting holes, one of which permits the entry of a man, for about 8 feet. Here it turns a corner and ends in a hole 6" in diameter which emits a small air current. The bottom is rubble and it could possibly be enlarged with great effort. It extends out of sight. There is one side passage, about 9' long, with some moonmilk. Total passage length is 65 to 70 feet.

We searched about 20% of the hill quite intensively and found an 8' cave about 30 yards NE of the main cave. Other areas had scores of sinks, some quite large and deep. An escarpment one foot high around its edge showed that one of the largest is active. There are many other solutional features that look like they should connect to a network inside the hill.

Nearby Z Canyon is said to contain several unexplored holes in limestone walls.

Cascade, Grotto of the
National Speleological Society
1117 36th Ave. E.
Seattle, Wash. 98102



Library rate - nonprofit organization
Mailed under Sect. 135.14
Return requested

Windy City Speleoneers
William Nixon, Editor
5035N South Drexel Blvd.
Chicago, Illinois 60615