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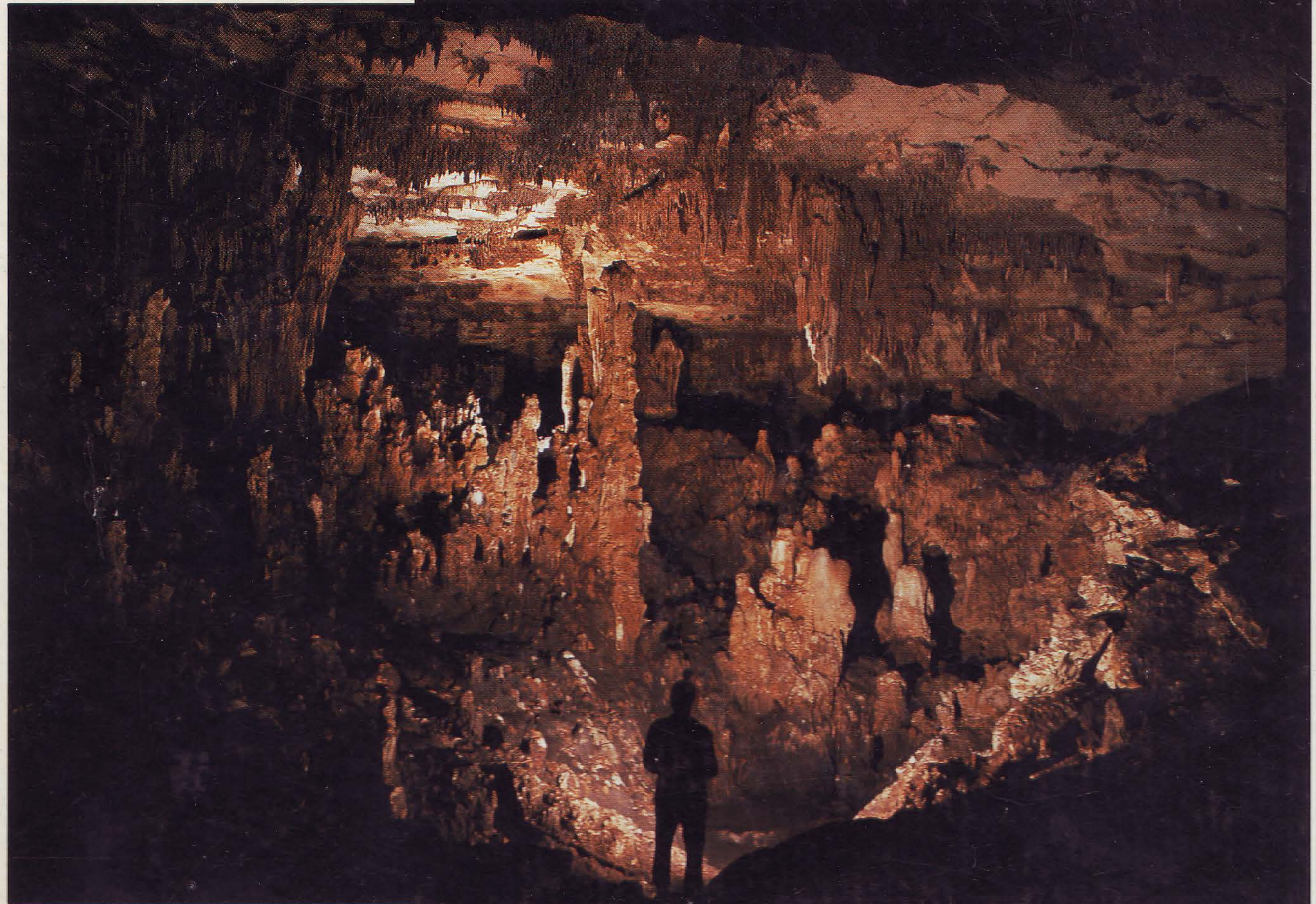

The Caves of Bexar County

Second Edition

George Veni

TEXAS MEMORIAL MUSEUM
Speleological Monographs, 2

The
Caves of Bexar County
Second Edition

George Veni

February 1988
Texas Memorial Museum
The University of Texas at Austin

Printed in the United States of America

ISSN: 0890-9822

Order from: Texas Memorial Museum
The University of Texas at Austin
2400 Trinity
Austin, Texas 78705

Front cover: Main chamber in Big Bexar Cave. Photograph by Roger Bartholomew

Back cover: Passage in Wurzbach Bat Cave. Photograph by Roger Bartholomew

A portion of the publication cost of this volume was provided by gifts from Mr. A. Richard Smith and Olin Corporation.

To Raymond "Chuck" Stuehm: For the Ideas, Inspiration
and Love You Shared

Preface

After eight years of work and the addition of 124 new caves, I have finally completed the second edition of The Caves of Bexar County. There are a few matters that are relevant to a better understanding of the material presented in this new edition.

When I first began the Bexar County Cave Survey in 1978, I set a strict criterion about which caves would be admitted to the survey and which would be filed as "rumored and potential caves." The criterion was for an accurate location, preferably one that was topographically exact. Without a location all information on a cave is severely devalued and sometimes made worthless. An accurate location also preserves a cave's identity independent of its name. Numerous caves listed in the original Bexar County Cave Survey were not included in this new survey because they either lacked an accurate location or were the same cave listed under multiple names. A direct benefit to the survey that was gained from these locations is a geologic report for each cave. Such information is basic to the study of any cave.

In past surveys, geologic, historic, and other types of data have usually been included within a cave's "description." These data have now been segregated into individual sections. The reader should not have to dig for the data; even though particular sections may sometimes be very brief their segregation allows for quick and easy reference. A new section, "Technique," has also been included in this report. It will assist in preparation for trips to the caves by noting safety factors, rope needs, reliable tie-offs, etc. The Technique section also includes information on possible means to extend the known length of a cave; methods may vary from a little digging to major blasting (which should only be done by those well trained in the use of explosives). This is not meant as advocating or encouraging cave excavation. If the potential for discovery is poor, I say so and indicate that the discovery may not justify the damage. In some people's minds there is *no* justifiable damage.

Attention to details and surveying of even the tiniest caves, as well as the largest, has shown relationships and provided otherwise unobtainable information (e.g., short and shallow Elmore Cave has proven to be a biologic gold mine). For those reasons, and to gather in one place all available information, even the smallest, most "insignificant" caves have been included in this survey. *All* data are potentially relevant and significant. In order to maximize their usefulness the data must be disseminated as widely as possible—hence, the publishing of all available data in this survey. Very little information in the Bexar County cave files is not included in this volume.

All information within this survey can be referenced to two general sources, the Bexar County cave files or me. By the time this volume is printed, I will have relinquished the files to Randy M. Waters in San Antonio. People interested in gaining information from the files should first contact the Texas Speleological Survey (in care of James Reddell, Texas Memorial Museum, 2400 Trinity, Austin, TX 78705) to obtain the current location of the files. If data presented in this volume are not found within the files, then I am the second source. Much information which I have amassed had not been entered into the files prior to this printing.

As author of this report, I accept full responsibility for the quality and accuracy of the data (except that from cited authors and cartographers). Undoubtedly, some inaccuracies and omissions will occur, but most will be for lack of time for further research. Many more caves are still to be found in Bexar County and many excellent research topics remain to be pursued. I am very excited thinking about caves to be found in the coming years and eagerly await *The Caves of Bexar County, Third Edition.*

—George Veni

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF MAPS

LIST OF PHOTOGRAPHS

Indexes

INDEX TO CAVES

191	Cave With Undropped Drop	1+	5+	89
144	Cement Cave	?	?	89
163	Chimney Cricket Cave	6.0	6.1	90
10	Christmas Cave	64.5	7.2	90
11	Cibohole	10.0	5.4	90
12	Cibolo Shelter	11.0	0	92
192	Come-Alone Cave	11.0	6.5	92
115	Coon Crap Cave	32.0	3.8	93
13	Corkscrew Cave	317.0	46.6	94
131	Council Cave	15.0	5.5	95
14	Crane Bat Cave	30.0	5.0	98
187	Crawl and a Prayer Cave	12.0	1.0	99
15	Creekbed Cave	70.0	10.0	99
105	Crescent Spring	9.5	0	100
109	Crystal Cave	13.0	17.0	101
16	Cub Cave	74.4	28.0	102
17	Cueva Cave	13.0	8.0	103
114	Dam Crawl	16.0	0	103
18	Dead Deer Cave	600+	37+	106
181	Death Loop Cave	6.0	5.0	109
157	Dick White Cave	0.6	6.1	109
137	Dirtwater Cave	8.5	3.1	109
19	Dreamland Road Cave	?	4.0	110
106	Drop and a Prayer Pit	1.0	5.0	110
20	Dynamite Cave	23.4+	7+	111
146	Eagles Nest Cave	?	?	114
113	Elephant Spring	8.5	1.3	114
198	Elm Creek Dam Cave	?	?	115
22	Elm Springs Cave	182.0	56.6	115
21	Elmore Cave	4.8	9.8	119
123	Enchanted Forest Pit	3.0	6.1	120
23	Fair Hole	650.0	23.6	120
160	Fat Man's Misery	?	?	123
125	Fence Post Hole	0.5	11.0	123
24	Fireworks Cave	8.5	5.0	123
25	Flint Bridge Cave	43.6	23.8	124
124	Fool's Folly Pit	1.0	4.9	126
175	Fountain Pond Cave	?	?	126
26	French Street Cave	?	?	126
28	Friesenhahn Cave	20.0	10.0	126
177	G.I. Joe Cave	8.5	0	135
29	Gandalf's Cave	51.6	7.3	135
196	Genesis Cave	186.6	78.0	136
184	Georg's Hole	28.0	17.0	138
30	Gladsam's Cave	38.0	16.2	138
189	Godchildren's Sink	7.1	6.0	139
195	Goonies Cave	?	3.0	141
31	Government Canyon Bat Cave	104.0	10.0	141
116	Gray Cave	12.8	0	142
155	Graywaters Cave	3.5	7.0	143
27	Grutas de los Mojados	33.3	9.0	143
32	Han's Grotto	15.4	0	145
172	Hay's Cave	4.0	11.6	145
93	Headquarters Cave	72.0	9.0	145

INDEX TO NON-CAVES

INDEX TO RUMORED AND POTENTIAL CAVES

INDEX TO ARTESIAN WELLS

INDEX TO NON-CAVE SPRINGS

ALTERNATE CAVE NAMES

Adam Wilson, Jr., Cave – John Wagner Ranch Cave No. 3
Adam Wilson Cave, Jr. – John Wagner Ranch Cave No. 3
Adam Wilson's Cave – John Wagner Ranch Cave No. 3
Airport Cave–Powerline Cave
Aue Cave – Blue Hole No. 1
Aue Cave No. 1 – Hills and Dales Pit
Aue Cave No. 2 – Robber's Cave
Babcock Road Cave – Basement Cave
Bailing Wire Cave – Baling Wire Cave
Barham's Cave No. 1 – Helotes Hilltop Cave
Barham's Cave No. 2 – Helotes Blowhole
Bat Cave – Voight's Bat Cave
Beiring Cave – Bering Sink
Betcha-Can't-Find-It Cave–Bet-Ya-Can't-Find-It Cave
Bexar Cave – Bear Cave
Big Bear Cave – Bear Cave; Big Bexar Cave
Big Bexar Cave – Bear Cave
Blue Hole – San Antonio Spring
Blue Hole Cave No. 1 – Blue Hole No. 2
Blue Hole No. 2 – Blue Hole No. 1
Bone Cave – Friesenhahn Cave
Bone Hole – Hitzfelder's Bone Hole
Box S Ranch Cave – Government Canyon Bat Cave
Bracken Bat Cave – Braken Bat Cave
Bulverde Cave – Friesenhahn Cave
Bulverde Coon Crap Cave – Black Cat Cave
C.C.C.C. Trash Hole – Dynamite Cave
Cave Lane Cave – Pogue's Cave; Robber Baron Cave
Cave near Hogan's Cave – Shoehorn Cave
Church's Cave – Grutas de los Mojados
Cibolo Cave – Schertz-Cibolo Cave
Cibolo Creek Cave – Fair Hole
Classen Baling Wire Cave – Baling Wire Cave
Classen Corkscrew Cave – Corkscrew Cave
Classen Tobacco Can Hole – Tobacco Can Hole
Classen's Cave – Corkscrew Cave
Classen's Double Drop Cave – Poison Ivy Pit
Classen's Hell Hole – Looserock Cave
Classen's Looserock Cave – Looserock Cave
Clawsen's Cave – Corkscrew Cave
Conglomerate Pit – 17′ Pit
Crane's Cave – Crane Bat Cave
Crawlsbad – Helotes Blowhole
Crow's Nest – Blue Hole No. 2
Crow's Salamander Cave – Blue Hole No. 1
Crystal Cave – Robber Baron Cave
Dever's Cave – Gladsam's Cave
Double Drop Cave – Poison Ivy Pit
Dynamit Cave – Dynamite Cave
El Camode Cave – Helotes Hilltop Cave
Fireworks Pit – Fireworks Cave
Floating Cave – Tick 'n Delight Cave
Fried Rubber Chicken Cave – Grutas de los Mojados
Gladsam Ranch Cave – Gladsam's Cave
Gladsam's Goat Cave – Gladsam's Cave
Gladstone's Cave – Gladsam's Cave
Gladstone's Goat Cave – Gladsam's Cave
Goat Cave – Gladsam's Cave
Government Canyon Cave – Government Canyon Bat Cave
Head of the River – San Antonio Spring
Helotes Cave – Basement Cave; Helotes Hilltop Cave
Helotes Creek Cave – Helotes Blowhole
Helotes Creek Ranch Cave – Scorpion Cave
Heubner Road Cave – Elm Springs Cave
Hilltop Cave – Helotes Hilltop Cave
Hills and Dales Cave – Hills and Dales Pit; Hummingbird Cave
Hills and Dales Cave No. 1 – Hummingbird Cave
Hills and Dales Cave No. 2 – Hummingbird Cave
Hills and Dales Estates Cave – Hills and Dales Pit
Hitzfelder Cave – Hitzfelder's Bone Hole
Hitzfelder Crawl – The Crawl
Hitzfelder's Bone Cave – Hitzfelder's Bone Hole
Hitzfelder's Cave – Creekbed Cave; Hitzfelder's Bone Hole
Hitzfelder's Creek Bottom Cave No. 1 – Creekbed Cave
Hunnicutt's Pit – Poison Ivy Pit
Indian Cave – Hills and Dales Pit
Indian Sink – Hills and Dales Pit
Isopit Cave – Isopit
Johnson's Cave – Gladsam's Cave
La Duquesa Cave – Scorpion Cave
Leon Creek Cave – KKYX Cave
Little Frog Cave – The Crawl
Lone Star Cave – Lone Star Pit
Lost Indian Cave – Hills and Dales Pit
Lytle Ranch Cave – Government Canyon Bat Cave
Madla's Cave No. 1 – Madla's Cave
Madla's Cave No. 3 – Madla's Drop Cave
Madla's Hilltop Cave – Madla's Cave
Madla's Park Cave – Madla's Cave
Madla's Ranch Cave – Madla's Cave
Malda Cave – Madla's Cave
Marbauch's Sink – Poison Ivy Pit
Mayer's Cave – Dead Deer Cave
Mayer's Shadowland Cave – Dead Deer Cave
Mc Donald's Cave – Spider Hole
Mosquito Cave – Madla's Cave No. 2
Natural Bridge Jr. Cave – Sam's Cave
New's Cave – World News Cave
Oak Meadows Cave – Wurzbach Bat Cave

Peature Fracture – Putrefaction Cave
Poison Ivy Cave – Poison Ivy Pit
Pope's Bat Cave – Government Canyon Bat Cave
Putrification Cave – Putrefaction Cave
Python Cave – Fair Hole
Quarry Cave – Portland Cement Cave
Road Cut Cave – Bandera Road Cave
Robber Baron's Cave – Robber Baron Cave
Robber Barrons Cave – Robber Baron Cave
Robber's Cave – Hills and Dales Pit; Robber Baron Cave
Rona's Cave – Roan's Cave
San Antonio Quarry Cave – Portland Cement Cave
San Pedro Park Spring – San Pedro Park Spring (West)
San Pedro Park Spring Cave – San Pedro Park Spring (West)
Scenic Loop Cave – Helotes Hilltop Cave
Schertz Cave – Schertz-Cibolo Cave
Shadowland Cave – Dead Deer Cave
Sink No. 1, Cave No. 2 – Sink Hole
Snake Cave – Fireworks Cave
Stapelton Ranch Cave No. 1 – Elm Springs Cave
Stapelton Ranch Cave No. 2 – Bet-Ya-Can't-Find-It Cave
Suffocation Sink – Fireworks Cave
Terra Alta Cave – Holmgreen's Hole
The Headwaters – San Antonio Spring
The Pit – Poison Ivy Pit
The Pits – Bob Bear Cave
30 ft Well – Blue Hole No. 3
31′ Deep 80′ Sink – Tiny Town Sink
Thomasini Sink – Hidden View Cave
Thurman Cave No. 1 – Hills and Dales Pit
Thurman Cave No. 2 – Hummingbird Cave; Robber's Cave
T.M.I. Cave No. 1 – T.M.I. Cave
Tobacco Can Hole – Tobacco Can Cave
Tract 6 Cave 1 – Shotgun and a Prayer Cave
Trap Door Cave – Holmgreen's Hole
Trash Hole – Ackerman's Trash Hole
Triangle Cave – Mattke Cave
Twin Pits Cave – Twin Pits
Van Raub Cave – Fair Hole
Wagner Ranch Cave – Huesta Cave
Wagner Ranch Cave No. 4 – John Wagner Ranch Cave No. 3
Wursback Bat Cave – Wurzbach Bat Cave

ALTERNATE NAMES FOR NON-CAVES

Blue Hole Cave No. 1 – Blue Hole No. 4

ALTERNATE NAMES FOR RUMORED AND POTENTIAL CAVES

Briant Stockfarm Caves Nos. 1-6 – Stevens Ranch Caves Nos. 1-6
Harris Murder Cave – Robber's Cave
Unnamed cave – Lobo Cave
Unnamed cave no. 7 – Robber's Cave
Unnamed cave no. 51 – Barnes Cave

ALTERNATE NAMES FOR ARTESIAN WELLS

Artesia Well – Artesia Pump Station Well
Artesia Well No. 4 – Artesia Pump Station Well
Boecke Well – Joseph Boecke Well
O.R. Mitchell Well No. 2 – O.R. Mitchell Well
San Antonio City Water Board Well No. 4 – Artesia Pump Station Well
Verstraeten Well – Verstraeten Well No. 1
Verstraeten Farm Well – Verstraeten Well No. 1

CAVES ERRONEOUSLY REPORTED IN BEXAR COUNTY

Cibolo Cave = Bracken Bat Cave, Comal County
Dawn's Delight Cave = Dawn's Delight Cave, Comal County
Dead Man's Cave = Cave Without A Name-Dead Man's Cave System, Kendall County
Haba Cave = Haby Cave, Medina County
Station "B" Cave = Station "C" Cave, Bandera County
Turner's Cave = Turner's Cave, Comal County

Introduction

The Caves of Bexar County is being presented in two parts. The first part includes county-wide reviews of speleological and geological data and the second provides specific cave information.

Three topics are dealt with in the first part—History, Biology, and Geology. The history section covers the history of cave exploration in Bexar County, with emphasis on the Bexar County Cave Survey. James Reddell provides an overview of the county's cave fauna in the biology section. The geology section examines stratigraphic, structural, hydrologic, and topographic factors affecting cave development in Bexar County.

The second part of this volume is divided into four sections. The first section provides a detailed description, history, biology, geology, etc., of each of the 208 known caves in the county.

The second section presents Bexar County "Non-Caves," holes not large enough to be considered as caves. The guidelines used in this report in defining a cave are set by the Texas Speleological Survey (TSS). A cave is any natural cavity 25 ft. (7.62 m) long or longer, or 15 ft. (4.57 m) deep or deeper. These lengths and depths must be humanly passable. In addition, the cavity's length or depth cannot be exceeded by the height, length, or width of its entrance. The limits were arbitrarily selected to eliminate small solution pockets and large-mouthed cliffside shelters, among others, from caves. These non-caves are presented because they have been often noted in the Bexar County cave files or have been recorded in speleologic literature.

The third section, Rumored and Potential Caves, presents rumored caves (which lack an adequate location for identification) and holes which visibly show potential to open into caves after some excavation. Many other cave leads exist in Bexar County but are not included for lack of descriptions and because of very vague locations. These can be pursued by consulting the Bexar County cave files. Also included in this section is a map indicating the potential of finding new caves in Bexar County.

The fourth section includes brief notes on "Non-Cave Springs and Artesian Wells." These localities are not caves but have produced an interesting subterranean fauna treated in the section on biology.

A new bibliographic format for the TSS is being presented in this volume. Each cave description is followed by author-date citations; the complete bibliographic reference will be found at the end of the volume. This format is used to reduce the bulk of this report since some references often discuss several caves and would have to be repeated many times.

Finally, it is worth noting how many of the caves are named. Generally, caves are named after some meaningful identifying feature. Often the owner's name is used. In the absence of such features caves are sometimes named for events and circumstances which may have little future meaning. When known, notes are included about the origin of a cave name.

GLOSSARY

The following terms used in the text of *The Caves of Bexar County* either are not common in lay use or have an uncommon definition in speleological literature.

Anastomoses—Interconnecting tubes that fork and rejoin, usually along bedding planes and joints.

Aquiclude—Rocks or sediments, such as shale or clay, that do not conduct water in significant quantities.

Aquifer—Rocks or sediments, such as cavernous limestone and unconsolidated sand, that store, conduct, and yield water in sufficient quantities for human use.

Aquitard—Rocks or sediments, such as cemented sandstone, that transmit water significantly more slowly than adjacent aquifers and that yield water at low rates.

Artesian—Describes water that would rise above the top of an aquifer when intersected by a well; sometimes flows at the surface.

Backflooding—Flooding of valley-side caves by floodwaters in nearby surface streams.

Bad air—Cave atmosphere with higher than normal carbon dioxide (CO_2) or lower than normal oxygen, or both; breathing is adversely affected.

Base level—The level to which drainage gradients, surface and subsurface, are adjusted, usually a surface stream or relatively impermeable bedrock. Sea level is the ultimate base level.

Bedding plane—A parting plane between two distinct bedrock layers; also calling a bedding joint.

Breakdown—Rubble and boulders in a cave resulting from collapse of the cave roof.

Dip—The angle that joints, faults, or beds of rock make with the horizontal; the "slope." Strike is perpindicular to dip and is the direction of a horizontal line on the fracture surface or bed.

Dye tracing—The use of harmless dyes, such as fluorescein, to trace the flow of underground water, usually from insurgence to expected resurgence.

Fault—See *joint.*

Fluviatile—Sediments deposited by rivers and streams.

Insurgence—Discrete point or opening through which surface water enters the subsurface (see *resurgence*).

Joint—Fracture in bedrock exhibiting little or no relative movement of the two sides. Faults are fractures along which one side has moved significantly with respect to the other.

Karst—A terrane, or area, characterized by landforms and subsurface features, such as sinkholes and caves, that are produced primarily by dissolution of rocks. Karst areas commonly have few surface streams; most water moves through cavernous openings.

Losing stream—Stream whose flow diminishes downgradient due to loss of water into the subsurface. Differs from insurgence by not losing all or most of its flow at a single discrete site.

Paleospring—An "old" spring; an opening that shows evidence of former outflow but not active in historic times.

Permeability—Measure of the ability of rocks or sediments to transmit fluids.

Photic zone—The part of a cave that receives natural light.

Phreatic zone—The "saturated" zone in which all the openings within rocks or sediments (caves and pores) are normally filled with water. The top of this zone is the *water table.* The *vadose zone* is the "unsaturated" or "aerated" zone above the water table, through which water moves downward from the surface to the phreatic zone.

Potentiometric surface—An imaginary surface to which underground water confined in pores and conduits would rise if intersected by a borehole.

Recharge—Natural or artificially-induced flow of surface water to an aquifer.

Resurgence—Discrete point or opening from which groundwater flows out to the surface; a spring. Strictly speaking, a return to the surface of a stream that had gone underground.

Siphon—See *sump.*

Speleothem—A chemically-precipitated deposit, usually calcite in Bexar County, on walls, ceilings, or floors of caves, commonly attractive. Some deposits formed by dripping water (dripstone) are stalactites, stalagmites, columns, totem poles, soda straw stalactites, and draperies. Others formed by flowing or seeping water include rimstone (travertine) dams, cave coral, and popcorn.

Strike—See *dip.*

Sump—A cave passage that descends below the surface of standing or running water and is water-filled (a term used by cave explorers).

Swallet—Same as *insurgence.*

Troglobite—A species of animal which is restricted to the subterranean environment and which typically exhibits morphological adaptations to that environment, such as loss or reduction of eyes and pigment and elongated appendages.

Troglophile—A species of animal which may complete its life cycle in the subterranean environment but which may also be found on the surface.

Trogloxene—A species of animal which inhabits caves but which must return to the surface for food or other necessities.

Vadose zone—See *phreatic zone.*

Water table—See *phreatic zone.*

ACKNOWLEDGMENTS

I thank first my two very good friends, Randy M. Waters and Gary A. Poole, for all their cave maps, descriptions, locations, miscellaneous information, general assistance, and splendid company in pushing the spelean frontiers of Bexar County. I also thank all members of the San Antonio Grotto and Bexar Grottos, especially John R. Cross, Jr., Carmen Goyette, Scott Harden, Joe Ivy, Dottie and Teeni Kern, Kurt L. Menking, Linda Palit, and Eric B. Short for their support and aid throughout the years. Additionally, I am grateful to Janice Everage, Julia Ann

Murrell, and Marjorie B. Waters for their assistance in typing and proofing my difficult writing into a useful manuscript. Thanks also go to Bill Elliott, Ronnie Fieseler, and John Spence for assisting in preparing many of the maps for publication. Special thanks go to A. Richard Smith for constructive criticisms and meticulous proofreading of the manuscript. To all the above I am truly indebted for their long enduring patience, kind consideration, and encouraging words. I could not have done this alone. The following cavers are thanked for their generosity in stocking the Bexar County Cave Files with valuable information: Roger V. Bartholomew, Steve Gutting, James Jasek, Orion Knox, Jr., David Litsinger, and Greg Passmore. Sincerest appreciation is extended to James Reddell for his continued biospeleological studies in Bexar County, for writing many of the sections on cave biology in this publication, and his exhaustive efforts in production of this volume. Last, but by no means least, I would thank Bill Elliott and again James Reddell for their great service to Texas speleology by heading the Texas Speleological Survey, which with the cooperation of the Texas Memorial Museum has made this and many other fine publications possible.

Caves as Resources

The majority of the information presented in this volume was gathered by individuals engaged in the sport of cave exploration or "caving." The use of caves as recreational resources, exploring the mysteries hidden inside the earth, has long fascinated people, but only in the last 50 years have cavers in the United States organized for the systematic exploration and scientific study of caves. From these studies it has come to light that caves are much more than curiosities and occasional recreational resources; they are tremendous repositories of data on our natural and cultural heritage, and can serve vital roles in the growth of many communities.

Caves, as recreational resources, are enjoyed by thousands of people throughout the United States. To the untrained person caving can be dangerous. Safety is thus the prime concern of the National Speleological Society (NSS) and its chapters. These organizations have outstanding records of safe cave exploration and are integral in cave search and rescue operations. Anyone reading this publication who desires to explore caves should contact the NSS (Cave Ave., Huntsville, AL 35810; (205) 852-1300) for information on the nearest local chapters (known as "grottos"). There are 140 grottos nationwide.

Cave safety can be divided into three types: safety for oneself, safety for others, and safety for the cave. The first two types are obvious to even the most casual explorer, but the third type, safety for the cave, is sometimes overlooked. The idea of caves as recreational resources extends to concern for their preservation. Caves often contain a very fragile crystalline beauty which took eons to create but can be destroyed in seconds. The policy of the NSS is best summed up by their motto: "Take nothing but pictures. Leave nothing but footprints. Kill nothing but time." Unless this policy is strictly followed, there will be little left in caves for future generations to enjoy.

Maintaining caves in their natural state goes beyond aesthetics to bettering our understanding of our cultural and natural resources. Many of the greatest archeological and paleontological sites in the world are in caves. Bexar County's Friesenhahn Cave, for example, is one of the premier sites in North America and contains bones from saber-toothed tigers, mastodons, and other animals of the last Ice Age. Additionally, caves often house unique and unusual animals, specially adapted for survival underground, whose study has increased our general knowledge of evolution and ecology. If it were not for the much maligned bats, as an example, life in much of Texas would be unbearable due to the insect population they control. Without proper care, these delicate ecosystems and windows to our distant past could be lost forever.

Water is a resource of major concern in Texas. Caves are formed by water moving through the ground and are in essence the natural plumbing system for the groundwater of many areas. They have been used many times as reliable water supplies because of their "mainline tap" into the groundwater systems. Yet, because of that tap, caves can rapidly introduce pollutants into the groundwater with virtually no filtration. Cities like San Antonio and Austin, Texas, which are expanding into cave areas, are learning that development around caves can seriously threaten the quality of their groundwater supply and that sealing caves can diminish its quantity. The tables below list the caves in Bexar County known to have been sealed or destroyed, or which have been used as trash dumps. The rate of cave destruction has increased dramatically with urbanization.

A purely conservationist standpoint would be to try to preserve all caves, but in the face of increasing urbanization and recreational use this is not possible. The important thing, however, is to recognize caves as practical, important resources, to minimize the impact of recreational caving, and to identify the caves that need to be preserved and protected from urban development. The results of careless mishandling of cave resources can be both tragic and devastating, but the benefits to be gained by cautious exploration and cautious urban growth can be far reaching.

CAVES SEALED AND DESTROYED IN BEXAR COUNTY
February 1987

Legend: * = Cave was a groundwater recharge site; u = Cave was sealed by urban development; r = Cave was sealed by rural land usage. Geologic units: PG = Pecan Gap Chalk; AC = Austin Chalk; ED = Edwards Limestone; UG = Upper Glen Rose; LG = Lower Glen Rose.

Cave name	Geologic unit	Date sealed	Method
Ackerman's Trash Hole (r)	ED*	1870-1978	Trash fill
Airport Cave (u)	AC*	ca. 1970	Rock, dirt, & wood fill
Alzafilled Cave No. 1 (u)	ED	1984	Rock & dirt fill
Alzafilled Cave No. 2 (u)	ED	1984	Rock & dirt fill
Assassin Cave (u)	ED	1986	Rock & dirt fill
Bandera Road Cave (u)	UG*	1979	Quarried by road construction
Bear Cave (u)	ED*	1984	Rock & dirt fill
Carcass Cave (u)	AC*	1982	Rock fill
Cave of the Bee Spirits (u)	ED*	ca. 1975	Brick & rock fill
Cement Cave (u)	ED*	ca. 1965	Cement filled
Council Cave (u)	ED*	1982	Trash & dirt fill
Dead Deer Cave (u)	ED*	ca. 1980	Rock & dirt fill
Death Loop Cave (u)	ED*	1985	Rock & dirt fill
Dick White Cave (u)	ED*	1974	Rock & dirt fill
Dreamland Road Cave (u)	AC*	1968	Paved over
Dynamite Cave (u)	ED*	ca. 1970	Trash fill
Elm Creek Dam Cave (u)	ED*	ca. 1980	Under dam
Fat Man's Misery (u)	AC*	ca. 1960	Paved over
Flint Bridge Cave (u)	ED*	1977	Paved over
Fools Folly Pit (u)	UG*	1979	Paved over
Fountain Pond Cave (u)	ED*	1984	Cement filled
French Street Cave (u)	AC	pre-1960	Dirt fill
Godchildren's Sink (r)	ED*	ca. 1960s	Trash fill
Graywaters Cave (u)	AC*	1985	Under house
Hildebrand and I-37 Cave (u)	AC*	1976	Cement filled & paved over
Hildebrand and Shook Cave (u)	AC	ca. 1955	Paved over
Holmgreen's Hole (u)	AC	ca. 1970	Under tennis court
Lone Star Pit (u)	ED*	1985	Paved over
Oak Park Mall Cave (u)	AC	ca. 1970	Cement filled & paved over
Powerline Cave (u)	AC*	ca. 1976	Under apartment building
Reservoir #7 Cave (u)	UG*	ca. 1975	Under dam
S.A.C.-Krete Cave (u)	AC	ca. 1960s	Cement filled
Saddle Trail Cave (u)	UG	ca. 1968	Rock fill
San Pedro Bank Cave No. 1 (u)	ED	1984	Cement filled
San Pedro Bank Cave No. 2 (u)	ED	1984	Cement filled
Schertz-Cibolo Cave (u)	PG	ca. 1973	Under house
Schreiner Place Cave (u)	AC	ca. 1955	Under house
Spencer's Cave (r)	UG*	1974	Rock & dirt fill
Spider Hole (u)	ED*	ca. 1976	Paved over
Stone Pond Cave (u)	ED	1984	Cement filled
Tezel Road Cave (r)	AC	ca. 1970	Dirt fill
Tiny Town Sink (u)	ED*	ca. 1973	Paved over
Woodlawn Hills Cave (u)	AC*	ca. 1950	Cement covered
Woods End Cave (u)	ED*	1985	Paved over

BEXAR COUNTY CAVES USED AS TRASH DUMPS
February 1987

Legend: * = Cave was a groundwater recharge site; u = Cave was sealed by urban development; r = Cave was sealed by rural land usage. Geologic units: AC = Austin Chalk; ED = Edwards Limestone.

Cave name	Geologic unit	Date of dumping	Comments
Ackerman's Trash Hole (r)	ED*	1870-1976	glass, metal, paint, wood, batteries
Baling Wire Cave (u)	ED*	pre-1965	wire, metal
Cave File Cave (r)	ED*	1950s-1978	metal
Council Cave (r)	ED*	ca. 1960s	metal, glass
Dynamite Cave (u)	ED*	ca. 1970	metal, wood, explosives
Godchildren's Sink (r)	ED*	ca. 1960s	metal, glass
Lone Star Pit (r & u)	ED*	ca. 1960s-1982	rubbish
Niche Cave (r)	AC	ca. 1960s	metal, glass
Robber Baron Cave (u)	AC*	1960s-1981	metal, wood, brick, glass

Cave Exploration in Bexar County—A History

The exploration of caves in Bexar County, Texas, has been fairly well documented. With the city of San Antonio situated within that cavernous county, several speleological organizations have formed over the years and have made good use of their fortuitous location. The compulsion to catalogue cave data was an interest common to many of those groups with their primary focus in their home county. Although groups as a whole usually receive credit for such work, more often a highly motivated individual or a few such persons have spurred otherwise dormant or semi-active organizations into productivity. It is the dedication and efforts of those cavers which have made the Bexar County Cave Survey possible.

American Indians were the first explorers of Bexar County caves. It is not known to what extent they explored or used the caves; some would have made excellent shelters, but two caves did involve mass burials (Hitzfelder's Bone Hole, BCS #39; and Skeleton Cave, BCRP #25). Archeological and historical records show considerable American Indian activity near San Antonio Spring (BCS #96) and San Pedro Park Spring (West) (BCS #62) (Brune, 1981). Of the caves near San Pedro Park Spring (West) it is not known what, if any, function they may have served prior to European settlement. Colorful tales written about these caves (Barnes, 1910) should be taken with the proverbial grain of salt, yet they clearly illustrate the classically curious, somewhat superstitious, and speleologically naive explorers who have continued to probe caverns from prehistoric to modern times.

In 1948 the National Speleological Society (NSS) published *The Caves of Texas*, its Bulletin Ten, compiled from the notes and experiences of people who had caved in the Lone Star State. No caving organizations existed in the state at that time, but the NSS publication inspired further exploration and the coalescence of cavers into organized groups. By the middle 1950s many "grottos" were forming throughout Texas; St. Mary's University Speleological Society in San Antonio was one of the first.

During the latter part of 1953 St. Mary's students Tony Athens, Harvey Cartwright, and Neil Kammer felt "that an organized group would give the cavers more unity and discipline" (Anonymous, 1960). Cartwright's family owned once-commercial Fairy Cave in Kendall County. Knowing of many caves in that area, early cavers went there often as well as into nearer Bexar County. Techniques and equipment were rather primitive, mainly tennis shoes, hand-held flashlights, and the 3- to-1 system (three cavers hauling one caver up and down pits); hard-hats were rare. Experience and communication with other grottos and NSS members (St. Mary's was not NSS-affiliated) rapidly improved exploration methods.

St. Mary's member Joe Ainsworth was the first person to record and maintain information on Bexar County caves. Bob Hudson, an NSS member from North Texas, who began associating with the grotto in 1955, worked with Ainsworth's rough notes and compiled them into a more orderly, informative, and readable collection of data. Hudson's work later appeared in the *Texas Cave Survey* published by the Dallas Grotto of the NSS about 1958-1959 (Widener, 1959).

About the time the *Texas Cave Survey* was being published, Orion Knox began leading trips into many Bexar County caves. When the Texas Speleological Survey (TSS) published the first edition of "Caves of Bexar County" (Reddell and Knox, 1961), about half of the information it contained was accumulated by Knox. In 1960 Knox led a St. Mary's trip to a major discovery, which resulted in the commercial development of Natural Bridge Caverns (Comal County). This project and others came to dominate much of Knox's caving, and by 1962 most of his interest had been diverted from the Bexar County caving scene.

"Caves of Bexar County" was published by cavers from the University of Texas Speleological Society in Austin. In addition to collecting data from the San Antonio cavers, they also made many caving trips to Bexar County in 1960 and 1961. Also about 1960 the Alamo Grotto was formed in San Antonio. Many of its members claimed membership in both San Antonio organizations. The level of activity in each group depended upon whether Knox, or other self-motivated members, were leading a trip for one grotto or for the other.

From 1962 to 1964 James Jasek led the first concerted attempt to map the caves of Bexar County. Jasek's departure from the San Antonio area created a vacuum in the systematic exploration and survey of caves, and the maintenance of cave data. New caving organizations were beginning to form, however, and carried the names of Bexar Grotto and San Antonio Grotto. Although all of the caving organizations in San Antonio did their share of exploration, it was the Alamo and San Antonio Grottos which survived through the years (in one form or another) and made the major contributions to Bexar County caving and the Bexar County Cave Survey.

Between 1967 and 1969, Roger V. Bartholomew, Ron Bridgemon, and Wayne Russell joined the San Antonio Grotto (SAG). Together they led many caving and mapping trips into the caves of Bexar County. Concurrently, the Alamo Grotto was undergoing a revitalization, inspired mostly by David Litsinger who began to update the Bexar County Cave Survey. By his own admission, Litsinger's plans for the survey were idealistically high. In striving to achieve them, however, he accomplished a tremendous amount of valuable work. Locations, histories, and descriptions were documented, and a computer program for classification and storage of all cave data was developed. Litsinger's success stemmed first from his friendship with Al Brandt, who had been caving in Bexar County for many years and was a walking encyclopedia on the area, and second from his productive relationship with SAG cavers Bartholomew, Bridgemon, and Russell.

In 1970 the Alamo Grotto and San Antonio Grotto merged to form the Alamo Area Chapter (AAC) of the NSS. Phil Winkler joined the AAC during the early 1970s and in 1973 he renewed efforts to organize the Bexar County Cave Survey. However, due to diminishing active interest in the Survey, a problem which had also plagued Litsinger's efforts, only a few caves were surveyed (most of the maps have not been drafted) and excerpts of the "Caves of Bexar County" were reprinted in the AAC's newsletter, *The Bexar Caver* (Winkler, 1973). Two years later Greg Passmore had compiled information on 74 Bexar County caves (Passmore, 1975) but was also unable to get much assistance for developing a systematic and comprehensive survey.

In late 1976 a new San Antonio Grotto split from the AAC and began its first major project—the resurvey and historical study of Robber Baron Cave (BCS #56). By May 1978 a large volume of survey data had accumulated on caves throughout the county, and George Veni began the current Bexar County Cave Survey (Veni, 1978). The new survey originally listed 84 caves, but the numbers rapidly increased (Veni, 1979). Many new cave maps were being produced by the SAG. Gary Poole and Greg Passmore (1978) compiled the new maps into a single volume, *Bexar County Speleology*, for timely dissemination.

Following that publication, work in Bexar County began to slow down. This was not due to less caving by the SAG but by increased caving in other areas. In 1983 Veni moved out of Texas and felt that it was time to publish the Bexar County Cave Survey. At the time of this writing Bexar County caving is still active. The AAC has dissolved and a new Bexar Grotto has formed. Randy Waters is leading most of the efforts in the county and as this volume is going to press, has found several new and major Bexar County caves.

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Regional Geology as Related to Cavern Development: Bexar County, Texas

INTRODUCTION

Cavern development in Bexar County is probably more diverse than any other similar-size area in Texas. Because of the extensive faulting of the Balcones fault system crossing the county, caves in six different rock units are found within close proximity.

Bexar County is located in South-Central Texas at the southeastern corner of the Edwards Plateau. The northern quarter of the county is a part of that upland, which comprise Cretaceous carbonate rocks. The plateau is a broad, flat expanse with deeply incised streams and has an areal extent of approximately 300 km by 600 km. Bounding the Edwards Plateau to the south and east is the Balcones Fault Zone, which extends 240 km west of Bexar County to Del Rio and 300 km northeast to Waco. Characterized by a series of high-angle normal faults along which the Balcones Escarpment has developed, the fault zone commonly juxtaposes rock units of differing porosities and permeabilities. This area is also known for its many losing streams that recharge the Edwards (Balcones Fault Zone) Aquifer. Tertiary clastic sediments of the Gulf Coastal Plain blanket the southern half of the county.

Climatic conditions in Bexar County reflect its location at the southern extremity of the Great Plains Province and the northern edge of the Gulf Coastal Plain. Precipitation averages 71.8 cm/yr (Reeves, Maclay, and Davis, 1982), most of it occurring from September to April. Flash floods are common because of moderately steep stream gradients, minimal soil cover on the uplands, and high-intensity storms. The area normally has short mild winters and long hot summers.

STRATIGRAPHY

Stratigraphic investigations of the Edwards Plateau region began over 100 years ago with Römer in 1846 (Abbott, 1973). Since that time, many rock-unit names have been proposed and used in describing the region's stratigraphy. Nomenclature and unit descriptions used in this report are from Barnes (1974) and Rose (1972).

Only the cavern-containing units are discussed below; they are the Glen Rose Formation, Edwards Limestone, Buda Limestone, Austin Chalk, and Pecan Gap Chalk, all of Cretaceous age, and Quaternary fluviatile deposits. Although the Anacacho Limestone is cavernous elsewhere and is present in Bexar County, it is not included here because it is thin, areally limited, and contains no known caves. Fig. 1 is a stratigraphic column displaying the relationship of the outcropping Cretaceous, Lower Tertiary, and Quaternary rocks in northern Bexar County, and Fig. 2 is a geologic map of the county.

Lower Cretaceous

The Glen Rose is commonly divided into two informal members. The lower member is a massive fossiliferous limestone with a thickness of about 150 m. The upper member is a 120-m-thick unit of limestone and dolomite beds alternating with soft marly beds that erode to form a distinctive stairstep topography. Separating the two members is the thin, regional "*Corbula* Bed," an interclastic biosparite containing many steinkerns of *Carycorbula harveyi* (Hill) formerly *Corbula harveyi*).

Conformably overlying the Glen Rose, the Edwards Limestone, principally hard limestone and dolomite, is rich in chert and rudistid reefs. Its thickness in Bexar County ranges from 100 to 150 m. Collapse breccias resulting from dissolution of evaporites and solution zones are common. The Edwards Limestone is a stratigraphic group that is divided into the lower Kainer Formation and upper Person Formation in Bexar County, but these two are difficult to distinguish in the field. Several members have also been defined and are shown in Fig. 1.

The Buda Limestone is massive, up to 15 m thick, somewhat nodular, and contains abundant pelecy-

Fig. 1.—Stratigraphic column, northern Bexar County, Texas, showing outcropping units (modified from Barnes, 1974; Rose, 1972; and Shaw, 1978).

SYSTEM	GROUP	FORMATION	THICKNESS (m)
Quaternary		Alluvium, terrace material*, colluvium	0-10
Tertiary	Wilcox		135+
	Midway		60±
Cretaceous	Navarro		300±
		[1]Anacacho Limestone	0-5
		[2]Pecan Gap Chalk*	60
	[1]Austin*		100-185
	Eagle Ford		10±
		Buda Limestone*	20-25
		Del Rio Clay	15-20
	Edwards	[2]Person*	55-75
		[3]Kainer*	80-95
		[4]Glen Rose Formation*	270±

*units with known caves in Bexar County

Notes: [1]The Austin, Pecan Gap, and Anacacho are partly gradational to one another in Bexar County.
[2]The Person is divided into 5 informal members, from bottom to top: regional dense bed, collapsed member, leached member, marine bed, and cyclic bed. The thin Georgetown Limestone is usually included in the top of the Person.
[3]The Kainer is divided into 2 informal members, from bottom to top: dolomitic member and grainstone member.
[4]The Glen Rose Formation is divided into informal upper and lower members by the "Corbula" bed (*Carycorbula harveyi*, formerly *Corbula harveyi*); they are about 120 and 150 m thick, respectively.

pods. It is separated from the underlying Edwards by the Del Rio Clay.

Upper Cretaceous

The Austin Chalk is composed of thick to massive chalk and marl beds, and contains pyrite and limonite nodules and abundant fossils. Some beds show large scale cross-stratifications. Thickness in Bexar County is about 100 m.

The Pecan Gap Chalk, up to 120 m thick, contains chalk and chalky marl with numerous *Exogyra ponderosa*. It thins westward and is overlain and replaced by the Anacacho Limestone near the Bexar-Medina County line.

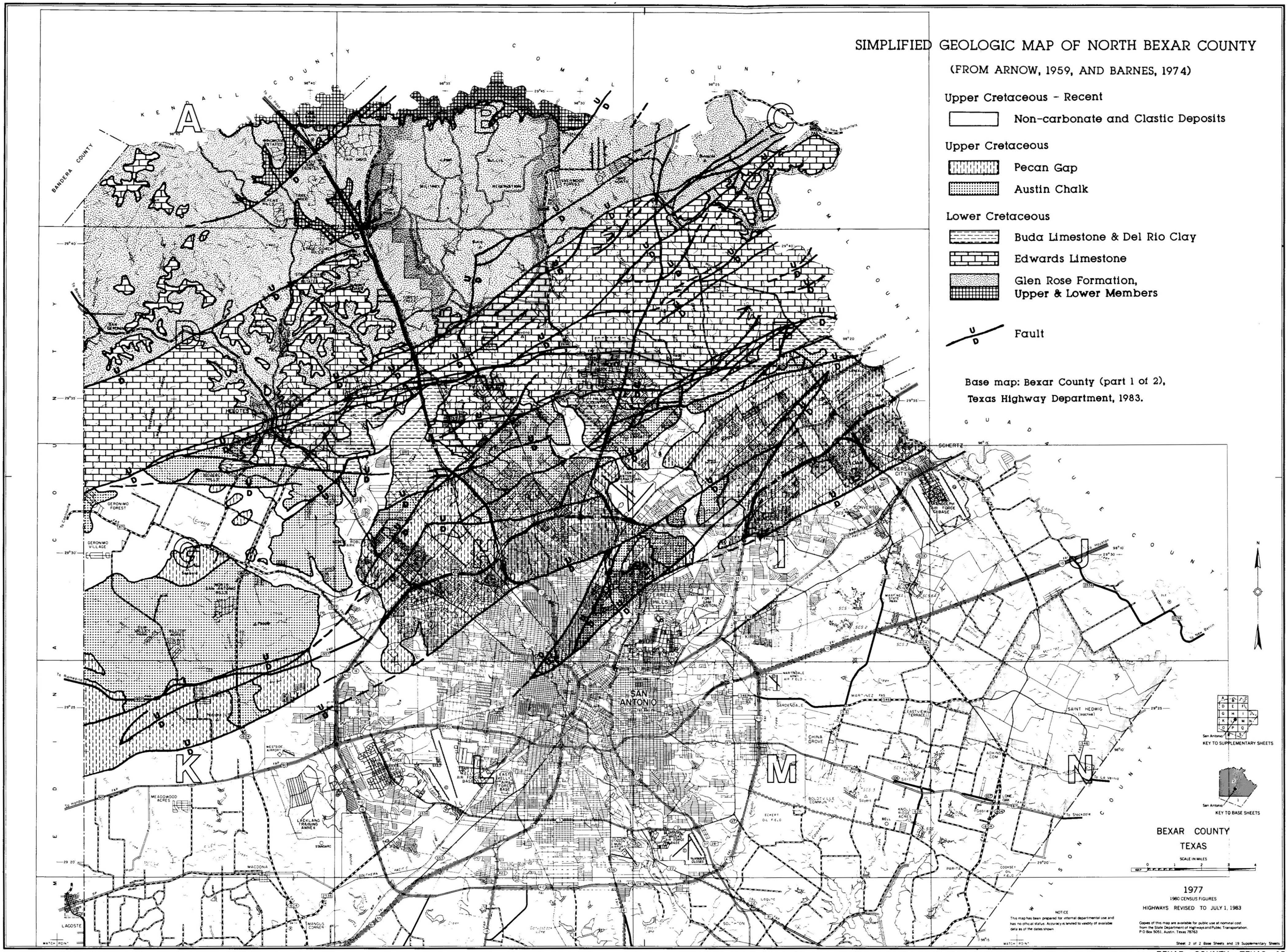
Quaternary

Fluviatile terrace deposits, containing caves, are composed predominantly of chert and limestone gravel with some sand, silt, and clay.

STRUCTURE

The Balcones Fault Zone is the dominant structural feature in Bexar County. Most of the faulting took place in the Miocene, well after deposition of the Cretaceous rocks in the area. The 25-km-wide fault zone sweeps from the northeast corner to the western county line. Faulting is especially intense and complex where fault orientations change from northeast-southwest to east-west. Most of the en echelon faults are normal, high angle, and downthrown towards the Gulf Coast. Fault displacement in Bexar County ranges up to 360 m.

Most of the caves in Bexar County are strongly guided by joints that parallel northeast-southwest faults of the Balcones Fault Zone. A few caves, such as Corkscrew Cave and Robber Baron Cave, show extensive development along east-west and northwest-southeast fractures associated with pre-Miocene structural features. Wermund et al. (1978, p. 12) have demonstrated that caves located on the Edwards Plateau are more likely to be oriented along the older fractures while those in the fault zone preferentially formed along the younger, more pronounced, and longer fractures. Field examinations of Bexar County caves support the idea that cave passages within the fault zone which developed along the older fractures in fact predate the passages formed along the younger Balcones fractures. This is not to say the passages also predate the Balcones faulting but that primary permeability was maintained through the older fractures


SIMPLIFIED GEOLOGIC MAP OF NORTH BEXAR COUNTY
(FROM ARNOW, 1959, AND BARNES, 1974)
Upper Cretaceous - Recent
Non-carbonate and Clastic Deposits
Upper Cretaceous
Pecan Gap
Austin Chalk
Lower Cretaceous
Buda Limestone & Del Rio Clay
Edwards Limestone
Glen Rose Formation, Upper & Lower Members
Fault
Base map: Bexar County (part 1 of 2), Texas Highway Department, 1983.
KENDALL COUNTY
COMAL COUNTY
GUADALUPE COUNTY
WILSON COUNTY
MEDINA COUNTY
BANDERA COUNTY
SAN ANTONIO
SCHERTZ
UNIVERSAL CITY
CONVERSE
KIRBY
HELOTES
GERONIMO FOREST
GERONIMO VILLAGE
SAINT HEDWIG
CHINA GROVE
LACOSTE
MEADOWOOD ACRES
LACKLAND TRAINING ANNEX
KEY TO SUPPLEMENTARY SHEETS
KEY TO BASE SHEETS
BEXAR COUNTY
TEXAS
SCALE IN MILES
1977
1980 CENSUS FIGURES
HIGHWAYS REVISED TO JULY 1, 1983
NOTICE

long enough for substantial conduit enlargement before the pirating of flow to the Balcones fractures.

In spite of intensive faulting throughout Bexar County, faults themselves play a very minor direct role in guiding cavern development. Except for artesian cave-springs where water rises along faults, such as San Antonio Spring and San Pedro Park Spring (West), only two caves in Bexar County are known to intersect a fault: Crystal Cave and Genesis Cave. In Crystal Cave little cavern enlargement or modification has occurred along the fault, while some fault-guided passages have formed in Genesis Cave.

The general lack of correlation between faults and caves is unexpected in view of the common belief that much recharging of the Edwards (Balcones Fault Zone) Aquifer occurs along faults, an excellent opportunity for ample and aggressive water to develop many caves. No one has made a detailed investigation of this unexpected lack of correlation. Based upon observations and data gathered thus far, I suggest that:

1. Tensional stresses along the Balcones Fault Zone created many joints prior to faulting. Depending upon the elapsed time between joint and fault development, groundwater could have established its courses along joints which were maintained as the preferred flowpaths even after faulting. Crystal Cave is an example of this. A consequence of this hypothesis is that much groundwater commonly thought to flow along faults might actually be paralleling them in well developed joint conduits.
2. In streambeds, where primary recharge is thought to occur through faults, flow may diffuse into a wide band of fractures and therefore not selectively enlarge a particular one. As explained later, Bexar County caves rarely open in streambeds, but that does not explain why caves both in and out of stream valleys do not develop along faults.
3. Recrystalized gouge along fault planes could effectively eliminate fault permeability. Precise monitoring of water loss along fractured streambeds might reveal whether actual recharge occurs through the faults or their associated fractures.

These three conditions might not be maintained in the phreatic zone of the Edwards (Balcones Fault Zone) Aquifer.

HYDROLOGY

Edwards Aquifers

Except for spring-fed streams, surface water flow in the Bexar County karst is seasonal and rarely continues more than a few days after a storm. The dominant regional hydrologic features are the two Edwards aquifers.

In the county's northeastern and northwestern corners hills of Edwards Limestone cap the upper member of the Glen Rose Formation. These hills and their groundwater systems are erosional outliers of the broad, unconfined Edwards Plateau Aquifer. Meteoric water descends through the Edwards Limestone to its contact with the upper member of the Glen Rose, in which marl-dolomite interbeds force lateral flow to springs located along the hillsides. Baseflow in streams fed by those springs runs across the upper Glen Rose and onto downthrown blocks of Edwards Limestone, the recharge zone of the Edwards (Balcones Fault Zone) Aquifer (Fig. 3).

Primary recharge of the Edwards (Balcones Fault Zone) Aquifer occurs during and after storms by way of faults, joints, and caves located in stream valleys of the recharge zone. Successive faulting carries the Edwards Limestone deeper underground, confining it between the upper member of the Glen Rose and the overlying Del Rio Clay (a 15-m-thick aquiclude between the Edwards and the Buda Limestone). Discharge of the confined Edwards Aquifer is from artesian springs developed along or adjacent to major faults. The largest artesian springs are San Antonio Spring, Comal Springs (the largest springs in the southwestern U.S.), and San Marcos Springs (base level for the aquifer). Comal and San Marcos Springs are located about 40 and 70 km northeast of San Antonio in Comal and Hays Counties.

The Edwards (Balcones Fault Zone) Aquifer is one of the most productive aquifers in the southwestern United States and is the sole water supply for over one million people. Increasing demand for its water has begun to lower the potentiometric surface of the aquifer. San Antonio and San Pedro Park Springs seldom flow. Klemt et al. (1979) have projected that the predicted increase in pumpage will surpass recharge and result in significant mining of groundwater by 1990. Comal and San Marcos Springs would be dry by the year 2020. Concern is growing in the San Antonio region about the aquifer's ability to supply water and about the effect that urban expansion onto its recharge zone may have on water quality.

Minor Aquifers

The Glen Rose Formation has a relatively low water yield. In northern Bexar County along Cibolo Creek, the lower member of the Glen Rose recharges the Edwards (Balcones Fault Zone) Aquifer. Glen

Rose groundwater enters the Edwards along a series of faults in the north-central part of the county, which juxtapose the two units. Tritium isotope studies have indicated, however, that this water does not join the main flow of the aquifer but travels as a separate subsystem to be discharged at Hueco and San Marcos Springs (Pearson et al., 1975). Research by Ogden and Spinelli (1983) demonstrated rapid travel time of recharge water to Hueco Springs (5 km north of Comal Springs in Comal County) and deterioration in water quality following recharge events.

Wells with low to moderate yields are common in the Buda Limestone and the Austin Chalk. Water from the Austin commonly contains hydrogen sulfide derived from the oxidation of pyrite found in the unit. Both formations can also produce high-yield wells where invaded by artesian water from the confined Edwards Aquifer (Arnow, 1959). Of the six cavernous formations in Bexar County only the Pecan Gap Chalk is not known to yield water to wells.

GEOMORPHOLOGY

The Balcones Escarpment effectively divides Bexar County in half. The northern half is an area of incised streams along the Edwards Plateau outliers and within the Edwards recharge zone; the southern half is the low relief Gulf Coastal Plain, which slopes gently toward the Gulf of Mexico. Maximum local relief in the county is in the northwest. Across 4 km of the escarpment, relief can exceed 120 m; relief is up to 260 m over the 10 km from the top of the Edwards Plateau outliers to the escarpment base. Cliffs are common in the resistant Edwards Limestone and even in the less resistant limestones and chalks along entrenched Cibolo Creek. Surface water not channeled into the Cibolo converges to form the San Antonio River, although the officially recognized "head of the river" is centrally located in Bexar County at San Antonio Spring.

Karst features in Bexar County are very subdued, a result of the region's relative geomorphic youth. Sinking streams are few, the average solution sink measures less than 5 m in diameter and less than 1 m deep, and collapse features are usually the result of coincidental intersection of caves by surface streams (e.g., Bear Cave, Cub Cave, John Wagner Ranch Cave No. 3) and not the result of a cave enlarging beyond its ability to support its roof. Even caves, the most significant karst features in the county, are generally small and shallow.

CAVERN DEVELOPMENT: LITHOLOGIC AND GEOMORPHIC ANALYSIS

The following discussion of cavern development in Bexar County considers stratigraphic, structural, geomorphic, and topographic factors.

Lower Member of the Glen Rose Formation

In Bexar County only three caves (Bullis Hole, Fair Hole, and Georg's Hole) are known in the lower member of the Glen Rose. Two reasons account for this relative lack of caves compared to adjacent counties: limited exposure of the lower member in Bexar County and restricted access to the outcrop

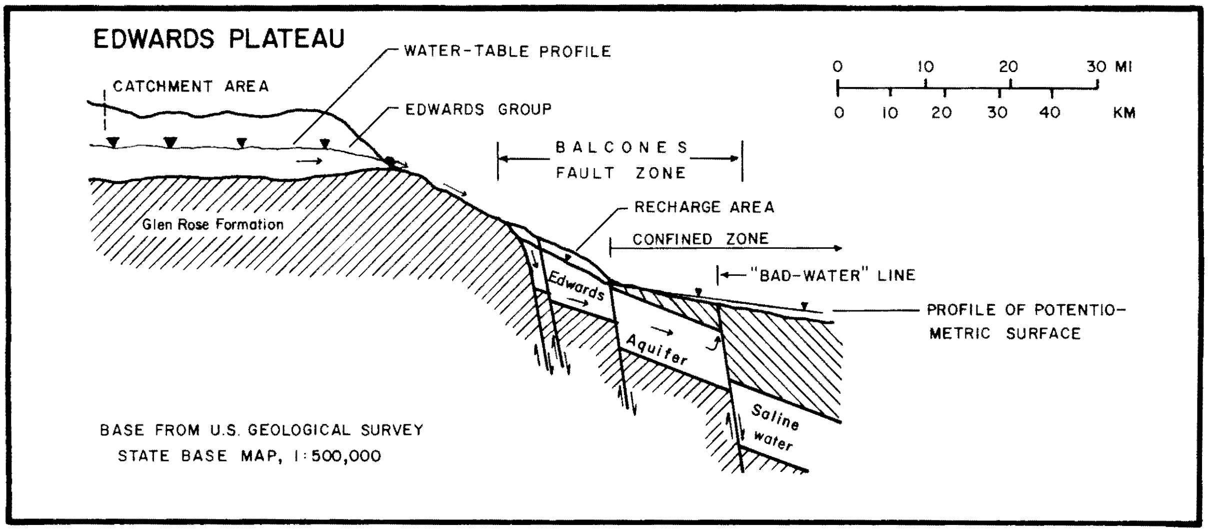


Fig. 3.—Diagrammatic cross section of the Edwards Plateau and Balcones Fault Zone Aquifers (after Maclay and Small, 1984).

area, most of which is on the Camp Bullis Military Reservation. Lower Glen Rose caves north of Cibolo Creek are usually well developed linear stream systems that efficiently drain to their local base level. Insurgent side passages are usually small and of little individual significance in lower Glen Rose caves. This type of development is expected in caves like Fair Hole and Georg's Hole, or in Cascade Caverns and Cascade Sink in Kendall County, all of which are swallets—the upstream end of the karst groundwater system. There is little or no upstream extent from their entrances, but downstream there is usually a large passage that shortly reaches base level. At the resurgence end of the local karst groundwater system are caves like Prassell Ranch Cave, Cave Without A Name (both in Kendall County), and Honey Creek Cave (Comal-Kendall Counties) that drain to the Guadalupe River valley. These caves formed by the combined flow of many discrete insurgence points, yet lack well developed side passages—further evidence of the region's geomorphic youth. In relative terms Prassell Ranch Cave, a single stream passage measuring over 2.6 km long, may be considered to be at a youthful stage; Cave Without A Name, whose side passages seldom exceed a few hundred meters in length, is at an intermediate stage; and Honey Creek Cave might be described as the region's mature or advanced stage of cavern development for lower Glen Rose resurgences because it has the best developed and most extensive dendritic system in the area (24+ km). Although these three caves drain to a surface valley, they demonstrate the susceptibility of the lower member of the Glen Rose to developing cave streams.

Upper Member of the Glen Rose Formation

Approximately one-third of the cavernous rock outcrop of Bexar County is composed of the upper Glen Rose, but only 26 caves (12.5% of Bexar County caves) are developed within it. The upper member of the Glen Rose Formation is not generally considered a major cave-forming unit or a unit in which major caves form (notwithstanding the anomalously large Natural Bridge Caverns and Bracken Bat Cave in adjacent Comal County). The upper Glen Rose caves in Bexar County can be classified into three genetic types: phreatic chambers, springs, and vadose insurgences (see Table 1).

Phreatic chambers account for the largest caves formed in the upper member. Natural Bridge Caverns and Bracken Bat Cave in Comal County and Madla's Cave and Crane Bat Cave in Bexar County are examples. Besides being large, all are near the top of the upper Glen Rose and have suffered collapse from the overlying Edwards Limestone. Abbott (1973) described the upper 43 m of the upper Glen Rose as largely dolomitic, as opposed to its lower 90 m which are thin-bedded clayey dolomite, biomicrite, and marl. Although most of the upper Glen Rose caves in Bexar County are not large, most are developed within the upper 43 m.

Cave-springs from the upper member of the Glen Rose Formation have formed within the upper 43 m by meteoric water descending through hills capped by Edwards Limestone to a base level or an aquitard. At such levels, water converges to flow southeast down the regional dip of the beds, resurging in nearby valleys. Only two of the eight upper Glen Rose cave-springs (Blue Hole No. 1 and Elephant

Table 1
Upper Glen Rose Caves; Listing by Genesis

Vadose Insurgence	
Cave With Blue Hammer In It	
Cave With Dead Coral Snake In It	
Cave With Undropped Drop	
Fool's Folly Pit	
Madla's Cave No. 2	
Papke Hill Cave	
Reservoir #7 Cave	
Spencer's Cave	
World News Cave	
Number of caves:	9
Percentage of Upper Glen Rose caves:	34.6
Percentage of Bexar County caves:	4.3
Phreatic Chambers	
Aue Road Cave	
Basement Cave	
Crane Bat Cave	
Gladsam's Cave	
Madla's Cave	
Moonshine Cave	
Roan's Cave	
Saddle Trail Cave	
Sam's Cave	
Number of caves:	9
Percentage of Upper Glen Rose caves:	34.6
Percentage of Bexar County caves:	4.3
Springs	
Bandera Road Cave	
Blue Hole No. 1	
Christmas Cave	
Dam Crawl	
Elephant Spring	
Helotes Blowhole	
Is That All There Is Spring	
Stealth Cave	
Number of caves:	8
Percentage of Upper Glen Rose caves:	30.8
Percentage of Bexar County caves:	3.8
Total number of caves in the Upper Glen Rose:	26
Percentage of total Bexar County caves:	12.5

Spring) flow opposite the dip along high hydraulic gradients to deeply incised valleys.

Flow from all the springs varies considerably. Only Elephant Spring is perennial. Bandera Road Cave (destroyed), Christmas Cave, Dam Crawl, Is That All There Is Spring, and Stealth Cave flow seasonally. The Christmas Cave flow has been affected by alluviation of its entrance and that from Stealth Cave by its location in a floodwater reservoir. Blue Hole No. 1 and Helotes Blowhole do not discharge water.

The degree of active flow from the upper Glen Rose springs can be used as a general indicator of the cave size and relative age. The more active caves are usually smaller and younger. Declining base levels encourage downcutting as the primary means of cavern enlargement, but this is short-lived due to pirating of flow to stratigraphically lower, non-cave seeps. All upper Glen Rose cave-springs exhibit little upward development, primarily forming along bedding planes and entrenching downward; Christmas Cave is an excellent example.

Approximately one-third of Bexar County's upper Glen Rose caves have developed as vadose insurgences. The sites are widely distributed, and judging by the lack of associated springs, they contribute little to local groundwater systems. Most of these caves are small and shallow. Spencer's Cave, largest of the group, and Reservoir No. 7 Cave, buried under a dam and of undetermined extent, are located in major stream valleys just upstream from the Edwards (Balcones Fault Zone) Aquifer recharge zone. Compared to other upper Glen Rose caves, their rumored larger size (increasing soil erosion had been filling Spencer's Cave before it was explored and later sealed) may result from the Edwards recharge zone serving as an efficient base level for their drainage.

Edwards Limestone

The Edwards Limestone is the most cavernous unit in Bexar County. Its outcrop accounts for one third of the cave-forming area, but it has 60% of the caves. Two primary types of cavern development occur in this formation—phreatic chambers and vadose insurgences (see Table 2).

The Edwards is well known for containing isolated, nonintegrated phreatic chambers; these usually result from slow-moving phreatic flow. In Bexar County they vary in size from less than 5 m in diameter (Villa Rreals Cave) to over 100 m long by 20 m wide (Government Canyon Bat Cave). Collapse, domepit development, and secondary calcite deposition commonly occur in phreatic chambers after they are drained.

Table 2
Edwards Limestone Caves; Listing by Genesis

Phreatic Chambers	
Assassin Cave	
Baling Wire Cave	
Bering Sink	
Big Bexar Cave	
Blue Hole No. 2	
Buzzard's Roost Cave	
Council Cave	
Death Loop Cave	
Friesenhahn Cave	
Gandalf's Cave	
Government Canyon Bat Cave	
Headquarters Cave	
Height's Cave No. 1	
Hidden View Cave	
Hitzfelder's Bone Hole	
Hogan's Cave	
Huesta Cave	
Hummingbird Cave	
John Wagner Ranch Cave No. 3	
Madla's Drop Cave	
Oliver Cave	
Pick-Up Sticks Cave	
Robber's Cave	
Scorpion Cave	
Shoehorn Cave	
Some Monk Chanted Evening Cave	
Tick 'n Delight Cave	
Tiny Town Sink	
Unknown Cave	
Villa Rreal's Cave	
Voight's Bat Cave	
Young Cave No. 1	
Young Cave No. 2	
Unnamed cave (BCS #58)	
Unnamed cave (BCS #59)	
Number of caves:	35
Percent in Edwards Aquifer Recharge Zone:	54.3
Percentage of Edwards Limestone caves:	27.8
Percentage of Bexar County caves:	16.8
Vadose Insurgences	
Ackerman's Trash Hole	
Bet-Ya-Can't-Find-It Cave	
Blue Hole No. 3	
Bob Bear Cave	
C-Section Cave	
Cave File Cave	
Cave of the Bee Spirits	
Cave of the Creek	
Cave of the Woods	
Cave With Ladder In It	
Cement Cave	
Cibohole	
Come-Along Cave	
Corkscrew Cave	
Creekbed Cave	
Crystal Cave	
Dead Deer Cave	
Dick White Cave	
Dirtwater Cave	
Drop and a Prayer Pit	

Table 2 (Cont.)

Dynamite Cave
Eagles Nest Cave
Elm Springs Cave
Elmore Cave
Flint Bridge Cave
Genesis Cave
Godchildren's Sink
Goonies Cave
Hay's Cave
Helotes Hilltop Cave
Hopeless Cave
Hornet's Last Laugh Pit
Kamikazi Cricket Cave
Lone Star Pit
Looserock Cave
Lytle Ranch Pit
Olive Pit
Pekingese Pit
Pendulum Pit
Persimmon Pit
Poison Ivy Pit
Pomeranian Pit
Por Boy Ranch Cave
Post Hole
Putrefaction Cave
Root Cave
17' Pit
Shavano Park Cave
Shotgun and a Prayer Cave
Silo Cave
Sink Hole
Spider Hole
The Last Cave
Toad Cave
Tobacco Can Cave
Tract 6 Cave 2
Twin Pits
Virgin Cave
Wagner Ranch Pit
Whistledrop Cave

Number of caves:	62
Percent in Edwards Aquifer Recharge Zone:	88.7
Percentage of Edwards Limestone caves:	49.2
Percentagė of Bexar County caves:	29.8

Other (see Table 4)

Alzafilled Cave No. 1
Alzafilled Cave No. 2
Bear Cave
Black Cat Cave
Cave of the Cliff
Cibolo Shelter
Crawl And A Prayer Cave
Crescent Spring
Cub Cave
Cueva Cave
Elm Creek Dam Cave
Fireworks Cave
Fountain Pond Cave
G.I. Joe Cave
Han's Grotto
Hills and Dales Pit
Horizontal Haven

Table 2 (Cont.)

Mattke Cave
No Exit Cave
San Pedro Bank Cave No. 1
San Pedro Bank Cave No. 2
Shot-and-a-Prayer Cave
Sorehead Cave
Stone Pond Cave
The Crawl
2 For 1 Cave
2 For 1 Spring
Wagner Ranch Fissure
Woods End Cave

Number of caves:	29
Percent in Edwards Aquifer Recharge Zone:	89.7
Percentage of Edwards Limestone caves:	23.0
Percentage of Bexar County caves:	13.9

Total number of caves in the Edwards Limestone:	126
Percent in Edwards Aquifer Recharge Zone:	79.4
Percentage of total Bexar County caves:	60.5

In Bexar County most Edwards Limestone caves are developed in the vadose zone. Eighty-nine percent of the vadose caves have formed in the Balcones Fault Zone with its efficient subsurface drainage. In contrast, the phreatic chambers are only coincidentally located in the recharge zone, their primary formative processes having been completed before vadose conditions reigned. The occurrence of 54.3% of the phreatic chambers in the recharge zone is largely a result of its broad extent.

Table 3 categorizes vadose insurgences in the Edwards according to topographic position: sink or swallet, streambed, streambank, hillside, and tableland (without entrance sinks). As discussed previously, primary recharge into the Edwards (Balcones Fault Zone) Aquifer is believed to occur in stream valleys, so it is initially surprising that only one-fourth of all Edwards caves are formed in streambeds and streambanks. All are small except for Dead Deer Cave, Elm Springs Cave, and Creekbed Cave. The first two have developed as efficient routes in pirating streamflow directly to the local water table. The third, located a few meters above the Upper Glen Rose aquitard, has attained its size not by the flow of insurging water but by its ponding. In contrast to these caves, those formed in solution sinks or stream swallets are the largest topographic category and are generally the largest Edwards caves in Bexar County. All are located on tablelands drained primarily by sinks. Standing water on karst tablelands dissolved closed catchment basins (sinks) and subsurface channels which drain the basins to base level. Basin retention capacity and capture area increase with continued

Table 3
Edwards Limestone Vadose Insurgence Caves; Listing by Topographic Occurrence

Sink/Swallet

Bet-Ya-Can't-Find-It Cave	
Come-Along Cave	
Corkscrew Cave	
Dirtwater Cave	
Dynamite Cave	
Flint Bridge Cave	
Genesis Cave	
Godchildren's Sink	
Looserock Cave	
Poison Ivy Pit	
Root Cave	
Shavano Park Cave	
Sink Hole	
Toad Cave	
Tobacco Can Cave	
Virgin Cave	
Whistledrop Cave	
Number of caves:	17
Percentage of vadose Edwards Limestone caves:	27.4
Percent in Edwards Aquifer Recharge Zone:	100.0
Percentage of Edwards Limestone caves:	13.5
Percentage of Bexar County caves:	8.2

Streambed

Cave of the Creek	
Cibohole	
Creekbed Cave	
Elm Springs Cave	
Hornet's Last Laugh Pit	
17' Pit	
Number of caves:	6
Percentage of vadose Edwards Limestone caves:	9.7
Percent in Edwards Aquifer Recharge Zone:	83.3
Percentage of Edwards Limestone caves:	4.8
Percentage of Bexar County caves:	2.9

Streambank

Ackerman's Trash Hole	
Bob Bear Cave	
Cave File Cave	
Cave of the Woods	
Cement Cave	
Dead Deer Cave	
Drop and a Prayer Pit	
Eagles Nest Cave	
Por Boy Ranch Cave	
Putrefaction Cave	
Number of caves:	10
Percentage of vadose Edwards Limestone caves:	16.1
Percent in Edwards Aquifer Recharge Zone:	100.0
Percentage of Edwards Limestone caves:	7.9
Percentage of Bexar County caves:	4.8

Hillside

C-Section Cave	
Elmore Cave	
Hay's Cave	
Helotes Hilltop Cave	
Kamikazi Cricket Cave	
Lytle Ranch Pit	
Olive Pit	
Pendulum Pit	
Silo Cave	
Spider Hole	
Tract 6 Cave 2	
Wagner Ranch Pit	
Number of caves:	12
Percentage of vadose Edwards Limestone caves:	19.4
Percent in Edwards Aquifer Recharge Zone:	50.0
Percentage of Edwards Limestone caves:	9.5
Percentage of Bexar County caves:	5.8

Table 3 (Cont.)

Tableland (without sinks)

Blue Hole No. 3	
Cave of the Bee Spirits	
Cave With Ladder In It	
Crystal Cave	
Dick White Cave	
Goonies Cave	
Hopeless Cave	
Lone Star Pit	
Pekingese Pit	
Persimmon Pit	
Pomeranian Pit	
Post Hole	
Shotgun and a Prayer Cave	
The Last Cave	
Twin Pits	
Number of caves:	15
Percentage of vadose Edwards Limestone caves:	24.2
Percent in Edwards Aquifer Recharge Zone:	73.3
Percentage of Edwards Limestone caves:	11.9
Percentage of Bexar County caves:	7.2

recharge. Eventually, some basins enlarged to over 150 m in diameter (the entrance sink into Corkscrew Cave) or developed a stream channel into their entrances (Bet-Ya-Can't-Find-It Cave). The caves associated with the large basins are also generally large. This statement is not universally true, but it does hold for Bexar County's high gradient vadose caves. In comparison, the caves formed in stream valleys do not develop retention basins because of the higher erosion rates in valleys. They retain little of the flashy valley runoff and subsequently do not enlarge to any great size. Two exceptions, Dead Deer Cave and Elm Springs Cave, may have originally developed from sink/swallet type caves but were later modified and enlarged to their present dimensions with all evidence of their parental basins removed by stream erosion.

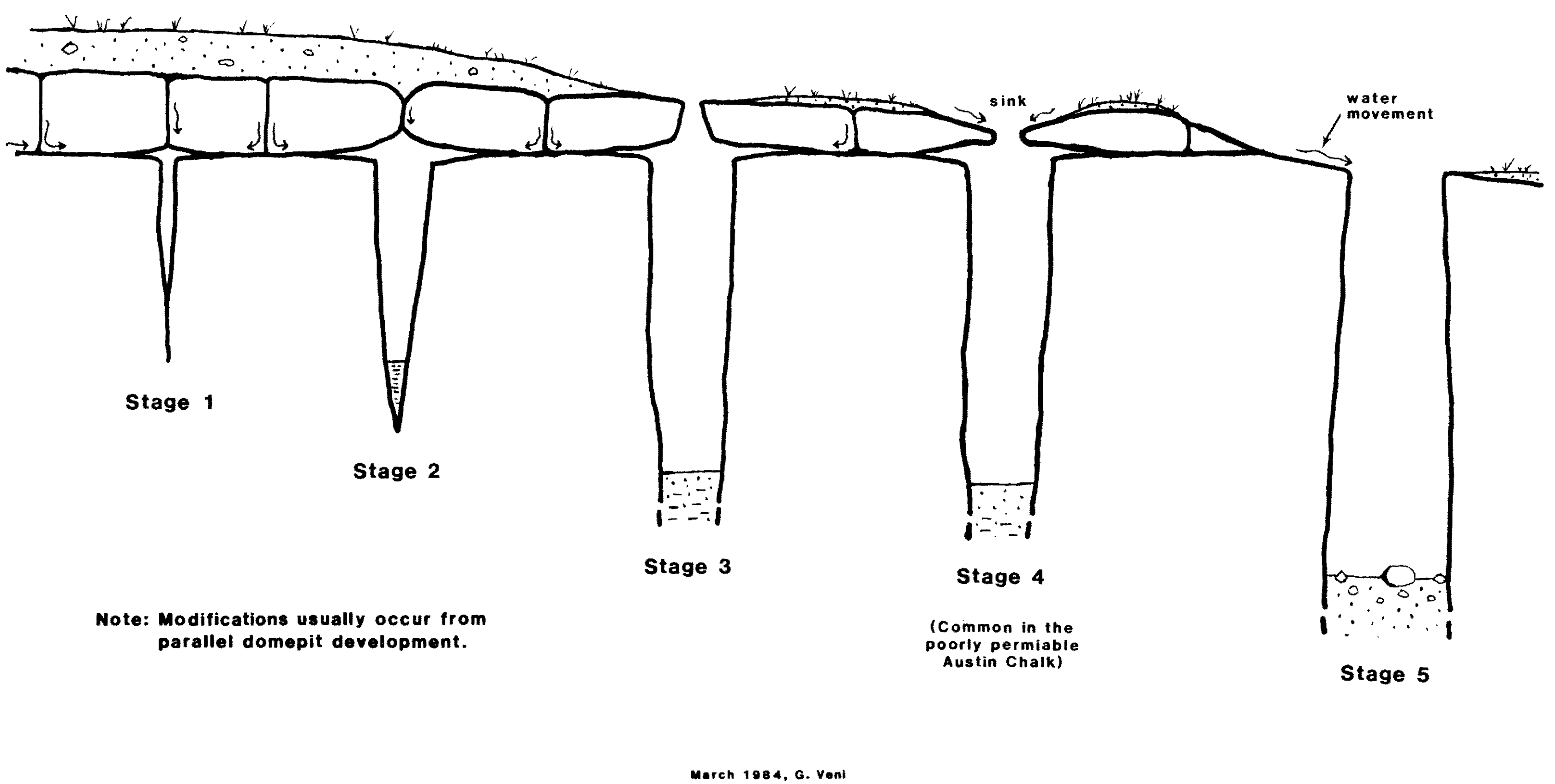
Edwards insurgence caves that formed on tablelands and hillsides but which do not have surface sinks are usually simple vertical shafts with little horizontal extent (the hillside caves being identical to those on the tablelands except for being intersected by slope retreat). Fig. 4 illustrates their development. During stage 1 meteoric water descends through available fractures in the limestone to a shallow bedding plane. The water then travels downgradient along the bedding plane until a major joint or a joint intersection is encountered. That joint is solutionally enlarged as it channels water downward. At stage 2 a proto-shaft has formed, channelization of flow along the bedding plane has occurred, and the first developmental stages of a solutional entrance are evident. If the vertical shaft is formed at a joint intersection, by stage 2 preferential development along one of the joints has been established. In stage 3 the vertical shaft and its bedding plane drainage routes are well developed, and a narrow entrance makes it accessible to the surface. Local topography and lithology determine if a sink might develop around the cave's entrance as shown in stage 4. The lack of sinks around most Edwards tableland caves is suggestive of a high fracture permeability which allows for little surface water runoff into the caves to form entrance sinks. Stage 5 is an open vertical shaft where the overlying bed, bedding plane, and sink (if present) have been removed by erosion. Lone Star Pit is a very good example of stage 3 development as C-Section Cave is of stage 5. Vertical shaft water continues to infiltrate downward along prominent fractures to base-level or near-base-level bedding planes. Sufficient flow along the bedding planes may form a cave passage that may be intersected by one of its more efficiently drained vertical shafts. Isopit is an example of such a system and is the exception rather than the rule in Bexar County—another phenomenon attributable to relative geomorphic youth. Passages seldom extend from the base of the vertical shaft caves, although the caves may be formed by more than one shaft. Cavern size and depth vary with relative age and local base level. Caves formed under similar conditions should therefore exhibit similar characteristics. In support of this statement are Pomeranian Pit and Pekingese Pit, separated by a horizontal distance of only 80 m, which display excellent parallel development with similar sizes and depths to the same elevation. Of the 27 caves in the combined hillside and tableland categories, only Helotes Hilltop Cave and Kamikazi Cricket Cave do not conform to the above model. The processes which formed these caves were considerably more complex, yet retain some similarities.

Table 2 lists "other" as a third category of Edwards caves. These caves comprise the 23.0% that cannot be classified as phreatic chambers or vadose insurgences. Table 4 subdivides these caves as vadose-phreatic chambers, phreatic tubes, springs, and as having unknown origins (caves of unknown origin were filled, sealed, or destroyed before an adequate description was recorded). Caves of the first group formed as phreatic chambers and accidentally intersected or were intersected by surface streams. The streams modified the caves, converting them to recharge sites for the Edwards (Balcones Fault Zone)

Table 4
Edwards Limestone Caves from "Other Caves" Category of Table 2; Listing by Genesis

Vadose-Phreatic Chambers	
Bear Cave	
Cub Cave	
Cueva Cave	
Fireworks Cave	
Hills and Dales Pit	
Mattke Cave	
Woods End Cave	
Number of caves:	7
Percentage of "Other" category:	24.1
Percent in Edwards Aquifer Recharge Zone:	85.7
Percentage of Edwards Limestone caves:	5.5
Percentage of Bexar County caves:	3.4
Phreatic Tubes	
Black Cat Cave	
No Exit Cave	
The Crawl	
Number of caves:	3
Percentage of "Other" category:	10.3
Percent in Edwards Aquifer Recharge Zone:	66.6
Percentage of Edwards Limestone caves:	2.4
Percentage of Bexar County caves:	1.4
Springs	
Cave of the Cliff	
Cibolo Shelter	
Crawl and a Prayer Cave	
Crescent Spring	
G.I. Joe Cave	
Han's Grotto	
Horizontal Haven	
Shot-and-a-Prayer Cave	
Sorehead Cave	
2 For 1 Cave	
2 For 1 Spring	
Wagner Ranch Fissure	
Number of caves:	12
Percentage of "Other" category:	41.4
Percent in Edwards Aquifer Recharge Zone:	91.7
Percentage of Edwards Limestone caves:	9.5
Percentage of Bexar County caves:	5.8
Unknown	
Alzafilled Cave No. 1	
Alzafilled Cave No. 2	
Elm Creek Dam Cave	
Fountain Pond Cave	
San Pedro Bank Cave No. 1	
San Pedro Bank Cave No. 2	
Stone Pond Cave	
Number of caves:	7
Percentage of "Other" category:	24.1
Percent in Edwards Aquifer Recharge Zone:	100.0
Percentage of Edwards Limestone caves:	5.5
Percentage of Bexar County caves:	3.4

Figure 4: Model for Shallow Domepit Development in Bexar Co., Texas



Aquifer. Degree of modification and subsequent enlargement were factors of stream type and, more important, the cave's location in or near it. For example, Mattke Cave, situated high in a cliff face, had only a very brief period of inflow. Bear Cave and Cub Cave were intersected along a stream bank; because of a recharge dam just downstream, their frequency of recharge has been recently increased. Upward development of an 18 m high dome in Hills and Dales Pit intersected the middle of a ravine. It currently pirates practically all stream flow. Cueva Cave and Fireworks Cave did not intersect a stream but instead broad shallow sinks which divert flow to their entrances.

Three examples of Edwards Limestone phreatic tubes occur in Bexar County: Black Cat Cave, The Crawl, and No Exit Cave. Black Cat Cave is the least distinct and the most difficult to classify. A small sink introduces runoff into a highly collapsed, phreatic chamber connected via a narrow shaft to a 40-m-long phreatic tube. The Black Cat phreatic tube is blocked by flowstone at both ends with little indication of its origin or destination. The Crawl is a narrow phreatic tube, with vadose entrenchment below its formative bedding plane. Water probably flowed through the cave to a nearby paleospring. No Exit Cave has the form of a classic phreatic tube. It measures over 2 m in diameter and possibly reflects current cavern development deep in the Edwards (Balcones Fault Zone) Aquifer.

Regional phreatic caves can be subdivided into two categories: shallow chambers and deep tubes. The chambers are results of a former regime of slow moving, probably shallow, phreatic water, and the tubes are modern, high transmissivity conduits as modeled for the Edwards (Balcones Fault Zone) Aquifer (Arnow, 1959), developed on or parallel to major faults. Rapid downcutting of Cibolo Creek has caused abandonment and truncation of No Exit Cave, leaving it as a lone indicator of present phreatic development possibly occurring deep in Bexar County. Similar conduits have been intersected by wells, which yield not only water but occasionally a unique and varied aquatic fauna.

Springs are the last type of Edwards Limestone cavern development known in Bexar County. Most are high hydraulic gradient resurgences in cliffsides that drain adjacent tablelands. Although these constitute the major Edwards spring type, they are few (about 10% of all Edwards caves) and small, a result of rapid abandonment to discharge points closer to base levels of the downcutting surface streams. Han's Grotto formed in a similar fashion except by water being pirated through the cave from a tributary creek to a primary creek. Together, 2 For I Cave and Spring represent a single cave stream passage truncated by a ravine. The stream resurges at Crescent Spring 460 m to the southwest. The 2 For 1 – Crescent Spring system is the only known active Edwards spring in Bexar County, and its location in the Edwards (Balcones Fault Zone) Aquifer recharge zone is unusual.

Buda Limestone

Only two caves in Bexar County are known in the Buda Formation: Enchanted Forest Pit and Peacock Pit. Both are small, vadose in origin, and about 5 m deep. The lack of caves in the Buda is a result of three factors:

1. Insufficient vertical extent of the formation.
2. Insufficient areal extent; the Buda accounts for less than 5% of the cavernous limestone outcrop in Bexar County.
3. Poor fracture permeability.

Austin Chalk

The Austin Chalk has the most diverse caves in Bexar County and is second to the Edwards in total number of caves. Table 5 lists five cave types: phreatic chambers, floodwater caves, vadose insurgences, artesian springs, and network mazes.

In contrast to the Edwards Limestone and upper member of the Glen Rose Formation, phreatic chambers are rare in the Austin Chalk, partly due to lower porosity and permeability but mainly to relatively limited exposure to phreatic conditions. The three known phreatic chambers are small and have suffered substantial collapse. One Austin phreatic chamber, Grutas de los Mojados, developed a few vertical shafts and a vadose drain prior to nearly complete filling with sediment; the cave has been excavated.

T.M.I. Cave and T.M.I. Cave No. 2, adjacent to Olmos Creek, have been formed by floodwater enlargement of joints in the chalk. T.M.I. Cave No. 2 is a single small passage formed near the creek's base-level. T.M.I. Cave is older, higher up the bluff, and considerably more extensive and complex. Most of the complexity is due to a large passage perpendicularly intersecting many passages formed by backflooding. This main passage captured a small surface stream, and its diversion through the cave modified some of the other passageways. The absence of similar flood developed caves from the Glen Rose and Edwards formations may be a result of lesser retention of floodwaters due to steeper stream gradients and the higher recharge capacity of the Lower Glen Rose and the Edwards Limestone.

Vadose insurgences account for half of all Austin Chalk caves (Table 6). As with the Edwards Lime-

Table 5
Austin Chalk Caves; Listing by Genesis

Unknown	
Airport Cave	
Anti-Porch Cave	
Dreamland Road Cave	
Fat Man's Misery	
French Street Cave	
Hildebrand and I-37 Cave	
Hildebrand and Shook Cave	
Oak Park Mall Cave	
S.A.C.-Krete Cave	
Schreiner Place Cave	
Tezel Road Cave	
Woodlawn Hills Cave	
Number of caves:	12
Percentage of Austin Chalk caves:	27.9
Percentage of Bexar County caves:	5.8
Phreatic Chambers	
Grutas de los Mojados	
Niche Cave	
Skull Cave	
Number of caves:	3
Percentage of Austin Chalk caves:	7.0
Percentage of Bexar County caves:	1.4
Floodwaters	
T.M.I. Cave	
T.M.I. Cave No. 2	
Number of caves:	2
Percentage of Austin Chalk caves:	4.7
Percentage of Bexar County caves:	1.0
Vadose Insurgences	
Black Widow Pit	
Braken Bat Cave	
Carcass Cave	
Cave of the Bearded Tree	
Cave of the Half-Snake	
Cave of the Mad Machete	
Chimney Cricket Cave	
Fence Post Hole	
Graywaters Cave	
Isopit	
KKYX Cave	
Molar Hole	
Owen Cave	
Portland Cement Cave	
Powerline Cave	
Sal Si Puedes Cave	
Screaming Meemies Pit	
Thurman's Cave	
Underwater Cave	
Womly Pit	
World Newt Cave	
Wurzbach Bat Cave	
Number of caves:	22
Percentage of Austin Chalk caves:	51.2
Percentage of Bexar County caves:	10.6
Artesian Springs	
San Antonio Spring	
San Pedro Park Spring (West)	
Number of caves:	2
Percentage of Austin Chalk caves:	4.7
Percentage of Bexar County caves:	1.0
Network Mazes	
Holmgreen's Hole	
Robber Baron Cave	
Number of caves:	2
Percentage of Austin Chalk caves:	4.7
Percentage of Bexar County caves:	1.0
Total number of caves in the Austin Chalk:	43
Percentage of total Bexar County caves:	20.7

stone insurgences, most Austin insurgences are tableland caves or sinks/swallets developed on tablelands. No caves are known in streambeds but two open in a streambank. KKYX Cave and Underwater Cave were modified to increase groundwater storage in the Leon Creek flood plain. The caves drain to seep springs located a few hundred meters downstream.

Powerline Cave is the only vadose Austin Chalk cave that opens on a hillside. Its genesis is the same as Austin tableland and sink/swallet caves. With the exception of Wurzbach Bat Cave, all of the Austin tableland, hillside, and sink/swallet caves were developed by the same process shown in Fig. 4. Of course, variations occur in the basic model, notably: Cave of the Mad Machete, with entrances located on the periphery of a broad, low, bedding-plane room in which the draining shaft is located; Sal Si Puedes Cave, with a 20-m-long side passage feeding into the main shaft; and Womly Pit, which has not advanced to stage 3 development but with an artificially enlarged vestigial entrance. Unlike the more permeable Edwards Limestone, sinks occur in the Austin Chalk subsequent to a cave's opening to the surface. There are many examples of stage 4. In the Austin, fracture permeability to the subsurface is inefficient, and surface runoff preferentially forms entrance sinks.

Wurzbach Bat Cave is anomalous in the Austin Chalk; it is placed in the vadose category for convenience. The described mechanisms of vertical shaft cave development do not apply to Wurzbach except at two discrete locations. Entrances to the cave include two sinkhole collapses and two solutional vertical shafts (not the above mentioned locations) into a large phreatic passage. A rapidly declining water table formed some major vadose passageways, one of which is a near-base-level crawl. The crawl is only a few meters higher than the stream passage in nearby Isopit, a typical vertical shaft for that area except that it drops into a base-level stream crawl with a size and shape resembling the Wurzbach crawl.

Table 6
Austin Chalk Vadose Insurgence Caves;
Listing by Topographic Occurrence

Sink/Swallet	
Braken Bat Cave	
Graywaters Cave	
Isopit	
Molar Hole	
Thurman's Cave	
World Newt Cave	
Wurzbach Bat Cave	
Number of caves:	7
Percentage of vadose Austin Chalk caves:	31.8
Percentage of Austin Chalk caves:	16.3
Percentage of Bexar County caves:	3.4
Creekbank	
KKYX Cave	
Underwater Cave	
Number of caves:	2
Percentage of vadose Austin Chalk caves:	9.1
Percentage of Austin Chalk caves:	4.7
Percentage of Bexar County caves:	1.0
Hillside	
Powerline Cave	
Number of caves:	1
Percentage of vadose Austin Chalk caves:	4.5
Percentage of Austin Chalk caves:	2.3
Percentage of Bexar County caves:	0.5
Tableland (without sinks)	
Black Widow Pit	
Carcass Cave	
Cave of the Bearded Tree	
Cave of the Half-Snake	
Cave of the Mad Machete	
Chimney Cricket Cave	
Fence Post Hole	
Owen Cave	
Portland Cement Cave	
Sal Si Puedes Cave	
Screaming Meemies Pit	
Womly Pit	
Number of caves:	12
Percentage of vadose Austin Chalk caves:	54.5
Percentage of Austin Chalk caves:	27.9
Percentage of Bexar County caves:	5.8

Neither the crawl nor the stream have been fully explored. Drainage probably goes to Medio Creek, a kilometer northwest and west of the caves. Although additional research is needed in these caves, they are significant in demonstrating a well developed karst hydrologic system in the Austin Chalk, one that might be traced from insurgance to resurgence.

In Bexar County two major artesian springs discharge from the Austin Chalk: San Antonio Spring and San Pedro Park Spring (West). Both cave springs have a set of satellite springs. The caves have been formed by artesian water rising along or adjacent to faults from the confined Edwards (Balcones Fault Zone) Aquifer. Increased municipal pumpage of the aquifer has lowered the regional potentiometric surface of the aquifer, and the springs seldom flow. During no-flow conditions, floodwaters from Olmos Creek backflood into San Antonio Spring carrying contaminants from 76.8 square kilometers of heavily urbanized northern San Antonio; this is a potential threat to the water quality of the aquifer.

Network maze caves are numerically the smallest Austin Chalk category, yet Robber Baron Cave alone is longer than all other Austin caves combined. Over 1.3 km long, Robber Baron is by far the longest cave in Bexar County. It was probably once connected to Holmgreen's Hole; artificial and natural collapse of passages physically separated the caves in the late 1920s. For our discussion they are considered to be one cave system. The Robber Baron network maze is developed in an upthrown fault block (horst) of Austin Chalk, under a 4-m-thick caprock of Pecan Gap Chalk. Processes forming the cave are similar to those proposed by Palmer (1975) in his discussion of maze cave genesis. From the overlying tableland, meteoric water descends uniformly along joints continuous through the Pecan Gap into the Austin Chalk. Lack of preferential flow has developed a high density of passages enlarged to similar sizes and shapes. More detailed information can be found in the description of the geology of Robber Baron Cave. Early explorers of Robber Baron recall encountering major stream passages far into the cave, beyond the present collapse terminations. The approximate stream location, water volume, water velocity, and described fauna suggest that the source was probably artesian flow from the Edwards (Balcones Fault Zone) Aquifer by a fault which intersects the cave. Four factors explain the absence of other known network mazes in the Austin Chalk:

1. San Antonio's urban growth has hidden or destroyed many cave entrances. Of the 12 sealed Austin caves listed under unknown origins, Anti-Porch Cave, Fat Man's Misery, French Street Cave, Hildebrand and I37 Cave, Hildebrand and Shook Cave, Oak Park Mall Cave, S.A.C.-Krete Cave, and Schreiner Place Cave were all located in the same Austin fault block as Robber Baron. Some of their vague descriptions indicate that they may have been maze caves.

2. There are approximately 30 m of relief from the entrance of Robber Baron Cave to base level at Olmos Creek. Many other areas lack this relief and resulting hydraulic gradient.

3. Cave entrances have not developed through

the Pecan Gap Chalk where it overlies the Austin.

4. Artesian flow that may have formed the rumored stream passages may have had a positive impact on other passage development within the fault block by increasing local groundwater circulation, limestone dissolution rates, and the resulting hydraulic efficiency.

Pecan Gap Chalk

The Pecan Gap Chalk is generally not cavernous. It was barely affected by the descending waters that developed the extensive Robber Baron Cave system beneath it. Five of Bexar County's eight known Pecan Gap caves were formed along Cibolo Creek as cliffside-springs (Table 7). What tableland conditions could not achieve in the way of cavern development, a high-gradient flow regime did. Schertz-Cibolo Cave, a 500-m-long maze, was an oddity in the cave poor Pecan Gap Chalk. It was once accessible from a collapse sink located near the five cliffside-spring caves but atop the bluff. Its origin is unexplained, and, unfortunately, further field work within it is impossible due to urban expansion which has sealed it. The origins of Pogue's Cave and Silo Hole are also unknown due to extensive excavations and burial under a silo. All three of these Pecan Gap caves of unknown origins were formed in tableland areas.

One possibility for the origin and distribution of Pecan Gap caves is that regular zones of greater susceptibility to solution exist in the chalk. Among the cliffside-spring caves Whitetop Cave, Breathe-If-You-Can Cave, and Coon Crap Cave are all developed in the same stratigraphic horizon with less than 0.3 m vertical variation over a 150 m horizontal distance. Gray Cave and Another Prayer Cave are formed in a bed 6.6 m higher than the aforementioned three caves and have less than 0.2 m vertical variation over a 50-m distance. The relation of Pogue's Cave, Schertz-Cibolo Cave, and Silo Hole to these beds is not known.

Fluviatile Terrace Deposits

South Side Sink, a 5-m-deep pit, is the only Bexar County cave south of the Balcones Fault Zone. It was vadosely formed in a poor to moderately cemented terrace deposit of predominantly Edwards Limestone pebbles, with some chert, calcareous sand, and silt intermixed. Several small solution sinks are present on the hill in which South Side Sink is located. Cavern development may be encouraged by the locally steep hydraulic gradient within the hill. Drainage apparently goes to adjacent Salado Creek. The cave and its nearby sinks may be some of the youngest karst features in Bexar County. More caves and sinks in the terrace deposit will be difficult to find and examine due to extensive urban development of the area.

Table 7
Pecan Gap Chalk Caves; Listing by Genesis

Springs	
Another Prayer Cave	
Breathe-If-You-Can Cave	
Coon Crap Cave	
Gray Cave	
Whitetop Cave	
Number of caves:	5
Percentage of Pecan Gap caves:	62.5
Percentage of Bexar County caves:	2.4
Unknown	
Pogue's Cave	
Schertz-Cibolo Cave	
Silo Hole	
Number of caves:	3
Percentage of Pecan Gap caves:	37.5
Percentage of Bexar County caves:	1.4
Total number of caves in Pecan Gap Chalk:	8
Percentage of total Bexar County caves:	3.8

CONCLUSIONS

Cave development is primarily dependent upon favorable lithologic and hydrologic conditions. In Bexar County, limestones with high fracture permeability are the rock type in which most caves occur. Efficient subsurface drainage and moderate to high relief between insurgance and base level are also conducive to cavern development and may sometimes supersede rock type in importance. For example, the Edwards Limestone is the most lithologically favorable unit in the county, yet only 20.6% of the Edwards caves are formed outside the Edwards (Balcones Fault Zone) Aquifer recharge zone. Although this is partly a matter of lesser areal extent, most of the caves are much smaller than those in the recharge area. Another example is the Pecan Gap Chalk which is rarely cavernous, but under steep hydraulic gradients it has developed a local high density of caves and passages in its more soluble beds. A distinct relationship also exists in Bexar County between density and extent of caves; their topographic numbers and size increase with distance from the valleys. The majority of Bexar County caves are formed by vadose flow in tableland areas. Aggressive stream erosion and little retention of runoff discourages cavern development in valleys.

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The Subterranean Fauna of Bexar County, Texas

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INTRODUCTION

The location of Bexar County at the southeastern corner of the Edwards Plateau and astride the Balcones Fault Zone has been crucial in the development of a highly diverse troglobitic and phreatobitic fauna. The faulting and subsequent exposure of several limestone units, together with isolation as a result of dissection of cavernous units in some areas, has allowed a limited amount of speciation with several genera. The remarkable diversity of the phreatobitic fauna as exposed by deep artesian wells in and south of San Antonio is probably the result of a variety of types of habitat at different levels within the aquifer. Longley (1981) has discussed the remarkable diversity, particularly as demonstrated in the San Marcos area, while Holsinger and Longley (1980) have extended this discussion to the San Antonio pool of the aquifer.

The first subterranean species to be reported from Bexar County was the remarkable blind catfish *Trogloglanis pattersoni*, described by Eigenmann in 1919. This was followed in 1947 by the description of a second blind catfish, *Satan eurystomus* Hubbs and Bailey. Additional records of these two species were reported by Suttkus (1961). The collections of these fish, however, were all fortuitous and the result of specimens emerging from wells and subsequently being presented to museums for study.

Ralph Ewers in the late 1950s visited Headquarters Cave on Camp Bullis and several small caves near Helotes and obtained a few troglobites, including two species of *Rhadine* beetle. With the exception of a few records of vertebrates, the caves of Bexar County were biologically neglected until 1962 when Cookie Heubner and Orion Knox collected in Madla's Cave. Between 1963 and 1968 Orion Knox, David McKenzie, James Reddell, William Russell, and other members of the University of Texas Grotto collected in several Bexar County caves. These collections resulted in the discovery of several new species of interest and revealed the potential of Bexar County as an area deserving further study. It was not, however, until the early 1980s and the advent of George Veni's intensive work in Bexar County that serious biological study in the area's caves was resumed. From 1980 until the present, members of the San Antonio and Bexar Grottos have collected in virtually every cave, large and small, which they have visited. Among the many collectors who helped in the biological study of Bexar County caves the following are especially mentioned: Allan Cobb, Scott Harden, Joe Ivy, Kurt Menking, George Veni, and Randy Waters. A particularly interesting collection was also made in Robber Baron Cave by A.G. Grubbs of San Marcos.

Serious study of the artesian well fauna was initiated by Glenn Longley of the Edwards Aquifer Research Center in San Marcos in the 1970s. This was effected by placing nets over several wells and sorting the specimens and depositing them with appropriate specialists. The results of this study were summarized in a M.S. thesis by Henry S. Karnei, Jr. (1978). Although a significant part of this material has been identified, some of the rarer undescribed species remain unstudied.

Recent study of the fauna of the artesian wells in the San Antonio area was made by Robert Hershler, with particular emphasis on the snail fauna. Although his netting resulted in obtaining large numbers of crustaceans and snails, only the snails have been studied (Hershler and Longley, 1986).

Finally, Scott Harden has made recent collections in small springs near Leon Springs and along the San Antonio River. Using mop-heads inserted in the spring mouths, he was able to obtain good collections of amphipods, stenasellid isopods, and other fauna. These collections will prove of particular value in allowing comparisons to be made between the true cave fauna, the deep phreatic fauna, and the shallow phreatic fauna.

Approximately 186 species have been identified from the caves and phreatic waters of Bexar County, but many more await study by specialists. Of this total, 23 aquatic and 17 terrestrial species are restricted to the subterranean habitat. The 23 aquatic species include 14 species known only from artesian wells and an additional one found only in small springs.

Although Bexar County is now among the better known counties in Texas with respect to its subterranean fauna, several areas remain poorly known, particularly the area north of San Antonio and along the eastern edge of the Edwards Plateau where there are extensive exposures of Edwards Limestone. Such major caves as Whistledrop Cave and Corkscrew Cave remain to be studied and will doubtless prove to have an interesting fauna.

Several distribution patterns are evident in the true cave fauna: species ranging outside the Bexar County area, species restricted to small isolated areas of the county, and species endemic to a single cave. Widespread terrestrial species are the isopod *Brackenridgia cavernarum*, the spider *Eidmannella rostrata*, the opilionid *Hoplobunus madlae*, the millipedes *Cambala speobia* and *Speodesmus echinourus*, and the silverfish *Texoreddellia texensis*. All of these are comparatively widespread in Bexar County with the exception of *Speodesmus echinourus* which barely reaches into the northern part of the county and is apparently replaced by undescribed species in other areas.

Terrestrial species with relatively limited distributions include the millipede *Speodesmus* n.sp. 2, known only from caves in northwestern Bexar and adjacent Medina Counties; the beetles *Rhadine exilis*, known only from Headquarters Cave on Camp Bullis and from caves near Helotes and *Rhadine infernalis infernalis*, which occurs only in two caves near Helotes.

Several species have been found only in a single cave. The spider *Neoleptoneta microps* is endemic to Government Canyon Bat Cave, while *Rhadine infernalis ewersi* is apparently restricted to Headquarters Cave. Of particular interest is the presence in Robber Baron Cave of five endemic species: an isopod (Trichoniscidae genus and species 2), an opilionid *Texella* ?n.sp.), a millipede *Speodesmus* n.sp. 1), an entotroph (Iapygidae genus and species), and an antloving beetle (*Batrisodes* n.sp.). The presence of Robber Baron Cave in the Austin Chalk probably serves as an isolating mechanism from caves in other limestone units and has allowed extensive speciation to occur.

Most of the terrestrial species clearly belong to temperate groups, but a few species are apparently tropical relicts most closely related to groups occurring in Mexico and other tropical regions but now isolated in Texas caves. Species clearly having their chief affinity to tropical forms are the opilionid *Hoplobunus madlae*, the silverfish *Texoreddellia texensis*, and possibly the undescribed species of Iapygidae. Also a relict, but of uncertain ecological status, is the pyrgodesmid millipede of the genus *Myrmecodesmus*, a genus widespread in Mexico and Central America.

The aquatic fauna includes species restricted to the deep phreatic zone, the shallow phreatic zone, caves, or occurring in both phreatic and open cave waters. The snails *Phreatodrobia imitata* and *P. nugax inclinata*; the amphipods Bogidiellidae, undetermined genus, n.sp., ?*Parabogidiella* n.sp., *P. americana*, *Allotexiweckelia hirsuta*, *Texiweckelia texensis*, and *Texiweckeliopsis insolita*; the isopods Cirolanidae undescribed genus and species and Stenasellidae undetermined genus and species; and the fish *Satan eurystomus* and *Trogloglanis pattersoni* are known only from artesian wells, some limited to the San Antonio area but others also occurring in phreatic waters in San Marcos. The isopod *Mexistenasellus* sp. nr. *coahuila* is known from small springs along the San Antonio River and from an interstitial habitat in Medina County. The amphipod *Stygobromus russelli* has been found both in the springs along the San Antonio River and in caves. The salamander *Eurycea tridentifera* is known only from open cave waters. The remaining species have been found both in deep phreatic and in open cave waters.

Of the aquatic fauna all of the amphipods except for the two species of the genus *Stygobromus*, the four isopods, and the thermosbaenacean *Monodella texana* are derived from marine ancestors. The cirolanids, amphipods, and thermosbaenaceans may have entered directly into the subterranean habitat from marine waters in the Tertiary. The stenasellid isopods, however, probably first inhabited an interstitial habitat before becoming truly subterranean. The remaining species are all apparently of freshwater origin.

The recent study of the subterranean fauna of Bexar County has clearly demonstrated how poorly known much of the underground fauna of Texas is. The discovery of additional terrestrial species and particularly the recent study of the deep phreatic and spring fauna indicates that we are only beginning to document the fauna of these extremely interesting and significant habitats. Many additional discoveries will be made in the caves and phreatic waters of Bexar County and the remainder of Texas.

In the checklist of species an asterisk preceding a species name indicates that the species is a troglobite (obligate cavernicole). The bibliographic citations include only references to the occurrence of the species in Bexar County. The standard terms for determination of ecological status are given. These are: troglobite—a species restricted to the cave habitat and exhibiting such specialized adaptations as eyelessness, depigmentation, and longer appendages; troglophile—a species which may complete its life cycle in the cave habitat but which may also live on the surface; trogloxene—a species which inhabit caves but which must return to the surface for food or other needs; accidental—an animal not normally a part of the cave habitat but which has fallen, been washed, or otherwise been accidentally introduced into the cave. A phreatobite is a species exhibiting the same adaptations to the cave habitat as troglobites but which is known only from completely submerged subterranean cavities, rather than from the comparatively open waters of caves.

ACKNOWLEDGMENTS

I particularly thank Scott Harden, George Veni, and Randy Waters for providing me not only with much of the material upon which this report was based, but for detailed notes on the specific cave habitats for many of their collections. In addition I thank the following collectors for providing specimens over the course of the 24 years that I have been collecting information on Bexar County cave biology: Roger Bartholomew, Duane Canny, Allan Cobb, Doug Drysdale, Don Erickson, John Fish, Carmen Goyette, A.G. Grubbs, Cookie Heubner, Joe Ivy, Dottie Kern, Orion Knox, Claire Lindblom, David McKenzie, Kurt Menking, Linda Palit, William Russell, A. Richard Smith, Eric Short, Bill Steele, and Suzanne Fowler Wiley.

I express my special appreciation to the following specialists for their identifications of material covered by this report: D.M. Anderson (alleculid, micromalthid, ptilodactylid, scarabaeid, and staphylinid beetles), T.C. Barr, Jr. (carabid and pselaphid beetles), T.E. Bowman (cirolanid and stenasellid isopods), T.S. Briggs (opilionids), N.B. Causey (millipedes), K. Christiansen (collembola), T.J. Cohn (crickets), J.C. Cokendolpher (opilionids), A.C. Cole (ants), W.R. Elliott (millipedes), F.W. Fisk (cockroaches), O.F. Francke (scorpions), R.C. Froeschner (hemipterans), T.V. Gaffigan (mosquitoes), R.J. Gagné (calliphorid flies), G.E. Gates (earthworms), W.J. Gertsch (scorpions and spiders), C.J. and M.L. Goodnight (opilionids), A.B. Gurney (cockroaches), L.H. Herman (staphylinid beetles), R. Herschler (hydrobiid snails), J.R. Holsinger (amphipods), T.H. Hubbell (crickets), L. Hubricht (snails), J.E. Keirans (ticks), T.C. Maa (streblid flies), E.L. Mockford (psocids), R.V. Peterson (sciarid flies), C.W. Sabrosky (milichiid flies), W.A. Shear (millipedes), R. Shelley (millipedes), R. Snelling (ants), T.J. Spilman (cantharid, elaterid, and tenebrionid beetles), A. Vandel (trichoniscid isopods), D.M. Weisman (moths), W.W. Wirth (ceratopogonid flies), P. Wygodzinsky (silverfish), and H.C. Yeatman (copepods).

CHECKLIST OF SPECIES

PHYLUM PLATYHELMINTHES
CLASS TURBELLARIA
Order Tricladida (flatworms)
Suborder Terricola

Undetermined material

Records.—Kamikazi Cricket Cave.

Comment.—A single specimen of a terrestrial planarian was collected from this cave.

PHYLUM ANNELIDA
CLASS CLITELLATA
Order Haplotaxida (earthworms)

Undetermined material

Records.—Springs along San Antonio River; Black Cat Cave; Cave of the Bearded Tree; Cave of the Creek; Robber Baron Cave.

Comment.—Earthworms from these caves remain unidentified.

Family Lumbricidae

Bimastos sp. (det. G.E. Gates)

Record.—Madla's Cave.

Bibliography.—Reddell (1965).

Comments.—This species was too poorly preserved for positive identification. The genus has been collected in several caves in Texas.

Family Megascolecidae

Diplocardia sp. (det. G.E. Gates)

Record.—Headquarters Cave.

Bibliography.—Reddell (1970a).

Comments.—This is probably an undescribed native species. Better preserved material is needed for positive identification. The genus has been collected in several Texas caves.

Family Tubificidae

Undetermined genus and species

Record.—Twin Pits.

Bibliography.—Palit (1986).

Comment.—Numerous tubificid worms were observed but not collected from water at the bottom of Twin Pits.

CLASS HIRUDINEA (leeches)

Undetermined material

Record.—Springs along San Antonio River.

Comment.—Several undetermined leeches have been collected from the mouths of springs along the San Antonio River.

PHYLUM MOLLUSCA
CLASS GASTROPODA (snails)

Undetermined material

Records.—Intermittent spring near Leon Springs; springs along San Antonio River; Assassin Cave; Cub Cave; Genesis Cave; Hills and Dales Pit; Twin Pits.

Bibliography.—Clement (1974).

Comment.—Small aquatic snails have been taken from the mouths of springs along the San Antonio River.

Order Diotocardia

Family Helicinidae

Helicina orbiculata (Say) (det. L. Hubricht)

Records.—Black Cat Cave; Elm Springs Cave; Isopit; KKYX Cave; Some Monk Chanted Evening Cave; Young Cave No. 1.

Comments.—Only empty shells were found. The species has also been found in caves in Blanco, Comal, Hays, Kendall, Medina, and Travis Counties.

Order Taenioglossa

Family Hydrobiidae

**Phreatodrobia conica* Hershler and Longley

Record.—Artesia Pump Station Well.

Bibliography.—Hershler and Longley (1986); Longley (1986); Longley and Karnei (1979a; 1979b).

Comment.—This species is also known from Hueco Springs and tentatively from Honey Creek Cave, Comal County.

**Phreatodrobia imitata* Hershler and Longley

Records.—O.R. Mitchell Well; Verstraeten Well No. 1.

Bibliography.—Hershler and Longley (1986); Karnei (1978); Longley (1986).

Comment.—This species is known only from these two wells.

**Phreatodrobia nugax inclinata* Hershler and Longley

Record.—Longhorn Portland Cement Company Well.

Bibliography.—Hershler and Longley (1986); Longley (1986); Longley and Karnei (1979a; 1979b).

Comment.—This is the only known locality for this subspecies.

**Phreatodrobia nugax nugax* (Pilsbry and Ferriss) (det. R. Herschler)

Records.—Springs along San Antonio River; Brackenridge Zoo Well; Union Stockyards Well.

Bibliography.—Hershler and Longley (1986); Karnei (1978); Longley (1986); Longley and Karnei (1979a; 1979b).

Comments.—This species was previously placed in *Horatia.* This subspecies is also known from wells, caves, and springs in Comal, Hays, Kendall, Travis, and Uvalde Counties.

Order Orthurethra

Family Pupillidae

Pupoides albilabris (C.B. Adam) (det. L. Hubricht)

Record.—Bullis Hole.

Bibliography.—Reddell (1970a).

Comment.—This species has also been collected in Swift's Cave, Hays County.

Order Basommotophora

Family Lymnaeidae

Lymnaea sp. (det. L. Hubricht)

Record.—Isopit.

Comment.—Only empty shells were found.

Order Sigmurethra

Family Bulimulidae

Rhabdotus alternatus (Say) (det. L. Hubricht)

Record.—KKYX Cave.

Comment.—Only empty shells were collected.

Family Helicodiscidae

Helicodiscus eigenmanni Pilsbry (det. L. Hubricht)

Records.—Bear Cave; Black Cat Cave; Braken Bat Cave; Cave of the Bee Spirits; Cave of the Half-Snake; Chimney Cricket Cave; Christmas Cave; Dirtwater Cave; Elm Springs Cave; Han's Grotto; Hitzfelder's Bone Hole;

Isopit; John Wagner Ranch Cave No. 3; Kamikazi Cricket Cave; KKYX Cave; Robber Baron Cave; Some Monk Chanted Evening Cave; Unknown Cave; Young Cave No. 1.

Bibliography.—Reddell (1965).

Comment.—This is the most common troglophilic snail in Texas.

Family Limacidae

Limax sp. (det. L. Hubricht)

Record.—Roan's Cave.

Comment.—This slug has not otherwise been found in Texas caves.

Family Oleacinidae

Euglandina singleyana (W.G. Binney) (det. L. Hubricht)

Records.—Cave of the Bearded Tree; Skull Cave.

Comments.—Only empty shells were found. This probable accidental has also been found in caves in Hays and Travis Counties.

Family Polygyridae

Mesodon roemeri (Pfeiffer) (det. L. Hubricht)

Record.—Robber Baron Cave.

Comment.—This species is a frequent inhabitant of entrance areas in Texas caves and probably should be considered a trogloxene.

Polygyra mooreana (W.G. Binney) (det. L. Hubricht)

Record.—Kamikazi Cricket Cave.

Comments.—Only empty shells were collected. This species has also been found in caves in Hays, Kendall, and Travis Counties.

Polygyra texasiana (Moricand) (det. L. Hubricht)

Records.—Black Cat Cave; KKYX Cave; Por Boy Ranch Cave; Underwater Cave.

Comments.—No live specimens were found. The species has also been found in caves in Comal, Kendall, and Medina Counties.

Family Zonitidae

Glyphyalinia roemeri (Pilsbry and Ferriss) (det. L. Hubricht)

Record.—Voight's Bat Cave.

Comments.—Only empty shells were collected. This species has also been found in caves in Edwards, Hays, Kerr, Medina, Travis, Uvalde, and Williamson Counties.

Glyphyalinia umbilicata (Singley) (det. L. Hubricht)

Records.—Cave of the Bearded Tree; Robber Baron Cave.

Comment.—This species has also been found in Swift's Cave, Hays County.

Zonitoides arboreus (Say) (det. L. Hubricht)

Records.—Elmore Cave; Robber Baron Cave.

Comment.—This species has also been found in caves in Hays, Kendall, and Travis Counties.

PHYLUM ARTHROPODA
CLASS BRANCHIOPODA
Order Anostraca (fairy shrimp)

Family Streptocephalidae

?*Streptocephalus* sp.

Record.—Corkscrew Cave.

Comments.—This species undoubtedly washed into the cave. The genus has also been found in Ezell's Cave, Hays County.

CLASS EUCOPEPODA (copepods)

Undetermined material

Records.—Black Cat Cave; Twin Pits.

Bibliography.—Palit (1986).

Comment.—The Black Cat Cave record is based on a sight record.

Order Cyclopoida

Family Cyclopidae

Cyclops sp. 1

Record.—Verstraeten Well No. 1.

Bibliography.—Karnei (1978).

Comment.—This species is eyeless and may be a troglobite.

Cyclops sp. 2

Record.—Verstraeten Well No. 1.

Bibliography.—Karnei (1978).

Comment.—This eyeless species is probably a troglobite.

Eucyclops speratus (Lilljeborg) (det. H.C. Yeatman)

Record.—Springs along San Antonio River.

Comments.—This European copepod is also widespread in the United States. This is the first Texas cave record for the species.

Macrocyclops albidus (Jurine) (det. H.C. Yeatman)

Record.—Springs along San Antonio River.

Comment.—This species has also been found in springs in Travis County and in caves in Medina, Schleicher, Travis, and Uvalde Counties.

CLASS OSTRACODA (ostracods)
Order Podocopida

Undetermined material

Record.—Black Cat Cave.

Comments.—Free-living ostracods were collected in a small pool in this cave. They are probably accidental.

CLASS MALACOSTRACA
Order Thermosbaenacea

Family Thermosbaenidae

Monodella texana Maguire

Records.—Artesia Pump Station Well; Verstraeten Well No. 1.

Bibliography.—Karnei (1978); Longley and Karnei (1979a; 1979b); Stock and Longley (1981).

Comment.—This remarkable troglobitic crustacean has also been collected in wells in Hays and Uvalde Counties and in Ezell's Cave, Hays County.

Order Amphipoda (water scuds)

Family Bogidiellidae

*Undetermined genus, new species

Record.—Verstraeten Well No. 1.

Bibliography.—Holsinger and Longley (1980).

Comment.—This species awaits study.

*?*Parabogidiella* n.sp.

Record.—Verstraeten Well No. 1.

Bibliography.—Holsinger and Longley (1980); Karnei (1978).

Comments.—This genus is represented in the United States only by this species and by *P. americana.* The family Bogidiellidae is otherwise known from groundwater habitats in the West Indies, southern Mexico, Guatemala, and South America.

**Parabogidiella americana* Holsinger

Records.—Artesia Pump Station Well; O.R. Mitchell Well; Verstraeten Well No. 1.

Bibliography.—Karnei (1978).

Comment.—This species has also been collected from the artesian well at San Marcos.

Family Crangonyctidae

**Stygobromus flagellatus* (Benedict)

Records.—Artesia Pump Station Well; O.R. Mitchell Well; Verstraeten Well No. 1.

Bibliography.—Karnei (1978).

Comments.—In addition to the above records this species is known with certainty only from cave and phreatic localities near San Marcos, Hays County. Holsinger (pers. com.) has expressed reservations about the identity of the above material.

**Stygobromus russelli* (Holsinger) (det. J.R. Holsinger)

Records.—Springs along San Antonio River; Elm Springs Cave; Isopit; Twin Pits.

Bibliography.—Ivy (1984); Palit (1986).

Comments.—This is the most widely distributed troglobitic amphipod in Texas. It has also been found in caves in Bell, Burnet, Comal, Coryell, Hays, Kendall, Kerr, Mason, Medina, San Saba, and Travis Counties.

Family Hadziidae

**Allotexiweckelia hirsuta* Holsinger

Records.—Artesia Pump Station Well; O.R. Mitchell Well; Verstraeten Well No. 1; Verstraeten Well No. 2.

Bibliography.—Holsinger and Longley (1980); Karnei (1978).

Comments.—The family Hadziidae is known from the United States only by four species from the Edwards (Balcones Fault Zone) Aquifer. It otherwise occurs in cave and groundwater habitats in the West Indies and Mexico. This species is also known from the artesian well at San Marcos.

**Texiweckelia texensis* Holsinger

Records.—O.R. Mitchell Well; Verstraeten Well No. 1.

Bibliography.—Karnei (1978).

Comment.—This species is also known from San Marcos Springs and the artesian well at San Marcos.

**Texiweckeliopsis insolita* (Holsinger)

Records.—O.R. Mitchell Well; Verstraeten Well No. 1.

Bibliography.—Holsinger and Longley (1980); Karnei (1978).

Comments.—This is the only species in this genus. It is otherwise known only from the artesian well at San Marcos and from San Marcos Springs.

Order Isopoda
Suborder Flabellifera (aquatic isopods)

Family Cirolanidae

*Undescribed genus and species

Record.—Verstraeten Well No. 1.

Bibliography.—Karnei (1978).

Comment.—Only a single specimen of this apparent new genus and species was collected.

**Cirolanides texensis* Benedict (det. T.E. Bowman)

Records.—Artesia Pump Station Well; Isopit; O.R. Mitchell Well; Twin Pits; Verstraeten Well No. 1; Verstraeten Well No. 2.

Bibliography.—Elliott and Mitchell (1973); Ivy (1984); Karnei (1978); Longley and Karnei (1979a; 1979b); Palit (1986); Winkler (1973a; 1973b).

Comment.—This troglobitic isopod ranges widely throughout the Edwards Plateau and Balcones Fault Zone.

Suborder Asellota (water slaters)

Family Stenasellidae

*Undetermined genus and species

Record.—Brackenridge Zoo Well.

Bibliography.—Karnei (1978); Longley and Karnei (1979a; 1979b).

Comments.—This probable new genus and species is most closely related to species from Mexico. This and the following species are the only records of the family for the United States. Only one complete specimen and several fragments were obtained.

**Mexistenasellus* sp. nr. *coahuila* Cole and Minckley (det. T.E. Bowman)

Record.—Springs along San Antonio River.

Comment.—Numerous specimens of this probable new species were collected; the same species is known from the interstitial habitat near Hondo, Medina County.

Suborder Oniscoidea (terrestrial isopods)

Undetermined material

Records.—Assassin Cave; Black Cat Cave; Cueva Cave; Genesis Cave; Helotes Blowhole; Isopit; John Wagner Ranch Cave No. 3; KKYX Cave; Robber Baron Cave; Young Cave No. 1.

Comment.—These epigean specimens await study.

Family Trichoniscidae

*Undetermined genus and species no. 1

Records.—Black Cat Cave; Braken Bat Cave; Cave of the Bee Spirits; Cueva Cave; Dirtwater Cave; Elm Springs Cave; Genesis Cave; Government Canyon Bat Cave; Han's Grotto; Headquarters Cave; Helotes Hilltop Cave; Isopit; Kamikazi Cricket Cave; Poison Ivy Pit; Robber Baron Cave; Twin Pits; Voight's Bat Cave.

Comments.—Undetermined trichoniscid isopods from these caves await study. All will probably prove to belong to *B. cavernarum.*

*Undetermined genus and species no. 2

Record.—Robber Baron Cave.

Comments.—Several small slender trichoniscid isopods, one of which was ovigerous, have been found on the underside of a piece of decaying wood in Robber Baron Cave. It appears to belong to or be closely related to similar isopods from Travis and Williamson Counties but otherwise not known south of Travis County.

**Brackenridgia cavernarum* Ulrich

Records.—?Cave of the Woods; Madla's Cave.

Bibliography.—Reddell (1965); Vandel (1965); Veni (1978).

Comments.—This small terrestrial isopod ranges from Bexar County north to Hays County, with additional populations along the western edge of the Edwards Plateau. It is usually found on and under rotting wood and other organic debris. Specimens from Cave of the Woods appear to belong to this species but require verification.

Order Decapoda
Suborder Pleocyemata

Family Palaemonidae (shrimp)

**Palaemonetes antrorum* Benedict

Records.—Artesia Pump Station Well; O.R. Mitchell Well; Verstraeten Well No. 1; Verstraeten Well No. 2.

Bibliography.—Karnei (1978); Longley and Karnei (1979a; 1979b).

Comments.—This troglobitic shrimp has also been definitely identified only from caves and wells at San Marcos, Hays County. It is the most abundant species in the artesian wells in the San Antonio area. Karnei (1978) reports 1,129 specimens from the Verstraeten Well No. 1, 22 specimens from the Verstraeten Well No. 2, 14 specimens from the O.R. Mitchell Well, and 87 specimens from the Artesia Pump Station Well.

CLASS ARACHNIDA
Order Scorpiones (scorpions)

Family Vaejovidae

Vaejovis reddelli Gertsch and Soleglad (det. W.J. Gertsch; O.F. Francke)

Records.—?Assassin Cave; ?Basement Cave; Black Cat Cave; ?Blue Hole No. 1; Elmore Cave; ?Genesis Cave; Government Canyon Bat Cave; ?Helotes Hilltop Cave; ?Hills and Dales Pit; Isopit; John Wagner Ranch Cave No. 3; ?Kamikazi Cricket Cave; Madla's Cave; ?Por Boy Ranch Cave; ?Schertz-Cibolo Cave; ?Scorpion Cave; ?Scorpion Gulch; ?Twin Pits; ?Voight's Bat Cave; ?Young Cave No. 1; ?Unnamed cave (BCS #58).

Bibliography.—Anonymous (1978); Gertsch and Soleglad (1972); Jasek (1965; 1975b); Poole and Passmore (1978); Reddell (1965; 1970a); Reddell and Knox (1962); Rowland and Reddell (1976).

Comments.—This is the only troglophilic scorpion in Texas and one of only a few in the United States. It is widely distributed throughout the Edwards Plateau but is rarely collected on the surface. Sight records of scorpions probably belonging to this species are indicated by a question mark preceding the cave name.

Order Pseudoscorpionida (pseudoscorpions)

Undetermined material

Record.—Robber Baron Cave.

Comment.—A single specimen was collected from the entrance sink.

Order Araneae (spiders)

Undetermined material

Records.—Ackerman's Trash Hole; Another Prayer Cave; Aue Road Cave; Basement Cave; Blue Hole No. 1; Bob Bear Cave; Breathe-If-You-Can Cave; Cave of the Creek; Cave of the Mad Machete; Chimney Cricket Cave; Corkscrew Cave; Council Cave; Crane Bat Cave; Creekbed Cave; Dam Crawl; Elephant Spring; Elmore Cave; Fireworks Cave; Gladsam's Cave; Gray Cave; Helotes Hilltop Cave; Is That All There Is Spring; KKYX Cave; Molar Hole; Por Boy Ranch Cave; Root Cave; Salado Creek Water Cave; Screaming Meemies Pit; Shavano Park Cave; Skull Cave; Spider Hole; Wagner Ranch Pit; Young Cave No. 2.

Bibliography.—Litsinger (1973); Poole and Passmore (1978); Reddell and Knox (1962).

Comment.—Most of these are sight records.

Family Agelenidae (funnel-weaver spiders)

Agelenopsis aperta Gertsch (det. W.J. Gertsch)

Record.—Cave of the Half-Snake.

Comments.—This species has also been collected in Three-Mile Cave, Williamson County. It probably is an accidental.

Cicurina sp. (eyed) (det. W.J. Gertsch)

Record.—Black Cat Cave.

Comment.—Immature specimens from this cave are probably referable to *C. varians.*

**Cicurina* n.sp. (blind) (det. W.J. Gertsch)

Records.—Braken Bat Cave; Government Canyon Bat Cave; Genesis Cave; Headquarters Cave; Helotes Blowhole; John Wagner Ranch Cave No. 3; Kamikazi Cricket Cave; Madla's Cave; Robber Baron Cave; Young Cave No. 1.

Bibliography.—Reddell (1965; 1970a).

Comments.—This material almost certainly belongs to one or more blind species. The genus *Cicurina* is represented in Texas caves by a large complex of undescribed blind species.

Cicurina varians Gertsch and Mulaik (det. W.J. Gertsch)

Records.—Assassin Cave; Bear Cave; Dirtwater Cave; Friesenhahn Cave; Government Canyon Bat Cave; Han's Grotto; Headquarters Cave; Hitzfelder's Bone Hole; Isopit; Kamikazi Cricket Cave; Madla's Cave; Niche Cave; Robber Baron Cave; Some Monk Chanted Evening Cave; Twin Pits; Wurzbach Bat Cave.

Bibliography.—Poole and Passmore (1978); Reddell (1965; 1970a).

Comment.—This is the most abundant troglophilic spider in Texas caves, with collections available throughout the state.

Family Amaurobiidae (white-eyed spiders)

Metaltella simoni (Keyserling) (det. W.J. Gertsch)

Record.—Robber Baron Cave.

Comments.—This is the only record for this species in Texas caves. It is presumably an accidental.

Family Clubionidae (sac spiders)

Trachelas sp. (det. W.J. Gertsch)

Record.—Cave of the Bearded Tree.

Comments.—This is the only record of this genus in Texas caves. Only immatures of this accidental were collected.

Family Gnaphosidae (hunting spiders)

Drassyllus sp. (det. W.J. Gertsch)

Record.—Robber Baron Cave.

Comment.—Although there are several records of this genus from Texas caves, all are probably accidental occurrences.

Family Leptonetidae

Neoleptoneta sp. (det. W.J. Gertsch)

Record.—Bear Cave; Kamikazi Cricket Cave.

Comment.—This is probably an undescribed troglophile.

**Neoleptoneta microps* (Gertsch) (det. W.J. Gertsch)

Record.—Government Canyon Bat Cave.

Bibliography.—Gertsch (1974); Reddell (1970a).

Comment.—This troglobite is known only from this cave.

Family Linyphiidae (sheet-web weavers)

Undetermined genus and species

Record.—Underwater Cave.

Comment.—Only immature specimens were collected.

Eperigone sp. (det. W.J. Gertsch)

Record.—Isopit.

Comment.—This genus is not infrequent in Texas caves, but the ecological status of this material is unknown.

Meioneta sp. (det. W.J. Gertsch)

Records.—Bear Cave; Black Cat Cave; Christmas Cave; Elm Springs Cave; Government Canyon Bat Cave; Isopit; Wurzbach Bat Cave.

Bibliography.—Reddell (1970a).

Comment.—This genus is well represented in Texas caves with one or more undescribed species having been collected.

Family Loxoscelidae (brown spiders)

Loxosceles reclusa Gertsch and Mulaik (det. W.J. Gertsch)

Record.—Roan's Cave.

Comments.—This is the highly poisonous brown recluse spider. The only other Texas cave record is from Tampke Ranch Cave, Uvalde County.

Family Lycosidae (wolf spiders)

Pirata davisi Wallace and Exline (det. W.J. Gertsch)

Record.—Bullis Hole.

Bibliography.—Reddell (1970a); Wallace and Exline (1978).

Comment.—This is certainly an accidental.

Schizocosa saltatrix Hentz (det. W.J. Gertsch)

Records.—Cave of the Bearded Tree; Cave of the Half-Snake.

Comments.—This is certainly an accidental. It has also been found in caves in Travis and Val Verde Counties.

Family Nesticidae (cave spiders)

Eidmannella pallida (Emerton) (det. W.J. Gertsch)

Records.—Government Canyon Bat Cave; Headquarters Cave; Voight's Bat Cave.

Bibliography.—Gertsch (1984); Reddell (1970a).

Comment.—This troglophilic spider ranges throughout the United States south into Central America and the West Indies.

**Eidmannella rostrata* Gertsch (det. W.J. Gertsch)

Records.—Braken Bat Cave; Cave of the Half-Snake; Dirtwater Cave; Fair Hole; Helotes Blowhole; Hitzfelder's Bone Hole; Isopit; Madla's Cave; Poison Ivy Pit; Robber Baron Cave; Wurzbach Bat Cave.

Bibliography.—Gertsch (1984); Reddell (1965).

Comments.—This troglobitic spider has also been found in caves in Bandera, Blanco, Burnet, Comal, Hays, Kendall, Medina, Real, Terrell, Uvalde, and Val Verde Counties. It appears to be a recent troglobite derived directly from *E. pallida.*

Gaucelmus augustinus Keyserling (det. W.J. Gertsch)

Record.—Young Cave No. 1.

Comment.—This is an abundant troglophile in caves in the United States and Mexico.

Family Pholcidae (daddy-long-legs spiders)

Modisimus texanus Banks (det. W.J. Gertsch)

Records.—Niche Cave; Poison Ivy Pit; World Newt Cave.

Comment.—This troglophile has also been found in caves in Kendall, Llano, and San Saba Counties.

Family Theridiidae (combfooted spiders)

Achaearanea porteri (Banks) (det. W.J. Gertsch)

Records.—Assassin Cave; Bear Cave; Cave of the Bee Spirits; Dirtwater Cave; Isopit; Kamikazi Cricket Cave; Unknown Cave; World Newt Cave; Wurzbach Bat Cave; Young Cave No. 1.

Comments.—This is one of the more frequently collected troglophilic spiders in Texas. It is usually found hanging from webs along cave walls and among breakdown.

Achaearanea tepidariorum (Koch) (det. W.J. Gertsch)

Record.—Robber Baron Cave.

Comments.—This troglophile has also been collected from caves in Hays, Kerr, and Llano Counties. It is far rarer than *A. porteri* in caves but a fairly common surface inhabitant.

Latrodectus sp.

Record.—Black Widow Pit.

Comments.—Black widow spiders from this cave were not collected. Black widows are not infrequently found in the entrance area of caves.

Steatoda sp. (det. W.J. Gertsch)

Record.—Cave of the Half-Snake.

Comment.—Only an immature specimen was collected.

Family Thomisidae (crab spiders)

Xysticus ferox (Hentz) (det. W.J. Gertsch)

Record.—Cave of the Bearded Tree.

Comment.—This is certainly an accidental.

Order Opiliones (harvestmen)
Suborder Palpatores

Family Gagrellidae

Leiobunum townsendii Weed (det. C.J. Goodnight; J.C. Cokendolpher)

Records.—?Ackerman's Trash Hole; ?Another Prayer Cave; Assassin Cave; ?Aue Road Cave; ?Bandera Road Cave; ?Basement Cave; ?Bear Cave; ?Bet-Ya-Can't-Find-It Cave; ?Big Bexar

Cave; ?Black Cat Cave; ?Blue Hole No. 1; Braken Bat Cave; ?Breathe-If-You-Can Cave; ?C-Section Cave; ?Cave File Cave; Cave of the Bearded Tree; ?Cave of the Cliff; ?Cave of the Creek; Cave of the Half-Snake; ?Cave of the Mad Machete; ?Cave of the Woods; ?Christmas Cave; ?Cliffside Crawl No. 1; ?Cliffside Crawl No. 2; ?Come-Along Cave; ?Crane Bat Cave; ?Creekbed Cave; ?Cub Cave; ?Dam Crawl; Dirtwater Cave; ?Drop and a Prayer Pit; ?Dynamite Cave; ?Elephant Spring; Elm Springs Cave; ?Elmore Cave; ?Fireworks Cave; ?Friesenhahn Cave; ?Genesis Cave; ?Gladsam's Cave; ?Godchildren's Sink; ?Goonies Cave; ?Gray Cave; ?Han's Grotto; ?Helotes Blowhole; Helotes Hilltop Cave; ?Hills and Dales Pit; Hitzfelder's Bone Hole; ?Hogan's Cave; ?Hopeless Cave; ?Hummingbird Cave; Isopit; ?Is That All There Is Spring; ?John Wagner Ranch Cave No. 3; Kamikazi Cricket Cave; KKYX Cave; ?Lone Star Pit; ?Madla's Cave; ?Mattke Cave; ?Molar Hole; Niche Cave; ?Now-You-See-It Now-You-Don't Cave; ?Olive Pit; ?Pekingese Pit; ?Persimmon Pit; Poison Ivy Pit; ?Pomeranian Pit; Por Boy Ranch Cave; Powerline Cave; Roan's Cave; ?Root Cave; ?Sam's Cave; ?Scorpion Cave; ?Screaming Meemies Pit; ?Shot and a Prayer Cave; ?Shotgun and a Prayer Cave; Skull Cave; ?The Crawl; ?Tick 'n Delight Cave; ?Tiny Town Sink; ?T.M.I. Cave; ?Toad Cave; ?2 For 1 Spring; Underwater Cave; Unknown Cave; ?Virgin Cave; ?Voight's Bat Cave; ?Womly Pit; ?World News Cave; Wurzbach Bat Cave; Young Cave No. 1; ?Young Cave No. 2.

Bibliography.—Anonymous (1964; 1973c; 1973d; 1978); Evans (1961); Litsinger (1973); Poole and Passmore (1978); Reddell (1970a); Reddell and Knox (1962); Rowland and Reddell (1976).

Comments.—A question mark preceding the records above indicate sight records of "harvestmen." Since *L. townsendii* is the only species of gagrellid harvestman reported from the caves of Central Texas, these records almost certainly are applicable to this species. This species frequently inhabits the entrance area of caves in vast numbers during the summer.

Suborder Laniatores

Family Phalangodidae

***Hoplobunus madlae* Goodnight and Goodnight (det. C.J. Goodnight; J.C. Cokendolpher)

Records.—Black Cat Cave; Elmore Cave; Genesis Cave; Helotes Hilltop Cave; Isopit; Kamikazi Cricket Cave; Madla's Cave; Wurzbach Bat Cave.

Bibliography.—Goodnight and Goodnight (1967); Reddell (1970a); Rowland and Reddell (1976).

Comments.—This large pale orange troglobite is also known from caves in Bandera, Comal, Edwards, Kendall, Kinney, Real, Uvalde, and Val Verde Counties. The only other species of this genus in the United States is *H. russelli* Goodnight and Goodnight from caves in Medina, Uvalde, and Val Verde Counties. The other members of the genus inhabit cave and surface habitats in Mexico.

**Texella* ?n.sp. (det. J.C. Cokendolpher; T.S. Briggs)

Records.—Genesis Cave; Robber Baron Cave.

Comments.—This small orange troglobite may be an undescribed species closely related to *T. mulaiki* Goodnight and Goodnight, a species reported from caves in Comal, Hays, Medina, Travis, and Williamson Counties. The only other species of the genus is *T. reddelli* Goodnight and Goodnight from caves in Hays, Travis, and Williamson Counties. The genus *Texella* is presently being revised by T.S. Briggs, and final identification of Texas cave records must await his study.

Order Acarina (mites and ticks)

Undetermined material

Records.—Bear Cave; Cave of the Bearded Tree; Chimney Cricket Cave; Headquarters Cave; Helotes Hilltop Cave; Hitzfelder's Bone Hole; Isopit; Kamikazi Cricket Cave; Niche Cave; Por Boy Ranch Cave; Robber Baron Cave; Shot and a Prayer Cave; Skull Cave; Unknown Cave; Voight's Bat Cave.

Bibliography.—Poole and Passmore (1978).

Comment.—Mites from these caves await study.

Suborder Metastigmata (ticks)

Undetermined material

Records.—Elmore Cave; Huesta Cave; Post Hole; Tick 'n Delight Cave; Virgin Cave; Wagner Ranch Fissure.

Comment.—These are all sight records.

Family Ixodidae

Amblyomma americanum (Linnaeus) (det. J.E. Keirans)

Records.—Cave of the Half-Snake; Wurzbach Bat Cave.

Comment.—The lone-star tick is not usually a cave inhabitant, and these records are certainly accidental occurrences.

Suborder Prostigmata

Family Trombidiidae

Undetermined genus and species

Records.—Government Canyon Bat Cave; Wurzbach Bat Cave.

Comment.—These mites were parasitic on cave crickets of the genus *Ceuthophilus.*

CLASS CHILOPODA (centipedes)

Undetermined material

Records.—Basement Cave; Cave of the Woods; Shot and a Prayer Cave.

Bibliography.—Poole and Passmore (1978); Veni (1978).

Comment.—These are all sight records.

Order Lithobiomorpha

Undetermined material

Records.—Assassin Cave; Cave of the Bearded Tree; Cave of the Half-Snake; Headquarters Cave; Robber Baron Cave.

Comment.—This material awaits study, but at least some records probably represent troglophiles.

Order Scolopendromorpha

Family Scolopendridae

Undetermined genus and species

Record.—Braken Bat Cave.

Comment.—This is a sight record of a large species; it is certainly an accidental.

Order Scutigeromorpha

Undetermined material

Records.—Black Cat Cave; Headquarters Cave; Underwater Cave; Unknown Cave.

Comment.—This material awaits study, but some records may represent troglophiles.

Order Geophilomorpha

Undetermined material

Record.—Kamikazi Cricket Cave.

Comments.—This material awaits study. Many geophilomorph centipedes are exclusively endogean but others are tentatively considered troglophiles or troglobites.

CLASS DIPLOPODA (millipedes)

Undetermined material

Records.—Intermittent spring near Leon Springs; Big Bexar Cave; Bob Bear Cave; Cave With Ladder In It; Chimney Cricket Cave; Crawl and a Prayer Cave; Dynamite Cave; Godchildren's Sink; Graywaters Cave; Screaming Meemies Pit.

Comment.—With the exception of the intermittent spring near Leon Springs these are sight records.

Order Spirostreptida

Family Cambalidae

**Cambala speobia* (Chamberlin) (det. N.B. Causey; R. Shelley)

Records.—Black Cat Cave; Braken Bat Cave; Cave of the Bee Spirits; Elm Springs Cave; Genesis Cave; Government Canyon Bat Cave; Han's Grotto; Helotes Hilltop Cave; Hitzfelder's Bone Hole; Isopit; John Wagner Ranch Cave No. 3; Kamikazi Cricket Cave; Madla's Cave; Robber Baron Cave; Shot and a Prayer Cave.

Bibliography.—Causey (1960); Poole and Passmore (1978); Reddell (1965; 1970a); Waters (1979).

Comments.—This is the most abundant troglobite in Texas caves having been collected throughout the Edwards Plateau, in the gypsum caves of Northwest Texas, and in the gypsum plain of Culberson County. It is frequently found in large numbers.

Family Spirostreptidae

Orthoporus sp. cf. *texicolens* Chamberlin (det. R. Shelley)

Record.—Kamikazi Cricket Cave.

Comments.—This large millipede is certainly an accidental. It has not otherwise been collected from caves.

Order Julida

Family Parajulidae

Gosiulus aethes (Chamberlin) (det. N.B. Causey)

Record.—Bullis Hole.

Bibliography.—Reddell (1970a).

Comments.—This species has also been collected in Cobb Cavern, Williamson County. It is certainly an accidental.

Order Callipodida

Family Casiopetalidae

Abacion texense (Loomis) (det. N.B. Causey; R. Shelley)

Records.—Bear Cave; Poison Ivy Pit; Wurzbach Bat Cave.

Comments.—This widely distributed epigean species is not infrequently found in the entrance area of caves; it is certainly an accidental.

Order Polydesmida

Family Eurymerodesmidae

Eurymerodesmus sp. (det. N.B. Causey; R. Shelley)

Records.—Black Cat Cave; Headquarters Cave.

Bibliography.—Poole and Passmore (1978); Reddell (1970a).

Comment.—This genus is occasionally found in the entrance area of Texas caves but is an accidental.

Family Fuhrmannodesmidae

***Speodesmus* sp. (det. J.R. Reddell)

Records.—Christmas Cave; Come-Along Cave; Cueva Cave; Elmore Cave; ?Flint Bridge Cave; Kamikazi Cricket Cave.

Bibliography.—Poole and Passmore (1978); Waters (1977).

Comments.—Troglobitic millipedes of this genus await study. The Come-Along Cave and Flint Bridge Cave records are based on sight records. Flint Bridge Cave is unfortunately now closed.

***Speodesmus* n.sp. 1 (det. W.R. Elliott)

Record.—Robber Baron Cave.

Comment.—This troglobitic species is known only from this cave.

***Speodesmus* n.sp. 2 (det. N.B. Causey; W.R. Elliott)

Records.—Government Canyon Bat Cave; Helotes Hilltop Cave; John Wagner Ranch Cave No. 3.

Bibliography.—Elliott (1976a); Reddell (1965; 1970a).

Comment.—This new species is known only from these caves and from Goat Cave and Suprise Cave, Medina County.

***Speodesmus echinourus* Loomis (det. N.B. Causey; W.R. Elliott)

Record.—Fair Hole.

Bibliography.—Elliott (1976a).

Comment.—This species ranges from northwestern Bexar County north to Hays County and west to Val Verde County.

Family Paradoxosomatidae

Oxidus gracilis (Koch) (det. N.B. Causey; R. Shelley)

Records.—Bullis Hole; Elm Springs Cave; ?Georg's Hole; Han's Grotto; Isopit; Kamikazi Cricket Cave; Robber Baron Cave; Underwater Cave.

Bibliography.—Reddell (1970a).

Comments.—The hot house millipede is frequently found in Texas caves, especially in areas near human habitations. It is apparently able to reproduce in caves and possibly is a troglophile.

Family Pyrgodesmidae

Myrmecodesmus sp. (det. W.A. Shear)

Record.—Elmore Cave.

Comments.—This tropical family is otherwise known from the United States only by an introduced species in the Rio Grande Valley of Texas and near New Orleans in Louisiana and from undetermined specimens from caves in Williamson County. In the absence of adults it is not possible to further identify the species.

CLASS ENTOGNATHA

Order Collembola (springtails)

Undetermined material

Records.—Assassin Cave; Black Cat Cave; Braken Bat Cave; Cave of the Half-Snake; Chimney Cricket Cave; Crawl and a Prayer Cave; Dirtwater Cave; Elm Springs Cave; Elmore Cave; Cave of the Half-Snake; Genesis Cave; Han's Grotto; Isopit; Kamikazi Cricket Cave; KKYX Cave; Por Boy Ranch Cave; Roan's Cave; Robber Baron Cave; Skull Cave; Twin Pits; Underwater Cave; Voight's Bat Cave; Wurzbach Bat Cave; Young Cave No. 1.

Comments.—Specimens from these caves await study. Most will probably prove to belong to *Pseudosinella violenta.*

Family Entomobryidae (slender springtails)

Pseudosinella violenta (Folsom) (det. K. Christiansen)

Records.—Bear Cave; Government Canyon Bat Cave; Headquarters Cave; Helotes Hilltop Cave; Hitzfelder's Bone Hole; Madla's Cave.

Bibliography.—Christiansen and Culver (1969); Reddell (1966; 1970b).

Comments.—This is the most abundant springtail in Texas caves. It exhibits some degree of variation in degree of adaptation to the cavernicole habitat with some populations, especially along the Balcones Fault Zone, having longer appendages than other populations. The species is frequently extremely abundant, especially in areas where organic debris has accumulated.

Sinella (Coecobrya) caeca (Schött) (det. K. Christiansen)

Record.—Robber Baron Cave.

Comments.—This species has also been collected in a cave in Travis County. It may be a troglophile.

Tomocerus (Pogonognathellus) flavescens Tullberg (det. K. Christiansen)

Record.—Bullis Hole.

Bibliography.—Reddell (1970b).

Comment.—This species has also been found in the entrance area of caves in Burnet, Hays, and Travis Counties.

Order Entotrophi (entotrophs)

Family Campodeidae (slender entotrophs)

Undetermined genus and species

Record.—Kamikazi Cricket Cave.

Comment.—This species is probably an endogean form.

Family Iapygidae (earwiglike entotrophs)

*Undetermined genus and species (det. J. Reddell)

Record.—Robber Baron Cave.

Comment.—This large species is an apparent troglobite restricted to this cave.

CLASS INSECTA

Undetermined material

Records.—Springs along San Antonio River; Black Cat Cave; Braken Bat Cave; Cave of the Half-Snake; Isopit; Roan's Cave; Skull Cave; Some Monk Chanted Evening Cave.

Comment.—Undetermined larval insects were collected from each of the above localities.

Order Thysanura (silverfish and allies)

Undetermined material

Records.—Bet-Ya-Can't-Find-It Cave; Creekbed Cave; Fence Post Hole; Genesis Cave.

Comment.—These are sight records.

Family Nicoletiidae (subterranean silverfish)

**Texoreddellia texensis* (Ulrich) (det. P. Wygodzinsky)

Records.—Black Cat Cave; ?Braken Bat Cave; ?Cave of the Bee Spirits; Elm Springs Cave; ?Elmore Cave; Headquarters Cave; ?Helotes Blowhole; Hitzfelder's Bone Hole; ?Isopit; ?Kamikazi Cricket Cave; Madla's Cave; Robber Baron Cave.

Bibliography.—Reddell (1966); Wygodzinsky (1973).

Comments.—This is the only troglobitic silverfish in the United States. It is usually found running on cave walls, especially in areas with a sprinkling of organic debris. Records marked with a question mark are tentatively assigned to this species pending further study.

Order Orthoptera (crickets and allies)

Family Gryllidae (crickets)

Undetermined genus and species

Record.—Screaming Meemies Pit.

Comment.—This material is certainly accidental.

Gryllus sp. (det. T.H. Hubbell; T.J. Cohn)

Records.—Isopit; Roan's Cave.

Comment.—This is certainly an accidental.

Family Rhaphidophoridae (cave crickets)

Ceuthophilus sp.

Records.—Ackerman's Trash Hole; Another Prayer Cave; Aue Road Cave; Bandera Road Cave; Basement Cave; Bear Cave; Bet-Ya-Can't-Find-It Cave; Blue Hole No. 1; Bob Bear Cave; Breathe-If-You-Can Cave; C-Section Cave; Cave File Cave; Cave of the Cliff; Cave of the Creek; Cave of the Mad Machete; Cave of the Woods; Cave With Dead Coral Snake In It; Christmas Cave; Cliffside Crawl No. 1; Cliffside Crawl No. 2; Come-Along Cave; Coon Crap Cave; Corkscrew Cave; Council Cave; Crane Bat Cave; Crawl and a Prayer Cave; Creekbed Cave; Cub Cave; Dam Crawl; Drop and a Prayer Pit; Dynamite Cave; Elephant Spring; Fence Post Hole; Fireworks Cave; Flint Bridge Cave; Genesis Cave; Georg's Hole; Gladsam's Cave; Godchildren's Sink; Gray Cave; Grutas de los Mojados; Helotes Blowhole; Hills and Dales Pit; Hopeless Cave; Hummingbird Cave; Is That All There Is Spring; Kamikazi Cricket Cave; Mattke Cave; Molar Hole; Moonshine Cave; Niche Cave; Pekingese Pit; Persimmon Pit; Pick-Up Sticks Cave; Pomeranian Pit; Putrefaction Cave; Robber's Cave; Root Cave; Sal Si Puedes Cave; Schertz-Cibolo Cave; Scorpion Cave; Scorpion Gulch; Screaming Meenies Pit; Shavano Park Cave; Shot and a Prayer Cave; Shotgun and a

Prayer Cave; Silo Hole; Skull Cave; Somebody Else's Cave; Sorehead Cave; Spider Hole; The Crawl; Tick 'n Delight Cave; Tiny Town Sink; T.M.I. Cave; T.M.I. Cave No. 2; Toad Cave; 2 For 1 Cave; 2 For 1 Spring; Villa Rreal's Cave; Virgin Cave; Wagner Ranch Pit; Womly Pit; World News Cave; Young Cave No. 2; Unnamed cave (BCS #58).

Bibliography.—Anonymous (1973d; 1978); Fritz (1981); Litsinger (1973); Poole and Passmore (1978); Reddell and Knox (1962); Veni (1978; 1979b); Waters (1977); Winkler (1973a).

Comments.—Most of these are sight records of "cave crickets." This is the only genus of rhaphidophorid cricket inhabiting the caves of Texas.

Ceuthophilus (Ceuthophilus) sp. (det. T.H. Hubbell)

Records.—Cave of the Bee Spirits; Elmore Cave; Friesenhahn Cave; Han's Grotto; Roan's Cave; World Newt Cave.

Bibliography.—Evans (1961); Poole and Passmore (1978); Reddell (1966).

Comment.—This is an apparently undescribed species.

Ceuthophilus (Ceuthophilus) secretus Scudder (det. T.H. Hubbell)

Records.—Black Cat Cave; Cave of the Bearded Tree; Cave of the Half-Snake; Chimney Cricket Cave; Dead Deer Cave; Dirtwater Cave; Elm Springs Cave; Government Canyon Bat Cave; Graywaters Cave; Helotes Hilltop Cave; Hitzfelder's Bone Hole; Isopit; KKYX Cave; Madla's Cave; Poison Ivy Pit; Por Boy Ranch Cave; Some Monk Chanted Evening Cave; Underwater Cave; Unknown Cave; Voight's Bat Cave; Young Cave No. 1.

Bibliography.—Poole and Passmore (1978); Reddell (1966).

Comment.—This is the most abundant species of cave cricket in Texas caves.

Ceuthophilus (Geotettix) cunicularis Hubbell (det. T.H. Hubbell)

Records.—Black Cat Cave; Braken Bat Cave; Friesenhahn Cave; Government Canyon Bat Cave; Headquarters Cave; Hitzfelder's Bone Hole; Isopit; John Wagner Ranch Cave No. 3; Madla's Cave; Robber Baron Cave; Some Monk Chanted Evening Cave; Wurzbach Bat Cave.

Bibliography.—Evans (1961); Reddell (1966); Waters (1979).

Comment.—This species of cave cricket is also extremely abundant in Texas caves and is frequently sympatric with *C. (C.) secretus.*

Ceuthophilus (Geotettix) umbratilis Hubbell (det. T.H. Hubbell)

Record.—?Isopit.

Comment.—Specimens from this cave are only tentatively assigned to this species, which is usually found to the northwest of Bexar County.

Order Dermaptera (earwigs)

Undetermined material

Record.—Robber Baron Cave.

Comments.—Two species of earwig were found in the entrance sink. They are certainly accidentals.

Order Dictyoptera (mantids and cockroaches)
Suborder Blattaria (cockroaches)

Undetermined material

Records.—Assassin Cave; Shavano Park Cave.

Comment.—These are sight records.

Family Blattellidae (German cockroaches)

Euthlastoblatta sp. (det. F.W. Fisk)

Records.—Robber Baron Cave; Underwater Cave; World Newt Cave.

Comments.—These are the only records for this genus in Texas caves, although it is a frequently collected group in Mexican caves. This species may be a troglophile.

Family Blattidae (American cockroaches)

Periplaneta sp. (det. F.W. Fisk)

Record.—Robber Baron Cave.

Comments.—This genus is otherwise unrecorded from Texas caves. The material from this cave was immature, and this is apparently an accidental.

Family Polyphagidae (desert cockroaches)

Arenivaga sp. (det. F.W. Fisk)

Record.—Niche Cave.

Comments.—Only nymphs were collected in this cave. The genus is frequently found in the dry entrance area of caves.

Arenivaga sp. prob. *bolliana* (Saussure) (det. F.W. Fisk)

Records.—G.I. Joe Cave; Skull Cave; Unknown Cave.

Comment.—Only nymphs were collected in these caves.

Arenivaga sp. prob. *tonkawa* Hebard (det. A.B. Gurney)

Records.—Elm Springs Cave; Headquarters Cave.

Bibliography.—Reddell (1970b).

Comment.—Specimens from these caves were immature but probably belong to this species, a frequent trogloxene in Texas caves.

Order Psocoptera (booklice and barklice)
Suborder Trogiomorpha

Family Psyllipsocidae (cave barklice)

Psyllipsocus n.sp. (det. E.L. Mockford)

Record.—Niche Cave.

Comment.—This apparently represents an undescribed species.

Psyllipsocus ramburii Selys-Longchamps (det. E.L. Mockford)

Record.—Unknown Cave.

Comment.—This is a common troglophile in Texas caves.

Order Hemiptera (bugs)

Undetermined material

Record.—Madla's Cave.

Comment.—This is a sight record.

Suborder Dipsocomorpha

Family Reduviidae (assassin bugs)

Undetermined genus and species

Records.—Assassin Cave; Black Cat Cave; Han's Grotto; Unknown Cave.

Comment.—This material awaits study.

Triatoma sp. (det. R.C. Froeschner)

Record.—Robber Baron Cave.

Comment.—This record is based on immature specimens.

Triatoma gerstaeckeri (Stal) (det. R.C. Froeschner)

Records.—?Headquarters Cave; Niche Cave; Young Cave No. 1.

Bibliography.—Reddell (1970b).

Comments.—This species is frequently found in the entrance area of caves in Texas. The record for Headquarters Cave is based on a nymph but probably belongs to this species.

Suborder Nepomorpha (aquatic bugs)

Undetermined material

Record.—Fair Hole.

Bibliography.—Anonymous (1973e); Reddell and Knox (1962).

Comment.—This is a sight record of "water bugs" in this cave.

Order Homoptera (leafhoppers and allies)

Undetermined material

Record.—Isopit.

Comment.—This material awaits study.

Order Coleoptera (beetles)

Undetermined material

Records.—Bet-Ya-Can't-Find-It Cave; Cave of the Bearded Tree; Cave of the Creek; Council Cave; Creekbed Cave; Godchildren's Sink; Han's Grotto; Molar Hole; Por Boy Ranch Cave; Sorehead Cave; Unknown Cave; World Newt Cave.

Bibliography.—Poole and Passmore (1978).

Comment.—These are sight records of "beetles" in the above caves.

Suborder Adephaga

Family Carabidae (ground beetles)

Undetermined genus and species

Records.—Assassin Cave; Bear Cave; Braken Bat Cave; Cave of the Half-Snake; Isopit; Robber Baron Cave; Skull Cave.

Comment.—These epigean ground beetles await study.

Agonum extensicolle (Say) (det. T.C. Barr, Jr.)

Record.—Bullis Hole.

Comments.—This species is probably an accidental; it has also been found in River Styx Cave, King County.

Agonum viride LeConte (det. T.C. Barr, Jr.)

Record.—Bullis Hole.

Bibliography.—Reddell (1970b).

Comments.—This probable accidental has also been found in Tarbutton's Cave, Hays County. In both cases it was probably washed into the caves.

Agonum (Circinalia) punctiforme Say (det. T.C. Barr, Jr.)

Record.—Bullis Hole.

Bibliography.—Reddell (1970b).

Comments.—This beetle is probably an accidental; it has also been found in Coffin Cave, Williamson County.

Calosoma scrutator Fabricius (det. T.C. Barr, Jr.)

Record.—Wurzbach Bat Cave.

Comments.—This species is probably an accidental; it is not otherwise known from Texas caves.

Chlaenius sp. (det. T.C. Barr, Jr.)

Record.—Wurzbach Bat Cave.

Comment.—This is an accidental.

Clivina sp. (det. T.C. Barr, Jr.)

Records.—Bullis Hole; Madla's Cave.

Bibliography.—Reddell (1966; 1970b).

Comment.—This genus is occasionally found in Texas caves, and this species may be a troglophile.

**Rhadine* sp. (det. J.R. Reddell)

Records.—Cave of the Woods; Genesis Cave; Helotes Blowhole; Isopit; Kamikazi Cricket Cave; Poison Ivy Pit; Wurzbach Bat Cave.

Bibliography.—Veni (1978).

Comments.—This material awaits study.

**Rhadine exilis* (Barr and Lawrence)

Records.—Small cave 0.5 mi. N of Helotes; Headquarters Cave; John Wagner Ranch Cave No. 3.

Bibliography.—Barr (1960; 1974); Barr and Lawrence (1960); Elliott (1976b); Mitchell and Reddell (1971); Nicholas (1960); Reddell (1966).

Comments.—This troglobite is known only from these caves. The identity of the "small cave 0.5 mi. N of Helotes" is unknown.

Rhadine howdeni (Barr and Lawrence)

Record.—Government Canyon Bat Cave.

Bibliography.—Reddell (1966).

Comments.—This widespread troglophile, unknown from the surface, is also known from caves in Burnet, Comal, Edwards, Hays, Kerr, Kimble, Kinney, Lampasas, Mason, Medina, San Saba, Uvalde, and Val Verde Counties. In this cave it was abundant on bat guano.

**Rhadine infernalis ewersi* (Barr)

Record.—Headquarters Cave.

Bibliography.—Barr (1960; 1974); Elliott (1976b); Mitchell and Reddell (1971); Nicholas (1960); Reddell (1966).

Comment.—This subspecies is known only from this cave.

**Rhadine infernalis infernalis* (Barr and Lawrence)

Records.—John Wagner Ranch Cave No. 3; Madla's Cave.

Bibliography.—Barr (1960; 1974); Barr and Lawrence (1960); Elliott (1976b); Mitchell and Reddell (1971); Nicholas (1960); Reddell (1966).

Comment.—This subspecies is known only from these caves.

**Rhadine infernalis ewersi* x *R. i. infernalis*

Record.—Government Canyon Bat Cave.

Bibliography.—Barr (1974).

Comment.—What appear to be intergrades between the two subspecies of *R. infernalis* have been collected from areas away from the bat colony in this cave.

Family Dytiscidae (predaceious diving beetles)

Undetermined genus and species

Record.—Twin Pits.

Comment.—Specimens from this cave await study.

Suborder Polyphaga

Undetermined material

Record.—Kamikazi Cricket Cave.

Comment.—A small soil beetle collected in this cave awaits study.

Family Alleculidae (comb-clawed beetles)

Undetermined genus and species (det. D.M. Anderson)

Records.—Cave of the Bearded Tree; Cave of the Half-Snake; Elm Springs Cave; Government Canyon Bat Cave; Kamikazi Cricket Cave.

Bibliography.—Reddell (1966).

Comments.—Only larvae were collected from Government Canyon Bat Cave; the remaining material awaits study.

Hymenorus sp. (det. D.M. Anderson)

Records.—Braken Bat Cave; Robber Baron Cave.

Comment.—This genus is not infrequently collected in Texas caves and is apparently a troglophile.

Family Cantharidae (soldier beetles)

Cantharis sp. (det. T.J. Spilman)

Record.—Headquarters Cave.

Bibliography.—Reddell (1970b).

Comment.—This is apparently an accidental.

Family Elateridae (click beetles)

Ampedus sp. (det. T.J. Spilman)

Record.—Robber Baron Cave.

Comment.—Only larvae of this accidental species were collected in the entrance sink.

Ampedus sp. nr. *impolitus* (Melsheimer) (det. T.J. Spilman)

Record.—Cave of the Bearded Tree.

Comment.—This is certainly an accidental.

Conoderus sp. (det. T.J. Spilman)

Record.—Robber Baron Cave.

Comment.—Larvae of this accidental were collected in the entrance sink.

Family Elmidae (riffle beetles)

Undetermined genus and species

Record.—Springs along San Antonio River.

Comment.—This material was taken from mopheads placed in the mouths of springs.

Family ?Histeridae (clown beetles)

Undetermined genus and species

Records.—Elm Springs Cave; Headquarters Cave.

Comments.—Material from Elm Springs Cave awaits study. The record for Headquarters

Cave is based on larvae.

Family Hydrophilidae (water scavenger beetles)

Undetermined genus and species

Record.—Bear Cave.

Comment.—This material awaits study.

Family Micromalthidae (telephone-pole beetles)

Micromalthus debilis LeConte (det. D.M. Anderson)

Record.—Robber Baron Cave.

Comments.—This rare species is not otherwise recorded from Texas caves. It is usually found in rotten logs and is certainly an accidental.

Family Pselaphidae (antloving beetles)

Undetermined genus and species

Records.—Chimney Cricket Cave; Helotes Hilltop Cave.

Comment.—Specimens from these caves await study.

**Batrisodes* n.sp. (det. T.C. Barr, Jr.)

Record.—Robber Baron Cave.

Comments.—This is one of only two eyeless species of *Batrisodes* from Texas caves; the other species is from Wyatt Cave, Edwards County. The genus is well represented in Texas caves with several species, all but one undescribed, having been collected. Specimens are usually found on the underside of rocks.

Family Ptilodactylidae (toed-winged beetles)

Ptilodactyla sp. (det. D.M. Anderson)

Record.—Elm Springs Cave.

Comments.—Only larvae of this genus have been identified. Two adults from the cave await study but presumably belong to the genus *Ptilodactyla.* The genus is occasionally found in caves and the presence of both adults and larvae indicate it may be a troglophile.

Family Scarabaeidae (lamellicorn beetles)

Cotinis sp. prob. *texana* (Casey) (det. D.M. Anderson)

Record.—Robber Baron Cave.

Comment.—Larvae probably belonging to this species were collected.

Family Staphylinidae (rove beetles)

Aleocharinae genus and species (det. L.H. Herman)

Record.—Kamikazi Cricket Cave.

Comment.—Generic identification is not possible in this difficult subfamily at this time.

Paederinae genus and species (det. D.M. Anderson; L.H. Herman)

Records.—Cave of the Half-Snake; ?Hitzfelder's Bone Hole.

Comment.—Only larvae of this subfamily were collected.

Belonuchus sp. (det. L.H. Herman)

Records.—Assassin Cave; Black Cat Cave; Braken Bat Cave; Cave of the Bearded Tree; Cave of the Half Snake; Elmore Cave; Government Canyon Bat Cave; Headquarters Cave; Isopit; John Wagner Ranch Cave No. 3; Kamikazi Cricket Cave.

Bibliography.—Reddell (1970b).

Comment.—One or more species of this genus have been collected in Texas caves as troglophiles.

Erichsonius sp. (det. L.H. Herman)

Record.—Elm Springs Cave.

Comment.—This is the only record of this genus in Texas caves.

Eustilicus condei (Jarrige) (det. L.H. Herman)

Records.—Elm Springs Cave; Elmore Cave; Genesis Cave; Helotes Blowhole; Madla's Cave.

Bibliography.—Herman (1970); Reddell (1966).

Comments.—This is an abundant troglophile in Texas caves. No epigean records are known for the species.

Homaeotarsus sp. (det. L.H. Herman)

Records.—Bullis Hole; Underwater Cave.

Bibliography.—Reddell (1970b).

Comment.—This is probably an accidental.

Orus (Leucorus) rubens (Casey) (det. L.H. Herman)

Records.—Isopit; Kamikazi Cricket Cave; Wurzbach Bat Cave.

Comment.—This troglophile has also been found in caves in Burnet, Edwards, Gillespie, Hays, Lampasas, Real, San Saba, Schleicher, Travis, and Val Verde Counties.

Philonthus sp. (det. L.H. Herman)

Record.—Isopit.

Comment.—This is among the more frequent genera of staphylinid beetles found in Texas caves.

Family Tenebrionidae (darkling beetles)

Undetermined genus and species

Records.—Helotes Hilltop Cave; Isopit; Robber Baron Cave.

Comment.—This material awaits study.

Zopherus haldemani Horn (det. T.J. Spilman)

Record.—Bear Cave.

Comments.—This species is probably an accidental; it has also been collected in Elm Water Cave, Williamson County.

Order Hymenoptera (wasps, ants, and bees)

Undetermined material

Record.—Cave of the Bee Spirits.

Bibliography.—Fritz (1980).

Comment.—Black bees were reported to have flown out of the entrance of Cave of the Bee Spirits when it was dug open.

Suborder Apocrita

Undetermined material

Record.—Young Cave No. 1.

Comment.—A small wasp from this cave awaits study.

Family Formicidae (ants)

Undetermined genus and species

Records.—Gandalf's Cave; Molar Hole; Young Cave No. 1.

Comment.—These are sight records.

Crematogaster (Crematogaster) laeviuscula Mayr (det. R. Snelling)

Record.—Poison Ivy Pit.

Comment.—This accidental has also been tentatively identified from Devil's Sinkhole, Edwards County.

Hypoponera opacior (Forel) (det. R. Snelling)

Record.—Voight's Bat Cave.

Comment.—This accidental is also known from Ezell's Cave, Hays County.

Labidus coecus (Latreille) (det. R. Snelling)

Record.—Dirtwater Cave.

Comments.—This ant species is occasionally collected in Texas caves; its ecological status is uncertain.

Leptogenys elongata (Buckley) (det. A.C. Cole; R. Snelling)

Records.—John Wagner Ranch Cave No. 3; Kamikazi Cricket Cave; Skull Cave.

Bibliography.—Reddell (1966).

Comments.—This species may be a trogloxene or accidental; it is also known from caves in Coryell, Stonewall, and Travis Counties.

Pheidole dentata Mayr (det. R. Snelling)

Record.—Cave of the Bearded Tree.

Comment.—This is the only Texas cave record for this accidental.

Solenopsis (Solenopsis) geminata (Fabricius) (det. R. Snelling)

Record.—Kamikazi Cricket Cave.

Comments.—The tropical fire ant is an accidental; it is otherwise not known from Texas caves.

Solenopsis (Solenopsis) invicta Buren (det. R. Snelling)

Records.—Poison Ivy Pit; Por Boy Ranch Cave.

Comments.—A large population of the red imported fire ant was present in Por Boy Ranch Cave, indicating that it is a trogloxene. It is not otherwise recorded from Texas caves.

Solenopsis (Solenopsis) xyloni McCook (det. R. Snelling)

Record.—Braken Bat Cave.

Comments.—The southern fire ant is probably an accidental. This is the only Texas cave record for the species and apparently the first record of the species for Bexar County (Francke et al., 1983).

Order Lepidoptera (moths and butterflies)

Undetermined material

Records.—Another Prayer Cave; Breathe-If-You-Can Cave; Dirtwater Cave; Gray Cave; Young Cave No. 1.

Comment.—These are sight records of "moths."

Suborder Ditrysia

Family Noctuidae (noctuid moths)

Noctuinae genus and species (det. D.M. Weisman)

Record.—Robber Baron Cave.

Comment.—A larva of this subfamily was collected.

Order Diptera (flies)

Undetermined material

Records.—Assassin Cave; Aue Road Cave; Bandera Road Cave; Bet-Ya-Can't-Find-It Cave; Blue Hole No. 1; Braken Bat Cave; Chimney Cricket Cave; Cub Cave; Elm Springs Cave; Elmore Cave; Government Canyon Bat Cave; Gray Cave; Isopit; John Wagner Ranch Cave No. 3; Robber Baron Cave; Skull Cave; Young Cave No. 1.

Bibliography.—Veni (1983).

Comments.—Some of the above are sight records of "flies" or "gnats"; others are based on material remaining to be studied. Maggots were reported from Gray Cave.

Suborder Nematocera

Family Ceratopogonidae (biting midges)

Undetermined genus and species (det. R.V. Peterson)

Record.—Cave of the Half-Snake.

Comment.—Larvae were collected in this cave.

Forcipomyia sp. (det. W.W. Wirth)
Record.—Hitzfelder's Bone Hole.
Comment.—Larvae of this genus were collected.
Family Culicidae (mosquitoes)
Undetermined genus and species
Records.—Another Prayer Cave; Aue Road Cave; Bandera Road Cave; Bet-Ya-Can't-Find-It Cave; Blue Hole No. 1; Breathe-If-You-Can Cave; Gray Cave; Is That All There Is Spring; John Wagner Ranch Cave No. 3; Madla's Cave No. 2; Mattke Cave; Young Cave No. 1.
Bibliography.—Poole and Passmore (1978).
Comments.—These are sight records of "mosquitoes." Mosquitoes frequently use the entrance area of caves for shelter.
Culiseta sp. prob. *inornatus* Williston (det. T.V. Gaffigan)
Record.—Robber Baron Cave.
Comment.—This is probably a trogloxene using the cave for shelter.
Family Sciaridae (dark-winged fungus gnats)
Undetermined genus and species (det. R.V. Peterson)
Record.—Cave of the Half-Snake.
Comment.—This record is based on larvae.
Family Tipulidae (crane flies)
Undetermined genus and species
Record.—Dirtwater Cave.
Comment.—This material awaits study. Crane flies are not infrequently collected in the entrance area of caves.

Suborder Brachycera

Family Calliphoridae (blow flies)
Calliphora vicina (R.-D.) (det. R.J. Gagné)
Record.—Robber Baron Cave.
Comments.—This is an accidental. This species of blow fly has also been found in caves in Edwards, Sutton, and Val Verde Counties.
Family Milichiidae
Leptometopa n.sp. nr. *latipes* (Meigen) (det. C.W. Sabrosky)
Record.—Bear Cave.
Comments.—This undescribed species is probably a troglophile; it has also been collected from caves in Kimble and Medina Counties.
Family Streblidae (bat flies)
Trichobius major Coquillett (det. T.C. Maa)
Record.—Bear Cave.
Comment.—This species is a parasite of bats.
Family Tabanidae (horse flies and deer flies)
Undetermined genus and species
Record.—Virgin Cave.
Comment.—This is a sight record of "horse flies."

Order Siphonaptera (fleas)

Undetermined material
Record.—Government Canyon Bat Cave.
Bibliography.—Reddell and Knox (1962).
Comment.—This is a sight record of "fleas."

PHYLUM CHORDATA
CLASS TELEOSTOMI (fishes)
Order Cypriniformes

Family Characidae
Astyanax mexicanus (Filippi) (Mexican tetra)
Record.—San Antonio Spring.
Bibliography.—Waters (1983b).
Comment.—This widespread species is frequently found in the entrance area of caves, but this is the only Texas cave record.
Family Cyprinidae (minnows)
Undetermined genus and species
Records.—Bullis Hole; Fair Hole; Georg's Hole; San Antonio Spring; 2 For 1 Spring.
Bibliography.—Anonymous (1973e); Reddell and Knox (1962); Waters (1983b).
Comment.—These are sight records of "river minnows."

Order Siluriformes

Family Ictaluridae (catfish)
*Undetermined genus and species
Records.—Alamo Dressed Beef Company Well; El Patio Foods Well; Persyn Well.
Bibliography.—Longley and Karnei (1979a; 1979b).
Comments.—No specimens were preserved from the Alamo Dressed Beef Company Well or the Persyn Well. Two types of fish were reported from the El Patio Foods Well, one of which, *Satan eurystomus*, was preserved. The other was probably *Trogloglanis pattersoni.*
**Satan eurystomus* Hubbs and Bailey (widemouth blindcat)
Records.—Artesia Pump Station Well; Bexar Metropolitan Water District Well; El Patio Foods Well; O.R. Mitchell Well; William Kempin Well.

Bibliography.—Anonymous (1948); Bailey et al. (1960; 1970); Baughman (1959); Bertin (1958a; 1958b); Bolívar y Pieltain and Carranza (1954); Brown (1959); Carranza (1954); Cooper (1979); Cooper and Longley (1980a; 1980b); Dearolf (1956); Delamare-Deboutteville and Botosanéanu (1970); Fox (1966); Hubbs (1957; 1958; 1971); Hubbs and Bailey (1947); Husmann (1967); Juberthie (1974); Karnei (1978); Longley (1977; 1981; 1986); Longley and Karnei (1979a; 1979b); Lundberg (1970); Miller (1969b); Moore (1957; 1968); Moore and Nicholas (1978); Nelson (1976); Nicholas (1960); Reddell (1967); Relyea and Sutton (1974); Sbordoni (1969); Smith (1956); Suttkus (1961); Taylor (1969); Thinès (1956; 1969); Thinès and Durand (1973); Thinès and Tercafs (1972); Vandel (1964); Woods (1954).

Comments.—This species is known only from deep artesian wells in and southeast of San Antonio. It has been collected from depths up to 582 meters. It is known to feed on crustaceans.

**Trogloglanis pattersoni* Eigenmann (toothless blindcat)

Records.—Artesia Pump Station Well; George W. Brackenridge Well; Joseph Boecke Well; O.R. Mitchell Well; Verstraeten Well No. 1.

Bibliography.—Anonymous (1948); Bailey et al. (1960; 1970); Baughman (1959); Bertin (1958a; 1958b); Bolívar y Pieltain and Carranza (1954); Brown (1959); Carranza (1954); Chappuis (1927); Cooper (1979); Cooper and Longley (1980a; 1980b); Dearolf (1956); Eigenmann (1919); Fox (1966); Gianferrari (1923); Hubbs (1957; 1958; 1971); Hubbs and Bailey (1947); Husmann (1967); Jeannel (1943); Jordan, Evermann, and Clark (1930); Karnei (1978); Longley (1977; 1981; 1986); Longley and Karnei (1979a; 1979b); Lundberg (1970; 1982); Miller (1969a); Moore (1957; 1968); Moore and Nicholas (1978); Nelson (1976); Nicholas (1960); Norman (1926); Reddell (1967); Relyea and Sutton (1974); Sbordoni (1969); Smith (1956); Suttkus (1961); Taylor (1969); Thinès (1956; 1960; 1969); Thinès and Tercafs (1972); Vandel (1964); Vinciguerra (1924); Woods (1954).

Comments.—This remarkable blind fish is known only from deep artesian wells (308-582 m) in and southeast of San Antonio. It probably feeds on fungi.

Order Perciformes

Family Centrarchidae

Lepomis cyanellus Rafinesque (green sunfish)

Record.—Bullis Hole.

Bibliography.—Anonymous (1973a); Reddell (1970c).

Comment.—This species probably washed into the cave.

CLASS AMPHIBIA

Order Urodela (salamanders)

Family Plethodontidae

**Eurycea tridentifera* Mitchell and Reddell (Honey Creek blind salamander)

Record.—Elm Springs Cave.

Bibliography.—Sweet (1976; 1984); Veni (1979a).

Comments.—This troglobitic salamander is also known from caves in Comal County. Hybrids between *E. tridentifera* and *E. neotenes* Burger and Smith have been collected in Comal, Kendall, and Medina Counties.

Plethodon glutinosus albagula Grobman (slimy salamander)

Records.—?Big Bexar Cave; ?Blue Hole No. 1; Christmas Cave; Cub Cave; Elmore Cave; Friesenhahn Cave; ?Gladsam's Cave; John Wagner Ranch Cave No. 3; Madla's Cave; Moonshine Cave; Tick 'n Delight Cave.

Bibliography.—Anonymous (1969); Evans (1961); Graham (1976); Jameson (1949); Litsinger (1973); Olson (1959); Reddell (1967); Reddell and Knox (1962).

Comments.—The slimy salamander is an abundant trogloxene in the caves of the Edwards Plateau. Records preceded by a question mark are based on sight records. On 28 November 1982 Scott J. Harden and Randy M. Waters reported more than 15 individuals crowded into a small joint in the cave wall near the entrance of Elmore Cave.

Order Anura (frogs and toads)

Undetermined material

Records.—Big Bexar Cave; Dynamite Cave; Han's Grotto; Headquarters Cave; Roan's Cave; Villa Rreal's Cave; Voight's Bat Cave.

Bibliography.—Anonymous (1973d); Poole and Passmore (1978); Reddell and Knox (1962).

Comment.—These are sight records of "frogs."

Family Bufonidae

?*Bufo* sp. (toads)

Records.—Cave of the Bearded Tree; Cave of the Woods; Elm Springs Cave; Grutas de los Mojados; Han's Grotto; Kamikazi Cricket Cave; Toad Cave.

Bibliography.—Poole and Passmore (1978); Veni (1978; 1979b); Waters (1981).

Comment.—These are sight records of "toads."

Bufo punctatus Baird and Girard (canyon toad)

Record.—Friesenhahn Cave.

Bibliography.—Evans (1961); Graham (1976); Jameson (1949); Reddell (1967); Reddell and Knox (1962).

Comments.—This toad is occasionally found in the entrance area of caves; it is presumably an accidental.

Bufo valliceps Wiegmann (Gulf Coast toad)

Record.—Friesenhahn Cave.

Bibliography.—Evans (1961); Graham (1976); Jameson (1949); Reddell (1967); Reddell and Knox (1962).

Comments.—This toad is frequently found in the entrance area of caves; its abundance in Texas caves indicates it may be a trogloxene.

Family Leptodactylidae

Hylactophryne augusti latrans (Cope) (barking frog)

Records.—Friesenhahn Cave; Madla's Cave.

Bibliography.—Evans (1961); Jameson (1949); Kellogg (1932); Olson (1959); Raun (1971); Reddell (1967); Reddell and Knox (1962); Zweifel (1967).

Comment.—This secretive frog is a trogloxene inhabiting the entrance area of caves and in crevices along cliffs.

Syrrhophus marnocki Cope (cliff frog)

Records.—Cave of the Woods; Dirtwater Cave; ?Elmore Cave; Elm Springs Cave; Friesenhahn Cave; Helotes Blowhole; Virgin Cave.

Bibliography.—Jameson (1949); Reddell (1967); Reddell and Knox (1962); Veni (1978).

Comments.—This is the most abundant frog in Texas caves. It is frequently seen on ledges and among breakdown in entrance areas. About a dozen frogs probably belonging to this species were seen in Elmore Cave on 28 November 1982 by Scott J. Harden and Randy M. Waters.

Family Pelobatidae

Scaphiopus sp. (spadefoot toad)

Record.—Friesenhahn Cave.

Bibliography.—Graham (1976).

Comment.—This is probably an accidental.

Family Ranidae

Rana "pipiens" Schreber (leopard frog)

Record.—Friesenhahn Cave.

Bibliography.—Evans (1961); Graham (1976); Jameson (1949); Reddell (1967); Reddell and Knox (1962).

Comments.—Leopard frogs occaionsally inhabit the entrance area of caves, especially where streams emerge from the entrance. The identity of this material must await re-collection of specimens due to problems in delineating the limits of species within the genus *Rana.*

CLASS REPTILIA

Order Chelonia (turtles)

Undetermined material

Record.—Mattke Cave.

Bibliography.—Poole and Passmore (1978).

Comment.—This is a sight record of a "turtle."

Family Chelydridae

Chelydra serpentina Linnaeus (snapping turtle).

Record.—San Antonio Spring.

Bibliography.—Waters (1983b).

Comment.—This is a sight record of "snapping turtles."

Order Squamata

Suborder Serpentes (snakes)

Undetermined material

Records.—Creekbed Cave; Fair Hole; Fireworks Cave; Friesenhahn Cave; Han's Grotto.

Bibliography.—Evans (1961); Graham (1976); Harden (1970); Poole and Passmore (1978).

Comment.—These are sight records of "snakes."

Family Colubridae

Thamnophis marcianus marcianus (Baird and Girard) (checkered garter snake)

Record.—Wagner Ranch Fissure.

Comment.—This is an accidental.

Family Crotalidae

Ankistrodon contortrix (Linnaeus) (copperhead)

Records.—Friesenhahn Cave; Robber's Cave.

Bibliography.—Anonymous (1968); Reddell (1967); Reddell and Knox (1962).

Comment.—Copperheads are occasionally found in cave entrance areas.

Crotalus sp. (rattlesnakes)

Records.—Baling Wire Cave; Cave of the Half-Snake; Creekbed Cave; Hitzfelder's Bone Hole; Poison Ivy Pit; Rattlesnake Cave; Robber's Cave (BCRP #23); Schertz-Cibolo Cave; Stevens Ranch Cave No. 1; Underwater Cave; Wurzbach Bat Cave.

Bibliography.—Brandt (1973); Litsinger (1973); Reddell (1967); Reddell and Knox (1962).

Comments.—These are sight records of "rattlesnakes"; all or most are probably records of *Crotalus atrox*.

Crotalus atrox Baird and Girard (western diamondback rattlesnake)

Record.—Molar Hole.

Bibliography.—Waters (1981).

Comment.—This is the most common snake occurring in Texas caves, where it usually is found near the entrance.

Family Elapidae

Micrurus fulvius (Linnaeus) (eastern coral snake)

Records.—Bear Cave; Cave With Dead Coral Snake In It.

Comments.—A large coral snake was observed in the entrance room of Bear Cave in 1982. In May 1984 a recently dead coral snake was seen in Cave With Dead Coral Snake In It. The only other Texas record for coral snakes in caves is that of Scott J. Harden who observed one in Valdina Farms Sinkhole, Medina County, in August 1986.

Suborder Sauria (lizards)

Family Iguanidae

Anolis carolinensis Voigt (green anole)

Record.—Friesenhahn Cave.

Bibliography.—Graham (1976).

Comments.—This species was reported to be occasionally present in the cave. It is certainly an accidental.

Family Scincidae (skinks)

Undetermined genus and species

Record.—Ackerman's Trash Hole.

Comment.—This is a sight record of "skinks."

CLASS AVES

Order Falconiformes

Family Cathartidae

Coragyps atratus (Bechstein) (black vulture)

Record.—?Wagner Ranch Fissure.

Comment.—This is a sight record of "vultures."

CLASS MAMMALIA

Order Chiroptera (bats)

Undetermined material

Records.—Basement Cave; Bear Cave; Bet-Ya-Can't-Find-It Cave; Elm Springs Cave; Helotes Blowhole; Hills and Dales Pit; Lobo Cave; Madla's Cave; San Pedro Park Cave; Voight's Bat Cave; Wurzbach Bat Cave.

Bibliography.—Litsinger (1972); Poole and Passmore (1978); Reddell and Knox (1962); Waters (1983a); Winkler (1973c; 1973d).

Comment.—These are sight records of "bats."

Family Vespertilionidae

Myotis velifer incautus (Allen) (Mexican brown bat)

Records.—?Crane Bat Cave; Friesenhahn Cave; Government Canyon Bat Cave; Headquarters Cave.

Bibliography.—Evans (1961); Graham (1976); Jasek (1975a); Reddell (1967); Reddell and Knox (1962).

Comments.—This species is the most frequently encountered bat in Texas caves. The record for Crane Bat Cave needs verification.

Pipistrellus sp. (pipistrelles)

Record.—Gladsam's Cave.

Comment.—This is a sight record.

Order Rodentia (rodents)

Undetermined material

Records.—Cave of the Bearded Tree; Looserock Cave; Shavano Park Cave.

Bibliography.—Anonymous (1973b); Litsinger (1973); Reddell and Knox (1962); Waters (1981).

Comment.—These are sight records of "mice."

Family Cricetidae

Neotoma sp. (packrats)

Record.—Robber Baron Cave.

Bibliography.—Waters (1979).

Comments.—An unidentified packrat is a trogloxene in this cave, where it has frequently been seen in the entrance area. Its nest was well into total darkness in a humanly impassable passage connecting the Lighted Passage to the Male Passage.

Family Sciuridae

Cynomys ludovicianus (Ord) (black-tailed prairie dog)

Record.—?Bering Sink.

Bibliography.—Reddell and Knox (1962).

Comment.—This is a sight record of a "prairie dog."

Order Carnivora

Family Canidae

Canis sp. (wolf)

Records.—Lobo Cave; San Pedro Park Cave.

Bibliography.—Barnes (1910); Reddell and Knox (1962).

Comments.—Barnes (1910) reported "wolves" in these caves; the entire account may be mythical.

Canis familiaris Linnaeus (domestic dog)

Record.—San Pedro Park Spring (West).

Comment.—A bitch with newborn pups were observed in the entrance area of the cave.

Canis latrans Say (coyote)

Records.—Lobo Cave; San Pedro Park Cave.

Bibliography.—Barnes (1910); Reddell and Knox (1962).

Comments.—Barnes (1910) reported "coyotes" in these caves; his accounts are highly fanciful and may be entirely invented.

Family Procyonidae

Procyon lotor (Linnaeus) (raccoon)

Records.—Bet-Ya-Can't-Find-It Cave; Coon Crap Cave; Government Canyon Bat Cave; Lytle Ranch Pit.

Bibliography.—Reddell (1967); Reddell and Knox (1962).

Comment.—Raccoons frequently are found in caves where they seek food, water, and shelter.

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BEXAR COUNTY CAVE LOCATION MAP
NUMBERS KEYED TO INDEX
A
B
C
D
E
F
G
H
I
J
K
L
M
N
184
23
90
191,202,203
15
39,92,109
112-114
1,28,72,
100,106,
128,153,197
157
77
73,130,
158,159
50,103-105
179
120,124
165,178
2,13,45,52,
70,76,82,91
11
49
12
5,16,200
21,129
3,14,55,
60,94
164
95
145
146
8,88,89
6,40,102,126,
140-142
93
144
61,81,175,
181,182,189,
196,204,205
195,201
30,86
166
79
167
154
43
183
32,69,111,
186-188,199,208
18,20,24,80,
107,108,
137,192
133
131,193,198
185
10,46,
127,172
58,59
174
38,42,57
68
194
17
121,122
36
206,207
34,35,47,48,
65,99,101,139
67,177
4,9,22,110,
132,134,138
25,29
33
31
123
63,115-119
162
87
54
71
19
85
27
160
44,78
171
170
41,51,56,
155,169
83
53,74,75
190
96
37,64
168
66,97,98,173
26,62,176
84,125,135,136,
143,147-152,
156,161,163
180
SAN ANTONIO
KEY TO SUPPLEMENTARY SHEETS
KEY TO BASE SHEETS
BEXAR COUNTY
TEXAS
SCALE IN MILES
1977
1980 CENSUS FIGURES
HIGHWAYS REVISED TO JULY 1, 1986
NOTICE
BEXAR COUNTY TEXAS 15

52A

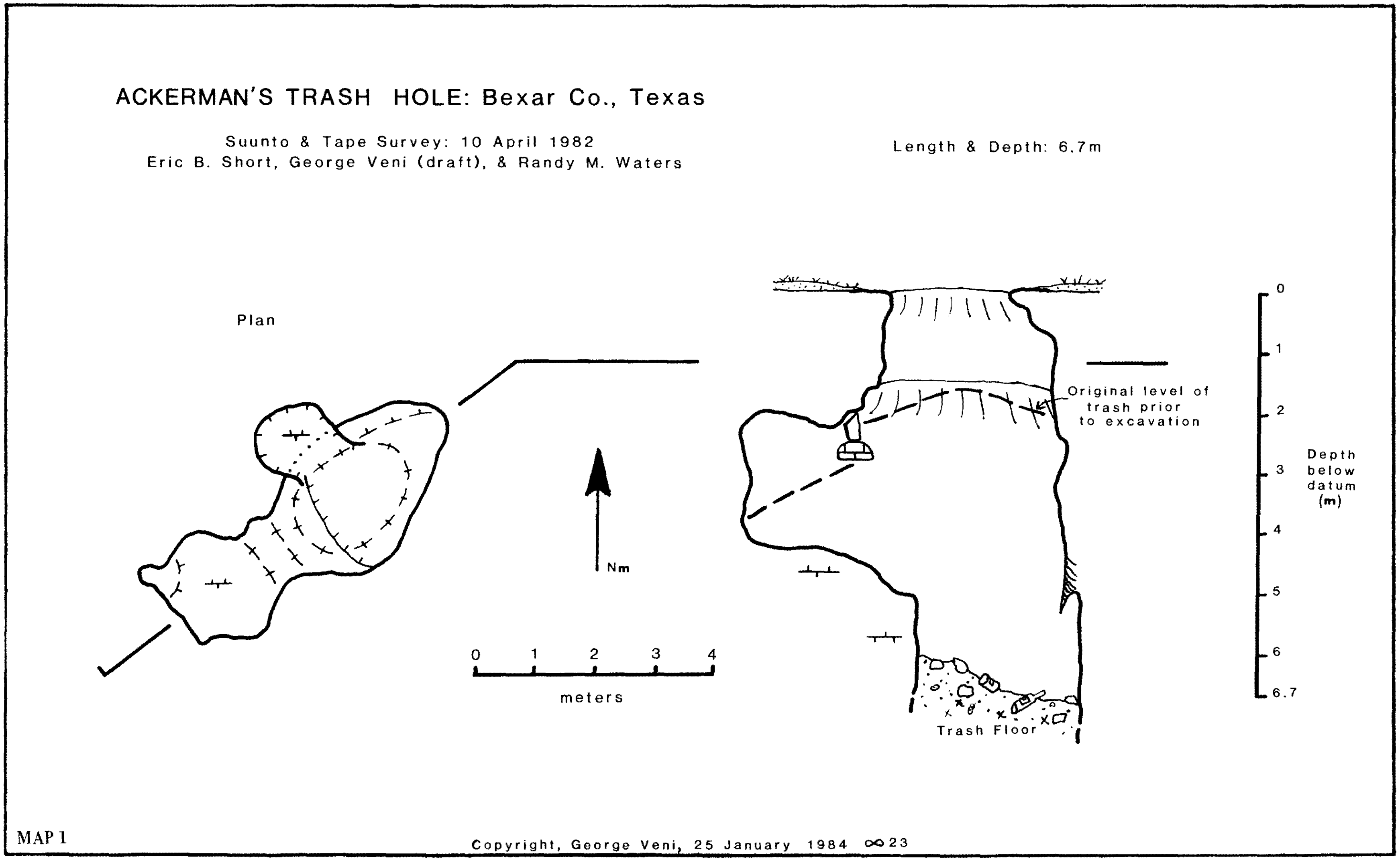
Descriptions of Caves

ACKERMAN'S TRASH HOLE (BCS #1)
Alternate name: Trash Hole
Location: Bulverde 7.5′
Description: The cave is a pit 1.6 m wide by 2.4 m long and almost 7 m deep. Four meters down, on the south end, is a small chamber 1 m wide, 2 m long, and 1.5 m high. The floor of the pit is solid trash fill. (See Map 1.)
History: According to the former owner, the cave served as the family trash dump for the past 100 years. Located 20 m from the old Bulverde Road, one of the main stagecoach trails into San Antonio, the cave may have served as a refuse site for even longer. In mid-1977 when the cave was first shown to members of the San Antonio Grotto it was a 2 m drop onto a trash heap. George Veni and Randy M. Waters led seven subsequent trips (between 9 September and 13 December 1978) to remove trash which filled 245 plastic garbage bags and two big cardboard boxes, plus 15 pounds of miscellaneous metal, an automobile battery, 13 pounds of assorted items, and enough broken glass to fill 29 gallon buckets. At a depth of 7 m, the trash dates to 1968. The pit was surveyed on 10 April 1982 by Eric Short, George Veni, and Randy Waters.
Biology: The cave has not been biologically investigated, but spiders, harvestmen (prob. *Leiobunum townsendii*), cave crickets (*Ceuthophilus* sp.), and skinks have been seen.
Geology: Located in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer, Ackerman's Trash Hole acts as a recharge pit in the Mud Creek flood plain. The cave now receives little water except when Mud Creek overflows its banks during periods of heavy rainfall.
Technique: The entire pit can be free climbed, but a 10 m wooden ladder was used during the excavation of the trash.
Bibliography: Anonymous (1978c:2; 1978h:1); Veni (1978a:5; 1985).

AIRPORT CAVE (BCS #85)
Location: Longhorn 7.5′
Description: Located in a creekbed, the cave was said to be very extensive. It is presently covered, its sinkhole entrance completely filled.
History: In the late 1960s or early 1970s Billy West was told by a friend about a major cave he had recently found. A few days later they returned to further explore it and discovered that nearby railroad construction had sealed the sinkhole entrance with dumped rocks and railroad ties. By 1977 the debris had been removed, but soil and rocks still filled the entrance. Chuck Pautz, George Veni, and Randy Waters attempted to dig the cave open but found it a hopeless task. In 1983 the creek bed was leveled by bulldozers, leaving no trace of the cave or sinkhole.
Geology: The cave was in the Austin Chalk.

ALZAFILLED CAVES NOS. 1 & 2 (BCS #204-205)
Location: Longhorn 7.5′
Description and History: Two caves of unknown extent were filled in 1984 during the construction of the new Alzafar Shrine Temple on Anderson Loop.
Geology: The caves were in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer.

ANOTHER PRAYER CAVE (BCS #118)
Location: Schertz 7.5′
Description: Although the cave measures 1 m high and 3.9 m wide at the entrance, within 4 m it narrows to 0.7 m high and 0.8 m wide. The cave continues 1 m to the left into a passage parallel to the first. This passage averages 0.5 m wide by 0.4 m high, extending 1.5 m towards the entrance and 2.4 m in the opposite direction. (See Map 2.)
History: Another Prayer Cave was discovered in December 1978 by George Veni. It was "another" of a series of small holes that, "with a prayer," would be long enough to be classified as a cave. It was surveyed on 23 July 1983 by Veni and Joe Ivy.


ACKERMAN'S TRASH HOLE: Bexar Co., Texas
Suunto & Tape Survey: 10 April 1982
Eric B. Short, George Veni (draft), & Randy M. Waters
Length & Depth: 6.7m
Plan
Nm
0 1 2 3 4
meters
Original level of trash prior to excavation
Trash Floor
0 1 2 3 4 5 6 6.7
Depth below datum (m)
Copyright, George Veni, 25 January 1984 ∞23

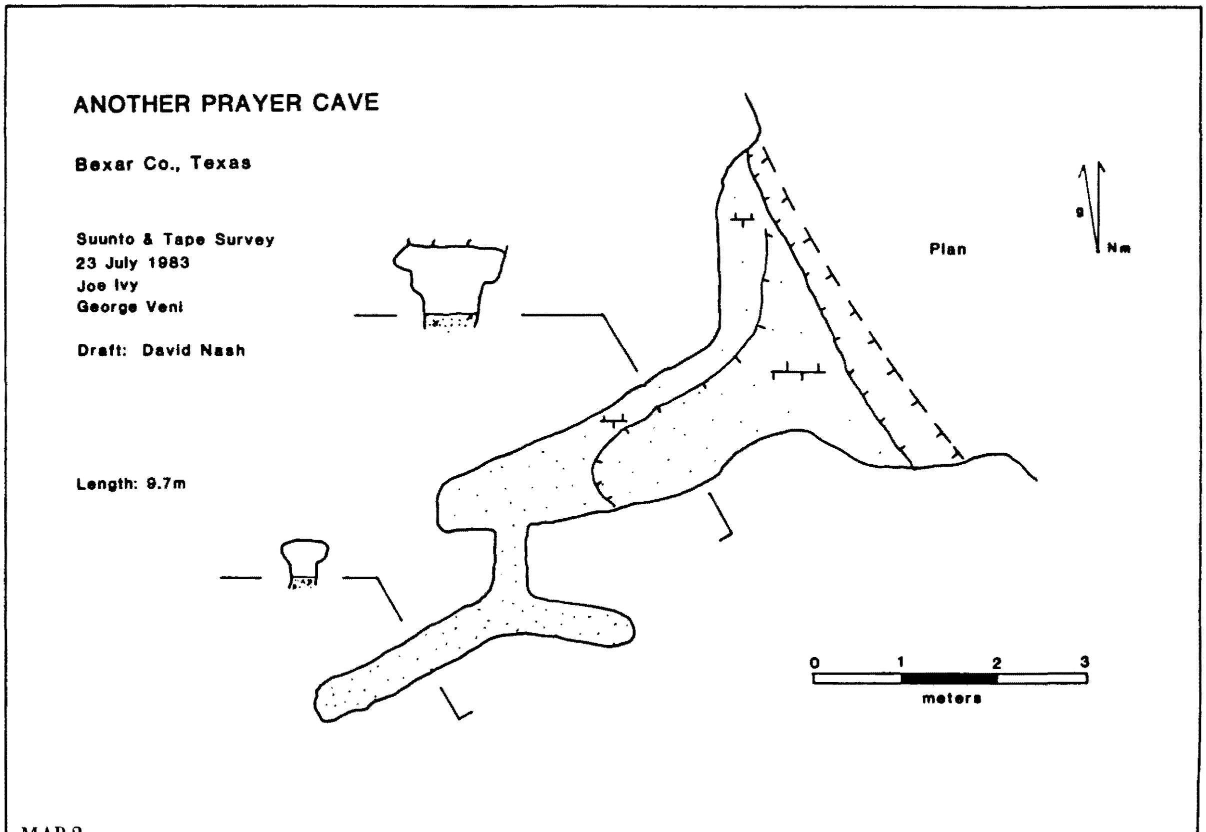
MAP 1

Biology: Spiders, harvestmen (prob. *Leiobunum townsendii*), cave crickets (*Ceuthophilus* sp.), moths, and mosquitoes were noted during the survey, but no collections were made.
Geology: Drainage down through the Pecan Gap Chalk, resurging at Cibolo Creek, formed Another Prayer Cave along two joints.
Bibliography: Anonymous (1979bb:1); Veni (1983: 98).

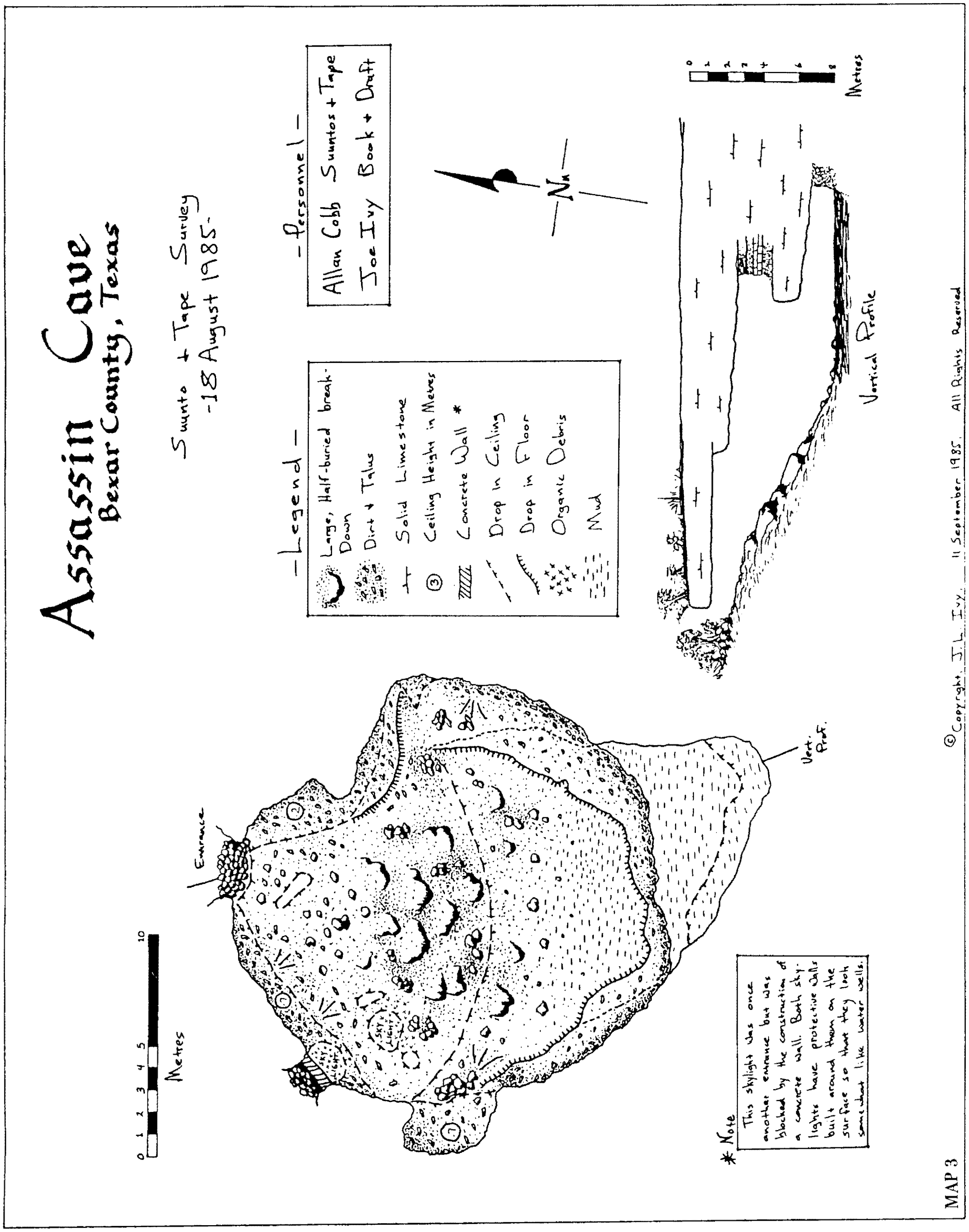
ANTI-PORCH CAVE (BCS #190)
Location: San Antonio East 7.5′
Description and History: In the fall of 1982 the back porch of a San Antonio residence was engulfed when a 1.5 m diameter, 5 to 7 m deep pit opened. The pit was not explored before it was filled.
Geology: The pit was formed in the Austin Chalk.

ASSASSIN CAVE (BCS #193)
Location: Longhorn 7.5′
Description: A 1 m high by 1 m wide collapse entrance slopes down to the south into an 18 m diameter room. Ceiling height of the room varies from 1.0 m to 5.5 m above the sloping floor. Two skylight entrances are in the northwest corner. Both are about one meter in diameter but the northernmost skylight is artificial and has a concrete wall built around it. The other skylight had a stone wall around it so that on the surface both skylights resemble dug water wells. (See Map 3.)
History: Rumor of the cave first reached members of the San Antonio Grotto in December 1979. It was in the spring of 1984 when the land was being cleared for subdivision that Duane Canny, Kurt Menking, and Randy M. Waters checked out the lead. The masonry around the skylights indicate the cave had been well known to a previous owner. The walls may have been built to prevent livestock injuries. The absence of graffiti indicates the cave was not popularly known. On 18 August 1985 the cave was surveyed by Allan Cobb and Joe Ivy. It was named for an assassin bug found inside. In late 1986 the cave was sealed by subdivision construction.
Biology: Collections made in the cave by Allan Cobb on 18 August and 7 September 1985 included the following material:

Snails—Undetermined material
Terrestrial isopods—Oniscoidea genus and species
Scorpions—Prob. *Vaejovis reddelli* (troglophile)
Spiders—*Cicurina varians* (troglophile)
Achaearanea porteri (troglophile)
Harvestmen—*Leiobunum townsendii* (trogloxene)



MAP 2



Assassin Cave
Bexar County, Texas
Suunto + Tape Survey
-18 August 1985-
- Legend -
Large, Half-buried break-Down
Dirt + Talus
Solid Limestone
Ceiling Height in Metres
Concrete Wall *
Drop in Ceiling
Drop in Floor
Organic Debris
Mud
- Personnel -
Allan Cobb Suuntos + Tape
Joe Ivy Book + Draft
N
Metres
Entrance
Vert. Prof.
Vertical Profile
Metres
* Note
This skylight was once another entrance but was blocked by the construction of a concrete wall. Both skylights have protective walls built around them on the surface so that they look somewhat like water wells.
©Copyright. J. L. Ivy. 11 September 1985. All Rights Reserved

MAP 3

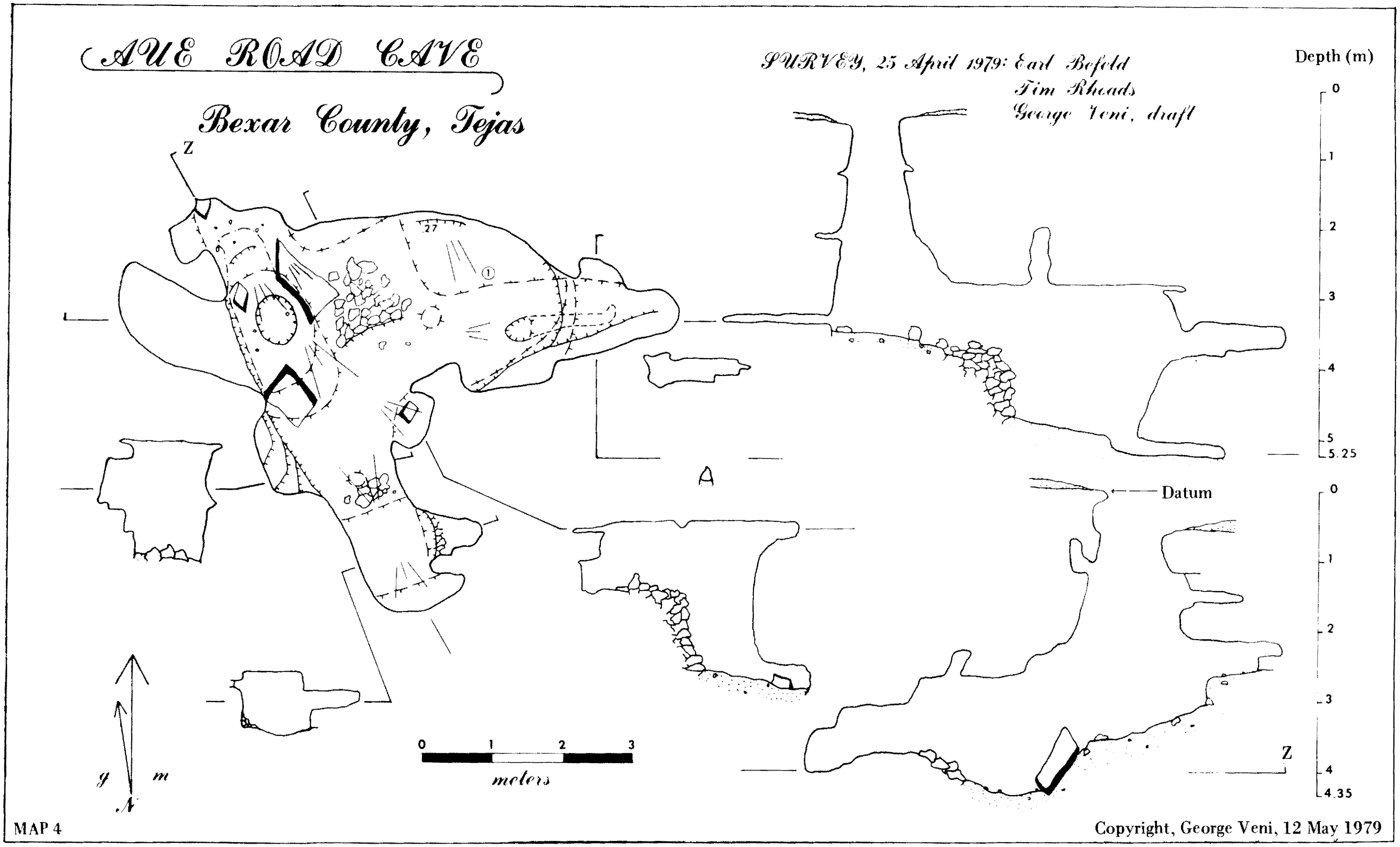
Centipedes–Lithobiomorpha undetermined
Springtails–Undetermined material
Cockroaches–Undetermined material
Assassin bugs–Reduviidae genus and species
Ground beetles–Carabidae genus and species
Rove beetles–*Belonuchus* sp.
Flies–Undetermined material

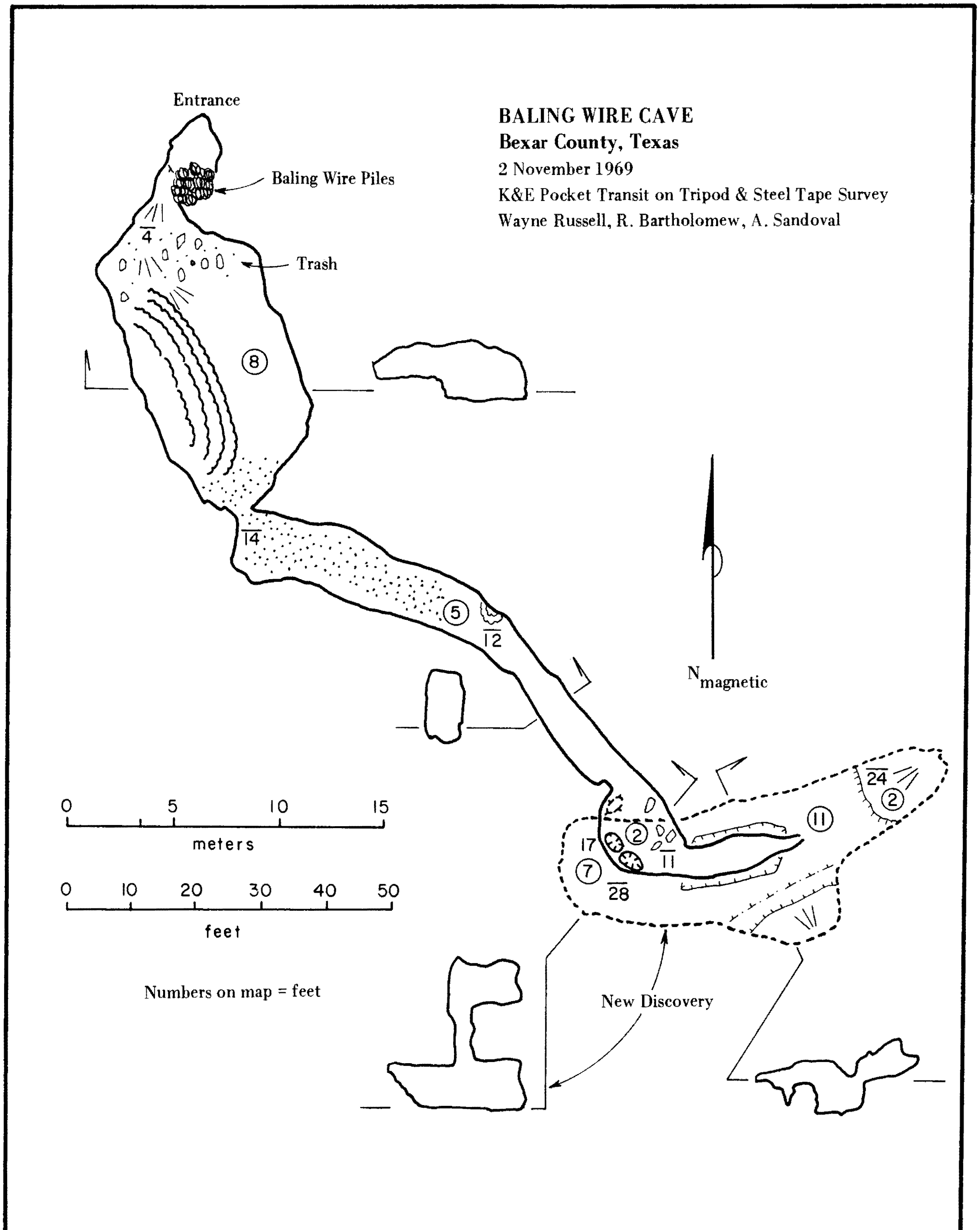
Geology: The cave is formed as a phreatic chamber in the Kirschberg Member of the Edwards Limestone in the Edwards (Balcones Fault Zone) Aquifer recharge zone. Substantial breakdown of the cave roof has occurred along beds of collapse breccias and highly altered "boxwork" units. These beds were not structurally competent to support the cave ceiling when the water table declined and buoyant support of the water was lost. The entrance is formed at the collapse apex where it was intersected by a small ravine. Vadose waters along that ravine formed the skylights.
Bibliography: Palit (1985b:87).

AUE ROAD CAVE (BCS #120)
Location: Camp Bullis 7.5′
Description: The 0.6 m diameter entrance drops 3.5 m into the curve of a small "C"-shaped room. The limbs of the "C" are 5 to 6 m long, 1 to 2 m wide, and 1 to 2 m high. (See Map 4.)
History: The cave was shown to Dottie Kern, Gary Poole, Chuck Stuehm, and Randy M. Waters on 12 January 1979 when the land was being cleared for development. On 25 April of that year the cave was surveyed by Earl Befeld, Tim Rhoads, and George Veni.
Biology: The survey team noted a spider, harvestmen (prob. *Leiobunum townsendii*), cave crickets (*Ceuthophilus* sp.), gnats, and mosquitoes.
Geology: Aue Road Cave is in the upper Glen Rose Formation.

BALING WIRE CAVE (BCS #2)
Alternate names: Classen Baling Wire Cave; Bailing Wire Cave
Location: Bulverde 7.5′
Description: The entrance to the cave is a shallow sink filled with baling wire to keep goats from falling into the opening. Once past the wire, one must scramble over a 5 m long trash pile to the main room. It is 6.5 m wide, 9 m long, 3 m high, and contains a number of nice formations. A tunnel, 0.8 m high, extends from the back of the room for 5 m before the ceiling height rises to 2 m. The passage continues 8 m to two small pits which drop 2 m into another room, the New Discovery. The main tunnel above ends 3 m past the pits. The New Discovery is 9 m long, 3 m wide, and 2 to 3.5 m high. The cave is generally dry and a little guano is present. Total length is roughly 37 m and depth is 9 m.
History: The cave has been known for many years, but its early history is not known. On 14 February 1965 six members of the Alamo Grotto (Luther Bundrant, Mike Bundrant, Bill Owens, Thad Howard, Dave Litsinger, and Dave Pearson) dug into the New Discovery. Surveying was done on 2 November 1969 by Roger V. Bartholomew, Wayne Russell, and Andy Sandoval. (See Map 5.)
Biology: The most memorable creatures of the cave are the rattlesnakes, which find the entrance a comfortable home. The presence of guano on the floor indicates a seasonal or occasional bat roost. The bats, however, were probably driven away from the cave when the entrance was closed by the dumping of baling wire and trash.
Geology: The cave is in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer.
Technique: Caution should be exercised on the trash pit to avoid being lacerated by sharp and rusty metal.
Bibliography: Anonymous (1965a:59; 1969f:115; 1973f:7-8; 1973q:11); Passmore (1977:19); Reddell and Knox (1962:3-4, 11); Reddell and Russell (1962a:5); Reddell and Smith (1966:3); Veni (1978a:5; 1985).

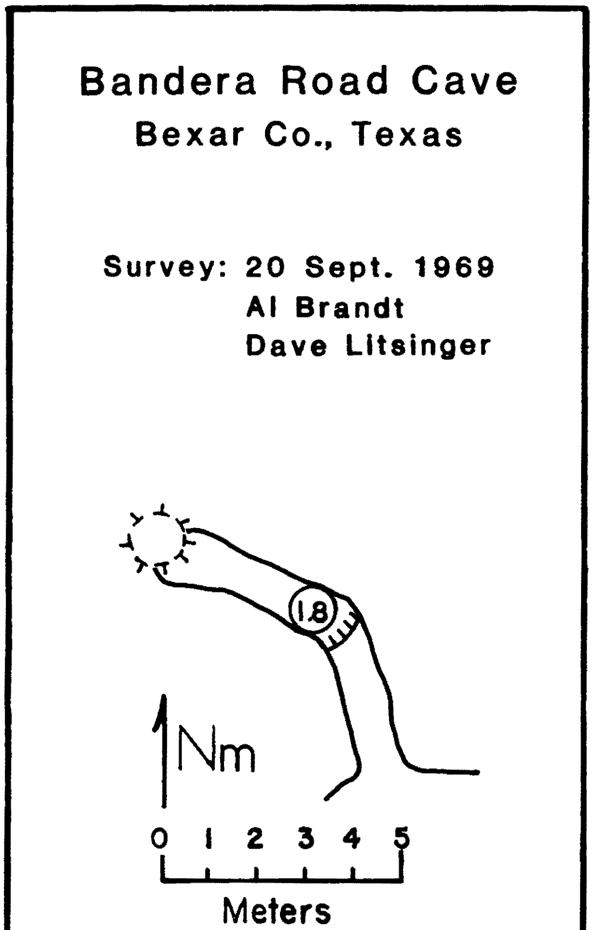
BANDERA ROAD CAVE (BCS #86)
Alternate name: Road Cut Cave
Location: San Geronimo 7.5′
Description: An 8 m long crawlway extended into a roadcut. About 3 m into the cave the passage turned left to the only standing room, a 1.8 m high dome. (See Map 6.)
History: First reported as Bandera Road Cave by the Texas Speleological Survey in 1962, it was visited later that year by James Jasek and Gus Peters. Thinking it was a new find, they named it Road Cut Cave. On 20 September 1969, the cave was mapped by Al Brandt and Dave Litsinger. In 1979 Bandera Road was widened and the cave was destroyed.
Biology: Harvestmen (prob. *Leiobunum townsendii*), cave crickets (*Ceuthophilus* sp.), gnats, and mosquitoes were observed.
Geology: The cave was in the upper Glen Rose Formation.
Bibliography: Anonymous (1973q:11, 12); Litsinger (1973a:17; 1973b:10); Reddell (1961b:1); Reddell and Knox (1962:3-4, 7); Reddell and Russell (1962a:5); Reddell and Smith (1966:2); Veni (1983:98).


AUE ROAD CAVE
Bexar County, Tejas
SURVEY, 25 April 1979: Earl Befeld
Tim Rheads
George Veni, draft
Depth (m)
0
1
2
3
4
5
5.25
Datum
0
1
2
3
4
4.35
Z
Z
27
A
0 1 2 3
meters
y
m
N
MAP 4
Copyright, George Veni, 12 May 1979


BALING WIRE CAVE
Bexar County, Texas
2 November 1969
K&E Pocket Transit on Tripod & Steel Tape Survey
Wayne Russell, R. Bartholomew, A. Sandoval
Entrance
Baling Wire Piles
Trash
4
8
14
5
12
N magnetic
11
24
2
17
2
11
7
28
0 5 10 15
meters
0 10 20 30 40 50
feet
Numbers on map = feet
New Discovery
WRE

MAP 5

BASEMENT CAVE (BCS #3)
Alternate names: Babcock Road Cave; Helotes Cave
Location: Van Raub 7.5′
Description: A short entrance drop of 2.7 m leads into the northeast corner of a roughly square room 13 m long by 9 m wide and 1.3 m high. West of the entrance, on the room's north wall, is a crawl which goes north for 4 m before turning east for 2 m. Here at the cave's deepest point (-3.4 m) the mud floor abruptly rises and makes further progress impossible without digging. This crawl acts as a water drain for the cave. (See Maps 7–8.)
History: The cave, which has been known to the people of the Helotes area for many years, was first reported in Bulletin 10 of the National Speleological Society as Helotes Cave. The early 1950s saw members of the St. Mary's University Speleological Society visit the cave. They found the entrance filled with trash and rocks. Apparently the fill was only enough to block the way into the room because it was reported as a 2 m deep hole. The St. Mary's group renamed it Basement Cave. On 12 September 1969 it was surveyed by Henry Kuehlem, David Litsinger, and Wayne Russell, who called it Babcock Road Cave. In the mid-1970s the cave became known to the San Antonio Grotto. It was resurveyed on 23 October 1977 by Gary A. Poole and George Veni, who knew of it as Basement Cave and so it remains.



MAP 6 Numbers on map = feet

Biology: The St. Mary's group noted scorpions (prob. *Vaejovis reddelli*), spiders, and cave crickets (*Ceuthophilus* sp.) in the cave. More recently, it was also observed to be a home to harvestmen (prob. *Leiobunum townsendii*), centipedes, and an occasional bat.
Geology: The cave is in the upper Glen Rose Formation. Most of the weathered stalactites are aligned along a WSW-trending joint. The floor is composed of highly organic soil with some small breakdown. In March 1979 Teeni Kern and Greg Passmore collected soil samples from the cave for analysis. Their results (Passmore, 1979:14) were:

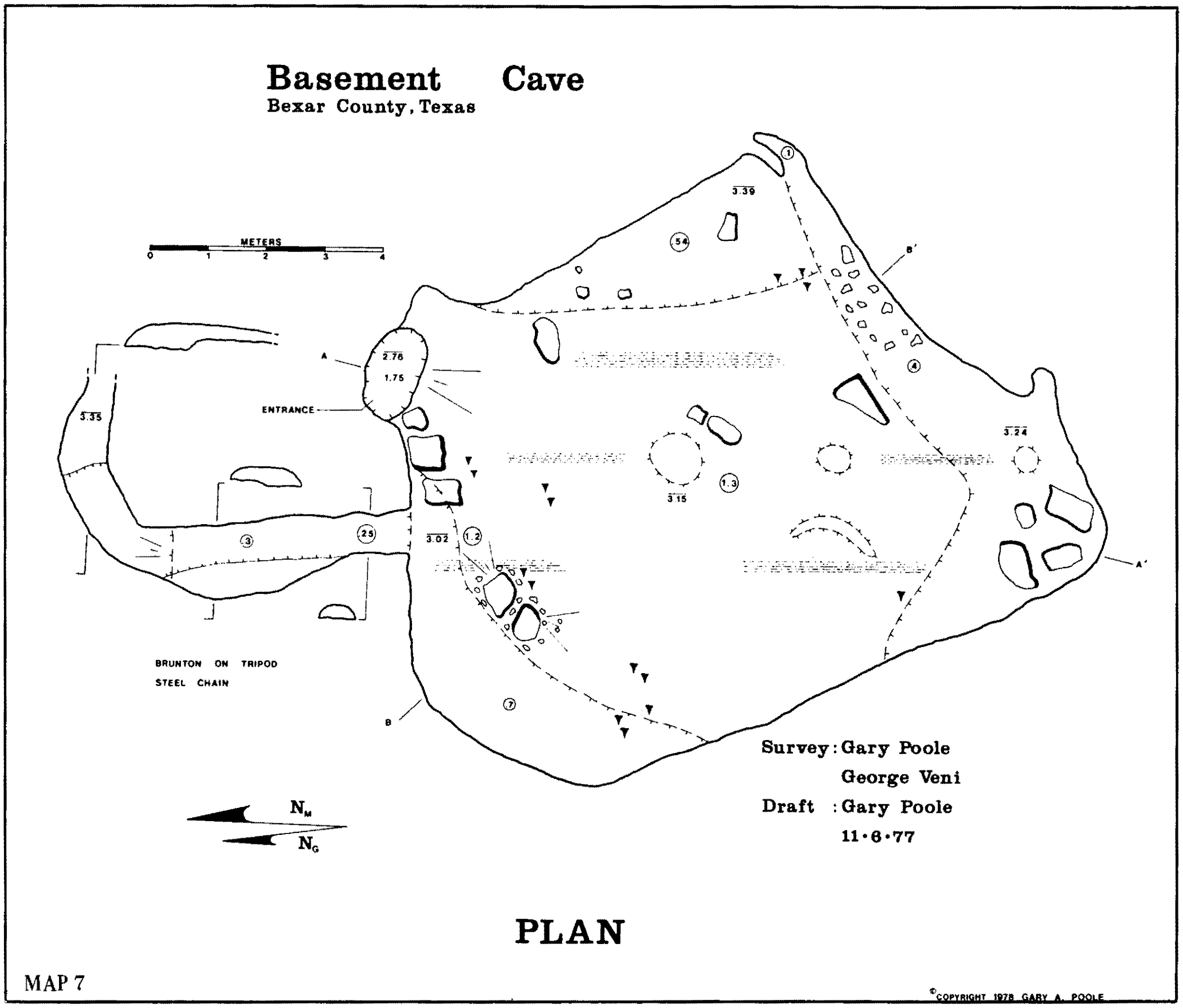
Constituents	Amount
Al_2O_3%	8.43
Fe_2O_3%	3.61
CaO%	10.10
MgO%	0.732
TiO_2%	0.429
MnO%	0.0945
Na_2O%	0.184
K_2O%	0.927
P_2O_5%	0.42
SiO_2%	54.60
Ni ppm	28.00
Cu ppm	23.50
Zn ppm	107.00
Cr ppm	43.60
Co ppm	5*
Cd ppm	10*
Ag ppm	0.5*
Sr ppm	52.20
V ppm	72.40
Be ppm	1.30
Ba ppm	220.00
Pb ppm	40.00
Zr ppm	100.00
Mo ppm	20.00
Th ppm	14.00
LOI %	15.90

*indicates less than

Passmore does not discuss the method of analysis and refrains from interpreting the results until more data are gathered.
Bibliography: Anonymous (1973q:11; 1979k:3); Litsinger (1973a:15; 1973b:10); Palit (1984b:27); Passmore (1979:14); Poole and Passmore (1978:8, 13-15, 52); Reddell and Knox (1962:3-4, 7, 22); Reddell

and Russell (1962a:5); Reddell and Smith (1966:2-3); Veni (1978a:5); White (1948:47, map); Widener (1959:80).

BEAR CAVE (BCS #5)
Alternate names: Bexar Cave; Big Bexar Cave; Big Bear Cave
Location: Bulverde 7.5′
Description: Bear Cave originally had two vertical entrances, the larger of which was 4 m in diameter and 7 m deep. Three meters to the northwest was the smaller entrance, a 2.6 m free climb. Following the filling and subsequent reopening of the cave entrance, the rock span separating the two entrance pits was destroyed creating one large pit. Both drops entered an irregular room measuring about 25 m long and 10 m wide. This room is now littered with boulders and gravel. Exiting from the southern part of this room is a low-ceilinged decorated area known as the Baby Bottle Branch. The main room, however, extends northward through a cluster of large, highly weathered columns before reaching the 6 m drop into the Bat Room. This room is 11 m in diameter, 8 m high, and has a guano-covered breakdown floor that contains a small maze of passages. These breakdown crawls lead to some solutionally developed passages which continue unexplored but require enlargement. The north side of the Bat Room narrows and drops 8 m. Opposite this drop, on the far north wall near the ceiling, the cave continues down a 45-degree slope of a 2 m long by 0.5 m diameter tube. The tube ends at the top of a 4 m dome. From the base of the dome, Bear Cave continues another 30 m northward via a 2 m high passage lined with cave coral. (See Map 9; Photos. 1-2.)
History: Known for many years, the cave was named after some bones found in it that are believed to be from a bear. The whereabouts of the bones or information as to identification and dating are not known. On 1 August 1965 the cave was surveyed by R. Cuzzi, James Jasek, R. Szalwinski, and R. Summar. On 11 February 1973 Virginia Bias, Bob Burdic, Bob

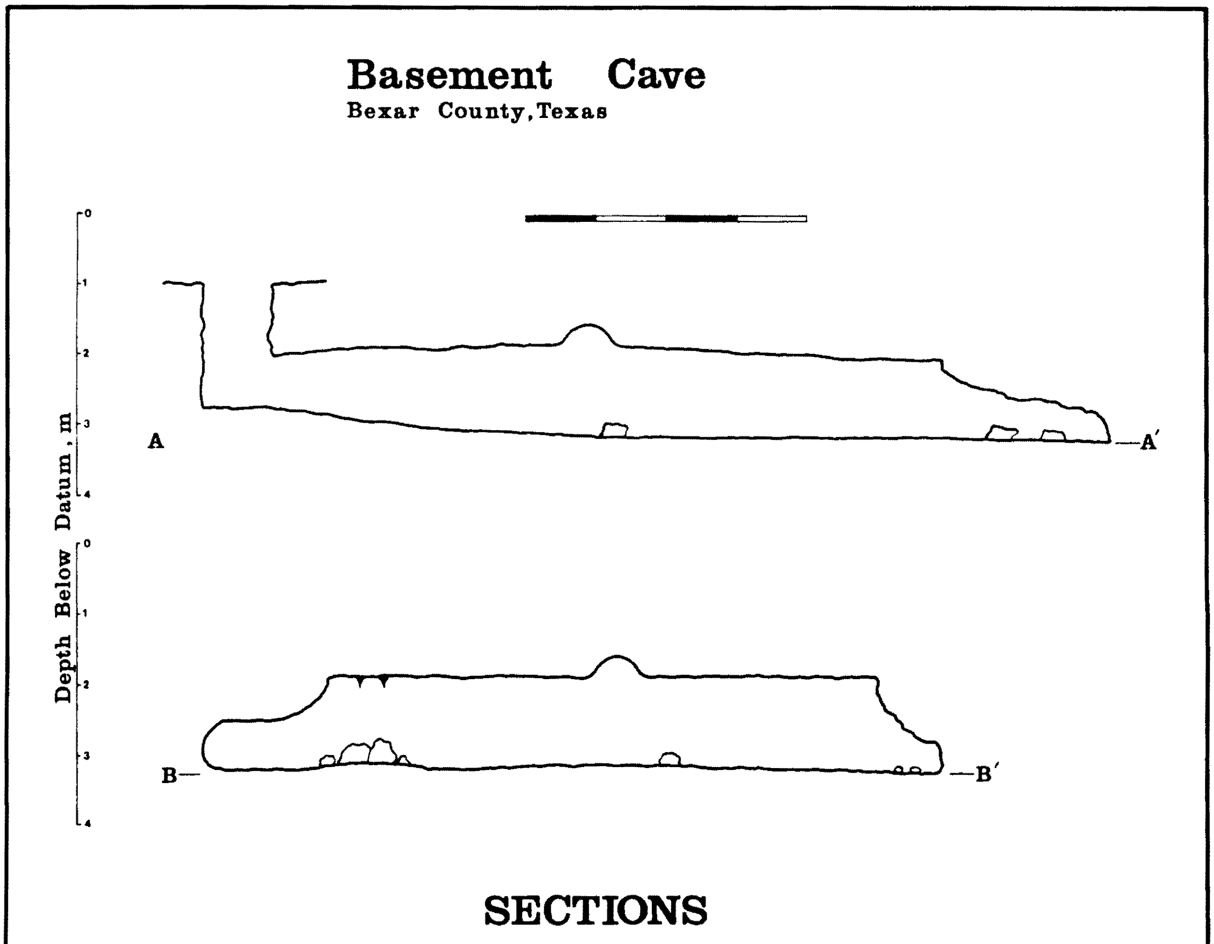


MAP 7

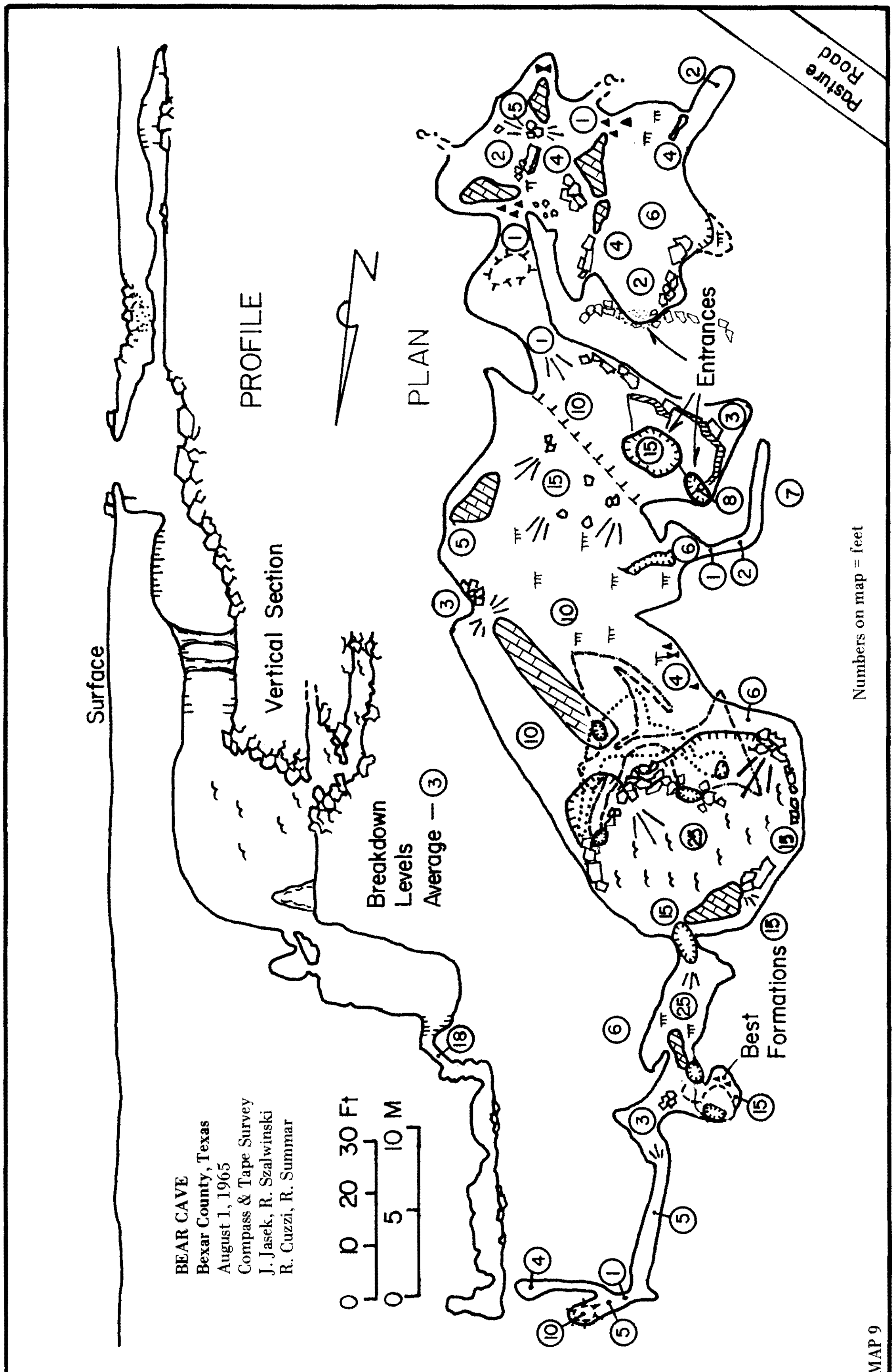
Meyer, Greg Passmore, Kelly Price, and Phil Winkler dug into the formation room at the south end of the cave. They thought it to be a new discovery and named it the Baby Bottle Branch. This entrance was sealed, however, at the owner's request. In the spring of 1973 the San Antonio River Authority completed construction of an aquifer recharge dam on Mud Creek, 60 m downstream from the cave. Bear Cave was to serve as a major recharge point into the Edwards Aquifer. Winkler reports that on 16 June 1973 the cave flooded, draining most of the water behind the dam, and became a bubbling, frothing, utterly disgusting cauldron of water, mud, and guano. The flood washed the cave clean, and some new, minor passages in the breakdown had been opened. Bear Cave was often used for vertical and rescue training. On 22 September 1984 an overweight individual became stuck in the smaller pit entrance, necessitating a minor rescue. As a result, the developers of the expanding Stone Oak Subdivision became concerned about liability and filled the cave entrances with large boulders, sand, and gravel. The entrances were graded over so well that no sign of them remained. In the spring of 1985 floodwaters washed open the filled entrances. As of December 1985, construction workers for the housing development state they must refill the entrance at the request of the Texas Water Commission.

Biology: The fauna of Bear Cave included a typical representation of troglophiles in a cave containing a large bat population. Bats were roosting in the cave when it was sealed. Since the cave has reopened, bats have again taken roost inside. Collections have been made in the cave on 3 July 1968 by James Reddell and A. Richard Smith, and on 15 June 1985 by Randy M. Waters. In 1982 a large eastern coral snake, *Micrurus fulvius*, was observed in the entrance room. The following is a fauna list for the cave:

Snails—*Helicodiscus eigenmanni* (troglophile)
Spiders—*Cicurina varians* (troglophile)
Neoleptoneta sp. (troglophile)



MAP 8


BEAR CAVE
Bexar County, Texas
August 1, 1965
Compass & Tape Survey
J. Jasek, R. Szalwinski
R. Cuzzi, R. Summar
0 10 20 30 Ft
0 5 10 M
Surface
Vertical Section
PROFILE
PLAN
Breakdown Levels Average — 3
Best Formations 15
Entrances
Pasture Road
Numbers on map = feet
MAP 9

Meioneta sp. (troglophile)
Achaearanea porteri (troglophile)
Harvestmen–Prob. *Leiobunum townsendii* (trogloxene)
Mites–Undetermined material
Millipedes–*Abacion texense* (accidental)
Springtails–*Pseudosinella violenta* (troglophile)
Cave crickets–*Ceuthophilus* sp. (trogloxene)
Ground beetles–Carabidae genus and species
Water scavanger beetles–Hydrophilidae genus and species
Darkling beetles–*Zopherus haldemanni* (trogloxene)
Flies–*Leptometopa* n.sp. nr. *latipes* (troglophile)
Trichobius major (bat ectoparasite)
Snakes–*Micrurus fulvius* (eastern coral snake) (accidental)
Bats–Undetermined material

Geology: Bear Cave developed as a phreatic chamber which was intersected by Mud Creek and converted to a significant site of point recharge for the Edwards (Balcones Fault Zone) Aquifer. Water first entered the cave through the Baby Bottle Entrance and possibly by another sink, later eradicated by the main entrance collapse. Bear Cave's dam-modified drainage basin encompassed 21 sq kms. Sealing of the cave will effectively eliminate its recharge capacity and greatly diminish the utility of the nearby recharge dam.

Technique: The entire cave can be free climbed, but the entrance pit is often rigged for short rappels and ladder climbs for training purposes. For this, a 20 m rope is needed. Caution is needed due to loose rocks and gravel that surround the pit, a result of the attempt to fill it. A handline is helpful at the 8 m drop, north of the Bat Room, and in crawling up and out of the steeply sloping crawlway beyond it.

Bibliography: Anonymous (1976b:34; 1978i:2; 1979r:3; 1979v:3; 1979y:6; 1980a:74); Kastning (1974:126); Litsinger (1973a:16); Orozco (1974c: 32-33; 1974d:19-20); Palit (1984a:14; 1985b:87; 1986:16); Passmore (1977:7); Poole (1978a:2); Veni (1978a:5; 1984a:3; 1985); Winkler (1973e:2; 1973g:248).

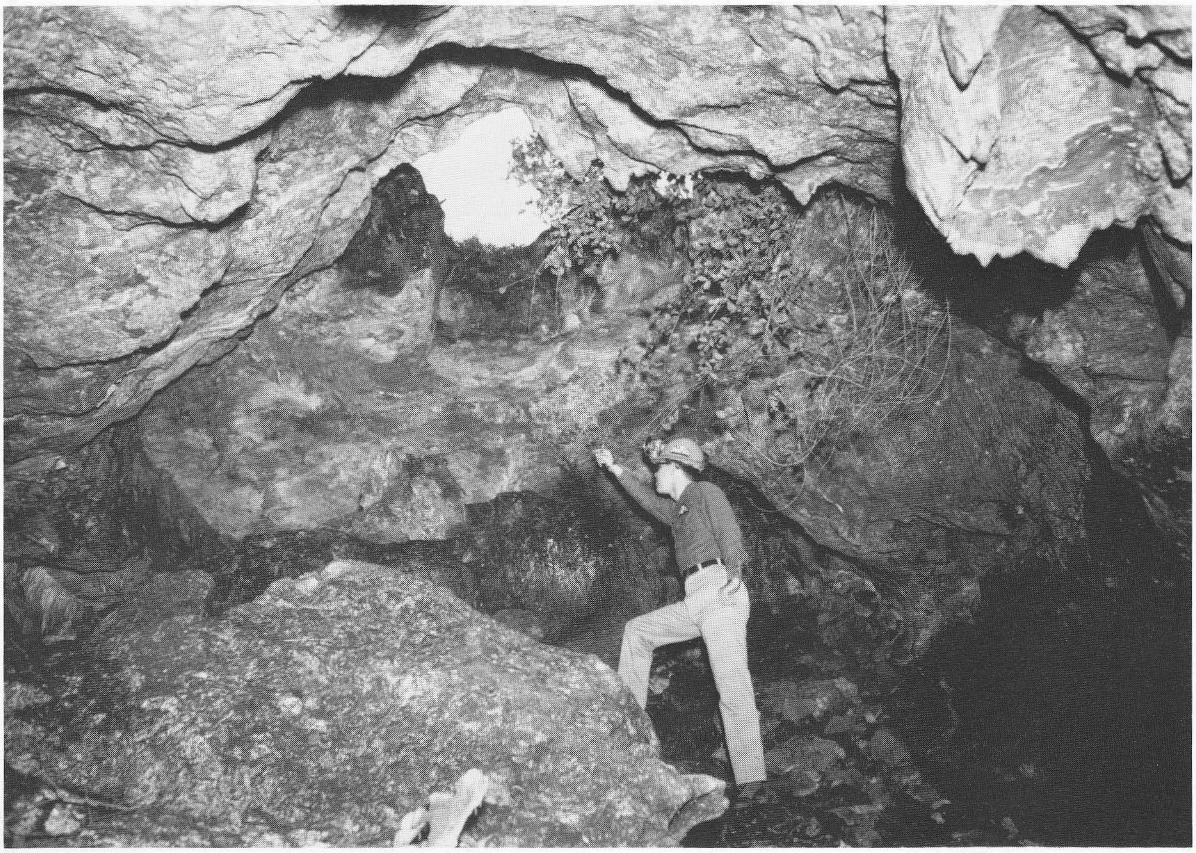


Photo 1.–Wayne Russell in entrance of Bear Cave, 1969 (Roger V. Bartholomew).

BERING SINK (BCS #87)
Alternate name: Beiring Cave
Location: Helotes 7.5′
Description: A hole 0.6 m in diameter drops 6.3 m into a room 2.6 m by 4 m by 0.5 to 4.5 m high. An adjoining room to the south is slightly smaller in plan view and has a 0.5 m high ceiling. The cave floor is flat and dirt covered. (See Map 10.)
History: The cave was first reported in the late 1950s by Bob Hudson of the St. Mary's University Speleological Society. On 28 March 1970 it was surveyed by Al and Sheila Brandt, David Litsinger, and Robert Penaloza.
Biology: What was probably the black-tailed prairie dog, *Cynomys ludovicianus*, was observed in the cave.
Geology: The cave is in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer.
Paleontology: The St. Mary's group found a dead prairie dog in the cave. If there is sufficient fill, more and older bones might be found.
Technique: A rope or ladder is needed to enter the cave.
Bibliography: Anonymous (1970:78; 1973q:11); Litsinger (1973a:17); Passmore (1977:5); Reddell (1961b:1); Reddell and Knox (1962:3-4, 7); Reddell and Russell (1962a:5); Reddell and Smith (1966:2, 3); Veni (1985); Widener (1959:79).

BET-YA-CAN'T-FIND-IT CAVE (BCS #4)
Alternate names: Betcha-Can't-Find-It Cave; Stapelton Ranch Cave No. 2
Location: Castle Hills 7.5′
Description: A 15,000+ square meter area drains via a small creek into the small sinkhole entrance. The entrance opens into the first room which is 12 m long by 8 m wide and up to 1.4 m high. Three pits in the floor drop 1.8 m to a second room directly under the first and with similar dimensions. The ceiling height varies from 1 to 3 m above the "funneled" floor which slopes down to the entrance of a 2.6 m long crawlway. At the end of the crawl is a 5.2 m drop into a room 6 by 4 by 7 m high. In its south end are a series of short drops totaling 7.4 m deep. The third room opens to the north into the low but wide Bellyscratcher Room, which measures 15 m long, 9.5 m wide, and 0.5 m high. A passage and a pit are located at the far side of the room. The unsurveyed meter-high passage extends 12 m north from the pit and ends in breakdown. The pit is 1.8 m deep and is followed by two more drops. The first is 4.7 m deep,

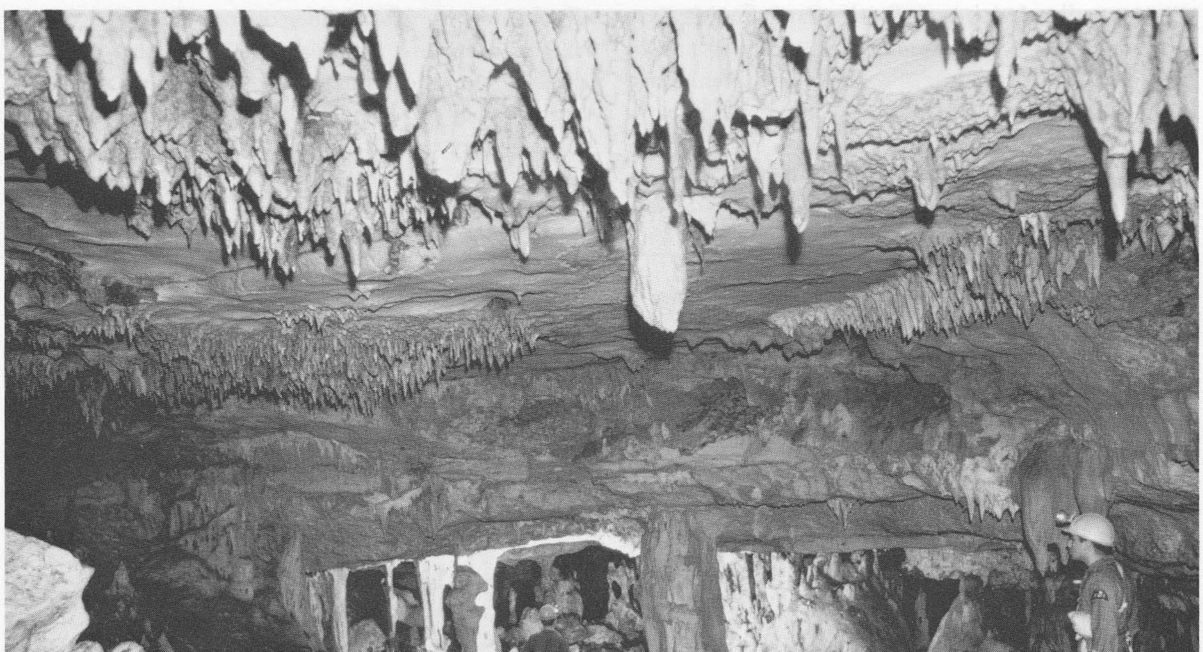


Photo 2.—Roger Bartholomew and Wayne Russell in entrance room of Bear Cave, 1969 (Wayne Russell).

1.8 m in diameter, and has a 0.1 m thick chert ledge that spans its width. A 6 m long by 3 m wide room is at the base of the 5.1 m deep second drop. Two impassably small passages extend into the floor of the room, the deepest known area of the cave. Five meters up the north wall is another unsurveyed passage which goes west for 3 m, south for 4 m, southwest for 5 m, then continues 0.2 m high at least 10 more meters but is impassably low. It probably connects to an impassable crawl at the base of the 7.4 m deep series of short drops off the third room. (See Map 11; Photo. 3.)

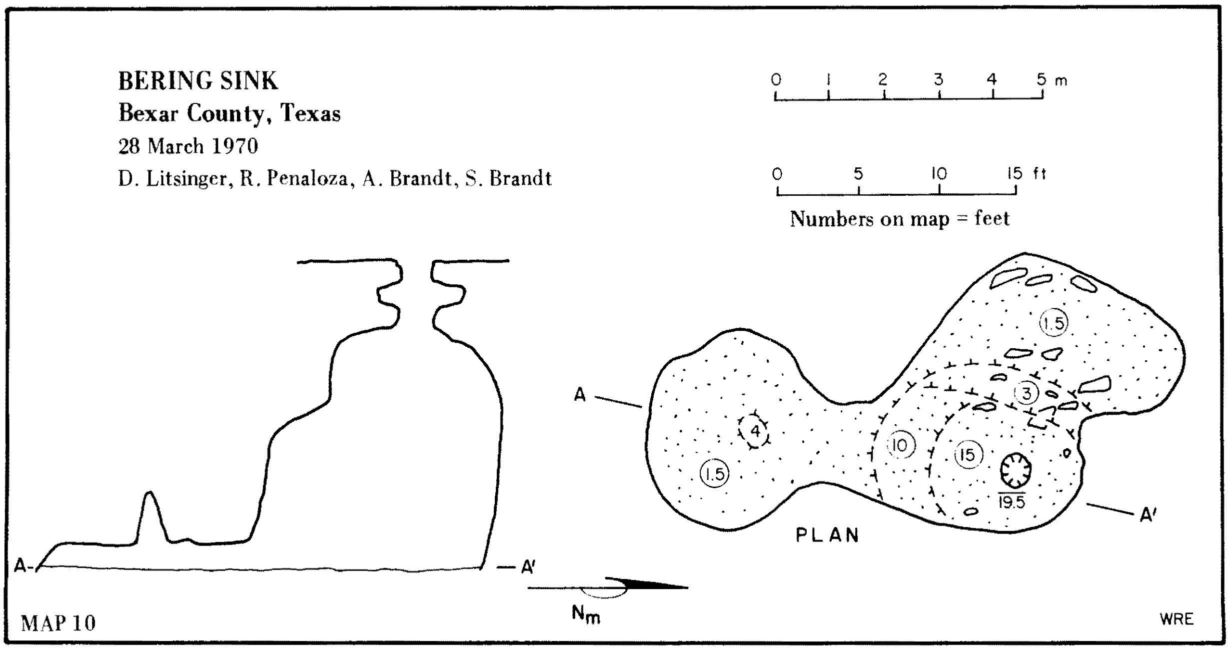
History: On 18 January 1959 Orion Knox and other members of the Alamo Grotto made the first known exploration of what they called Stapelton Ranch Cave No. 2. The low fractured ceiling of the Belly-scratcher Room appeared unstable and dangerous so they did not explore beyond it. Later, the owner blasted the entrance shut, but this did not deter some unknown explorers because by 1974 the entrance had been dug open. While lost in the cedars of north Bexar County, Jim Clark, Tom Illiffe, Doug Maitland, and Greg Passmore accidentally rediscovered the cave on 3 November 1974. They named it in acknowledgment of its hard to find location. By 1979 a housing development was built to within a few minutes walk of the cave. Bet-Ya-Can't-Find-It Cave was surveyed on 6 November 1979, and 5 and 26 June 1980, by Greg Fritz, Scott Harden, Teeni Kern, Linda Palit, Gary Poole, George Veni, and Randy M. Waters.

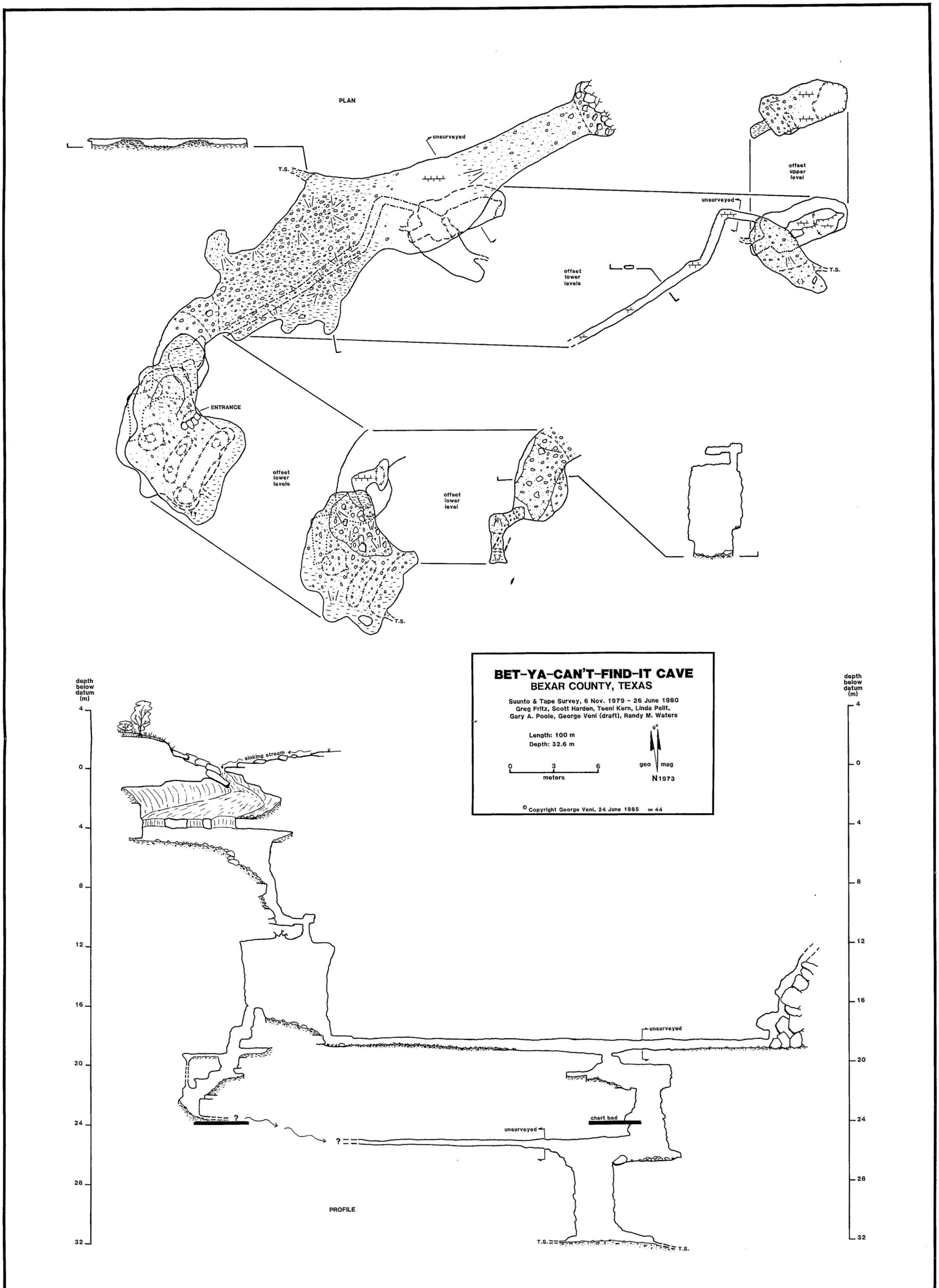
Biology: The cave has not been biologically investigated, but the following groups have been observed: harvestmen (prob. *Leiobunum townsendii*), silverfish, cave crickets (*Ceuthophilus* sp.), beetles, gnats, mosquitoes, and an occasional raccoon and bat in the entrance room.

Geology: The cave is a significant point recharge site for the Edwards (Balcones Fault Zone) Aquifer. Its drainage basin reaches to within a few meters of an encroaching housing development, but urban channelization during 1985 diverted substantial street runoff to the cave. The size of the urban drainage area added to the cave's natural 15,000 sq.m. drainage basin has not been determined. The urban storm water channel is next to a sewage lift station. Failures or spills from the station could prove highly detrimental to the aquifer. Bet-Ya-Can't-Find-It Cave is a swallet primarily developed by vadose water to recharge the aquifer, is one of the deepest caves in Bexar County, and extends to within a few tens of meters of the local water table.

Meteorology: Although air flow has often been detected in the cave, it is still notorious for high CO_2 in its lower levels (beyond the first two entrance rooms). Sometimes flood debris plugs the crawlway at the base of the second room and restricts air circulation.

Technique: A cable ladder or rope is needed for the 5.2 m drop into the third room. A belay is recommended for the drops beyond the fourth room. Be wary of bad air and do not enter the cave if there is a possibility that it will rain. The crawl to the 5.2 m drop may fill with rocks and flood debris, and can




PLAN
unsurveyed
T.S.
offset upper level
unsurveyed
offset lower levels
T.S.
ENTRANCE
offset lower levels
offset lower level
T.S.
BET-YA-CAN'T-FIND-IT CAVE
BEXAR COUNTY, TEXAS
Suunto & Tape Survey, 6 Nov. 1979 - 26 June 1980
Greg Fritz, Scott Harden, Teeni Kern, Linda Palit,
Gary A. Poole, George Veni (draft), Randy M. Waters
Length: 100 m
Depth: 32.6 m
0 3 6
meters
9°
geo mag
N1973
© Copyright George Veni, 24 June 1985 ∞ 44
depth below datum (m)
4
0
4
8
12
16
20
24
28
32
sinking stream
unsurveyed
chert bed
unsurveyed
PROFILE
T.S.
T.S.

MAP 11

take a considerable effort to dig open.

Bibliography: Anonymous (1973q:12; 1978k:2; 1979c:2; 1980a:74); Passmore (1975d:44; 1977:6, 45); Poole (1979a:2); Reddell and Knox (1962:3-4, 33-34); Reddell and Russell (1962a:6); Reddell and Smith (1966:4); Veni (1978a:5; 1983:97, 99; 1985).

BIG BEXAR CAVE (BCS #6)

Alternate name: Big Bear Cave

Location: Van Raub 7.5′

Description: Of the three entrances to the cave one is impassable, another was dug open but resealed, and the third is a climb-down shaft 3.4 m deep, 0.8 m in diameter, and located in the upper northeast corner of the cave's main room. Roughly 30 m in diameter and 8 m high, this room contains some of the more massive columns and stalagmites in Bexar County. Unfortunately, some vandalism has occurred. A crawlway in the breakdown in the west corner leads to a 6 m drop into the terminal room, 10 m long, 5 m wide, and 3.3 m high. It slopes to a second drop, where the cave ends at a depth of 27.4 m. (See Map 12; Cover photo.)

History: Although graffiti in the cave dates back to 1926, the cave was forgotten with the passage of time. In the spring of 1969 the owner mentioned to Richard Clement that he had found a hole on his property. Richard returned on 2 June 1969 with John Allison and explored the main room. A trip by Bruce and Rick Allison, Charlie Burns, Buster Huntsman, and David Litsinger led to the discovery of the breakdown crawl and the lower room. The cave was mapped in October 1969 as a joint effort of the Alamo and San Antonio Grottos; the mappers were Roger Bartholomew, Karen and Richard Clement, James Myers, and Wayne Russell. The cave was named Big Bexar because it was believed to be the largest room in Bexar County. This honor, however, belongs to Government Canyon Bat Cave.

Photo. 3.—Stream swallet. Greg Fritz at entrance to Bet-Ya-Can't-Find-It Cave (George Veni).

Biology: Harvestmen (prob. *Leiobunum townsendii*), millipedes, salamanders (prob. *Plethodon glutinosus albagula*), and frogs were noted in October 1969.

Geology: The main room of the cave is formed in the Edwards Limestone. Parallel north-south joints have slightly elongated the roughly circular room. The lower room was formed along a joint with an east-west trend in the upper Glen Rose Formation. The upper and lower rooms developed as separate phreatic chambers. When the hydrologic conditions changed to vadose, the two rooms were connected and the lower was modified. Heavy silting of the lower room also occurred at this time, as did some collapse in the upper room.

Technique: An 8.5 m rope is needed for the drop into the lower room.

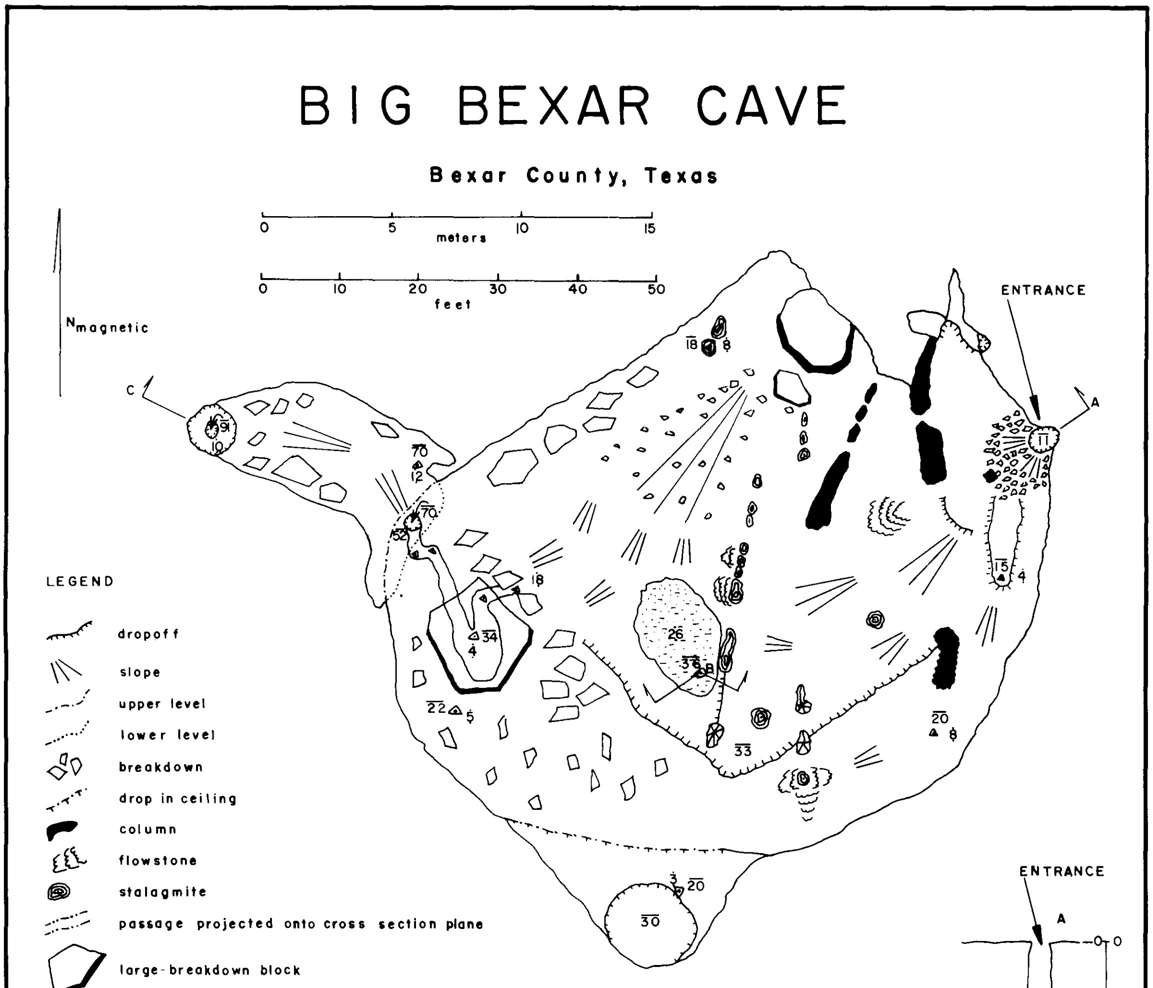
Bibliography: Anonymous (1969g:110; 1970:78; 1974:21-22; 1976a:27); Austin (1977:12); Bartholomew and Clement (1970:164-165); Clement (1973:102-103); Fieseler (1978b:30); O'Neill (1973a:154); Orozco (1971:76); Passmore (1977:8); Smith (1973a:188; 1973b:7); Veni (1978a:5; 1978f:6); Winkler (1973c:9-11, map; 1973d:123-124).

BLACK CAT CAVE (BCS #7)

Alternate name: Bulverde Coon Crap Cave

Location: Bulverde 7.5′

Description: A small collapse sink slopes down into a room 4 m long, 3 m wide, and 0.8 m high. Three of the walls are obscured by breakdown and almost hidden in the southeast corner is an 8 m long crawl which leads into the main cave. The largest room, Ballroom For A Short Fred Astaire, is irregularly shaped and roughly 8 m in diameter; the ceiling height averages about 1 m. The center of the room is nearly filled with formations. A narrow slot in the southeast wall goes to a 2.5 m drop leading into a passage 10 m long. The west wall of the Ballroom connects to the Bulverde Road Room. Where these rooms join, there is a small 8 m long passage which



BIG BEXAR CAVE
Bexar County, Texas
meters
feet
N magnetic
ENTRANCE
LEGEND
dropoff
slope
upper level
lower level
breakdown
drop in ceiling
column
flowstone
stalagmite
passage projected onto cross section plane
large-breakdown block
mud
large stalactite
stalactites
survey station
depth
ceiling height
VERTICAL CROSS SECTION
depth
feet
SURVEY : OCTOBER 1969
Wayne Russell
Richard & Karen Clement
Roger Bartholomew
James Myers
INSTRUMENT : K&E Pocket Transit on Tripod
Steel Tape
PLOT : Wayne Russell
R. Bartholomew
DRAFT : R. Bartholomew
COMPUTER DATA ANALYSIS : Roger Sorrells
AMDG

MAP 12

shows evidence of enlargement by flood waters. The Bulverde Road Room is somewhat oval in plan, measuring 9 m long by 4 m wide, and 2 m high. Bulverde Road runs over this room; road traffic may be responsible for some pressure breaks in the ceiling and for recent-appearing breakdown. A small hole in the west wall drops 1.4 m into a fourth room, which has extensively decorated west and north walls. At the north end of the fourth room is a small formation-filled area, Buffalo Gal's Lament. Through the formations on the fourth room's west wall and past the only standing water in the cave, the passage opens into Trout Fishing in America Shorty Hallway. It has an irregular cross-section and is the only walking-size passage in the cave. Near its end, the ceiling drops to within a meter of the floor, and, except for its flowstone choke, this 33 m long passage is devoid of formations. (See Map 13.)

History: Bulverde Coon Crap Cave, as it was originally called, was discovered on 23 October 1970 by St. Mary's University Speleological Society members Jeff Dravis, Robert Johnson, Preston Knodell, Galen A. Mueller, and Dan Titerie. Their report mentioned having to enlarge the entrance to gain access into the cave. Unfortunately, their report didn't circulate far among cavers so the cave remained generally unknown. In the summer of 1976, Randy Waters noticed a small sink near Bulverde Road, but it was not until June 1977 that Randy returned with Gary Poole for a very pleasant surprise. The cave was not virgin, for string and trash were testimony of earlier exploration. They found the cave was also known to some explorers from St. Mary's University Speleological Society. Their date of exploration was not known. The graffiti did not include dates. On 3 and 10 December 1977 the cave was surveyed by Gary Poole, Will Schwartz, and George Veni. Unaware of the St. Mary's group's earlier naming of the cave, they renamed and mapped it as Black Cat.

Biology: Harvestmen and cave crickets inhabit the twilight zone. Millipedes are occasionally seen, while scorpions have always been noted on the walls and ceiling of the dome of the Ballroom's west wall where it turns to the Bulverde Road Room. The speleothem area at the east end of Trout Fishing Hallway is home to many thysanurans. A small pool in the cave contained a large species of epigean ostracod. Copepods in the same pool were not collected. Collections were made in the cave on 28 November 1982 by Scott Harden and Randy Waters, and on 2 December 1984 by Scott Harden and Joe Ivy. The following is a list of fauna collected from the cave:

Earthworms–Undetermined material
Snails–*Helicina orbiculata* (accidental)
Helicodiscus eigenmanni (troglophile)
Polygyra texasiana (accidental)
Ostracods–Undetermined material
Isopods–Oniscoidea genus and species
Trichoniscidae genus and species 1 (troglobite)
Scorpions–*Vaejovis reddelli* (troglophile)
Spiders–*Cicurina* sp. (troglophile)
Meioneta sp. (troglophile)
Harvestmen–Prob. *Leiobunum townsendii* (trogloxene)
Hoplobunus madlae (troglobite)
House centipedes–Scutigeromorpha undetermined
Millipedes–*Cambala speobia* (troglobite)
Eurymerodesmus sp. (accidental)
Insects–Undetermined larvae
Springtails–Undetermined material
Silverfish–*Texoreddellia texensis* (troglobite)
Cave crickets–*Ceuthophilus (C.) secretus* (trogloxene)
Ceuthophilus (Geottetix) cunicularis (trogloxene)
Assassin bugs–Reduvidiidae genus and species
Rove beetles–*Belonuchus* sp. (troglophile)

Geology: The cave entrance does not act as a large surface drain. Even though the water channel out of the Ballroom For A Short Fred Astaire indicates some flow, there is no evidence that the cave ever floods. Chert nodules, averaging 0.4 m in diameter, have fallen from the ceiling of the Ballroom. On the floor chert nodules are encased in a matrix of clay, soil, and limestone fragments. Trout Fishing Hallway is phreatically developed along a strong east-west joint in a bed of white limestone not found elsewhere in the cave. Black Cat Cave is formed in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer.

Bibliography: Anonymous (1979g:3; 1979aa5); Poole (1978b:4); Poole and Passmore (1978:13-15, 49); Veni (1978a:5; 1978e:4; 1985).

BLACK WIDOW PIT (BCS #97)

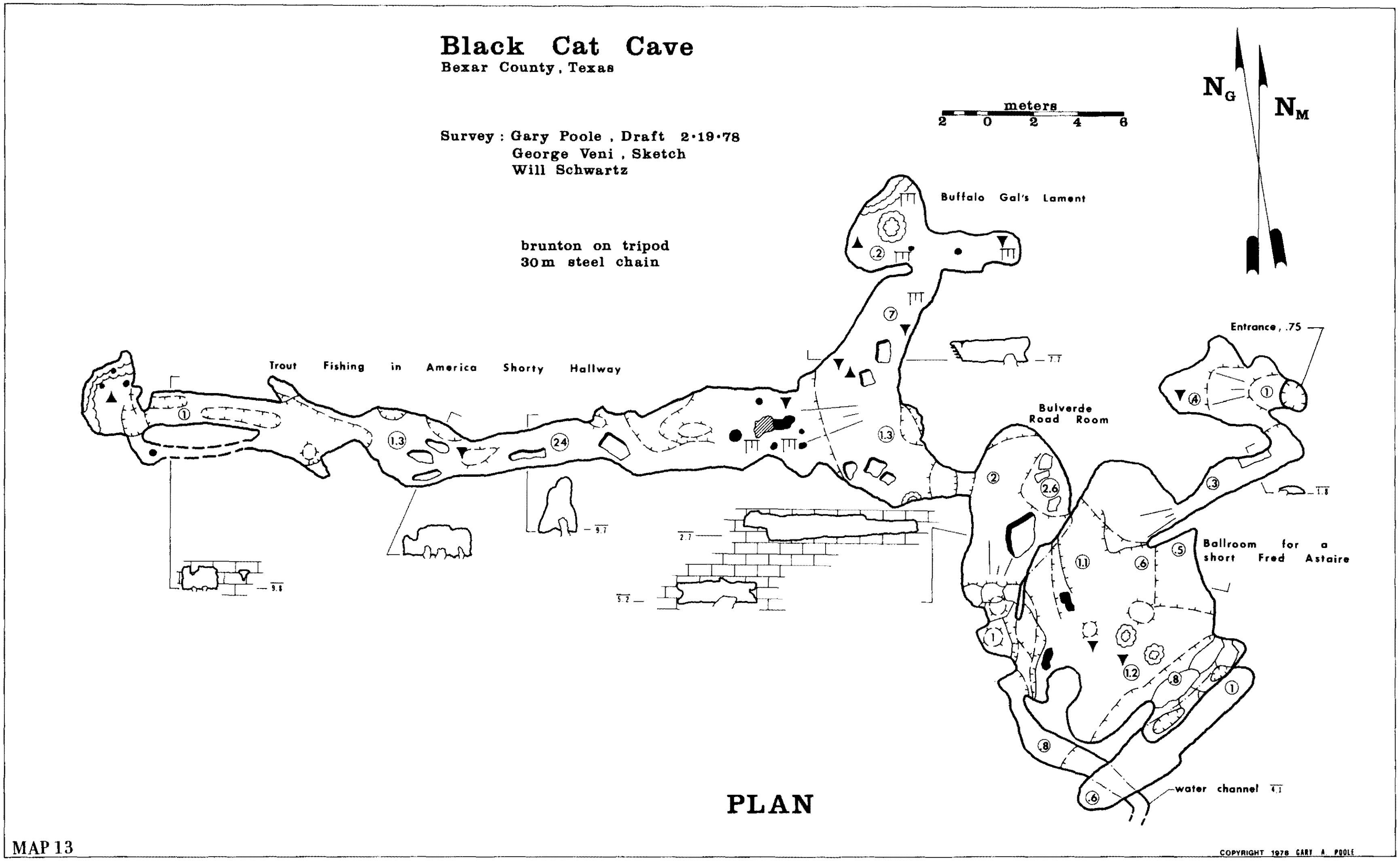
Location: Culebra Hill 7.5'

Description: A 0.3 m diameter hole drops 6 m, opening to 1 m wide and 2 m long. In the west corner of the floor is an impassably narrow slot into another pit about 5 m deep. (See Map 14.)

History: The cave was explored and surveyed on 5 August 1978 by Gary Poole, George Veni, and Randy M. Waters.

Biology: The only life form noted, and vividly remembered, is the cave's namesake, a black widow spider (*Latrodectus* sp.).

Geology: Black Widow Pit is primarily developed by


Black Cat Cave
Bexar County, Texas
Survey: Gary Poole, Draft 2·19·78
George Veni, Sketch
Will Schwartz
brunton on tripod
30m steel chain
meters
2 0 2 4 6
N_G
N_M
Buffalo Gal's Lament
Trout Fishing in America Shorty Hallway
Entrance, .75
Bulverde Road Room
Ballroom for a short Fred Astaire
water channel
PLAN
MAP 13

vadose water in the Austin Chalk.

Technique: A cable ladder is helpful. Explosives would dislodge a large limestone flake presently blocking entry into the second pit.

Bibliography: Anonymous (1978a:4; 1978e:1).

BLUE HOLE NO. 1 (BCS #8)

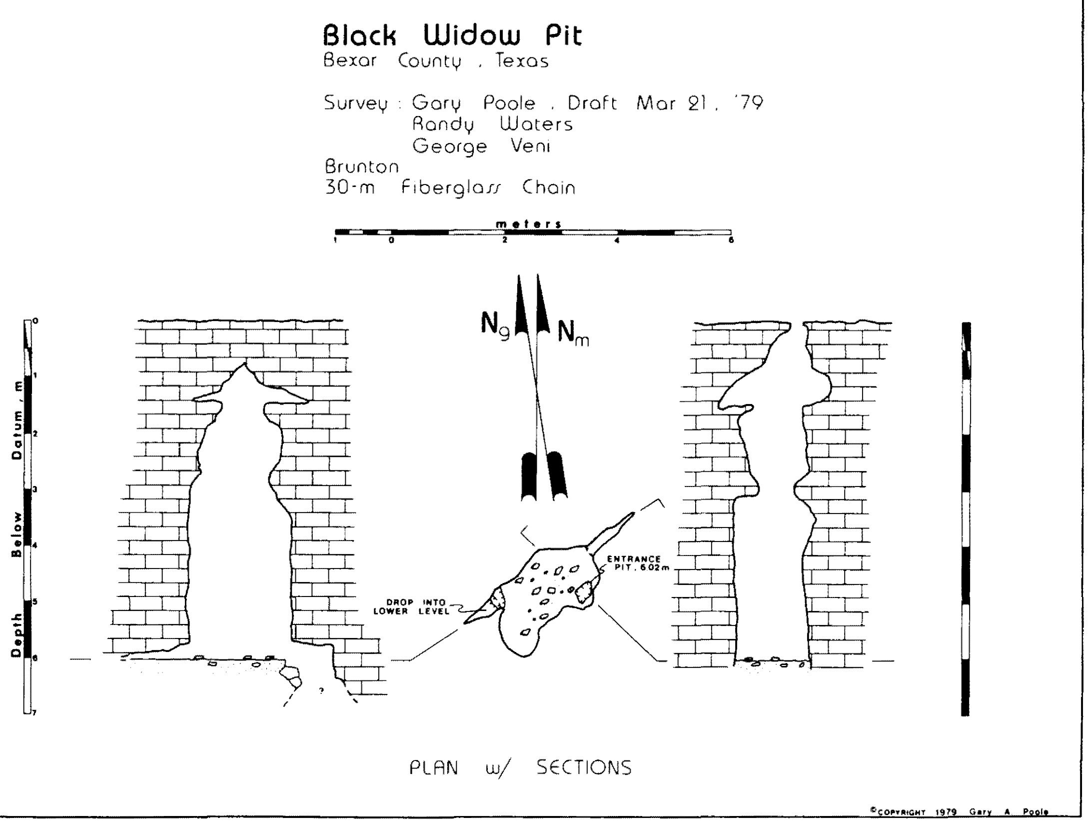
Alternate names: Blue Hole No. 2; Crow's Salamander Cave; Aue Cave

Location: Van Raub 7.5′

Description: Opening on a steep hillside, the main entrance is a hole 2.6 m wide by 3 m high. The entrance passage is 12 m long, 2.6 m wide, and about 3 m high. Five meters into this passage a natural bridge passes over a 2 m deep pit which contains two short breakdown-choked leads. The entrance passage ends abruptly with flowstone on the east wall, a crawlway in the west wall, and a 1.6 m blind pit between them. The crawlway is 0.7 m high and goes 4 m to a pit 1.3 m deep, then continues 2 m to end in a small room 2 m in diameter with a little flowstone. Just north of the natural bridge in the entrance passage are two crawlways on the east wall. The northbound crawl is 0.5 m high and continues 13 m to a second, smaller entrance. The southbound crawlway, 0.5 m high and 0.7 m wide, extends 2.2 m to an impassable 1.4 m long passage to the right, which connects with the entrance passage south of the natural bridge. The southbound crawl continues 25 m to a 1.4 m deep pit which drops through a layer of red clay. At the bottom are two short leads, both choked with breakdown. From the south lead, a current of fresh air was observed by Ross Felton and Wayne Russell in 1967, but this has not been mentioned in any other reports. (See Map 15; Photo. 4.)

History: The earliest references to the cave date from the late 1950s and are reported by Orion Knox. He related that the 25 m crawl extended only 5 m. Stories of buried Federal gold at that time resulted in some digging which probably opened up the crawl. Like many caves, Blue Hole No. 1 has often been visited by local youths. On 1 April 1967 it was surveyed by Ross Felton and Wayne Russell. On 5 October 1969 the cave was resurveyed by Ron Bridgemon, Bob Burney, and Robert Henry. The 1969 survey referred to it as Crow's Salamander Cave. Reddell and Knox (1962) add more confusion to the cave's name, calling it Blue Hole No. 2. It has also been referred to as one of the Aue Caves.

Biology: During the 1967 survey, scorpions (prob. *Vaejovis reddelli*), spiders, cave crickets (*Ceutho-*



MAP 14

philus sp.), flies, and mosquitoes were seen. During the summer, mosquitoes are abundant in the main chamber. The 1969 survey observed numerous harvestmen (prob. *Leiobunum townsendii*), black salamanders (prob. *Plethodon glutinosus albagula*), and signs of bats.

Geology: Blue Hole No. 1 was developed in the basal section of the Edwards Limestone by converging groundwater flow paths draining the overlying hill to the top of the Glen Rose Formation and then into Helotes Creek.

Meteorology: As previously noted, a strong outflow of fresh air from the breakdown pit in the back of the cave was observed in 1967.

Bibliography: Anonymous (1973q:11); Litsinger (1973a:17); Palit (1984b:28); Passmore (1977:10); Reddell (1961b:1); Reddell and Knox (1962:3-4, 8); Reddell and Russell (1962a:5); Reddell and Smith (1966:2); Widener (1959:79).

BLUE HOLE NO. 2 (BCS #88)

Alternate names: Blue Hole Cave No. 1; Crow's Nest

Location: Van Raub 7.5′

Description: A walk-in entrance opens into an 8 m by 5 m room with a 3.4 m high ceiling. In the southeast corner is a 4 m deep pit. A passage extends 4 m off the room to the east and ends in a 6 m deep pit. Both pits are manmade. (See Map 16.)

History: The cave was first reported in the late 1950s by Orion Knox and was surveyed on 1 April 1967 by Ross Felton and Wayne Russell. Sometime between discovery and survey a local furor over rumors of buried gold in this cave and Blue Hole No. 1 accounted for the manmade pits. The cave was resurveyed by Ron Bridgemon and Robert Henry on 5 October 1969.

Geology: The cave is in the Edwards Limestone.

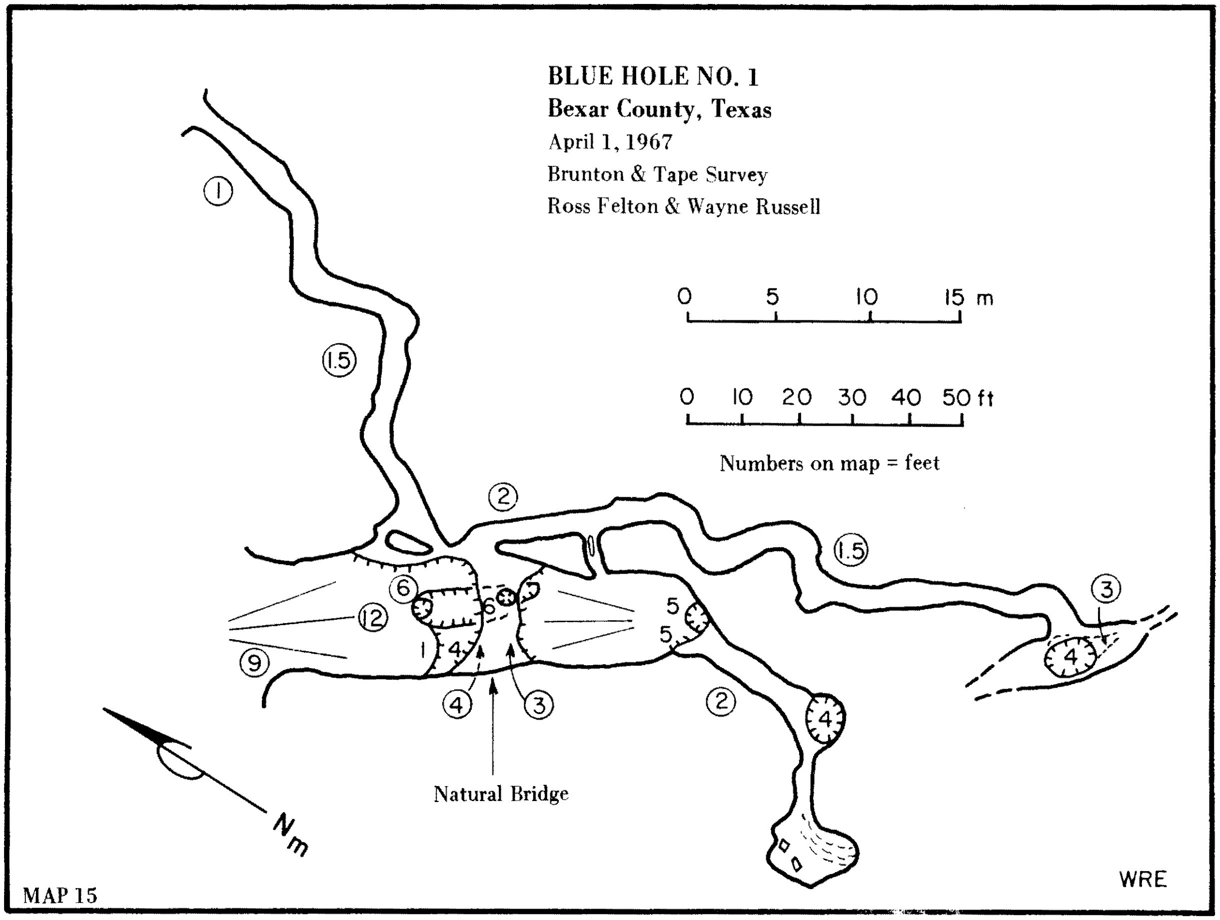
Technique: Caution should be exercised as the pits are unstable and dangerous.

Bibliography: Anonymous (1973q:11); Litsinger (1973a:17); Palit (1984b:28); Passmore (1977:9); Reddell (1961b:1); Reddell and Knox (1962:3-4, 7); Reddell and Russell (1962a:5); Reddell and Smith (1966:2); Veni (1978a:5); Widener (1959:79).

BLUE HOLE NO. 3 (BCS #89)

Alternate name: 30 ft Well

Location: Van Rauh 7.5′



MAP 15

Description: This cave is simply an oval-shaped pit, 10.7 m deep, 1 m wide, and 2 m long, with a removable cover over the entrance. (See Map 16.)
History: First explored by Butch Jubela, Ernest Kalterman, Orion Knox, and Arturo Solis, the cave was later surveyed by Ross Felton and Wayne Russell on 1 April 1967.
Geology: The cave is in thin-bedded Edwards Limestone.
Bibliography: Anonymous (1973q:11); Litsinger (1973a:17); Palit (1984b:28); Passmore (1977:9); Reddell and Knox (1962:3-4, 8); Reddell and Russell (1962a:5); Reddell and Smith (1966:2); Widener (1959):79).

BOB BEAR CAVE (BCS #199)
Alternate name: The Pits
Location: Castle Hills 7.5′
Description: The cave entrance, 9 m north and 3 m above Salado Creek, is a 1.5 m diameter pit that drops 2.6 m to breakdown. A short crawl under the breakdown leads to a small room approximately 3 m long by 2 m wide and 1.3 m high. A bedrock-floored crawlway extends 13 m from the room to a 4 m deep pit, followed by a "body-size" drop of 2 m. The 2 m pit is followed by the Tight Pit, a narrow 3 m deep pit to a crawl. The crawl leads 5 m to the largest pit in the cave. This 5 m long, 1.5 m wide pit drops 5 m to a large ledge, then 6 m to another ledge. To one side of the second ledge is a 0.3 m wide by 2 m high passage that goes 3 m, then drops 3 m to a 3 m long crawl. The crawl ends at a 2.6 m deep pit too small to explore. From the second ledge the main pit drops another 2.2 m to the floor. The cave continues down a 1.3 m drop, then down a 1 m drop to a 3 m long crawlway that ends in a 3 m diameter by 3 m high dome. The way down continues through a 0.6 m long by 0.05 m wide pit. Both this and the other impassably narrow pit had air blowing out. (See Map 17.)
History: The cave was explored by Allan Cobb and Randy M. Waters in October 1985. Chisel marks in the Tight Pit indicate Cobb and Waters were not the original discoverers. Cobb and Waters first called the cave "The Pits." Later they revised it to Bob Bear as a Spanish-English play on words to call it a "fool's cave."
Biology: Spiders, millipedes, and cave crickets (*Ceuthophilus* sp.) were collected.
Geology: The cave is vadosely formed in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer.

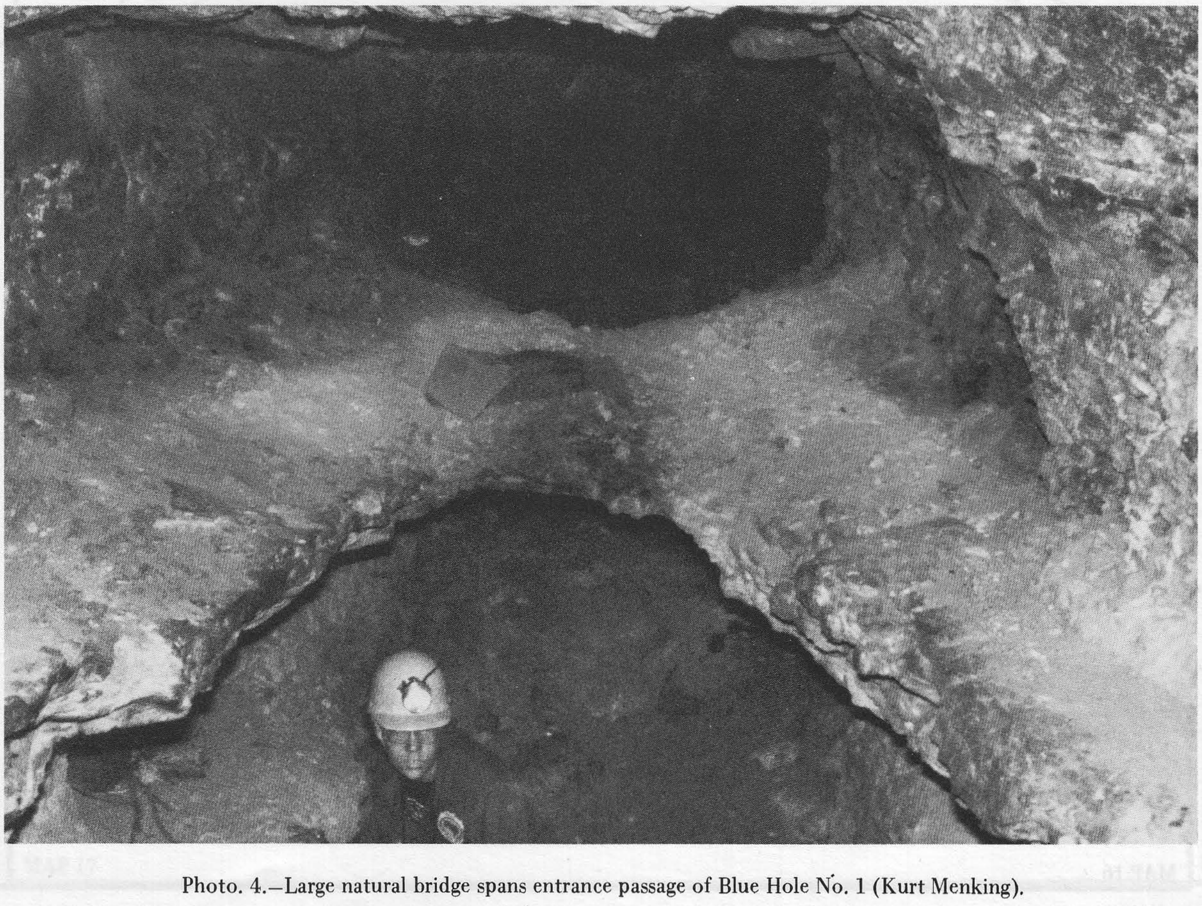
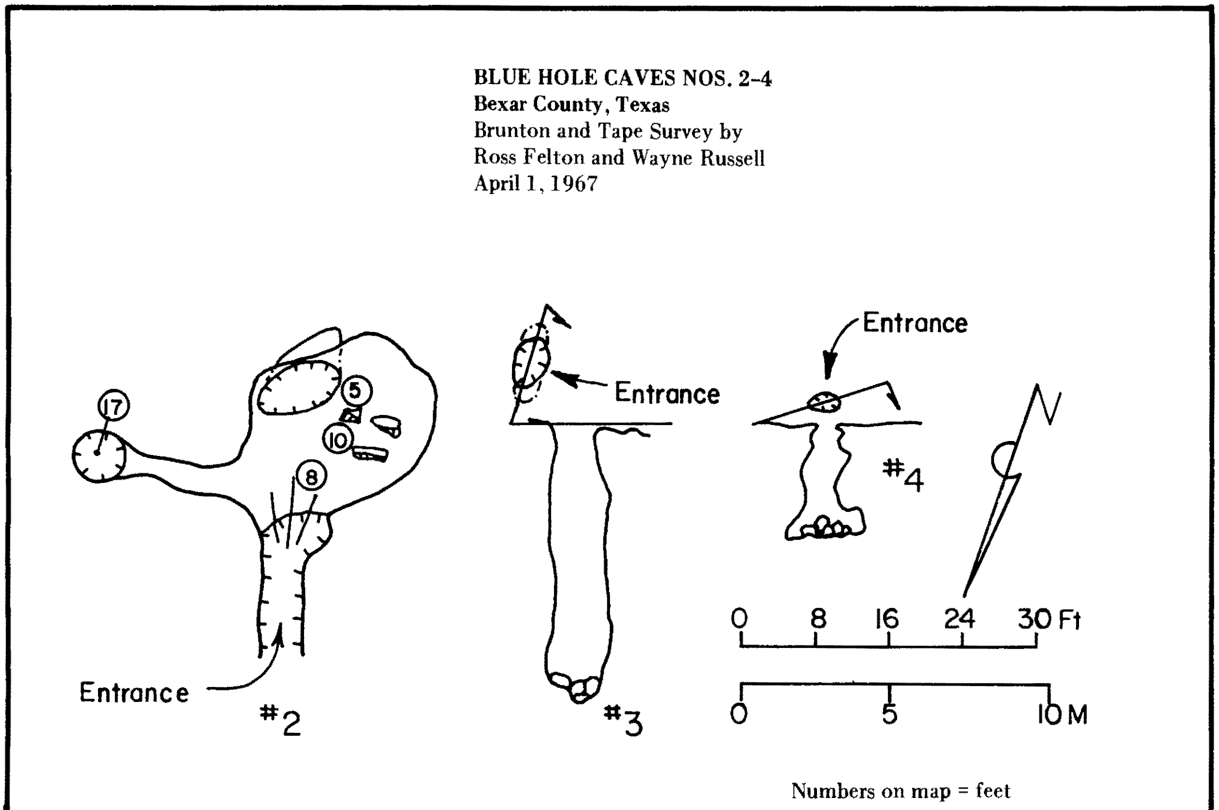


Photo. 4.—Large natural bridge spans entrance passage of Blue Hole No. 1 (Kurt Menking).

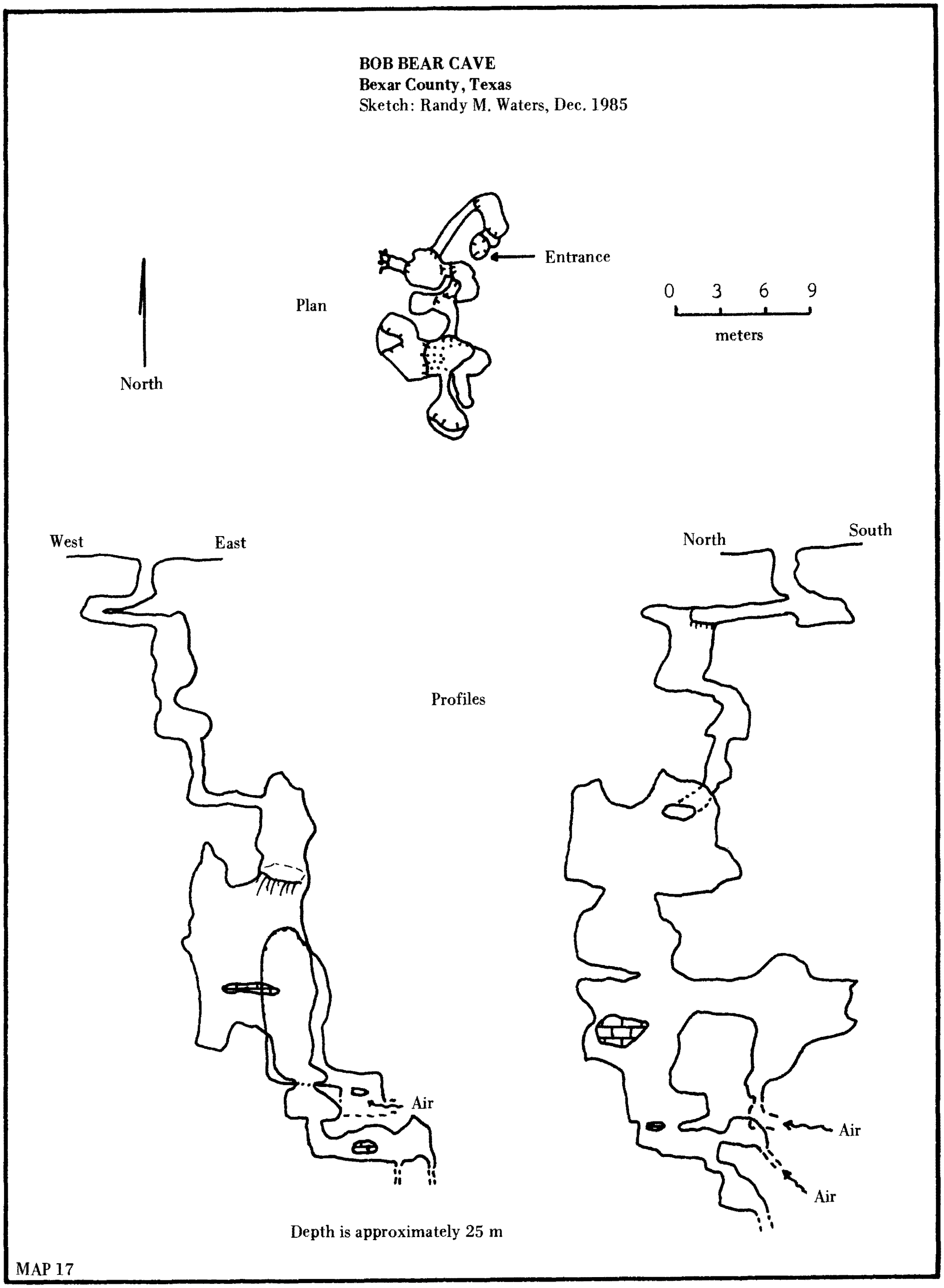
Meteorology: Air blows out of both constrictions.
Technique: The entire cave can be freeclimbed by experienced climbers. A handline is generally advised, and a cable ladder is recommended for the big pit. Explosives are needed to enlarge the two constrictions for further exploration.
Bibliography: Palit (1986:16).

BRAKEN BAT CAVE (BCS #147)
Alternate name: Bracken Bat Cave
Location: Lacoste NE 7.5′
Description: The pit entrance is centered in a sink measuring 0.4 m deep and 4 m in diameter; the pit itself is 0.4 m in diameter and 1.7 m deep. A 2 m drop slopes northwest from the entrance pit to a 0.25 m wide twisting vertical squeeze. Five meters down, it opens into a passage 5 m long and 1 m high. The irregularly shaped domed ceiling reaches a height of 6.9 m. Two blind pits in the floor drop 1.5 m. To the southwest a passage 0.5 m high and wide, and located 2 m above the main passage floor, constricts and is impassable after 2 m. (See Map 18.)
History: On 22 November 1980 the cave was discovered and explored by Don Arburn, Gary Poole, George Veni, and Randy M. Waters. Veni returned and surveyed the cave with Eric Short on 18 October 1983.
Biology: The fauna of the cave is relatively rich, with five species of troglobite having been collected to date. Contrary to its name, the cave is not and never has been a bat cave. Collections were made in the cave on 22 November 1980 by George Veni and on 18 October 1983 by Eric Short and George Veni. The following is a fauna list for the cave:

Snails–*Helicodiscus eigenmanni* (troglophile)
Isopods–Trichoniscidae genus and species 1 (troglobite)
Spiders–*Cicurina* n. sp. (troglobite)
Eidmannella rostrata (troglobite)
Harvestmen–*Leiobunum townsendii* (trogloxene)
Millipedes–*Cambala speobia* (troglobite)
Insect larvae–Undetermined material
Springtails–Undetermined material
Silverfish–Prob. *Texoreddellia texensis* (troglobite)
Cave crickets–*Ceuthophilus (Geotettix) cunicularis* (trogloxene)
Ground beetles–Carabidae genus and species
Comb-footed beetles–*Hymenorus* sp. (troglophile)
Rove beetles–*Belonuchus* sp. (troglophile)
Ants–*Solenopsis xyloni* (accidental)



MAP 16


BOB BEAR CAVE
Bexar County, Texas
Sketch: Randy M. Waters, Dec. 1985
Entrance
Plan
North
0 3 6 9
meters
West
East
North
South
Profiles
Air
Air
Air
Depth is approximately 25 m
MAP 17

Gnats—Undetermined material

Closely observed but not collected was a very large orange and green-black centipede of the family Scolopendridae.

Geology: The cave is developed in the Austin Chalk by vadose groundwater.

Meteorology: High levels of CO_2 are often found in the cave.

Technique: The 5 m vertical squeeze is very tight and difficult to negotiate. It is good to remember that going up is much more difficult than going down—especially if bad air is being breathed.

Bibliography: Anonymous (1978i:2); Arburn (1980: 127); Veni (1983:99).

BREATHE-IF-YOU-CAN CAVE (BCS #119)

Location: Schertz 7.5′

Description: The cave is a single 13.3 m long passage in a cliffside located 10 m above Cibolo Creek. Although the entrance is 0.9 m high and 1.2 m wide, most of the cave is 0.6 m high and 0.3 m wide, except for two slightly larger areas near and at the end of the cave. (See Map 19.)

History: Discovered in December 1978 by George Veni and Randy M. Waters, the first 8 m of crawl had to be dug open from 0.3 m high and wide, to 0.6 m high. The cave was named for the choking experience of excavating the very dusty floor. On 23 July 1983 Veni returned with Joe Ivy to survey the cave and dig another 1.5 m into the second, and final, larger portion of the cave.

Biology: During the survey spiders, harvestmen (prob. *Leiobunum townsendii*), cave crickets (*Ceuthophilus* sp.), moths, and mosquitoes were noted.

Geology: Guided by a northeast-southwest joint in the Pecan Gap Chalk, the cave shows evidence of being developed both by groundwater draining to Cibolo Creek and by backflooding of the creek when it was at a higher level. The dusty chalk soil is evidence of a prolonged dry period.

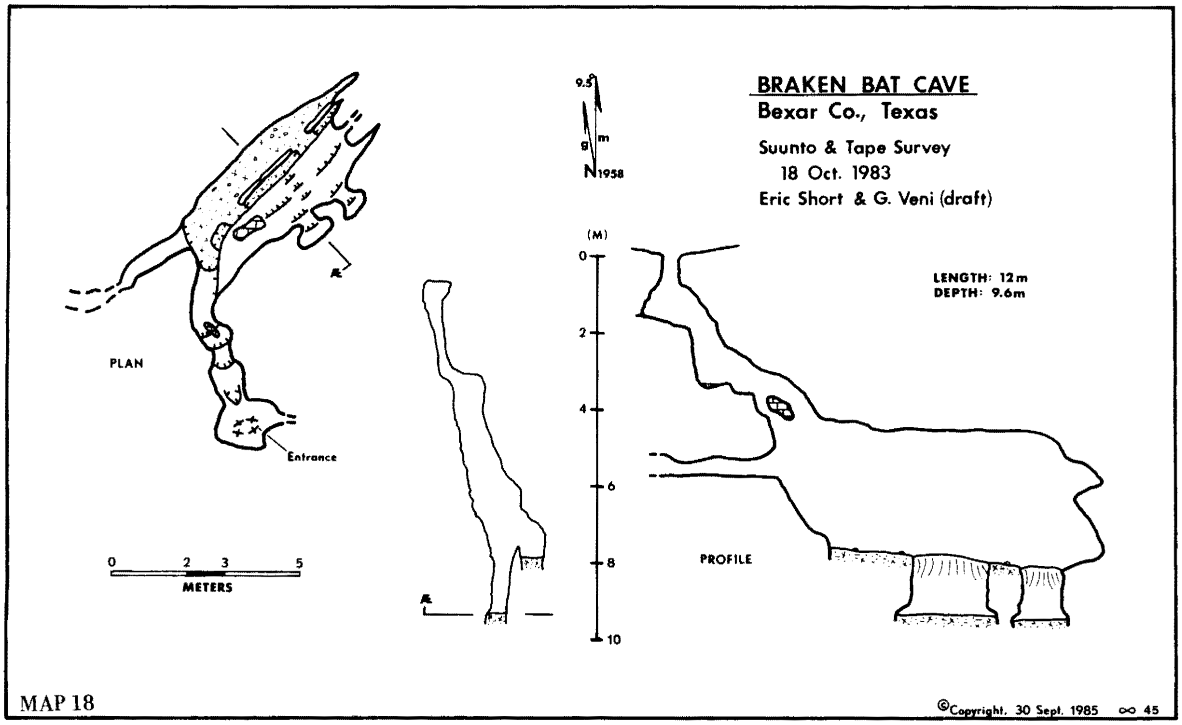
Technique: Some free-climbing along the cliffside is necessary.

Bibliography: Anonymous (1979bb:1); Veni (1983: 98).

BULLIS HOLE (BCS #90)

Location: Camp Bullis 7.5′

Description: The 3.3 m diameter entrance pit is located on a hillside overlooking Cibolo Creek. The pit drops 1.2 m to a ledge and then 6.1 m to another ledge. Narrowing to 0.7 m in diameter for 4.3 m, the pit drops 17.4 m from the second ledge into a 1.5 m wide passage. This passage extends 5 m to the northeast and 4 m southwest to intersect the Fissure Passage, which is 9 m long, 0.7 m wide, and over 9 m high. Along this southeast-trending passage are four drops of 2.1, 3.0, 1.0, and 2.1 m, respectively. A small passage at the base of the 3 m drop goes north-



MAP 18

west under the Fissure Passage and drops 3 m into a pool. Following the 2.1 m drop at the southeast end of the Fissure Passage, the cave widens to 2.6 m to become the Syphon Room named for a sump (siphon) at its far end. Inaccessibly high above the sump is the unexplored continuation of the Fissure Passage. (See Maps 20-21.)

History: Military personnel stationed at Camp Bullis have often visited the cave. In May 1966 Don Erickson, John Fish, James Reddell, and Bill Russell were the first cavers to explore the cave. Reddell and Russell returned with Jan Knox and surveyed the cave on 29 September 1972.

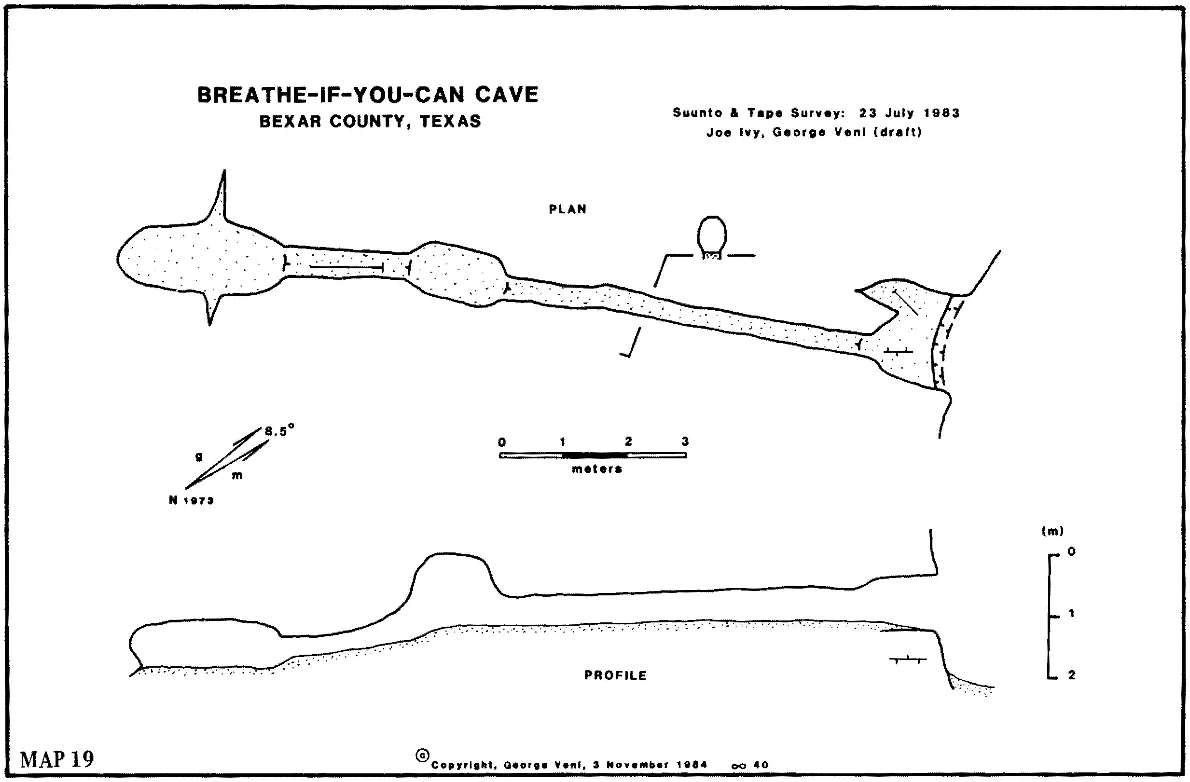
Biology: Most of the species found in Bullis Hole obviously were washed into the cave by the periodic flooding of Cibolo Creek. The following fish and invertebrates were collected for identification by Don Erickson, John Fish, James Reddell, and William Russell on 30 May 1966:

Snails–*Pupoides albilabris* (accidental)
Spiders–*Pirata davisi* (accidental)
Millipedes–*Gosiulus aethes* (accidental)
Oxidus gracilis (troglophile)
Springtails–*Tomocerus (Pogonognathellus) flavescens* (trogloxene)
Ground beetles–*Agonum extensicolle* (accidental)
Agonum viride (accidental)
Agonum (Circinalia) punctiforme (accidental)
Clivina sp. (?accidental)
Rove beetles–*Homaeotarsus* sp. (?troglophile)
Fish–Cyprinidae genus and species
Lepomis cyanellus (green sunfish) (accidental)

Geology: Bullis Hole developed along Cibolo Creek in the lower Glen Rose Formation. Downcutting of the creek cut off water flow through the entrance. Rapid infiltration from Cibolo Creek presently drains water to the cave's lower levels. Although the cave is in the Glen Rose, a series of high angle vertical faults downstream divert the water to recharge the Edwards (Balcones Fault Zone) Aquifer. Tritium isotope studies indicate that recharge from this area travels as a separate subsystem within the Edwards Aquifer and is discharged at Hueco and San Marcos Springs (Comal and Hays Counties).

Technique: A 30 m rope is needed for the entrance pit. A 5 m scaling pole would provide access to the continuation of the Fissure Passage from the Syphon Room.

Bibliography: Anonymous (1973b:7; 1973q:11); Pearson, Rettman, and Wyerman (1975); Reddell (1970a:393, 399, 400, 406; 1970b:49, 56, 57, 62; 1970c:141); Reddell and Smith (1966:2); Veni (1985); Wallace and Exline (1978:89).

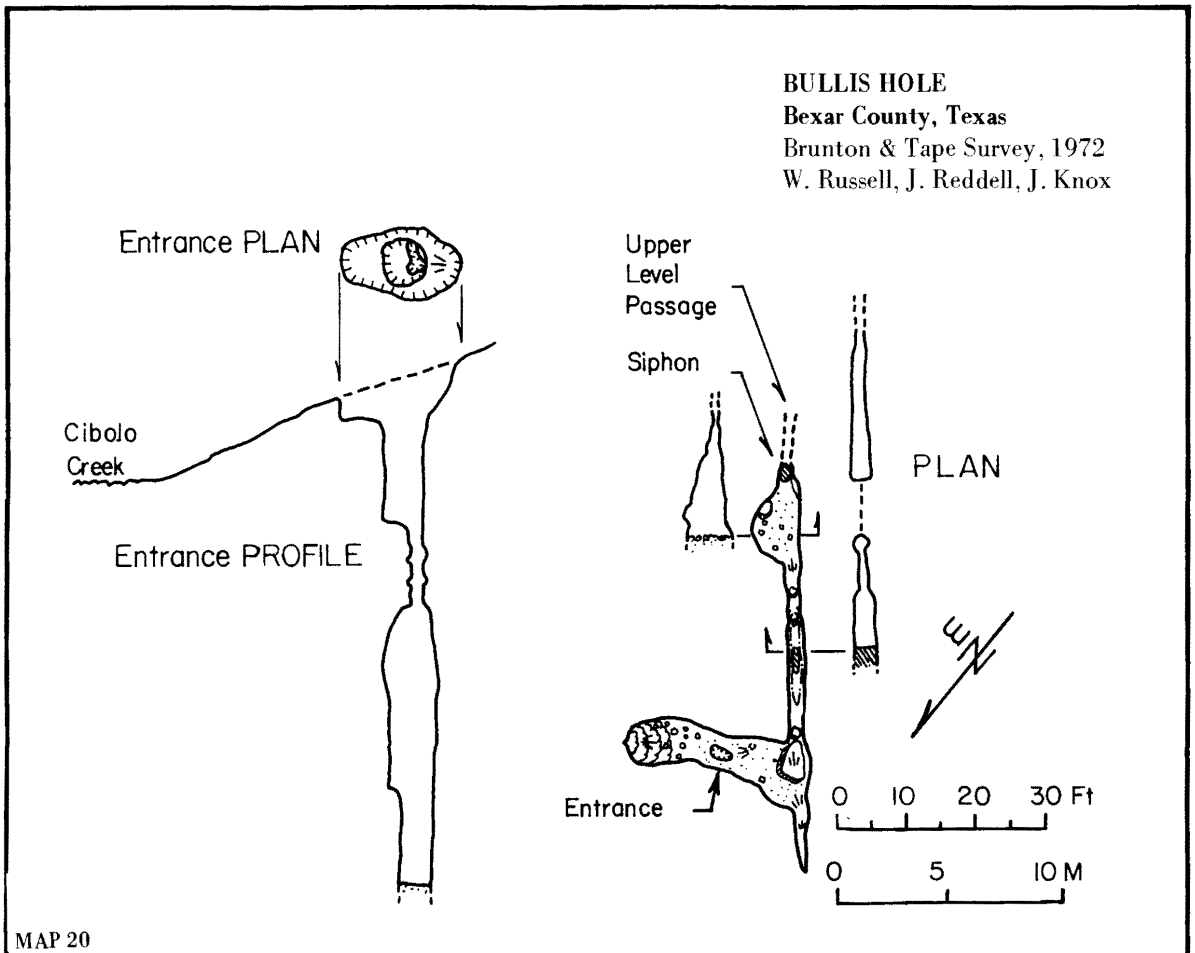


MAP 19

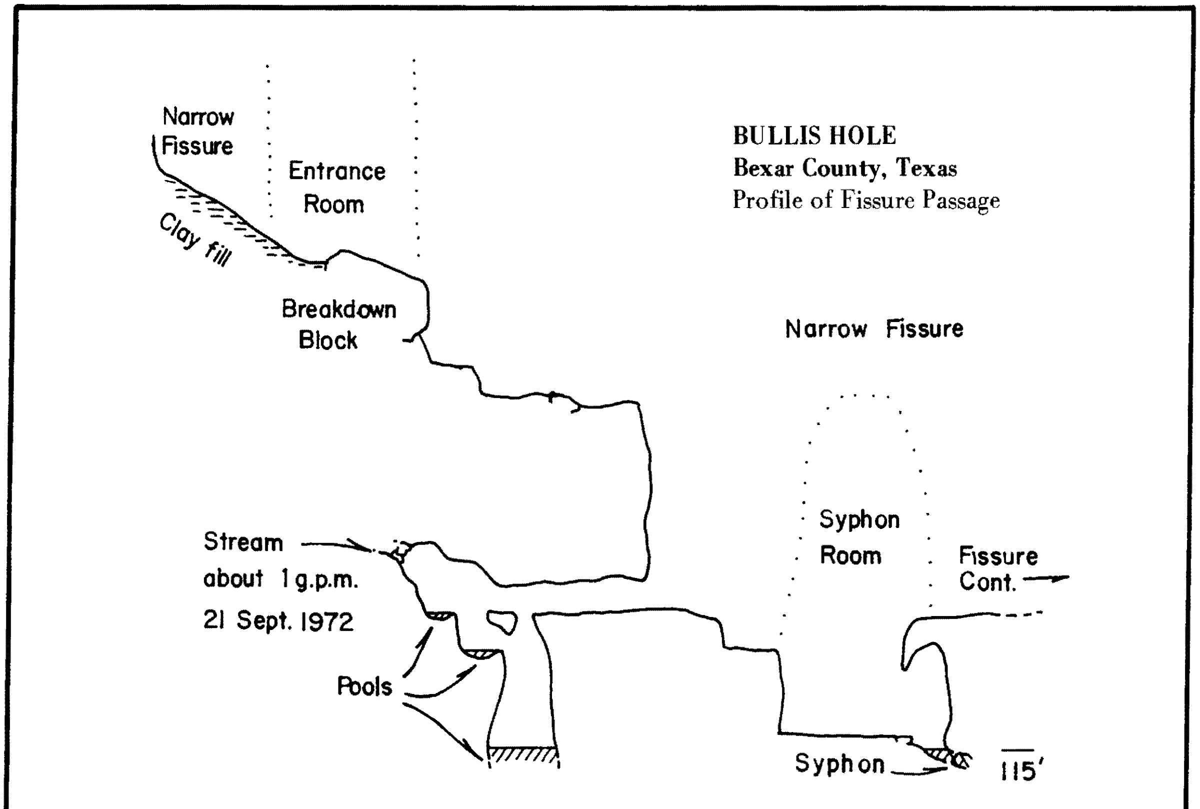
BUZZARD'S ROOST CAVE (BCS #91)
Location: Bulverde 7.5'
Description: A 3 m sink drops 1.3 m into a single room 10 m in diameter and 1.6 m high.
History: Buzzard's Roost Cave was explored by William Gray and members of the Alamo Grotto in the late 1950s.
Geology: The cave is in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer.
Bibliography: Anonymous (1973c:7; 1973q:11); Reddell and Knox (1962:3-4, 10); Reddell and Russell (1962a:5); Reddell and Smith (1966:2); Veni (1985).

C-SECTION CAVE (BCS #159)
Location: Bulverde 7.5'
Description: The kidney-shaped entrance pit measures 1.2 m long, 0.8 m wide, and 1.4 m deep. Off its north "lobe" is a 1.6 m drop to a short crawl sloping down to a 2.9 m pit. The pit floor slopes steeply downward for 1.6 m and ends in a mud fill. One meter of the 1.6 m has been hand dug. At the original floor level an impassably low passage continues to the north. (See Map 22.)
History: C-Section Cave was shown to Joe Ivy and Randy M. Waters in early 1982. They named it for its constricting qualities. Early in 1983, local boys dug at the bottom of the cave hoping to find new passage. Carmen Goyette and George Veni surveyed the cave on 24 July 1983.
Biology: Many harvestmen (prob. *Leiobunum townsendii*) and relatively few cave crickets (*Ceuthophilus* sp.) were seen during the survey.
Geology: The cave is developed in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer.
Bibliography: Veni (1983:98; 1985).

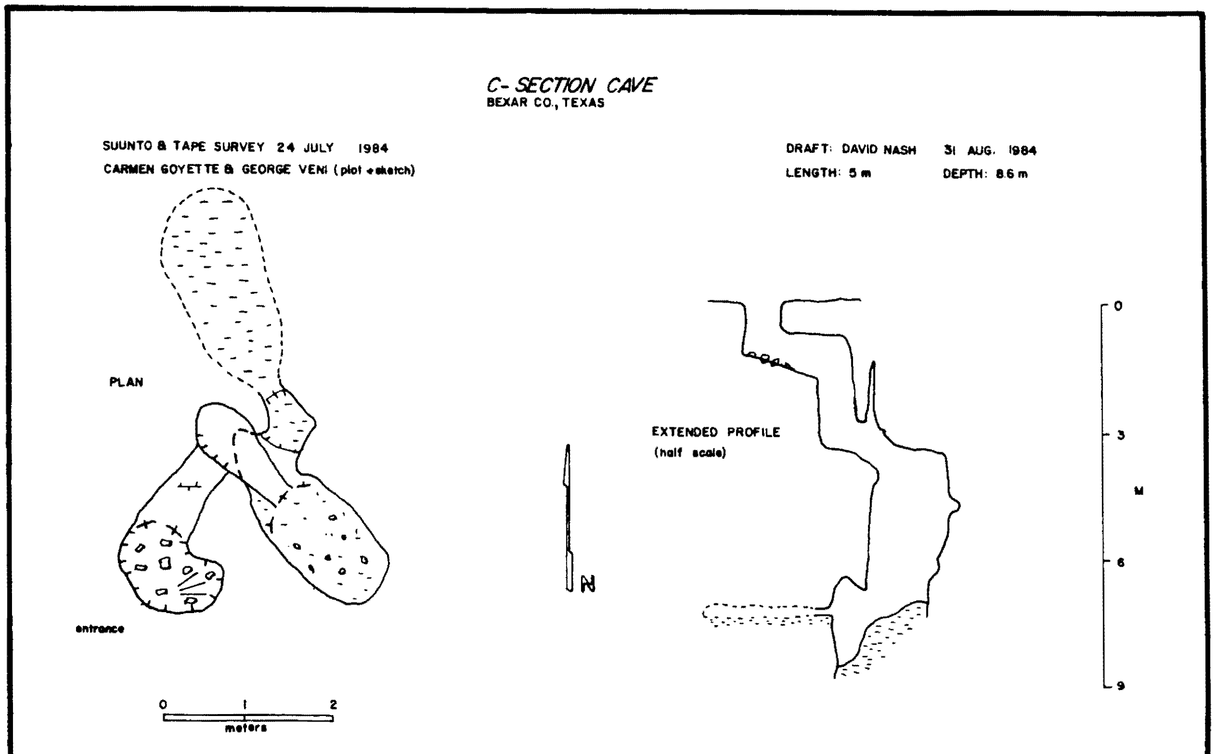
CARCASS CAVE (BCS #152)
Location: Lacoste NE 7.5'
Description: This is an oval pit of undetermined extent whose entrance measures only 0.25 m wide by 0.5 m long. The pit enlarges slightly with depth. (See Map 23; Photo. 5.)
History: Discovered on 18 April 1981 by Kurt



MAP 20


BULLIS HOLE
Bexar County, Texas
Profile of Fissure Passage
Narrow Fissure
Entrance Room
Clay fill
Breakdown Block
Narrow Fissure
Syphon Room
Fissure Cont.
Stream about 1 g.p.m. 21 Sept. 1972
Pools
Syphon
115'

MAP 21

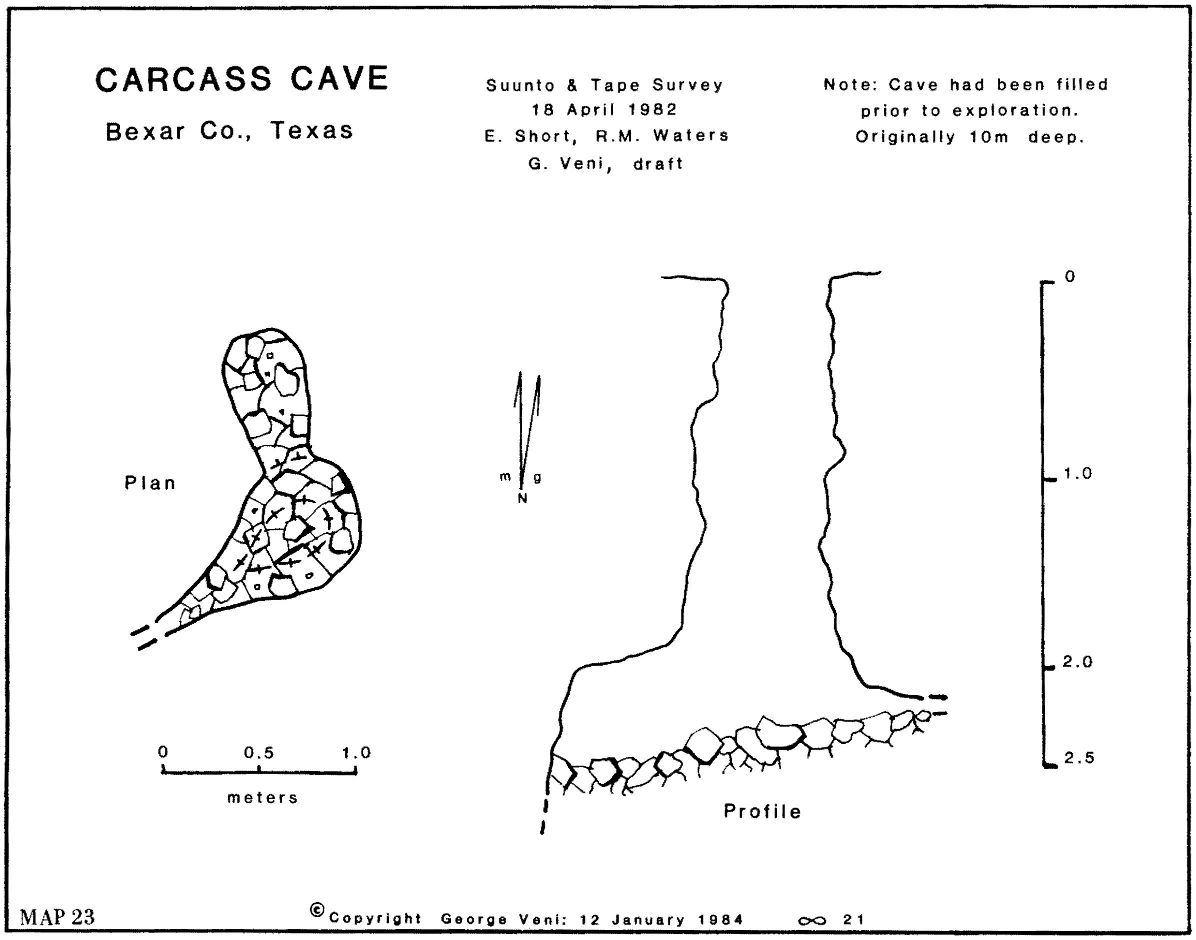

C-SECTION CAVE
BEXAR CO., TEXAS
SUUNTO & TAPE SURVEY 24 JULY 1984
CARMEN GOYETTE & GEORGE VENI (plot + sketch)
DRAFT: DAVID NASH 31 AUG. 1984
LENGTH: 5 m DEPTH: 8.6 m
PLAN
entrance
0 1 2
meters
N
EXTENDED PROFILE
(half scale)
0
3
M
6
9

MAP 22

Menking, Eric Short, and Randy M. Waters, the pit was seen to drop 5-7 m before curving out of sight. By dropping rocks, they estimated its total depth to be approximately 10 m. A foul odor of "something dead" in the pit persuaded them to forego exploration. Members of the San Antonio Grotto returned in March 1982 to find the pit completely filled with rocks; they assumed, because of a new road nearby, that the filling was done by a private landowner or the subdivision developer. By 18 April 1982, the rubble had settled and Short, George Veni, and Waters surveyed the pit to a depth of 2.4 m.
Geology: Carcass Cave is a vertical shaft developed in the Austin Chalk.
Bibliography: Waters (1981b:63).

CAVE FILE CAVE (BCS #100)
Location: Bulverde 7.5′
Description: The 1 m diameter entrance pit drops over 5 m to a trash floor sloping to the southeast and ending at a total depth of 9.6 m. (See Map 24.)
History: Gary Poole and Randy M. Waters in 1978 were the first cavers to explore the cave. Prior to their visit, the cave had been used by the owner as a trash dump for many years. Waters recovered a large filing cabinet from the refuse pile, which he later used to store his cave files, hence the cave name. The cave was surveyed on 10 April 1982 by Eric Short, George Veni, and Randy Waters.
Biology: Harvestmen (prob. *Leiobunum townsendii*) and cave crickets (*Ceuthophilus* sp.) have been observed in the cave.
Geology: Cave File Cave, located in the Mustang Creek flood plain, is a recharge pit to the Edwards (Balcones Fault Zone) Aquifer.
Technique: Although the entrance pit can be free-climbed, a hand line or cable ladder is recommended.
Bibliography: Veni (1985).

CAVE OF THE BEARDED TREE (BCS #151)
Location: Lacoste NE 7.5′
Description: The entrance is a small pit 0.9 m long and up to 0.6 m wide. It drops 1.65 m into an enlarged bedding plane 2 m wide by 4 m long and 0.4 m high. The pit continues another 8.1 m down to the cave floor. This lower portion of the cave is 0.6 m



MAP 23

wide and 4 m long before becoming too narrow for exploration in either direction. (See Map 25.)

History: Kurt Menking, Eric Short, and Randy M. Waters discovered the cave on 18 April 1981. Short and Waters returned exactly one year later with George Veni and surveyed it. The map has not yet been drafted.

Biology: Observed fauna included frogs and an abundance of harvestmen (*Leiobunum townsendii*) which cling to the flora surrounding the entrance, giving them the appearance of being "bearded trees." The following species were collected in the cave in April 1982 by George Veni:

Earthworms–Undetermined material
Snails–*Euglandina singleyana* (empty shells)
Glyphyalinia umbilicata (empty shells)
Spiders–*Trachelas* sp. (accidental)
Schizocosa saltatrix (accidental)
Xysticus ferox (accidental)
Harvestmen–*Leiobunum townsendii* (trogloxene)
Mites–Undetermined material
Centipedes–Lithobiomorpha undetermined
Cave crickets–*Ceuthophilus (C.) secretus* (trogloxene)
Comb-clawed beetles–Alleculidae genus and species
Click beetles–*Ampedus* sp. nr. *impolitus* (accidental)
Rove beetles–*Belonuchus* sp. (troglophile)
Ants–*Pheidole dentata* (accidental)

Geology: Vadose waters collect along a bedding plane 1.6 m below the surface. Their vertical movement through a northeast-southwest trending joint developed the 8.1 m pit. The cave is formed in the Austin Chalk.

Technique: Although the pit can be safely free-climbed, a belay rope or ladder is recommended.

Bibliography: Waters (1981b:63).

CAVE OF THE BEE SPIRITS (BCS #138)

Location: Castle Hills 7.5′

Description: The 2.6 m deep entrance pit is 0.8 m in diameter. Adjoining the base of this drop is the main pit which is 2 m in diameter and 8.2 m deep. From the main pit a small passage drops a meter and goes 2 m to an unexplored pit estimated to be 7 m deep, access to which is blocked by a rock blade and the passage's narrow dimensions. Two passages appear to extend from the pit, one at floor level and the other 4 m above its floor. (See Map 26.)

History: As a housing development was being built

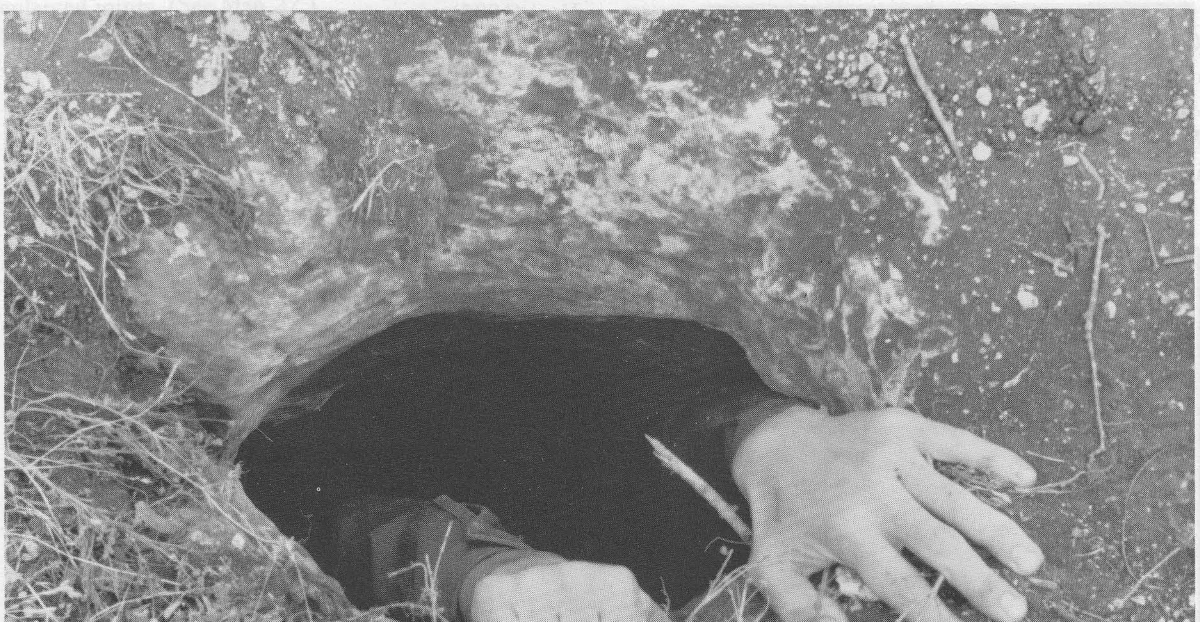


Photo. 5.–Carcass Cave and the hands of Eric Short (George Veni).

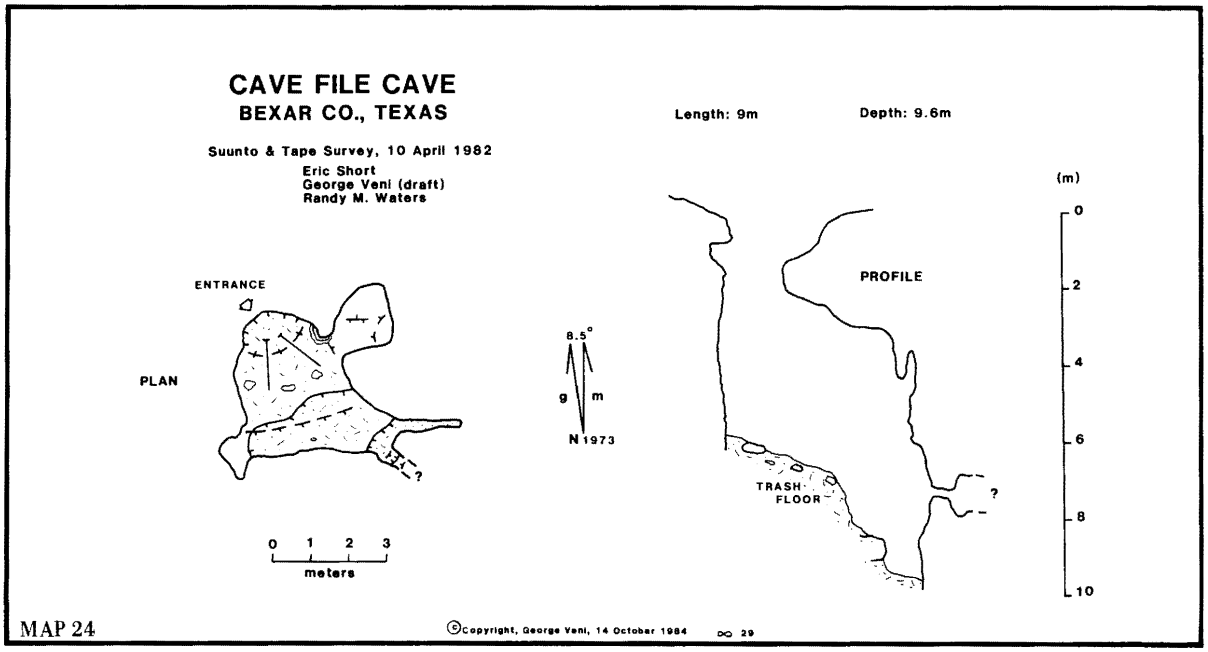
around the cave, some neighboring home-owners found and filled the entrance pit with bricks and assorted debris. Greg Fritz obtained permission to excavate the pit and breached the fill on 8 November 1980. Fritz found that a natural bridge blocked entry into the main pit. The next day he returned and with Randy M. Waters topside he barely squeezed through. On 15 November, Fritz and Waters returned with Don Arburn, Kurt Menking, Gary Poole, and George Veni. They removed the obstructing natural bridge and made a brief exploration but were forced out by bad air. The cave received its unusual name because when Fritz dug the cave open, a number of black bees flew out of the sealed pit.
Biology: The cave was inhabited by the strange black bees which flew from the cave when it was opened. The following fauna was collected on 24 April 1983 by Randy Waters for taxonomic study:

Snails–*Helicodiscus eigenmanni* (troglophile)
Isopods–Trichoniscidae genus and species 1 (troglobite)
Spiders–*Achaearanea porteri* (troglophile)
Millipedes–*Cambala speobia* (troglobite)
Silverfish–Prob. *Texoreddellia texensis* (troglobite)
Cave crickets–*Ceuthophilus (C.)* sp. (trogloxene)

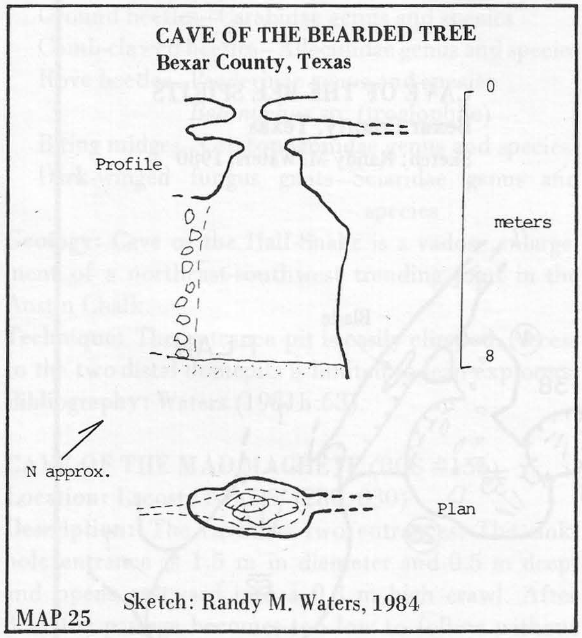
Geology: The cave is vadosely developed in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer.
Meteorology: Occasional high levels of CO_2 are found in the cave.
Technique: A cable ladder may be preferred to a rope in descending the 8 and 7 m pits. The latter pit needs some hammer and chisel work for access.
Bibliography: Fritz (1980:126; 1981a:43, 45; 1981b: 45); Veni (1985).

CAVE OF THE CLIFF (BCS #121)
Location: Longhorn 7.5′
Description: This cliffside cave is primarily a single meandering passage, surveyed 9.5 m long, averaging 1 to 1.5 m high and 1 m wide. The only side passage is 3 m long by 0.5 m wide and high. It extends to the east from 5 m into the main passage. (See Map 27.)
History: The cave was discovered by Randy M. Waters who explored it with Steve Damon on 10 February 1979. Waters returned with George Veni on 5 March that year to survey.
Biology: Harvestmen (prob. *Leiobunum townsendii*) and cave crickets (*Ceuthophilus* sp.) were observed.
Geology: The cave is a shallow phreatic tube developed as a recharge conduit for the Edwards (Balcones Fault Zone) Aquifer. Downcutting of Mud Creek has truncated the cave. Minor amounts of drainage seasonally discharge from Cave of the Cliff and recharge the aquifer into Mud Creek 4.7 m below.
Bibliography: Anonymous (1979e:1; 1979m:3); Veni (1985).

CAVE OF THE CREEK (BCS #122)
Location: Longhorn 7.5′
Description: A crawlway entrance in the floor of Mud Creek valley leads into the 11 m long cave. From the



MAP 24



entrance the passage steadily enlarges, achieving maximum dimensions of 3.5 m high and 1 m wide. The cave drains to, and ends in, a 1 m long crawlway which divides into two parallel, impassably small, enlarged joints. (See Map 27.)

History: On 10 February 1979, while Randy Waters was discovering nearby Cave of the Cliff, Steve Damon discovered Cave of the Creek. Both caves were surveyed by Waters and George Veni on 5 March 1979. They also excavated the terminal crawl to its bifurcation.

Biology: The organic, composting cave floor supports a varied fauna: earthworms, spiders, harvestmen (prob. *Leiobunum townsendii*), cave crickets (*Ceuthophilus* sp.), and beetles.

Geology: Cave of the Creek is developed as a recharge conduit into the Edwards (Balcones Fault Zone) Aquifer by pirating flow from Mud Creek. Strong joint control is evident in its morphology.

Bibliography: Anonymous (1979e:1; 1979m:3); Veni (1985).

CAVE OF THE HALF-SNAKE (BCS #150)

Location: Lacoste NE 7.5′

Description: A slit in bedrock, 1.0 m long by 0.5 m wide, drops 9 m to the floor of the cave. Most of the cave is a northeast-southwest trending passage which slopes downward to the southwest and a maximum depth of 11.9 m. This passage measures 12.5 m long, 1.0 to 0.25 m wide, and has a 7 m high dome at either end. Where the entrance pit intersects this passage, the only side passage in the cave slopes steeply upward to the southeast for 5 m and an elevation gain of 4 m. (See Map 28; Photo. 6.)

History: The cave was discovered and explored on 18 April 1981 by Kurt Menking, Eric Short, and Randy M. Waters. That day a rattlesnake was discovered on a ledge 7 m down the entrance pit. Quick work with a knife gave the cave its name. One year later, Short and Waters returned to survey the cave with George Veni.

Biology: A rattlesnake (*Crotalus* sp.) was closely observed. The following species were collected by George Veni in April 1982:

Snails—*Helicodiscus eigenmanni* (troglophile)
Spiders—*Agelenopsis aperta* (accidental)
Schizocosa saltatrix (accidental)
Eidmannella rostrata (troglobite)
Steatoda sp. (?accidental)
Harvestmen—*Leiobunum townsendii* (trogloxene)
Ticks—*Amblyomma americanum* (accidental)
Centipedes—Lithobiomorpha undetermined
Insect larvae—Undetermined material
Springtails—Undetermined material
Cave crickets—*Ceuthophilus (C.) secretus* (trogloxene)

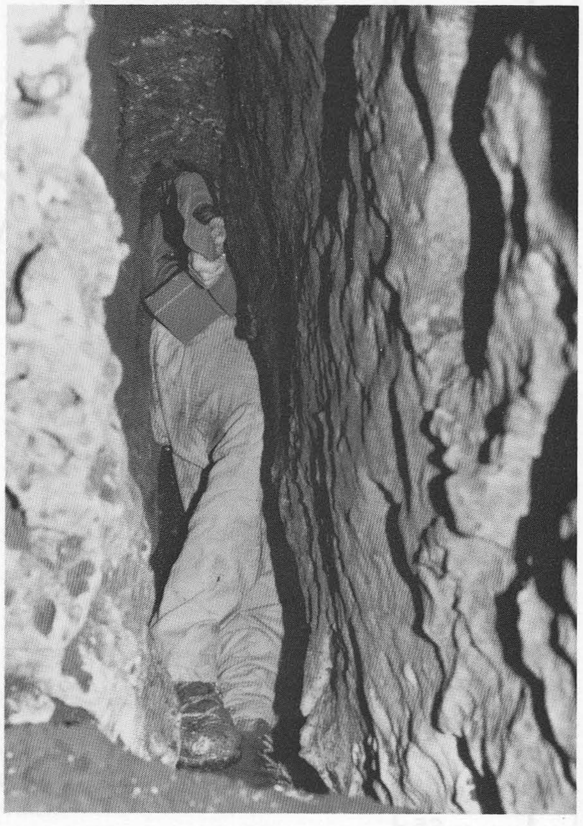
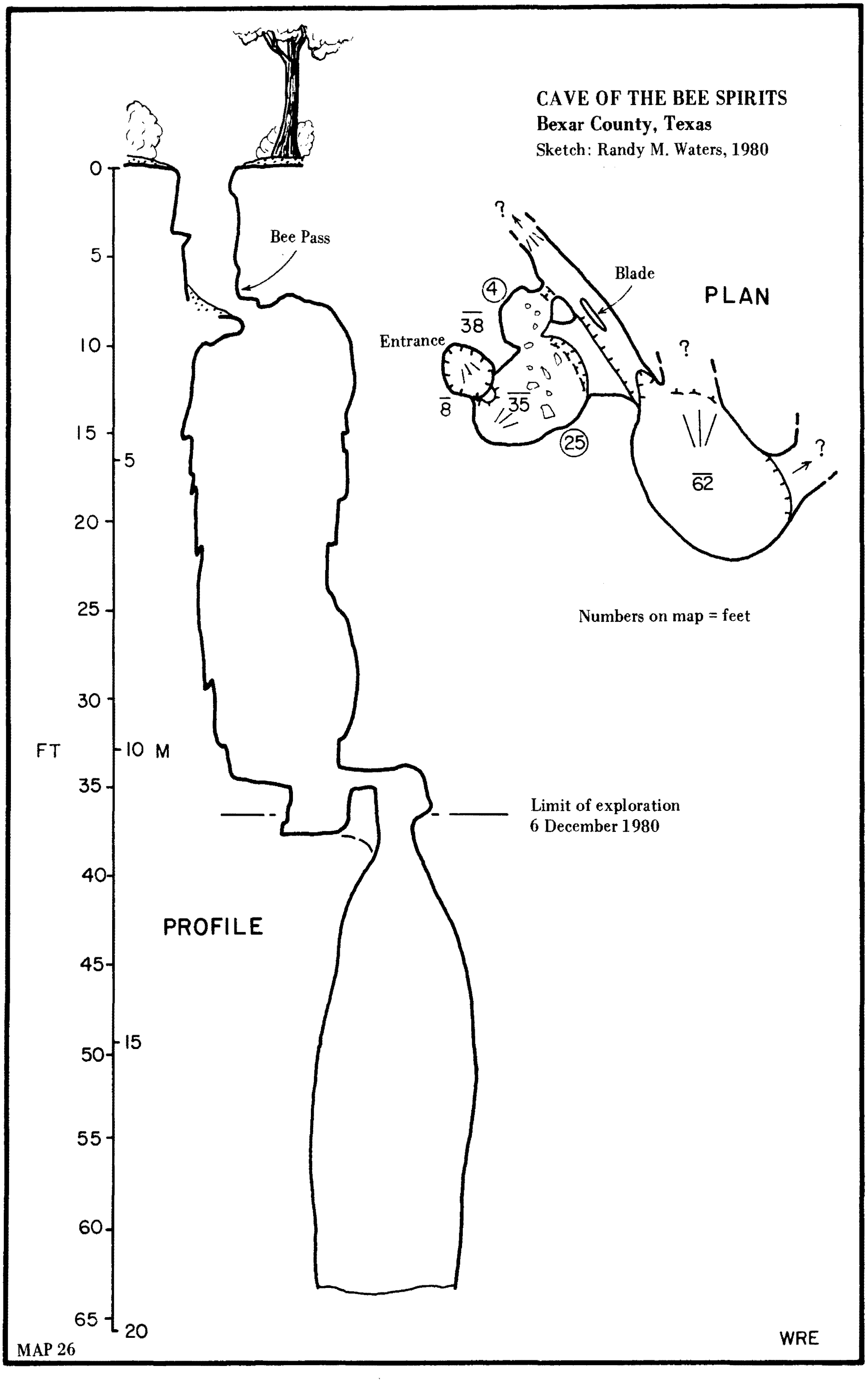


Photo. 6.—George Veni pushing into The Double or Nothing Room of Cave of the Half-Snake (Randy Waters).


CAVE OF THE BEE SPIRITS
Bexar County, Texas
Sketch: Randy M. Waters, 1980
PLAN
Blade
Entrance
4
38
8
35
25
62
?
Numbers on map = feet
Bee Pass
PROFILE
Limit of exploration
6 December 1980
FT
M
0
5
10
15
20
25
30
35
40
45
50
55
60
65
MAP 26
WRE

Ground beetles—Carabidae genus and species
Comb-clawed beetles—Alleculidae genus and species
Rove beetles—Paederinae genus and species
Belonuchus sp. (troglophile)
Biting midges—Ceratopogonidae genus and species
Dark-winged fungus gnats—Sciaridae genus and species

Geology: Cave of the Half-Snake is a vadose enlargement of a northeast-southwest trending joint in the Austin Chalk.

Technique: The entrance pit is easily climbed. Access to the two distal domepits is limited to lean explorers.

Bibliography: Waters (1981b:63).

CAVE OF THE MAD MACHETE (BCS #156)

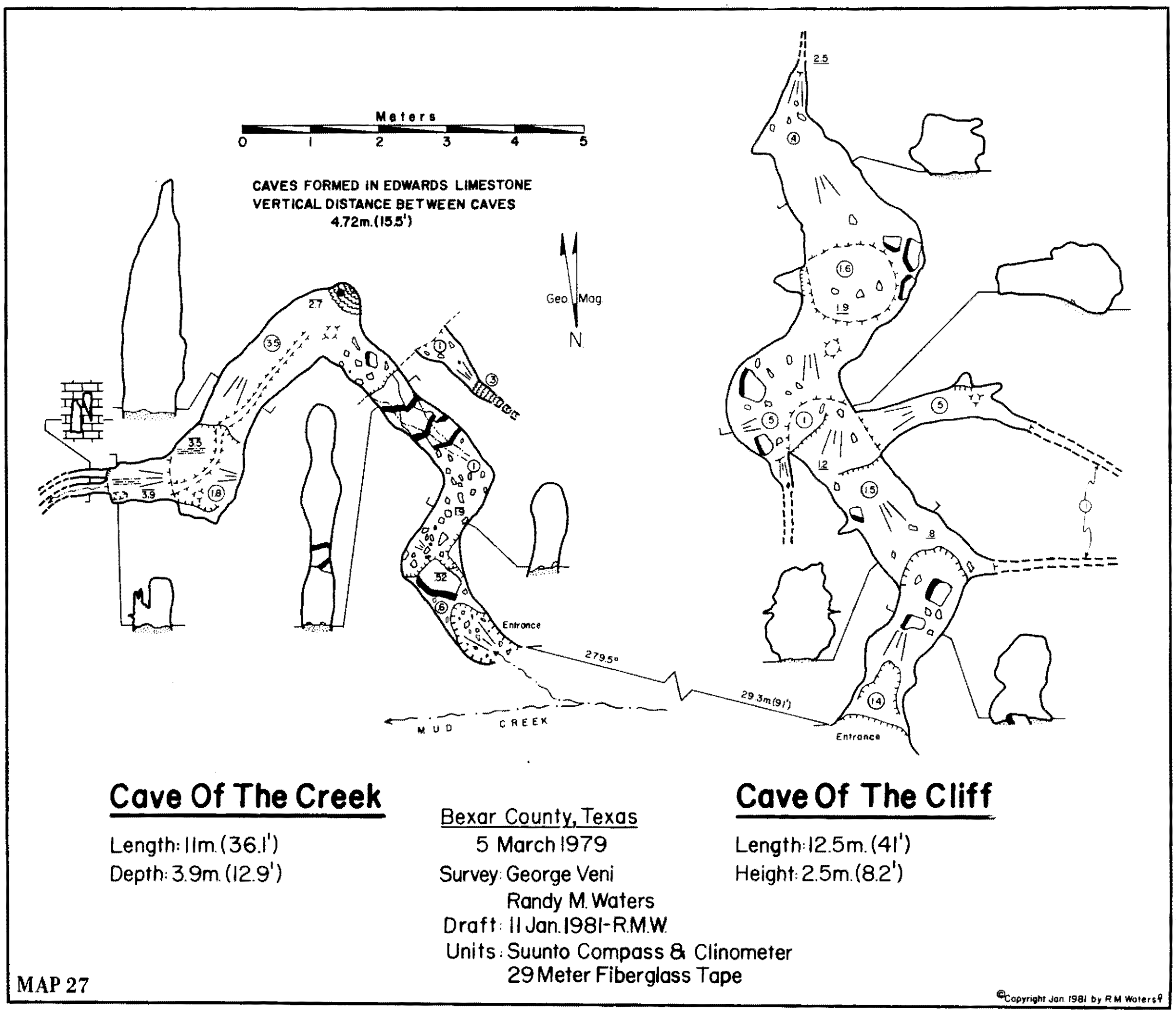
Location: Lacoste NE 7.5′

Description: The cave has two entrances. The sinkhole entrance is 1.5 m in diameter and 0.5 m deep, and opens eastward into a 0.3 m high crawl. After 3 m the passage becomes too low to follow without digging but widens into a room 8 m in diameter and 0.15 m to 0.3 m high. In the southern corner is the 1.1 m deep pit entrance, which gives easier access to this part of the cave. During the original exploration, it was necessary to dig a northeastward path to crawl 5 m to a fissure pit. It drops 5 m and extends 7 m through a tortuously tight series of natural bridges towards the pit entrance. Three very tight crawls, measuring 9, 7, and 3 m in length, extend off the fissure towards the sinkhole entrance. (See Map 29.)

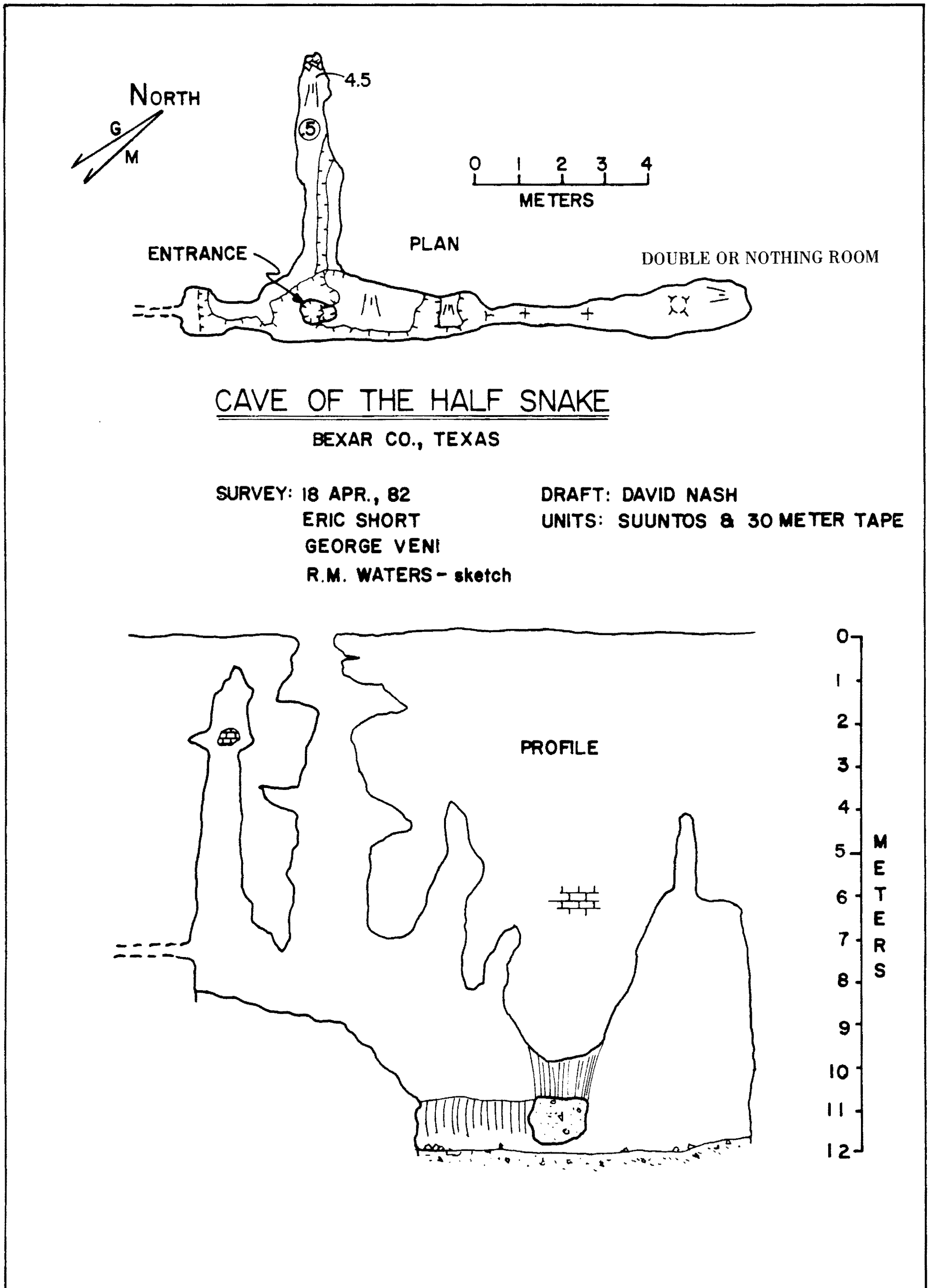
History: The cave was discovered in 1980 by George Veni but wasn't explored and surveyed until 18 April 1982 when he returned with Eric Short and Randy M. Waters. Maniacal clearing of brush from the entrance gave the cave its name.

Biology: Spiders, harvestmen (prob. *Leiobunum townsendii*), and cave crickets (*Ceuthophilus* sp.) were noted.

Geology: Cave of the Mad Machete is developed in the Austin Chalk along east-west and northeast-



MAP 27

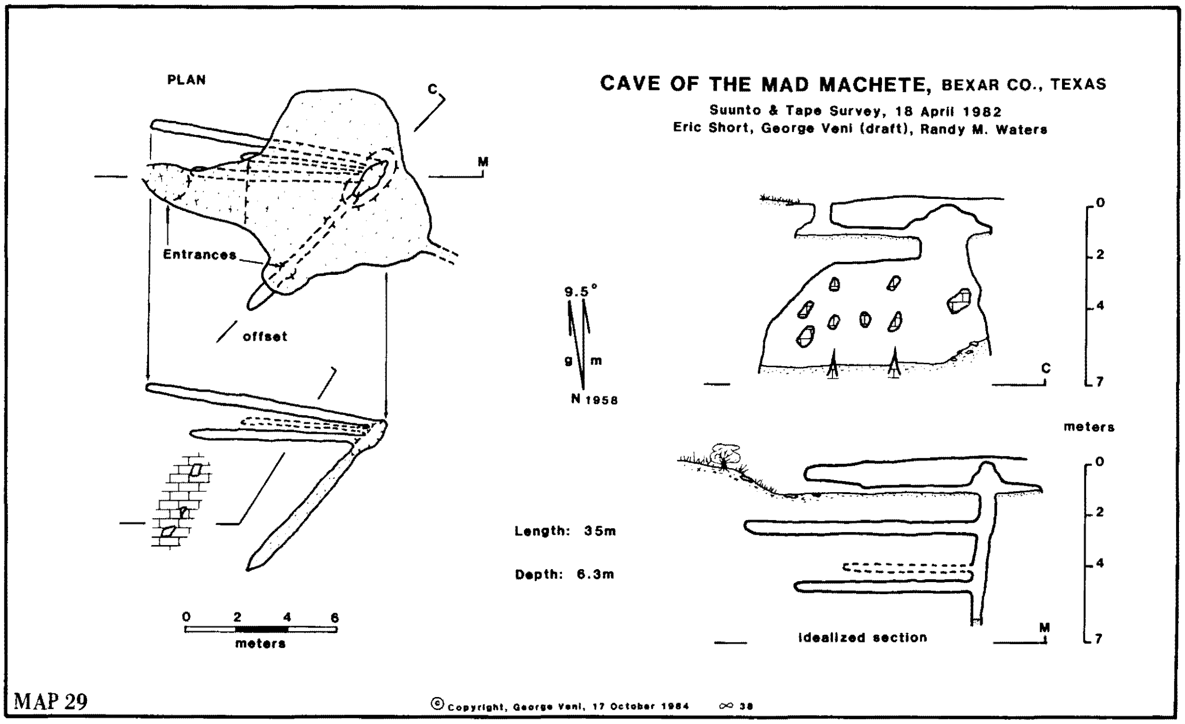

NORTH
G
M
4.5
5
0 1 2 3 4
METERS
ENTRANCE
PLAN
DOUBLE OR NOTHING ROOM
CAVE OF THE HALF SNAKE
BEXAR CO., TEXAS
SURVEY: 18 APR., 82
ERIC SHORT
GEORGE VENI
R.M. WATERS - sketch
DRAFT: DAVID NASH
UNITS: SUUNTOS & 30 METER TAPE
PROFILE
0 1 2 3 4 5 6 7 8 9 10 11 12
METERS

MAP 28

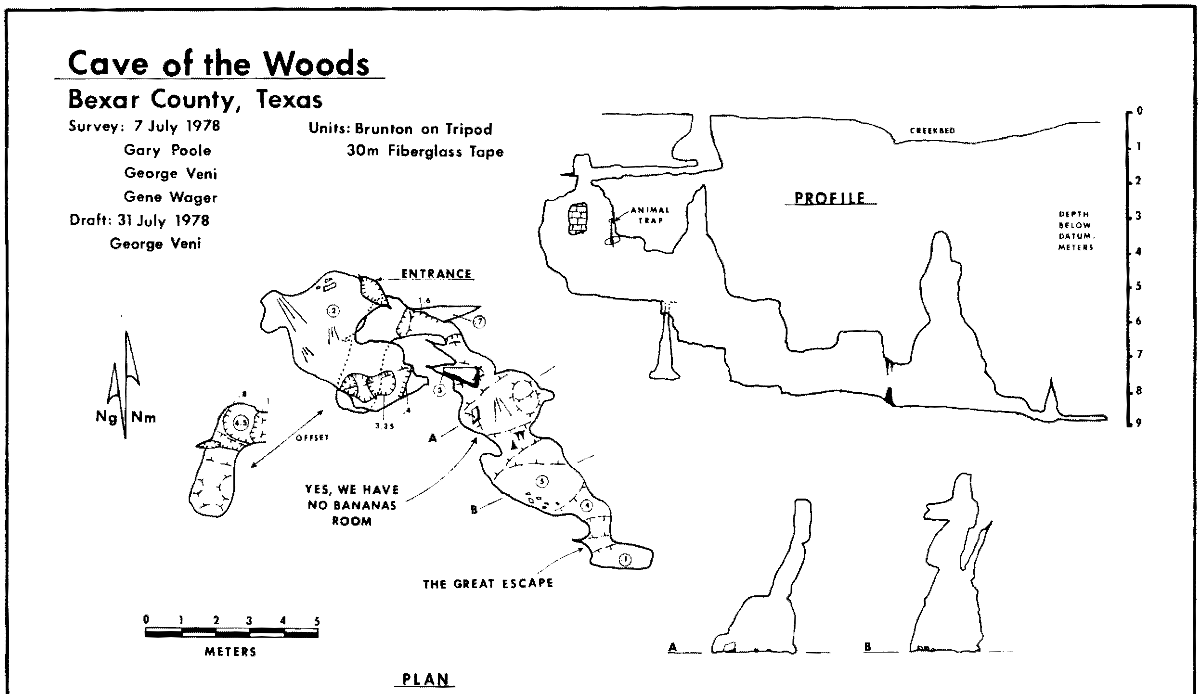
southwest joints. Both entrances formed along these joints, but the room is an enlarged bedding plane. Water drains to the fissure-like pit, formed at the joint intersection.
Bibliography: Ganter (1984:1-2).

CAVE OF THE WOODS (BCS #9)

Location: Castle Hills 7.5′
Description: The entrance was a 1.5 m drop along an enlarged joint, along which the cave trended. A low crawl off the entrance drop, 0.2 m high, 2 m wide, and 2.5 m long, was Froggy Freeway, the first "room" in the cave. Approximately 1 m to the east the cave opened into a pit where a distinct bedding plane was noticeable. The pit dropped 3.35 m, past a natural bridge, into the Hall of the Hanging Trap. The passage doubled back under the entrance, then made an abrupt turn to the south following the entrance joint. A passage 0.5 m wide led to the Yes, We Have No Bananas Room, 2 m in diameter with a 4.5 m high dome. To the southeast, a drop in the ceiling marked the area of speleothem growth, followed by the main and terminal room of the cave, a dome room 5 m high and 2 m wide. The Great Escape was a crawl to a mud plug. The cave floor was a thin layer of dirt, cricket droppings, bones, rocks, and loose organic debris. (See Map 30.)
History: The small entrance sink was discovered by Randy Waters in early 1978. A return trip with George Veni on 23 April 1978 led to opening the cave after an hour's digging. The cave was probably virgin; however, it is possible, because of the light, loose rock fill, that the cave was open in the recent past. An animal trap found in the first pit is evidence of water flow strong enough to move large objects. Floods of the nearby creekbed may have periodically opened and closed the cave. The cave was named after the nearby subdivision, The Woods of Shavano. Expansion of this subdivision in the spring of 1981 put the cave under 7 m of landfill. The cave was surveyed on 7 July 1978 by Gary Poole, George Veni, and Gene Wager.
Biology: During the summer months harvestmen (prob. *Leiobunum townsendii*) covered the walls of the entrance sink. The low, flat entrance room, Froggy Freeway, was named for the presence of two cliff frogs, *Syrrhophus marnocki*, and a large toad. A *Rhadine* beetle of undetermined species was noted in the Hall of the Hanging Trap, and numerous troglobitic isopods (prob. *Brackenridgia cavernarum*) were present in both the middle and lower levels of the cave. A centipede was also observed, and cave crickets (*Ceuthophilus* sp.) were distributed throughout the cave. Situated near a small creekbed, the cave received much of the floodflow with its plentiful supply of organic debris. Although the cave received much water, it did not appear to flood completely, allowing for relatively undisturbed life cycles for its inhabitants.
Geology: Cave of the Woods developed along joints



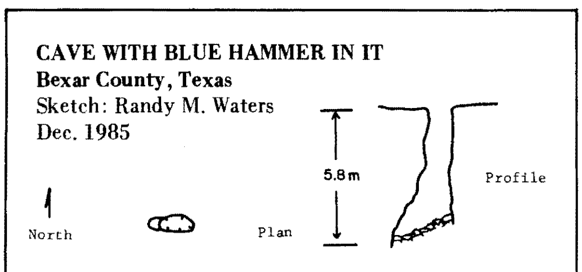
MAP 29



MAP 30

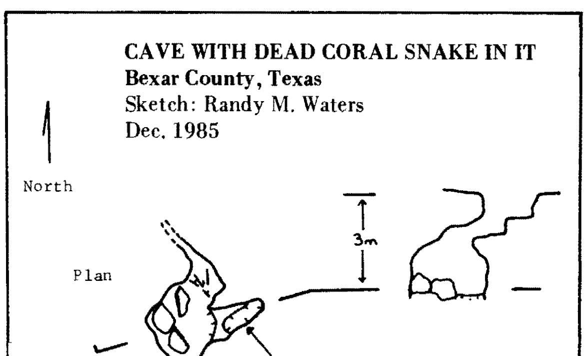
and bedding planes enlarged by overflow of a small, seasonally active stream channel in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer.
Paleontology: Many bones were present but were of recent origin. Excavation would have been pointless due to the thin (0.1 to 0.2 m) alluvial layer over the rock floor.
Bibliography: Anonymous (1978a:4); Veni (1978a:5; 1978b:8-9; 1985); Waters (1978b:3).

CAVE WITH BLUE HAMMER IN IT (BCS #202)
Location: Bulverde 7.5′
Description: A 1.3 m long, 0.8 m wide oval entrance leads to a 5.8 m drop. (See Map 31.)
History: The pit was discovered and explored by Randy M. Waters in May 1984.
Geology: The cave is vadosely formed in the upper member of the Glen Rose Formation.

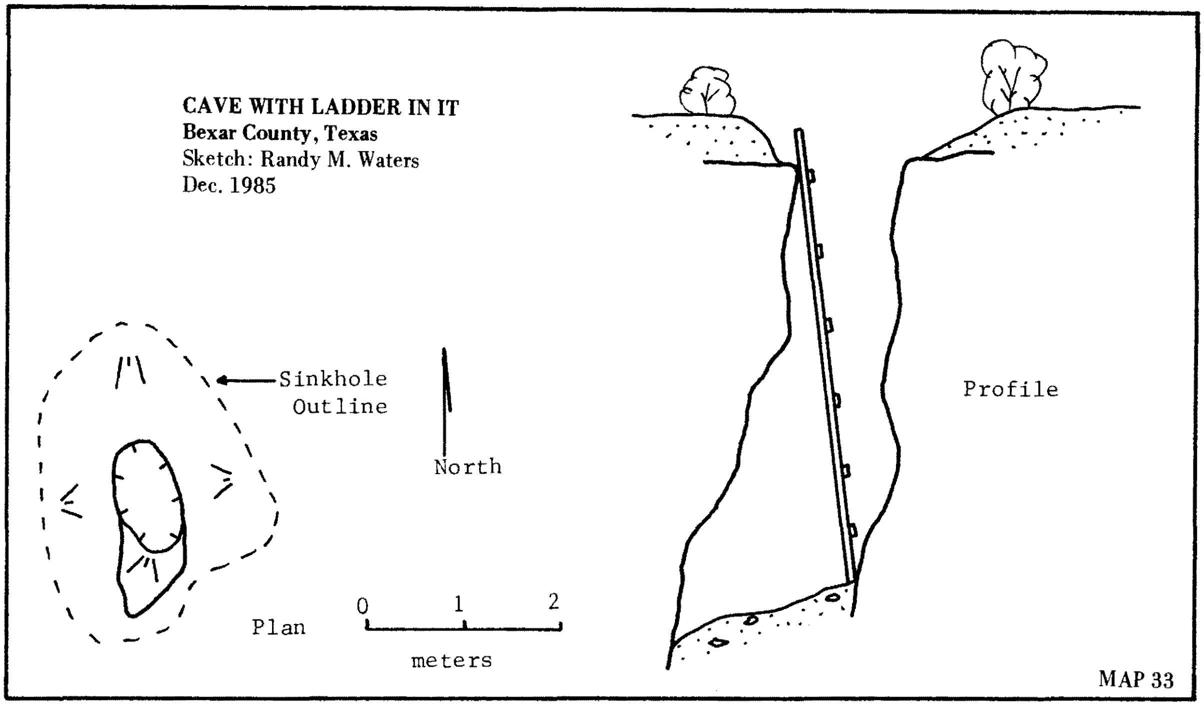


MAP 31

CAVE WITH DEAD CORAL SNAKE IN IT (BCS #203)
Location: Bulverde 7.5′
Description: The 1.8 m long by 0.7 m wide entrance drops 1 m and then another meter to the west before dropping 2 m into a 3.5 m diameter room. The room is approximately 3 m high and floored with breakdown. A crawlway slopes down to the northwest but becomes impassably small after 3 m. (See Map 32.)
History: The cave was discovered and explored by Randy M. Waters in May 1984.
Biology: Cave crickets (*Ceuthophilus* sp.) and a recently dead eastern coral snake, *Micrurus fulvius*, were observed.
Geology: The cave is formed in the upper member of the Glen Rose Formation.



MAP 32

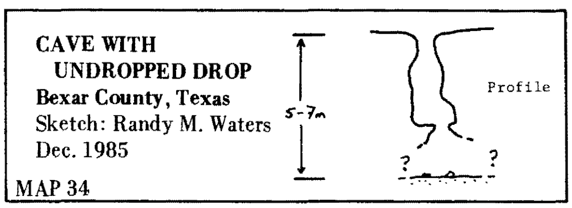


CAVE WITH LADDER IN IT (BCS #201)

Location: Longhorn 7.5′
Description: This is a 5.2 m deep pit with a 1 m long by 0.7 m wide entrance and a 1.7 m long by 0.7 m wide dirt floor. (See Map 33.)
History: Following the rescue of a boy stuck in nearby Goonies Cave (BCS #195) on 12 June 1985, Bob Cowell, Kurt Menking, and Randy M. Waters were shown the cave by local residents.
Biology: A black millipede was observed.
Geology: The cave is vadosely formed in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer.
Technique: A wooden ladder in the pit aids its exploration.

CAVE WITH UNDROPPED DROP (BCS #191)

Location: Bulverde 7.5′
Description: The entrance pit is 0.6 m long by 0.3 m wide and approximately 3 to 4 m deep. An unexplored drop follows and was estimated as being 2 to 3 m deep. It is uncertain if any passages extend from the base of the undropped drop. (See Map 34.)
History: The cave was discovered and partially explored by Randy M. Waters in May 1984.
Geology: The cave is vadosely formed in the upper member of the Glen Rose Formation.



CEMENT CAVE (BCS #144)

Location: Camp Bullis 7.5′
Description: Little is known of this cave which was rumored to be large, the entrance of which is now cement filled.
History: While Steve White was stationed at Camp Bullis from 1970–71, he learned of some caves there. Unfortunately because of unwritten camp policy at that time, caves discovered on the property were promptly filled with cement. White states that if while searching for caves on Camp Bullis and a patch of cement is found out in the middle of nowhere, one can be fairly certain there is a cave below. Such is the story of Cement Cave. Three other cement patches were located by White for the Bexar County Cave Survey, but only this one was definitely known to be a cave.
Geology: Few caves in Bexar County are, as Cement Cave was, developed along major faults. This faulting is also the contact between the upper member of the Glen Rose Formation and the Edwards Limestone, where primary recharge into the Edwards (Balcones Fault Zone) Aquifer occurs. These geologic factors support the rumor of the cave's large size. Since it was developed in a ravine as a recharge cave adjacent to an important fault, the filling of Cement Cave

represents a possible great loss of recharge water to the aquifer, as well as a loss of valuable data.

CHIMNEY CRICKET CAVE (BCS #163)
Location: Lacoste NE 7.5′
Description: The 1.0 by 0.5 by 1.3 m deep entrance pit opens along an enlarged bedding plane, offsets slightly, and drops another 1.7 m. This drop is followed by a narrow 2.8 m pit. (See Map 35.)
History: While Richard Fulks was clearing land with a tractor, he uncovered the cave. Later that month, on 30 January 1982, Randy M. Waters explored the cave. Gary Poole and George Veni surveyed and named it on 15 October 1983.
Biology: Gnats and a millipede were observed in the cave in addition to the following species collected for study on 15 October 1983 by George Veni:

Snails–*Helicodiscus eigenmanni* (troglophile)
Spiders–Undetermined material
Mites–Undetermined material
Springtails–Undetermined material
Cave crickets–*Ceuthophilus (C.) secretus* (trogloxene)
Antloving beetles–Pselaphidae genus and species

Meteorology: High levels of CO_2 were present during both known explorations.

CHRISTMAS CAVE (BCS #10)
Location: Helotes 7.5′
Description: A small entrance sink leads 5 m down a steep-floored stoopway to a 2.5 m wide walking passage. A large natural bridge and the cave's deepest point, -7 m, are 13 m from the entrance. From here the floor steadily rises until the main passage becomes too small for further exploration 60 m into the cave. A small seasonal stream, flowing toward the entrance, sinks into the sediment at this point. The passage is impassably tight upstream. The cave also has two minor side passages. The first is 1 m high, 1 m wide, and 8 m long; the second extends 2 m before becoming impassably small. (See Map 36; Photo. 7.)
History: For many years the cave has been known to Helotes residents. On 1 April 1967, Ross Felton and Wayne Russell surveyed Christmas Cave. It was resurveyed on 16 July 1983 by Carmen Goyette, Joe Ivy, and George Veni.
Biology: Collections were made in the cave on 25 December 1982 by Joe Ivy and Randy Waters. Scott Harden reported the presence of the slimy salamander *Plethodon glutinosus albagula* in the cave on 22-23 October 1984. The following species have been identified from the cave:

Snails–*Helicodiscus eigenmanni* (troglophile)
Spiders–*Meioneta* sp. (troglophile)
Harvestmen–Prob. *Leiobunum townsendii* (trogloxene)
Millipedes–*Speodesmus* sp. (troglobite)
Cave crickets–*Ceuthophilus* sp. (trogloxene)

Geology: Christmas Cave is an alluviated paleospring developed in the upper member of the Glen Rose Formation. Initial passage development occurred at ceiling level and later cut down to the present floor. The seasonal seep at the end of the cave occasionally rises to flow and pond in the main passage.
Bibliography: Anonymous (1973e:8); Owens (1967: 14); Passmore (1977:14, 46); Veni (1978a:5; 1983: 98).

CIBOHOLE (BCS #11)
Location: Bat Cave 7.5′
Description: The solution pit entrance drops 4 m to a dirt floor. A short crawl follows and drops 0.6 m into a passage 1 m high by 0.5 m wide. Continuing to the south for 1 m, the passage makes a sharp left turn into the main passage. This passage is 0.9 m wide, 1.2 m high, and 6 m long, ending in an organic soil fill. (See Map 37.)
History: Cibohole was discovered by John R. Cross

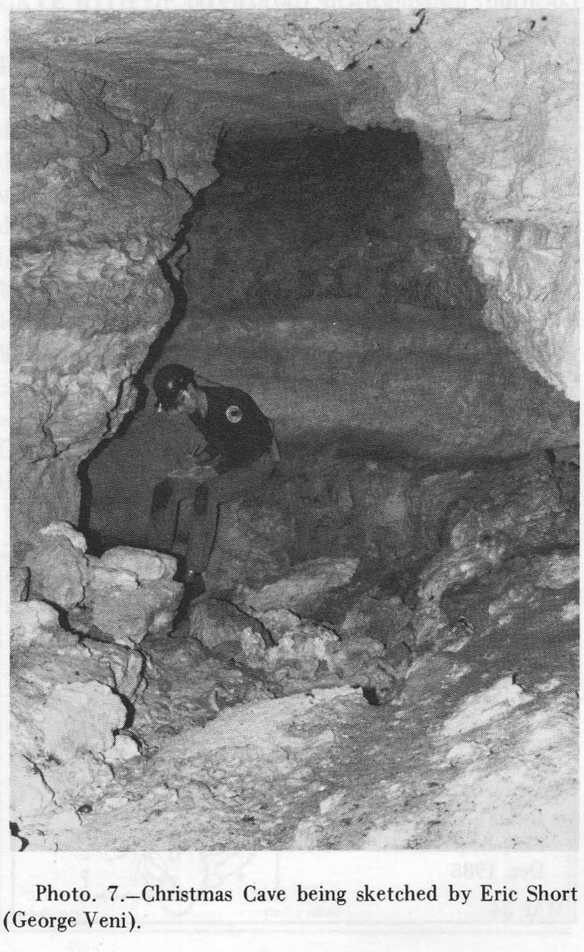
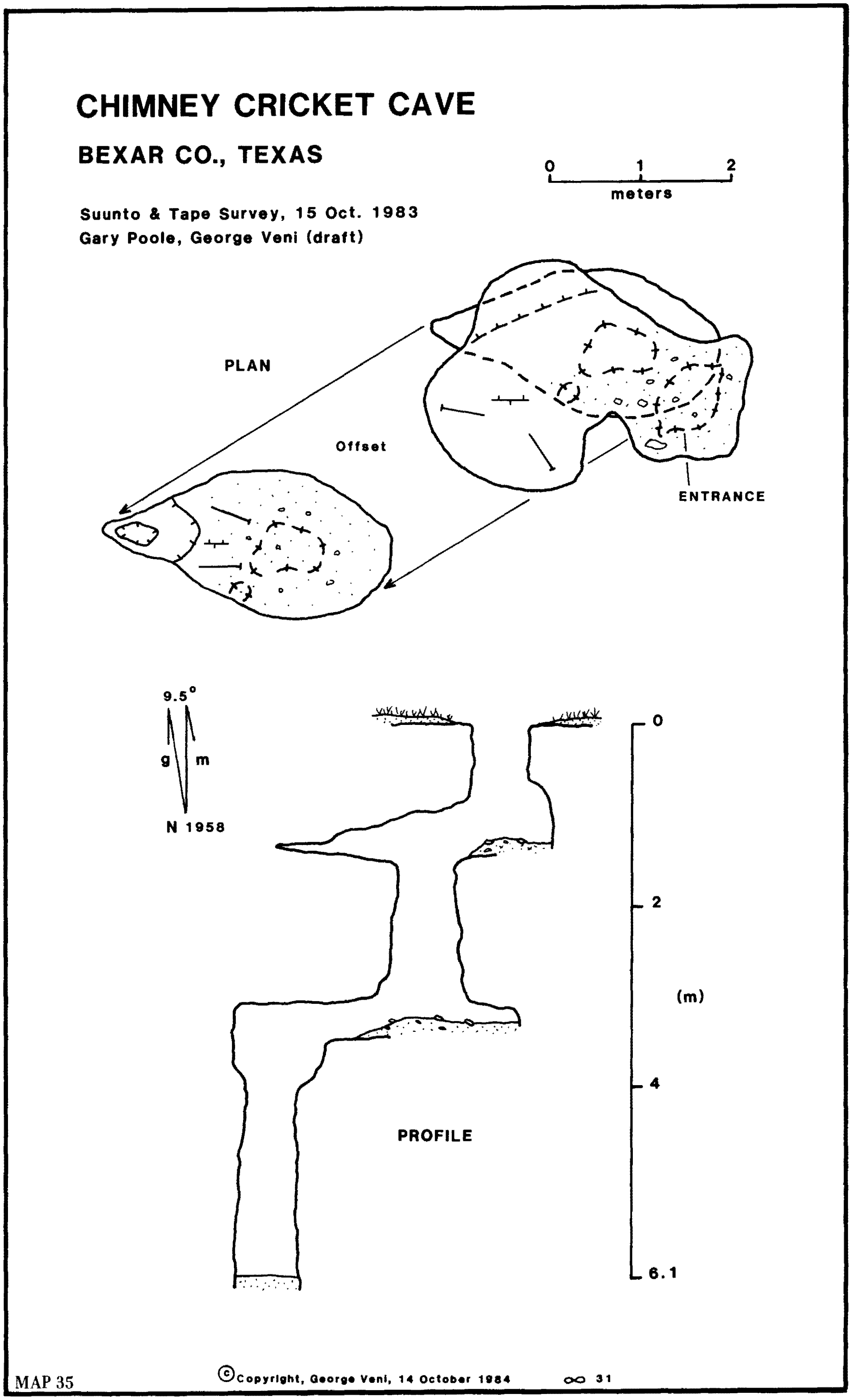


Photo. 7.–Christmas Cave being sketched by Eric Short (George Veni).



CHIMNEY CRICKET CAVE
BEXAR CO., TEXAS
0 1 2
meters
Suunto & Tape Survey, 15 Oct. 1983
Gary Poole, George Veni (draft)
PLAN
Offset
ENTRANCE
9.5°
g
m
N 1958
0
2
(m)
4
6.1
PROFILE
©Copyright, George Veni, 14 October 1984
∞ 31

MAP 35

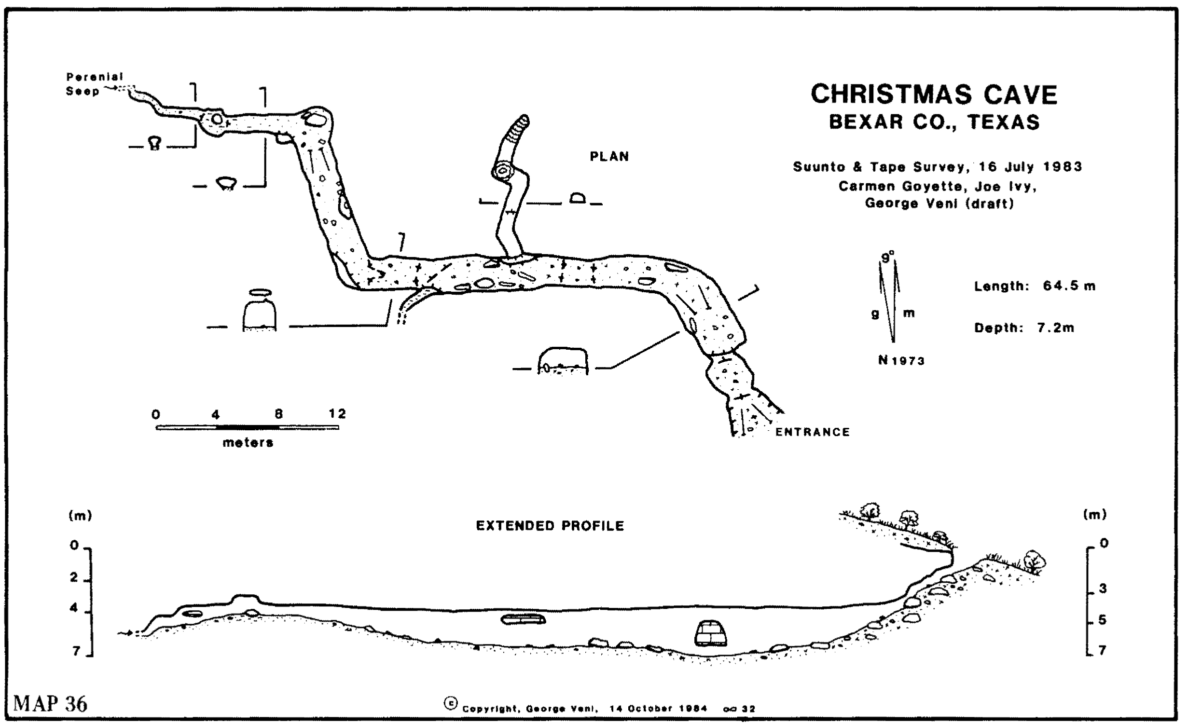
and Randy M. Waters on 7 October 1977. It was then only one of four sinkholes in the floor of Cibolo Creek. The next day they returned with George Veni and removed the rocks blocking access to the pit and dug open the short crawl at its base. Veni was the only one to explore the cave because extremely bad air forced a quick exit.
Geology: Cibohole is developed as a solutionally enlarged joint in a highly faulted and jointed area of the Edwards Limestone. Due to the numerous crisscrossing fractures in this section of Cibolo Creek, preferential fracture enlargement is minimized so that all caves would probably be much like Cibohole—small. The fracture area does, however, serve as a major recharge point into the Edwards (Balcones Fault Zone) Aquifer.
Meteorology: A high CO_2 content noted during exploration was due to a combination of the sealed entrance and decaying organic material. No return trips have been made to determine if the air quality has improved since the opening of the cave.
Bibliography: Veni (1978a:5; 1985).

CIBOLO SHELTER (BCS #12)

Location: Bat Cave 7.5′
Description: In a large cliff overlooking Cibolo Creek, the cave is at the top of a 20 m high talus slope. The 6 m by 6 m entrance leads back 4.5 m to the back wall. On the left wall is a 0.4 m high crawlway that extends 5 m. (See Map 38.)
History: The entrance was first seen on 7 October 1977 by John Cross and Randy M. Waters. The next day the cave was explored when the discoverers returned with Teeni Kern, Gary Poole, and George Veni.
Biology: No cave-adapted creatures were observed, but the cave is occasionally used as an animal den.
Geology: The cave is in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer, but is unrelated to recharge.
Bibliography: Veni (1978a:5; 1985).

COME-ALONG CAVE (BCS #192)

Location: Castle Hills 7.5′
Description: A 1 m diameter pit narrows considerably, forks at a depth of 2.6 m, and continues downward for a total depth of about 4 m before opening to a room 5 m long, 3 m wide, and 1.0 to 1.5 m high. Some flowstone and small stalactites are present. At the room's western end is a short crawlway that narrows to a 0.15 m diameter window into an unexplored passage. This passage drops off about 1.5 m from the window. (See Map 39.)
History: On 6 April 1985 Bob Cowell, Kurt Menking, and Randy M. Waters used a come-along to remove four large rocks from the cave entrance. Before exiting the cave they dug out the top of a dome near the



MAP 36

entrance to open the fork in the entrance pit.

Biology: Harvestmen (prob. *Leiobunum townsendii*), a *Speodesmus* millipede, and cave crickets (*Ceuthophilus* sp.) were noted.

Geology: The cave is vadosely formed in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer.

Technique: Explosives are needed to gain access to the cave's unexplored passage.

Bibliography: Palit (1985a:46).

COON CRAP CAVE (BCS #115)

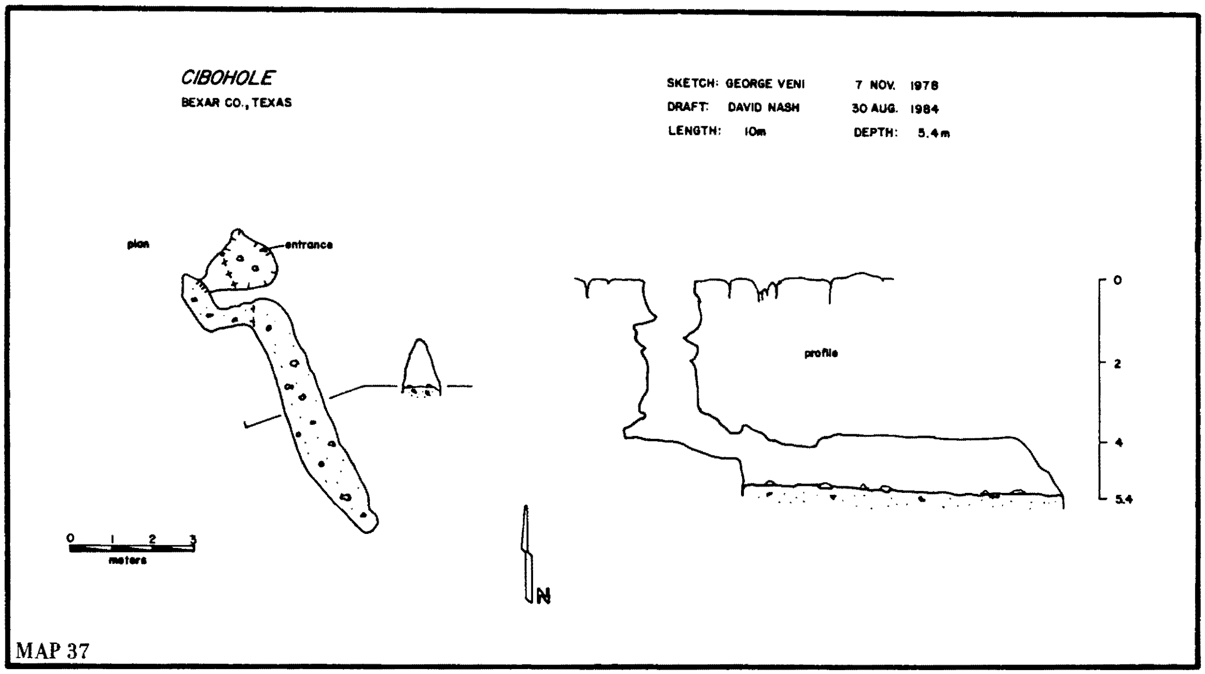
Location: Schertz 7.5′

Description: Five entrances in a bluff overlooking Cibolo Creek open into five interconnecting passages which comprise this 32 m long cave. The two northernmost entrances lead into two parallel crawlways extending to the southwest. They average 1.0 m wide by 0.3 m high and have very dusty floors. The westernmost passage is explorable for 13.5 m where a natural bridge blocks further exploration. Beyond the bridge, the inaccessible portion of the crawl can be seen to continue with passable dimensions for at least 3 m. Eight meters into the first crawl is a tiny hole in the left wall, the "Finger Connection," opening into the end of the second crawlway. Three side-passages extend northeast out to the cliff from the 11 m long second crawlway. The first is 1.4 m from the crawl entrance and is 2 m long. Six meters into the crawlway are the other two passages. The second side passage is 0.5 m high by 0.8 m wide and is 6.5 m long. Midway down its length it drops 1.5 m into the third side passage. This last passage extends southwest impassably small for 3 m to connect with the main crawlway. In the opposite direction this 1.0 m high by 0.7 m wide passage opens within 2 m onto the cliff face. (See Map 40.)

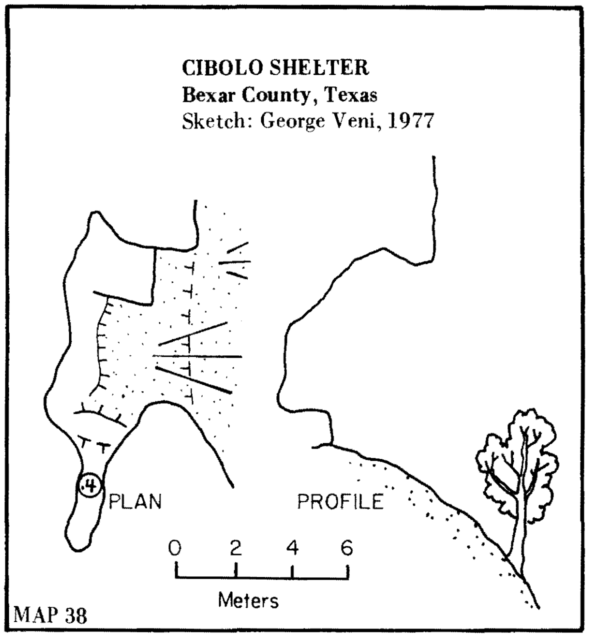
History: Coon Crap Cave is one of three caves in the cliffs of Cibolo Creek shown to Randy M. Waters in mid-December 1978. Waters returned with Kathy Ballard and George Veni on 12 August 1979 to survey the cave. The cave was named for the abundant fecal matter found in the second and third side passages.

Biology: Cave crickets (*Ceuthophilus* sp.) were observed as was ample evidence of raccoons (*Procyon lotor*). Some worm castings were also noted.

Geology: Developed in the Pecan Gap Chalk, the multiple levels and passages of Coon Crap Cave are the result of local groundwater flow adjusting its gradient to the declining base level of Cibolo Creek. Groundwater drainage is primarily guided to the northeast by joints. The highest and oldest of the passages is Gray Cave, parallel, 6 m above, and 5 m south of the 13 m long passage in Coon Crap Cave. The "Finger Connection" reflects diversion of flow to the 11 m long crawlway, almost 1 m lower in elevation. This crawl's side passages are further downward diversions of flow, first to the second side passage and then steeply pirated down to the third. Abundance of dust, an erosional product of the chalk formation, throughout the cave demonstrates a lack of modern groundwater flow.



MAP 37



Bibliography: Anonymous (1979bb:1); Waters (1981a:41-42).

CORKSCREW CAVE (BCS #13)

Alternate names: Classen's Cave; Clawsen's Cave; Classen Corkscrew Cave

Location: Bulverde 7.5′

Description: The cave entrance is a small hole at the base of a large sink. A series of drops, 3.7, 6.1, 1.8, and 1.8 m, corkscrew west, north, and east to the top of a flowstone slope. From the top of the flowstone a passage extends west 6 m to a breakdown room approximately 4 m in diameter and up to 5.2 m high. At the base of the 3.6 m high flowstone slope is a perennial pool of water and the beginning of a 5 m high by 3 m wide breakdown-floored passage. This 18 m long tunnel heads north to a 6 m diameter, 5 m high room with a floor covered with small travertine dams. From this travertine room, two successive drops of 1.5 m open northward into a rubble-strewn room 6.5 by 3.3 by 7.6 m high. Three passages extend from this room, two to the north and one to the east. One of the northbound passages is small and 12 m long; the other is a 9 m crawl to a 7 m diameter, 2 m high room. A tight squeeze connects a small room to this muddy one. The eastward passage, from the 7.6 m high room, continues 7 m past two 1.8 m pitches to a 9.1 m drop into a room 3.4 m in diameter and 10.7 m high. Two passages extend from this room; one is 9 m up in the east wall—the same level as, and opposite to, the entry passage into the room—and the other is through a 2 m deep hole in the floor. The latter goes west 5 m, then turns south as a very wet and muddy crawlway to end after 14 m in a sump. At 46.6 m below the entrance, this is the deepest known point in the cave. Opposite the base of the 2 m hole is a flowstone slope up to a 7 m long crawl which opens into a chamber 11 m long, 5 m wide, and up to 9 m high. Over 4 m up in the chamber's north wall is a 4.6 m high passage that heads west for 8 m. This is the previously mentioned passage located 9 m up the east wall of the 10.7 m high room. East of the 9 m high chamber the cave lowers and narrows for 8 m before enlarging into the last known room in the cave which is 12 m in diameter and up to 4 m high. From this room passages go north and east. The northward passage, at floor level, becomes impassably small after 20 m, but in its ceiling is a 15.5 m high dome into an upper level. The upper level goes west 15 m with heights and widths up to 2.5 m. Eastward, the upper level goes 4 m to a 4 m climb and ends at a flowstone mass after another 8 m. The upper level is better decorated than the muddy lower levels. From the 12 m diameter room, a 5 m wide passage goes east 25 m to a "T" junction. The crawl to the north ends within 15 m at a 6 m high dome. The 1 m high crawl to the south becomes too small after 29 m. (See Map 41.)

History: For many years, Corkscrew Cave was one of the more popular and challenging caves in Bexar County. Access to the cave was unfortunately restricted after a change in ownership about 1974. The first recorded visit is by Orion Knox and other Alamo Grotto members on 16 August 1959. They explored as far as the watercrawl to the sump, but the crawl itself wasn't pushed for another month until Knox returned with Dennis Doyle. Original exploration east of the water crawl was with a piton-assisted climb up the 9 m high east wall of the 10.7 m high room. At an undetermined date the flowstone slope at the east end of the watercrawl was dynamited to enlarge it for human passage, bypassing the piton climb. The cave was surveyed in 1966 and early 1967 by Bruce Davenport, Ross Felton, Patricia Rudewick, and Wayne Russell.

Biology: A visit on 28 October 1970 by members of the St. Mary's University Speleological Society noted the cave had "many spiders and crickets." Suzanne Fowler Wiley collected the fairy shrimp *Streptocephalus* sp. in the cave on 9 April 1967. The cave should be among the more biologically productive of any cave in the county, and it is in serious need of study.

Geology: The morphology of Corkscrew Cave reflects its development in one of the best karst regions of Bexar County. Most of the cave is under the 213 m long by 122 m wide sink that drains to the entrance.

In the western part of the cave, along the route from the entrance to the watercrawl, NE-SW joints guide passage development. This area has been developed and modified by aggressive stormwater runoff entering through the large sink. In sharp contrast, the middle and eastern portion of the cave has developed from the confluence of many small groundwater courses. These mud-floored passages and rooms are probably older than the western portion of the cave. They are developed along northwest-southeast fractures which probably predate the northeast-southwest fractures of the Balcones fault system. The western portion of the cave was probably a minor infeeder to the local base level to which the eastern portion of the cave drained. The western passages were later enlarged and modified by vadose water, while the enlarging entrance sink pirated water from the older eastern passages. Corkscrew Cave is developed in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer. It is one of the few caves in Bexar County that provides human access to the local water table. In this case the water level averages 21 m below the floor of nearby Cibolo Creek (a major stream valley which is usually dry because it loses its water as recharge into the Edwards Aquifer). No research has determined if the recharge water from the cave is maintained in conduit flow or if it disperses into small fractures when under phreatic conditions. Based on the low success rate of drilling productive water wells in that region, the assumption that recharge in the Corkscrew Cave area enters and maintins itself as conduit flow is not unreasonable. The consequences of such a flow regime should be carefully weighed in considering problems of water quality for the regional groundwater supply.

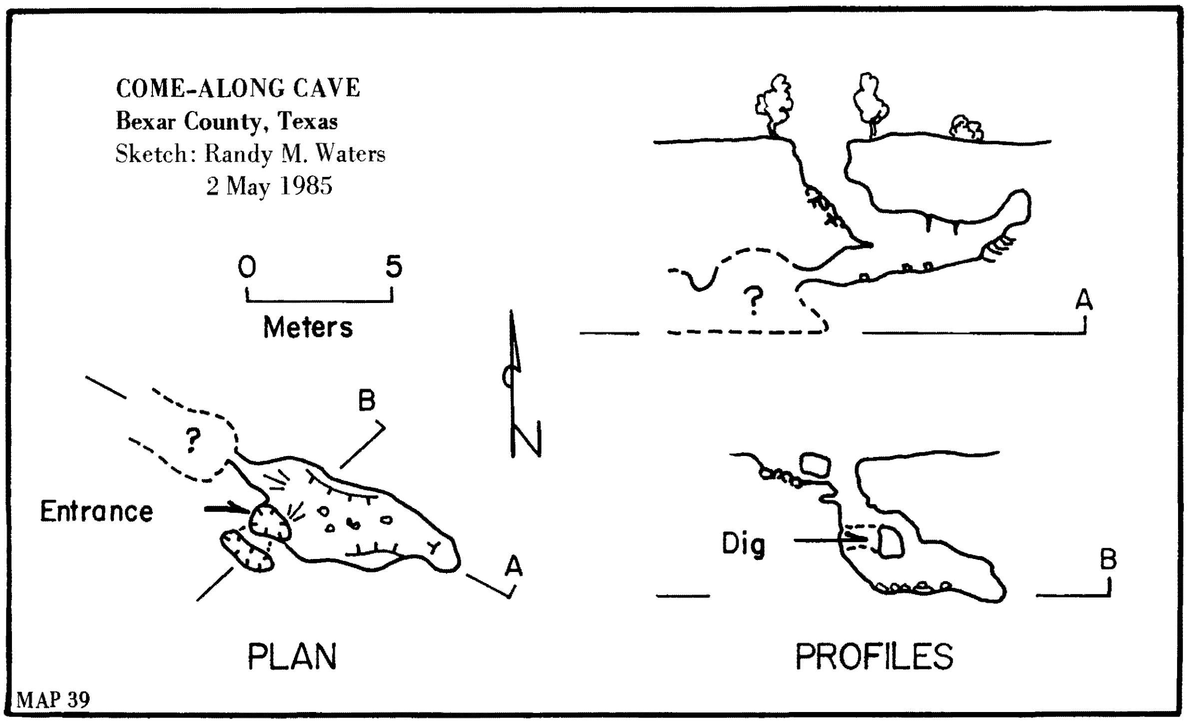
Technique: A 20 m rope or cable ladder is needed for the entrance pits, and another 15 m of rope or ladder is needed for the 9.1 m drop into the 10.7 m high room. Much of the cave is muddy, wet, and offers a fine variety of walking, crawling, and climbing experiences. No one has attempted to push the watercrawl with diving gear. Because of the sump's small dimensions and the overabundance of mud, a dive would probably not be fruitful.

Bibliography: Anonymous (1963c:16; 1965b:102; 1965c:122; 1966a:162; 1966c:127; 1967b:75-76; 1968d:147-148; 1968f:85; 1969a:25; 1973d:4; 1973q:11); Druding (1966:162); Fleming (1973b: 223; 1975:14); Litsinger (1973a:18-19); Miller (1975:25); O'Neill (1973b:158); Owens (1966:10; 1967:14); Passmore (1977:17); Pate (n.d.:32); Reddell (1961b:1); Reddell and Knox (1962:3-4, 11); Reddell and Russell (1962a:5); Reddell and Smith (1966:3); Streng (1974:58); Teates (n.d.:38); Veni (1978a:5; 1978e:4; 1978f:6; 1985).

COUNCIL CAVE (BCS #131)

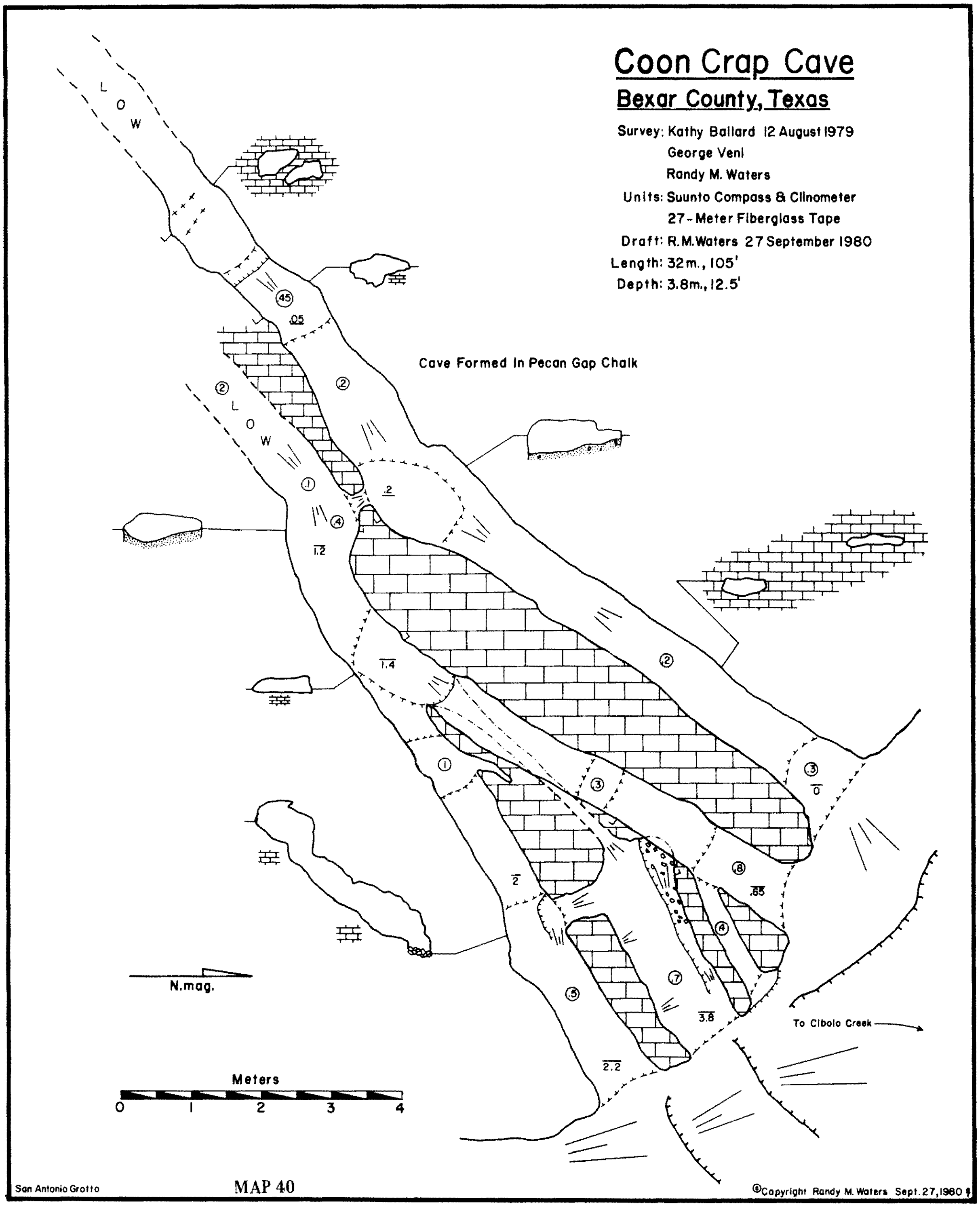
Location: Bulverde 7.5′

Description: The 5 m diameter trash-filled entrance sinkhole of Council Cave has been completely filled

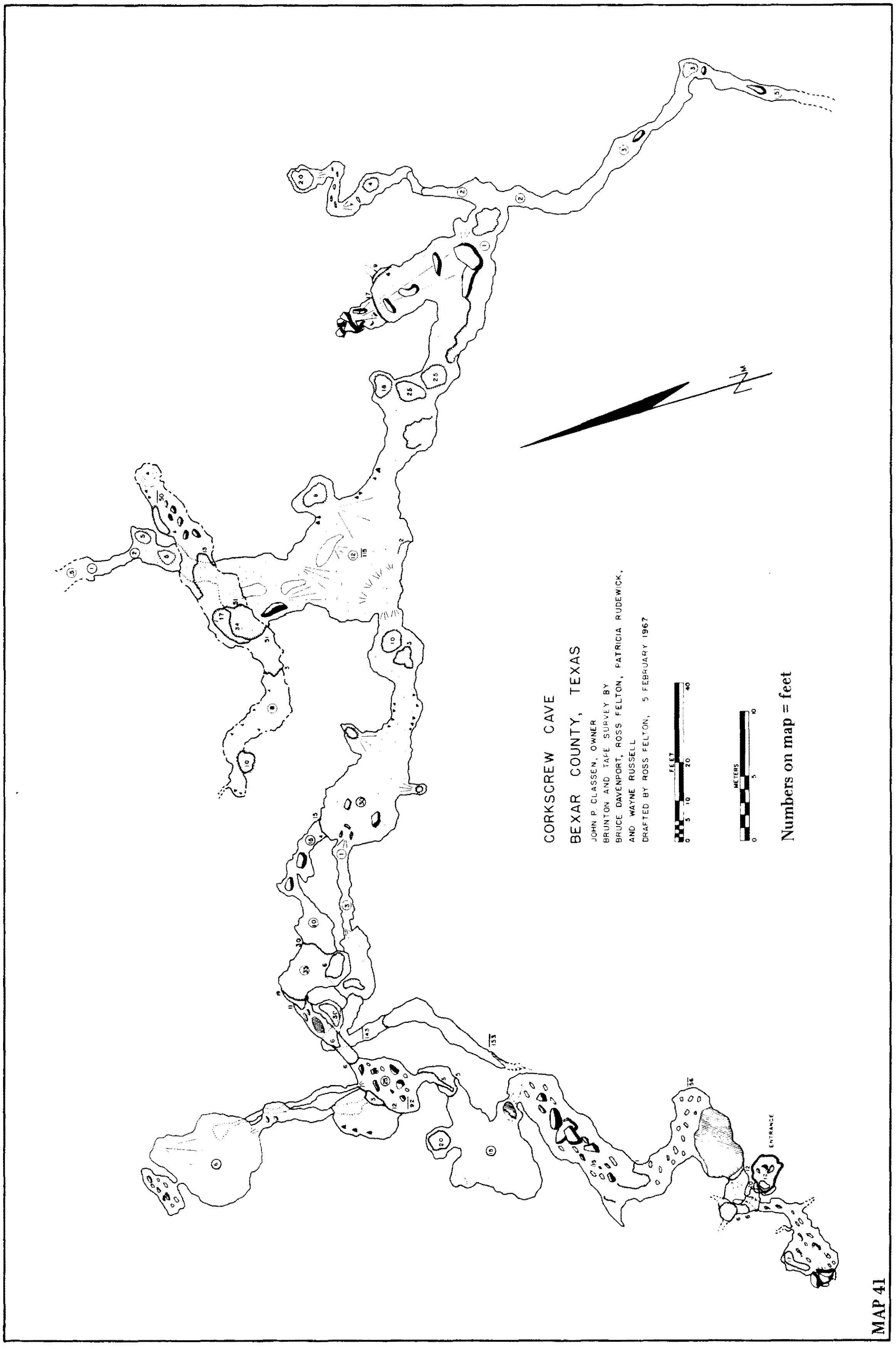


with dirt and rocks. A small hole in the now-covered trash pile led into the cave. The wall indicated on the sketch map, separating the small entrance area from the "Council Chamber" (a half-moon-shaped room approximately 11 m long, 4 m wide, and 0.3 to 1.5 m high), was actually trash. Along the west wall of the Council Chamber was an adjoining small room, 4 m by 2.5 m by 1.5 m high. (See Map 42.)

History: It is not known who used the sinkhole as a trash dump. Land developers found the cave in late 1979 and excavated enough trash to gain access. Chuck Stuehm received permission to explore and

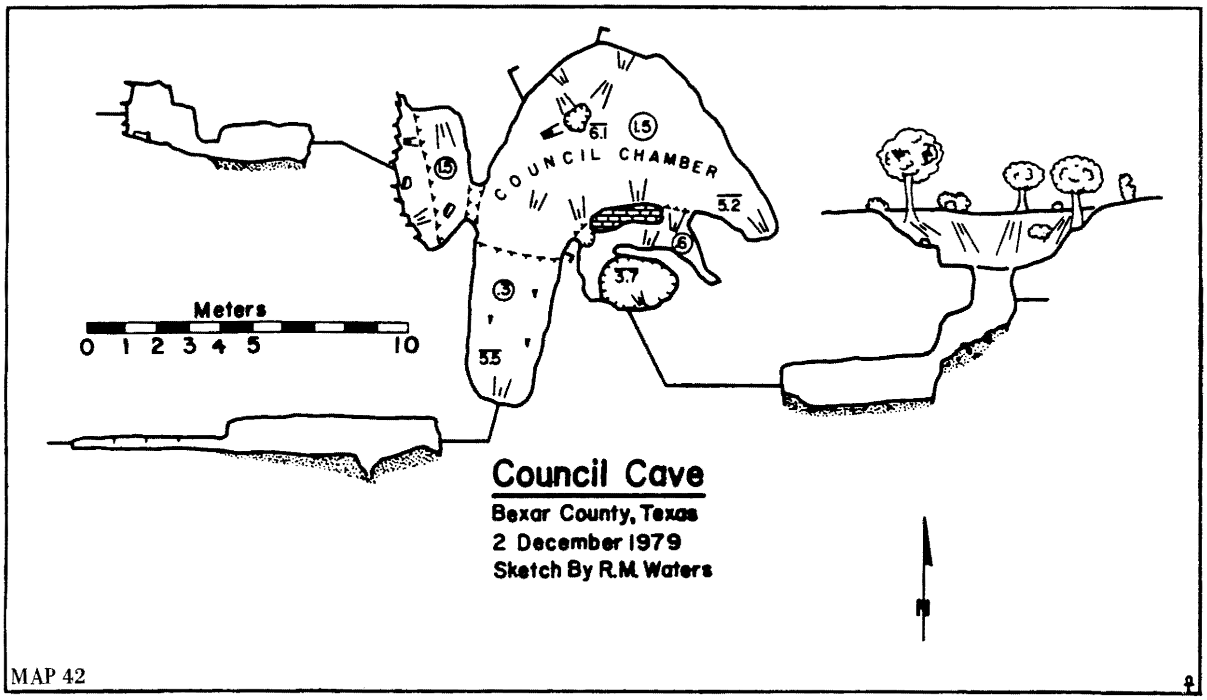


MAP 40

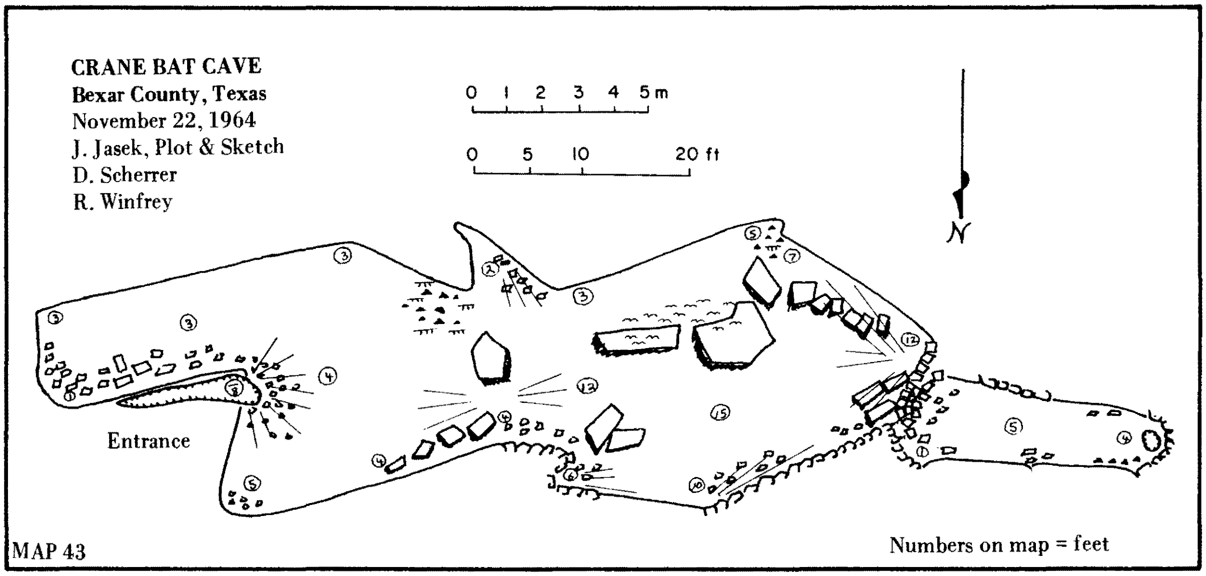

CORKSCREW CAVE
BEXAR COUNTY, TEXAS
JOHN P CLASSEN, OWNER
BRUNTON AND TAPE SURVEY BY
BRUCE DAVENPORT, ROSS FELTON, PATRICIA RUDEWICK,
AND WAYNE RUSSELL
DRAFTED BY ROSS FELTON, 5 FEBRUARY 1967
FEET
METERS
Numbers on map = feet
ENTRANCE
MAP 41

made the only known exploration on 2 December 1979 with Dottie and Teeni Kern, Gary A. Poole, George Veni, and Randy M. Waters. The comfortable soft dirt floor seated a discussion of speleo-politics which inspired the cave's name.
Biology: Spiders, cave crickets (*Ceuthophilus* sp.), and beetles were observed.
Geology: The west wall of the small room, off the Council Chamber, is a recemented paleo-breccia whose collapse is not evident on the surface. As a one-time uncontrolled refuse dump in a sinkhole of the Edwards (Balcones Fault Zone) Aquifer recharge zone, Council Cave represents a potential source of contamination for the regional groundwater supply. A drainage pipe to the subsurface maintains some access to the cave for stormwater runoff collected from the roof and grounds of a nearby business.
Bibliography: Veni (1985).

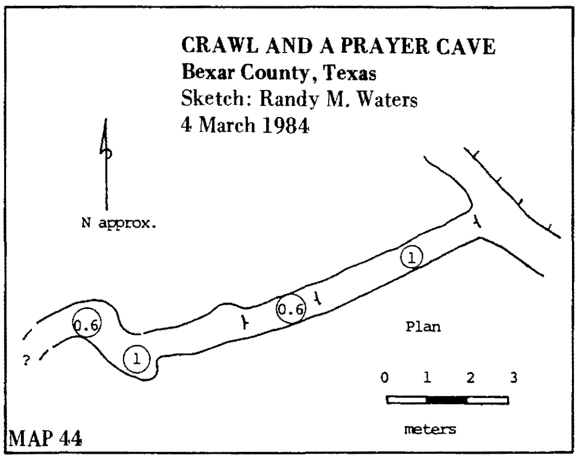
CRANE BAT CAVE (BCS #14)
Alternate name: Crane's Cave
Location: Van Raub 7.5′
Description: A 2.5 m deep elongate sink leads into a room 22 m long, 1 to 5 m high, and 5 to 7 m wide. Crawlways extend into the breakdown- and guano-covered floor but do not lead into any true solution passages. At the west end of the room is an opening to a second smaller room 8 m long, 3 m wide, and 1.6 m high. It is rumored that in early 1977 this area suffered some collapse, the extent of which is not known. Five meters from the entrance is a skylight that is too small to enter. Some small speleothems are present in the cave. (See Map 43.)
History: Carl Crane made the first reported entry into the cave in 1919. In later years, Greg Crane also explored the cave. Not until about 1960 did cavers first visit the cave when St. Mary's University Speleological Society took the Jefferson High School Science Club (San Antonio) to the cave. On 22 November 1964 the cave was surveyed by James Jasek, Dick Scherrer, and Ron Winfrey. A resurvey took place in 1982 by Duane Canny, Steve Gutting, and other members of the Alamo Chapter of the National Speleological Society, but a new map has not yet been drafted.
Biology: The small bat population inhabiting the cave is probably *Myotis velifer incautus.* Other observed fauna includes spiders, harvestmen (prob. *Leiobunum townsendii*), and cave crickets (*Ceuthophilus* sp.).
Geology: Located on a hilltop, the cave is developed along a predominant east-west joint trend in the upper Glen Rose Formation.
Technique: Caution should be observed in the area of potentially unstable breakdown.
Bibliography: Anonymous (1969a:25; 1973j:9; 1973q:11); Austin (1977:12); Passmore (1975c:28); Reddell (1961b:1); Reddell and Knox (1962:3-4, 12); Reddell and Russell (1962a:5); Reddell and Smith (1966:3); Veni (1978a:5; 1983:98).



MAP 42



CRAWL AND A PRAYER CAVE (BCS #187)
Location: Castle Hills 7.5′
Description: This cliffside crawlway is approximately 12 m long, 0.8 m wide, and 0.6 to 1.0 m high. The cave continues unexplored. (See Map 44.)
History: This is one of three caves discovered by Randy M. Waters on 4 March 1984 (the others are Sorehead Cave, BCS #186; and Horizontal Haven, BCS #188). The cave name is another in the "prayer" series where divine intervention may have been needed to have it qualify as a cave according to TSS standards.
Biology: Epigean millipedes, springtails, cave crickets (*Ceuthophilus* sp.), and raccoon feces were noted in the cave.
Geology: Crawl and A Prayer, and its two neighboring caves, formed as small springs for nearby upland drainage. The caves have been hydrologically abandoned as springs due to the continued incising of Salado Creek. Being formed at different levels, the caves may reflect distinct periods of the creek's downcutting.
Bibliography: Veni (1985).



CREEKBED CAVE (BCS #15)
Alternate names: Hitzfelder's Cave; Hitzfelder's Creek Bottom Cave No. 1
Location: Bat Cave 7.5′
Description: Two holes in a brushy creekbed drop 8 m into the eastern end of the cave. The first room is roughly square, about 13 m on a side, and is 1.3 m high. Two low crawls off the east end might offer new discoveries to a diligent digger. The known cave extends west past some columns into a 5 by 7 by 1 m high second room. A 6 m long crawlway from the second room goes into a third room 13 by 10 by 1.6 m high. Two small pits located where a crawlway leads from the northeast corner of the third room drain all the water that enters the cave and have exhibited slight airflow. In spite of considerable digging and blasting, the way onward is much too small to follow. The crawlway which extends west over the pits goes 5 m to a junction. The left passage slopes down and ends within 10 m; the right branch enters a small room with a 5 m high dome. (See Map 45; Photo. 8.)
History: The owner had known of the cave for quite some time prior to its exploration and survey by James Jasek and Larry Wertheim on 28 December 1964. Creekbed Cave was occasionally visited by local cavers in the following years. In 1978-1980 Randy M. Waters led members of the San Antonio

Grotto on a thorough push of the cave. During this period the cave was blasted and excavated in search of new passages (see the history of Hitzfelder's Bone Hole, BCS #39, for other related information).

Biology: Spiders, harvestmen (prob. *Leiobunum townsendii*), silverfish, cave crickets (*Ceuthophilus* sp.), beetles, and rattlesnakes (*Crotalus* sp.) and other snakes have occasionally been seen in the cave.

Geology: Creekbed Cave has developed in the basal Edwards Limestone near its contact with the Glen Rose Formation. The Glen Rose acts as an aquitard, resulting in the ponding of water which enters the cave. The flat mud floors and low, wide cross-sectional shapes result from this ponding; sediment accumulates as it drops out of the standing, chemically aggressive, vadose water which enlarges the cave by lateral solution along bedding planes.

Meteorology: High CO_2 concentrations are sometimes present in the cave. A minor volume of intermittent airflow has been noted from the small pits near the back of the cave.

Technique: A cable ladder or 10 m rope is needed for the entrance drop.

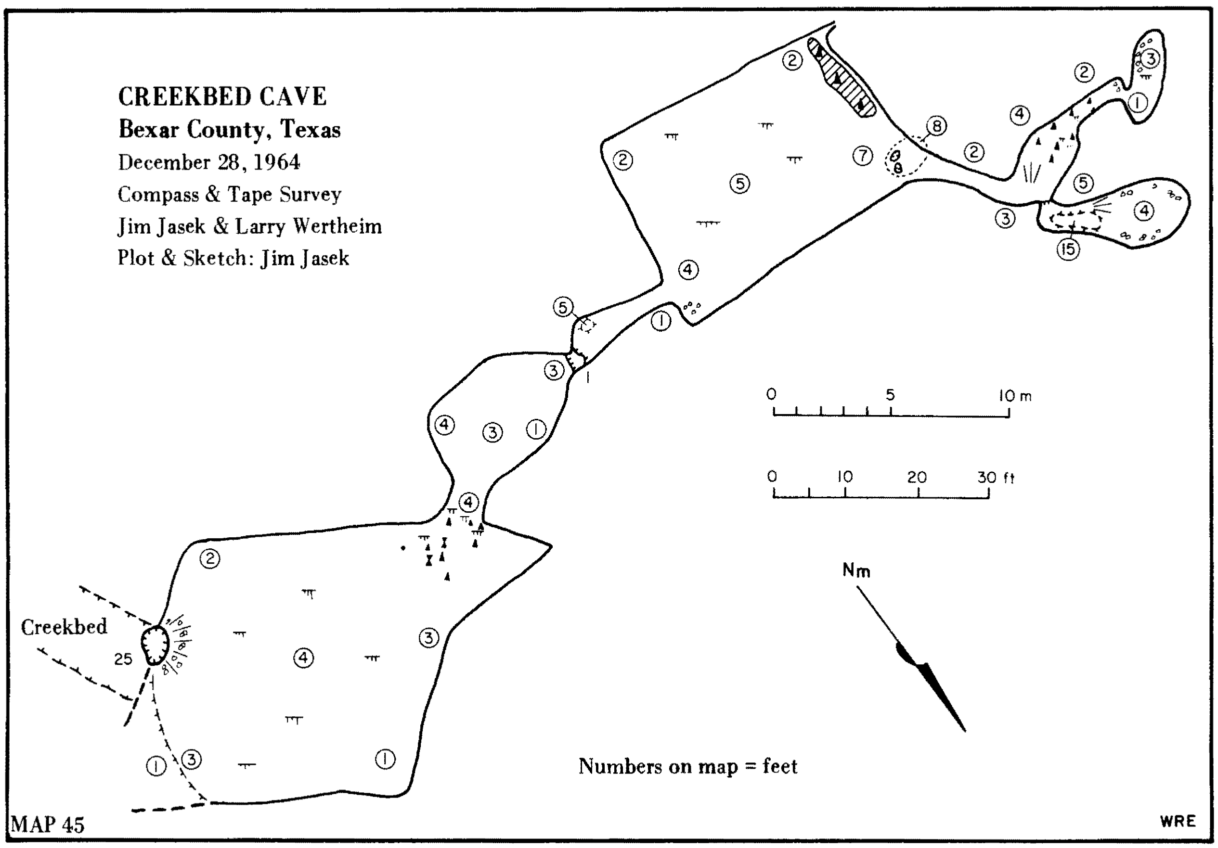
Bibliography: Anonymous (1964d:131; 1973q:12; 1979d:2); Passmore (1977:18); Reddell and Smith (1966:3); Veni (1978a:5); Winkler (1973e:2; 1973f:2).

CRESCENT SPRING (BCS #105)

Location: Bulverde 7.5'

Description: Located at the base of a cliff along Mud Creek, the spring entrance is 6 m wide by 2 m high. After 4 m the passage narrows to 1.8 m and the height is reduced to 1.1 m. At this point a 0.3 m thick concrete wall blocks the passage. An 8 cm diameter pipe protrudes from the wall to discharge the spring flow, and a small square window in the wall, covered with a sheet metal door, allows access further into the spring. Five meters beyond the wall, the passage narrows to 0.8 m wide and averages 1.8 m high, of which 1.1 to 1.4 m is water filled. The explored portion ends in a small sumped continuation of the passage 9.5 m from the entrance. (See Map 46; Photo. 9.)

History: The spring has been used to water livestock for about 100 years. In the early 1950s the wall was built to increase storage capacity and to control spring flow. The first cavers to be shown the cave were Dottie and Teeni Kern, Gary A. Poole, George



Veni, and Randy M. Waters in the summer of 1978. The cave name materialized through a series of bad puns. Scott Harden and George Veni surveyed the cave in the summer of 1979.

Geology: The cave is the resurgence for the 2-For-1-Crescent-Spring System. 2 For 1 Spring and 2 For 1 Cave (BCS #103 and 104) were a single cave stream passage truncated by a valley. Stream flow exits 2 For 1 Spring, sinks into 2 For 1 Cave, and has been dye-traced to rise at Crescent Spring located 460 m to the southwest. All three caves are developed along the same joint which clearly appears as lineation on an aerial photo. Average flow from this perennial spring system is about 8 liters per minute and is absorbed in the bed of Mud Creek to recharge the Edwards (Balcones Fault Zone) Aquifer. Minor seep springs along the north wall of the Crescent Spring entrance are bedding-plane leakage from the elevated water level behind the concrete wall. Crescent Spring has never been known to go dry.

Technique: A crescent wrench is needed to open the door in the wall.

Bibliography: Anonymous (1978e:1; 1979r:4); Veni (1985).

CRYSTAL CAVE (BCS #109)

Location: Bulverde 7.5′

Description: The triangular entrance pit, about 1 m on a side, drops 2.6 m to a rock-floored crawl. The crawl leads into a 3 m long by 1 to 1.5 m wide room. A fault runs the length of the room and goes southwest into an adjoining second room which is 0.6 to 2 m wide, 1.3 to 2.2 m high, and 3 m long. The second room and the rest of the cave contain abundant and varied forms of calcite, giving the cave its name. Speleothems include the usual stalagmites, stalactites, and flowstone; less common are calcite blades, shards, and nodules. A 4 m pitch connects the second room to the third room, which is bisected by a calcite curtain. The third room is approximately 5 m long, 1.0 to 2.6 m wide, and 1.5 to 4 m high. At the far end of the room the ceiling drops to within 1 m of the floor and a short sloping passage leads to a pit. The pit is 9 m deep, 3 m long, 2 m wide, and has a sticky red clay floor. (See Map 47.)

History: Crystal Cave was discovered as a result of its owner's search for a big cave which he could commercialize and make his fortune (see history of Hitzfelder's Bone Hole, BCS #39). In early 1978 at

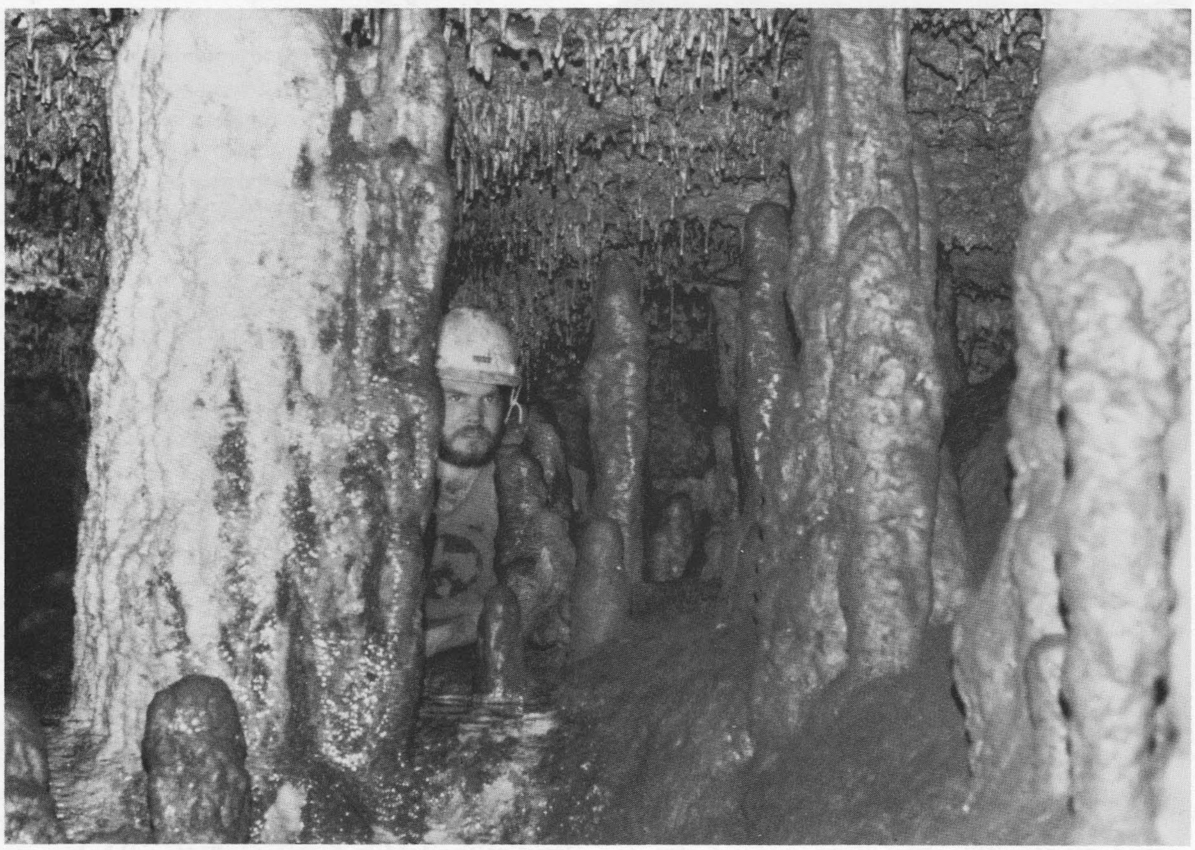


Photo. 8.—Speleothems in Creekbed Cave and admirer Randy Waters (Don Bowman).

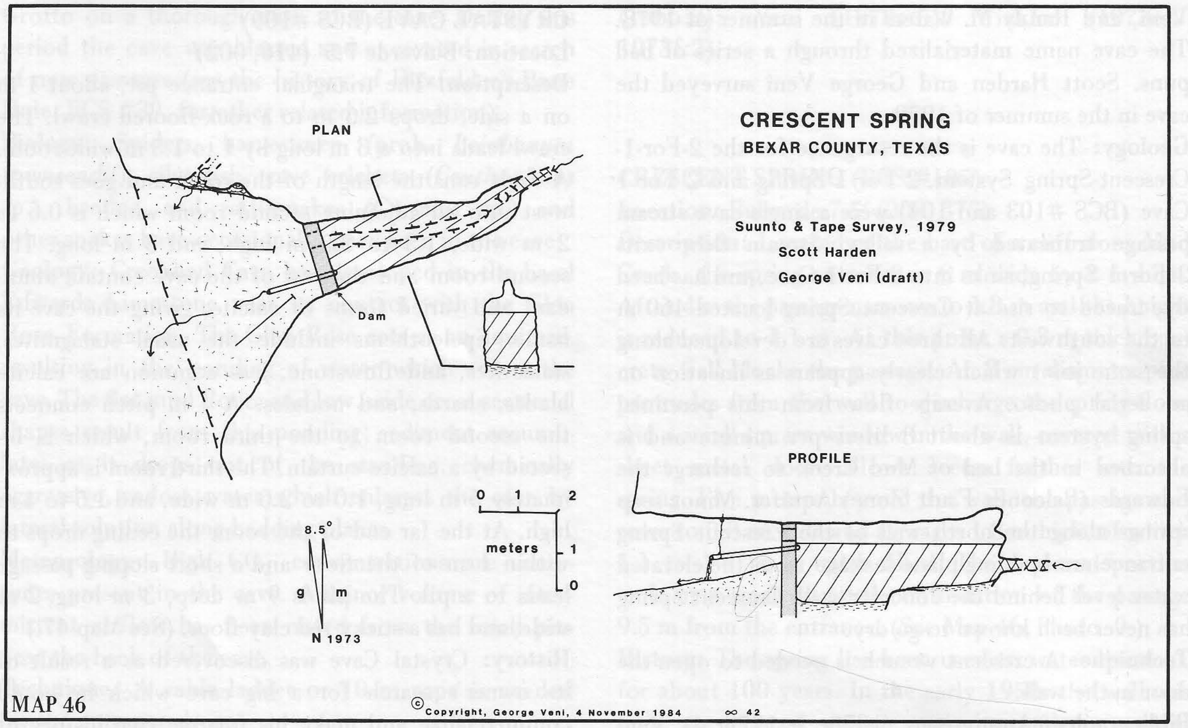


Photo. 9.—Kurt Menking peeking past dam into Crescent Spring (George Veni).

the owner's urging, cavers dug a small sink to a depth of 1 m. Willard Schwartz resumed the excavations on 29 October 1978 and uncovered a natural bridge that obstructed further progress at a depth of 1.6 m. On 5 November 1980 David Radsdorf, Danny Vail, and Randy M. Waters continued the digging effort; after removing a large breakdown block, they found a small hole into the cave's first chamber. Enlisting the aid of Brad Westberry and a jackhammer, the crew returned the next day and removed the natural bridge to gain access into the room. Waters then led Radsdorf and Pat Martain on the first exploration of the cave.

Geology: The cave has developed in the Edwards Limestone and is only one of two Bexar County caves intersected by a fault. Its tightly sealed entrance aided in speleothem growth by maintaining the cave's humidity and in preventing weathering through aeration.

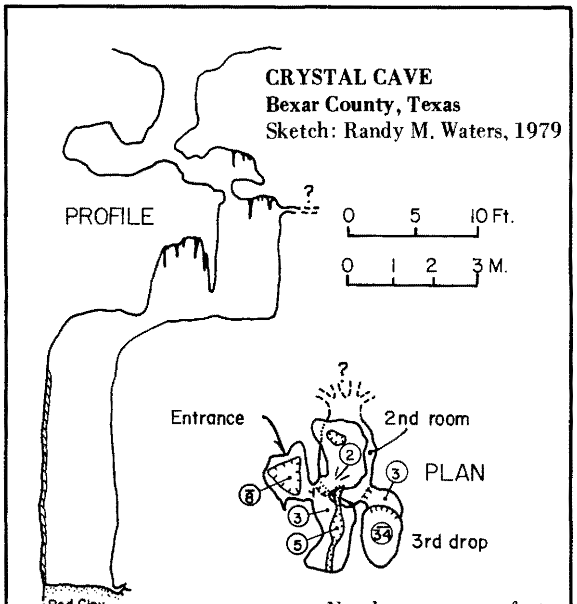
Technique: A rope or ladder is needed for the 9 m deep pit. A tree near the entrance is the only available anchor.

Bibliography: Anonymous (1978g:7; 1979l:3); Boyer (1979:46).

CUB CAVE (BCS #16)

Location: Bulverde 7.5′

Description: A 14 m diameter collapse sinkhole opens southward into a 20 m diameter, 8.5 m high room. A

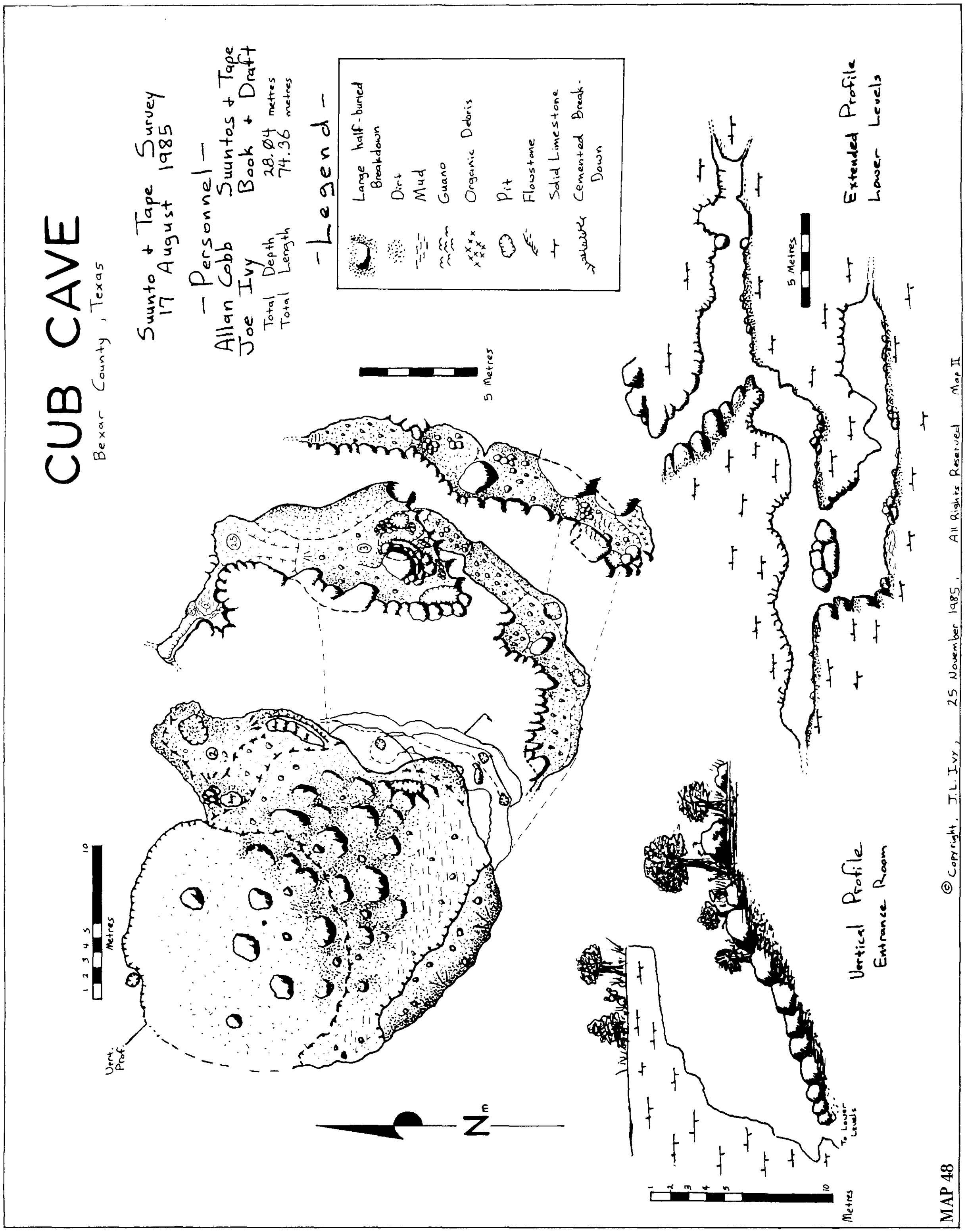


MAP 47

1 m diameter hole near the room's western wall leads down to three levels of passages. The passages are primarily spaces between collapsed blocks and the cave wall. Five meters below the entrance to the lower levels is the first level which extends north 12 m and is 3 m wide by 1.5 to 3 m high. Continuing straight down 4 m past the first level the passage opens to the south-bound second level. This level is 15 m long, 2 m wide, and up to 2 m high. Midway along its length are two 0.6 m diameter pits which drop 3 m to the third level which heads north 16 m, varying in width from 0.5 to 1.0 m and in height from 1 to 3 m. All levels pinch in breakdown or flowstone-covered breakdown. (See Map 48.)
History: The discovery and exploration of Cub Cave coincide with the discovery of Bear Cave about 100 m away. The first documentation of the cave is on a 1964 location map of Bear Cave by James Jasek. The overhanging entrance has occasionally been used for vertical and rescue training. The cave was surveyed by Allan Cobb and Joe Ivy on 17 August 1985.
Biology: The cave serves as an animal shelter. Allan Cobb collected snails and flies in the cave on 17 August 1985. Other observed fauna includes spiders, harvestmen (prob. *Leiobunum townsendii*), cave crickets (*Ceuthophilus* sp.), and a slimy salamander (*Plethodon glutinosus albagula*). Fresh bat guano was present in the third level but no bats were seen.
Geology: The cave developed as a single phreatic chamber in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer. The chamber was later intersected by Mud Creek, resulting in the large entrance and breakdown floors.
Bibliography: Anonymous (1976b:34; 1978i:2; 1979v:3; 1979y:6); Kastning (1974:126); Orozco (1974d:19-20); Palit (1984a:14; 1985b:87); Veni (1978a:5; 1985); Winkler (1973e:2).

CUEVA CAVE (BCS #17)
Location: Longhorn 7.5′
Description: Two 1.3 m diameter vertical entrances drop 2 m into the northeast corner of the cave. The single room is 12 m in diameter, 2 m high, and ends in dirt fill. (See Map 49; Photo. 10.)
History: Known since the early 20th century, the cave was said to be much more extensive than that presently accessible, extending as far as 1.6 km to Canyon Creek Country Club. In 1962 during the development of the City of Hollywood Park, a large volume of dirt and rocks were dumped into the cave, sealing any passageways. Although no map or written report confirms this, it is said that members of the St. Mary's University Speleological Society surveyed the cave in the 1960s. The cave was resurveyed on 10 October 1983 by Carmen S. Goyette, George Veni, and Randy M. Waters. The present owner has been excavating the cave in search of the rumored extensive passages. The cave's close proximity to Cueva Lane inspired the street name, which in turn inspired the cave name.
Biology: The cave was almost devoid of life when surveyed in 1983. A diligent search by George Veni and Carmen Goyette on 10 October 1983 discovered an epigean pillbug, a troglobitic isopod (Trichoniscidae genus and species 1), and a troglobitic millipede (*Speodesmus* sp.), all feeding on decaying wood. The lack of fauna is probably due to the owner's use of pesticides and herbicides in maintining his yard, situated only 4 m above the cave. Cueva Cave would serve as an excellent site for studying the effects of roadways and urban contaminants such as pesticides, herbicides, and septic systems upon the cave life.
Geology: Cueva Cave is the only known cave in Bexar County with significant bedding dip. The beds strike N84°W and dip 3°S. The cave developed in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer as a collapse chamber (probably of phreatic origin) that has been modified by vadose flow through its entrance sink.
Bibliography: Veni (1985).

DAM CRAWL (BCS #114)
Location: Bulverde 7.5′
Description: This seasonal spring is a single passage averaging 0.8 to 1.0 m wide and 0.35 m high. From an entrance in a small creek cliffbank, the passage extends 6 m northeast, turns west for 4 m, north for


CUB CAVE
Bexar County, Texas
Suunto + Tape Survey
17 August 1985
— Personnel —
Allan Cobb Suuntos + Tape
Joe Ivy Book + Draft
Total Depth 28.04 metres
Total Length 74.36 metres
— Legend —
Large half-buried Breakdown
Dirt
Mud
Guano
Organic Debris
Pit
Flowstone
Solid Limestone
Cemented Break-Down
5 Metres
Extended Profile
Lower Levels
Metres
Vert. Prof.
N
To Lower Levels
Vertical Profile
Entrance Room
©Copyright, J.L. Ivy, 25 November 1985. All Rights Reserved. Map II
MAP 48

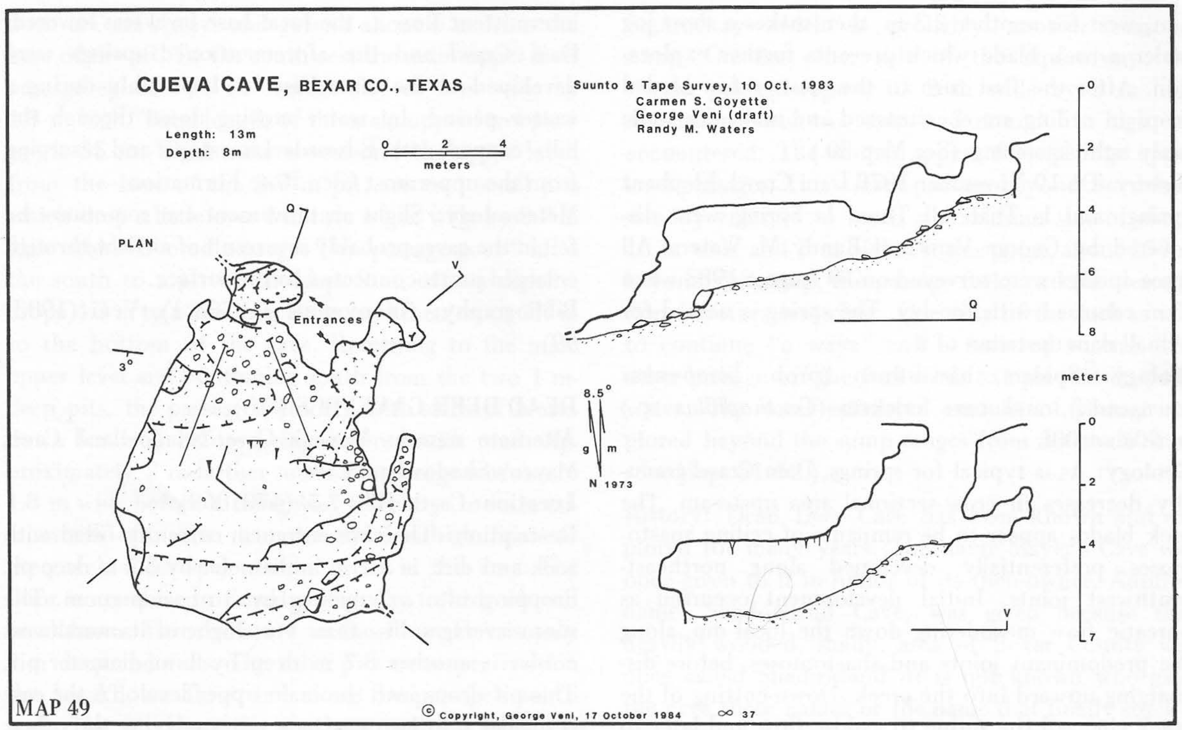


Photo. 10.–Suburban karst. Cueva Cave in owner's front yard (George Veni).

2 m, west for another 2.3 m, then makes a short jog under a rock blade which prevents further exploration. After the first turn to the west, a few bladed drops in ceiling are encountered and make for some fairly tight squeezing. (See Map 50.)

History: On 19 November 1978 Dam Crawl, Elephant Spring, and Is That All There Is Spring were discovered by George Veni and Randy M. Waters. All three springs were surveyed on 10 August 1983 when Veni returned with Joe Ivy. The spring is named for a small dam upstream of it.

Biology: Spiders, harvestmen (prob. *Leiobunum townsendii*), and cave crickets (*Ceuthophilus* sp.) were observed.

Geology: As is typical for springs, Dam Crawl gradually decreases in cross-sectional area upstream. The rock blades appear to be remnants of ceiling anastomoses preferentially developed along northeast-southwest joints. Initial development occurred as phreatic flow meandering down the local dip, along the predominant joints and anastomoses, before discharging upward into the creek. Down-cutting of the creek changed the spring to vadose flow and later to intermittent flow as the local base level was lowered. Dam Crawl and the aforementioned springs were developed at the same base level, possibly during a wetter period, by water moving down through the hills capped with Edwards Limestone and resurging from the uppermost Glen Rose Formation.

Meteorology: Slight air movement can sometimes be felt in the cave, probably as a result of airflow through enlarged joints connected to the surface.

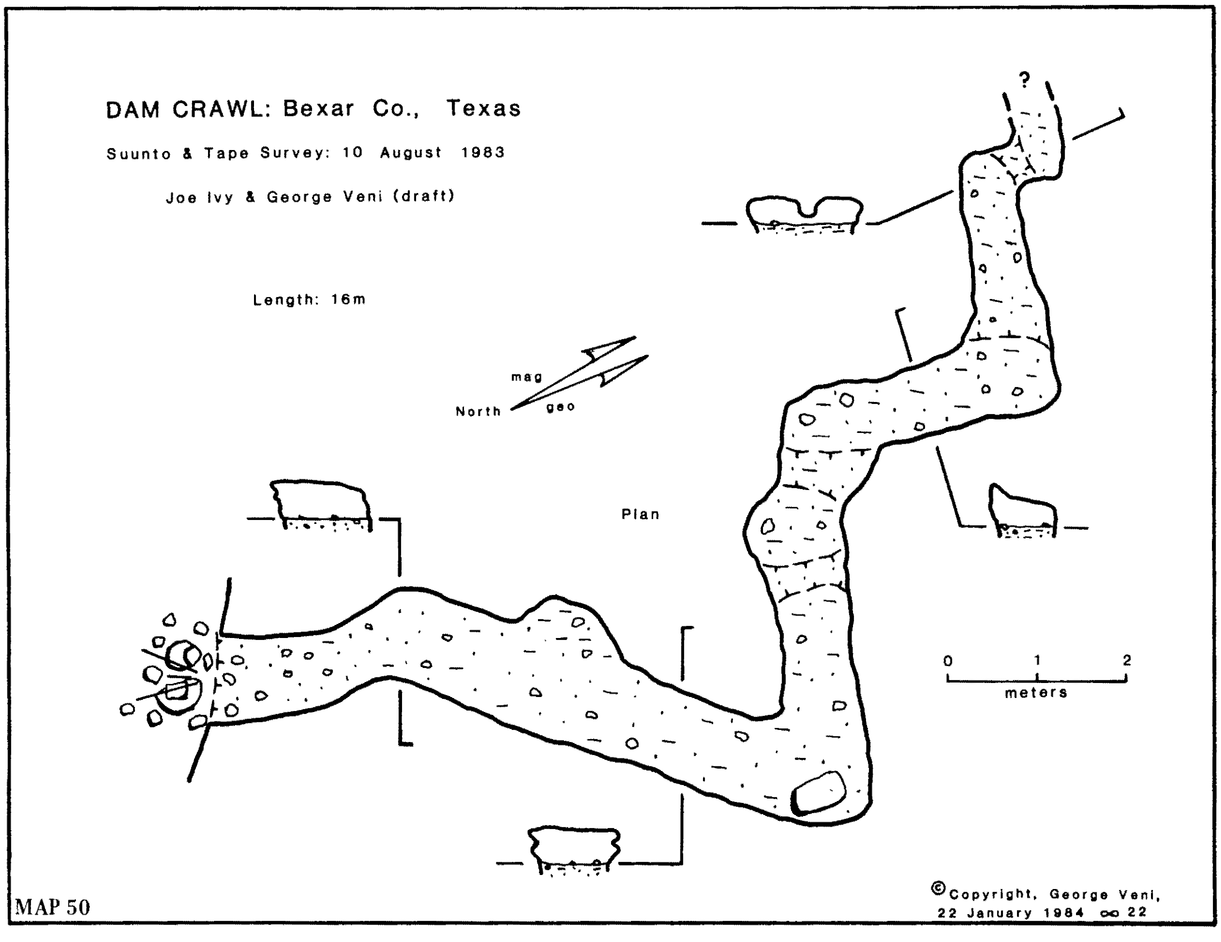
Bibliography: Anonymous (1978h:1); Veni (1983: 99).

DEAD DEER CAVE (BCS #18)

Alternate names: Mayer's Cave; Shadowland Cave; Mayer's Shadowland Cave

Location: Castle Hills 7.5′

Description: The cave entrance, currently filled with rock and dirt, is a 1 m in diameter by 3.7 m deep pit dropping into a 7 m long by 3 m wide room. The room averages less than 1 m high; in its northwest corner is another 3.7 m deep by 1 m diameter pit. This pit drops into the main upper level. To the east it divides into two passages, one overlying the other.

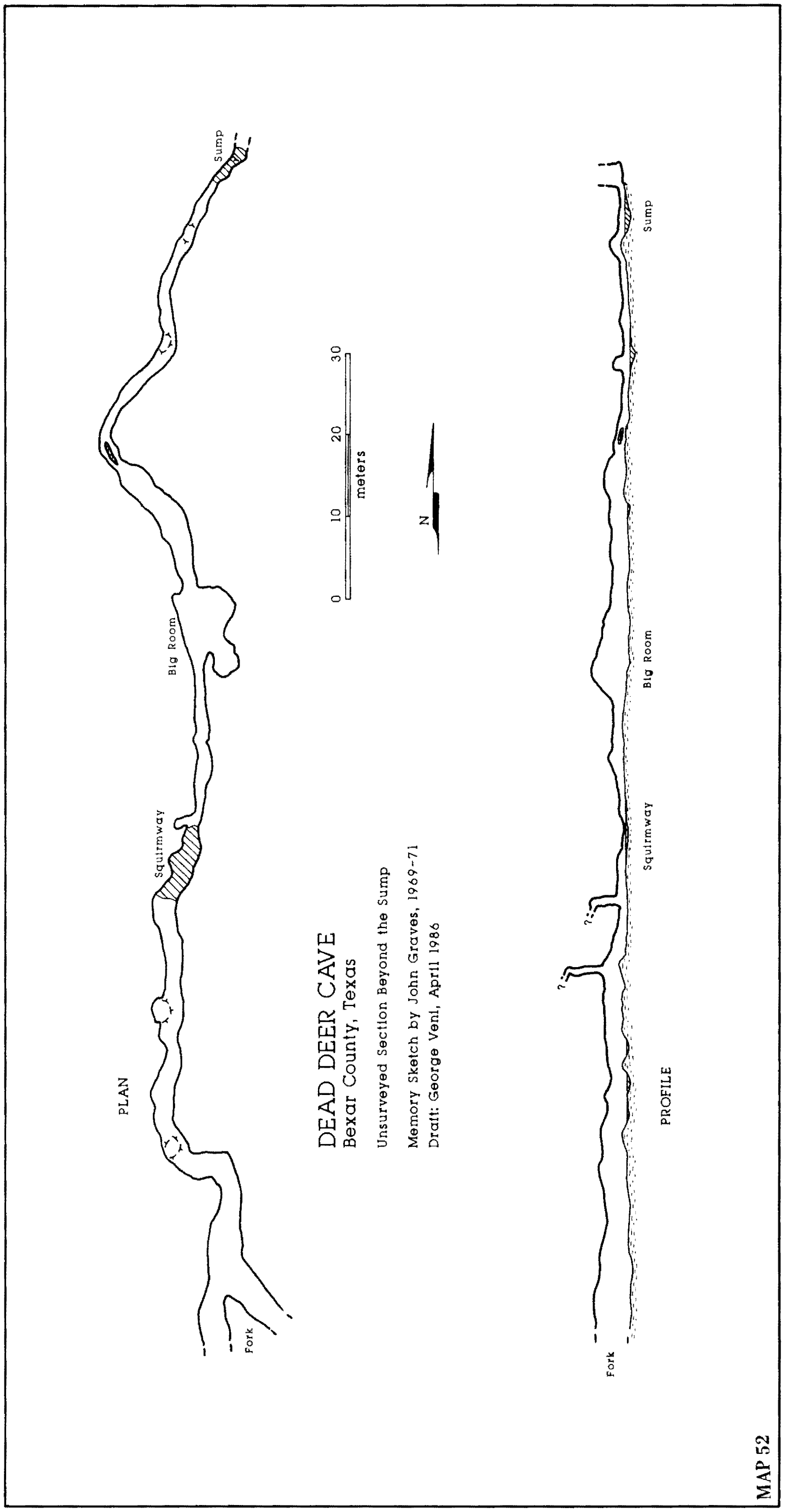


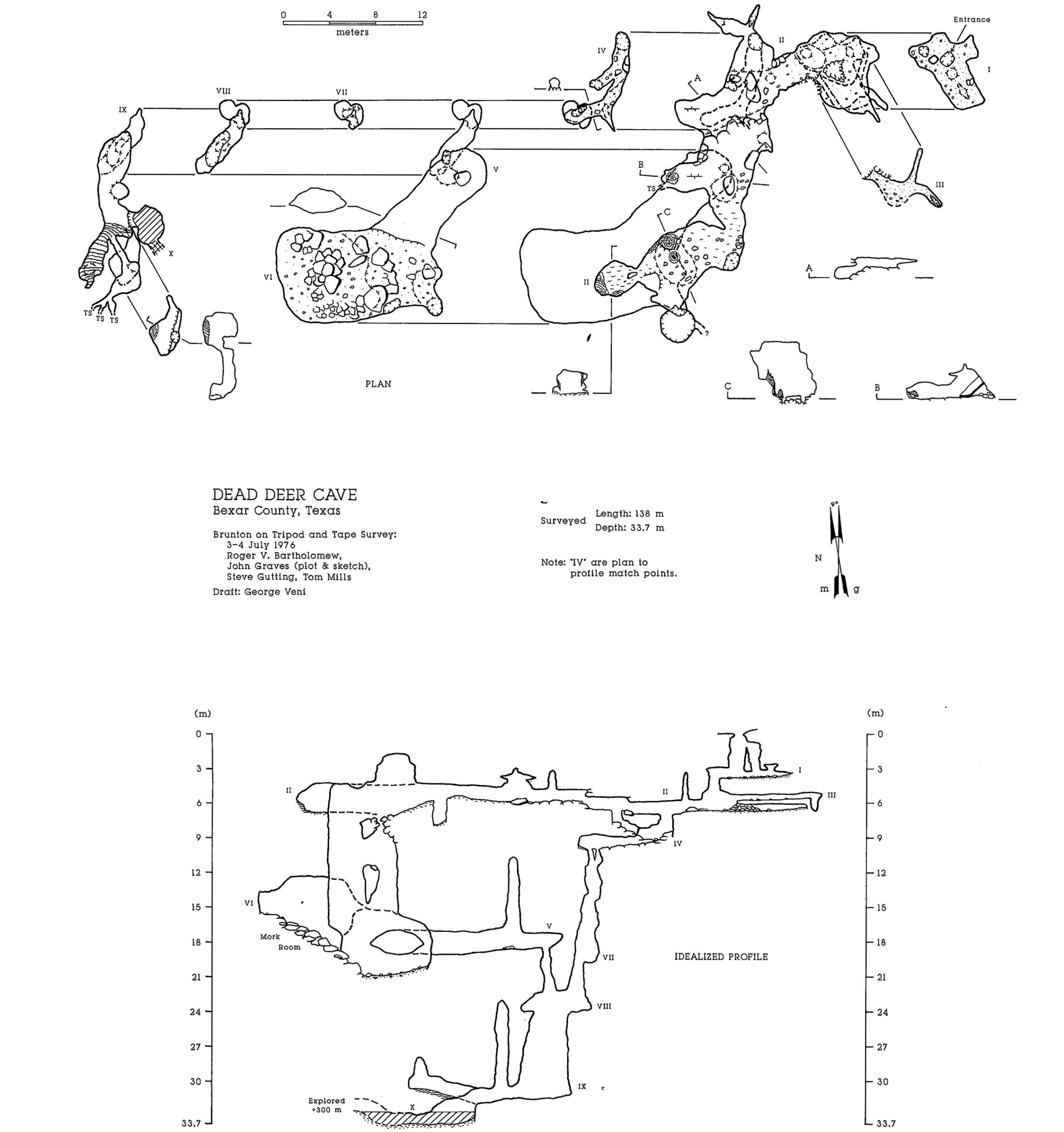
MAP 50

Both are crawlways and extend about 6 m from the base of the pit. To the southwest the main upper level passage enlarges to an average size of 4 m wide by 1.3 m high. Total length of the main upper level passage is 35 m. Eight meters west into the upper level, from the base of the 3.7 m pit, are two small pits which drop a little over 1 m into a 1 m wide by 0.7 m high rubble-floored passage. This passage goes 9 m to the south to a pit which drops 9 m, offsets slightly, drops 4.3 m to a 2 m long ledge, and then drops 7.7 m to the bottom of the cave. Returning to the main upper level and continuing south from the two 1 m-deep pits, the passage is floored with slabs of breakdown for 6 m before being covered with mud. Approximately 2 m farther south the passage narrows to 1.8 m wide before turning west to enlarge to its maximum size of 6 m in diameter and 5 m high. Some of the cave's nicer speleothems occur in this area. The floor is composed of mud giving way to bedrock and breakdown. Three pits are in the floor. One is only 2 m deep and ends. The other pits are respectively in the breakdown floor and along the passage's south wall. The pit along the southern wall has an unexplored passage which extends from its far side. Both pits drop 11.8 m into the largest room of the cave, the Mork Room. The Mork Room measures 14 m long by 8 m wide and has an average ceiling height of 5 m. The room extends primarily to the west up a 5 m high breakdown slope. In the northeast corner and 1.5 m above the floor of the Mork Room is a 5 m wide by 2 m high passage extending 8 m to a 1 m diameter pit. This pit connects with the pit system described earlier that extends to the bottom of the cave. Six meters down the pit is the 2 m long ledge above the 7.7 m drop. The 1.5 m wide passage at the base of that pit heads south for 8 m to a pool and a sump. Just before the pool is another southbound passage. This passage extends up a flowstone slope to a fork. The west branch is 1.5 m wide by 1 m high and ends after 5 m. The east branch is a tight crawlway for the first 3 m. It enlarges slightly for another 3 m before splitting into three passages which are all too small to follow. In the ceiling of this passage is a 4 m high dome to a 3 m diameter by 2 m high upper level room. Backtracking to the sump, the sump has airspace during extended dry seasons and the stream passage beyond can then be explored. The passage begins as a low muddy crawlway and enlarges to a 2 m wide by 3 m high fissure within 40 m. Sixty meters down the passage is the Big Room, which is about 10 m long, 5 m wide, and 4 m high. The stream passage continues along its southeasterly trend off the Big Room, but after 20 m it pinches down to an 8 m long tight water crawl—the Squirmway—which is probably another seasonal sump. On the other side of the Squirmway, the stream passage regains its 2 m wide by 3 m high dimensions, and two domes, 5 m and 7 m high, are encountered. The domes appear to lead into upper level passages. The stream passage beyond the domes steadily enlarges to reach a maximum size of about 10 m wide and 7 m high. At this point, about 150 m beyond the sump, the passage forks and the description becomes less clear. One side of the fork is said to continue "a ways" and is believed to end. The other passage off the fork leads to a pit that drops to water. The total estimated amount of passage explored beyond the sump ranges from 300 to 500 m. (See Maps 51-52.)

History: Dead Deer Cave has been known and explored for many years. The name Mayer's Cave was once given to it in honor of its then-owner. Another name, Shadowland Cave, was given because that heavily wooded, shady, area of Bexar County was once called Shadowland. It is not known who gave the cave these names or the name that finally stuck—Dead Deer. Dead deer, however, were being tossed into the cave by a local hunter during the early 1960s. The first significant exploration of the cave by organized cavers wasn't until 17 June 1961 when Orion Knox and Barbara Madden explored to the top of the drop into the Mork Room. They returned with Al Brandt, Leonard Clark, and John Talley on 15 July 1961 and explored past the Mork Room to the sump. These trips make no mention of the other pit system route to the sump and one undated and anonymous sketch shows the pit system as explored, except for the final drop to the bottom of the cave. Between 1969 and 1971, Al Brandt and John Graves explored the stream passage beyond the sump. On 18 March 1973 the cave was gated by Graves, Glenn Darilek, Forrest Smith, and Mike Walsh. Unfortunately, the gate was breached, and on 31 May 1975 Dead Deer Cave was the site of a major cave rescue. The accident involved two teenage boys climbing out of the Mork Room. One suffered a broken leg and jaw, and the other was fatally injured. A year later the cave was surveyed to the sump by Graves, joined by Roger V. Bartholomew, Steve Gutting, and Tom Mills, on 3-4 July 1976. As a result of the 1975 fatal accident, the owner purportedly filled the pit entrance with dirt and rocks sometime after the survey. In early 1986 a large sewer pipeline was placed within 30 m of the cave. Bexar Grotto members are checking on reopening the cave to monitor for sewage leaks.

Biology: Roger V. Bartholomew collected the cave


DEAD DEER CAVE
Bexar County, Texas
Unsurveyed Section Beyond the Sump
Memory Sketch by John Graves, 1969-71
Draft: George Veni, April 1986
PLAN
PROFILE
Fork
Squirmway
Big Room
Sump
0
10
20
30
meters
N
MAP 52


0 4 8 12
meters
Entrance
PLAN
DEAD DEER CAVE
Bexar County, Texas
Brunton on Tripod and Tape Survey:
3-4 July 1976
Roger V. Bartholomew,
John Graves (plot & sketch),
Steve Gutting, Tom Mills
Draft: George Veni
Surveyed
Length: 138 m
Depth: 33.7 m
Note: 'IV' are plan to
profile match points.
N
m
g
(m)
Mork
Room
Explored
+300 m
IDEALIZED PROFILE

MAP 51

108A

cricket *Ceuthophilus (C.) secretus* in the cave on 2-3 July 1976.

Geology: Dead Deer Cave is formed along a creekbed by vadose waters recharging the Edwards (Balcones Fault Zone) Aquifer. Northeast oriented fractures captured water from the creekbed to form the cave, but since Dead Deer's initial development the creek has cut down and only high stage floodwaters reach the pit entrance. However, in spite of the pit being filled and located a bit above the creek floor, substantial volumes of water probably still enter and travel through the cave along highly permeable solutionally enlarged fractures. The stream passage in Dead Deer is the longest and largest passage known in the Edwards Limestone Group in Bexar County. The passage is perched atop the Regional Dense Member of the Person Formation. The pit at the end of the passage drops to the water table of the Edwards Aquifer located, at that point, within the Kainer Formation. The capacity of Dead Deer Cave to rapidly transmit unfiltered water directly to the regional water supply makes the cave a sensitive recharge site in the management of the Edwards Aquifer.

Technique: If the cave is excavated, a 30 m long rope is needed for the pit system to the bottom. Alternatively, two 15 m ropes are needed if exploring to the bottom via the Mork Room and the drop beyond it. Wetsuits are not needed for the stream passage, although a light wetsuit top may be nice if surveying or otherwise moving slowly. CAUTION: The stream passage should only be entered when there is no chance of rain.

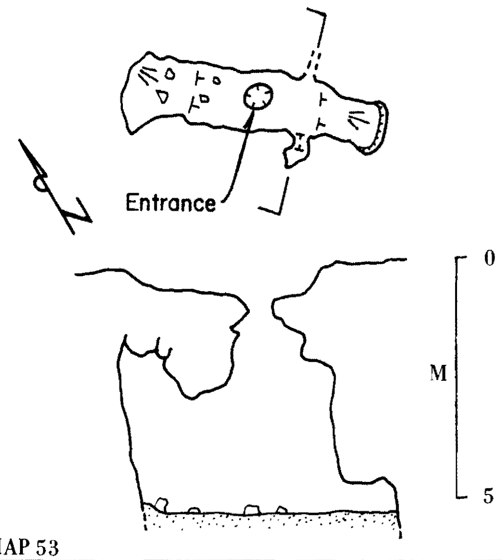
Bibliography: Anonymous (1963a; 1963b; 1963c:16; 1963d:130; 1964f:62; 1973l:10; 1973m:3; 1973q: 11; 1975a:9; 1975c:109; 1975d; 1975e:1-B; 1975f: 5-A); Bundrant (1968:21); Darilek (1973a:149; 1973c:115); Earll (1975:1-A, 14-A); Ediger (1975: 165); Fieseler (1975:110-111); Grantham (1975: 113); Hagerty and Hagerty (1975:112); Jasek (1975a: 106); Kastning (1983:478); Passmore (1975a:107-109; 1975b:30-32); Reddell and Knox (1962:3-5, 13); Reddell and Russell (1962a:5); Reddell and Smith (1966:3); Veni (1978a:5; 1985); Widener (1959:81).

DEATH LOOP CAVE (BCS #181)

Location: Longhorn 7.5′

Description: The 0.4 m diameter entrance dropped 5 m into a 6 m long by 1.5 m wide by 2 m high room. (See Map 53.)

DEATH LOOP CAVE
Bexar County, Texas
31 December 1983
Discovered by Kurt Menking
& R.M. Waters



MAP 53

History: Kurt L. Menking and Randy M. Waters discovered and explored the cave on 31 December 1983. They named it for its location near Farm Market Road 1604, sometimes known as the "Death Loop" for its high incidence of traffic fatalities but also called that by cavers for its expansion to a four lane highway which will fill and pave over more than 1,000 sinkholes and many caves (Sinkin, 1983). The cave was sealed by construction of the Stone Oak Housing development in 1985.

Geology: The cave was developed in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer.

Bibliography: Sinkin (1983).

DICK WHITE CAVE (BCS #157)

Location: Bulverde 7.5′

Description: Dick White Cave was a small pit approximately 0.6 m in diameter and 6.1 m deep.

History: Probably in the early 1960s, James Jasek placed a location map for the cave in the St. Mary's University Speleological Society cave files. The author of the brief description is unknown. In 1974 Steve Gutting updated the files and stated that the cave had been destroyed.

Geology: The cave was developed in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer.

Bibliography: Veni (1985).

DIRTWATER CAVE (BCS #137)

Location: Castle Hills 7.5′

Description: A 3 m diameter, 1 m deep sinkhole slopes into the 0.5 m high by 1 m wide entrance. The cave narrows and turns southwest after 2.5 m into a small collapse room measuring 2.5 m long, 2.8 m wide, and 0.4 m high. Two passages extend southwest from this area; the higher one is 2 m long and the lower drops 1.2 m through a very narrow slot and continues 2.5 m to the cave's end. (See Map 54.)

History: Discovered on 12 October 1980 by Greg Fritz, Kurt Menking, Gary Poole, George Veni, and Randy M. Waters, the cave was named for a popular movie of that time. Joe Ivy and George Veni surveyed the cave on 2 August 1983.

Biology: The following material was collected by Joe Ivy and George Veni on 2 August 1983:

Snails—*Helicodiscus eigenmanni* (troglophile)
Isopods—Trichoniscidae genus and species 1 (troglobite)
Spiders—*Cicurina varians* (troglophile)
Eidmannella rostrata (troglobite)
Achaearanea porteri (troglophile)
Harvestmen—*Leiobunum townsendii* (trogloxene)
Springtails—Undetermined material
Cave crickets—*Ceuthophilus (C.) secretus* (trogloxene)
Ants—*Labidus coecus* (accidental)
Crane flies—Tipulidae genus and species

Observed but not collected were moths and two cliff frogs (*Syrrhophus marnocki*).

Geology: The cave is a shallow collapse sink, with some vadose modification, developed within the recharge zone of the Edwards (Balcones Fault Zone) Aquifer.

Bibliography: Veni (1983:99; 1985).

DREAMLAND ROAD CAVE (BCS #19)

Location: Castle Hills 7.5′

Description: The only known information concerning this cave is that it was 4 m deep and led off laterally in four directions.

History: The cave was broken into on 19 April 1968 during trenching for a sewer line. The next day it was briefly written up in the *San Antonio Light* newspaper. On 23 April 1968 David Litsinger went to visit the site only to find it already covered by the sewer construction.

Geology: The cave was developed in the Austin Chalk Formation.

Bibliography: Anonymous (1968a).

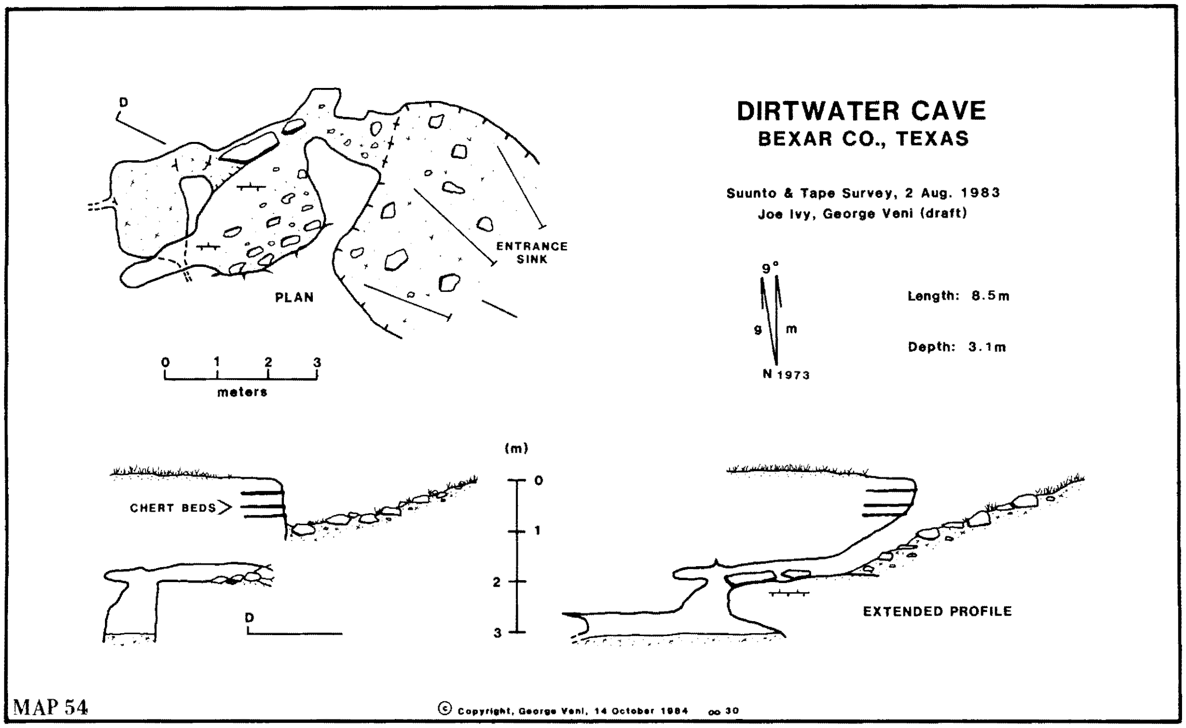
DROP AND A PRAYER PIT (BCS #106)

Location: Bulverde 7.5′

Description: A 4.98 m deep pit, with an average diameter of 1 m, ends in a loose matrix of soil and organic debris. (See Map 55.)

History: Discovered by Randy M. Waters in the summer of 1978, he and George Veni surveyed the pit on 4 October 1978.

Biology: Harvestmen (prob. *Leiobunum townsendii*)



MAP 54

and cave crickets (*Ceuthophilus* sp.) were observed.

Geology: Drop and a Prayer Pit developed as a recharge pit into the Edwards (Balcones Fault Zone) Aquifer. It is located in the flood plain of Mud Creek.

Bibliography: Anonymous (1978a:4; 1978e:1); Veni (1985).

DYNAMITE CAVE (BCS #20)

Alternate names: C.C.C.C. Trash Hole; Dynamit Cave

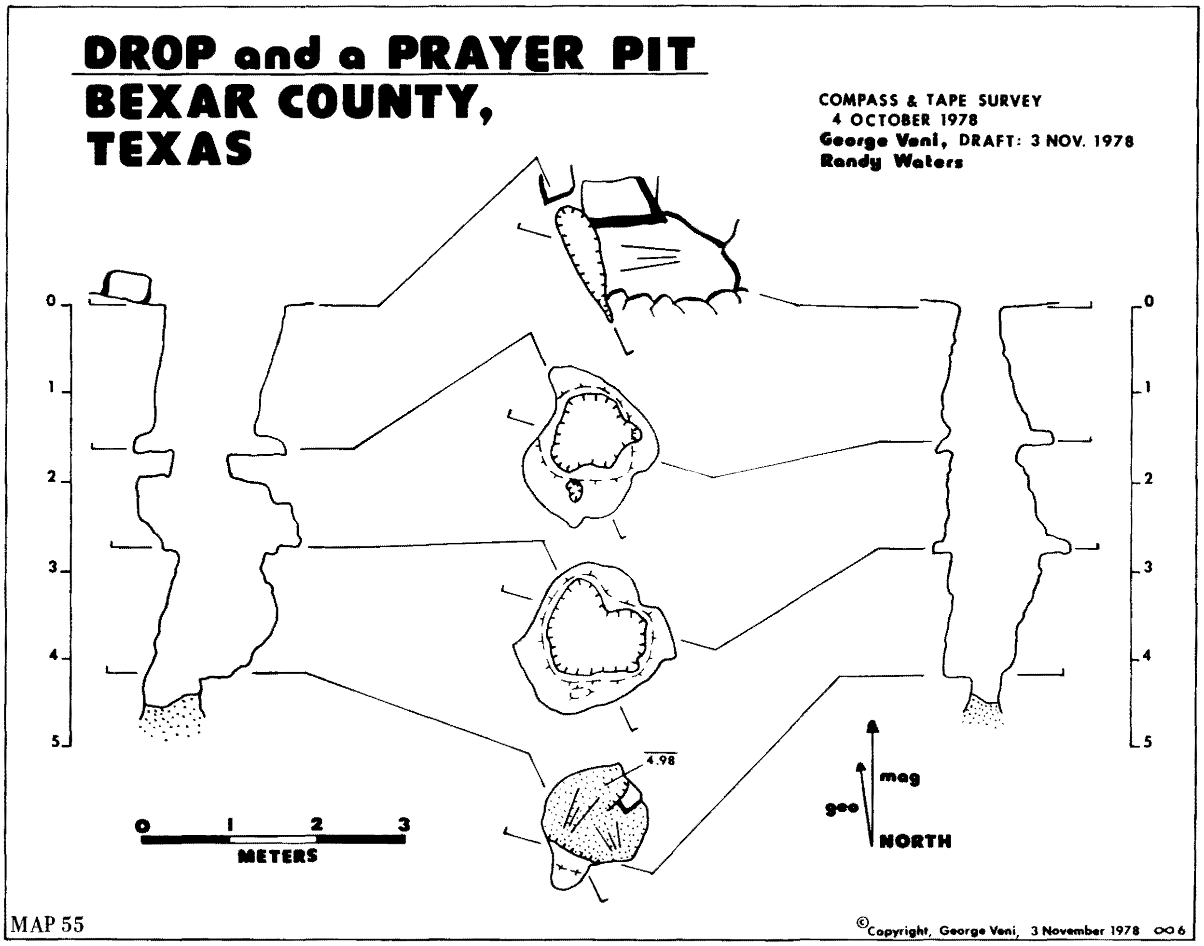
Location: Castle Hills 7.5′

Description: A trash-strewn entrance sink slopes into a room about 5 m in diameter and 1.5 m high. In the southeast corner of the room, a pit drops 2 m to a trash fill and a second level. Trash spilling into a 3 m square, 1 m high room almost seals this second level. Extending from the small chamber is a 6 m long crawl to a small, heavily flowstone-covered terminal chamber. Prior to the trash dumping, the pit dropped 2 m farther to breakdown and opened into a chamber 3 m wide, 16 m long, and 1 to 3 m high. At its northeast end a small hole opened to a mud-floored room 0.6 m high and 7 m long. Adjoining this was a 5 m long by 1 m high room with a small, too-tight crawl where the cave drains and exploration ended. (See Maps 56–57.)

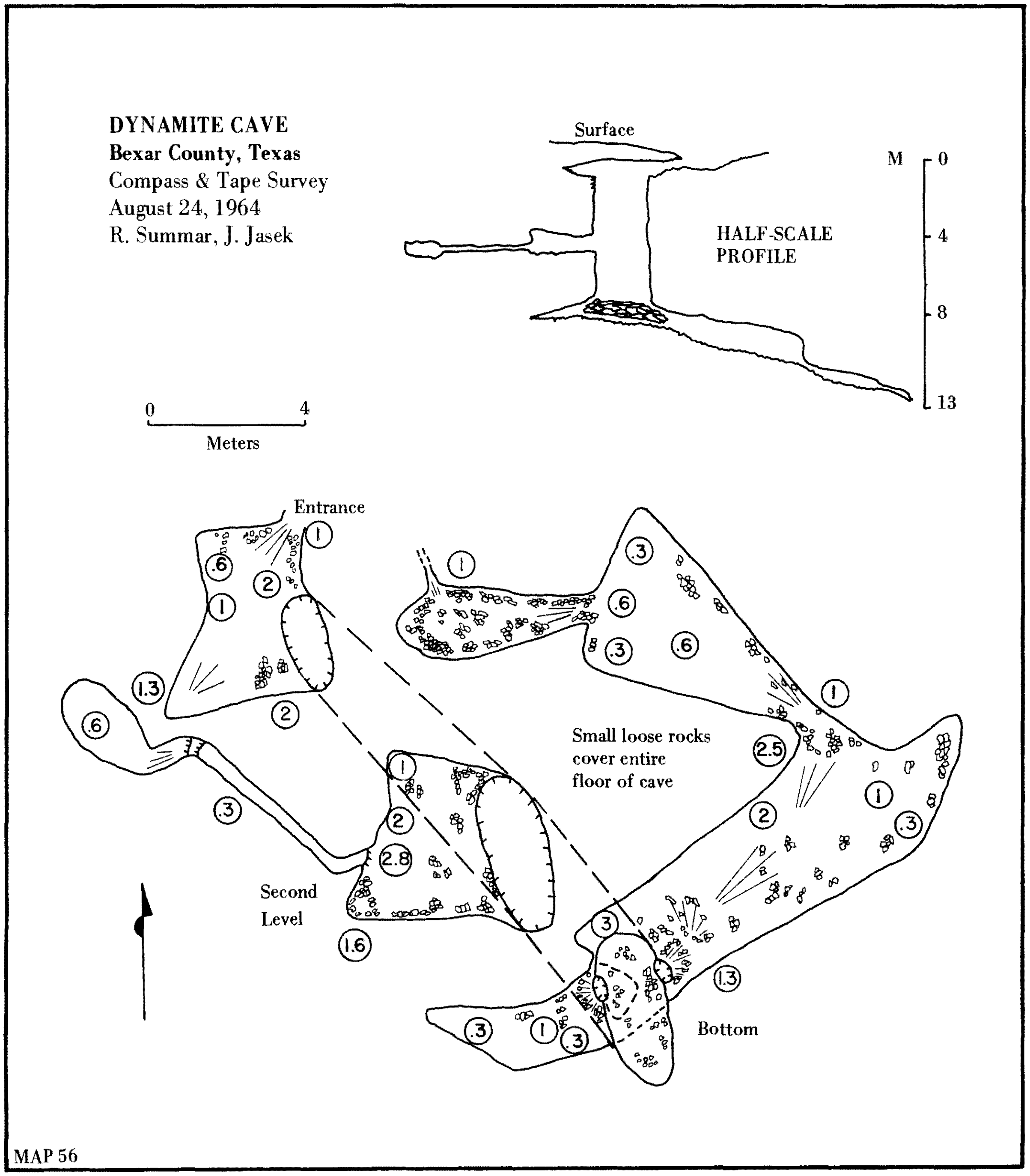
History: Dan Webb was the first person known to visit the cave where he found a box of dynamite, with caps, in the first level and disposed of them down the pit. On 24 August 1964 Dynamite Cave was first surveyed by James Jasek and Roy Summar. In the late 1960s or early 1970s the cave was used as a trash dump. When John Graves and Scott Harden surveyed what they knew as C.C.C.C. (Canyon Creek Country Club) Trash Hole on 28 July 1971, only the upper level was accessible. Seven years later, the trash had settled down into the cave and opened up the second level for survey by Steve Halford, George Veni, and Randy M. Waters.

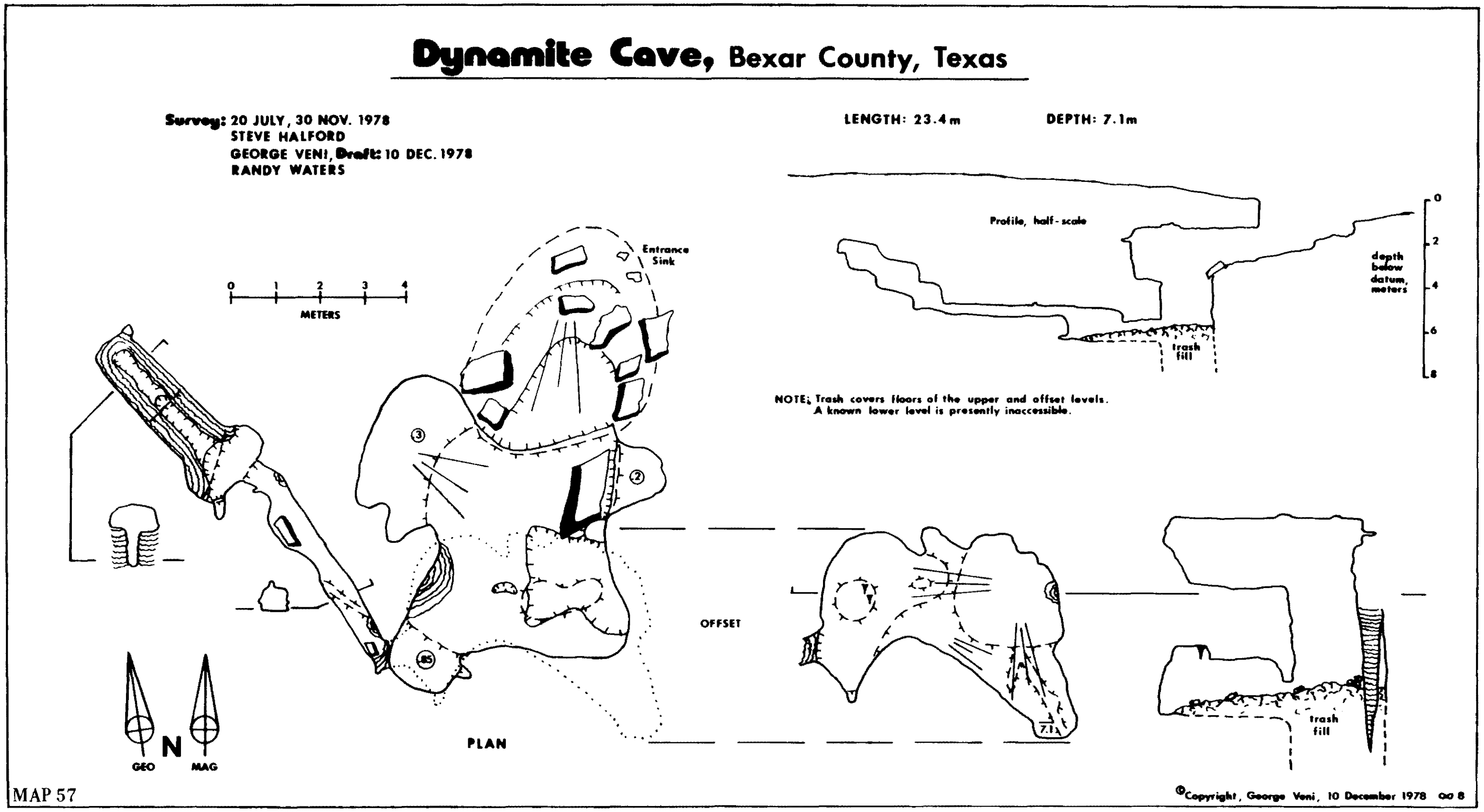
Biology: In 1964 James Jasek reported the presence of harvestmen (prob. *Leiobunum townsendii*), cave crickets (*Ceuthophilus* sp.), and frogs. In 1978 a millipede was found in the trash, and cave crickets were seen in the second level flowstone room.

Geology: The cave is developed in the recharge zone



MAP 55


DYNAMITE CAVE
Bexar County, Texas
Compass & Tape Survey
August 24, 1964
R. Summar, J. Jasek
Surface
HALF-SCALE
PROFILE
M 0
4
8
13
0 4
Meters
Entrance
Small loose rocks
cover entire
floor of cave
Second
Level
Bottom
MAP 56


Dynamite Cave, Bexar County, Texas
Survey: 20 JULY, 30 NOV. 1978
STEVE HALFORD
GEORGE VENI, Draft: 10 DEC. 1978
RANDY WATERS
LENGTH: 23.4 m
DEPTH: 7.1 m
0 1 2 3 4
METERS
Entrance Sink
Profile, half-scale
depth below datum, meters
0 2 4 6 8
trash fill
NOTE: Trash covers floors of the upper and offset levels.
A known lower level is presently inaccessible.
OFFSET
PLAN
N
GEO
MAG
trash fill
7.1
MAP 57
©Copyright, George Veni, 10 December 1978

of the Edwards (Balcones Fault Zone) Aquifer, along primary northeast and secondary northwest joint trends.

Technique: Prior to the trash dumping, a ladder or rope was needed to descend the pit. Now, caution is required because of the abundant broken glass.

Bibliography: Anonymous (1964c:177; 1973n:10-11; 1973q:11; 1978b:2); Harden (1971:183); Passmore (1977:20); Reddell and Smith (1966:3); Veni (1978a:5; 1985).

EAGLES NEST CAVE (BCS #146)

Location: Camp Bullis 7.5′

Description: Reported in a 1979 letter from Steve White as being on the south side of a road and going "under the road. . . has three or four rooms, is fairly large and has a lot of loose rock due to blasting." It is believed the blasting referred to was from road construction. The cave has probably been sealed.

History: Steve White discovered this and other caves while stationed at Camp Bullis from 1970-71.

Geology: Located along a ravine, the cave is most likely developed to recharge the Edwards (Balcones Fault Zone) Aquifer.

Technique: Although no special equipment is needed, White advises special caution in the blasting-induced breakdown areas.

Bibliography: Veni (1985).

ELEPHANT SPRING (BCS #113)

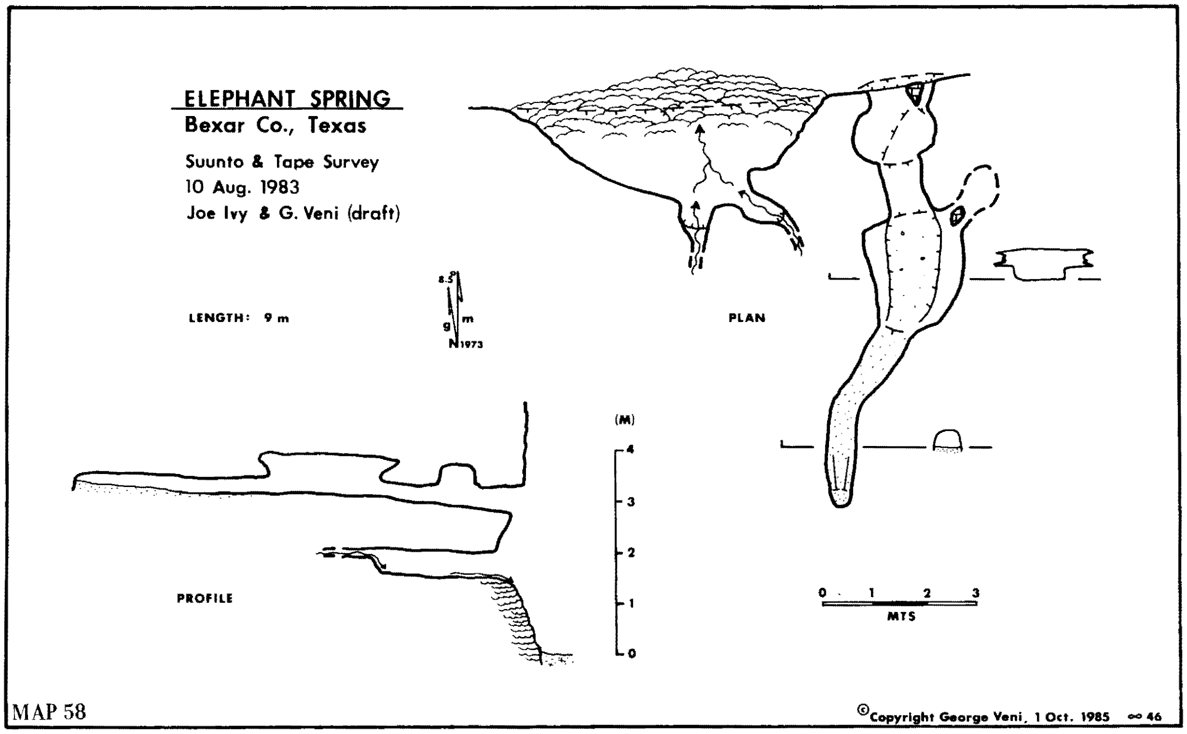
Location: Bulverde 7.5′

Description: A single passage in a cliff face, this cave averages 0.5 m high by 1.0 m wide and fills after 8.5 m. The actual spring is located 1 m below the cave and is 6.2 m wide, 0.5 m high, but only 2.3 m long before it pinches too tightly for further exploration. (See Map 58.)

History: This is one of three springs discovered on 19 November 1978 by George Veni and Randy M. Waters. They were hunting for caves based on springs marked on a topographic map. Joe Ivy and George Veni surveyed the springs on 10 August 1983. The spring was named for the Elephant Ear plants growing abundantly along its flow.

Biology: Spiders, harvestmen (prob. *Leiobunum townsendii*), and cave crickets (*Ceuthophilus* sp.) were observed.

Geology: Water percolating down and through hills capped by Edwards Limestone discharges from the uppermost Glen Rose Formation to form the three springs. Of the three, only Elephant Spring flows perennially, while the other two (Dam Crawl and Is That All There Is Spring) flow seasonally. The springs represent a former base level, developed prior to erosion of the valley to its present elevation. At Elephant Spring, the former flow path is represented by the dry, truncated, high passage, and the present path by the active spring below.



MAP 58

Bibliography: Anonymous (1978h:1); Veni (1983: 99).

ELM CREEK DAM CAVE (BCS #198)
Location: Longhorn 7.5′
Description and History: A cave of unknown extent was discovered and sealed by the construction of Elm Creek Dam circa 1980.
Geology: The cave was formed in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer.

ELM SPRINGS CAVE (BCS #22)
Alternate names: Stapelton Ranch Cave No. 1; Heubner Road Cave
Location: Castle Hills 7.5′
Description: Located in a tributary to Olmos Creek, the 0.6 m diameter entrance drops 3 m to the cave floor. The cave consists of two sets of pits that take separate routes to the same chamber at the bottom. The paths diverge immediately inside the entrance. The large obvious passage, the Big Pit route, is 3.5 m wide, 1.7 m high, and 20 m long. A crawlway near the end of this passage extends 6 m before filling with rock and soil. This crawlway is the filled continuation of Useless Pit, a 4 m deep pit on the surface located 9 m southwest of the crawlway. In the main passage opposite the entrance to the crawlway is the Big Pit. Up to 5 m in diameter and 23 m deep, the Big Pit is the largest and most impressive pit known in Bexar County. At the base of the Big Pit is the Big Room. The room is 14 m long, 6.5 m wide, and has a sloping floor which ranges the ceiling height from 2 to 8 m. A 2 m long belly crawl from the Big Room's lower end opens into a passage that goes 12 m to a 10 m deep pit which drops into the Chinese Water Torture Chamber. The C.W.T.C. is 13 m long, 2 to 3 m wide, and 3 to 7 m high. At the southeast end is a thick deposit of clay and organic debris. Opposite the bank of sediment is a water crawl which averages 1.4 m high by 0.8 m wide and extends 14 m, under the C.W.T.C. to a sump. SCUBA divers have pushed the sump 22 m to breakdown. The sump is the deepest known part of the cave, 56.6 m below the entrance, making Elm Springs Cave the second deepest known cave in Bexar County. From the cave entrance, a small short crawlway opposite the passage to the Big Pit leads to the Pit Series. The first drop of the Pit Series can be reached from one of two 1 m long crawlways situated

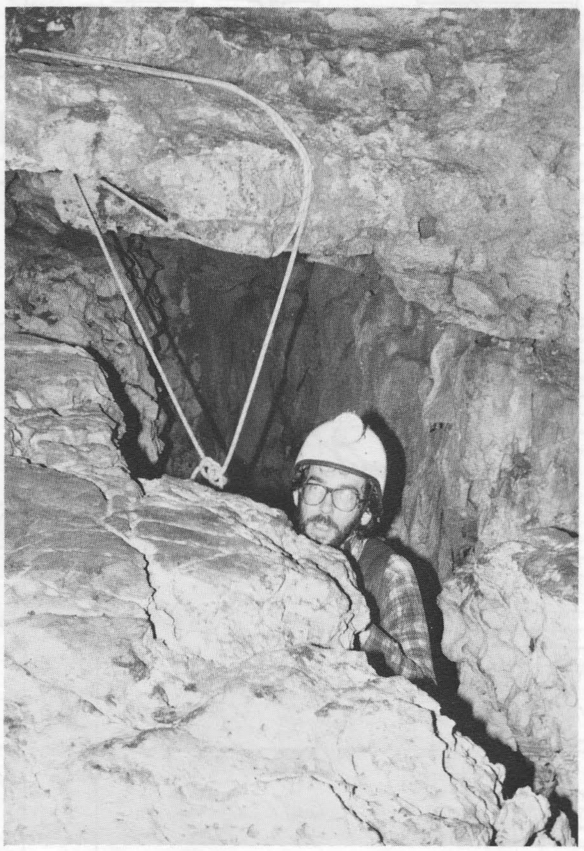
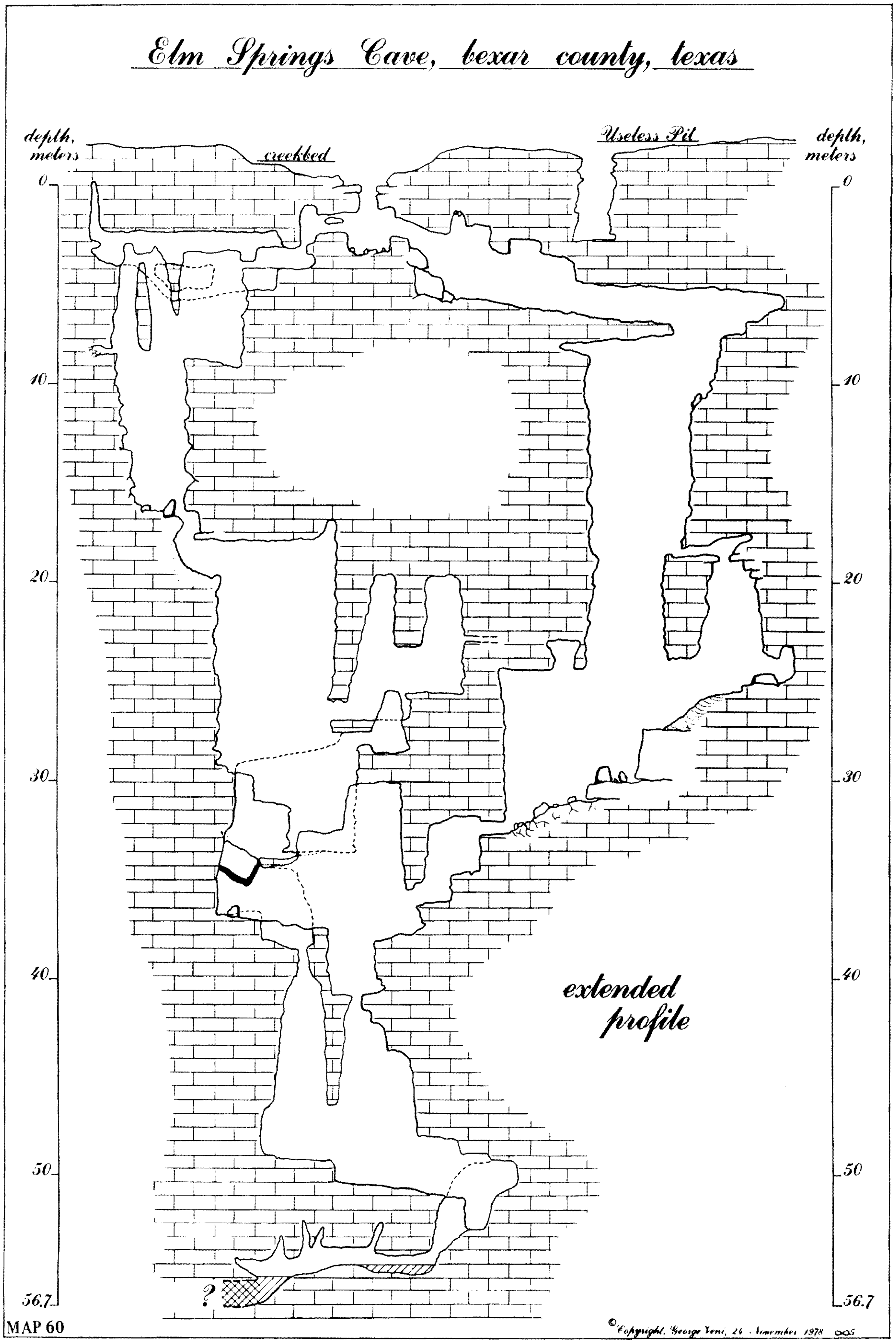
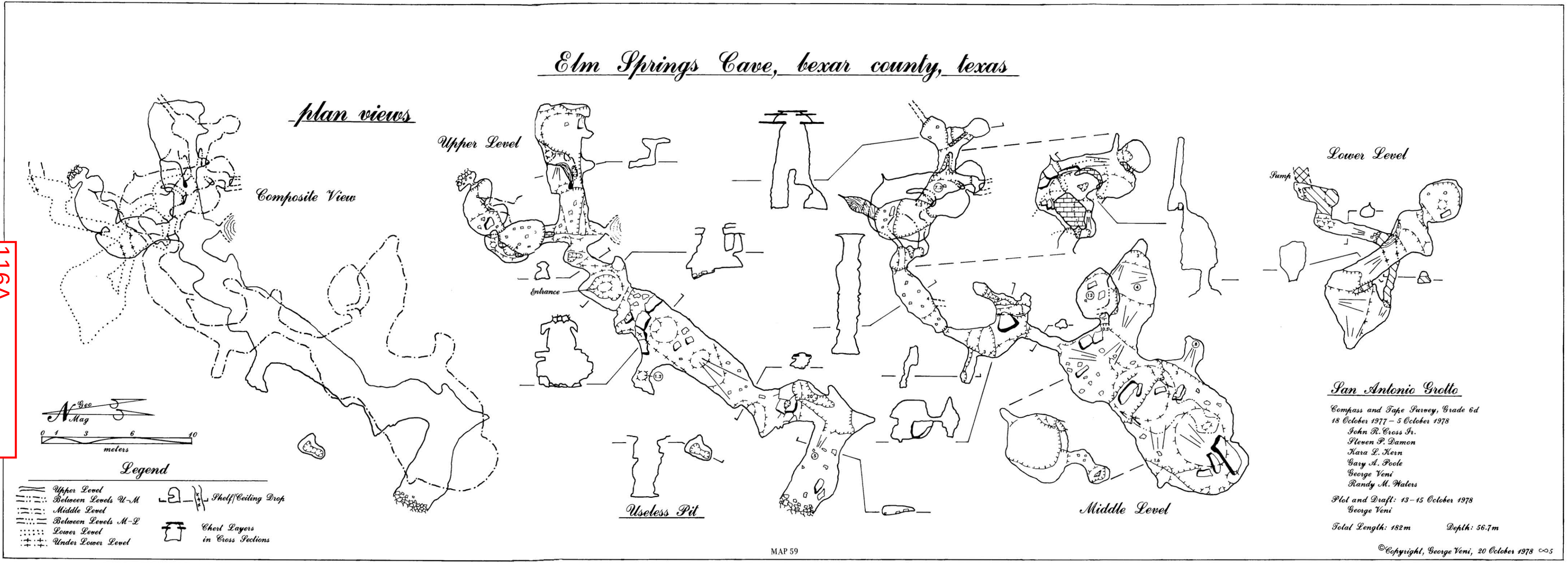


Photo. 11.—Scott Harden at top of the Big Pit in Elm Springs Cave (George Veni).

Photo. 12.—Kurt Menking at bottom of the Big Pit in Elm Springs Cave (George Veni).


Elm Springs Cave, bexar county, texas
depth, meters
creekbed
Useless Pit
depth, meters
0
10
20
30
40
50
56.7
?
extended profile
©Copyright, George Veni, 24 November 1978
MAP 60


Elm Springs Cave, bexar county, texas
plan views
Composite View
Upper Level
Entrance
Useless Pit
Middle Level
Lower Level
Sump
Geo
Mag
0 1 3 6 10
meters
Legend
Upper Level
Between Levels U-M
Middle Level
Between Levels M-L
Lower Level
Under Lower Level
Shelf/Ceiling Drop
Chert Layers in Cross Sections
San Antonio Grotto
Compass and Tape Survey, Grade 6d
18 October 1977 – 5 October 1978
John R. Cross Jr.
Steven P. Damon
Kara L. Kern
Gary A. Poole
George Veni
Randy M. Waters
Plot and Draft: 13–15 October 1978
George Veni
Total Length: 182m
Depth: 56.7m
©Copyright, George Veni, 20 October 1978
MAP 59

116A

near the start of a 10 m long, west trending passage. Depending upon which crawl is selected, the drop is either 5 or 3.7 m deep. Four meters from the base of the first drop is an 8.5 m drop followed by a 2.3 m drop into a short and narrow passage that ends at a 10 m pitch. The cave continues down the pitch, then corkscrews counter-clock-wise to a 4 m drop. In the floor of this drop is an 11 m deep pit to the Chinese Water Torture Chamber. An eastbound passage above the 11 m pit goes 4.5 m to a 3.4 m pitch. It emerges over the 10 m drop to the C.W.T.C., as followed from the Big Pit route to the bottom of the cave. Opposite the 10 m pit, at ceiling level in the C.W.C.T., is an unmapped passage to another 10 m deep pitch which leads to a sumped water passage believed to be the far side of the sumped water crawl. (See Maps 59-60; Photos. 11-12.)

History: The cave was first reported by Joe Ainsworth as "Heubner Road Cave" on 12 June 1957. On 18 January 1959, Orion Knox and other members of the Alamo Grotto visited what they called "Stapelton Ranch Cave No. 1." Apparently, this group only knew of the Big Pit side of the cave while Ainsworth had explored both sides but did not think they connected. In the late 1960s Wayne Russell called the cave "Elm Spring" after a nearby street. An unsuccessful attempt was made to survey the cave in 1972. Although he wasn't associated with the survey, Doug Maitland in 1972 explored the high (and currently unmapped) passage off the Chinese Water Torture Chamber. Other exploration that year involved Greg Passmore and Warnie Meitenschlaeger who dove the sump to its breakdown terminus. Elm Springs Cave was the site of a cave rescue in October 1977. A local youth was climbing a knotted rope up the Big Pit. High CO_2 levels in the cave made him dizzy, and he fell 7 m breaking his sacrum. A new survey of the cave was begun a few days after the rescue by San Antonio Grotto members John Cross, Steve Damon, Kara (Teeni) Kern, Gary A. Poole, George Veni, and Randy M. Waters. In 1982 Veni returned with Eric Short to dive the sump, but they could only go 13 m to cobble fill partially blocking the passage.

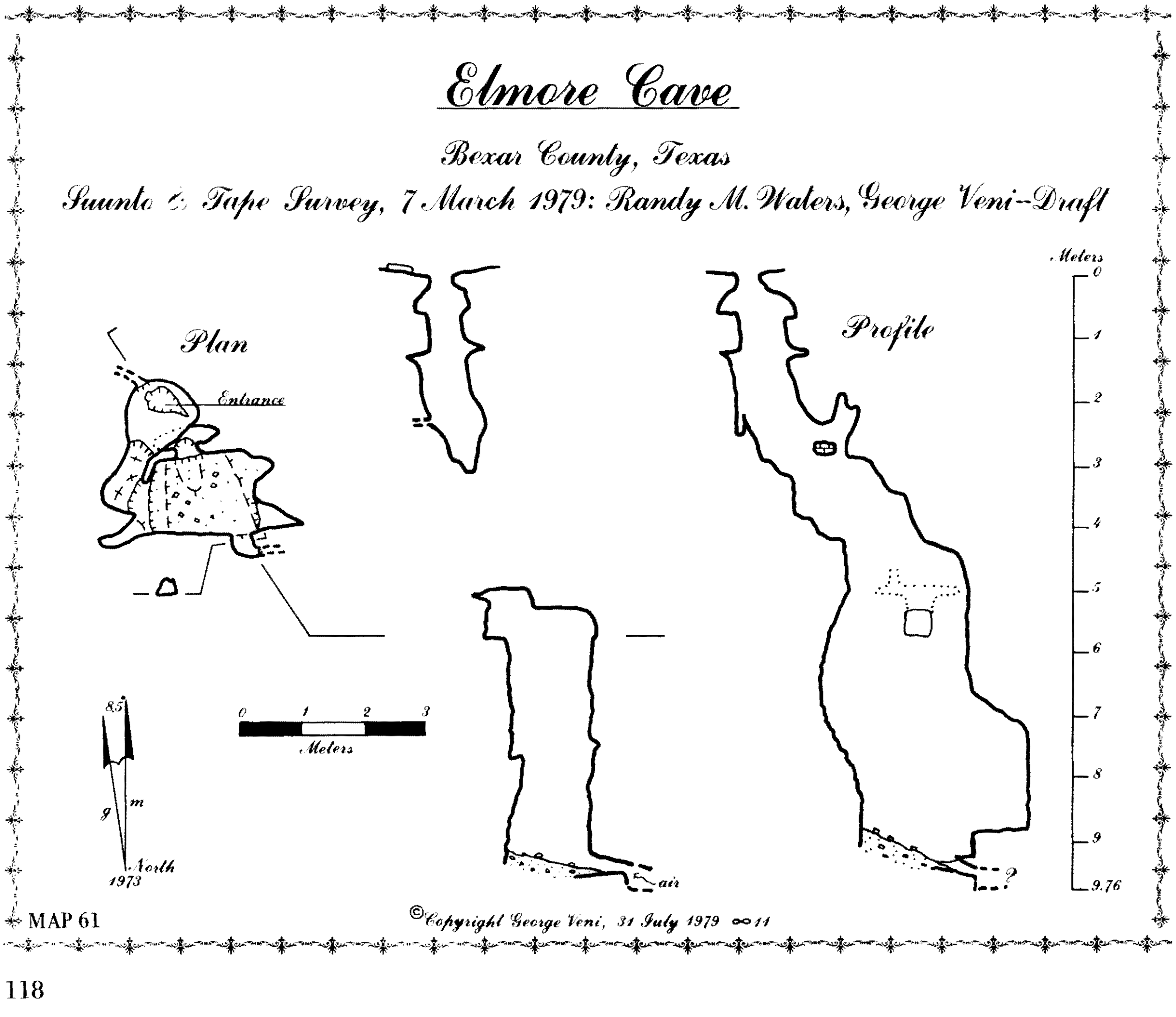
Biology: Elm Springs Cave is the only Bexar County cave known to contain troglobitic salamanders and only one of three with troglobitic aquatic crustaceans. The terrestrial fauna includes only three troglobites, but a more careful study of the cave will probably reveal a far richer terrestrial troglobite fauna. An occasional unidentified bat has been seen in the cave. Other fauna reported from the cave includes the cliff frog *Syrrhophus marnocki* and a toad. Collections were made in the cave on 12 August 1984 by Scott Harden, Kurt Menking, and George Veni. The following is a list of the fauna collected for study:

Snails—*Helicina orbiculata* (accidental)
Helicodiscus eigenmanni (troglophile)
Amphipods—*Stygobromus russelli* (troglobite)
Isopods—Trichoniscidae genus and species 1 (troglobite)
Spiders—*Meioneta* sp. (troglophile)
Harvestmen—*Leiobunum townsendii* (trogloxene)
Millipedes—*Cambala speobia* (troglobite)
Oxidus gracilis (troglophile)
Springtails—Undetermined material
Silverfish—*Texoreddellia texensis* (troglobite)
Cave crickets—*Ceuthophilus (C.) secretus* (trogloxene)
Roaches—*Arenivaga* sp. prob. *tonkawa* (trogloxene)
Beetles—Undetermined material
Comb-clawed beetles—Alleculidae genus and species
Clown beetles—?Histeridae genus and species
Toed-winged beetles—*Ptilodactyla* sp. (troglophile)
Rove beetles—*Erichsonius* sp. (?troglophile)
Eustilicus condei (troglophile)
Flies—Undetermined material
Salamanders—*Eurycea tridentifera* (Honey Creek blind salamander) (troglobite)

Geology: Elm Springs Cave is developed in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer. Flooding of the creekbed in which it is located results in a large whirlpool over the entrance. The cave is a series of vadose vertical shafts which interconnect to form short sections of horizontal passage. Only the bottom 10 m of the cave displays any phreatic morphology. Most of the cave is developed along 40 m of a northeast trending joint set. The cave extends through four lithic zones in the Edwards Limestone. The water crawl is near the top of the phreatic zone. Dependent upon antecedent storm events, the cave may sometimes be slow to drain its recharge to the aquifer. In February 1976, George Veni and Randy M. Waters found the bottom 15 m of the cave still flooded from a major storm that occurred two weeks earlier, but this may have been an elevated level of the regional water table and unrelated to the rate the cave drains into it. Elm Springs Cave recharges a substantial volume of water into the Edwards Aquifer. As expanding housing developments approach its drainage basin, awareness of the cave's vital role to the aquifer's water quality and quantity should also be expanded.

Meteorology: Lack of rapid air exchange (because of its small entrance) and abundant decomposing organic debris make the cave notorious for high levels of CO_2. As with many bad air caves, air quality improves when cold fresh winter air displaces the cave's warmer CO_2 laden air.

Technique: Elm Springs Cave should not be entered if there is any possibility of rain. Bad air is also a very serious problem and carbide lamps often will not burn. Groups should always be small in number to prevent excessive consumption of the available oxygen. November to March usually have the best air quality. Except for the entrance pit, all the pits in the cave require the use of ropes. The Big Pit tie-off is a natural bridge over the pit. A 25 m long rope is adequate, but lack of good anchors for the following 10 m pit makes an 80 m long rope desirable. An experienced climber can freeclimb the entire Pit Series except for the final 11 m drop. A rope is still needed as an essential belay. The best anchor for the Pit Series is in the west-trending passage at the top of the first drop; the tie-off is a section of wall. The westward passage splits into an upper and lower level that are connected by a small hole. This obscure yet safest anchor is used by taking the rope through the upper passage, down the meter deep hole in its floor, then out via the lower passage to the knot. The first two drops in the pit series are most easily climbed with a cable ladder. A 50 m rope attached to the ladder is sufficient to reach the bottom of the cave. The Big Room and the 10 m pitch off the Pit Series each have a passage located up in their walls, 10.5 and 4.3 m above the floor, respectively. No attempts should be made to reach these passages, both of which have been explored and surveyed. The walls are very unstable for climbing and quite dangerous. One attempt resulted in a near accident. Further exploration of the unsurveyed passage off the Chinese Water Torture Chamber would require the use of a 12 m long scaling pole. Individual pole sections longer than 2.5 m will not fit through the entrance. Only competent cave divers should attempt exploration of the sump. Small tanks are preferable and maximum visibility is 1.5 m. Flooding periodically changes the size of the sumped passage, and underwater digging may be necessary. The breakdown encountered in the sump in 1972 was probably from the unsurveyed passage. Future dives would probably



MAP 61

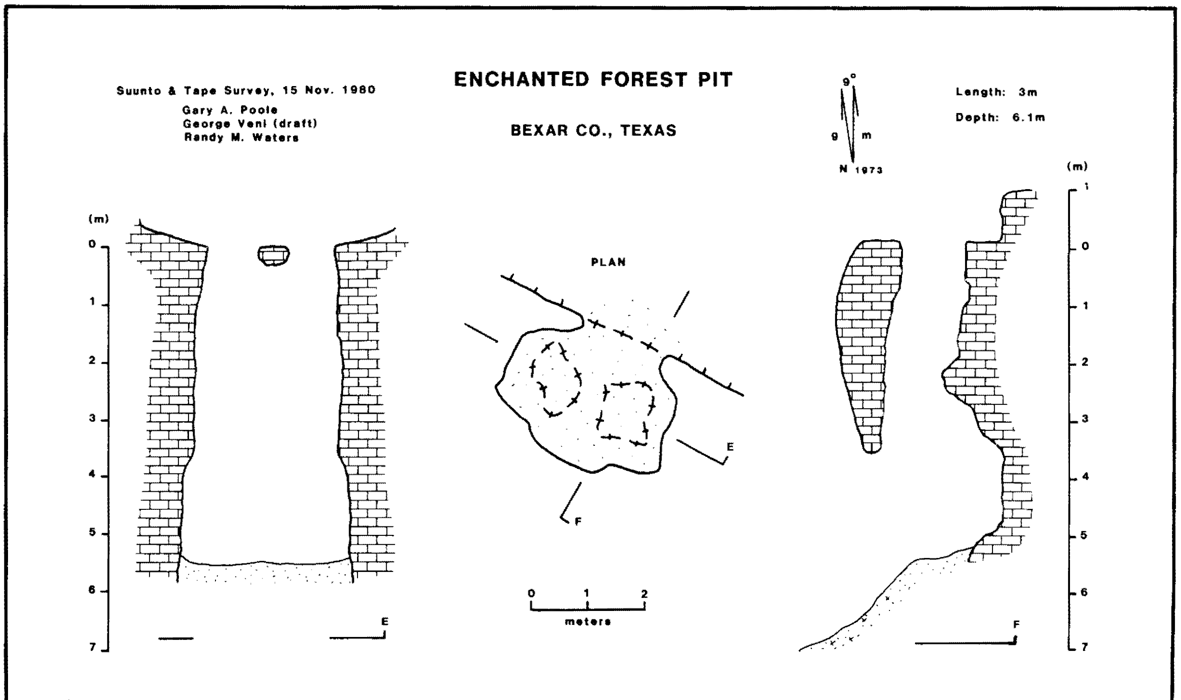
be better staged from the unsurveyed passage.
Bibliography: Anonymous (1973q:12; 1977b:1A, 6A; 1978a:4; 1978b:2; 1978g:7; 1985d:1-2); Cross (1978:46-47); Fleming (n.d.:49; 1978a:17); Fritz (1981a:45); Palit (1984b:27); Passmore (1977:15, 21, 35); Poole (1978b:4; 1978c:3); Reddell and Knox (1962:3-5, 24); Reddell and Russell (1962a:5); Reddell and Smith (1966:3); Russell (1971a:201; 1971b:202-203); Sweet (1976:61; 1984:429, 432, 433, 437); Veni (1978a:5; 1978e:1; 1978f:6; 1979a: 2-3, 12, map; 1983:99; 1985); Widener (1959:80).

ELMORE CAVE (BCS #21)
Location: Bulverde 7.5′
Description: The entrance is a small hole on a hillside. The pit drops 2.5 m, then follows a steep narrow fissure a short distance to a 4.3 m drop. Here the cave ends in a small room measuring 3 by 1.5 by 4 m high. An impassably small hole in the south wall takes the cave's drainage and blows air. (See Map 61.)
History: While cave hunting along Bulverde Road on 22 May 1977, Chuck Stuehm and George Veni learned of the cave from Mr. Elmore, and it was soon explored. A few months later Stuehm showed the cave to Randy Waters, and on 7 March 1979 Veni and Waters surveyed it. Waters returned again in late 1982 for biological collecting and to blast open the small air-blowing hole. The collection was magnificent, but the hole needs more work to become "caver-size."

Biology: Fauna noted during the 1979 survey were cave crickets, harvestmen, ticks, a spider, and a salamander. Collections were made in the cave on 24 October 1982 by Randy Waters, on 28 November 1982 by Scott Harden and Randy Waters, and on 28 April 1983 by Randy Waters. The most unusual specimens collected in the cave have been little millipedes of the family Pyrgodesmidae—the first Texas cave record for this tropical family. The following is a list of the fauna of this biologically interesting cave:

Snails—*Zonitoides arboreus* (?troglophile)
Scorpions—*Vaejovis reddelli* (troglophile)
Spiders—Undetermined material
Harvestmen—Prob. *Leiobunum townsendii* (trogloxene)
Hoplobunus madlae (troglobite)
Ticks—Undetermined material
Millipedes—*Speodesmus* sp. (troglobite)
Myrmecodesmus sp. (troglophile)
Springtails—Undetermined material
Silverfish—Prob. *Texoreddellia texensis* (troglobite)
Cave crickets—*Ceuthophilus (C.)* sp. (trogloxene)
Rove beetles—*Belonuchus* sp. (troglophile)
Eustilicus condei (troglophile)
Flies—Undetermined material
Salamanders—Prob. *Plethodon glutinosus albagula* (slimy salamander) (trogloxene)
Frogs—*Syrrhophus marnocki* (cliff frog) (trogloxene)

Geology: Elmore Cave is developed in the recharge



MAP 62

zone of the Edwards (Balcones Fault Zone) Aquifer.

Meteorology: During the survey the small drain hole was dug open, and a breeze issued from it so strong that it would blow out a cigarette lighter.

Bibliography: Anonymous (1979n:4); Veni (1978a:5; 1985); Waters (1983a:73).

ENCHANTED FOREST PIT (BCS #123)

Location: Castle Hills 7.5′

Description: A small sinkhole at the top of a cliff along Salado Creek has two 1.3 m diameter holes dropping 5.5 m to the floor of the 3 m diameter pit. The organic soil floor slopes steeply out of the 1.7 m high lower entrance to Salado Creek. (See Map 62.)

History: Discovered by Randy M. Waters in 1977 and named after a nearby subdivision, it was surveyed on 15 November 1980 by Waters, Gary A. Poole, and George Veni.

Geology: Enchanted Forest Pit was vadosely developed in a terrace on Buda Limestone along Salado Creek. The cave's lower entrance formed by lateral cutting of Salado Creek into the cliffside. The two upper entrances, atop the cliff, are a result of upward stoping and downward solution.

FAIR HOLE (BCS #23)

Alternate names: Van Raub Cave; Python Cave; Cibolo Creek Cave

Location: Van Raub 7.5′

Description: The cave entrance lies in the bed of Balcones Creek and has a triangular concrete wall, 4 m on each side and 1.2 m high, built around it. The original entrance, now filled, was a narrow fissure. The present entrance was blasted open and is a 1.3 m diameter by 15 m deep shaft. Part way down the pit, water flows out of a small upper level passage. A water crawl near the base of the entrance pit is explorable for 30 m and probably leads to a second, now filled entrance. A dome in this passage leads to an upper level that connects back to the entrance pit. Most of the cave is a single 510 m long stream passage which averages 1.5 m wide. Water depth ranges from 0.2 to 2.7 m; ceiling height above the water is usually 1 to 2 m. Logjams sometime block the passage. From the cave entrance the stream passage leads east for 90 m, then turns southwest, and gently meanders 400 m to the top of a 7 m high waterfall. The stream sinks into a gravel floor located at the base of the waterfall and at the head of a 9.5 m

Photo. 13.—Aerial view of Fair Hole near the confluence of Balcones (upper) and Cibolo (lower) Creeks (Roger V. Bartholomew).

high by 3.5 m wide passage. Down that passage the remaining 100 m of the cave are generally low, wide, and floored with mud and breakdown. (See Map 63; Photos. 13–15.)

History: Fair Hole was discovered by the owner, Sylvester Simon, in 1873. During a drought in 1878 he entered the cave, blasted open the present entrance, and placed a pump in the cave. With the discovery of water on another part of his property, he removed the pump. On 24 July 1894 a large group of people from San Antonio and Van Raub entered the cave. Although most of the group remained at or near the entrance, several people, including George Lupton and Joseph and Jesse McMillan, explored the cave to its end. They named the cave Python Cave after a large water moccasin in the stream passage. At some later date the concrete wall was built so water would flow down the creek to the ranch. The original entrance was also filled at that time. Since then, the wall has also served to keep cattle and excessive flood debris from falling into the cave. It may be safe to assume that at an earlier date another wall was temporarily built around the entrance for similar purposes. The present wall is maintained should the cave again be needed as a water supply. Bill Fair purchased the cave in 1939. In late 1951 he entered the cave with members of the University of Texas Grotto. Mr. Fair commented that a geologist from New Braunfels claimed the cave extended much farther in the 1930s. In 1960 the cave was surveyed to the waterfall by Bob Benfer, Murph Carpenter, and Mike Pfeiffer. Roger V. Bartholomew led four trips from July 1969 to September 1970 and completely surveyed the cave with the assistance of Scott Harden, Bob Henry, Richard Martin, Doug Nunnelly, Wayne Russell, Andy Sandoval, Eugene Uecker, and Bob Voche.

Biology: The only species identified from the cave are the troglobitic spider *Eidmannella rostrata* and the troglobitic millipede *Speodesmus echinourus.* Other observed fauna includes waterbugs and river minnows. A water moccasin (*Ancistrodon piscivorus*) was observed in the cave during the 1984 exploration.

Geology: Fair Hole developed as a phreatic tube along a northeast-southwest joint set that parallels Balcones and Cibolo Creeks. Decline in base level resulted in vadose modification of the tube, displayed by its canyon-cutting, domepit development along secondary northwest-southeast joints (which probably predate the Balcones fault system), and by collapse at the rear of the cave. The most extensive

Photo. 14.—Claire Snider at entrance of Fair Hole (George Veni).

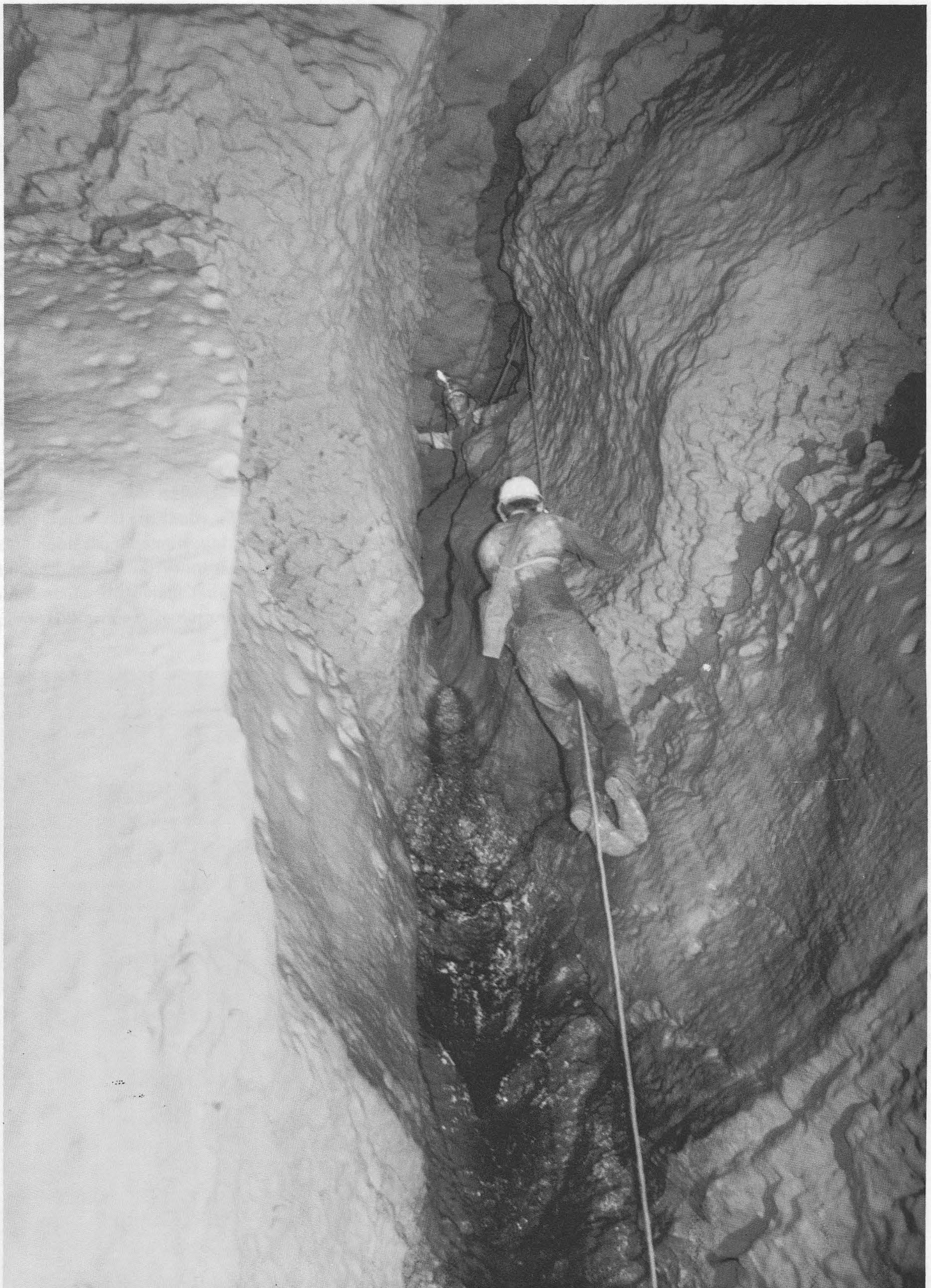
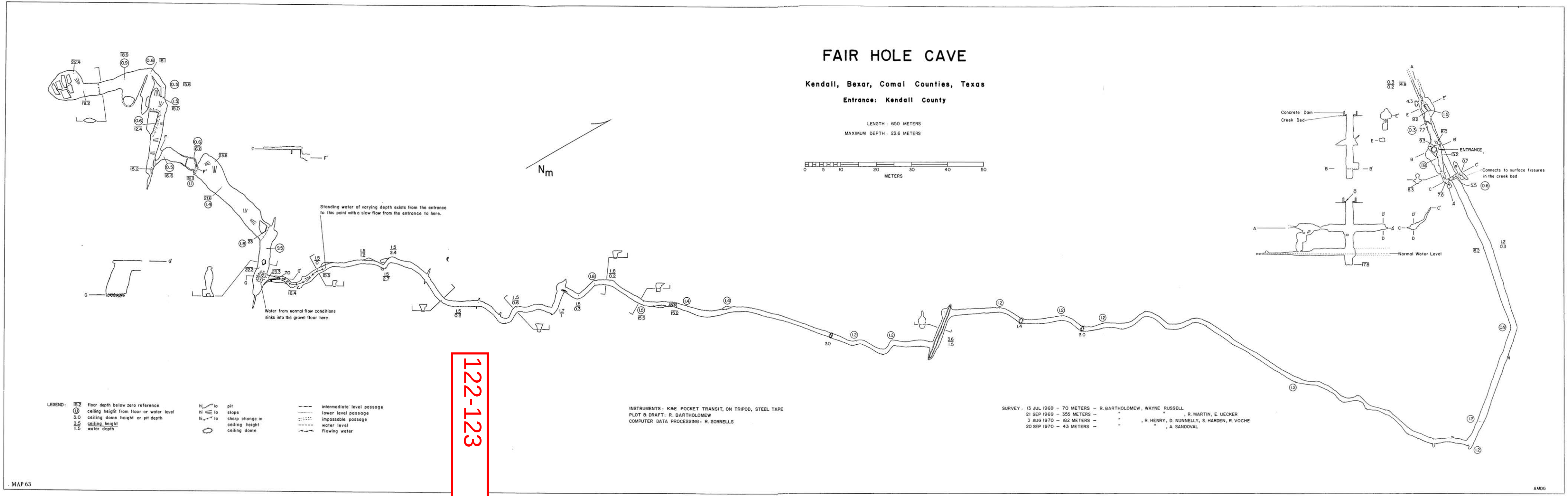


Photo. 15.–Doug Nunnelly ascending 7 m waterfall in Fair Hole (Roger V. Bartholomew).



FAIR HOLE CAVE
Kendall, Bexar, Comal Counties, Texas
Entrance: Kendall County
LENGTH: 650 METERS
MAXIMUM DEPTH: 23.6 METERS
0 5 10 20 30 40 50
METERS
Nm
ENTRANCE
Connects to surface fissures in the creek bed
Concrete Dam
Creek Bed
Normal Water Level
Standing water of varying depth exists from the entrance to this point with a slow flow from the entrance to here.
Water from normal flow conditions sinks into the gravel floor here.
LEGEND: 15.2 floor depth below zero reference
1.1 ceiling height from floor or water level
3.0 ceiling dome height or pit depth
3.5 ceiling height
1.5 water depth
pit
slope
sharp change in ceiling height
ceiling dome
intermediate level passage
lower level passage
impassable passage
water level
flowing water
INSTRUMENTS: K&E POCKET TRANSIT, ON TRIPOD, STEEL TAPE
PLOT & DRAFT: R. BARTHOLOMEW
COMPUTER DATA PROCESSING: R. SORRELLS
SURVEY: 13 JUL 1969 – 70 METERS – R. BARTHOLOMEW, WAYNE RUSSELL
21 SEP 1969 – 355 METERS – " " , R. MARTIN, E. UECKER
3 AUG 1970 – 182 METERS – " , R. HENRY, D. NUNNELLY, S. HARDEN, R. VOCHE
20 SEP 1970 – 43 METERS – " " , A. SANDOVAL
MAP 63
AMDG

122-123

vadose morphology is found at the entrance. Fair Hole is a major site of point recharge into the Edwards (Balcones Fault Zone) Aquifer. Although the cave is developed in the lower member of the Glen Rose Formation, its water is carried down into the Edwards Aquifer by a series of high-angle normal faults downstream along Cibolo Creek. Tritium isotope studies indicate that water recharged in the Fair Hole area travels as a subsystem within the Edwards Aquifer and discharges at Hueco and San Marcos Springs (Comal and Hays Counties). In terms of water quality this area might be considered potentially sensitive to contamination. It lacks the benefit of dilution into the main body of the aquifer, and, because of rapid travel to discharge points, it may lack adequate retention time for purification.

Meteorology: A trip in October 1951 noted bad air at the end of the cave, probably due to decomposing organic material. This seems to be an infrequent occurrence as there have been no other reports of high CO_2 levels.

Techniques: Watch for rain! During some floods a huge whirlpool forms over the entrance. Some of the debris washed in includes logs over half a meter in diameter! Rope or ladders are needed for the entrance pit. The only anchors are trees about 20 m away. Wetsuits are not needed for the cave, although wetsuit bottoms would make the trip more comfortable. The 7 m waterfall drop can be bypassed without the use of ropes or ladders. A safe descent to the floor is possible by traversing on ledges over the drop and lower passage to a narrow crack at the passage's northeast end.

Bibliography: Anonymous (1894a:15; 1894b:8; 1894c:3; 1960b:2; 1960c:1-2; 1969d:80; 1969e:88; 1969g:110; 1973o:11; 1973q:11; 1977a:37-38); Bartholomew (1974:166-167); Elliott (1976b:155; 1985a:11, 27, 103); Gertsch (1984:61); Harden (1970a:176; 1980:96-97); Kastning (1983:478, 481, 516); Keeper (1970:244); Pearson, Rettman, and Wyerman (1975); Poole (1978a:2); Poole and Passmore (1978:50); Reddell (1961b:5; 1964a:6); Reddell and Knox (1962:3-5, 13-14, map); Reddell and Russell (1962a:13); Reddell and Smith (1966:3); Smith (1965:160); Veni (1978a:5; 1978e:4; 1978f:6; 1983:99; 1985); Widener (1958:40-41).

FAT MAN'S MISERY (BCS #160)

Location: Longhorn 7.5′

Description and History: During the first half of the 20th century the 3 m deep pit was explored past a tight squeeze into a small room. At least four passages led from the room. The entrance was filled due to urban growth during the century's later half. Several truck-loads of dirt give the entrance area the appearance of a shallow solution sink.

Geology: The cave is in the Austin Chalk.

FENCE POST HOLE (BCS #125)

Location: Lacoste NE 7.5′

Description: This is a pit 0.45 m in diameter and approximately 11 m deep.

History: The only cavers to visit this cave were Paul Carey, Steve Gutting, and Terry McDaneld, and of the three, only McDaneld was small enough to explore it. Their trip was on 17 March 1978.

Biology: A silverfish and cave crickets (*Ceuthophilus* sp.) were noted.

Geology: Fence Post Hole is one of a number of small caves developed on a hill of Austin Chalk on the Culebra Anticline. They are primarily vadose vertical shafts draining most of the hill's stormwater runoff to the subsurface.

Bibliography: Anonymous (1979aa:5).

FIREWORKS CAVE (BCS #24)

Alternate names: Fireworks Pit; Snake Cave; Suffocation Sink

Location: Longhorn 7.5′

Description: The 0.8 m diameter entrance pit drops 4.2 m to a floor of organic soil. The cave is a single, roughly oval room 8.5 m long, 4.5 m wide, and 0.6 m high. (See Map 64.)

History: The cave was first reported by James Jasek on 24 August 1964. It was indicated on a location map for Dynamite Cave and called Suffocation Sink. No other information was given on that map. In the late 1960s a location map by Butch Summar called it Snake Cave, but again no description was given. In 1977 an area resident told the San Antonio Grotto about a cave behind a shack selling fireworks. On 28 January 1978 it was surveyed by Dave Guerrero and Gary Poole.

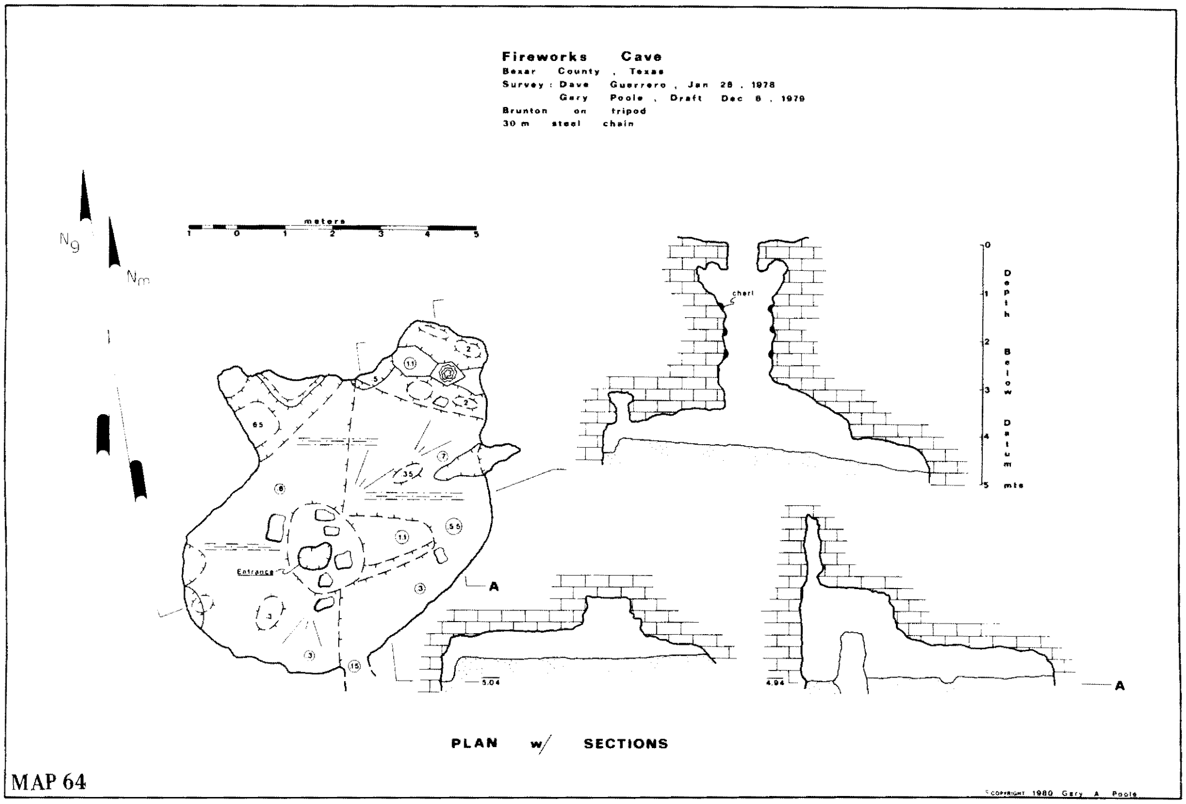
Biology: In January 1978 spiders, harvestmen (prob. *Leiobunum townsendii*), and cave crickets (*Ceuthophilus* sp.) were seen. Fungus and decaying wood were also noted. Butch Summar probably found a snake in the cave during his exploration.

Geology: The cave is developed in the Edwards Limestone and has numerous layers of both nodular and bedded chert. Although the cave originally formed as a small phreatic chamber, its entrance now drains a broad, shallow sink approximately 30 m in diameter. Several small water courses are present in Fireworks Cave, two of which appear to be fed by water from ceiling joints, and all feed into the Edwards (Balcones Fault Zone) Aquifer.

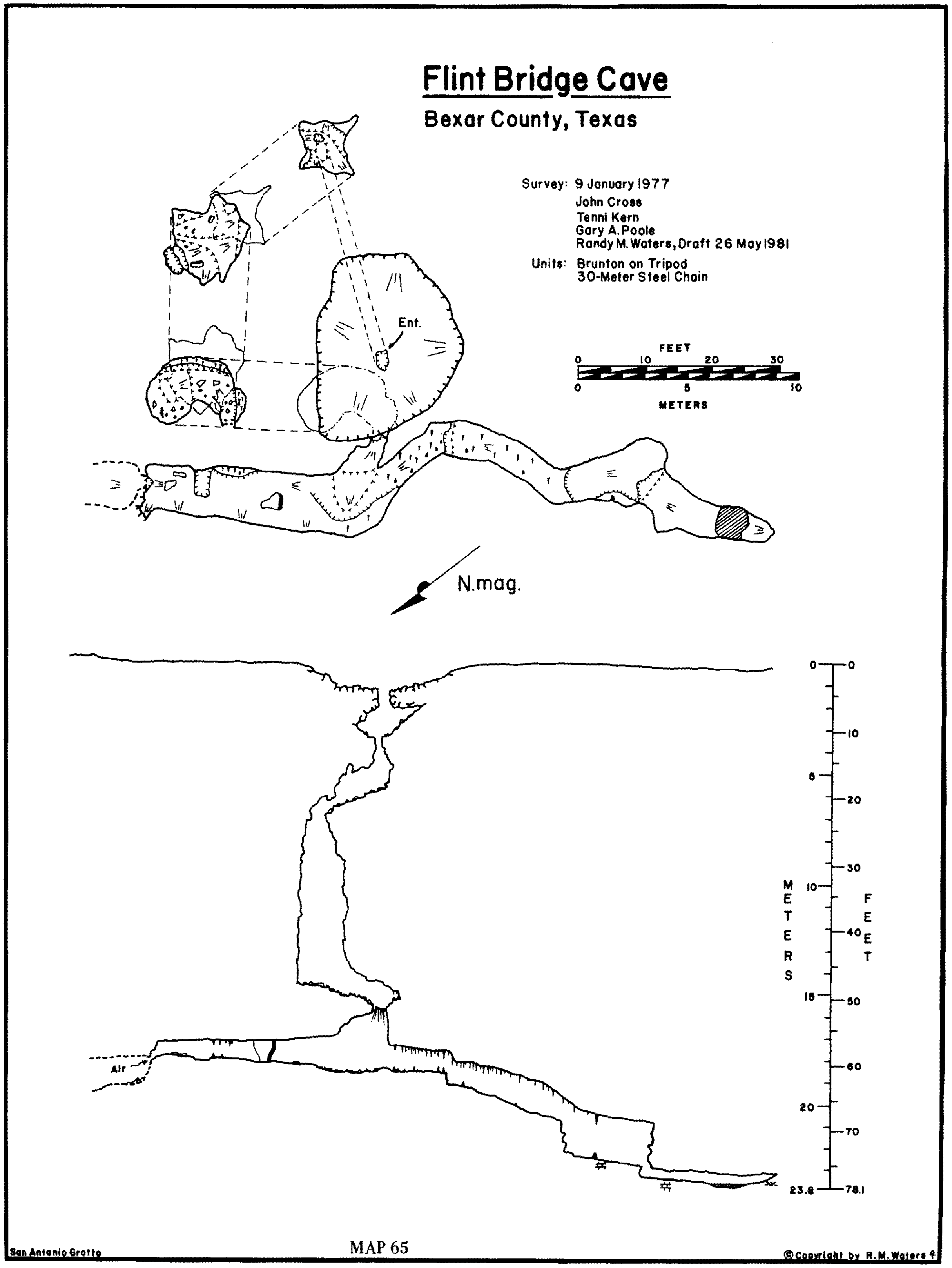
Meteorology: In August of 1964, Jasek reported that

the air was bad. In the summer of 1977 the San Antonio Grotto also encountered air of poor quality. However, during a winter survey later that year, the air was found to be good. The cave's air quality appears to be seasonally controlled.
Bibliography: Poole (1978b:4); Veni (1978a:5; 1985).

FLINT BRIDGE CAVE (BCS #25)
Location: Castle Hills 7.5′
Description: The cave entrance was a small hole on the south side of a collapse sink, dropping 3 m into the first room. The first and second rooms were primarily cavities in a jumble of breakdown. The first room was about 2 m in diameter with a 1 m high ceiling. A small hole in the floor dropped 2 m into the south end of the second room. The floor sloped 3 m northward to the edge of the cave's largest pit. One meter in diameter, the pit dropped 8 m into the third room. The room pinched to a crawl on its west end, then dropped 3 m into the lower level. Just before the 3 m drop, there was a natural flint bridge—the cave's namesake. The lower level was a single, horizontal passage with a general northeast to southwest trend. Northward, the passage extended for 13 m as a hands-and-knees crawl. The floor was hard-packed red clay and sloped upward to the southwest wall. At the northernmost end a small impassable hole dropped 0.6 m into a continuation of the same passage. Southward, the main passage ducked under a veritable forest of stalactites for 10 m. After a crawlway the cave ended in a plug of red clay 9 m from the formations. On all recorded trips, a small stagnant pool of water was present at the crawl. (See Map 65.)
History: In December 1976 Randy Waters and his fellow land development survey-crew workers found the cave. A dead opossum in the entrance and lack of lighting prevented him from entering the cave. Waters returned with John Cross and Gary Poole, and they opened another entrance in the collapse sink, thus bypassing the opossum, and proceeded with the first exploration. The trio returned on 9 January 1977 with Teeni Kern to survey the cave. In the spring of 1977 it was covered by Green Run Road.
Biology: Only cave crickets (*Ceuthophilus* sp.) and some white millipedes (probably a species of the genus *Speodesmus*) were seen in the cave. A dead opossum is evidence of use of the first room as an animal shelter. Near the flint bridge, a 6-inch light green plant was growing.
Geology: The cave was formed in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer. The upper levels consist of breakdown and highly fissured



MAP 64


Flint Bridge Cave
Bexar County, Texas
Survey: 9 January 1977
John Cross
Tenni Kern
Gary A. Poole
Randy M. Waters, Draft 26 May 1981
Units: Brunton on Tripod
30-Meter Steel Chain
FEET
0 10 20 30
0 5 10
METERS
Ent.
N.mag.
Air
METERS
FEET
0 5 10 15 20 23.8
0 10 20 30 40 50 60 70 78.1
San Antonio Grotto
MAP 65
©Copyright by R.M. Waters

rock. Heavily pitted limestone with several layers of bedded chert forms the walls of the main pit. Red clay in the lower level is the only fill in the cave. The lower level is formed along a northeast trending joint.
Meteorology: An outward current of air was noticed on all trips at the tight 3 m drop into the lower level.
Bibliography: Poole and Passmore (1978:16, 18, 19, 51); Veni (1978a:5; 1985); Waters (1977a:124-125; 1983b:73-74).

FOOL'S FOLLY PIT (BCS #124)
Location: Camp Bullis 7.5'
Description: This was a small 4.9 m deep pit, whose entrance measured 0.8 m long by 0.5 m wide and whose floor was 1.5 m in diameter. (See Map 66.)
History: On 4 March 1979 Randy M. Waters led a group of non-cavers to check two pit leads. Both were small and only one was deep enough, barely, to be classified as a cave. It was surveyed by Waters and Carol Wright. The cave was later paved over by subdivision development.
Geology: Fool's Folly Pit was formed in the upper member of the Glen Rose Formation.
Bibliography: Anonymous (1979l:3).

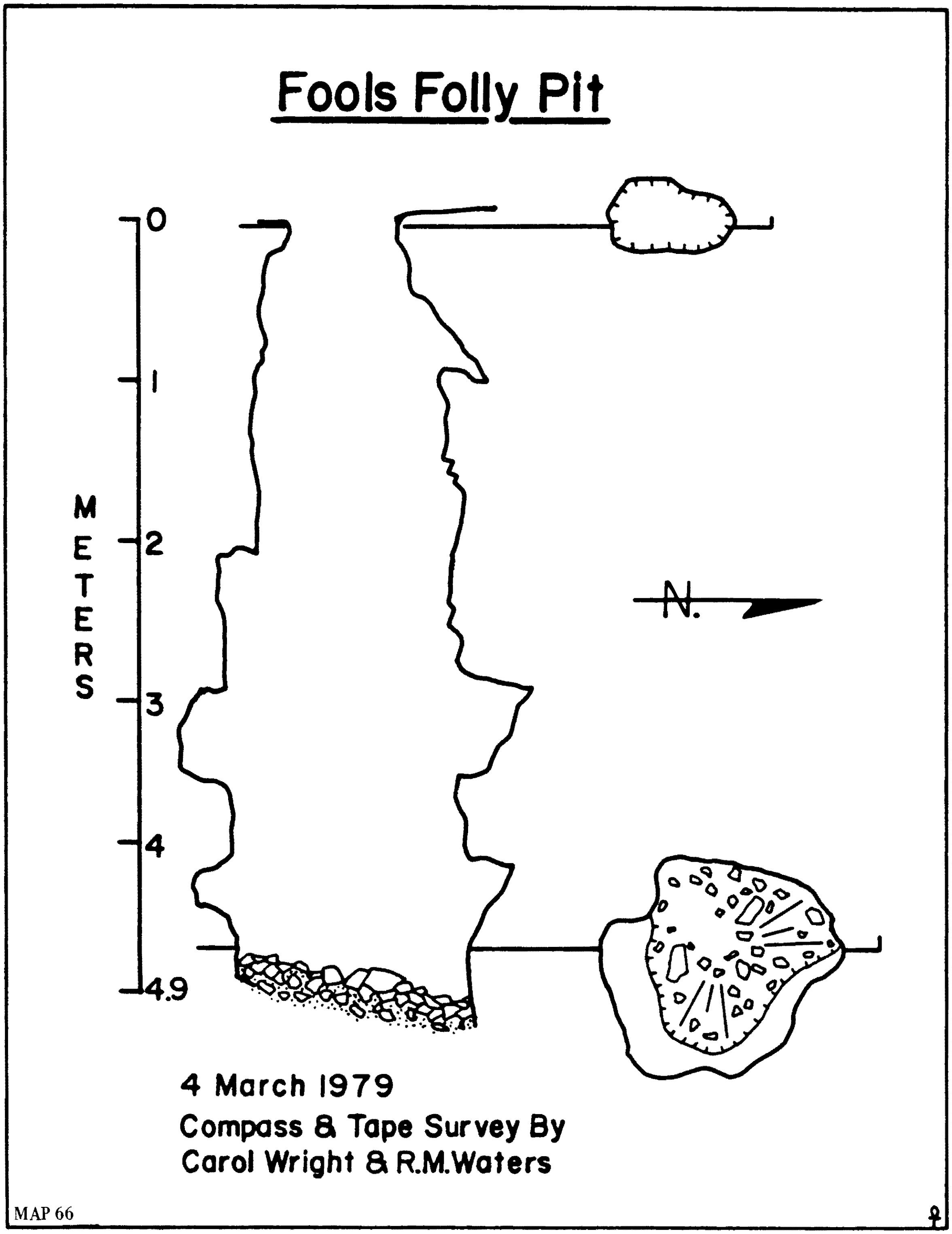
FOUNTAIN POND CAVE (BCS #175)
Location: Longhorn 7.5'
Description and History: A cave of unknown extent was discovered and sealed during the construction of a pond and fountain for the Stone Oak housing development in the spring of 1984. The cave was said to be larger than nearby Voight's Bat Cave.
Geology: The cave was formed in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer.

FRENCH STREET CAVE (BCS #26)
Location: San Antonio East 7.5'
Description: A 1.2 m square metal grid covers the entrance to the cave located in the owner's front yard. The cave is said to be fairly extensive, but no modern exploration has confirmed this. Leaves and grass cuttings have been raked into it for many years, and it is currently filled by this debris.
History: Little is known of the cave's discovery or exploration; however, it must have been known for many years, as it is located in an old, well-established neighborhood.
Geology: The cave is formed in the Austin Chalk, and, like other caves in that formation and area, it is probably a maze of joint-guided passages with little vertical development.
Bibliography: Veni (1978a:5).

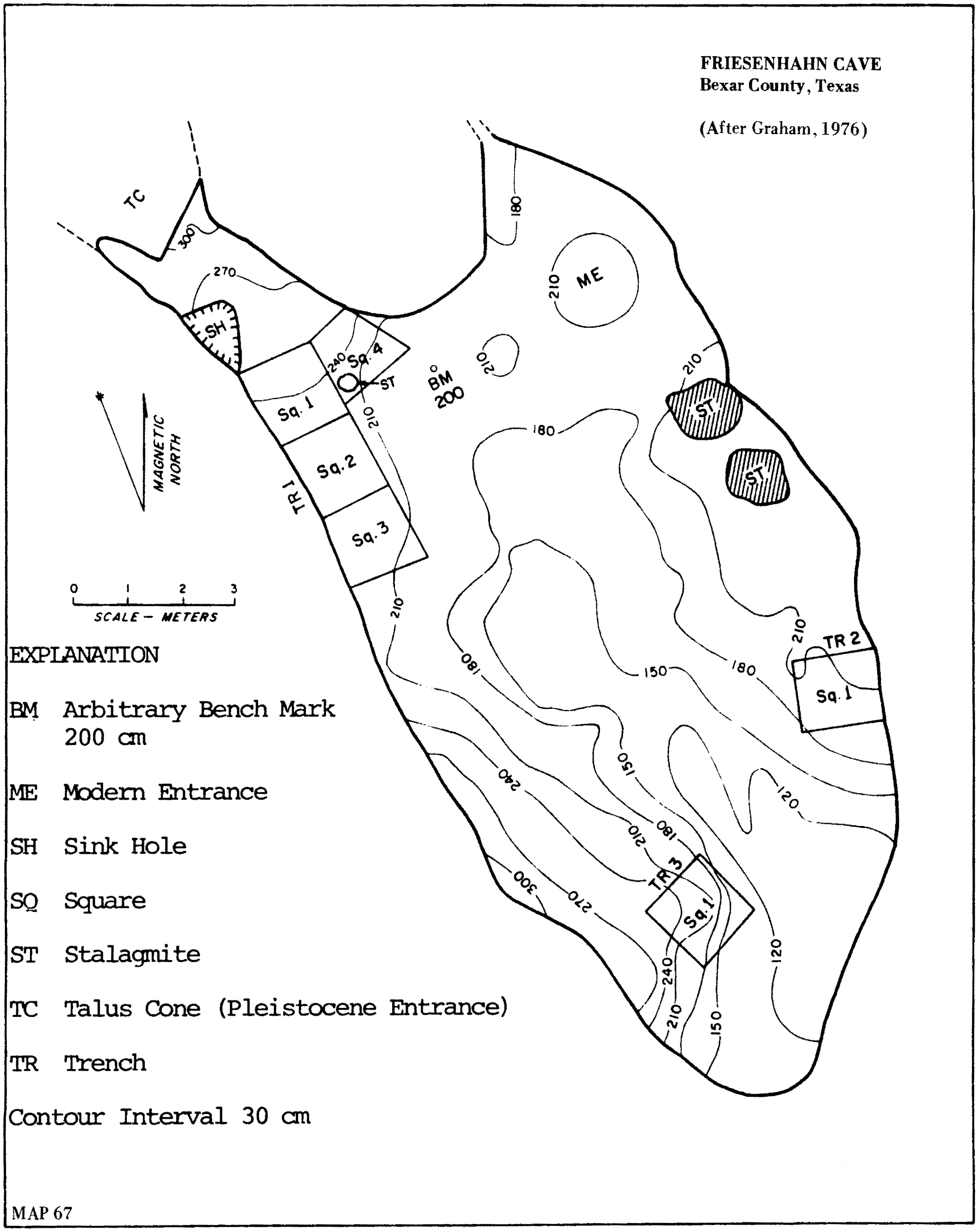
FRIESENHAHN CAVE (BCS #28)
Alternate names: Bone Cave; Bulverde Cave
Location: Bulverde 7.5'
Description: The cave is described by Graham (1976) as follows:

> Friesenhahn Cave is a one-room cave about 18 meters long and 10 meters wide. The modern entrance is a vertical shaft 10 meters deep. An old Pleistocene entrance at the north end of the cave is plugged by a carbonate-cemented talus cone which is composed of a heterogeneous mixture of coarse and fine sediments, limestone blocks, and bone. The surface of this talus cone extends upward at an angle of 20° to 30°. There is a small depression where the projected talus cone intersects the land surface. This depression may be a relatively recent feature because it was not reported by Evans (1961) and because there is a thin veneer of organic sediment on the top surface of the talus cone.
>
> Along the southwest wall at the north end of the cave is a small circular sink hole about 2 meters in diameter and 2.5 meters deep. At the bottom, it narrows into a small fissure in the wall. There is also a large tapering fissure in the wall at the northwest end of the modern entrance. When Schuchardt and the TMM [Texas Memorial Museum] parties worked in the cave, there was a large sink hole 5 meters by 3 meters in the cave floor below the modern entrance. . . . However, this sink hole is not visible today because it was filled with back dirt during the TMM excavations.

(See Maps 67-69.)
History: In a brief account Sellards (1919:73-74) first brought the cave to the attention of the scientific community. Bones collected by D.V. Schuchardt in 1915 were sent to O.P. Hay for identification. Hay (1920) published a map of the cave and a list of 18 species which he had identified from the "Bulverde Cave" and which he considered to be of the Middle Pleistocene era. For many years permission to explore the cave could not be obtained. In the summer of 1949, Mr. Alfred Friesenhahn invited a party from the Texas Memorial Museum at The University of Texas to excavate the cave deposits and collect whatever fossils were found. Immediately thereafer, a field camp was established at the site in preparation for the long-delayed exploration. Excavations were carried on during the summers of 1949 and 1951 by a field party consisting of Glen L. Evans, Grayson E. Meade, Charles E. Mear, John White, Carl Moore, and Kenneth Rochat. Dr. E.H. Sellards, then Director of the Texas Memorial Museum, was in general charge of the project (Evans, 1961). The remains of a still, the concrete footings of which remain today, probably ex-


Fools Folly Pit
0
1
2
3
4
4.9
METERS
N.
4 March 1979
Compass & Tape Survey By
Carol Wright & R.M.Waters
MAP 66

plains the inaccessibility of the cave during the period between 1919 and 1949. In the 1960s Ruben M. Frank collected sediments for mineralogical study. During the early 1970s Russell W. Graham conducted an intensive excavation of the cave using modern techniques for the recovery of small bones, many of which were overlooked by earlier excavations. Cavers have seldom visited the cave which is of little interest



to the explorer, and the owner has properly restricted access to prevent the disturbing of any unexcavated material.

Biology: David Lee Jameson made the first faunal inventory during the summer of 1949. A small collection of invertebrates was made by Terry Raines in October 1964. Identified so far from Friesenhahn Cave are:

Spiders—*Cicurina varians* (troglophile)
Cave crickets—*Ceuthophilus (C.)* sp. (trogloxene)
Ceuthophilus (Geotettix) cunicularis (trogloxene)
Slimy salamanders—*Plethodon glutinosus albagula* (trogloxene)
Canyon toad—*Bufo punctatus* (accidental)
Gulf Coast toad—*Bufo valliceps* (?trogloxene)
Barking frog—*Hylactophryne augusti latrans* (trogloxene)
Cliff frog—*Syrrhophus marnocki* (trogloxene)
Leopard frog—*Rana "pipiens"* (accidental)
Copperhead—*Ankistrodon contortrix* (accidental)
Anole—*Anolis* sp. (accidental)
Mexican brown bat—*Myotis velifer incautus* (trogloxene)

Geology: Friesenhahn Cave is a phreatic chamber formed in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer. Decline of the water table resulted in minor collapse, substantial calcite deposition, and eventual stoping and vadose development of the now filled entrance. The present pit entrance similarly formed sometime after the other entrance had sealed. Opening of the now filled entrance marked the beginning of Late Pleistocene sedimentation in the cave. The following account of the sedimentary history of the cave is from Evans (1961):

> The oldest surface materials recognized in the cave deposits occur in Zone 1 where they are intermixed with fallen rocks and dripstone and rest directly on deposits of the older self-filling stage. The fact that only small vertebrates were found in Zone 1 suggests that the surface materials were introduced during the early development of the opening, before it had attained sufficient size to admit larger animals into the cave. The pronounced disconformity at the contact between Zone 1 and its overlying sediments is believed to represent a significant gap in the sequence of deposits. A large part of the original Zone 1 deposit obviously was stripped off by running water and redeposited on a lower, unfilled part of the cavern system. Such erosion could have taken place only at times when deeper, connecting parts of the cavern had been partly emptied of water, caused by a lowering of the water table. The lowered base level led inflowing surface water to wash swiftly through the cave and erode the deposits previously accumulated on its floor. A subsequent rise of the water table prevented further drainage into deeper passages. This ended the erosion of Zone 1 and initiated a new stage of deposition. The fine-grained and thinly bedded sediments which comprise most of Zones 2 and 3 are obviously pond deposits. Throughout the time represented by these two zones the water table stood at a high level, inundating the deeper connecting chambers and, at times, the lower part of the cave floor. Surface water flowing into the cave could not escape through the saturated openings and it accumulated in a pond where the fine-grained sediments were deposited. Numerous partings of limestone grit and very minor disconformities between the thin beds of silt and clay indicate that the pond dried up and reappeared many times during the deposition of the two zones. This intermittent ponding condition was probably caused by minor fluctuations in the water table level and by seasonal variations in the inflow of surface water. The lithologic differences in Zones 2 and 3 apparently reflect somewhat different depositional conditions within the cave. There is no indication, however, that these units were separated by any considerable hiatus. Rather, they appear to represent a continuing process of filling during a single climatic substage. Articulated and well-preserved skeletons found in Zone 2 and in the lower parts of Zone 3 suggests a fairly rapid rate of deposition for at least a part of these sediments. Had the skeletons been exposed for a considerable time before burial they almost surely would have been scattered about by scavenger animals. The uppermost part of Zone 3 apparently accumulated at a relatively slow rate. Many of the fossil bones from this zone show advanced decomposition and very slight mineralization, indication that they were exposed to the atmosphere for a long time before they were ultimately buried in sediments. Indeed, some fossil teeth and the harder, less perishable bones that were never completely buried were found partly exposed at the surface of Zone 3 when excavations were commenced in 1949. The retarded rate of deposition in upper Zone 3 time is believed to have been caused by the gradual filling of the old surface opening which reduced, and eventually completely shut out, inflow of sediment bearing surface water. For some time thereafter there appears to have been no deposition within the cave. But eventually surface drainage again found its way into the cave through a new opening near the present surface entrance. The water was not impounded on the cave floor, as

> had been the case during the preceding stage of deposition. Instead, it flowed through the cave, eroding a channel into the older ponded deposits. The channel crosses the cave on a rapidly steepening gradient and passes beneath the exposed cave into a lower part of the cavern system. Evidently subsidence of the water table after deposition of Zone 3, had reopened the lower cavern enough to receive the inflow from the channel. In time the opening into the deeper cavern was completely filled by Zone 4 channel deposits. At the present time surface water flows into the cave only in occasional periods of unusually heavy rainfall. As no water course leads to the cave's entrance, the inflow is derived exclusively from sheetwash across the gentle surface slope. Modern deposits are accumulating at a very slow rate and are retained within the sinkhole in the cave floor which lies immediately beneath the present entrance. Surface drainage passes freely through the sinkhole debris into deeper openings, so the remaining area of the cave floor is no longer subject to erosion or deposition. This condition has been obtained since the sinkhole first developed some time after the Zone 4 channel filling had been completed.

Frank (1965) analyzed clay from the cave but his results were not confirmed by Graham (1976), and the significance of these studies is so uncertain as to warrant no further discussion here. Graham (1976) prepared a more detailed stratigraphy for the cave than that of Evans (1961), but his conclusions about sedimentary history generally agree with Evans.

Archeology: "Several objects found in the excavations suggest the possibility that he (Paleo-American man) either entered the cave occasionally or lived in the immediate vicinity of its entrance. A few pieces of flaked flint recovered from Zones 2 and 3 closely resemble the flint scrapers which are known to have been fashioned by man." (Evans, 1961) Other artifacts found include several pieces of polished bone and a large freshwater clam which could only have come from a large stream several kilometers away from the cave. Krieger (1964) discusses the status of the artifacts recovered from the cave. He states:

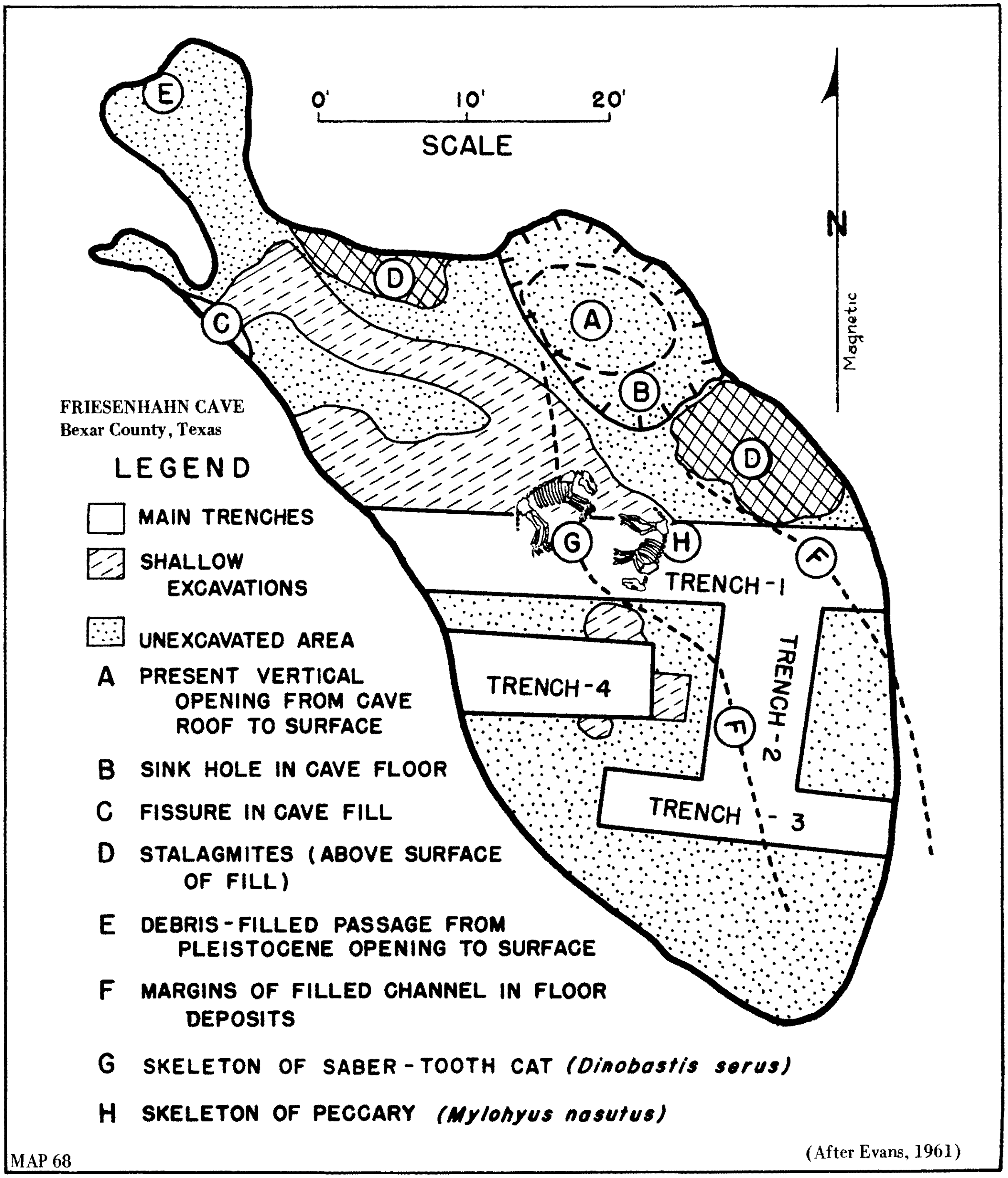
> To my utter amazement, the collection, which was being catalogued at the time Sellards selected the scraper illustrated in 1952, contains at least forty flints that show a crude but nonetheless definite pattern of chipping, resulting in steep, almost vertical edges with small, protruding "beaks." These artifacts are plano-convex and cannot be accidental; all come from zones 2 and 3 in the cave, the same zones that contained the bulk of the Pleistocene fossils and that were not disturbed by the erosion channel, zone 4.

This suggests the possibility that man occasionally entered the cave; certainly he lived near the entrance. The polished bones recovered from the cave, however, probably are not artifactual; similar polishing has been shown in bone material after passing through the intestinal tract of carnivores.

Paleontology: Friesenhahn Cave is well-known as one of the most important paleontologic sites in the United States. The Texas Memorial Museum excavated full and partial skeletons, as well as almost 4,000 isolated teeth and bones, of more than 30 genera of mammals, reptiles, and birds. A general summary of the fossil cave fauna is given by Evans (1961):

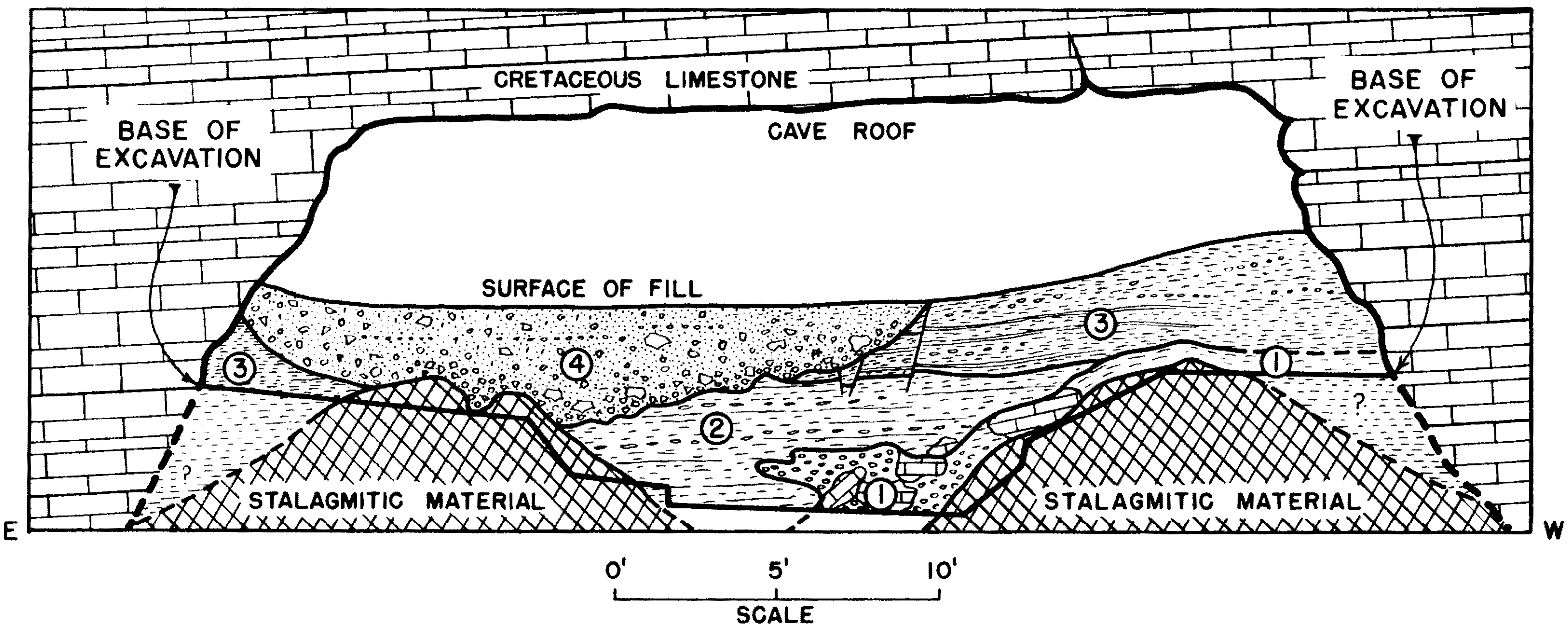
> Among the larger herbivorous mammals represented in the fauna which would not have been expected to enter the cave of their own accord are elephant, mastodon, camel, horse, *Bison,* tapir, and deer. Quite probably, carnivores dragged many of these animals into the cave as prey, and were thus a major factor in the accumulation of the fauna. The carnivores found in association with the herbivorous animals include saber-toothed cats, (*Dinobastis* [=*Homotherium*] and *Smilodon* sp., only a canine tooth of the later being recovered), bear, dire wolf, and coyote. Bones of *Dinobastis* [=*Homotherium*] and coyote are especially abundant, indicating that those animals occasionally or regularly used the cave as a den. One of the most interesting features of the fossil accumulation is the very large number of immature elephant bones found (*Elephas* sp. [=*Mammuthus* sp. cf. *columbi*]) as compared to relatively few bones of the adult elephants. The condition of the bones, and the fact that they were associated with numerous bones of *Dinobastis* [=*Homotherium*], points clearly to the fact that young elephants were the preferred and principal diet of the great cat, *Dinobastis* [=*Homotherium*]. The American mastodon (*Mammut americanum*) is also present in the cave deposits but is not nearly so abundant as the elephant. Like the elephant the mastodon is represented almost entirely by young individuals. . . . Although the cave fauna contains most of the familiar late Pleistocene mammals of the general region, the edentates (glyptodonts, ground sloths, and armadillos) commonly present in the late Pleistocene deposits of the Coastal Plain and in river deposits throughout Central Texas, are virtually absent from the collection. Only the fragmentary remains of a sloth were found. A possible explanation for this absence is that edentates preferred to remain near the

water courses and rarely invaded the rocky, upland environment in which the cave is located. The Friesenhahn fauna contains a large number and variety of fossil rodents. At least nine genera have been identified and part of these have been studied statistically (Kennerly, 1956). Rodent bones occur in all units of the fill but are especially abundant in Zones 3 and 4. Those found in Zone 4 are in part indigenous to the unit, and in part reworked from the older deposits. Some of the rodents represented probably entered the cave in search of food or shelter. Others were probably carried in as the prey of the carnivores. . . . Turtle bones occur in all levels of the cave fill, but are by far the most common in Zone 3. The collection made in 1949 and 1951 includes two genera of turtles represented by 354 complete and fragmentary



MAP 68

FRIESENHAHN CAVE
Bexar County, Texas (After Evans, 1961)



Cross section along south wall of Trench 1 showing stratigraphic relation of the several units of fill.

MAP 69

> shells. . . . The turtles may have used the cave as a hibernation site, or possibly they were attracted by the intermittent pond in which the sediments were being deposited. . . . There appears to be no sound basis for assigning any part of the fossil-bearing sediments to the middle Pleistocene, as was suggested by Hay (1920). Zones 2 and 3 compose the main body of the cave deposits and are by far the most fossiliferous of any tested in the excavations. The occurrence of such typically late Pleistocene genera as *Bison, Mammut,* and *Elephas* [=*Mammuthus*] clearly indicates that these zones originated in the Wisconsin stage of the late Pleistocene time. . . . Zone 1 contains fossils which are less definitive in age. This unit, however, is a part of the related sequence of cave deposits and probably originated in an early moist substage of the Wisconsin. . . . Zone 4 yielded fossils consisting in part of vertebrates reworked from the older cave deposits and in part of smaller forms found in primary position. The indigenous fauna unfortunately does not include species which can be used for conclusive age determinations. The channel and its Zone 4 deposits must have originated during a somewhat drier interval than the preceding period when the ponded sediments of Zones 2 and 3 were accumulated. On the other hand, the nature of the channel deposits indicates a considerable volume of inflow which suggests somewhat moister climatic conditions than obtained at the present time. There seems to be no reliable means of telling at present whether Zone 4 was deposited during a late substage of the Wisconsin, or whether it is all or in part of post-Pleistocene age.

Graham (1976) studied in considerable detail the mammals recovered from the cave, with particular emphasis on the smaller species, many of which were overlooked by the earlier excavators. He also reports carbon-14 dates from the cave and comments on their significance: ". . .there were two distinct periods of sedimentation separated by a 10,000 year hiatus. During the first period (17,000 to 20,000 yrs. BP) Units 3A and 3B were deposited. Units 3C and 2C were then deposited between 9,640 and 8,010 yrs. BP." (Graham (1976) These dates correlate with the early period when the sealed sinkhole was open and the cave was used as a large mammal den. After this entrance filled, a 8,000 year period occurred before the modern entrance opened and the cave became a home for bats, owls, and possibly other small vertebrates. Most of the vertebrate remains in the cave during this later period were left by owls. A complete list of fossil remains recovered from the cave follows. Extinct species are indicated by an asterisk while species no longer occurring in the vicinity of the cave are indicated by a plus sign.

CLASS TELEOSTOMI
- Order Cypriniformes
  - Family Cyprinidae
    - **Alisodon mirus* Hay (extinct minnow)

CLASS AMPHIBIA
- Order Anura
  - Family Bufonidae
    - *Bufo woodhousei bexarensis* Mecham (Woodhouse's toad)
    - *Bufo cognatus* Say (Great Plains toad)
  - Family Leptodactylidae
    - *Hylactophryne augusti* Dugés (barking frog)
  - Family Pelobatidae
    - *Scaphiopus* sp. (spadefoot toad)
  - Family Ranidae
    - *Rana* sp. (frog)
    - *Rana pipiens* group (leopard frog)

CLASS REPTILIA
- Order Chelonia
  - Family Testudinidae
    - **Terrapene carolina triunguis* (Agassiz) (box turtle)
    - **Testudo wilsoni* Milstead (Wilson's extinct turtle)
- Order Squamata
  - Family Colubridae
    - *Pituophis melanoleucus* (Daudin) (pine snake)
  - Family Crotalidae
    - *Crotalus atrox* Baird and Girard (western diamondback rattlesnake)
  - Family Iguanidae
    - *Crotaphytus collaris* (Say) (collard lizard)

CLASS AVES
- Order Falconiformes
  - Family Accipitridae
    - *Aquila chrysaetos* (Linnaeus) (golden eagle)
  - Family Falconidae
    - *Falco sparverius* Linnaeus (sparrow hawk)
- Order Galliformes
  - Family Phasianidae
    - *Colinus virginianus* (Linnaeus) (bob-white)

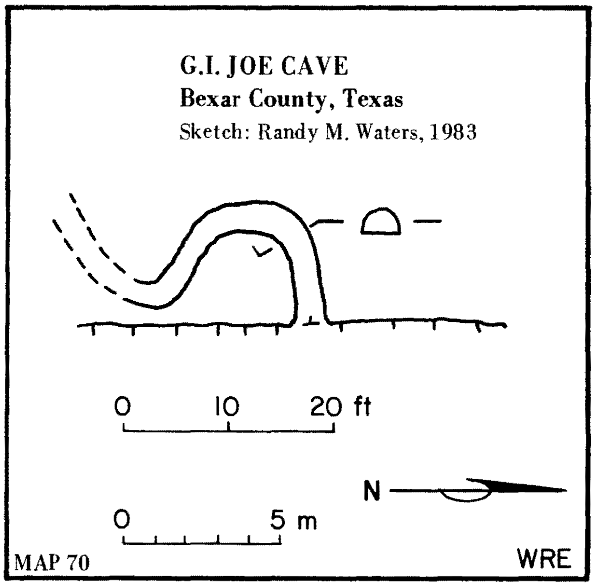
CLASS MAMMALIA
- Order Marsupicarnivora
  - Family Didelphidae
    - *Didelphis virginiana* Kerr (opossum)
- Order Insectivora
  - Family Soricidae
    - +*Blarina carolinensis* (Bachman) (short-tailed shrew)
    - +*Cryptotis parva* (Say) (least shrew)

Notiosorex crawfordi (Coues) (desert shrew)
Family Talpidae
Scalopus aquaticus (Linnaeus) (eastern mole)
Order Chiroptera
Family Vespertilionidae
Myotis velifer (J.A. Allen) (Mexican brown bat)
Pipistrellus sp. (pipistrelle)
Order Edentata
*Sloth
Order Lagomorpha
Family Leporidae
Lepus sp. cf. *californicus* Gray (black-tailed jackrabbit)
Sylvilagus sp. (rabbit)
Sylvilagus floridanus (Allen) (eastern cottontail)
Order Rodentia
Family Cricetidae
Microtus sp. (vole)
Microtus ochrogaster (Wagner) or *M. pinetorum* LeConte (prairie vole or pine vole)
Neotoma sp. (packrat)
Onychomys leucogaster (Wied-Neuwied) (northern grasshopper mouse)
Peromyscus sp. (white-footed mouse)
Peromyscus boylii (Baird) (brush mouse)
Reithrodontomys sp. (harvest mouse)
Reithrodontomys sp. cf. *megalotis* (Baird) (western harvest mouse)
Reithrodontomys sp. cf. *montanus* (Baird) (plains harvest mouse)
Sigmodon hispidus Say and Ord (hispid cotton rat)
+*Synaptomys cooperi* Baird (southern bog lemming)
Family Geomyidae
Geomys sp. (eastern pocket gopher)
Family Heteromyidae
Dipodomys sp. (kangaroo rat)
Perognathus sp. (pocket mouse)
Perognathus hispidus Baird (hispid pocket mouse)
Family Sciuridae
Cynomys ludovicianus (Ord) (black-tailed prairie dog)
Sciurus niger Linnaeus (eastern fox squirrel)
Spermophilus sp. (ground squirrel)
+*Tamias striatus* (Linnaeus) (eastern chipmunk)
Order Carnivora
Family Canidae
**Canis dirus* Leidy (dire wolf)
Canis latrans Say (coyote)
Urocyon sp. cf. *cinereoargenteus* (Schreber) (gray fox)
Family Felidae
Felis onca augusta Leidy (jaguar)
Felis rufus Schreber (bobcat)
**Homotherium serum* (Cope) (scimitar cat)
**Smilodon* sp. cf. *floridanus* (Leidy) (sabertooth)
Family Mustelidae
Mephitis mephitis (Schreber) (striped skunk)
Spilogale sp. (spotted skunk)
Family Procyonidae
Procyon lotor (Linnaeus) (raccoon)
Family Ursidae
**Arctodus simus* (Cope) (giant short-faced bear)
Ursus americanus Pallas (black bear)
Order Artiodactyla
Family Bovidae
Bison sp. (bison)
Family Camelidae
**Camelops* sp. (extinct camel)
Family Cervidae
Odocoileus virginianus (Zimmermann) (white-tailed deer)
Family Tayassuidae
**Mylohyus nasutus* (Leidy) (long-nosed peccary)
**Platygonus compressus* LeConte (flat-headed peccary)
Order Perrisodactyla
Family Equidae
**Equus* sp. (extinct horse)
Family Tapiridae
**Tapirus veroensis* Sellards (Vero tapir)
Order Proboscidea
Family Elephantidae
**Mammuthus* sp. cf. *columbi* (Falconer) (Columbian mammoth)
Family Mammutidae
**Mammut americanum* (Kerr) (American mastodon)

Bibliography: Anonymous (1950:181; 1951:176; 1960a:25-28); 1961b:121; 1961f:157; 1963e:32; 1965e:60; 1973q:11; 1979x:6); Agenbroad (1984a: 125; 1984b:96); Anderson (1984:58); Auffenberg (1958; 1962:630-631, 635; 1963; 1974:167); Auffenberg and Milstead (1965:561); Aveleyra Arroyo de Anda (1964:400); Baker and Penteado-Orellana (1977:416); Bryant and Shafer (1977:13); Byrd (1976:42-43); Dalquest (1967:10); Davies (1966:3); Dibble and Alexander (1971:136); Evans (1961:1-22); Fieseler (1978a:65; 1978c:69-70); Foster (1961:127); Frank (1961:94-95; 1963:126; 1964a:

59; 1964b:4-5, 15-16, 40-41; 1965a:120; 1965b:9, 65, 69-72, 76-77, 80, 82; 1965c:59); Gehlbach (1965:63); Gilmore (1938:73); Graham (1976:i-xviii, 1-233); Graham and Lundelius (1984:236); Harrington and Simpson (1961:32); Hay (1920:129-146, pls. 5, 9-11; 1924:15, 47, 190, 247); Hester (1980: 131-132; 1986:55, 58); Hibbard (1970:396-397, 429-432); Holman (1964:73, 76, 82; 1966:347; 1969a:65-67; 1969b:167); Irwin (1971:42, 43, 45); Jameson (1949:20); Jennings (1968:69-70, 87); Jones (1933:53-54); Kennerly (1956:74-86); Krieger (1964:43-46); Kurtén (1963:2-9, 13; 1967:7, 14, 36; 1974:9); Kurtén and Anderson (1980:43, 81, 82, 113, 190, 219, 234, 243, 297); Land, Lundelius, and Valastro (1980:147); Lundelius (1960:1-40; 1967: 289-296, 306-307, 309; 1972:150, 151; 1986:44-46); Lundelius, Graham, Anderson, Guilday, Holman, Steadman, and Webb (1983:317, 326-328, 330, 333-338); Lundelius and Slaughter (1971:15-16, 18-19, 21, 23-25; 1976:241); McClure and Milstead (1967:322); MacNeish (1971:46); Martin (1968:253-266); Meade (1961:23-60); Mecham (1959:17-27); Milstead (1956:162-171; 1967:172-175; 1969:6, 62-65, 70, 112-113); Newcomb and Adams (1959a: 4; 1959b:5); Oesch (1967:180); Pettus (1956:109-115); Poole (1978a:2); Raun (1971:100); Reddell (1961b:1; 1961c:53; 1965:169; 1966:31, 34; 1967: 188-190, 192); Reddell and Knox (1962:3-5, 14-21); Reddell and Russell (1962a:5); Reddell and Smith (1966:3); Schmidly (1974:2); Sellards (1919: 73-74; 1951:229; 1952:94, 143); Semken (1961:291; 1967:6, 8; 1983:183, 201); Slaughter (1961:314); Streng (1974:58); Tamsitt (1957:355-363); Tihen (1962:44-45); Veni (1978a:5; 1985); Wermund, Cepeda, and Luttrell (1978:8); White (1944:45); Widener (1959:80); Wormington (1957:218-219); Zweifel (1967:41.2).

G.I. JOE CAVE (BCS #177)
Location: Castle Hills 7.5′
Description: G.I. Joe Cave is an "S"-shaped crawlway in a cliff overlooking Salado Creek. The entrance is through the top of the "S"; at the lower bend of the "S" is a rock blade which obstructs exploration. The cave averages 0.3 to 0.6 m high, 0.6 to 1.0 m wide, and has an explored length of 8 to 9 m. A thin veneer of dirt and clay covers the flat floor. (See Map 70.)
History: The cave was discovered and explored in 1982 by Randy M. Waters, who described it as being a perfect size for an explorer the size of a "G.I. Joe" doll.
Biology: An immature desert cockroach, *Arenivaga* sp. prob. *bolliana* was collected in the cave in December 1983 by Randy M. Waters.



Geology: The cave was developed in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer as a minor spring for upland drainage into Salado Creek. Declining base level by downcutting of the creek has resulted in abandonment of flow through the cave.
Technique: A hammer and chisel could be used to remove the blade obstruction, but since most springs diminish in size upstream, any extension may not justify the damage.
Bibliography: Veni (1985).

GANDALF'S CAVE (BCS #29)
Location: Castle Hills 7.5′
Description: The 1 m diameter by 3.8 m deep entrance pit is in the northeast corner of a shallow sink. From the pit floor a low, wide crawlway leads into the cave, which is a single room 36 m long, 6 m wide, and about 1 m high. This is one of the more extensively decorated caves known in Bexar County. (See Map 71.)
History: In late 1977 Randy Waters noticed air blowing from a shallow sink. Encouraged by Waters to explore the sink, Ted Roberts and George Veni dug it open on 23 December 1977. The fragile, somewhat mystical beauty of the cave inspired its name in honor of the great wizard from the books of J.R.R. Tolkien. Gandalf's Cave was surveyed on 31 December 1977 and 8 January 1978 by John Cross, George Veni, and Randy M. Waters. After the survey, it was decided the cave could best be protected from vandalism by resealing it, especially because a new housing development was within 100 m of the cave. Prior experience suggested that if the cave were discovered, it would be stripped bare of its formations.

The entrance pit was filled more than 1 m deep with large rocks to give it the impression of being only a shallow pit. The ploy worked for a couple of years, but the cave was eventually dug open and resealed by area residents. Fortunately, damage was minimal during the time the cave was open.

Biology: Ant trails indicated on the map are small interconnecting paths made by hundreds of red ants. Other than a worm, no other fauna was observed, possibly due to the wintertime exploration.

Geology: The cave formed in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer along two parallel joints that trend NE-SW. An ephemeral seasonal stream flows into the entrance sink. Parts of the cave's thick sediment cover on the floor are subsiding into deeper cavities of unknown extent.

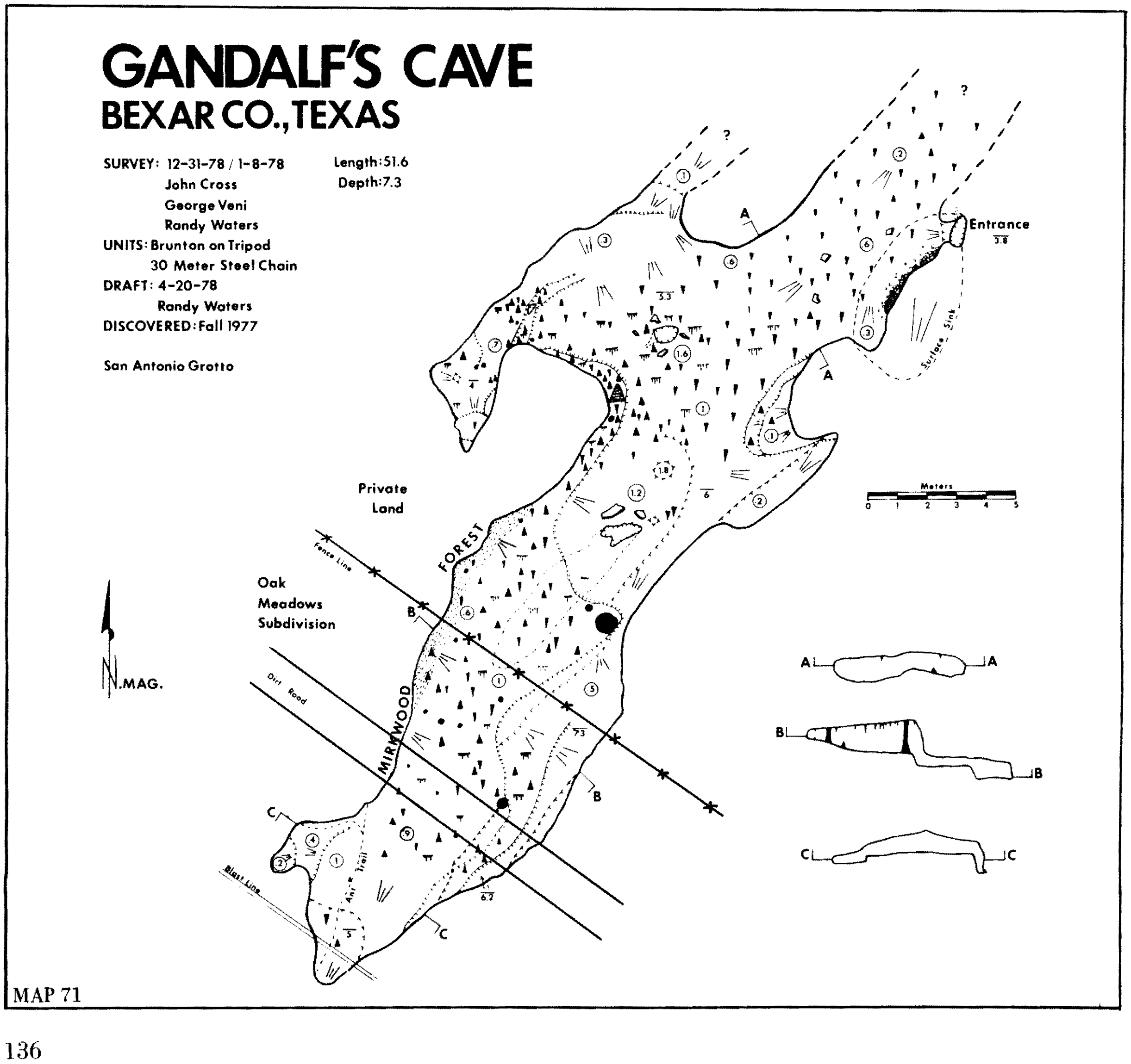
Technique: Please do not visit the cave! Visitation only draws further attention to it from the local residents. In addition, ambulating inside the cave is nearly impossible without breaking some speleothems. A trail was established during the initial exploration. If you find it imperative to enter the cave, please stay on the trail.

Bibliography: Poole (1978c:3); Poole and Passmore (1978:18, 20, 51); Veni (1978a:5; 1978c:3-5; 1985).

GENESIS CAVE (BCS #196)

Location: Longhorn 7.5′

Description: The cave entrance is a narrow pit, 1 m long, 0.4 m wide, and 4 m deep, next to a shallow sinkhole. The pit drops into a 1.8 m wide passage which slopes downward 14 m to the north and gains a ceiling height of 3 m. The passage turns west 19 m, going through a minor reduction of ceiling height and passage width, and descends an additional 6 m. A series of short pitches lead to the northeast and



MAP 71

downward for 10.6 m. At this point the cave becomes a 1 m long crawl and opens over a 9.4 m deep pit. At the base of the pit is a 30 m long passage known as The Walkway. It is formed along a fault and heads southwest and northeast. To the southwest The Walkway is over 2 m high, 1 m wide, and ends after 12 m. Two passages extend to the northeast. An upper passage, about 4 m above the floor, lies directly over The Walkway and only goes 3.5 m before ending. The Walkway gains 9.8 m of depth as it slopes 18 m down to The Crawl. This 1 m wide, 47 m long crawlway zig-zags some, but overall it heads due east. The floor of The Crawl is a matrix of clay overlain by coarse gravel and many sharp, angular rocks. The ceiling height is no more than 1 m, with an average of 0.5 m; it may change in places after floodwaters rearrange the cobbles. Portions of the crawlway sometimes have to be dug open. Water is often ponded throughout much of The Crawl. The best thing about the crawl is that it opens to The Drain, a 22.8 m deep pit. Half-way down the pit is a 12 m high by 2.3 m wide passage that leads 18 m to the 8 m deep Mud Pit. A passage leading from the pit ends in mud fill within 7 m. From the base of The Drain a passage heads north, drops down a 3 m pit, goes through a hands-and-knees-sized crawlway for 6 m, and drops 4 m to the 3 m in diameter, 6 m high Sump Room. During low water levels the sump is open, and a crawlway extends 1 m northwest into the Phreatic Mud Chamber. The chamber is about 10 m long, 7 m wide, 2 m high, and floored with large blocks of breakdown that are heavily coated with mud. Gaps within the breakdown allow the cave to be explored only 2 m deeper—the bottom of the cave. At 78.0 m, Genesis is by far the deepest explored cave in Bexar County. (See Map 72.)

History: Genesis Cave was discovered in early June 1985 by Randy M. Waters. He first explored it with Kurt Menking to the start of The Crawl. On 15 June 1985 they returned with Bob Cowell and Steve Boehme to explore to the end of The Crawl and then survey out to the entrance. Instead, they discovered The Drain and managed to survey only the horrid crawl itself. On 19 June 1985 Menking and Waters surveyed the section from the entrance to The Crawl. Waters, Menking, and Cowell returned with Steve Gutting and Scott Harden on 29 June and surveyed and explored to the Sump Room. On 11 August 1985 Waters was joined by Allan Cobb and George Veni. Discovering that the sump no longer existed, they extended the survey into the Phreatic Mud Chamber and the bottom of the cave. In August 1986 Marion O. Smith and Bill Steele explored the Mud Pit to its muddy end.

Biology: Collections made in the cave on 19 and 29 June 1985 by Randy M. Waters and on 3 February 1986 by Allan Cobb included the following material:

Snails—Undetermined material
Isopods—Oniscoidea genus and species
Trichoniscidae genus and species 1 (troglobite)
Scorpions—Prob. *Vaejovis reddelli* (troglophile)
Spiders—*Cicurina* n. sp. (troglobite)
Harvestmen—*Hoplobunus madlae* (troglobite)
Millipedes—*Cambala speobia* (troglobite)
Springtails—Undetermined material
Ground beetles—*Rhadine* sp. (troglobite)
Rove beetles—*Eustilicus condei* (troglophile)

Other fauna observed in the cave include harvestmen (prob. *Leiobunum townsendii*), silverfish, and cave crickets (*Ceuthophilus* sp.).

Geology: Genesis is one of the more geologically interesting caves known in Bexar County. It has several features unique in the county. The first and second rooms, at elevations between 4 m and 8 m below the entrance, have walls comprised of predominantly angular chert pebbles and cobbles that are well-cemented into a matrix of calcareous sand, silt, and some small limestone clasts. During the course of the cave development, the constriction at the lower end of the second room was filled by chert fragments (fractured due to intense localized faulting) and sediment from the surface sinkhole. Both rooms filled with the clastic debris, and eventually the sinkhole itself was plugged. The sinkhole is actually a swallet and drains a small area of a few hundred square meters, yet its water is the primary driving force in the cave's development. As the sinkhole filled with sediment, its capacity to recharge water was diminished. One result was an increase in overland flow, some of which enlarged a dome in the first room to make it the cave's present entrance. The overland flow could have also better developed some of the cave's deeper tributary conduits. Eventually, the clastic plug was breached, either by stoping from below, by vertical solution from above, or probably by both. It is likely that the sinkhole also reopened, only to fill again—a cyclic process dependent on the material carried into the sinkhole and the competence of the insurging stream to transport it. After the first two rooms the cave descends steeply to a depth of 44 m, where The Crawl is encountered. Along the descent at least two significant faults are encountered. The series of short pitches heading northeast and the 30 m long passage at the base of the 9.4 m drop are developed along faults which trend approximately N30°E and have a 1 m vertical displacement downthrown to the east. These are the second and third passages discovered in Bexar County that are intersected by a fault and the only ones known to be developed along one. Genesis Cave is developed in the Edwards Limestone Group. The entrance is situated near the top of the Marine Member of the Person Formation. The contact between the Marine Member and the underlying Leached Member is seen in the walls of the 9.5 m drop. Below the Leached Member are the Collapsed Member and the Regional Dense Member. The 50 m long Crawl formed atop the Regional Dense Member. It is likely that its development was perigenetic—when an insoluble hardpan covers the floor of the passage and the passage enlarges upward as the floor continues to rise. The chemically insoluble and physically resistive floor is composed of a 1 m thick deposit of clay with a high density of chert fragments and clasts from the cemented matrix that filled the first two rooms. The walls and roof of the crawlway are dissolved out of the Collapsed Member, and show intense fracturing and brecciation. At the end of the crawl the Regional Dense Member is breached at the 23 m deep pit. Approximately 3 to 4 m down the pit is the contact between the Person and Kainer Formations, and respectively, their Regional Dense Member and Grainstone Member. At the base of the pit the Grainstone Member alters from a hard, cemented grainstone to a more leached and very porous limestone. The base of the pit also marks the uppermost extent of the paraphreatic zone, as indicated by the mud coating on the walls and the phreatic morphology of the passage. The collapse at the bottom of the cave may be into a chamber formed in the Dolomitic Member of the Kainer, located 7 to 10 m farther below (the Dolomitic Member is known to be very cavernous in its upper part).

Meteorology: Occasionally, high levels of carbon dioxide are present in the cave. Bad air beyond the base of The Drain plagued the survey of the Phreatic Mud Chamber, the air being especially bad in the chamber. A subsequent trip to the cave noted high CO_2 at the beginning of The Crawl. This may be from decomposing organic debris deposited in that area. On 14 September 1986 William R. Elliott measured CO_2 and oxygen levels at several points in the cave. His results and the sites of his measurements follow: 2 m below the entrance (18.8% O_2); entrance room (19.5% O_2; 2.3% CO_2); at top of 9.4 m pit (18.5% O_2); bottom of 9.4 m pit (18.0% O_2); beginning of The Crawl (17.8% O_2; 3.8% CO_2).

Technique: Although the cave can be freeclimbed down to the 9.4 m pit, 6 m and 10 m long handlines would be very helpful for the entrance pit and the pitches just before the 9.4 m pit. A rope or cable ladder is needed for the 9.4 m pit; the tie-off is 9 m above the pit. Body padding is recommended for The Crawl. A 30 m rope is needed for The Drain which follows. Caution should be exercised, especially past The Crawl, because of bad air.

Bibliography: Palit (1985b:86; 1986:16); Veni (1985).

GEORG'S HOLE (BCS #184)

Location: Camp Bullis 7.5′

Description: The 1.3 m diameter pit entrance is located on the south bank of Cibolo Creek, about 1 m above its bed. After a 4 m drop into a breakdown-floored room approximately 10 m long, 5 m wide, and 2 m high, the cave continues down a 2.5 m wide northbound passage which drops successively 7.5 and 3 m and opens into a lake room whose dimensions are about 5 by 5 by 5 m. The water is about 1 m deep and is supplied by an impassably small inlet in the northwest wall. A 2 m high and wide passage extends west from the lake room for 6 m to a sump. (See Map 73.)

History: Georg's Hole is indicated on the topographic map as a ponded area of Cibolo Creek. The nearby cave was explored in February 1984 by Bob Cowell and Randy M. Waters.

Biology: Observed fauna included what are probably hot house millipedes, *Oxidus gracilis*, and cave crickets (*Ceuthophilus* sp.) in the dry passages, and minnows in the water.

Geology: The cave is vadosely developed in the lower member of the Glen Rose Formation. It recharges the Edwards (Balcones Fault Zone) Aquifer through a series of faults located downstream along Cibolo Creek.

Technique: Although the cave can be freeclimbed, the walls are slippery and a cable ladder or rope is highly recommended.

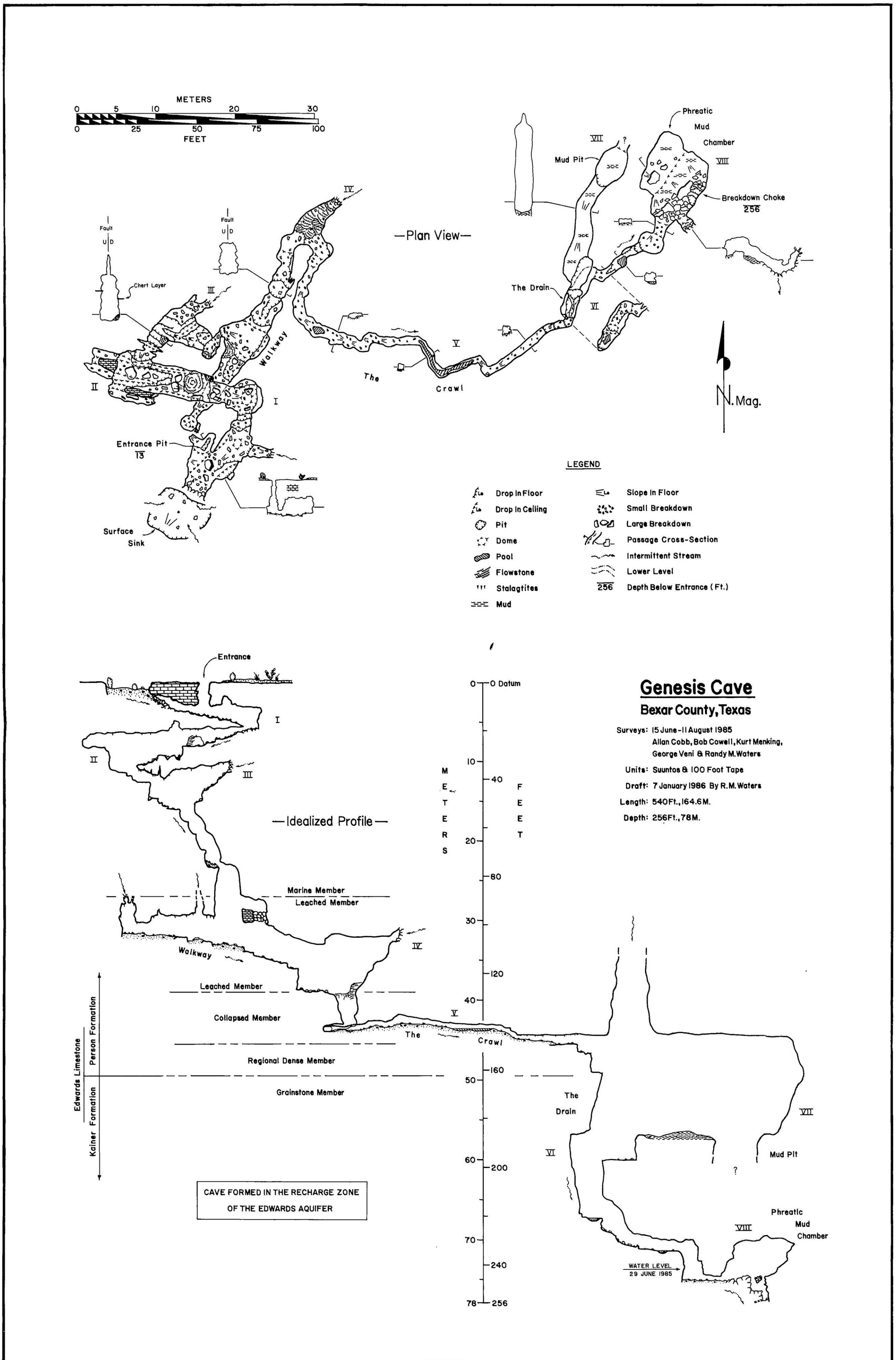
Bibliography: Veni (1985).

GLADSAM'S CAVE (BCS #30)

Alternate names: Johnson's Cave; Gladstone's Cave; Gladstone's Goat Cave; Goat Cave; Gladsam Ranch Cave; Gladsam's Goat Cave; Dever's Cave

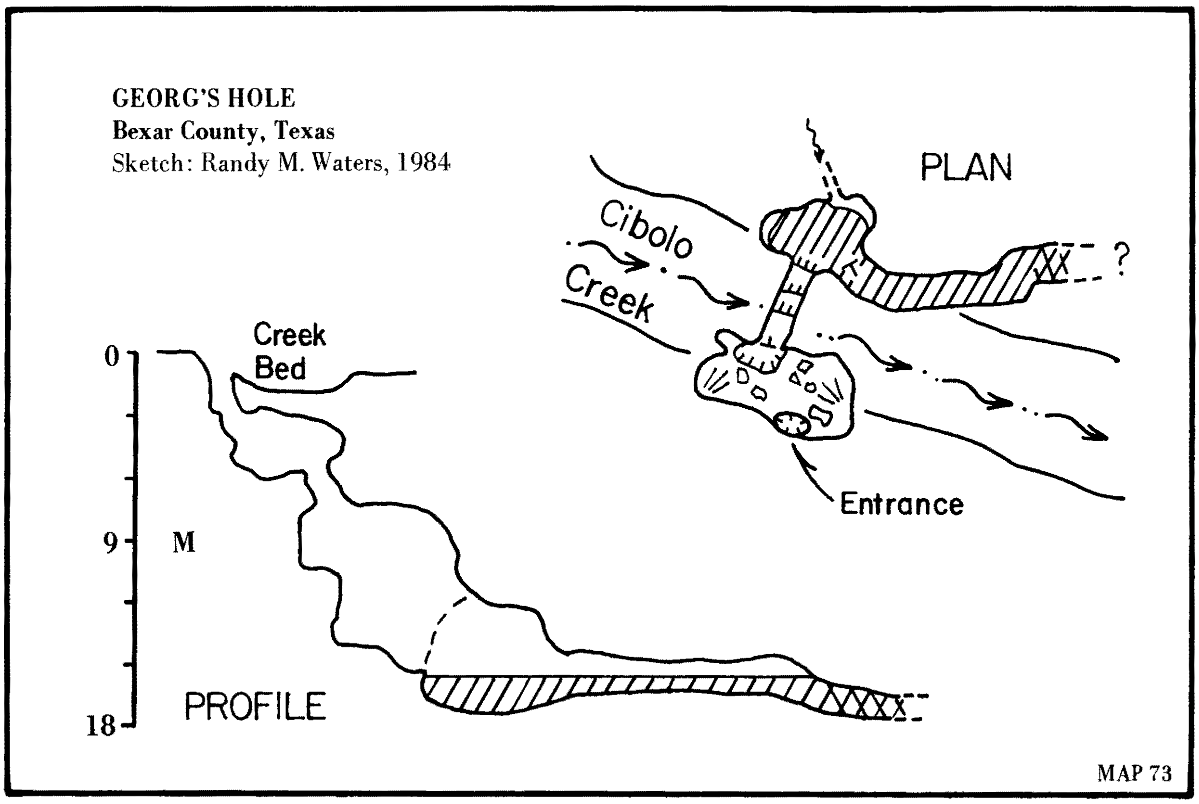
Location: San Geronimo 7.5′

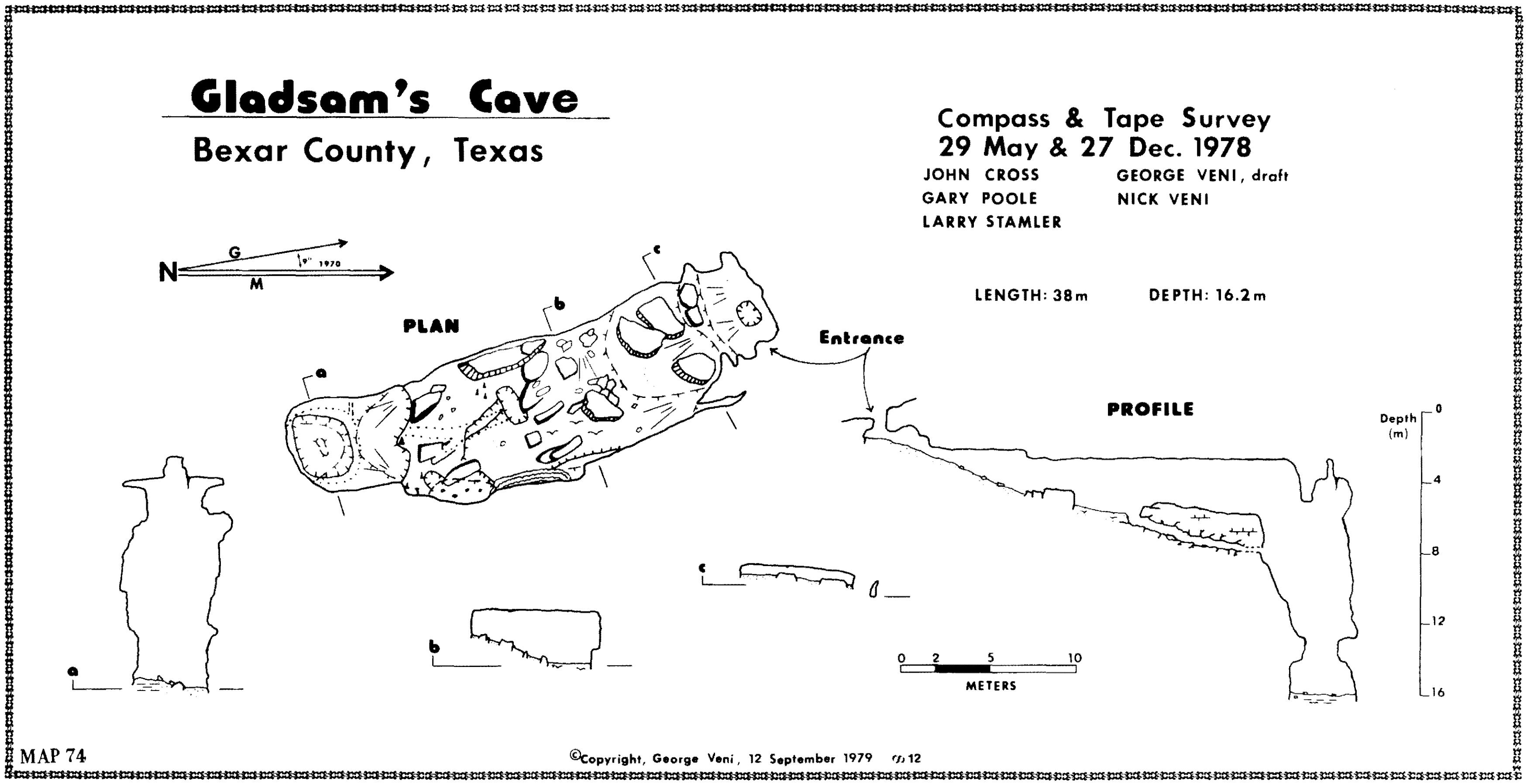
Description: The entrance is 1.4 m in diameter and drops 1 m into the north end of the cave. Gladsam's Cave is a rectangular room 30 m long and 8 m wide. Its floor slopes down from the entrance below a horizontal ceiling to increase the ceiling height to 3 m. Guano and large blocks of breakdown cover much of the room. At the far end is a 10 m deep pit with sediment fill. (See Map 74.)

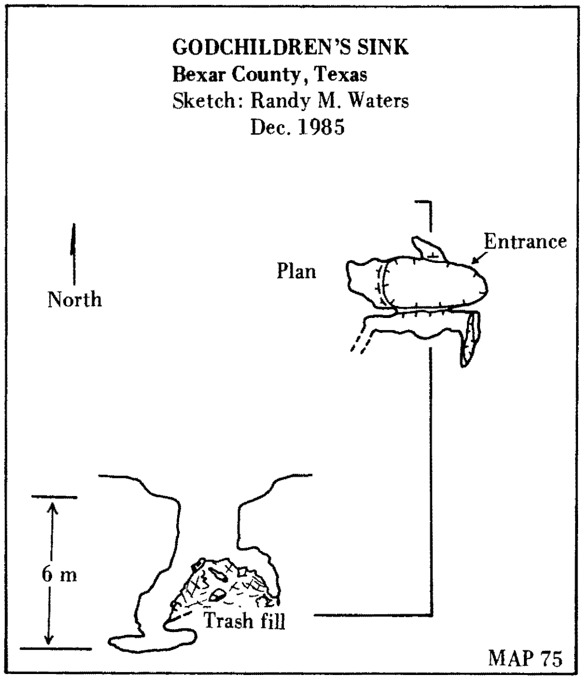

METERS
0 5 10 20 30
0 25 50 75 100
FEET
—Plan View—
Fault
U D
Chert Layer
Entrance Pit
13
Surface
Sink
Walkway
The
Crawl
The Drain
Mud Pit
Phreatic
Mud
Chamber
Breakdown Choke
256
N. Mag.
LEGEND
Drop In Floor
Drop In Ceiling
Pit
Dome
Pool
Flowstone
Stalagtites
Mud
Slope In Floor
Small Breakdown
Large Breakdown
Passage Cross-Section
Intermittent Stream
Lower Level
256 Depth Below Entrance (Ft.)
Entrance
—Idealized Profile—
Marine Member
Leached Member
Walkway
Leached Member
Collapsed Member
Regional Dense Member
Grainstone Member
Edwards Limestone
Person Formation
Kainer Formation
CAVE FORMED IN THE RECHARGE ZONE
OF THE EDWARDS AQUIFER
The
Crawl
The
Drain
Mud Pit
Phreatic
Mud
Chamber
WATER LEVEL
29 JUNE 1985
METERS
FEET
0 Datum
Genesis Cave
Bexar County, Texas
Surveys: 15 June-11 August 1985
Allan Cobb, Bob Cowell, Kurt Menking,
George Veni & Randy M. Waters
Units: Suuntos & 100 Foot Tape
Draft: 7 January 1986 By R.M. Waters
Length: 540Ft., 164.6M.
Depth: 256Ft., 78M.

History: It is not known who first discovered the cave, but by the 1920s the 5 m deep entrance pit had been filled to a depth of 1 m, making it easy for goats that fell into the pit to climb back out. During prohibition years a moonshine still was hidden inside. On 16 April 1954 members of the St. Mary's University Speleological Society were the first cavers to explore the cave. Al Brandt, Preston Knodell, David Litsinger, and Robert Penazola surveyed the cave on 20 and 27 September 1969. John Cross, Gary Poole, Larry Stamler, and George and Nick Veni resurveyed it on 29 May and 28 December 1978. The cave is often visited by cavers and local residents.
Biology: Abundant guano indicates the cave served as a bat roost for many years. Filling of its entrance, however, has made bat visitation a sporadic occurrence. Two pipistrelles (*Pipistrellus* sp.) were reported in 1954. Other observed fauna includes spiders, harvestmen (prob. *Leiobunum townsendii*), cave crickets (*Ceuthophilus* sp.), and two salamanders (prob. *Plethodon glutinosus albagula*) at the bottom of the 10 m pit.
Geology: The cave is developed in the upper Glen Rose Formation. During the 1930s it is said that water flowed across the base of the 10 m pit and was used in the moonshine operation.
Technique: The upper 5 m of the 10 m deep pit can be freeclimbed, but 16 m of rope or ladder is needed to reach the bottom.
Bibliography: Anonymous (1973q:12; 1976c:165; 1979b:2); Clement (1974b:56); Litsinger (1973b: 10); Mills (1975:205); Montgomery (1975b:35); Poole (1979a:2); Reddell and Smith (1966:3); Veni (1978a:5).

GODCHILDREN'S SINK (BCS #189)
Location: Longhorn 7.5′
Description: An oval pit entrance, about 2.6 m long by 1.8 m wide, originally dropped 2 m to trash fill. The pit has been excavated an additional 4 m down along the south wall to a passage that extends 4.5 m to the east before becoming too small to explore. (See Map 75.)
History: The cave was discovered by Randy M. Waters in June 1985. In early October 1985 Waters and Kurt Menking dug 2 m down into the trash. On 13 October 1985 Waters and Allan Cobb dug an additional 2 m to discover the 4.5 m long passage.
Biology: Harvestmen (prob. *Leiobunum townsendii*), millipedes, cave crickets (*Ceuthophilus* sp.), and epigean beetles were observed and collected.
Geology: The cave is vadosely formed in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer and may drain into nearby Genesis Cave (BCS #196).




Gladsam's Cave
Bexar County, Texas
Compass & Tape Survey
29 May & 27 Dec. 1978
JOHN CROSS
GARY POOLE
LARRY STAMLER
GEORGE VENI, draft
NICK VENI
LENGTH: 38 m
DEPTH: 16.2 m
N
G
M
1970
PLAN
PROFILE
Entrance
a
b
c
Depth (m)
0
4
8
12
16
0 2 5 10
METERS
©Copyright, George Veni, 12 September 1979
MAP 74



Technique: The pit is freeclimbable and holds promise for new discoveries with further digging.
Bibliography: Palit (1986:16).

GOONIES CAVE (BCS #195)
Location: Longhorn 7.5′
Description: A very narrow entrance drops 3 m into a cave of undetermined extent. The entrance is impassably small for adults. Local children report a "small" room extending from the base of the pit.
History: Inspired by a popular movie called "Goonies," three boys entered the cave in search of buried treasure on 12 June 1985. One boy could not climb out of the narrow entrance and had to be rescued by Bob Cowell, Texas Speleological Association's Safety and Rescue Chairman, assisted by the Northeast Volunteer Fire Department. According to a newspaper account, one of the boys said: "We have a rock chipper that we use to knock off pieces of the stalactites. Sometimes we just dig around in there to see what we can find" (Anonymous, 1985). Unfortunately, after the rescue the boys could not be dissuaded and were looking forward to their next such underground adventure.
Biology: Harvestmen (prob. *Leiobunum townsendii*) were noted during the rescue.
Geology: The cave is formed in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer.
Bibliography: Anonymous (1985b:6A); Driver (1985); Palit (1985b:86).

GOVERNMENT CANYON BAT CAVE (BCS #31)
Alternate names: Box S Ranch Cave; Lytle Ranch Cave; Pope's Bat Cave; Government Canyon Cave
Location: San Geronimo 7.5′
Description: This cave contains the largest known room in Bexar County. A hole in the side of an elongate collapse sink opens into the northwest end of a chamber measuring 96 m long, 10 to 20 m wide, and 5 to 7 m high. Large breakdown blocks are scattered throughout the cave. Large stalagmites and some columns are also present. Guano covers everything. (See Map 76.)
History: Joe Ainsworth first reported the Lytle Ranch Cave on 11 March 1955 and again on 24 May 1956. He indicated that it had also been known as the Box S Ranch Cave because permission had to come from the Box S Ranch foreman. In the early 1960s James Jasek tried many times to gain access from the new owner, Mr. Pope. He finally received permission and surveyed the cave on 9 August 1964 with Don Bledsoe, Al Brandt, Leonard Clark, and Frank Jasek. During the mid-1970s the cave was included within a 37.7 sq km land purchase by the San Antonio Ranch (housing development) Corporation. The cave location in Government Canyon will prevent it from being paved over or filled by the subdivision's expansion. It is likely, however, that the urban growth and therefore increased accessibility will take Government Canyon Bat Cave along the same route as Wurzbach Bat Cave (BCS #84): It will be vandalized and will lose its bat population.
Biology: A collection was made in the cave on 11 August 1965 by John Fish and James Reddell. Below is a list of fauna identified from the cave:

Isopods—Trichoniscidae genus and species 1 (troglobite)
Scorpions—*Vaejovis reddelli* (troglophile)
Spiders—*Cicurina* n. sp. (troglobite)
Cicurina varians (troglophile)
Neoleptoneta microps (troglobite)
Meioneta sp. (troglophile)
Eidmannella pallida (troglophile)
Mites—Trombidiidae genus and species (parasites of *Ceuthophilus* spp.)
Millipedes—*Cambala speobia* (troglobite)
Speodesmus n. sp. 2 (troglobite)
Springtails—*Pseudosinella violenta* (troglophile)
Cave crickets—*Ceuthophilus (C.) secretus* (trogloxene)
Ceuthophilus (Geotettix) cunicularis (trogloxene)
Ground beetles—*Rhadine howdeni* (troglophile)
R. infernalis ewersi x *R. infernalis infernalis* (troglobite)

Comb-clawed beetles—Alleculidae genus and species
Rove beetles—*Belonuchus* sp. (troglophile)
Flies—Undetermined material
Fleas—Undetermined material
Bats—*Myotis velifer incautus* (Mexican brown bat) (trogloxene)
Raccoons—*Procyon lotor* (trogloxene)

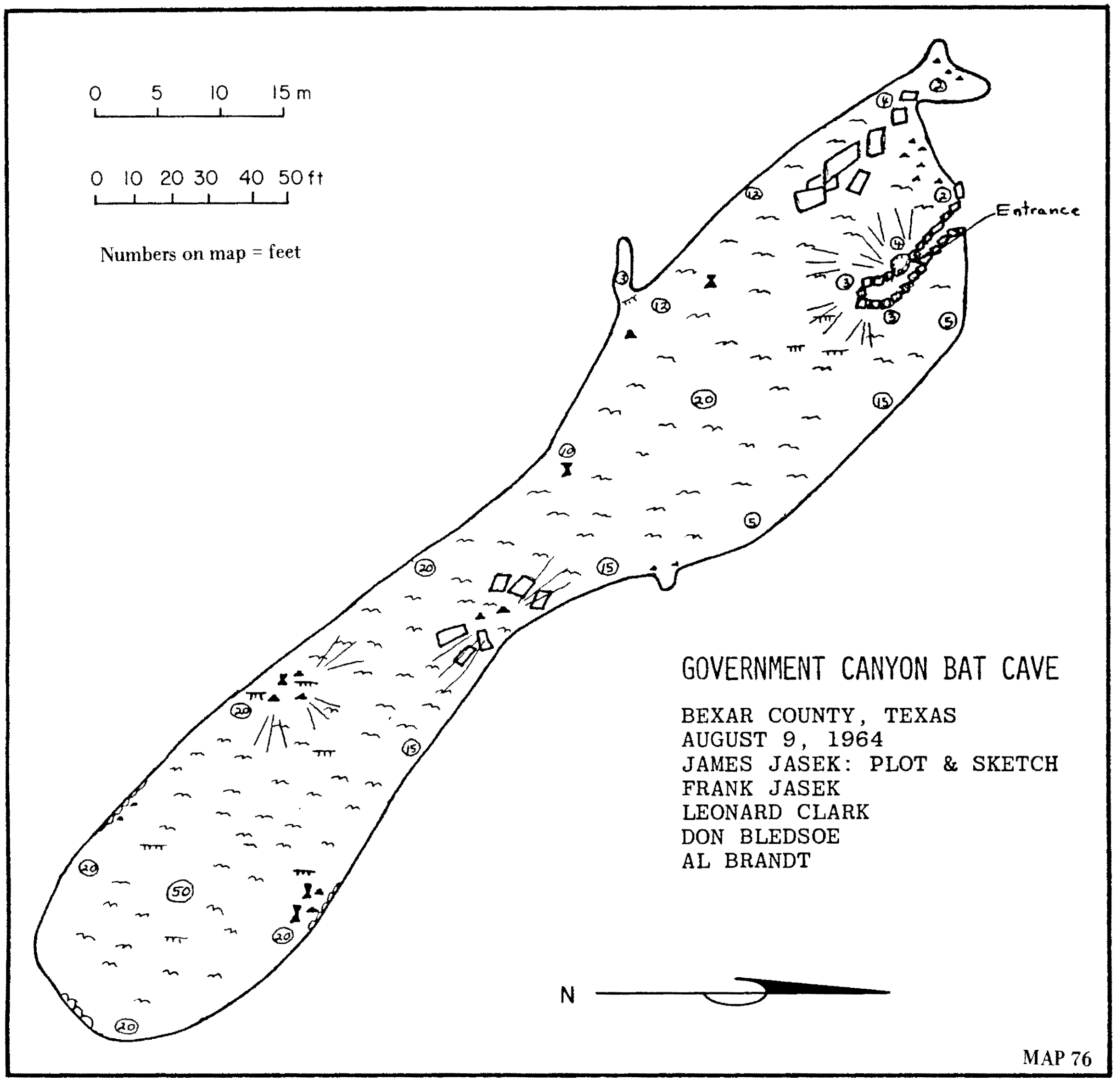
Geology: The cave is in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer. Insufficient field examination prevents the development of a substantiated hypothesis on the genesis and morphology of this important Bexar County cave.

Bibliography: Anonymous (1964e:131; 1965g:184; 1973q:12); Barr (1974:24); Elliott (1976a:7; 1976b: 152); Gertsch (1974:173; 1984:59); Gertsch and Soleglad (1972:597); Jasek (1975b:191, 193); Reddell (1961b:1; 1966:33-34, 40, 43-44; 1967:197, 201; 1970a:400-402, 404-407; 1970b:49, 61); Reddell and Knox (1962:3-5, 25); Reddell and Russell (1962a:5); Reddell and Smith (1966:3); Rowland and Reddell (1976:6); Veni (1978a:5; 1978e:4; 1983:98; 1985); Widener (1959:81); Wood (1964:131).

GRAY CAVE (BCS #116)

Location: Schertz 7.5′

Description: Gray Cave is essentially a single passage almost 8 m long with two minor side passages that are too small to follow. The entrance measures 1 m high by 0.8 m wide, but the passage narrows to 0.4 by 0.5 m. It enlarges slightly until exploration is halted by an obstructing natural bridge. (See Map 77.)



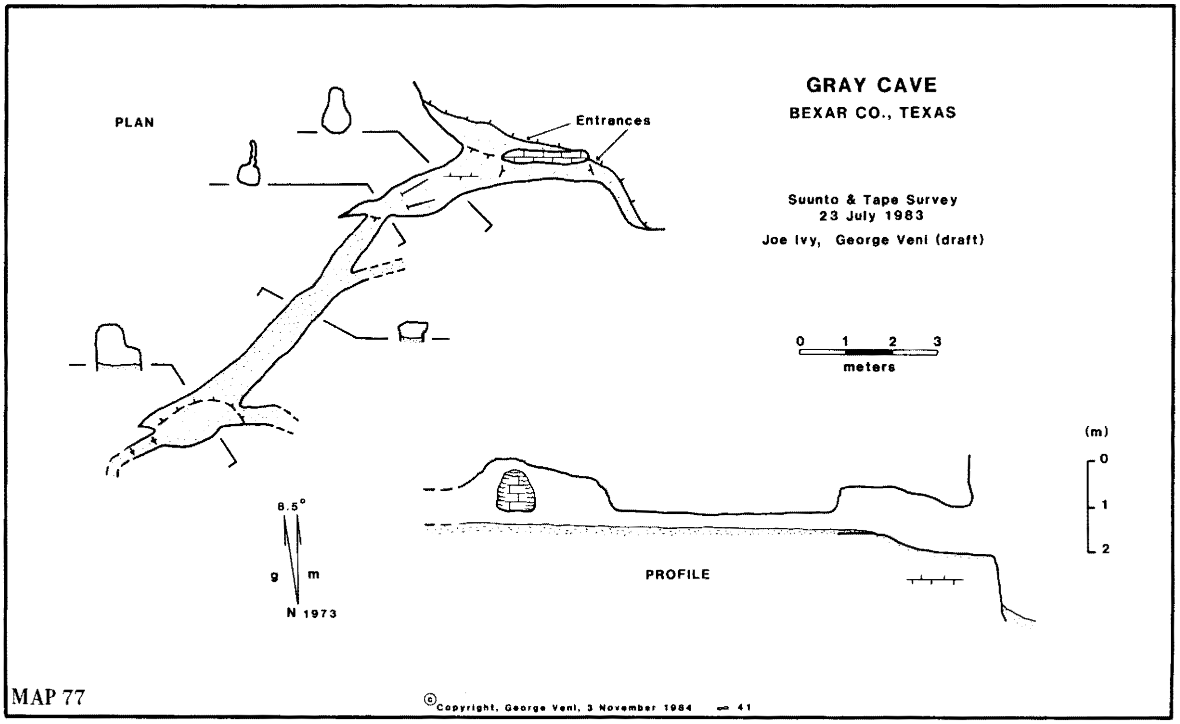
History: The cave is named for Nancy Gray who showed this and two other caves to Randy M. Waters in mid-December 1978. Joe Ivy and George Veni surveyed the cave on 23 July 1983.
Biology: Fauna noted included small populations of spiders, harvestmen (prob. *Leiobunum townsendii*), cave crickets (*Ceuthophilus* sp.), moths, and mosquitoes. Maggots were seen feasting on decomposing material, and it was noticed that raccoons use the cave for a shelter.
Geology: Developed by upland drainage down to Cibolo Creek through the Pecan Gap Chalk, Gray Cave represents the highest of five levels. The other four levels are 6 m below in Coon Crap Cave (BCS #115). The passage levels were formed in hydraulic response to the declining base level of the down-cutting creek.
Bibliography: Anonymous (1979bb:1); Veni (1983: 98).

GRAYWATERS CAVE (BCS #155)

Location: Longhorn 7.5′
Description: The 0.6 m diameter pit entrance was on the rim of a 13 m long by 7 m wide sink; a cement-filled trash can gated the cave. Following the 2 m entrance drop, the cave sloped down to the east for 1.5 m, narrowed to 0.3 m wide, and then dropped 4.5 m into the cave's terminal room. This room was 1 m wide, almost 2 m long, and had three small leads at floor level, all of which were too small to follow. (See Map 78.)
History: The sink adjacent to the cave was known to the owner for several years. The cave was originally a 0.15 m diameter by 0.6 m deep hole. In the summer of 1980 Susan Gary and Randy M. Waters worked to enlarge the hole with hammer and chisel hoping to find a cave similar to extensive Robber Baron Cave nearby. Waters returned several times with Kurt Menking to break rock, and eventually they got past the entrance only to be halted by the tight slot over the room. Four blasting trips, with Eric Short accompanying Waters, opened the way into the terminal room. At the owner's request, Waters, and Leilani and Roy Gary gated the cave on 21 February 1982. The cave was sealed in May 1985 during the construction of a house.
Biology: The cave cricket *Ceuthophilus (C.) secretus* was collected in the cave on 30 March 1981 by Randy M. Waters. Dark millipedes have also been observed in the cave.
Geology: Graywaters Cave is developed along two, almost parallel, east-west joints in the Austin Chalk.

GRUTAS DE LOS MOJADOS (BCS #27)

Alternate names: Church's Cave; Fried Rubber Chicken Cave
Location: Castle Hills 7.5′



MAP 77

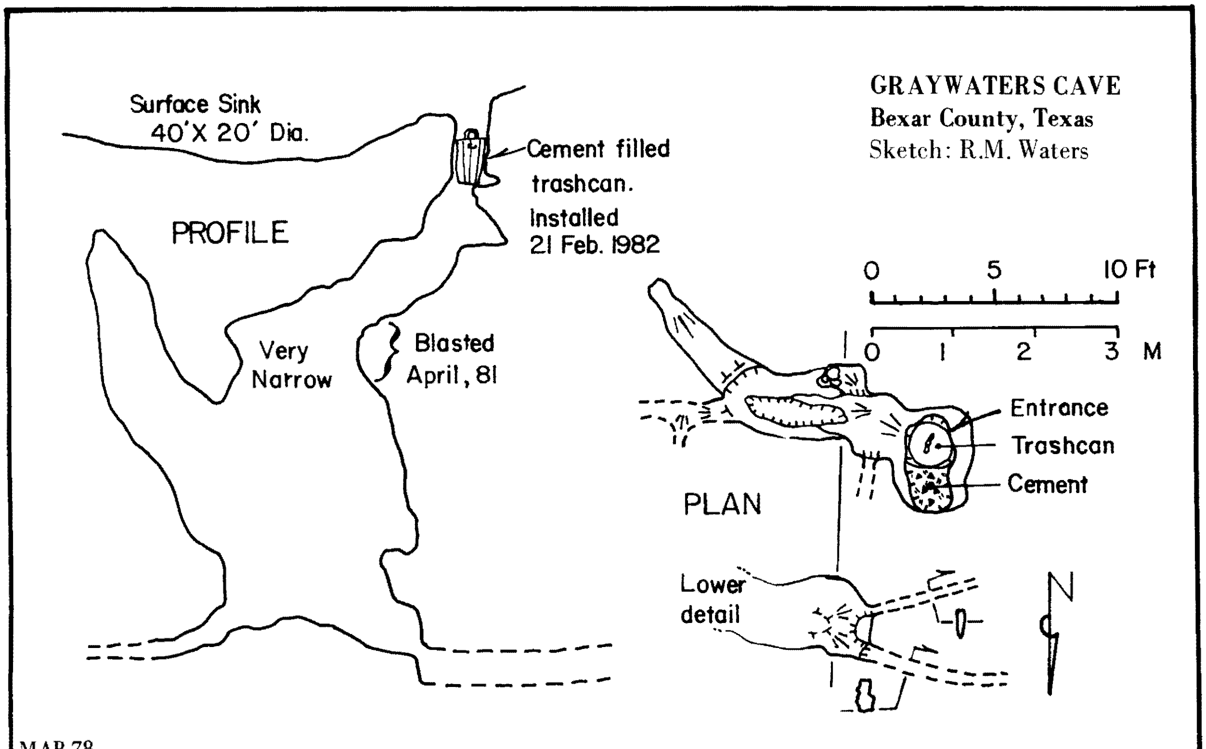
Description: Gary Poole (1983) has provided the following information:

> Grutas de los Mojados is located in a residential neighborhood. . .[in north-central San Antonio]. The original entrance, which is now plugged, was a narrow chimney located outside the property line and adjacent to a road. Originally only a couple of feet deep [approximately one meter], this entrance was excavated until the room shown on the map was reached. At this time the owner of the adjacent property, who had been paying for the excavation, dug down to the cave on his side of the fence and plugged the original hole. The new entrance is a five meter deep pit, entirely man-made, and covered by a large, movable wooden slab. The pit leads to a single room which is itself largely excavated. The floor of this room consists of breakdown blocks with red clay between them. When this chamber was originally broken-into the floor cover in the small air pockets consisted of a thin black soil with small animal remains lying on top. What makes this unusual is that prior to the opening of the original entrance there was no access to the 'room.' At the southern end of the room is a clay floored crawlway. Only minor portions of this twenty-five meter long passage have been excavated. Toward the back of this passage are some domes that reach to near the surface and the terminus of the cave is a clay plug.

(See Map 79.)

History: Poole continues:

> The history of Grutas de los Mojadas is interesting. The owner of the property. . .was interested in using a cave to heat and cool the house he was in the process of building. He contacted the San Antonio Grotto (1977) and told them of the hole outside his property line. He hoped the hole would lead to a large cavern which would run under his property and could be tapped for its thermal potential. The hole was checked and found to be only about one meter deep but dirt floored. Digging commenced. Excavation was slow due to the small cross-sectional area of the chimney. The digging was eventually taken over by wetbacks. Soon after the new room was broken-into the new entrance was dug and the original entrance plugged. The deepening of the room resulted in the discovery of the crawl. The failure to find a large cavern was very disappointing (for the owner) and excavation has become sporadic. The *gruta* derives its name from the men that worked on it, *mojados,* Spanish slang for "wetbacks". Grutas de los Mojados was surveyed by



MAP 78

members of the San Antonio Grotto on December 14, 1977. . . .

Biology: Only cave crickets (*Ceuthophilus* sp.) and toads were observed.

Geology: The cave is in the Austin Chalk; limonite or hematite nodules are embedded in some of the cave walls.

Paleontology: Some small animal bones were discovered in the room. They pre-dated the filling of the original entrance which acted as a natural trap.

Bibliography: Anonymous (1978b:2); Cross (1977: 120-121); Poole (1978c:3; 1983); Veni (1978a:5).

HAN'S GROTTO (BCS #32)

Location: Castle Hills 7.5′

Description: The 1.5 m high by 2.7 m wide entrance is in a small bluff along Salado Creek. From the entrance the cave extends east for 9 m, then turns north for 7.5 m before ending in soil fill. (See Maps 80-81.)

History: The discovery of the cave probably coincides with the construction of Farm Market Road 1604, from which the entrance is plainly visible. Han's Grotto was surveyed on 1 November 1977 by Dottie Kern, Teeni Kern, and Gary Poole.

Biology: The cave has often been used by animals as a shelter. A biological collection was made in the cave on 16 February 1984 by Duane Canny and Scott Harden. In addition to material collected for study, observed fauna include harvestmen (prob. *Leiobunum townsendii*), beetles, frogs, toads, and a snake. The following is a list of fauna collected in the cave:

Snails–*Helicodiscus eigenmanni* (troglophile)
Isopods–Trichoniscidae genus and species 1 (troglobite)
Spiders–*Cicurina varians* (troglophile)
Millipedes–*Cambala speobia* (troglobite)
Oxidus gracilis (troglophile)
Springtails–Undetermined material
Cave crickets–*Ceuthophilus (C.)* sp. (trogloxene)
Assassin bugs–Reduviidae genus and species

Geology: Two processes are responsible for the development of this Edwards Limestone cave, which is located in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer. First, water from a nearby tributary to Salado Creek was routed through Han's Grotto in preference to its steeper hydraulic gradient; second, the cave has also been enlarged by backflooding from Salado Creek.

Sedimentology: In March 1979 Teeni Kern and Greg Passmore collected soil samples from the cave and the nearby stream terrace. Results of the soil analyses were:

Constituent	Han's Grotto	Terrace
Al_2O_3%	9.71	9.11
Fe_2O_3%	3.61	3.26
CaO%	12.30	16.80
MgO%	0.965	0.973
TiO_2%	0.514	0.443
MnO%	0.0851	0.0744
Na_2O%	0.216	0.433
K_2O%	1.29	1.10
P_2O_5%	0.54	0.13
SiO_2%	49.0	42.0
Ni ppm	29.0	26.0
Cu ppm	22.9	13.5
Zn ppm	90.0	50.0
Cr ppm	49.1	42.2
Co ppm	>5.0	>5.0
Cd ppm	>10.0	>10.0
Ag ppm	>0.5	>0.5
Sr ppm	67.5	87.7
V ppm	72.8	62.7
Be ppm	1.4	1.2
Ba ppm	230.0	190.0
Pb ppm	15.0	>1.0
Zr ppm	110.0	118.0
Mo ppm	>20.0	>20.0
Th ppm	11.0	10.0
LOI %	18.4	18.4

The similarity between the two analyses indicates that the cave fill is probably derived from terrace material.

Bibliography: Passmore (1979:14); Poole and Passmore (1978:21-23, 49); Veni (1978a:5; 1985).

HAY'S CAVE (BCS #172)

Location: Helotes 7.5′

Description: An 11.6 m deep pit leads to a small room about 4 m long by 2.6 m wide. The only speleothem in the cave is said to look like a coconut.

History: On 27 July 1961 Orion Knox led the only reported exploration of Hay's Cave.

Geology: Hay's Cave is in the Edwards Limestone.

Technique: A 15 m rope is needed to rappel into this cave.

Bibliography: Anonymous (1973q:11); Reddell and Knox (1962:3-4, 22); Reddell and Russell (1962a:5); Reddell and Smith (1966:3).

HEADQUARTERS CAVE (BCS #93)

Location: Camp Bullis 7.5′

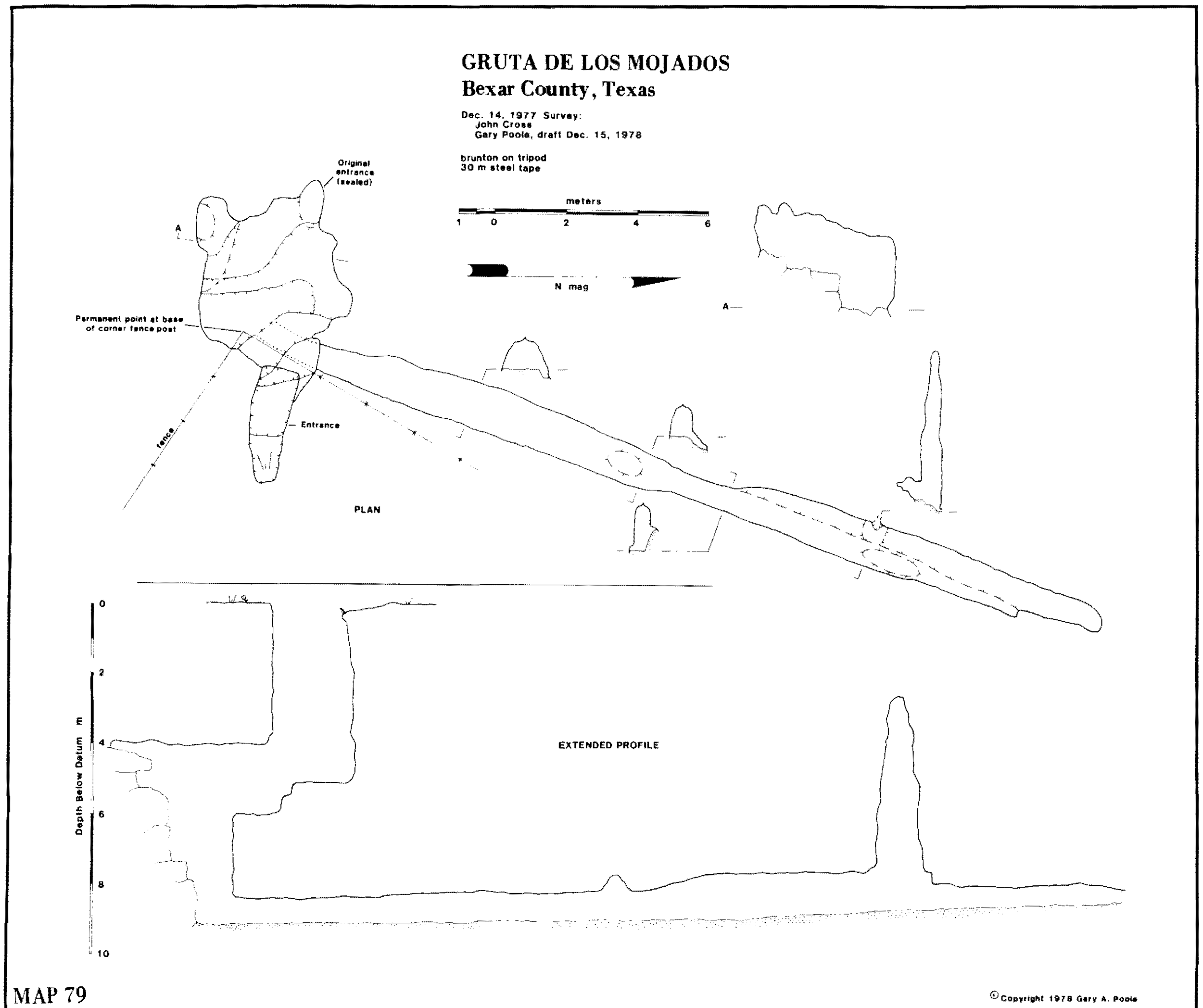
Description: From the entrance a crawlway goes a short way to the Entrance Room, 17 m long, 7 m wide, and up to 2 m high. A 13 m long crawl then extends south to the Back Room, 17 m by 11 m by

4.5 m high. A 2 m high passage heads east 7 m from this chamber down a breakdown slope to the end of the cave. The cave contained some speleothems prior to vandalism, and most of its floor is covered in breakdown. (See Map 82.)

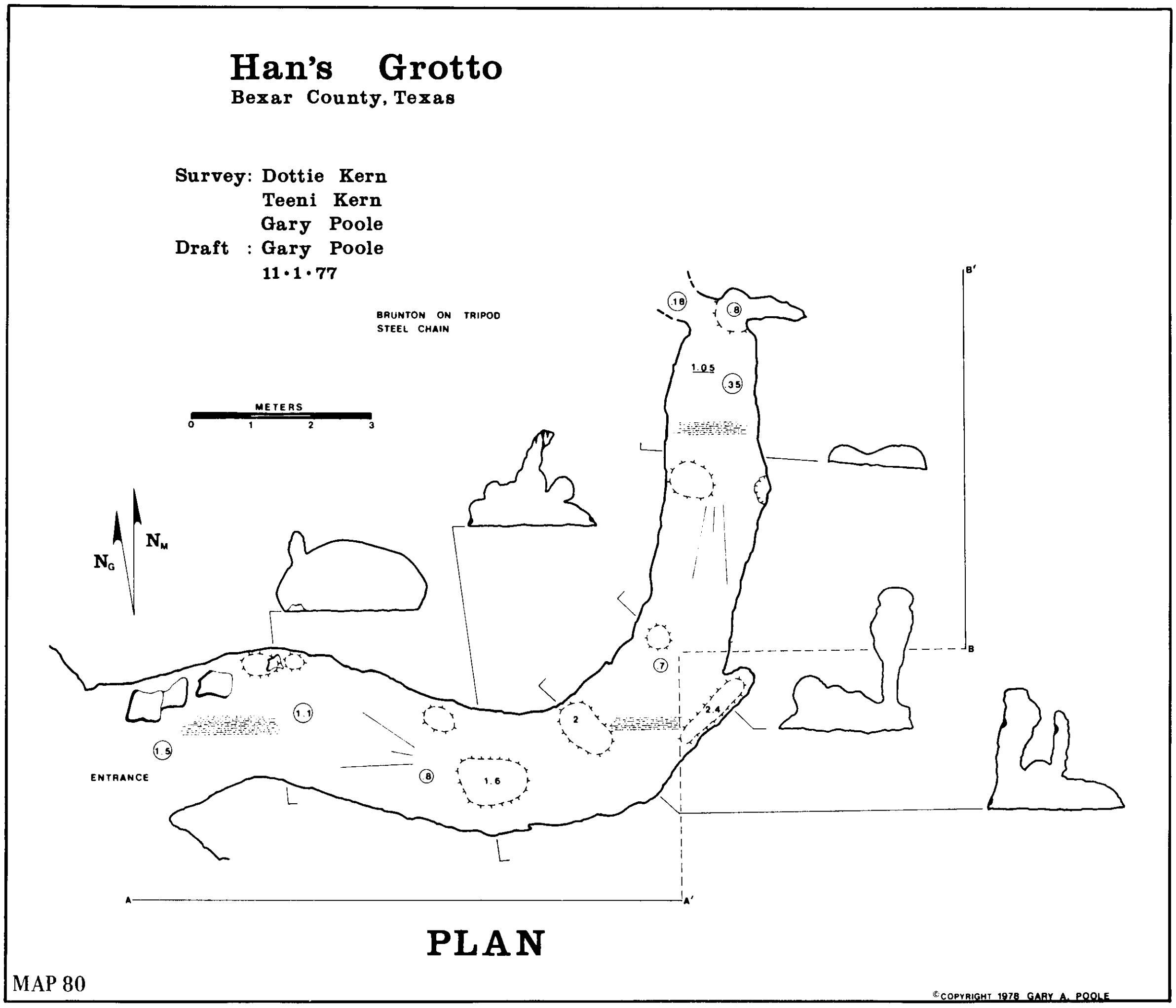
History: Joe Ainsworth was the first caver to visit the cave when he explored it on 26 February 1955. Military personnel stationed at Camp Bullis have often visited the cave, which is located near their headquarters, and are probably responsible for most of the vandalism. On 9 April 1978 Headquarters Cave was surveyed by Scott Harden, Bob Oakley, Mike Walsh, Phil Winkler, and Margaret Wright. It was resurveyed during a Texas Speleological Association cave surveying project on 30 January 1982 by Donna Anderson, Wayne Burks, Ken Byrd, Dan Klinefelter, Glen Mabee, and Bill Russell.

Biology: The cave was investigated biologically by Ralph Ewers on 19 April and 10 May 1959. He collected the blind carabid beetles *Rhadine exilis* and *R. infernalis ewersi* in the cave. David McKenzie and Bill Russell made a biological collection on 24 April 1966. In addition to material collected by them the cave has been reported to harbor a frog and a few bats, *Myotis velifer incautus*. Species collected from the cave are:

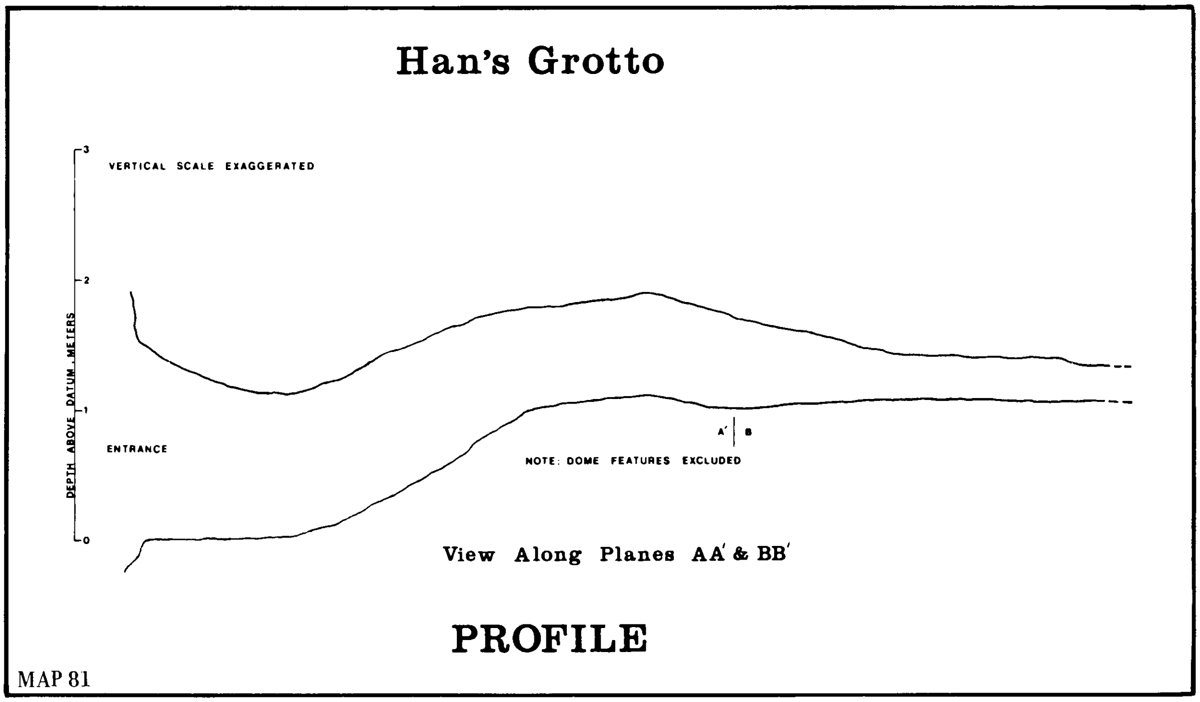
Earthworms—*Diplocardia* sp. (troglophile)
Isopods—Trichoniscidae genus and species 1 (troglobite)
Spiders—*Cicurina* n. sp. (troglobite)
Cicurina varians (troglophile)
Eidmannella pallida (troglophile)
Mites—Undetermined material
Centipedes—Lithobiomorpha undetermined
Scutigeromorpha undetermined
Millipedes—*Eurymerodesmus* sp. (accidental)
Springtails—*Pseudosinella violenta* (troglophile)
Silverfish—*Texoreddellia texensis* (troglobite)
Cave crickets—*Ceuthophilus (Geotettix) cunicularis* (trogloxene)



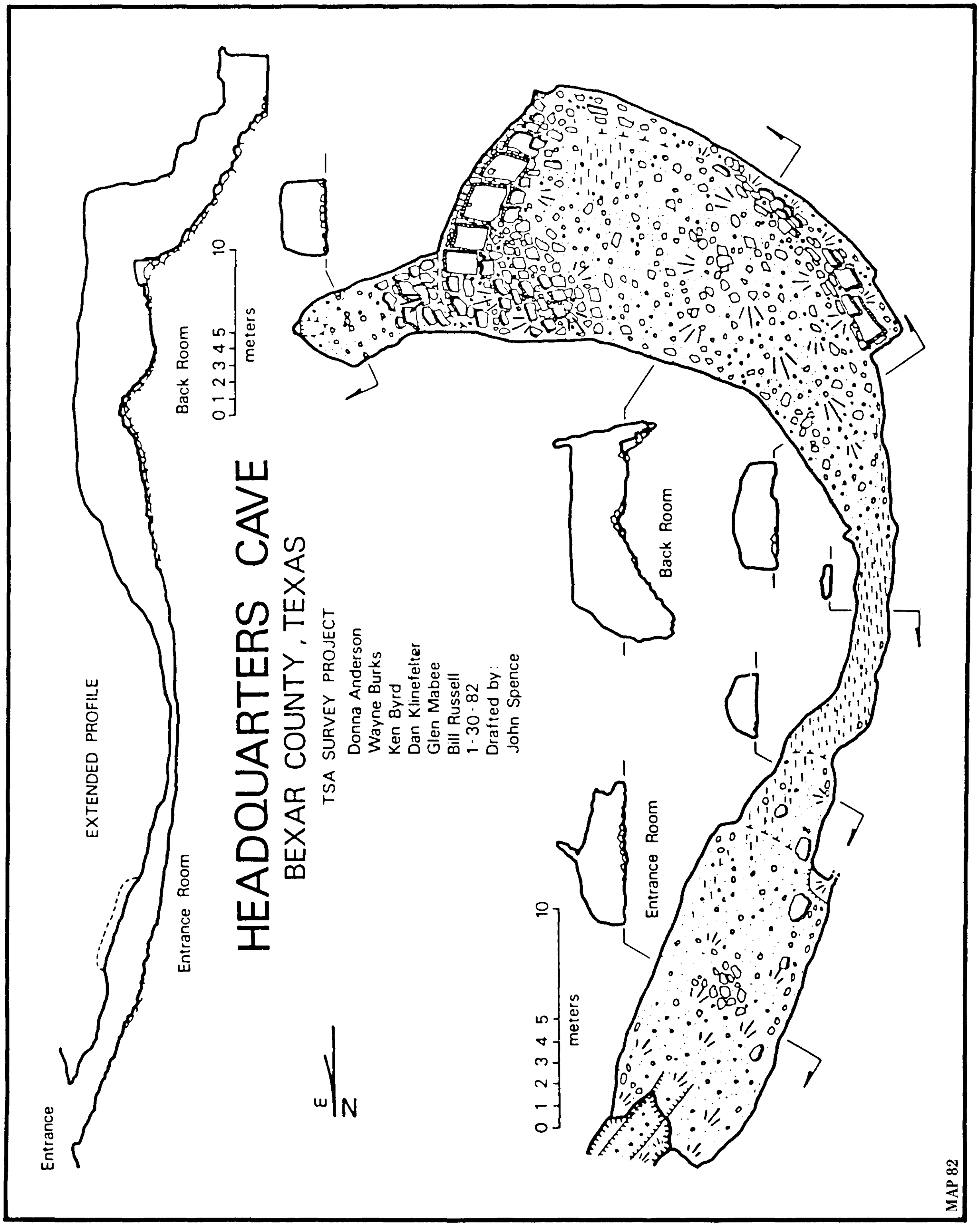
MAP 79


Han's Grotto
Bexar County, Texas
Survey: Dottie Kern
Teeni Kern
Gary Poole
Draft : Gary Poole
11•1•77
BRUNTON ON TRIPOD
STEEL CHAIN
METERS
0 1 2 3
N_G
N_M
ENTRANCE
A
A'
B
B'
PLAN
©COPYRIGHT 1978 GARY A. POOLE

MAP 80


Han's Grotto
VERTICAL SCALE EXAGGERATED
DEPTH ABOVE DATUM, METERS
3
2
1
0
ENTRANCE
A' B
NOTE: DOME FEATURES EXCLUDED
View Along Planes AA' & BB'
PROFILE

MAP 81

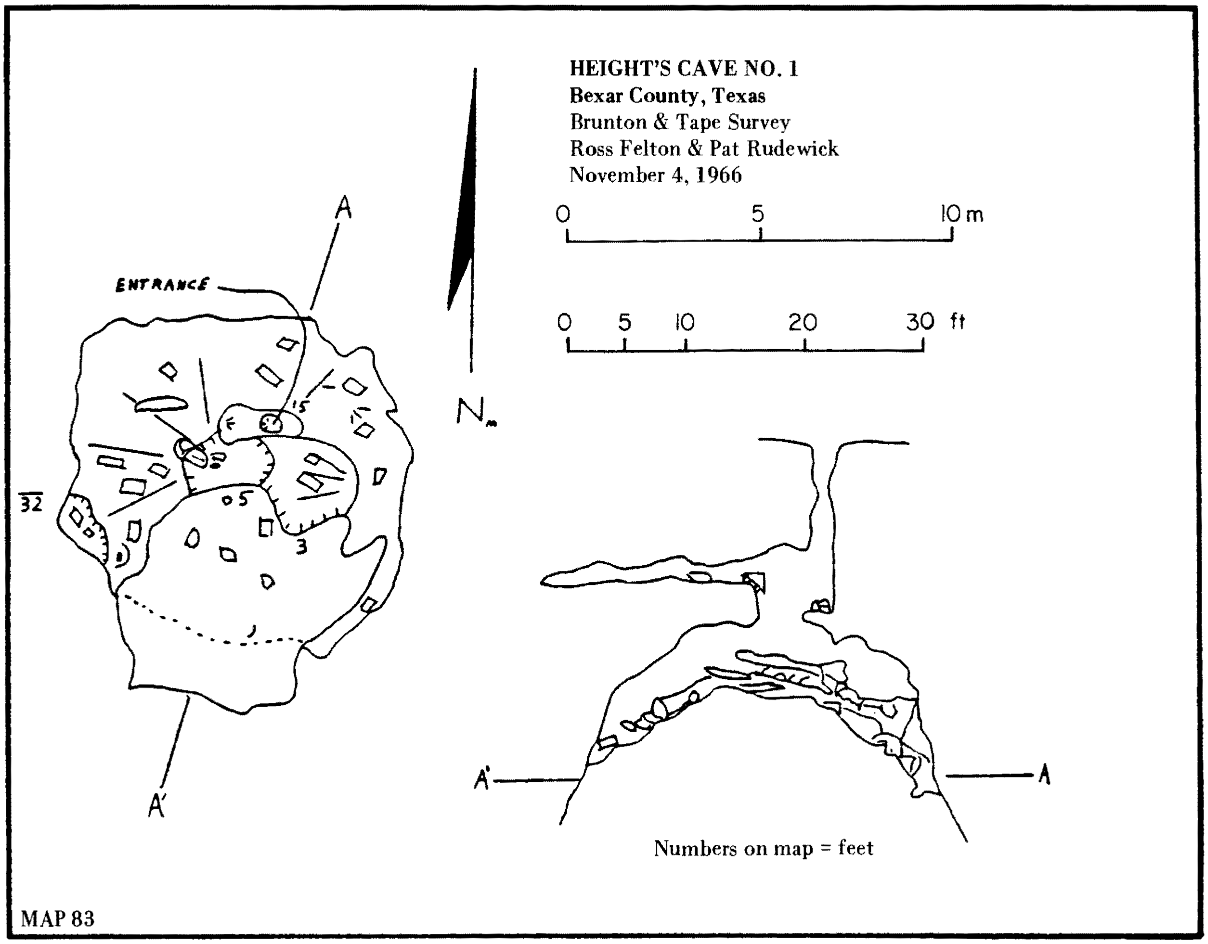

HEADQUARTERS CAVE
BEXAR COUNTY, TEXAS
TSA SURVEY PROJECT
Donna Anderson
Wayne Burks
Ken Byrd
Dan Klinefelter
Glen Mabee
Bill Russell
1-30-82
Drafted by:
John Spence
EXTENDED PROFILE
Entrance
Entrance Room
Back Room
0 1 2 3 4 5 10
meters
Entrance Room
Back Room
0 1 2 3 4 5 10
meters
E
N
MAP 82

Desert cockroaches–*Arenivaga* sp. prob. *tonkawa* (trogloxene)
Assassin bugs–*Triatoma ?gerstaeckeri* (trogloxene)
Ground beetles–*Rhadine exilis* (troglobite)
Rhadine infernalis ewersi (troglobite)
Soldier beetles–*Cantharis* sp. (?troglophile)
Clown beetles–?Histeridae genus and species
Rove beetles–*Belonuchus* sp. (troglophile)

Geology: Most of the cave is in the Edwards Limestone, but the slope down to its terminus extends into the upper member of the Glen Rose Formation.
Bibliography: Anonymous (1973q:11); Barr (1960: 55; 1974:16-17, 23-24, 27); Barr and Lawrence (1960:141); Elliott (1976a:7); Nicholas (1960:140); Reddell (1961b:1; 1966:43-44; 1967:197; 1970a: 394, 399, 404, 407; 1970b:49-51, 55, 61); Reddell and Knox (1962:3-4, 22); Reddell and Russell (1962a:5); Reddell and Smith (1966:3); Russell and Arens (1983:12-15); Smith (1970:235); Veni (1985); Widener (1959:80); Wygodzinsky (1973:6).

HEIGHTS CAVE NO. 1 (BCS #33)
Location: Longhorn 7.5′
Description: A 0.7 m diameter pit drops 5 m to a ledge which leads to a 7 m long and 5 m wide crawl. The pit drops another 1.6 m to the top of a breakdown mound in a 9 m diameter room. (See Map 83.)
History: The cave was surveyed on 4 November 1966 by Ross Felton and Pat Rudewick.
Geology: The cave is in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer.
Bibliography: Passmore (1977:23); Veni (1978a:5; 1985).

HELOTES BLOWHOLE (BCS #34)
Alternate names: Barham's Cave No. 2; Helotes Creek Cave; Crawlsbad
Location: Helotes 7.5′
Description: Located in a cliff and about 4 m above Helotes Creek, the cave is a single passage 117 m long, 1 to 1.4 m wide, and 0.5 to 2 m high. This horizontal clay-covered passage ends in clay fill. (See Map 84.)
History: First reported by Bob Hudson in 1954, the

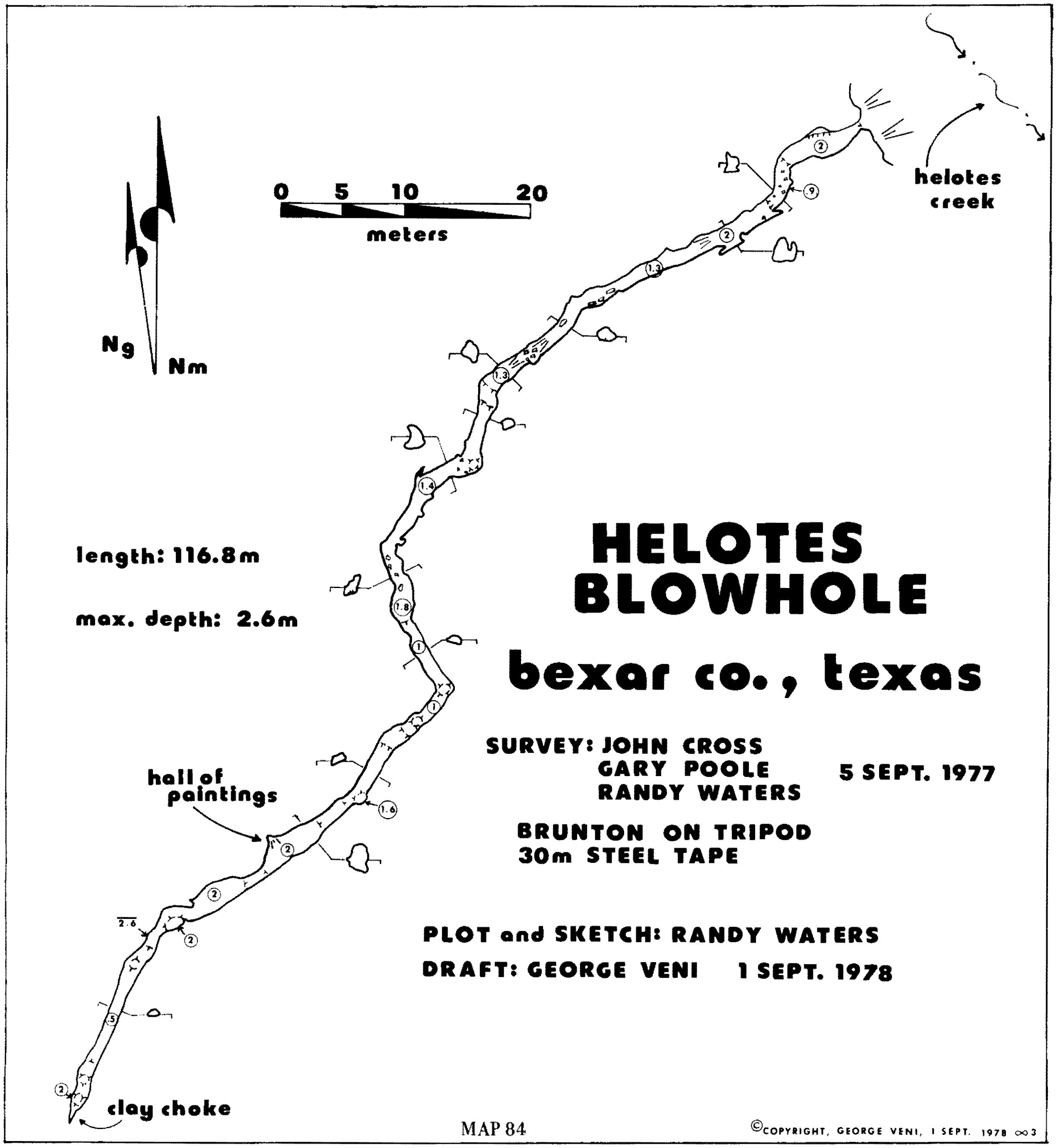


MAP 83

cave is often visited by local cavers and youths of the Helotes area. Al Brandt, Leonard Clark, Preston Knodell, and Orion Knox surveyed the cave during the Christmas holidays of 1959. A resurvey was made on 8 February 1970 by Roger V. Bartholomew, Al Brandt, David Litsinger, and A. Williams. The third and most recent survey was done on 5 September 1977 by John R. Cross, Gary Poole, and Randy M. Waters.

Biology: Fauna observed in 1977 included some harvestmen (prob. *Leiobunum townsendii*), many cave crickets, three bats, and two small cliff frogs (*Syrrhophus marnocki*). Fauna collected for identification by Gary Poole and Randy M. Waters included a surface pillbug, blind spiders, a troglobitic thysanuran, *Rhadine* beetles, and rove beetles. An additional collection was made on 25 December 1982 by Randy M. Waters. The following is a composite list of material collected from the cave:

Isopods—Oniscoidea genus and species
Spiders—*Cicurina* n. sp. (troglobite)
Eidmannella rostrata (troglobite)



MAP 84

Silverfish—Prob. *Texoreddellia texensis* (troglobite)
Cave crickets—*Ceuthophilus* sp. (trogloxene)
Ground beetles—*Rhadine* sp. (troglobite)
Rove beetles—*Eustilicus condei* (troglophile)

Geology: The cave is developed along a northeast-southwest joint trend in the upper member of the Glen Rose Formation. It formed as a resurgence for water moving downward from Helotes Hilltop Cave, Spider Hole, and other solutional conduits farther up the hill.

Meteorology: In spite of its name, no airflow has ever been documented at Helotes Blowhole.

Bibliography: Anonymous (1973q:11; 1976c:165; 1978a:4; 1978d:2-3); Bartholomew (1970b:56); Harden (1970b:177); Hershberger (1966:8); Passmore (1973a:1-2; 1973b:49; 1977:25); Poole and Passmore (1978:48); Reddell (1961b:1); Reddell and Knox (1962:3-5, 22, map); Reddell and Russell (1962a:5); Reddell and Smith (1966:3); Russell (1966:31); Veni (1978a:5; 1978e:4).

HELOTES HILLTOP CAVE (BCS #35)

Alternate names: Helotes Cave; Barham's Cave No. 1; Hilltop Cave; Scenic Loop Cave; El Camode Cave

Location: Helotes 7.5′

Description: Located in a small limestone outcrop, the 0.45 m diameter entrance drops 5 m to a short fissure passage that drops another 10 m into the main passage. To the north this passage divides into upper and lower levels. The upper level goes 12 m, over a 3.3 m deep pit, to a fork. The left branch is 11 m long and the right branch, 4 m. Off the fissure's lower level is the only room in the cave, 13 by 7 by 2.6 m high. A small crawlway heads 10 m north from this breakdown-floored room before ending. From the room a passage leads south under and connects up into the fissure passage. Farther south along the lower passage are two 10 m high domes, the northern of which also connects to the fissure. Three passages lead south from the domes. Two are crawls up in the wall that converge and end within 10 m. The third passage is at floor level and is 1.2 m high; it goes 10 m to a fork. The left-hand passage is only 5 m long. The right-hand passage continues eastward for 9 m as a crawlway, then turns north and again to the east. Pushing on through Ivan's Squeeze, a constriction which follows the hands-and-knees crawl, the passage ends in 16 m at some 10 m high breakdown-floored

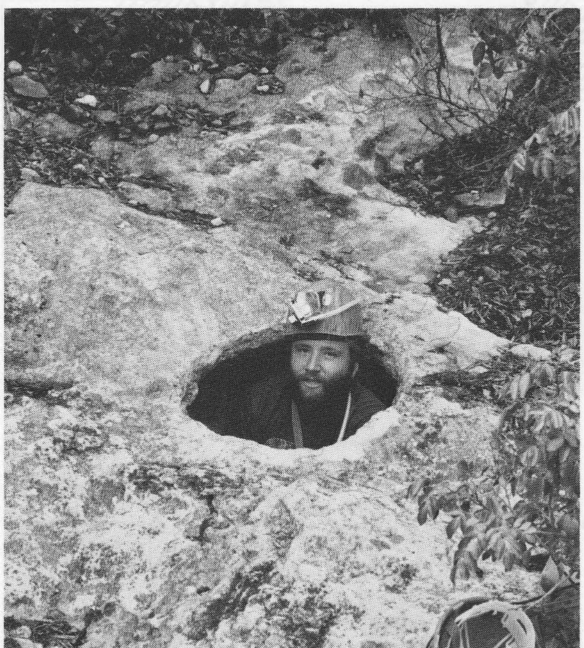


Photo. 16.—Duane Canny in entrance of Helotes Hilltop Cave (George Veni).

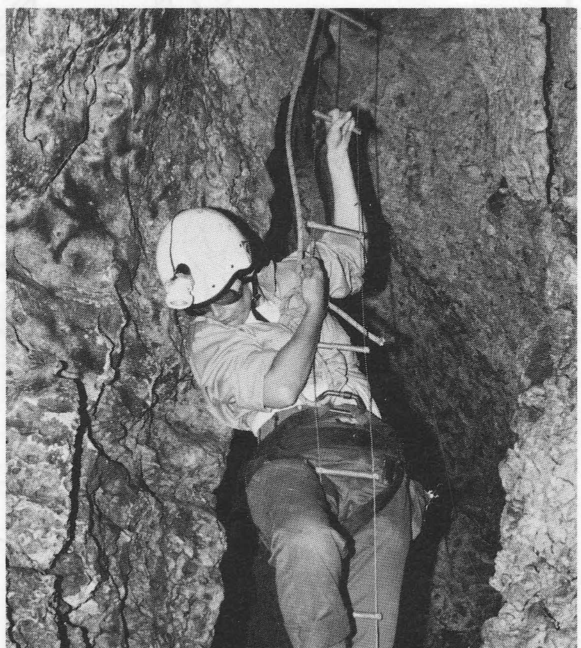
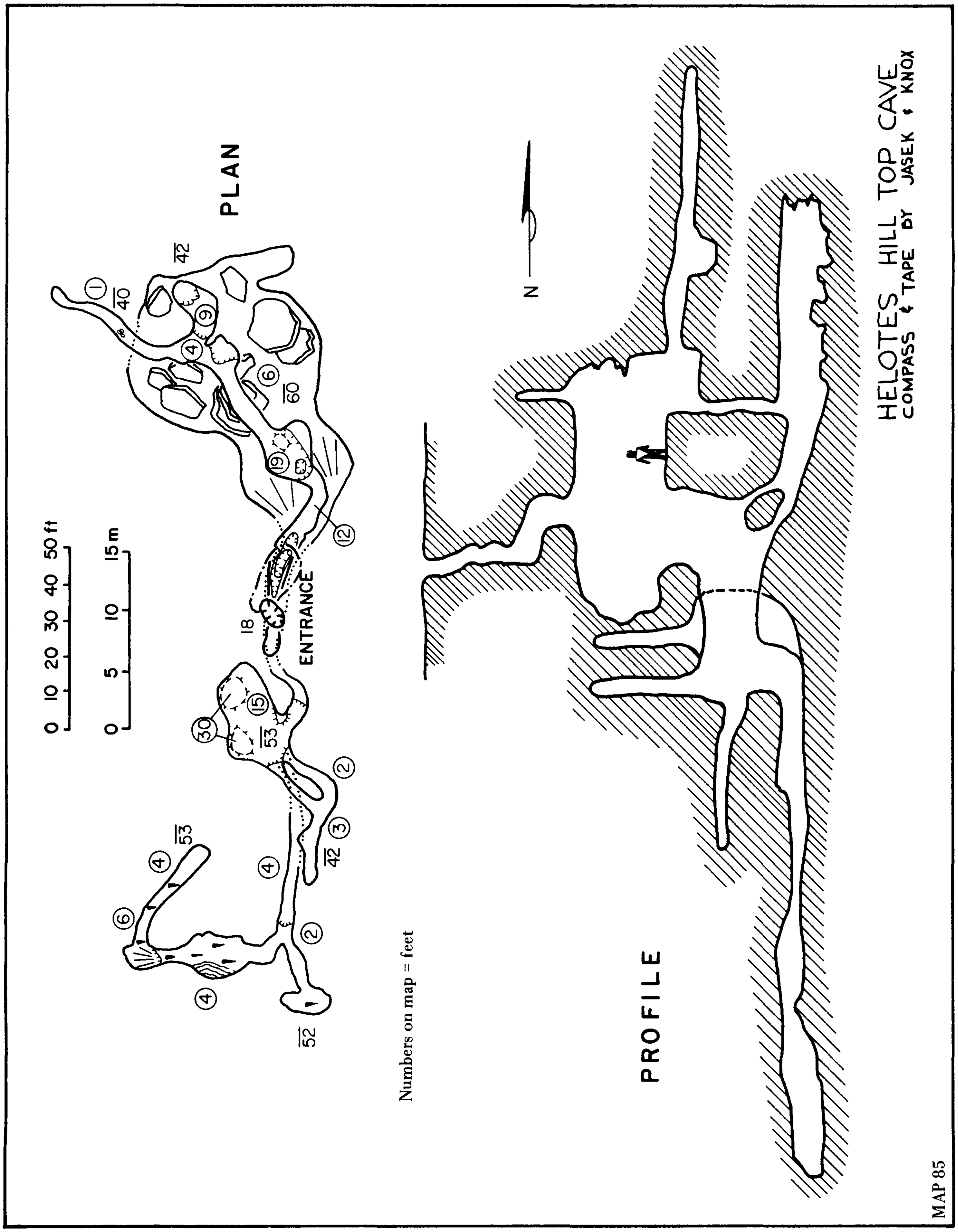


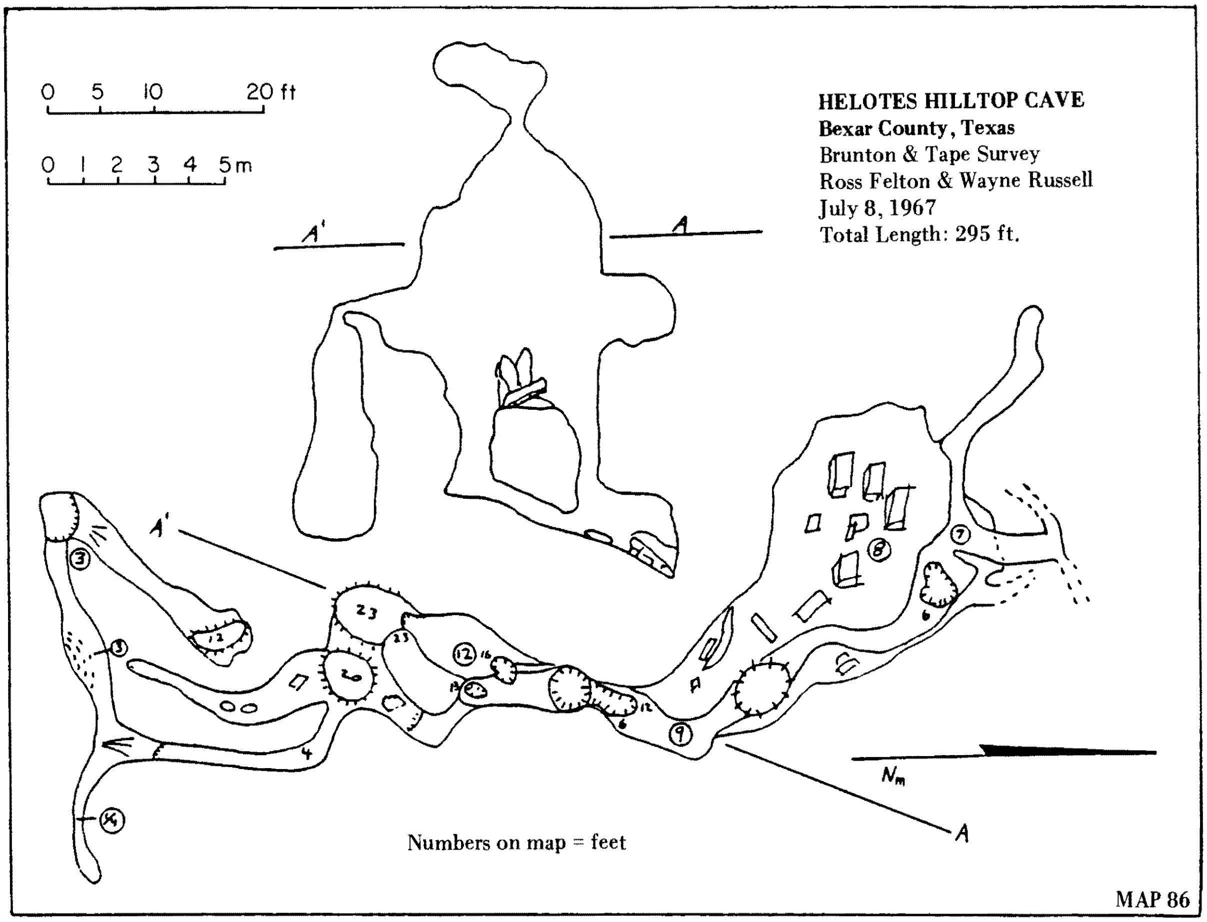
Photo. 17.—Linda Palit descending into Helotes Hilltop Cave (George Veni).


HELOTES HILL TOP CAVE
COMPASS & TAPE BY JASEK & KNOX
PLAN
PROFILE
ENTRANCE
N
0 10 20 30 40 50 ft
0 5 10 15 m
Numbers on map = feet
MAP 85

domes. Helotes Hilltop Cave is virtually devoid of speleothems except for abundant cave coral and popcorn lining its walls. (See Maps 85-87; Photos. 16-17.)
History: Helotes Hilltop Cave was mistaken in some reports for Helotes Cave mentioned in White (1948) (now known as Basement Cave—BCS #3). Hilltop is one of the more popular caves of the San Antonio/Helotes area and has been visited by cavers and locals for many years. The cave has been surveyed three times, first by James Jasek and Orion Knox in the early 1960s, on 8 July 1967 by Ross Felton and Wayne Russell, and by Wil Howie et al., on 17 March 1971. All three maps show some differences in passage relationships and passage extent, and for that reason all three are presented. Only Howie et al., seem to have negotiated Ivan's Squeeze.
Biology: Collections were made in the cave on 30 August 1964 by Orion Knox and on 29 September 1984 by Joe Ivy and George Veni. The following is a list of fauna collected from the cave:

Isopods—Trichoniscidae genus and species 1 (troglobite)
Scorpions—Prob. *Vaejovis reddelli* (troglophile)
Harvestmen—*Leiobunum townsendii* (trogloxene)
Hoplobunus madlae (troglobite)
Mites—Undetermined material
Millipedes—*Cambala speobia* (troglobite)
Speodesmus n. sp. 2 (troglobite)
Springtails—*Pseudosinella violenta* (troglophile)
Cave crickets—*Ceuthophilus (C.) secretus* (trogloxene)
Antloving beetles—Pselaphidae genus and species
Darkling beetles—Tenebrionidae genus and species

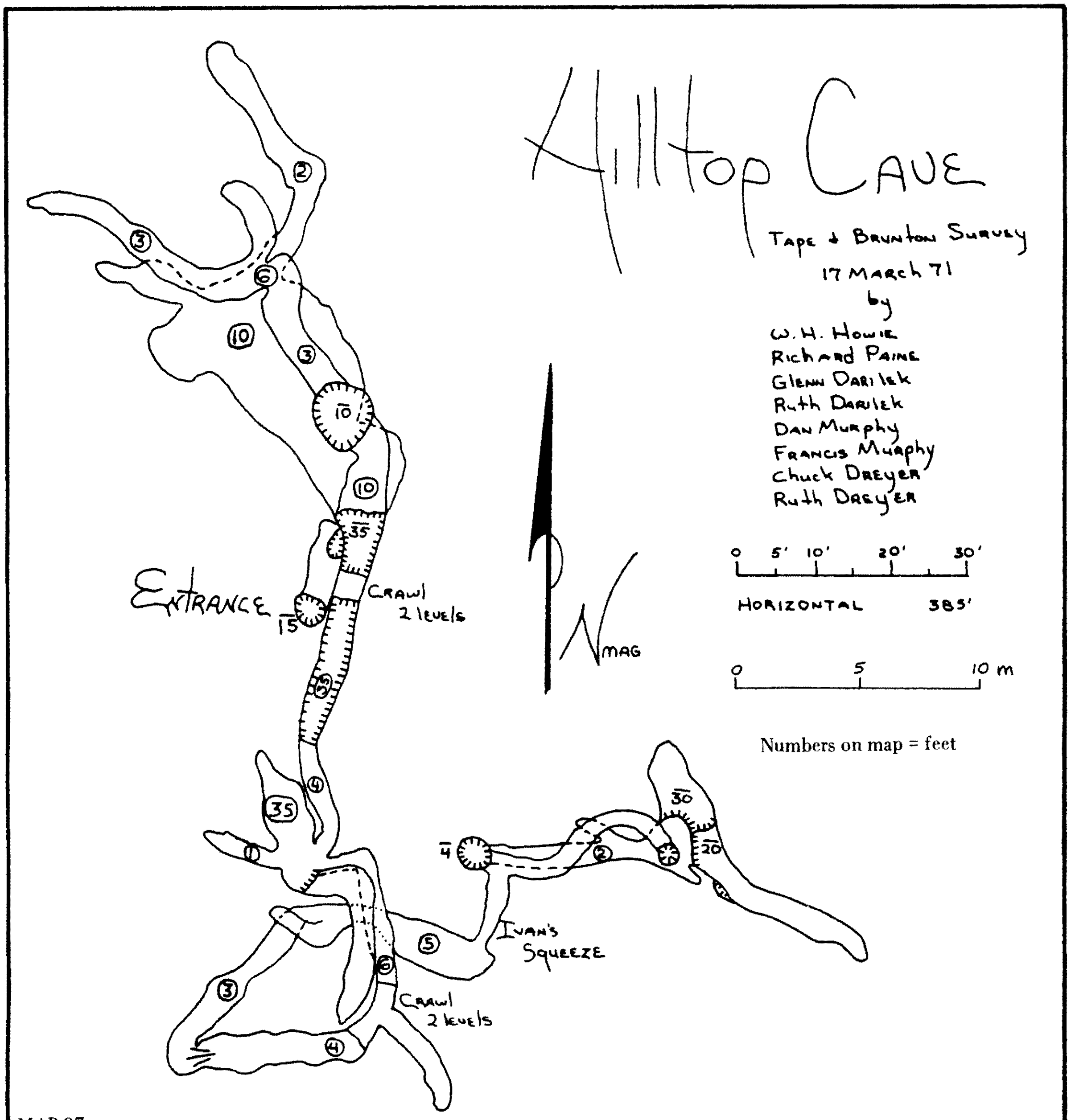
Other observed fauna include spiders.
Geology: Helotes Hilltop Cave formed in the basal section of the Edwards Limestone along a prominent joint set which controls its south to north drainage pattern. The cave may have been an infeeder to Helotes Blowhole (BCS #34), a paleospring located at the base of the same hill.
Technique: A cable ladder is recommended for the 10 m drop. A metal pipe has been placed over the drop to serve as an anchor.
Bibliography: Anonymous (1964e:131; 1973q:11-12; 1979o:4); Elliott (1976b:152); Goodnight and Goodnight (1967:4); Howie (1978:94); Jasek (1975c:40-41); Owens (1967:14); Palit (1984b:27); Passmore (1977:26-27); Poole and Passmore (1978:48); Red-



MAP 86

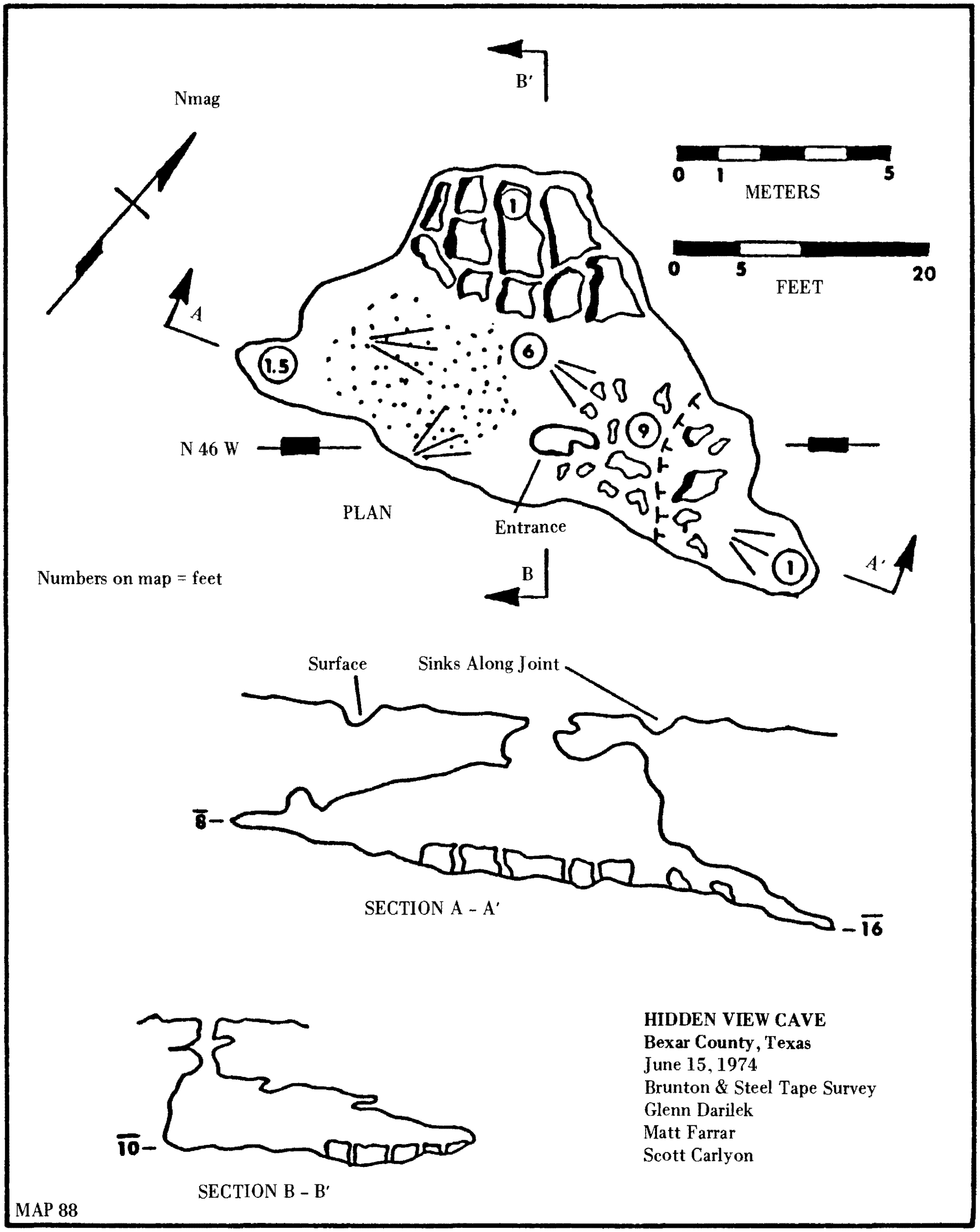
dell (1961b:1; 1965:163-164; 1966:28, 33; 1970a: 409); Reddell and Knox (1962:3-5, 23); Reddell and Russell (1962a:5); Reddell and Smith (1966:3); Rowland and Reddell (1976:13); Russell (1966:31); Veni (1978a:5; 1979b:6; 1983:98); Waters (1978a:4; 1978d:62).

HIDDEN VIEW CAVE (BCS #36)
Alternate name: Thomasini Sink
Location: Longhorn 7.5′
Description: A 3.3 m drop leads into a 2 m high triangular room with 8, 12, and 15 m sides. (See Map 88.)
History: First reported by James Jasek as Thomasini Sink in the early 1960s, it was rediscovered about ten years later during subdivision development and surveyed by Scott Carlyon, Glenn Darilek, and Matt Farrar on 15 June 1974.
Geology: Hidden View Cave is in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer.
Technique: A hand line may be required for the entrance drop.
Bibliography: Darilek (1974:61-62); Passmore (1977: 28); Veni (1978a:5; 1983:98-99; 1985).



MAP 87

HILDEBRAND AND I-37 CAVE (BCS #168)
Location: San Antonio East 7.5′
Description and History: During the construction of Interstate 37 in 1976 a large pit was opened near the intersection with Hildebrand Avenue. Three bulldozers took six hours to fill the pit. One week later, following some very heavy rains, all the fill is said to have washed into the cave. The pit was quickly refilled and capped with cement. Later that year, while working another construction site, the three bulldozer operators related their experiences to Randy M. Waters. Construction officials, however, denied any knowledge of caves when questioned by Alex Depeña.
Geology: Given the proximity of this Austin Chalk



cave to major faults, San Antonio Spring, and extensive Robber Baron Cave, it is very possible that the bulldozer story does not exaggerate the cave's potential extent.

HILDEBRAND AND SHOOK CAVE (BCS #37)
Location: San Antonio East 7.5′
Description: All that is known of the cave is from an article in the *North San Antonio Times*. In it is Victor Herring's account of the 1940s: "I went down about 70 feet [21 m]. The passages only went sideways but they would open into big rooms about 10 x 12 feet [3 x 4 m]" (Anonymous (1972).
History: Since Mr. Herring's time in the cave, it has been paved over by the road intersection of Hildebrand and Shook.
Geology: The cave is in the Austin Chalk and, like most caves in this formation, it was probably a series of intersecting joint-controlled passages, the only "rooms" being at enlarged passage intersections.
Archeology: A few Indian relics, mostly "carvings and skulls," were found in the cave.
Bibliography: Anonymous (1972); Veni (1978a:5).

HILLS AND DALES PIT (BCS #38)
Alternate names: Aue Cave No. 1; Thurman Cave No. 1; Robber's Cave; Indian Sink; Hills and Dales Estates Cave; Hills and Dales Cave; Indian Cave; Lost Indian Cave
Location: Helotes 7.5′
Description: The 18 m deep pit entrance is located in the middle of a creekbed. Although initially it may not appear so, Hills and Dales Pit is actually a single chamber separated by collapse into three "rooms." The first room is at the base of the entrance drop and is about 10 m in diameter and 2 m high. South of this room is a high dome that extends to within a few meters of the surface. North of the first room is a semicircular breakdown wall, behind which is the second room. This breakdown room is approximately 5 m in diameter and has five interconnecting domes in the ceiling which average 7 to 8 m in height. The third room is at the cave's northeast corner. It is a low flat area containing some modest speleothems. This room enlarges to a height of 3 m at the end of the collapse zone. Some small crawlways extend into the breakdown but do not go far. (See Maps 89-90; Photos. 18-19.)
History: This is one of the best known and most frequently visited caves in Bexar County. Yet because "everyone has always known about the cave," very little of its past has been well documented. Its many different names are a prime example of this. The pit entrance is often used for training novice cavers in ropework skills. During such an exercise in 1975, the cave became the site of a cave rescue. A rock broke loose from the top of the pit and struck a caver below on the head. On 20 December 1970 Hills and Dales Pit was surveyed by Roger V. Bartholomew and Andy Sandoval. It was resurveyed by Debbie Cavazos, Gary Poole, and George Veni in 1977.
Biology: No faunal study has been made of the cave, but it should prove to be of interest. The cave's most impressive faunal display is the thick "fur" of harvestmen (prob. *Leiobunum townsendii*) that usually cover the pit walls. Other fauna includes snails, dark-brown scorpions (prob. *Vaejovis reddelli*), cave crickets (*Ceuthophilus* sp.), and an occasional bat.
Geology: This cave is a significant site of point recharge into the Edwards (Balcones Fault Zone) Aquifer. Initially developed as a phreatic chamber, the cave was significantly modified by vadose waters when a dome intersected a ravine. This vertical shaft entrance effectively pirates all streamflow from all but the largest storm events. Little evidence of ponding in the cave indicates that water rapidly infiltrates through its highly organic soil floor. The collapse within the cave was a result of diminished ceiling

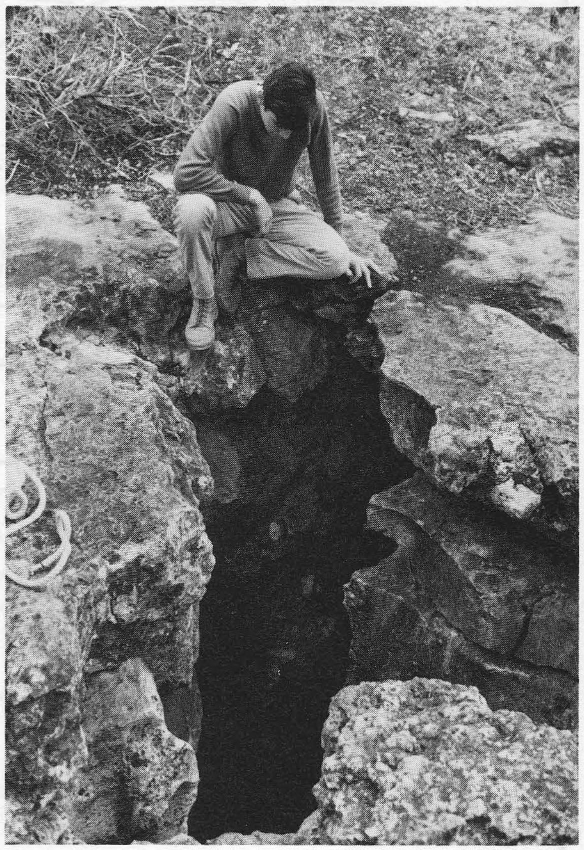
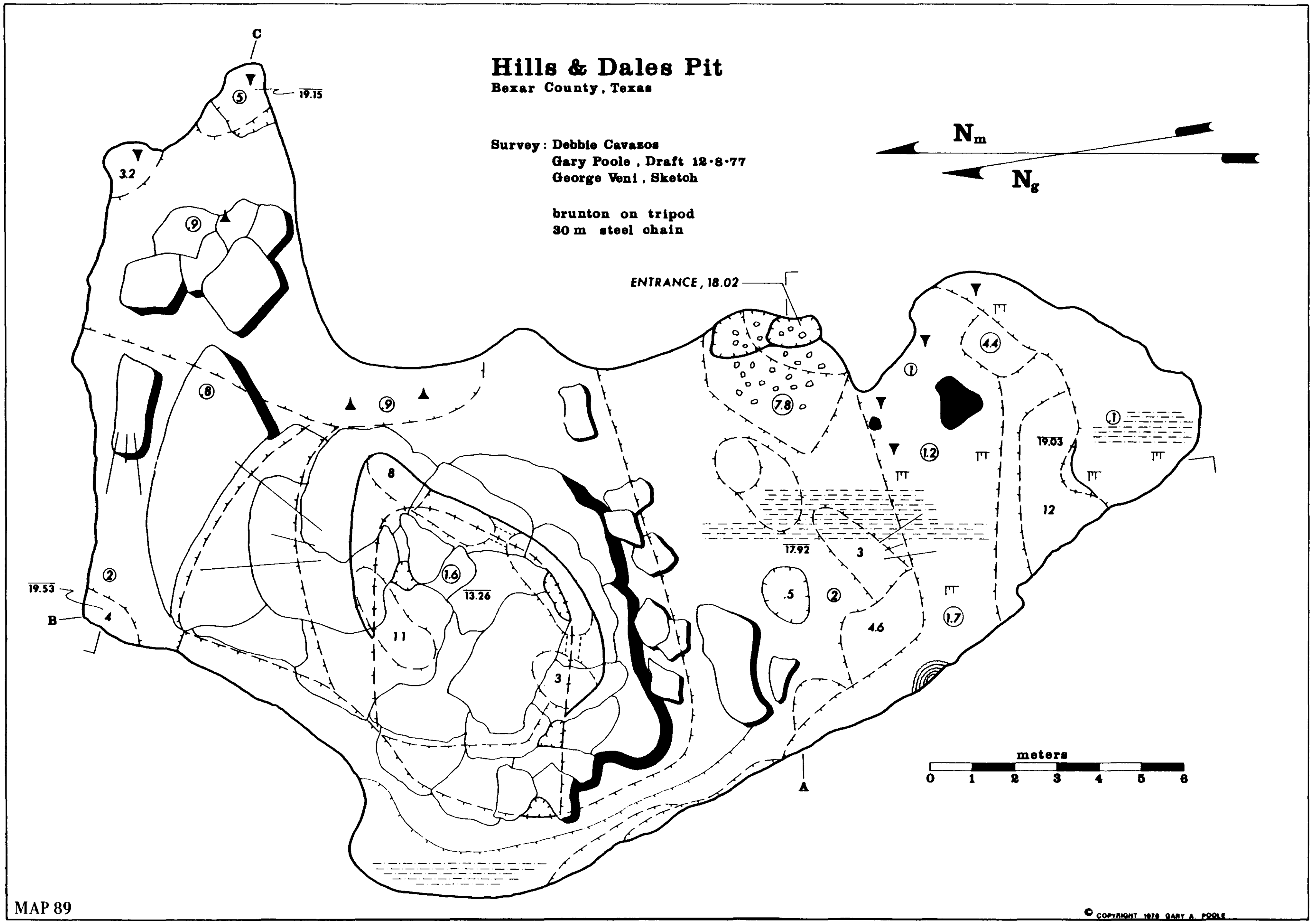


Photo. 18.—Hills and Dales Pit under Andy Sandoval's watchful eyes (Roger V. Bartholomew).


Hills & Dales Pit
Bexar County, Texas
Survey: Debbie Cavazos
Gary Poole, Draft 12-8-77
George Veni, Sketch
brunton on tripod
30 m steel chain
ENTRANCE, 18.02
N_m
N_g
meters
0 1 2 3 4 5 6
C
19.15
5
3.2
9
.8
9
8
2
19.53
4
B
1.6
13.26
11
3
7.8
17.92
3
.5
2
4.6
1.7
1
1.2
4.4
1
19.03
12
A
© COPYRIGHT 1978 GARY A. POOLE
MAP 89

competence because of extensive dome development along two joints.

Technique: A 25 m long rope tied to a nearby tree is needed for the 18 m pit.

Bibliography: Anonymous (1966b:71; 1971b:39; 1973q:11-12; 1976c:165; 1979j:3; 1979o:4; 1979t: 3); Austin (1975:76-77); Bartholomew (1970d:134); Clement (1974a:30); Darilek (1975a:10-11; 1975b: 62); Ediger (1975:165-166); Elliott (1985b:13; 1985c:47); Gelsone (1975a:55-57; 1975b:186-187); Litsinger (1973a:15; 1973b:10); Minton (1986:45); Montgomery (1975a:34-35); Passmore (1977:29); Poole (1978b:4); Poole and Passmore (1978:21, 24-26, 47); Reddell (1961b:1); Reddell and Knox (1962:3-4, 6, 35); Reddell and Russell (1962a:5); Reddell and Smith (1966:2, 4); Veni (1978a:5; 1983:99; 1985); Widener (1959:79).

HITZFELDER'S BONE HOLE (BCS #39)

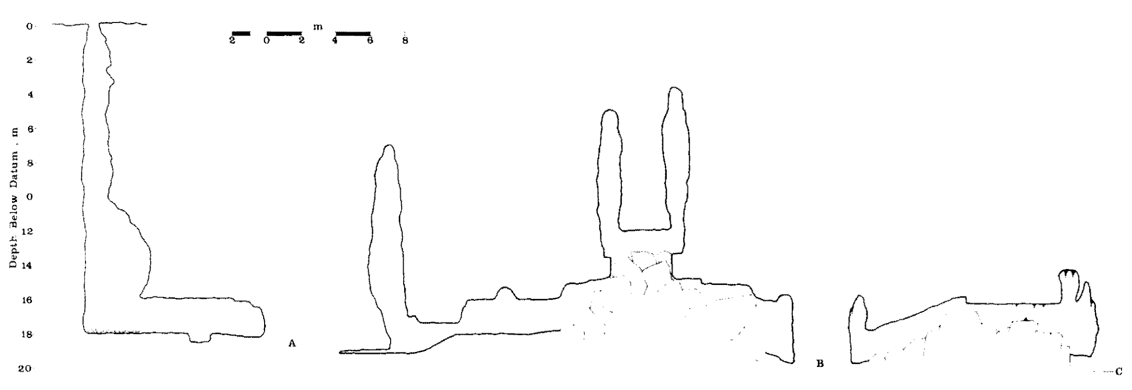
Alternate names: Bone Hole; Hitzfelder's Cave; Hitzfelder's Bone Cave; Hitzfelder Cave

Location: Bulverde 7.5′

Description: Located on a hilltop overlooking Cibolo Creek, the 3.2 m diameter entrance pit drops 12.8 m into a 10 m diameter room. A short crawl leads to an 8.2 m drop into "The Cellar," a short narrow passage that ends in mud fill. (See Map 91.)

History: The story of Hitzfelder's Bone Hole is actually the story of Norman Hitzfelder's search for a spectacular cave that would be an unequaled commercial success. The discovery of nearby Natural Bridge Caverns (across Cibolo Creek in Comal County) served to inspire him. In 1963 he called Al Brandt, James Jasek, and Brother Marvin Sannemann to check out his cave. Finding the pit to be only 3-4 m deep, they advised that it might go to a cave with *a lot* of digging and thought that would be the last they'd hear about it. Surprise! Norman hired some cheap labor to excavate the pit. Unexpectedly, they discovered the pit floor was laid in uniform layers of rock and dirt. When the main room was finally breached, the cave was discovered to be an ancient American Indian burial site. Archeological studies revealed that 30-50 individuals were buried in the cave. When the artifacts were removed, it was time to press on for "big cave discoveries"–which would mean more digging. At one point Ross Felton and Dick White used a hose to pump water into The Cellar and see where the water would drain. The water ponded and took a long time to drain through the thick clay-mud floor. The Bone Hole was surveyed on 8 May 1971 by Roger V. Bartholomew, Al Brandt, and Jorga Lindgron, and again in 1977 by Logan McNatt, Max Miller, Neal Morris, and Max Witkin. From late 1978 to 1980, Randy M. Waters led the San Antonio Grotto in a push for Norman's big cave. During that time Crystal Cave (BCS #109) was dug open, leads in another of Norman's caves (Creekbed Cave, BCS #15) were blasted open, and there was more digging in the Bone Hole. The property was searched in vain for new caves or potential sinks to dig. Two sinks near Cibolo Creek were dug down to continuing dirt fill. A drilling rig perforated the area around the Bone Hole without finding a void. The Bone Hole hill was geologically mapped for insight as to where a big cave might be and a psychic was consulted, who affirmed that the big cave was really there but Norman just hadn't found it yet. And so Norman Hitzfelder keeps on trying. It is rumored that he blasted in the Bone Hole in early 1983 but found nothing. One hopes all

Hills & Dales Pit



SECTIONS

MAP 90

archeological artifacts were completely removed during the detailed excavations of the 1960s to preclude the loss of any valuable data.

Biology: Collections made in the cave in August 1964 by Orion Knox and in March 1965 by William H. Russell included the following material:

Snails–*Helicodiscus eigenmanni* (troglophile)
Spiders–*Cicurina varians* (troglophile)
Eidmannella rostrata (troglobite)
Harvestmen–*Leiobunum townsendii* (trogloxene)
Mites–Undetermined material
Millipedes–*Cambala speobia* (troglobite)
Springtails–*Pseudosinella violenta* (troglophile)
Silverfish–*Texoreddellia texensis* (troglobite)
Cave crickets–*Ceuthophilus (C.) secretus* (trogloxene)
Ceuthophilus (Geotettix) cunicularis (trogloxene)
Rove beetles–?Paederinae genus and species
Biting midges–*Forcipomyia* sp.

Rattlesnakes (*Crotalus* sp.) have been observed in the cave.

Geology: The Hitzfelder Hill is composed of the upper member of the Glen Rose Formation capped by Edwards Limestone in which the cave has formed. Unfortunately for Hitzfelder's "big cave" search, the hill is not likely to produce it. In spite of faulting which could channel flow for passage enlargement, most rainfall runs off the steep-sided hill and does not infiltrate. There are no significant sinks on the hill and no springs, such as would be expected at the Edwards-Glen Rose contact if significant volumes of cavern developing water did sink into it. Lastly, the hill's small areal extent is rather limiting.

Archeology: When the skeletons were discovered, they were found scattered throughout the room. No one is certain if they were just tossed into the cave or placed in a set pattern and later disturbed by movement of a nearby fault. American Indian artifacts associated with the human remains "are characteristic of a range spanning from 1000 to 4000 years ago. One radiocarbon sample, miscellaneous charcoal taken from the fill, rendered a date of 1000 ± 190 BP (Turpin and Bement, 1985). It has not been determined what significance was placed on this cave burial by the people of that time, or for how long a period the bodies were in the cave before the pit was sealed. Other unanswered questions are: Why a cave

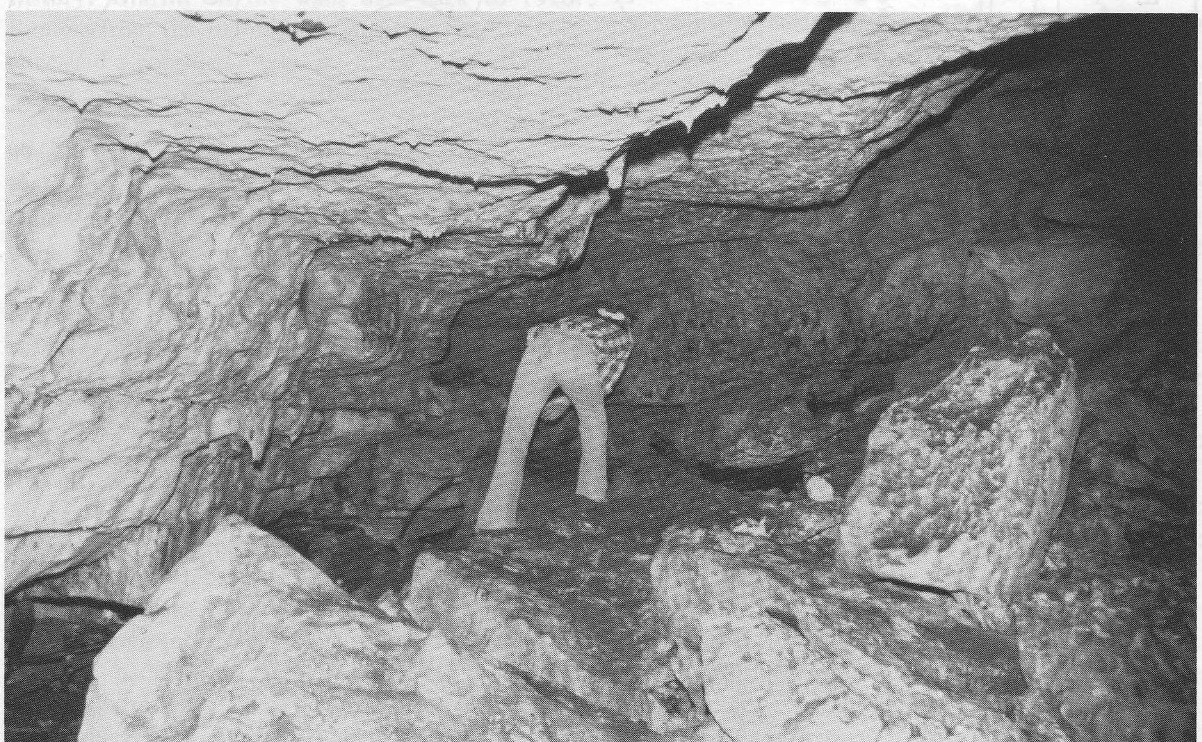
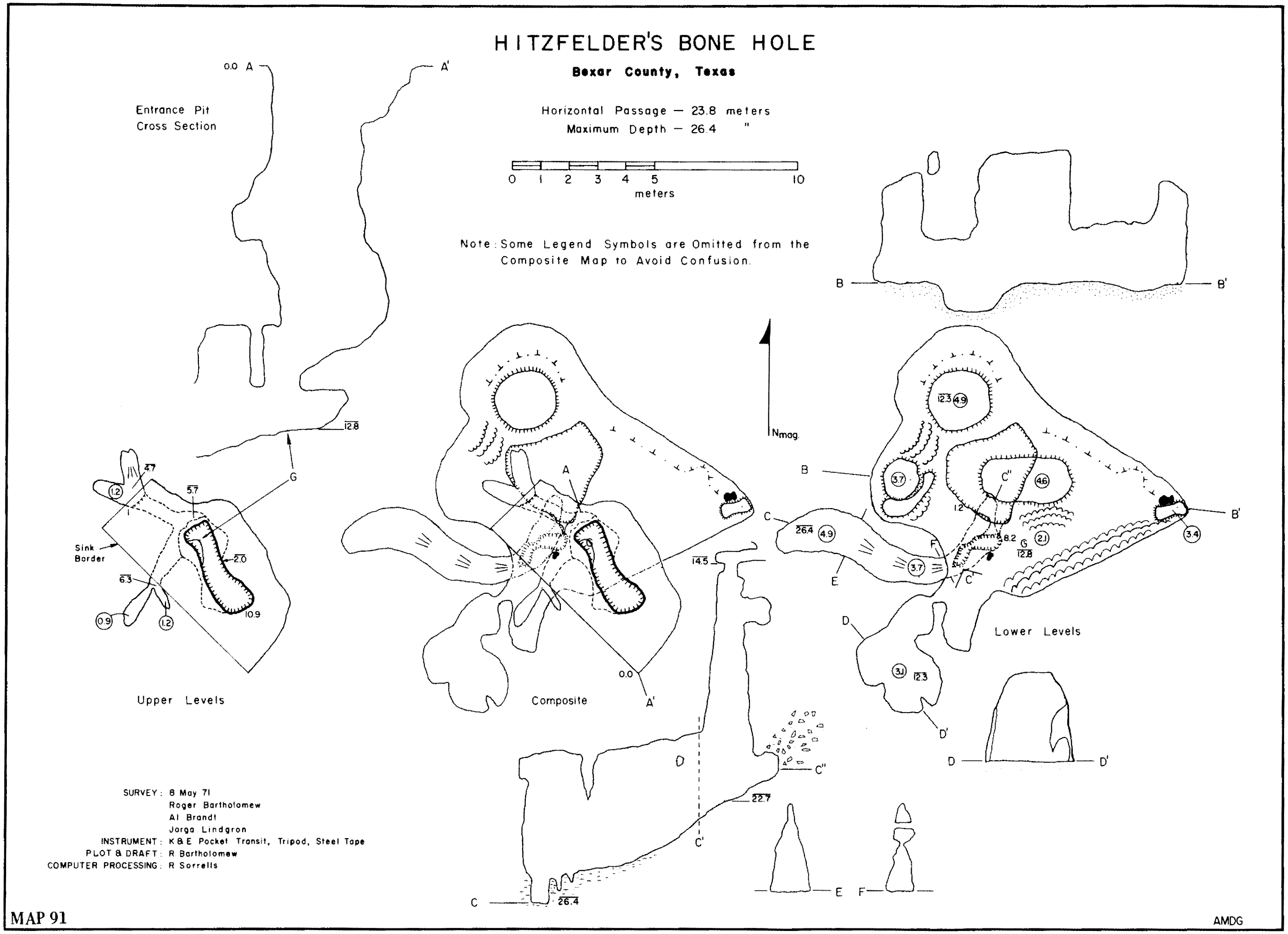


Photo. 19.–Breakdown area of Hills and Dales Pit being probed by John Cross (Randy Waters).


HITZFELDER'S BONE HOLE
Bexar County, Texas
Horizontal Passage — 23.8 meters
Maximum Depth — 26.4 "
0 1 2 3 4 5 10
meters
Note: Some Legend Symbols are Omitted from the Composite Map to Avoid Confusion.
Entrance Pit
Cross Section
Upper Levels
Composite
Lower Levels
Sink Border
Nmag.
SURVEY: 8 May 71
Roger Bartholomew
Al Brandt
Jorga Lindgron
INSTRUMENT: K&E Pocket Transit, Tripod, Steel Tape
PLOT & DRAFT: R Bartholomew
COMPUTER PROCESSING: R Sorrells
AMDG

MAP 91

burial? Why that particular cave? Why was the cave sealed? What is the probability of finding other burial caves similar to this one?

Technique: A 30 m long rope tied to an automobile driven to the cave is adequate for the entrance pit and the drop into The Cellar.

Bibliography: Anonymous (1968b:106; 1979l:3); Bartholomew (1973:321-322, map); Boyer (1979:46); Collins (1970:301-304); Dibble and Alexander (1971:142); Fieseler (1978a:66; 1978c:69-70); Givens (1968:47-50); Jasek (1969:1, 6); Lindgron (1971:124); Lundelius and Slaughter (1971:15); McNatt (1977:23); Passmore (1977:30); Sanneman and Hitzfelder (1965:130); Skinner, Haas, and Wilson (1980:3, 12); Turpin and Bement (1985:12-13); Valastro, Pearson, and Davis (1967:448); Veni (1978a:5; 1978f:6-7); Winkler (1973e:2).

HOGAN'S CAVE (BCS #40)

Location: Van Raub 7.5′

Description: The 1 m high by 4 m wide entrance opens, down a sloping floor, into a single, roughly circular chamber. The chamber is 20 m in diameter, 1.6 to 5 m high, and contains several large, inactive speleothems. (See Map 92.)

History: Graffiti on the walls date back to 1918. Rumors from the Helotes area mention that the cave once had a considerably greater extent. Bob Hudson first reported the cave on 18 September 1954, and on 14 March 1970 it was surveyed by Roger Bartholomew, Rick Clements, and David Litsinger.

Biology: An abundance of harvestmen (prob. *Leiobunum townsendii*) have been observed.

Geology: The cave is a single chamber intersected on one side by a ravine. It is in the Edwards Limestone.

Bibliography: Anonymous (1970:78; 1973q:12); Passmore (1977:31); Reddell (1961b:1); Reddell and Knox (1962:3-4, 23); Reddell and Russell (1962a:5); Reddell and Smith (1966:3); Veni (1978a:5).

HOLMGREEN'S HOLE (BCS #41)

Alternate names: Trap Door Cave; Terra Alta Cave

Location: Longhorn 7.5′

Description: A trap door in a shed, once located near the owner's house, opened to an 8 m drop into the cave. Holmgreen's Hole is a complex maze of passages that run parallel and perpendicular to each other. Robber Baron Cave (BCS #56) is an excellent analog to Holmgreen's (see the Robber Baron report for further details on the local history, geology, biology, and meteorology). Many of the passages are tall fissures that average 2 to 7 m high and 1 to 1.5 m wide. Commonly, the walls narrow to a "V"-slot cross section, allowing no true floor to walk on. The cave is apparently largely unexplored and is potentially one of the longest caves in Texas.

History: The cave was uncovered in the 1920s when the father of the present owner was building a house. He built a shed over the trapdoor entrance and put another small hole into the cave to heat and cool his greenhouse. The greenhouse no longer exists and the hole has been sealed. According to the original owner and the late Mr. Charles Spang, who aided in the commercialization and early exploration of Robber Baron Cave, Holmgreen's Hole did at one time connect to Robber Baron, and it was possible to go into one cave and exit from the other over 700 m away. Commercial developers of Robber Baron sealed all connecting passages by 1930. Holmgreen's Hole was partially explored on 10 January 1961 by University of Texas Grotto members Graham Bell, Bob Benfer, Bud Frank, and James Reddell. Soon afterward it was explored by M.D. Doyle, Bill Gray, and Orion Knox of the Alamo Grotto. Since then the cave has been closed to exploration, and the entrance has been sealed.

Geology: Holmgreen's Hole is a network maze cave in the Austin Chalk. Its genesis and morphology are the result of water uniformly infiltrating down through joints in the overlying Pecan Gap Chalk caprock and solutionally enlarging the passages to similar shapes and sizes.

Meteorology: A strong current of air has often been reported to blow out of the cave. Evidently it was enough to maintain a constant temperature within a small greenhouse. If access were possible, simultaneous volumetric and directional air-flow studies in both Holmgreen's Hole and Robber Baron Cave might provide valuable data on the caves and how they are related.

Technique: When the trapdoor entrance was not sealed, a metal ladder had been set in the cave for the 8 m entrance drop.

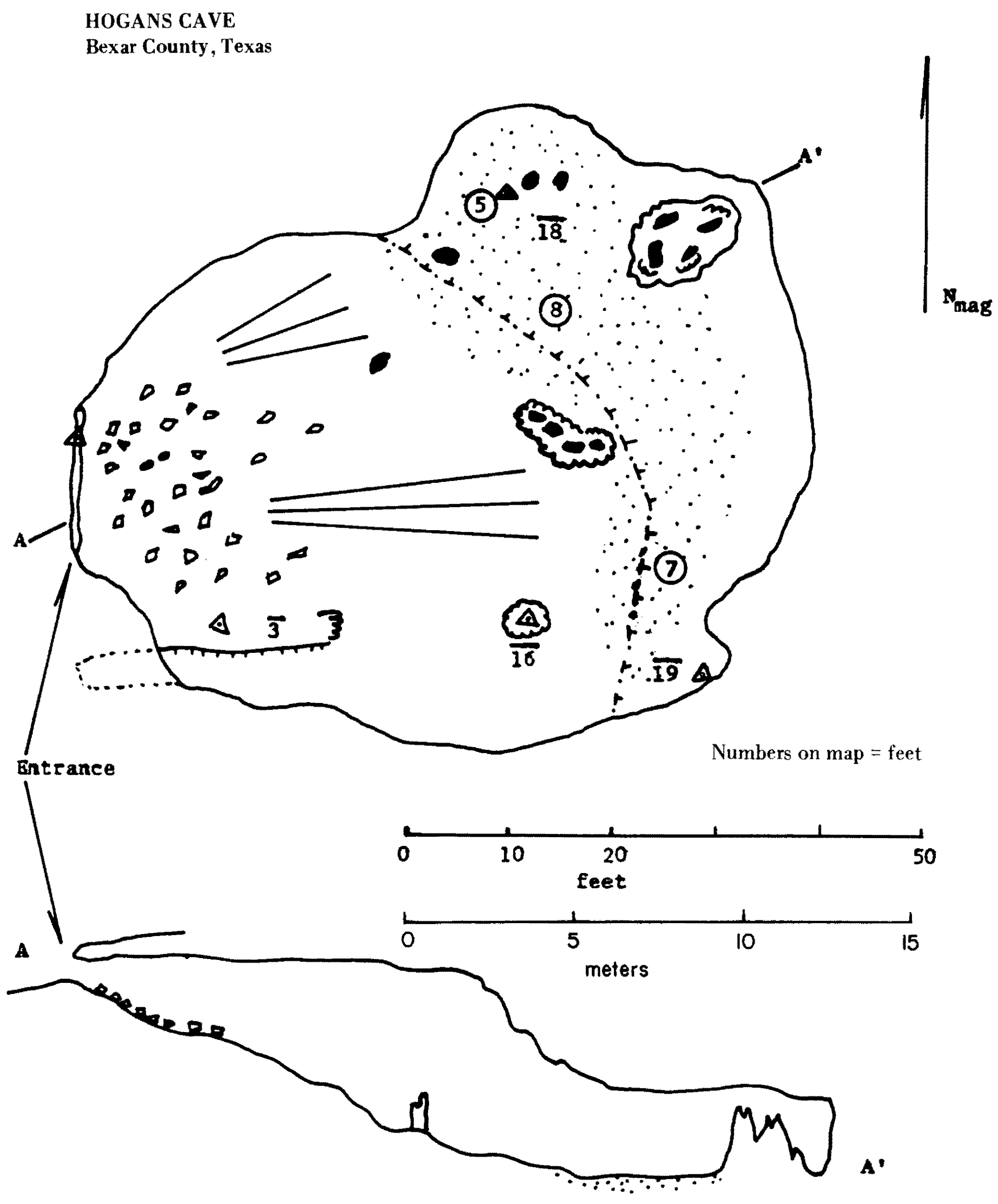
Bibliography: Anonymous (1961c:18-19; 1973q:12); Reddell (1961a:21; 1961b:1); Reddell and Knox (1962:3-5, 23-24); Reddell and Russell (1962a:5); Reddell and Smith (1966:3); Russell (1962:61); Veni (1978a:5).

HOPELESS CAVE (BCS #153)

Location: Bulverde 7.5′

Description: A 0.8 m diameter hole drops 3 m to the top of an almost vertical flowstone slope. The cave ends in a small speleothem area at the base of the flowstone, at a depth of 11.3 m. (See Map 93.)

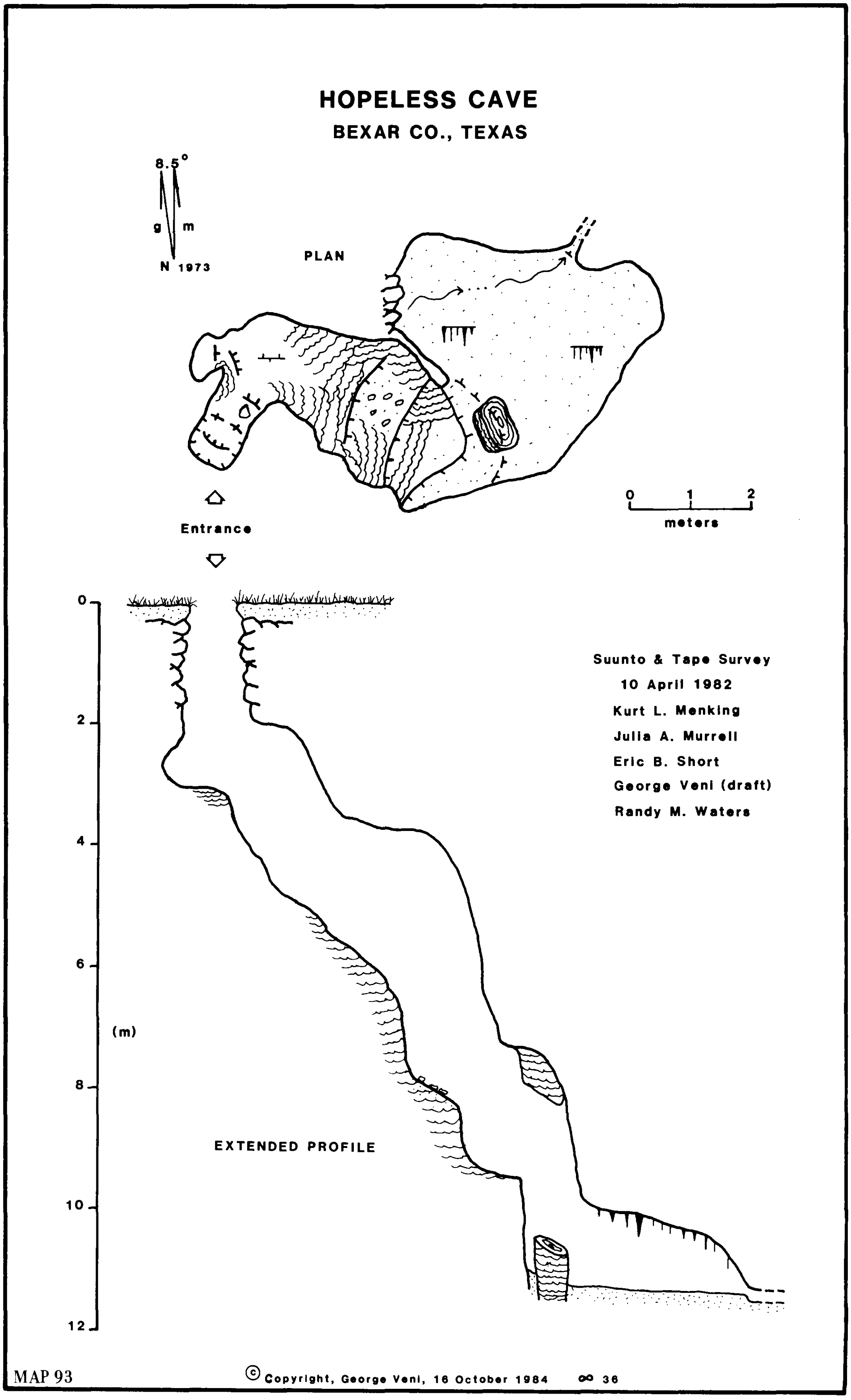
History: On 31 May 1981 Scott Harden and Randy M. Waters were looking for caves near Tick 'n Delight Cave. Waters found a small shallow sinkhole, about



Survey: March 1970
R. Bartholomew
D. Litsinger
R. Clement

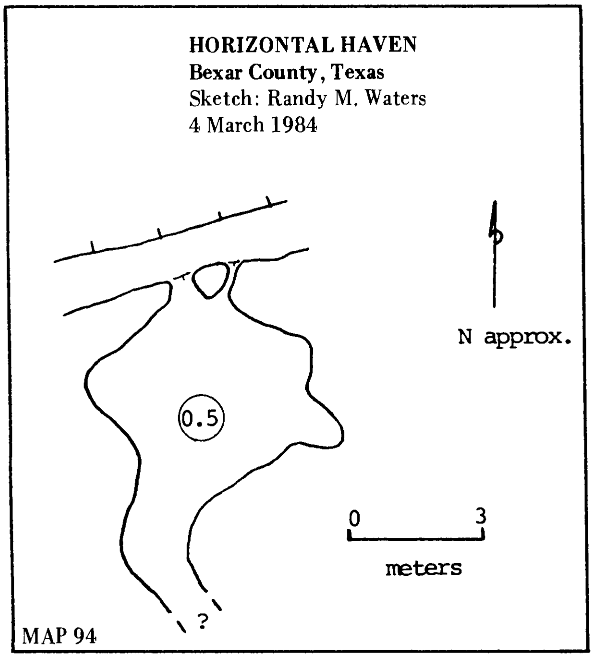
Instrument: K&E Pocket Transit
Tripod
Steel Tape

MAP 92


HOPELESS CAVE
BEXAR CO., TEXAS
8.5°
g
m
N 1973
PLAN
Entrance
0
1
2
meters
0
2
4
6
8
10
12
(m)
Suunto & Tape Survey
10 April 1982
Kurt L. Menking
Julia A. Murrell
Eric B. Short
George Veni (draft)
Randy M. Waters
EXTENDED PROFILE
MAP 93
© Copyright, George Veni, 16 October 1984
∞ 36

1 m in diameter, and began digging. After thirty minutes of digging, Harden decided the effort was "hopeless." His words seemed to trigger a rockfall into the void below, and thus the cave was named. Hopeless Cave was surveyed on 10 April 1982 by Kurt Menking, Julia Murrell, Eric Short, George Veni, and Randy M. Waters.
Biology: Harvestmen (prob. *Leiobunum townsendii*) and cave crickets (*Ceuthophilus* sp.) were observed.
Geology: Hopeless is a vertical shaft in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer.
Technique: Caution is needed to avoid dislodging loose rocks in the excavated portion of the entrance.
Bibliography: Veni (1985).

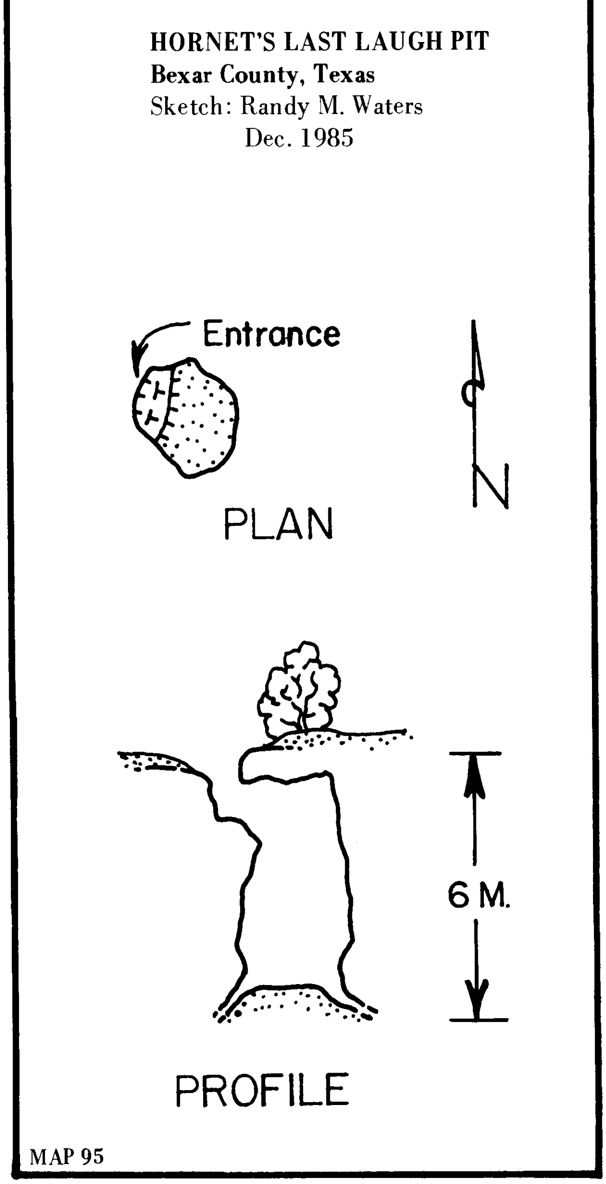
HORIZONTAL HAVEN (BCS #188)
Location: Castle Hills 7.5′
Description: Two small holes extend from a Salado Creek cliffside into the cave. The easternmost hole is impassably small, but the cave entrance, a hole 0.8 m to the west, isn't. The 0.8 m wide by 0.5 m high entrance opens into a room almost 5 m in diameter, yet only 0.5 m high. An unexplored crawlway heads south from the southwest corner of the room. (See Map 94.)



MAP 94

History: This is one of three caves discovered by Randy M. Waters on 4 March 1984 (the others are Crawl and A Prayer Cave, BCS #187, and Sorehead Cave, BCS #186).
Geology: Horizontal Haven and its two neighboring caves formed as small springs for nearby upland drainage. The caves have been hydrologically abandoned as springs owing to the continued incising of Salado Creek. Being at different levels, the caves may reflect distinct periods of the creek's downcutting. The low room in Horizontal Haven may have been formed by ponded water from the creek.
Bibliography: Veni (1985).

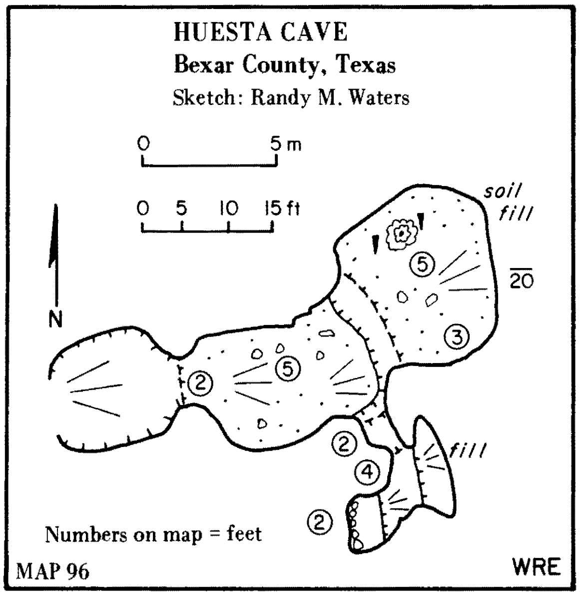
HORNET'S LAST LAUGH PIT (BCS #200)
Location: Bulverde 7.5′
Description: The cave entrance is situated in a shallow sinkhole and is about 1.0 m long by 0.5 m wide. The pit drops 2 m to a ledge and then 4 m to a dirt floor. The base of the pit is about 3.5 m in diameter. (See Map 95.)



MAP 95

History: Discovered and explored by Joe Ivy and Randy M. Waters in July 1985, the cave was named after a hornet's nest on a tree branch over the entrance.
Geology: The cave is located in the Mud Creek Dam Reservoir and serves as a site of discrete recharge into the Edwards (Balcones Fault Zone) Aquifer.
Technique: A cable ladder or at least a hand-line is needed.
Bibliography: Palit (1985b:87).

HUESTA CAVE (BCS #154)
Alternate name: Wagner Ranch Cave
Location: Helotes 7.5′
Description: In the east corner of a shallow sink the 1.5 m wide by 0.6 m high entrance opens into a 5 m diameter by 1.6 m high room. To the north is a 2 m drop into a room of similar dimensions but decorated with some modest speleothems. Extending south from the first room is a 2 m long crawlway into a short, breakdown-choked passage. (See Map 96.)

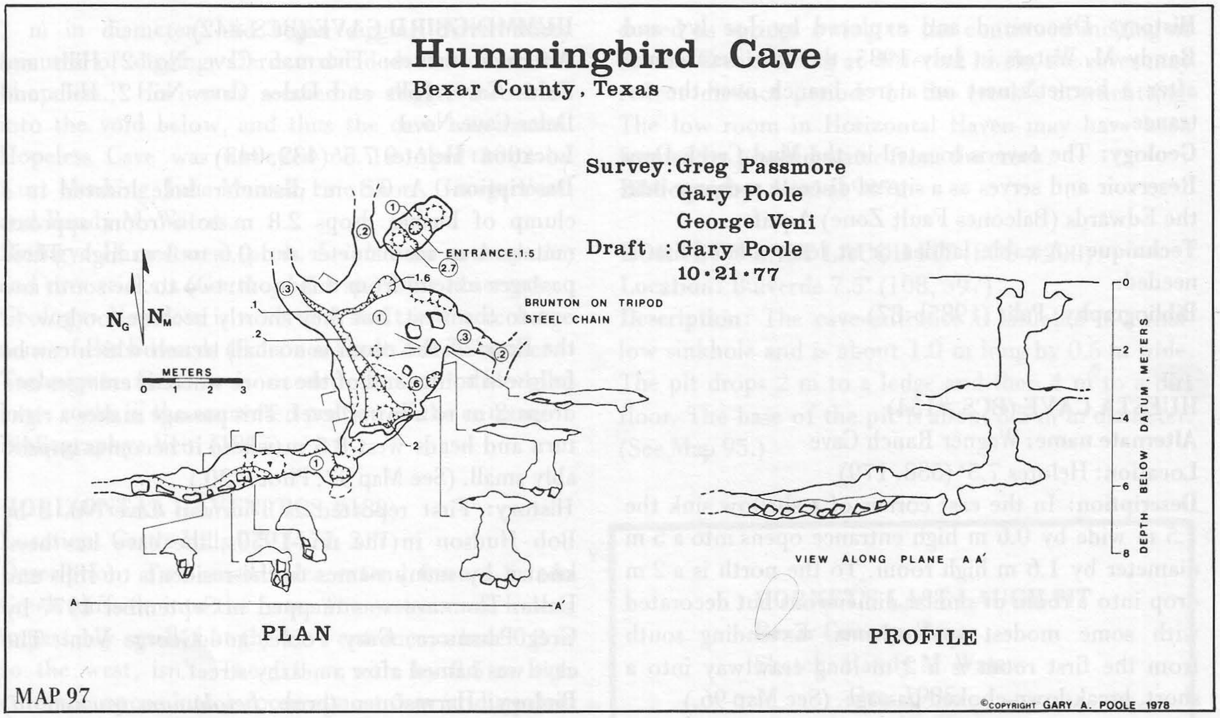


MAP 96

History: The cave was originally called Wagner Ranch Cave by cavers who visited it in the early to mid-1960s. During the winter of 1982 San Antonio Grotto members Don Arburn, Kurt L. Menking, Jana Olsen, Bill Swaggerty, and Randy M. Waters were shown what the owners called "Huesta Cave." On that trip Arburn dug open the 2 m long crawlway.
Biology: Many ticks were noted near the entrance during the 1960s.
Geology: Huesta Cave is in the Edwards Limestone.

HUMMINGBIRD CAVE (BCS #42)
Alternate names: Thurman Cave No. 2; Hills and Dales Cave; Hills and Dales Cave No. 2; Hills and Dales Cave No. 1
Location: Helotes 7.5′
Description: A 0.3 m diameter hole located in a clump of bushes drops 2.8 m to a room approximately 4 m in diameter and 0.6 to 1 m high. Three passages extend from this room; two to the south and one to the west, but they shortly become too low. In the floor of the room is a small trench which can be followed to the end of the room where it enlarges and drops 2 m to a lower level. This passage makes a right turn and heads west 8.5 m where it becomes impassably small. (See Map 97; Photo. 20.)
History: First reported as Thurman Cave No. 2 by Bob Hudson in the mid-1950s, the cave has been known by many names to the residents of Hills and Dales. The cave was mapped in September 1977 by Greg Passmore, Gary Poole, and George Veni. The cave was named after a nearby street.
Biology: Harvestmen (prob. *Leiobunum townsendii*) and cave crickets (*Ceuthophilus* sp.) have been observed in the cave.
Geology: Developed in the Edwards Limestone along a bedding plane, the back portion of the cave has been vadosely entrenched by water draining into the Edwards (Balcones Fault Zone) Aquifer. The water's quality may require monitoring since a septic field was established a few meters from the cave in 1986.
Meteorology: Occasionally a current of air blows from the constriction at the end of the cave.
Bibliography: Anonymous (1973q:12; 1979t:3); Poole (1978d:7); Poole and Passmore (1978:27, 28, 47); Reddell (1961b:1); Reddell and Knox (1962:3-4, 35); Reddell and Russell (1962a:6); Reddell and Smith (1966:4); Veni (1978a:5; 1985); Waters (1976a:15).

IS THAT ALL THERE IS SPRING (BCS #112)
Location: Bulverde 7.5′
Description: This seasonally active spring has an entrance measuring 0.5 m high by 1 m wide. The cave extends 1.5 m to the northwest, turns northeast, and ends within 6 m. (See Map 98.)
History: While checking springs indicated on a topographic map, George Veni and Randy M. Waters discovered this spring and two others (Dam Crawl and Elephant Spring) on 19 November 1978. The spring was surveyed on 10 August 1983 by Joe Ivy and George Veni.
Biology: Spiders, harvestmen (prob. *Leiobunum townsendii*), cave crickets (*Ceuthophilus* sp.), and



MAP 97

Photo. 20.—Fear and awe; Chris Rhoads emerging from Hummingbird Cave (Randy Waters).

mosquitoes were observed when the cave was surveyed.

Geology: The three springs are developed near the top of the upper member of the Glen Rose Formation by water percolating through Edwards Limestone hilltops and discharging into the deeply incised valley. Developed at approximately the same elevation, 2 to 5 m above the present valley floor, the springs represent a paleo-base level. Since further downcutting of the valley, the springs are only intermittently active. Remnants of primary ceiling anastamoses, along which Is That All There Is Spring originally developed, are present at the upstream end of the cave.

Bibliography: Anonymous (1978h:1); Veni (1983: 99).

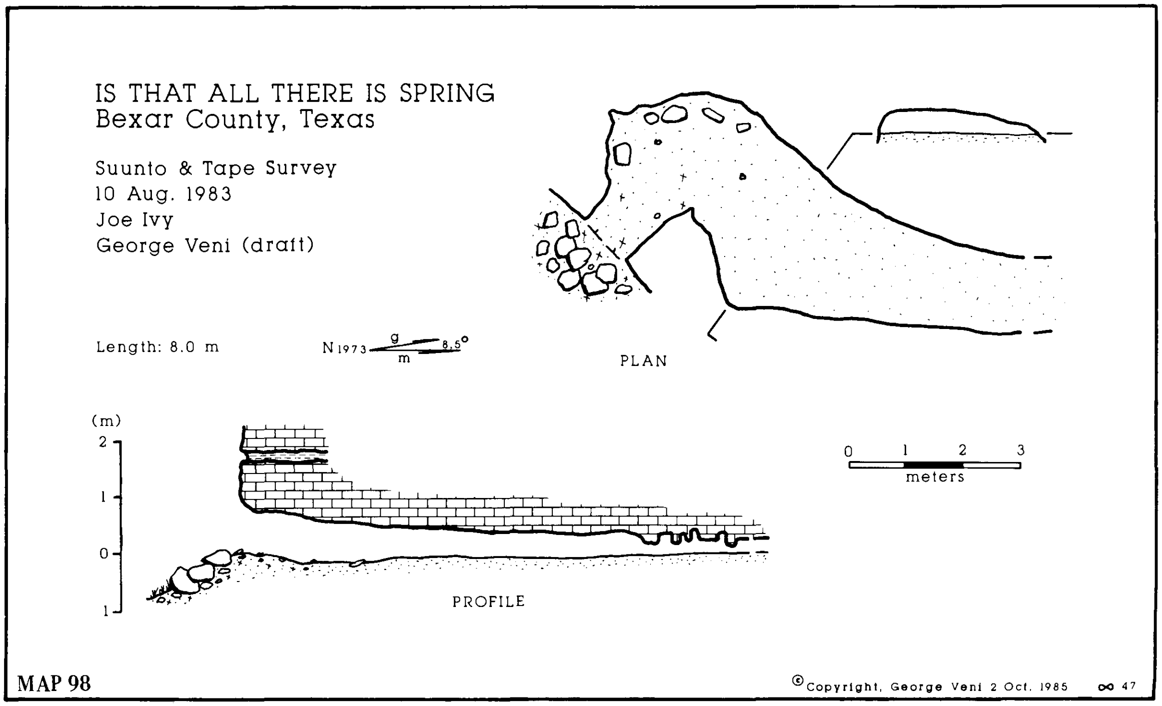
ISOPIT (BCS #143)

Alternate name: Isopit Cave

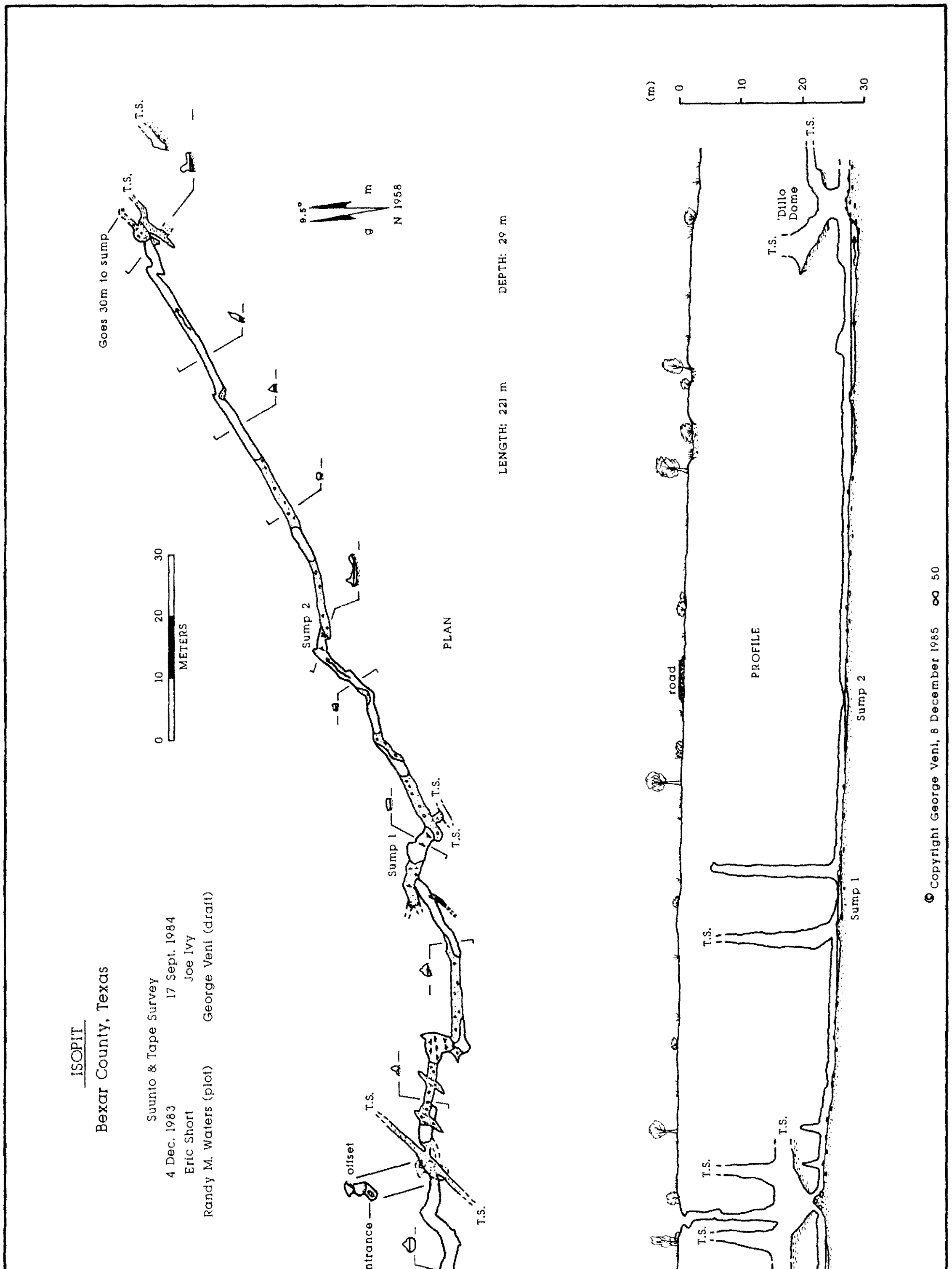
Location: Lacoste NE 7.5′

Description: Three 0.5 m diameter holes at the base of a solution sink drop 0.5 m to a ledge that overlooks the entrance room. The drop from the ledge into the 3 m diameter room is about 2.5 m. In the north end of the entrance room an 8 m drop to another ledge is followed by a 7 m drop to a stream passage. The stream passage averages less than 1 m high and wide. Domes along the stream are typically snug, 7 to 8 m high, and pinch too tight for exploration. Upstream, to the west, the stream goes about 40 m to a sump. Downstream, the passage reaches intermittent Sump I after 55 m. Sump I is 2.5 m long and opens into an east-trending passage that ends at Sump II after 37 m. Sump II also intermittently has very limited airspace and was pushed into about 90 m of stream passage to Sump III. 'Dillo Dome, located 70 m downstream from Sump II, was named for a complete armadillo carcass at its base. Two passages lead off the 5 m high dome. The first, and probable source of the armadillo, is an entrenched passage which goes about 30 m to the northeast before pinching at a narrow domepit/canyon. The second passage goes up some breakdown, about 15 m above the stream passage, and can be seen to continue up a dome for at least 7 m. Exploration is hampered by a constriction in the dome. Location of this dome on the surface, followed by digging, may yield a new entrance to the cave. (See Map 99.)

History: Gary Poole was shown the cave in 1980 but did not explore for lack of equipment. In April 1982 George Veni relocated it under similar circumstances. Finally, on 20 February 1983 the cave was explored to the upstream sump, downstream Sump I, and surveyed from the entrance to the stream passage by Hal Lloyd, Eric Short, John Spence, and Bill Steele. On 4 December 1983, Short returned with Randy M. Waters and surveyed the cave to Sump II. Waters returned with Scott Harden a month later and explored to Sump III. On 17 September 1984 Veni and Joe Ivy surveyed from Sump II to 'Dillo Dome.



MAP 98


ISOPIT
Bexar County, Texas
Suunto & Tape Survey
4 Dec. 1983
17 Sept. 1984
Eric Short
Joe Ivy
Randy M. Waters (plot)
George Veni (draft)
0 10 20 30
METERS
PLAN
LENGTH: 221 m
DEPTH: 29 m
9.5°
g
m
N 1958
Entrance
offset
T.S.
Goes 20m to sump
Goes 30m to sump
Sump 1
Sump 2
PROFILE
road
'Dillo Dome
(m)
0
10
20
30
© Copyright George Veni, 8 December 1985 ∞ 50
MAP 99

Biology: Large populations of the troglobitic cirolanid isopod *Cirolanides texensis* and the amphipod *Stygobromus russelli* are of considerable interest. Scott Harden estimated 40-50 isopods per square meter and a slightly smaller number of amphipods. Remarkably this is the only known occurrence of either species in the Austin Chalk. Collections have been made in the cave on 13 February 1983 by Scott Harden; in March 1983 by Eric Short; on 4 December 1983 by Scott Harden and Joe Ivy; on 8 January 1984 by Scott Harden and Randy Waters; on 6 June 1984 by Scott Harden; and on 17 September 1984 by Joe Ivy and George Veni. The following is a complete list of fauna collected in the cave:

Snails–*Helicina orbiculata* (empty shells)
Lymnaea sp. (empty shells)
Helicodiscus eigenmanni (troglophile)
Amphipods–*Stygobromus russelli* (troglobite)
Isopods–*Cirolanides texensis* (troglobite)
Oniscoidea genus and species
Trichoniscidae genus and species 1 (troglobite)
Scorpions–*Vaejovis reddelli* (troglophile)
Spiders–*Cicurina varians* (troglophile)
Eperigone sp. (?accidental)
Meioneta sp. (troglophile)
Eidmannella rostrata (troglobite)
Achaearanea porteri (troglophile)
Harvestmen–*Leiobunum townsendii* (trogloxene)
Hoplobunus madlae (troglobite)
Mites–Undetermined material
Millipedes–*Cambala speobia* (troglobite)
Oxidus gracilis (troglophile)
Insects–Undetermined larvae
Springtails–Undetermined material
Silverfish–Prob. *Texoreddellia texensis* (troglobite)
Crickets–*Gryllus* sp. (accidental)
Cave crickets–*Ceuthophilus (C.) secretus* (trogloxene)
Ceuthophilus (Geottetix) cunicularis (trogloxene)
Ceuthophilus (G.) ?umbratilis (trogloxene)
Homopterans–Undetermined material
Ground beetles–Carabidae genus and species
Rhadine sp. (troglobite)
Rove beetles–*Belonuchus* sp. (troglophile)
Orus (Leucorus) rubens (troglophile)
Philonthus sp. (troglophile)
Darkling beetles–Tenebrionidae genus and species
Flies–Undetermined material

Geology: Isopit is a series of vadose shafts that feed into the once phreatic but presently paraphreatic stream passage. This is the only known perennial cave stream in the Austin Chalk (not including artesian springs). Base flow is generally slow and filters through the many sediment bars in the stream.

Technique: A 30 m long rope or cable ladder is needed for the 8 and 7 m drops. Knee and elbow pads are strongly recommended for the cobble-floored stream passage, as is a wetsuit when surveying.

Bibliography: Canny (1984:35); Ivy (1984:34-35); Palit (1984b:28).

JOHN WAGNER RANCH CAVE NO. 3 (BCS #43)

Alternate names: Adam Wilson Cave, Jr.; Adam Wilson, Jr., Cave; Adam Wilson's Cave; Marnock Cave; Wagner Ranch Cave No. 4

Location: Helotes 7.5'

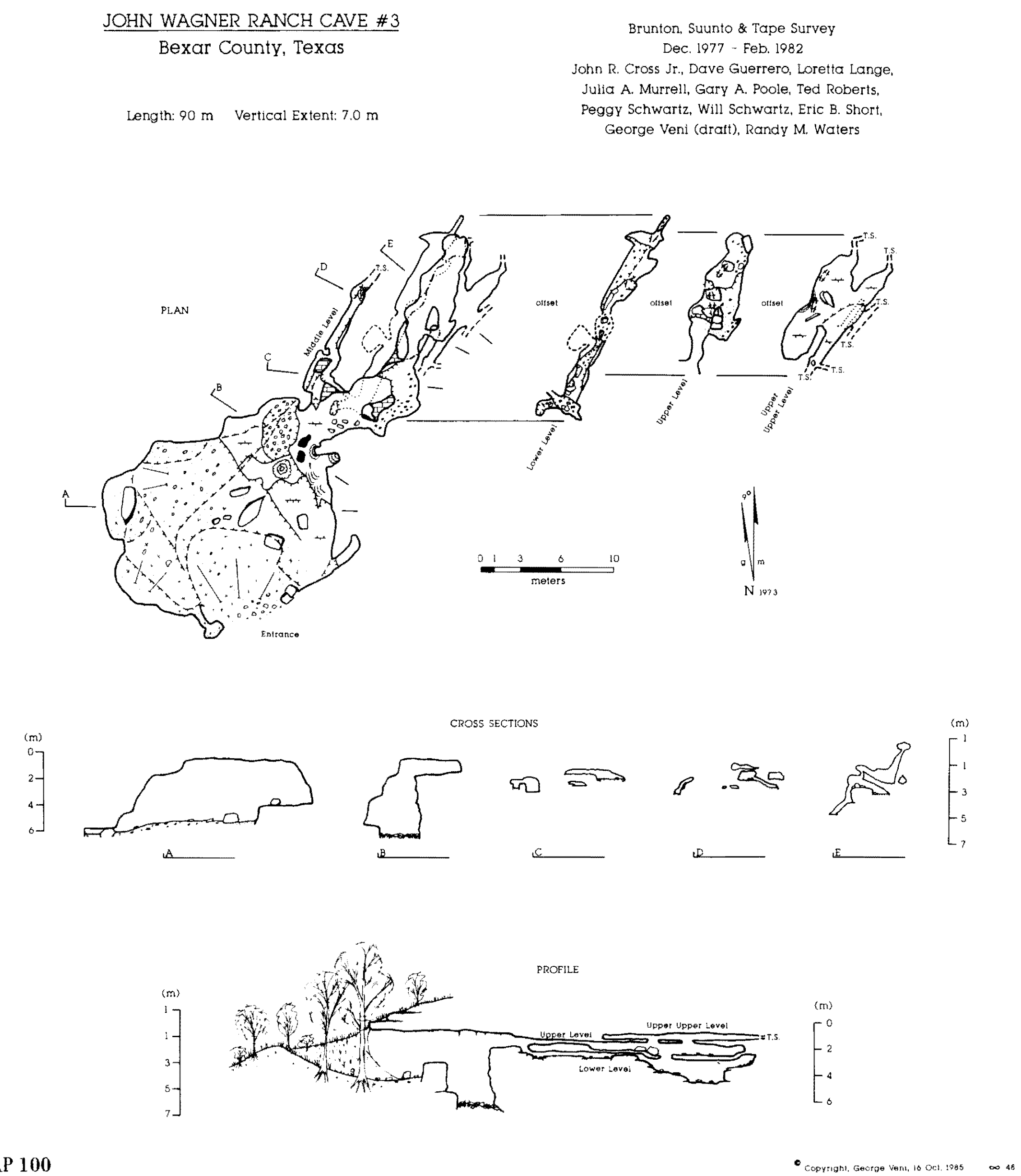
Description: The major portion of this cave is its amphitheater-like entrance room about 15 m in diameter and 3 m high. Near the ceiling behind some highly weathered speleothems are three crawls to the north. Along the west wall is the Middle Level Crawl. It is the tightest of the three and goes 10 m before pinching too small. One meter east of the Middle Level Crawl is the 9 m long Lower Level Crawl. It ends in collapse but can be seen to continue beyond the breakdown. Above and east of the Lower Level Crawl is the 16 m long Upper Level Crawl, which drops into the 6 m long continuation of the Lower Level Crawl. A meter south of the drop to the Lower Level is a squeeze in the ceiling to the 8 m long Upper Upper Level. A small Upper Upper Upper Level can be seen from the Upper Upper Level but a constriction prevents entry. (See Map 100.)

History: Orion Knox first reported the cave in the late 1950s as Adam Wilson Cave, Jr. A later report referred to it as Marnock Cave. In the mid-1970s, Chuck Stuehm called the cave John Wagner Ranch Cave No. 3. The other Wagner Ranch caves were later learned to be Wagner Ranch Fissure (BCS #174) and Huesta Cave (BCS #154), formerly known as Wagner Ranch Cave. In December 1977 the cave was mapped during a survey training exercise led by Gary Poole and George Veni. In 1978 Veni broke into the Upper Upper Level and surveyed it three years later with Julia Murrell, Eric Short, and Randy M. Waters. John Wagner Ranch Cave No. 3 is often used by local youths for illicit parties.

Biology: Mammals commonly use the cave as a shelter. Collections have been made in the cave on 23 December 1962 by Cookie Heubner and Orion Knox; on 6 October 1963 by James Reddell; and on 25 January 1985 by Scott Harden. Harvestmen (prob. *Leiobunum townsendii*), mosquitoes, and gnats have been observed in addition to the following fauna collected for study:

Snails—*Helicodiscus eigenmanni* (troglophile)
Isopods—Oniscoidea genus and species
Scorpions—*Vaejovis reddelli* (troglophile)
Spiders—*Cicurina* n. sp. (troglobite)
Opilionids—Phalangodidae genus and species (troglobite)
Millipedes—*Cambala speobia* (troglobite)
Speodesmus n. sp. 2 (troglobite)
Cave crickets—*Ceuthophilus (Geotettix) cunicularis* (trogloxene)
Ground beetles—*Rhadine exilis* (troglobite)
Rhadine infernalis infernalis (troglobite)
Rove beetles—*Belonuchus* sp. (troglophile)
Ants—*Leptogenys elongata* (accidental)
Salamanders—*Plethodon glutinosus albagula* (slimy salamander) (trogloxene)

Geology: Developed as a single phreatic chamber in the Edwards Limestone, the cave was intersected by a small ravine whose flow is now pirated underground.



MAP 100

The crawls are solutionally modified voids in a massive collapse located north of the main room.
Bibliography: Anonymous (1973q:11; 1976c:165; 1978f:1; 1979k:3); Barr (1960:55; 1974:16-17, 23, 27); Barr and Lawrence (1960:139, 141); Darilek (1973d:101-102; 1973e:372-373); Elliott (1976a:7; 1976b:152); Gertsch and Soleglad (1972:597); Litsinger (1973a:15); Nicholas (1960:140); Passmore (1977:12); Poole (1978b:4); Reddell (1965:152, 163-164, 167-168; 1966:34, 37, 43-44; 1967:188); Reddell and Knox (1962:3-4, 6); Reddell and Russell (1962a:5); Reddell and Smith (1966:2); Rowland and Reddell (1976:6); Veni (1978a:5; 1978d:58).

KAMIKAZI CRICKET CAVE (BCS #99)
Location: Helotes 7.5′
Description: A narrow keyhole-shaped entrance pit enlarges to 2 m in diameter while dropping 6.3 m to the cave floor. The highest and most extensive of the cave's four levels is 4 m below the entrance. To the east of the entrance pit this first level is a 1 m wide by 1.5 m high passage which ends after 4.5 m. To the west this passage continues from the opposite side of the entrance pit and extends 2 m to a fork. The right fork is up to 2.2 m high and 1.7 m wide. After 11 m the passage slopes up to an entrenched crawlway which pinches too small within an additional 6 m. The left fork of the westbound passage drops 2.6 m to the second level before resuming along the first level after 5 m. Within 6 m farther to the west, the first level passage stair-steps upward and ends in a crawlway filled with dirt, organic debris, and rocks. The end of this crawl is about 0.5 m below the surface. The second level is at the floor of the entrance pit. To the east of the entrance is a stoopway which becomes too small to explore after 4 m. To the west the second level goes down a rubble slope into a 4.5 m long by 0.5 m wide, multiple natural-bridge ceilinged passage. The passage leads to the base of a 2.2 m drop, which extends off the 2.6 m drop from the first level's left fork passage. The second level passage slopes down 1 m into the third level and to a 2.3 m drop to the fourth level. The westward extent of the third level can only be entered by climbing up through a slot in the ceiling of the fourth level. Access from the top of the 2.3 m drop is prohibited by a very narrow passage width. From the floor of the 2.3 m drop the passage goes east 2 m, past a natural bridge, and drops 2 m to the floor of the fourth level. West of the base of the 2.3 m drop is a vertical, cave-coral-encrusted squeeze down to the fourth level floor, connecting to the bottom of the aforementioned 2 m drop by a 4 m long eastbound crawlway. The main extent of the fourth level extends 2.5 m to the west and is 1.5 m wide by 5 m high. An impassably small slot in the floor is the drain for the cave. (See Map 101; Photo. 21.)
History: The cave was explored by George Veni, Randy M. Waters, and other members of the San Antonio Grotto on 6 August 1978. The 6 m deep entrance pit had been described to them as being about 30 m deep! "Suicidal" cricket behavior inspired the cave's unique name. Duane Canny, Joe Ivy, and George Veni surveyed the cave on 3 October 1984. A chain gate was installed on the cave by Bexar Grotto members Jim Beall, Caroline Biegert, Allan Cobb, Joe Ivy, and Linda Palit during the spring of 1986.
Biology: Collections were made in the cave on 3 October 1984 by Joe Ivy and George Veni and on 19 January 1986 by Allan Cobb and Scott J. Harden. In addition to the following list of collected fauna, a large toad (?*Bufo* sp.) with a mouthful of cave crickets was observed.

Terrestrial flatworms–Undetermined material
Snails–*Helicodiscus eigenmanni* (troglophile)
Polygyra mooreana (empty shells)

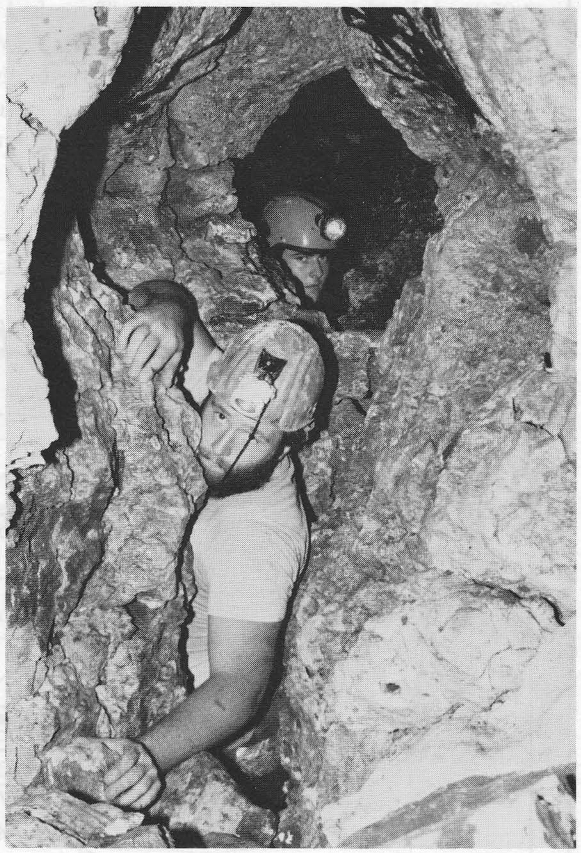
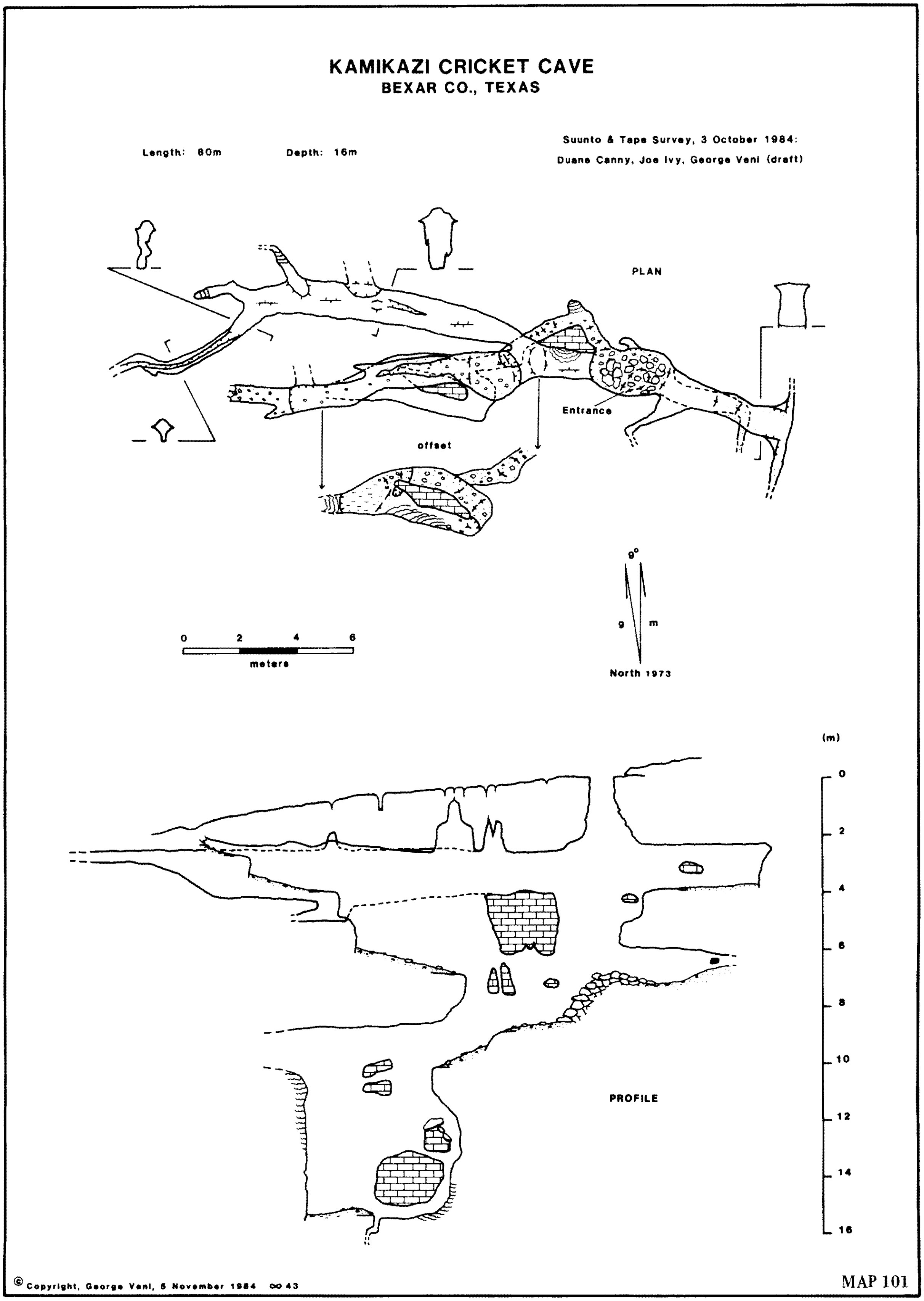


Photo. 21.–Duane Canny (foreground) and Joe Ivy (background) maneuvering through the multi-level passages in Kamikazi Cricket Cave (George Veni).

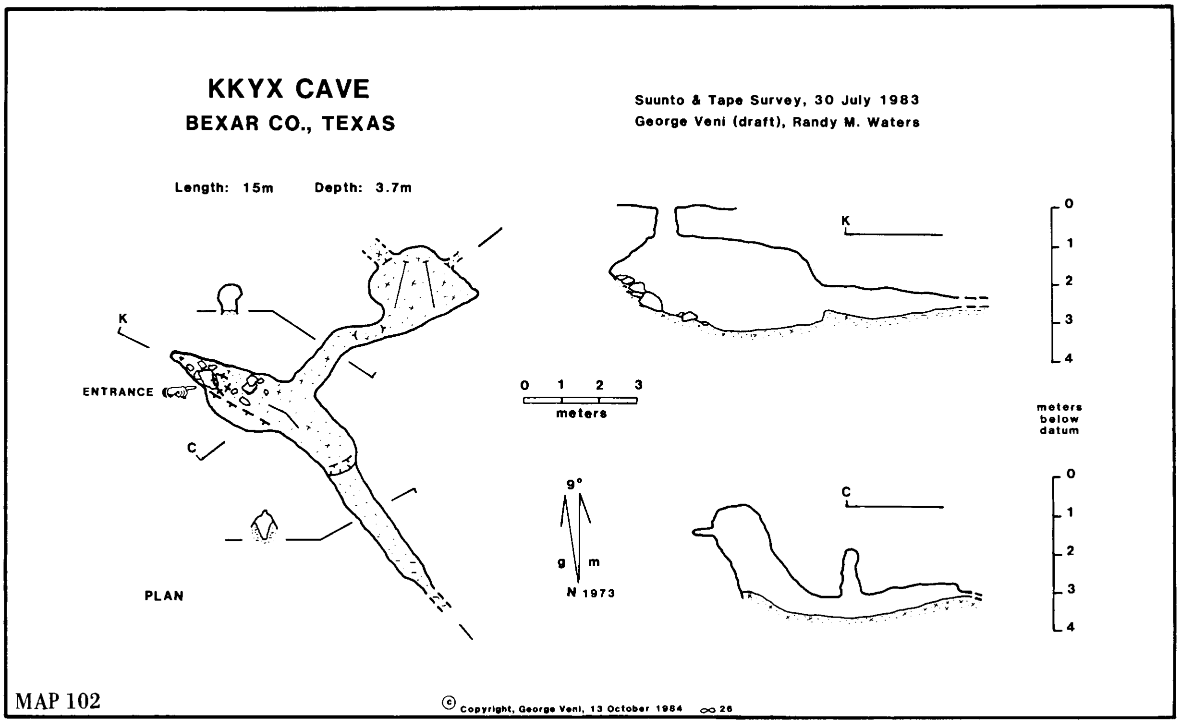

KAMIKAZI CRICKET CAVE
BEXAR CO., TEXAS
Length: 80m
Depth: 16m
Suunto & Tape Survey, 3 October 1984:
Duane Canny, Joe Ivy, George Veni (draft)
PLAN
Entrance
offset
9°
g
m
North 1973
0
2
4
6
meters
(m)
0
2
4
6
8
10
12
14
16
PROFILE
© Copyright, George Veni, 5 November 1984 ∞ 43

MAP 101

Isopods—Trichoniscidae genus and species 1 (troglobite)
Scorpions—Prob. *Vaejovis reddelli* (troglophile)
Spiders—*Cicurina* sp. (blind) (troglobite)
Cicurina varians (troglophile)
Neoleptoneta sp. (troglophile)
Achaearanea porteri (troglophile)
Harvestmen—*Leiobunum townsendii* (trogloxene)
Hoplobunus madlae (troglobite)
Mites—Undetermined material
Centipedes—Geophilomorpha undetermined
Millipedes—*Cambala speobia* (troglobite)
Orthoporus sp. cf. *texicolens* (accidental)
Oxidus gracilis (troglophile)
Speodesmus sp. (troglobite)
Springtails—Undetermined material
Slender entotrophs—Campodeidae genus and species
Silverfish—Prob. *Texoreddellia texensis* (troglobite)
Cave crickets—*Ceuthophilus* sp. (trogloxene)
Beetles—Undetermined material
Ground beetles—*Rhadine* sp. (troglobite)
Comb-clawed beetles—Alleculidae genus and species
Rove beetles—Aleocharinae genus and species
Belonuchus sp. (troglophile)
Orus (Leucorus) rubens (troglophile)
Ants—*Leptogenys elongata* (accidental)
Solenopsis geminata (accidental)

Geology: Kamikazi Cricket Cave is formed in the Edwards Limestone along a strong east-west joint trend. The cave developed by converging flow in the first level from numerous sinkholes and fractures mapped on the surface. Descending base level resulted in the vertical development of the second, third, and fourth levels.
Technique: Although the entrance can be freeclimbed, a cable ladder is recommended.
Bibliography: Anonymous (1979k:3); Ivy (1986:43); Palit (1984b:27; 1986:16); Veni (1979b:6; 1985).

KKYX CAVE (BCS #44)
Alternate name: Leon Creek Cave
Location: Helotes 7.5′
Description: The triangular entrance, 0.4 to 0.7 m on a side, drops 2.2 m into the cave. A passage 2 m high and 0.7 m wide extends 8 m to the southeast before becoming too small. Two meters from the entrance a side passage extends 5 m to a small room, with barely enough room to turn around. (See Map 102; Photo. 22.)
History: First recorded in the late 1960s by David Litsinger as Leon Creek Cave, it was not explored due to bad air. The cave was rediscovered in July 1972 by Greg Passmore and Warnie Meitenschlaeger, and was rediscovered again by Terry Inboden and Randy M. Waters on 12 December 1977. The notes to a 1978 survey were lost so George Veni and Randy Waters



MAP 102

resurveyed the cave on 30 July 1983. KKYX Cave was named after the nearby KKYX radio towers.
Biology: A collection made in the cave on 30 July 1983 by George Veni and Randy M. Waters included the following material:

Snails—*Helicina* **orbiculata** (empty shells)
Rhabdotus alternatus (empty shells)
Helicodiscus eigenmanni (troglophile)
Polygyra texasiana (empty shells)
Isopods—Oniscoidea genus and species
Spiders—Undetermined material
Harvestmen—*Leiobunum townsendii* (trogloxene)
Springtails—Undetermined material
Cave crickets—*Ceuthophilus (C.) secretus* (trogloxene)

Geology: KKYX Cave, formed in the Austin Chalk, receives water from Leon Creek at bankfull stage. The water is apparently discharged at seep springs located 200 m downstream.
Meteorology: High levels of CO_2 are sometimes present.
Technique: The cave cannot be visited when Leon Creek is at flood stage.
Bibliography: Veni (1978a:5; 1983:98).

Photo. 22.—Unorthodox technique in entering KKYX Cave (George Veni).

LONE STAR PIT (BCS #133)
Alternate name: Lone Star Cave
Location: Longhorn 7.5′
Description: The 0.5 m diameter pit dropped 4.6 m down to a ledge, where it enlarged to a diameter of 2.5 m. The pit continued down past the ledge for 9.8 m to end in trash fill. (See Map 103.)
History: Greg Fritz discovered the pit in the spring of 1980. He returned on 22 June 1980 with Kathy Ballard and Randy M. Waters to explore it. Don Arburn joined Fritz and Waters on 2 May 1982 in surveying the pit. Lone Star Pit was sealed by housing development construction in January 1985.
Biology: Only harvestmen (prob. *Leiobunum townsendii*) have been observed.
Geology: Lone Star Pit was vadosely developed in the Edwards (Balcones Fault Zone) Aquifer recharge zone by converging flow along a near-surface bedding plane that drains to the pit. The entrance was a result of downward solution and upward stoping. Thanks to someone's ignorant and inconsiderate actions, water that drains through the cave to recharge the aquifer must also filter through an undetermined volume of garbage.
Bibliography: Anonymous (1980a:74); Veni (1985).

LOOSEROCK CAVE (BCS #45)
Alternate names: Classen's Hell Hole; Classen's Looserock Cave
Location: Bulverde 7.5′
Description: The cave entrance is a small, 2.7 m deep collapse sink. The rubble-strewn entrance room is 10 m long, 6 m wide, and 1.2 m high. To the south is a narrow crawlway that goes about 10 m before ending. The main passage of the cave extends east from the entrance room. Some nice speleothems and a 7.2 m deep pit are present near the end of this 30 m long passage. Off the base of the pit is a 4.8 m drop, which can be bypassed by a passage that makes an 18 m long loop from the top of the drop to its base. The cave heads east from the drop and, following a 3 m drop, enlarges to 5 m high by 1 m wide. For the next 18 m, however, the passage lowers to a crawl, then drops 5.2 m into the terminal room. A final crawl can only be explored for 3 m before it becomes too tight. (See Map 104.)
History: The first documented exploration was on 16 August 1959 by Orion Knox and other members of the Alamo Grotto. It was mapped by Bruce Davenport, Ross Felton, and Pat Rudewick on 4 September 1966.
Biology: In 1959 some mice were living in the cave at a depth of about 30 m.
Geology: Developed in the recharge zone of the Ed-

wards (Balcones Fault Zone) Aquifer, the cave has a very prominent vadose morphology. Looserock is one of many caves and sinks which drain that local low relief portion of the recharge zone. The cave terminates a short vertical distance above the local water table.

Technique: A 15 m rope is needed for the 7 m pit.

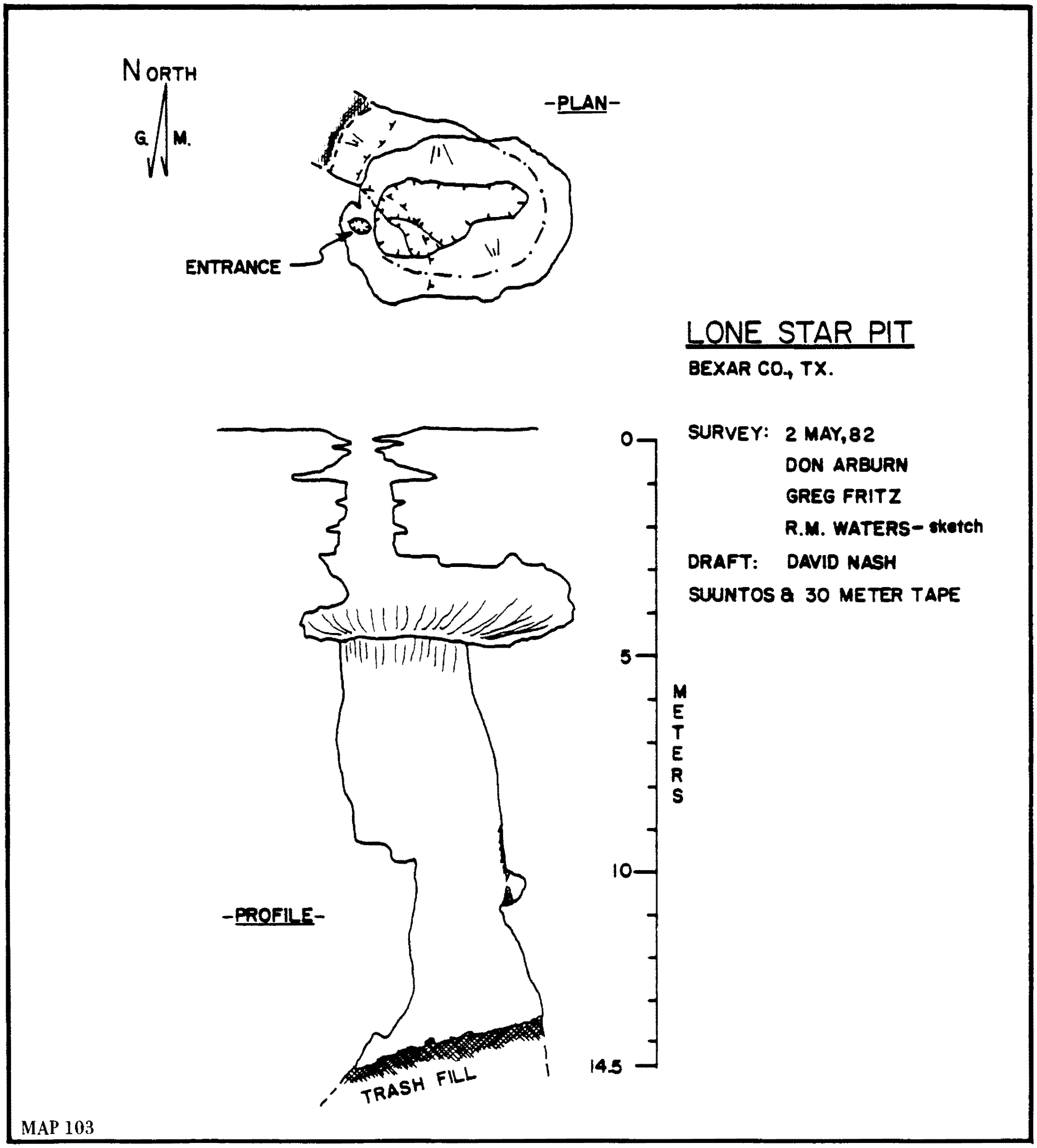
Bibliography: Anonymous (1965a:59; 1967b:75-76; 1969f:115; 1973h:8-9; 1973q:11); Litsinger (1973a: 19, 21); Passmore (1977:15-16, 33); Reddell and Knox (1962:3-5, 12); Reddell and Russell (1962a:5); Reddell and Smith (1966:3); Veni (1978a:5; 1978f:6; 1985).

LYTLE RANCH PIT (BCS #167)

Location: Helotes 7.5′

Description: This incompletely explored pit is about 1.5 m in diameter and 10 m deep. Two passages appear to lead from the bottom. (See Map 105.)

History: Eric Short freeclimbed halfway down the pit



MAP 103

in the fall of 1983. During his descent the landowner became concerned about liability and asked him to climb back up until he could return with a release form.

Biology: A sheltered ledge near the top of the pit has been frequented by raccoons, *Procyon lotor.*

Geology: The pit is in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer.

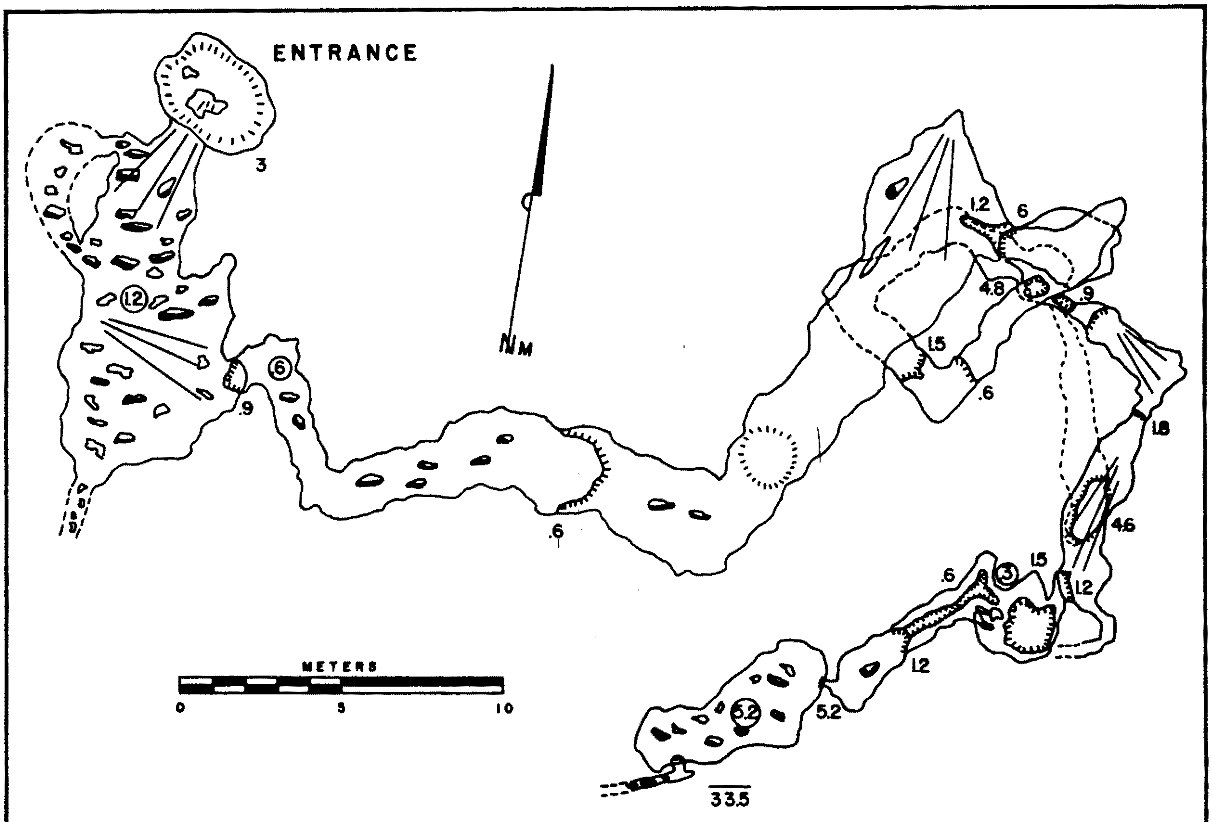
Bibliography: Veni (1985).

MADLA'S CAVE (BCS #46)

Alternate names: Madla's Park Cave; Madla's Cave No. 1; Madla's Hilltop Cave; Madla's Ranch Cave; Malda Cave.

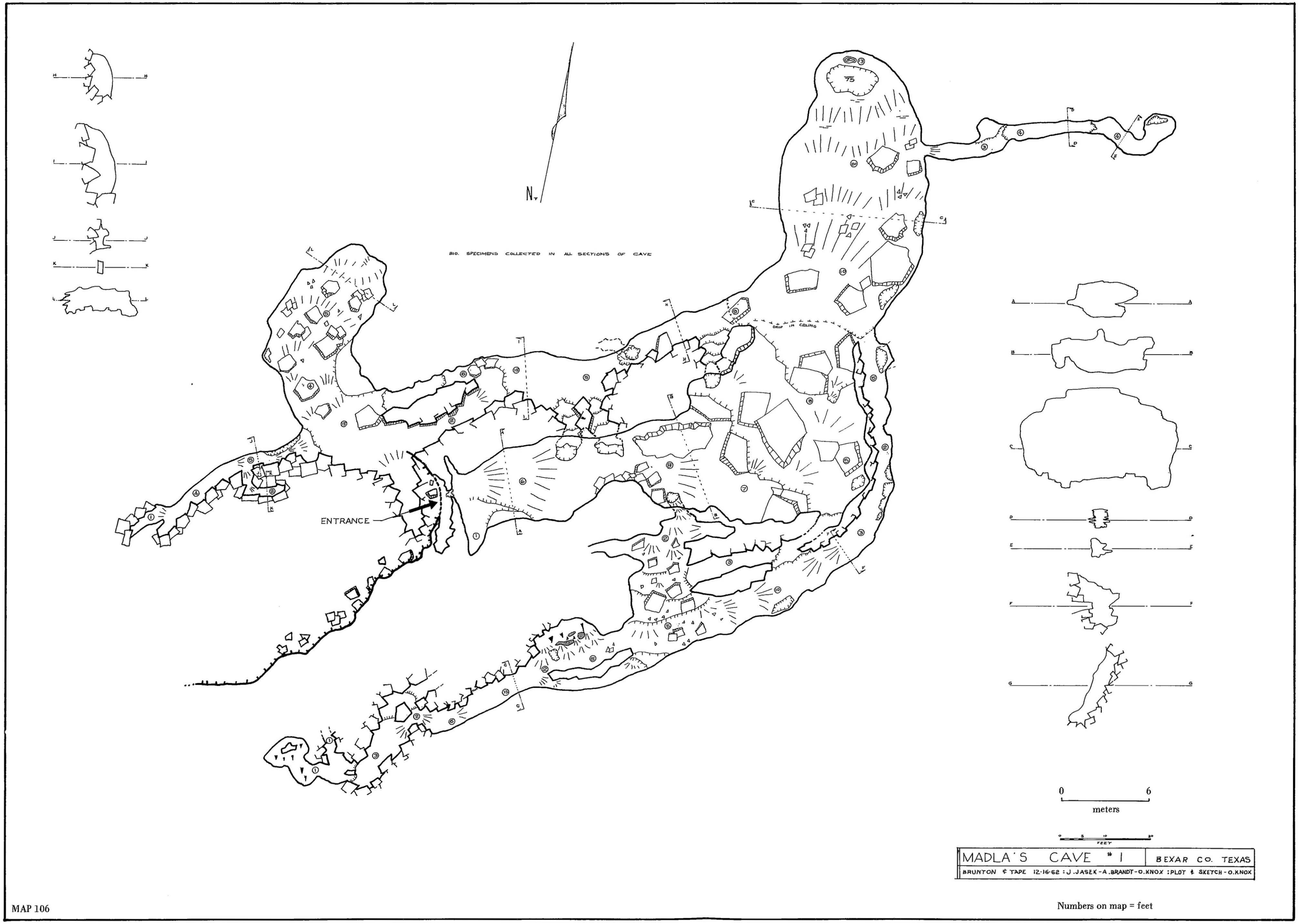
Location: Helotes 7.5′

Description: Madla's Cave is a single large chamber that is segregated into "rooms" and "passages" by collapse. The small entrance is on a hillside in the northern end of a collapsed area. Immediately inside its entrance, the cave opens up into a passage measuring 25 m long by 6 m wide and 2 m high. This passage ends at a breakdown slope down to the Big Room. About 16 by 12 by 10 m high, the Big Room has three passages extending from it. The first is an 18 m long muddy eastbound tunnel that averages 1.4 m high by 1.0 m wide. The second passage heads west for 40 m, and the third passage goes south for 13 m, then west for 45 m. The last two passages end in breakdown and follow the north and south walls of the original, pre-collapse chamber. A hole in the ceiling of the third passage leads into a major room not shown on the map. "Normandy," as it is called, is square, about 15 m to a side, and has a ceiling height of 3 m. This room is infrequently visited and therefore is the most decorated and least vandalized part of this popular, well-known cave. Normandy's collapsed north wall is the underside of the surface collapse area near the entrance. (See Map 106.)

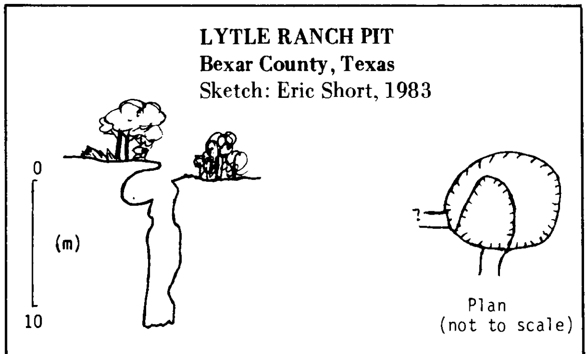


LOOSEROCK CAVE
BEXAR CO., TEXAS
BRUNTON & TAPE SURVEY BY
BRUCE DAVENPORT, ROSS FELTON (NSS 7698), PAT RUDEWICK
SEPTEMBER 4, 1966
DRAFTED BY ROSS FELTON
FEBRUARY 18, 1967
RE-DRAWN BY STEVE FLEMING (NSS 13727) AAC, SWTG
FEBRUARY 5, 1973

MAP 104


MADLA'S CAVE # 1
BEXAR CO. TEXAS
BRUNTON & TAPE 12-16-62 : J. JASEK - A. BRANDT - O. KNOX : PLOT & SKETCH - O. KNOX
BIO. SPECIMENS COLLECTED IN ALL SECTIONS OF CAVE
DROP IN CEILING
ENTRANCE
N
0
6
meters
FEET
Numbers on map = feet
MAP 106

176A



MAP 105

History: The cave has been known for many years and was once part of the attraction of a privately owned park. The first reported visit by cavers was on 16 November 1958 by Orion Knox and Arturo Solis of the St. Mary's University Speleological Society. On 16 December 1962 Knox returned with Al Brandt and James Jasek to survey the cave. In 1978 George Veni followed a lead given to him by Jim Normand and relocated the large room Normand had discovered some years earlier. The room was named in honor of its original discoverer.

Biology: Collections were made in the cave on 16 December 1962 by Orion Knox; on 23 December 1962 by Cookie Heubner and Orion Knox; on 6 October 1963 by David McKenzie and James Reddell; on 1 April 1965 by James Reddell; and on 7 June 1969 by Roger V. Bartholomew. The following material has been identified from the cave:

Earthworms–*Bimastos* sp. (troglophile)
Isopods–*Brackenridgia cavernarum* (troglobite)
Scorpions–*Vaejovis reddelli* (troglophile)
Spiders–*Cicurina* n. sp. (troglobite)
Cicurina varians (troglophile)
Eidmannella rostrata (troglobite)
Harvestmen–Prob. *Leiobunum townsendii* (trogloxene)
Hoplobunus madlae (troglobite)
Millipedes–*Cambala speobia* (troglobite)
Springtails–*Pseudosinella violenta* (troglophile)
Silverfish–*Texoreddellia texensis* (troglobite)
Cave crickets–*Ceuthophilus (C.) secretus* (trogloxene)
Ceuthophilus (Geotettix) cunicularis (trogloxene)
Hemiptera–Undetermined material
Ground beetles–*Clivina* sp. (?troglophile)
Rhadine infernalis infernalis (troglobite)
Rove beetles–*Eustilicus condei* (troglophile)
Slimy salamanders–*Plethodon glutinosus albagula* (trogloxene)
Barking frogs–*Hylactophryne augusti latrans* (trogloxene)

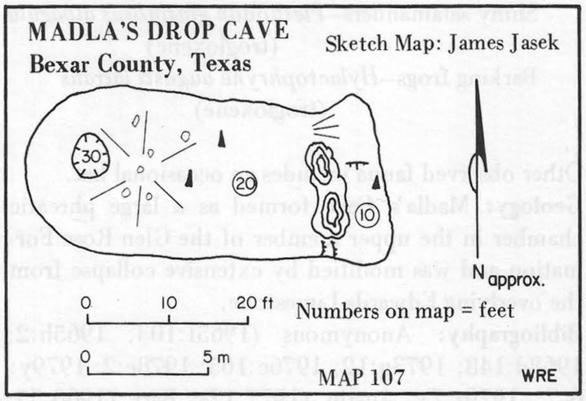
Other observed fauna includes an occasional bat.

Geology: Madla's Cave formed as a large phreatic chamber in the upper member of the Glen Rose Formation and was modified by extensive collapse from the overlying Edwards Limestone.

Bibliography: Anonymous (1965f:103; 1965h:2; 1968d:148; 1973q:12; 1976c:165; 1978e:2; 1979y:6-7; 1979z:7); Austin (1977:12); Barr (1960:55; 1974:23); Barr and Lawrence (1960:139); Darilek (1973d:101-102; 1973e:372-373); Gertsch (1984:61); Gertsch and Soleglad (1972:597); Goodnight and Goodnight (1967:4); Harden (1970c:243); Herman (1970:23); Ivy (1986:43); Jasek (1975d:23-25); Nicholas (1960:140); Olson (1959:48); Orozco (1974a:7-8; 1974b:16-17); Owens (1967:14); Palit (1986:16); Passmore (1977:34); Reddell (1961b:1; 1965:154, 159, 164, 168-169, 174; 1966:28, 33-34, 42, 44, 51; 1967:188-189; 1970a:409); Reddell and Knox (1962:25); Reddell and Russell (1962a:5); Reddell and Smith (1966:3); Rowland and Reddell (1976:6, 13); Vandel (1965:360); Veni (1978a:5; 1978e:4; 1979b:6).

MADLA'S CAVE NO. 2 (BCS #127)
Alternate name: Mosquito Cave
Location: Helotes 7.5′
Description: This cave consists of a 5 m deep pit containing a 3 m long crawl at the bottom that leads to a small dome.
History: Located near Madla's Cave, Madla's Cave No. 2 was discovered by Orion Knox and Arturo Solis in November 1958. Later, an attempt was made to dig into more cave, which apparently opened the crawl to the dome. On 26 May 1979 it was rediscovered as Mosquito Cave by Jean Campbell, John Posey, and Quinn Woods.
Biology: Many mosquitoes were present during the 1979 trip.
Geology: The cave is in the uppermost Glen Rose Formation.
Bibliography: Anonymous (1973q:12; 1979r:3); Harden (1970c:243); Reddell and Knox (1962:3-4, 25); Reddell and Russell (1962a:6); Reddell and Smith (1966:3).

MADLA'S DROP CAVE (BCS #166)
Alternate name: Madla's Cave No. 3
Location: Helotes 7.5′
Description: A 9 m deep pit opens into a room 16 m



MAP 107

long, 7 m wide, and 5 m high. Considerable speleothem growth in the cave partitions off one section of the room. (See Map 107.)
History: Madla's Cave No. 3 was first reported and explored in the late 1950s by members of the Alamo Grotto and the St. Mary's University Speleological Society. It was rediscovered as Madla's Drop Cave by James Jasek and Gus Peters in 1963.
Geology: The cave is in the Edwards Limestone.
Technique: A rope or ladder is needed for the entrance pit.
Bibliography: Anonymous (1973q:12); Reddell and Knox (1962:3-4, 25); Reddell and Russell (1962a:6); Reddell and Smith (1966:3).

MATTKE CAVE (BCS #47)

Alternate name: Triangle Cave
Location: Helotes 7.5′
Description: The triangular entrance sits obscurely in a cliffside and drops 2.8 m into the first room, which measures about 4 m in diameter and 1.5 m high. The floor slopes down to an adjoining second room that is 7 m long by 3 m wide and 0.7 to 2 m high. Two small, 3 m long side passages extend into the room's west wall. (See Maps 108-109.)
History: Greg Passmore first reported the cave in 1972. He called it "Triangle Cave" in reference to the shape of its entrance. In the spring of 1974 the cave was rediscovered by Randy M. Waters, who returned on 5 September 1977 to survey it with John Cross and Gary Poole. Unaware of its previous name, they named it Mattke Cave after the owner. The cave is well known to area residents.
Biology: Observed fauna include harvestmen (prob. *Leiobunum townsendii*), cave crickets (*Ceuthophilus* sp.), mosquitoes, and a turtle.
Geology: Mattke Cave is genetically a single room in the Edwards Limestone, which has been intersected by the cutting of the Helotes Creek Valley. Vadose water, from when Helotes Creek was higher in the valley, modified the cave and washed in large quantities of sediment, which divided the cave into two rooms at a drop in its ceiling.
Bibliography: Poole and Passmore (1978:27, 29-30, 48); Veni (1978a:5; 1985).

MOLAR HOLE (BCS #149)

Location: Lacoste NE 7.5′
Description: The 1.6 m entrance drop is centered in a 12 m diameter, gently sloping sinkhole. Extending to the west for a little over 5 m, the entrance passage averages 1.4 m high by 1 m wide. Two small pits, 0.4 m and 1.6 m deep, are passed before reaching two impassably small crawls; one from a high ledge and the other a crevice at floor level. A short distance from the entrance is another passage which extends northeast as a 0.2 m high by 0.5 m wide crawl. After 10 m it turns to the north but cannot be explored without digging. (See Map 110; Photo. 23.)
History: Discovered and explored on 18 April 1981 by Kurt Menking, Eric Short, and Randy M. Waters, surveying was done exactly one year later when Short

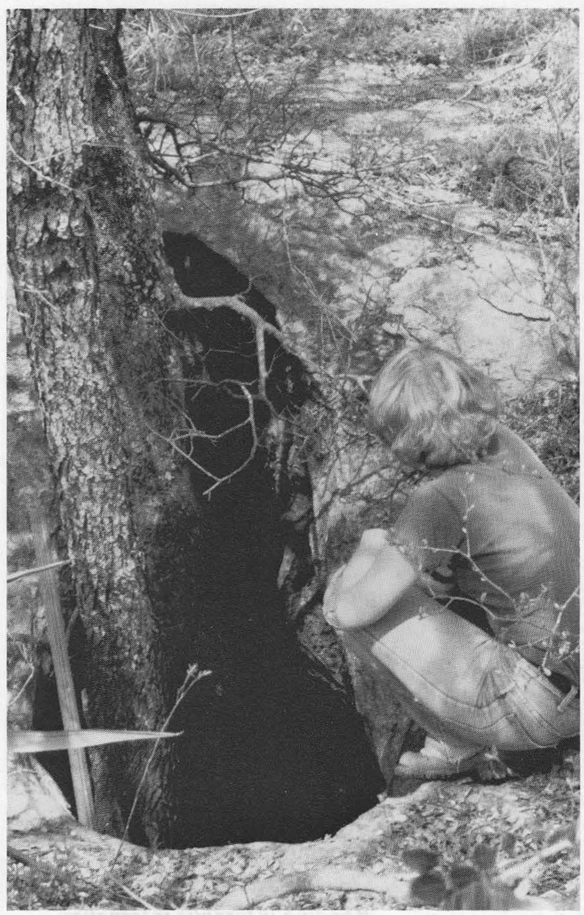
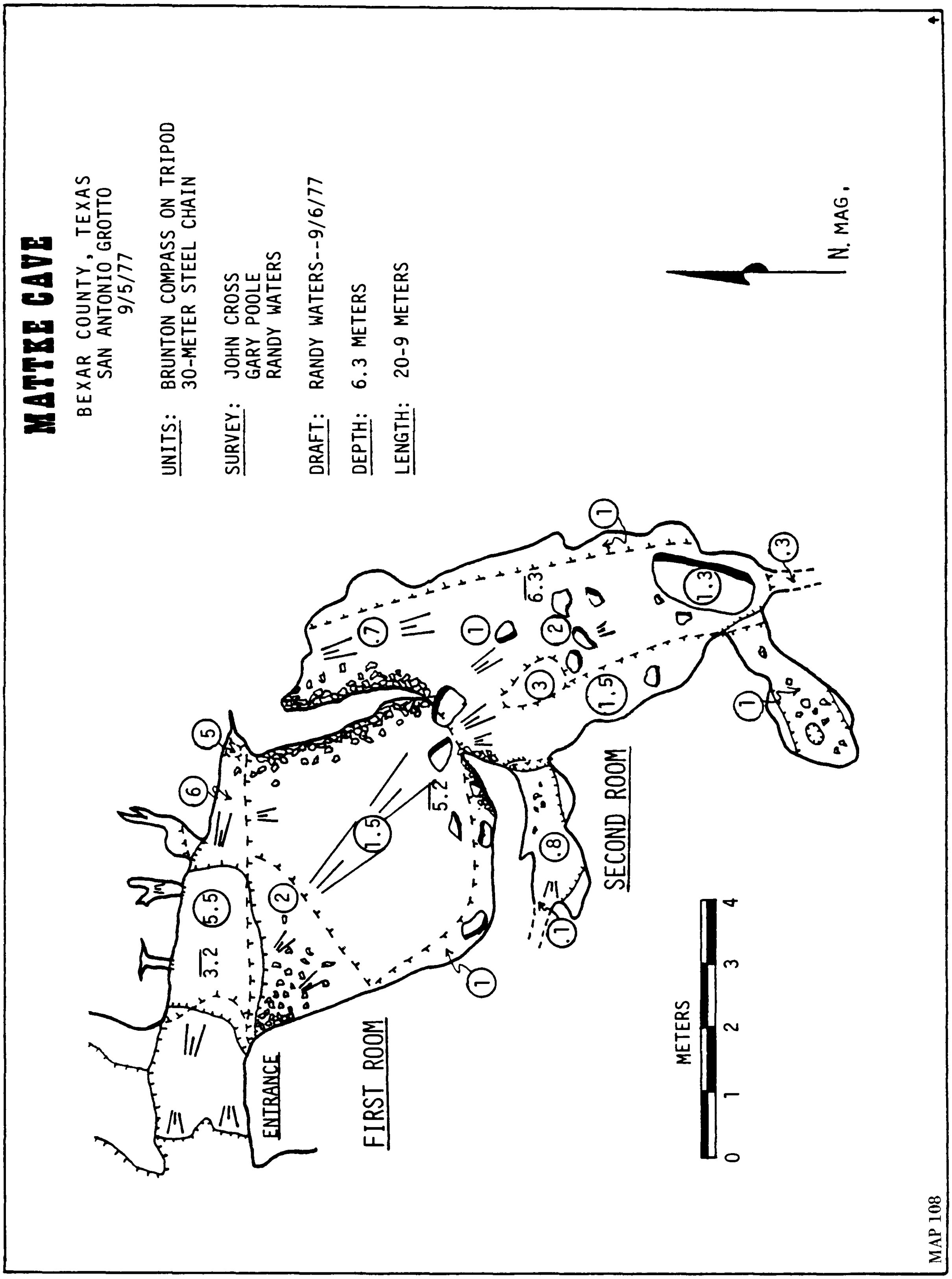
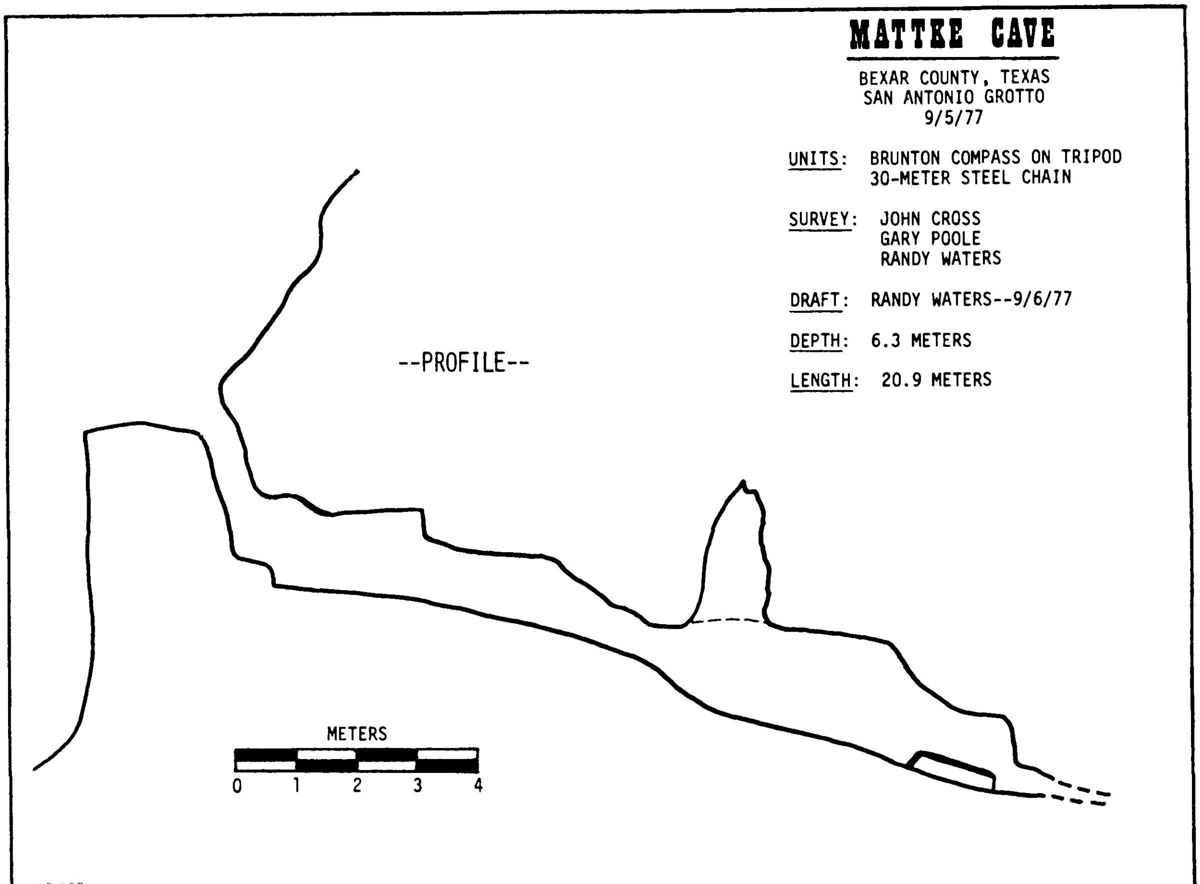
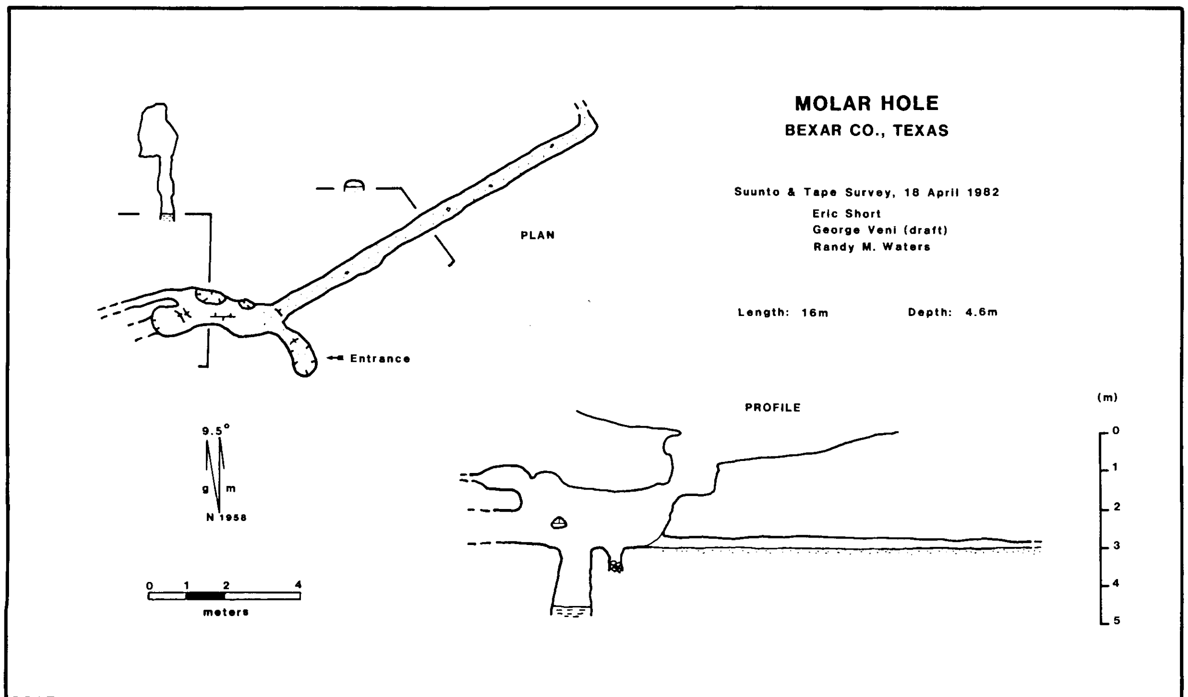


Photo. 23.—Claire Lindblom contemplating the entrance of Molar Hole (George Veni).


MATTKE CAVE
BEXAR COUNTY, TEXAS
SAN ANTONIO GROTTO
9/5/77
UNITS: BRUNTON COMPASS ON TRIPOD
30-METER STEEL CHAIN
SURVEY: JOHN CROSS
GARY POOLE
RANDY WATERS
DRAFT: RANDY WATERS--9/6/77
DEPTH: 6.3 METERS
LENGTH: 20-9 METERS
N. MAG.
ENTRANCE
FIRST ROOM
SECOND ROOM
METERS
0 1 2 3 4
MAP 108



MAP 109



MAP 110

and Waters returned with George Veni.
Biology: Spiders, harvestmen (prob. *Leiobunum townsendii*), cave crickets (*Ceuthophilus* sp.), beetles, and ants were noted during the survey. A rattlesnake (*Crotalus* sp.) and mammalian molars (the cave's namesake) were encountered during the initial discovery. Molar Hole is apparently used as an occasional animal shelter.
Geology: Developed in a hill of Austin Chalk, the entrance passage has formed by the confluence of surface water, from the solution sink, with two small groundwater conduits (the 10 m crawl and the crawl above the ledge).
Bibliography: Waters (1981b:63).

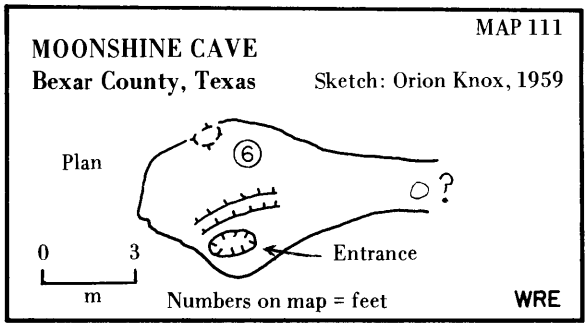
MOONSHINE CAVE (BCS #94)

Location: Van Raub 7.5′
Description: The entrance is a 1 m diameter pit that drops about 5 m into a circular room, approximately 5 m across and 2 m high. On one side of the room the cave continues but impassably small. (See Map 111.)
History: The ruins of an old moonshine still from the prohibition years are in the cave. It was first explored by cavers on 30 January 1960 by Orion Knox and members of the St. Mary's University Speleological Society.
Biology: Although no bats were seen in the cave, some guano was present; Moonshine Cave probably serves only as an occasional roost. Other fauna include cave crickets (*Ceuthophilus* sp.) and the slimy salamander *Plethodon glutinosus albagula.*
Geology: Moonshine Cave is in the upper member of the Glen Rose Formation.
Bibliography: Anonymous (1973q:12); Reddell (1967:188); Reddell and Knox (1962:3-4, 26); Reddell and Russell (1962a:6); Reddell and Smith (1966:3).

NICHE CAVE (BCS #136)

Location: Lacoste NE 7.5′
Description: Roughly 5 m in diameter, the entrance sink was filled with trash. Two meters down the sink's west wall is the 0.5 m diameter entrance, which opens into the small cave. This "niche" parallels the sink and is slightly over 8 m long, 2 m wide, and 0.6 m high. (See Map 112.)
History: Origin of the trash is unknown. In early 1982 Richard J. Fulks dug through the trash into the cave and showed it to Randy M. Waters. Michael and Roman Goyette and George Veni surveyed Niche Cave on 31 July 1983.
Biology: A collection made in the cave on 31 July 1983 by George Veni included the following material:

Spiders—*Cicurina varians* (troglophile)



Modisimus texanus (troglophile)
Harvestmen—*Leiobunum townsendii* (trogloxene)
Mites—Undetermined material
Cave crickets—*Ceuthophilus* sp. (trogloxene)
Desert cockroaches—*Arenivaga* sp. (trogloxene)
Cave barklice—*Psyllipsocus* n.sp. (troglophile)
Assassin bugs—*Triatoma gerstaeckeri* (trogloxene)

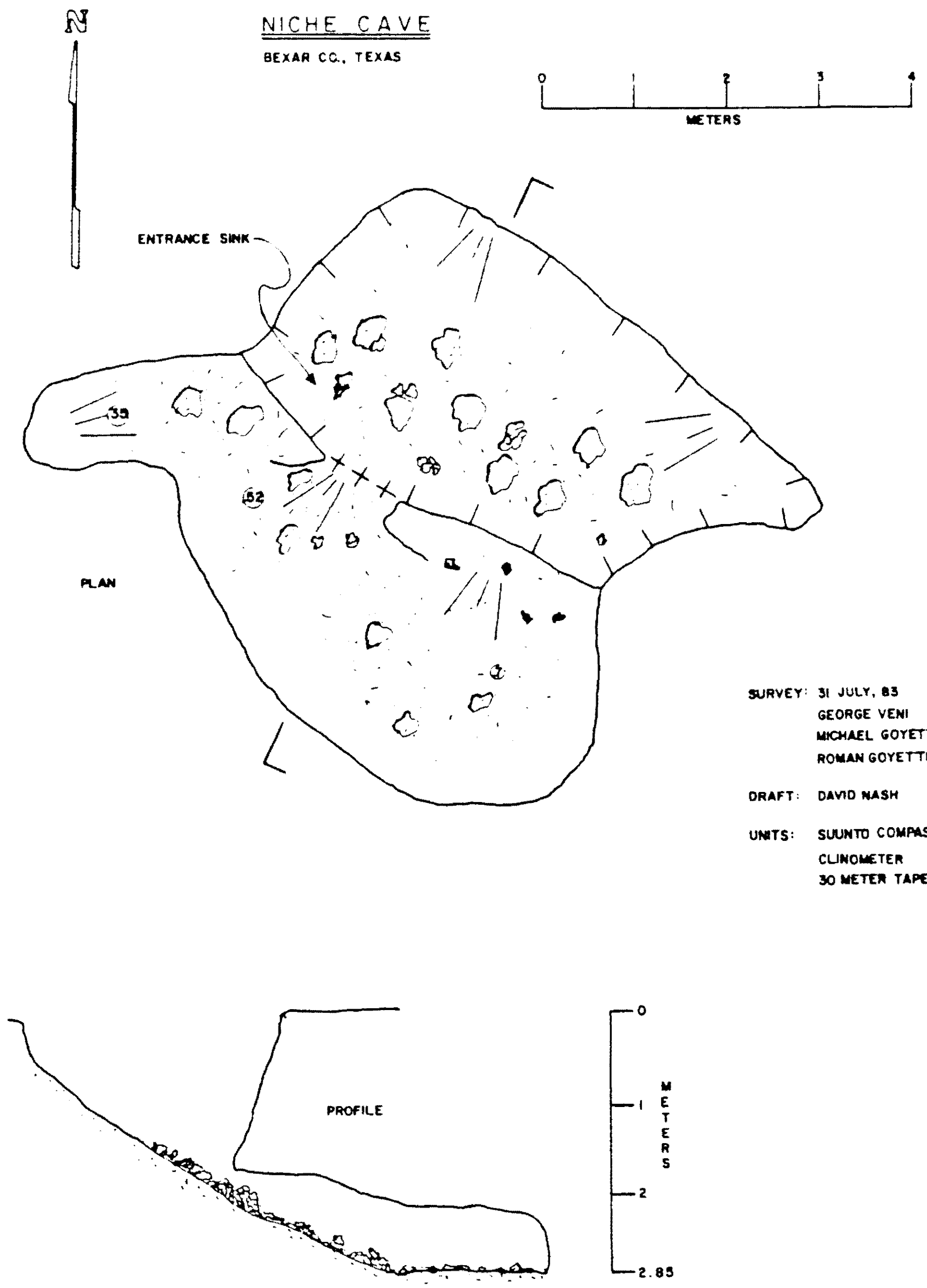
Geology: The cave is in the Austin Chalk, but the trash fill obscures most of the cave and its collapse sink.
Technique: Caution should be exercised on the trash heap; broken bottles and sharp objects abound.
Bibliography: Veni (1983:99).

NO EXIT CAVE (BCS #49)

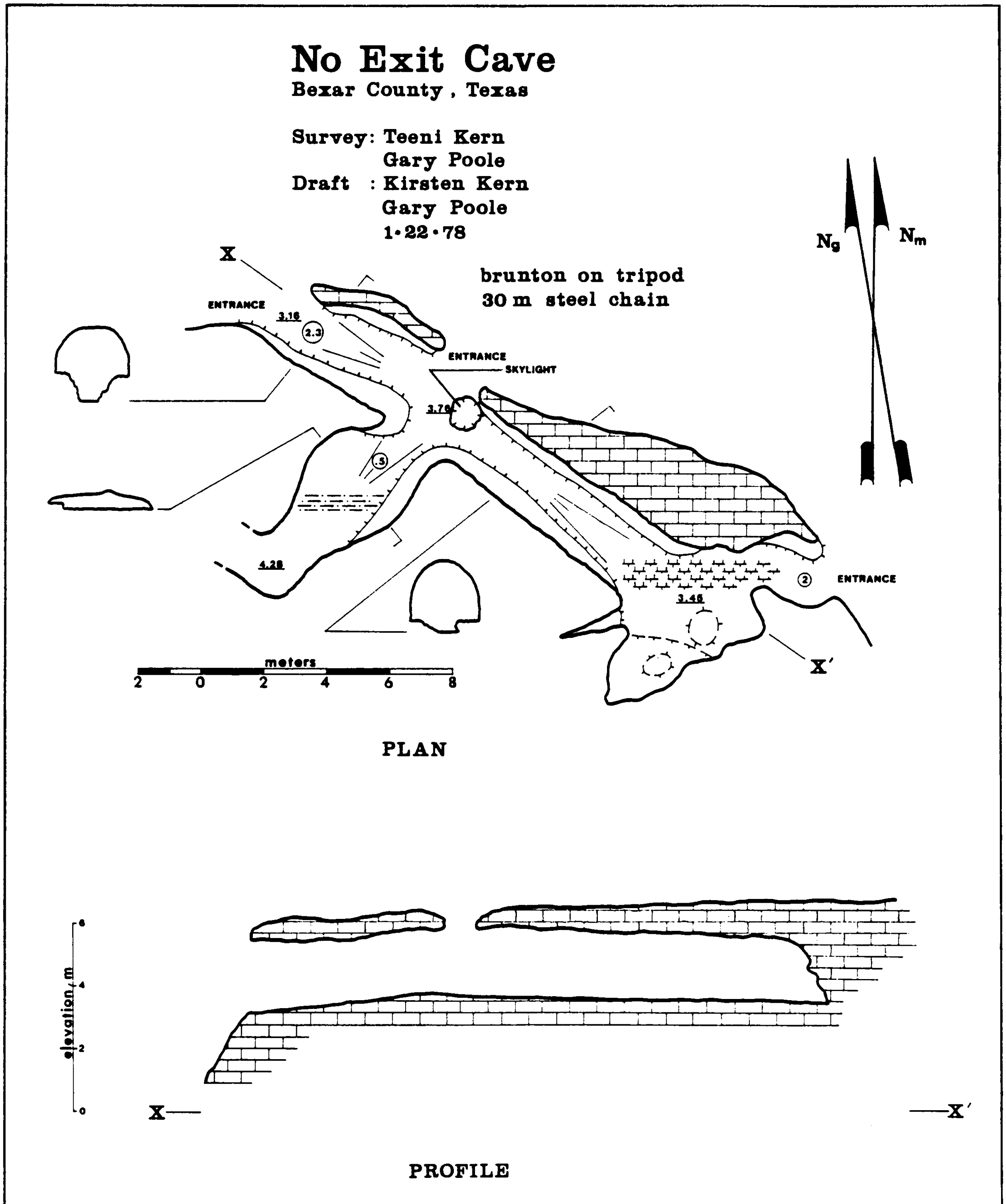
Location: Bat Cave 7.5′
Description: Located in a cliff along Cibolo Creek, the cave is a tube 20 m long by 2.3 m high and wide. An entrance into the cave is situated at either end of the tube, and two more are located midway along its length, one in the north wall and one in the ceiling. The only side passage is a 0.5 m high crawlway that goes 8 m to the southwest before becoming too small. (See Map 113.)
History: The cave was discovered by John R. Cross and Randy M. Waters while searching for caves along Cibolo Creek on 7 October 1977. The next day they returned with Teeni Kern, Gary Poole, and George Veni. Kern and Poole surveyed and named the cave.
Geology: No Exit Cave is in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer. It is a phreatic tube truncated by Cibolo Creek and probably a remnant of a paleo-recharge conduit system formed prior to the creek's erosion to its present level.
Bibliography: Poole (1978b:4); Poole and Passmore (1978:31-32); Veni (1978a:6; 1985).

OAK PARK MALL CAVE (BCS #169)

Location: Longhorn 7.5′
Description: The only information on this cave comes from an article in the *North San Antonio Times*:


NICHE CAVE
BEXAR CO., TEXAS
0
1
2
3
4
METERS
ENTRANCE SINK
35
52
PLAN
SURVEY: 31 JULY, 83
GEORGE VENI
MICHAEL GOYETTE
ROMAN GOYETTE
DRAFT: DAVID NASH
UNITS: SUUNTO COMPASS,
CLINOMETER
30 METER TAPE
PROFILE
0
1
2
2.85
METERS

MAP 112


No Exit Cave
Bexar County, Texas
Survey: Teeni Kern
Gary Poole
Draft : Kirsten Kern
Gary Poole
1·22·78
brunton on tripod
30 m steel chain
N_g
N_m
X
X′
ENTRANCE
ENTRANCE
SKYLIGHT
ENTRANCE
3.16
2.3
3.76
.5
4.28
3.46
2
meters
2 0 2 4 6 8
PLAN
elevation, m
6
4
2
0
X
X′
PROFILE
©COPYRIGHT 1978 GARY A. POOLE

MAP 113

. . .When foundations were being laid for the Oak Park Shopping Center, a City Public Service Board apparently broke through the roof of a cave tunnel. "The Public Service Board has a policy of filling up old wells and other openings in the ground they come upon, so they started backing up trucks of cement to the opening," Stanford Busby recalls. "They kept pouring cement into the opening but the hole never filled up. So they finally took a big cement filled bucket, dropped it into the hole to act as a plug and closed it that way."

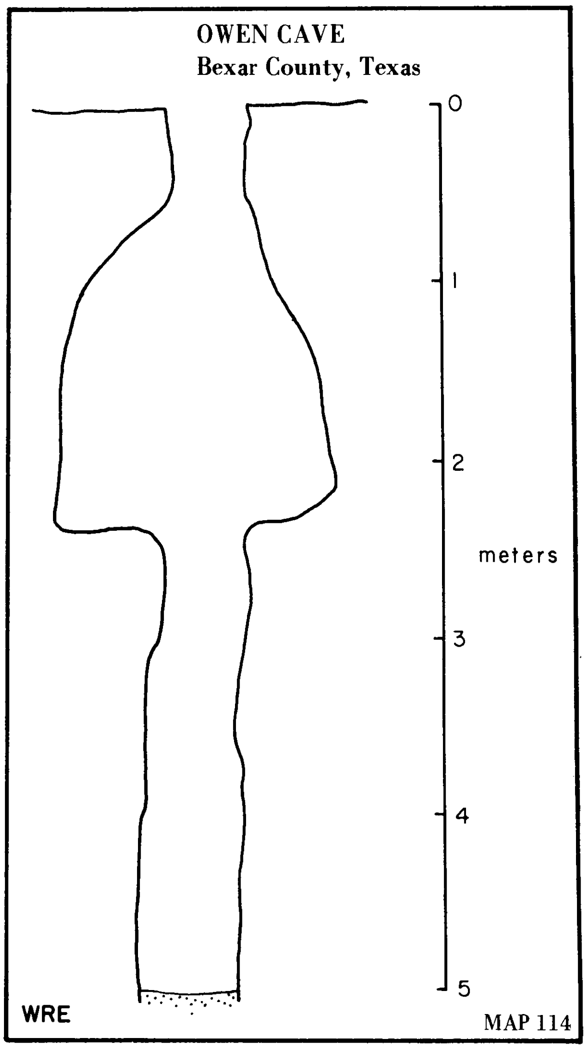
Geology: Developed in the Austin Chalk, the cave is probably a network maze genetically, if not one time physically, connected to the extensive nearby mazes of Holmgreen's Hole and Robber Baron Cave.
Bibliography: Anonymous (1975b).

OLIVE PIT (BCS #128)
Location: Bulverde 7.5′
Description: This 20 m deep pit bells open from 0.4 m diameter at the entrance to over 2 m in diameter at its floor.
History: The pit was first explored by Greg Passmore and other members of the Alamo Area Chapter of the National Speleological Society in 1972. Seven years later, on July 4th, it was visited by Susan Alvis, Pete Bella, Teresa Canales, Steve Damon, Gary Poole, George Veni, and the now former owner, John Oliver. Olive Pit was named as a tribute to the owner and as a playful pun on his name.
Biology: Harvestmen (prob. *Leiobunum townsendii*) have been observed in the pit.
Geology: Olive Pit is vadosely developed in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer.
Technique: Although a 25 m long rope can be used to explore the cave, two cable ladders make it much easier to negotiate the narrow entrance.
Bibliography: Anonymous (1979x:6); Byrd (1976:43); Veni (1985).

OLIVER CAVE (BCS #197)
Location: Bulverde 7.5′
Description: This cave is located near Olive Pit (BCS #128). A horizontal entrance leads into a passage 15 to 20 m long with a ceiling height of 1 to 2 m. The floor is of black fill.
History: Oliver Cave was explored in the summer of 1975 by Tom Byrd, Dr. Ernest Lundelius, and others. At that time some of the fill was removed for paleontological study. The results of their examination are not known.
Geology: The cave is in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer.
Bibliography: Byrd (1976:43).

OWEN CAVE (BCS #173)
Location: Lacoste NE 7.5′
Description: This 5 m deep pit only slightly enlarges past its narrow entrance. (See Map 114.)
History: The cave was explored on 8 March 1970 by Roger V. Bartholomew, David Litsinger, and Andrew and Jack Maxwell.
Geology: Owen Cave is a vadose shaft in the Austin Chalk.
Meteorology: High CO_2 levels were noted in 1970. Candles would not burn at depths of 2.3 and 2.9 m.

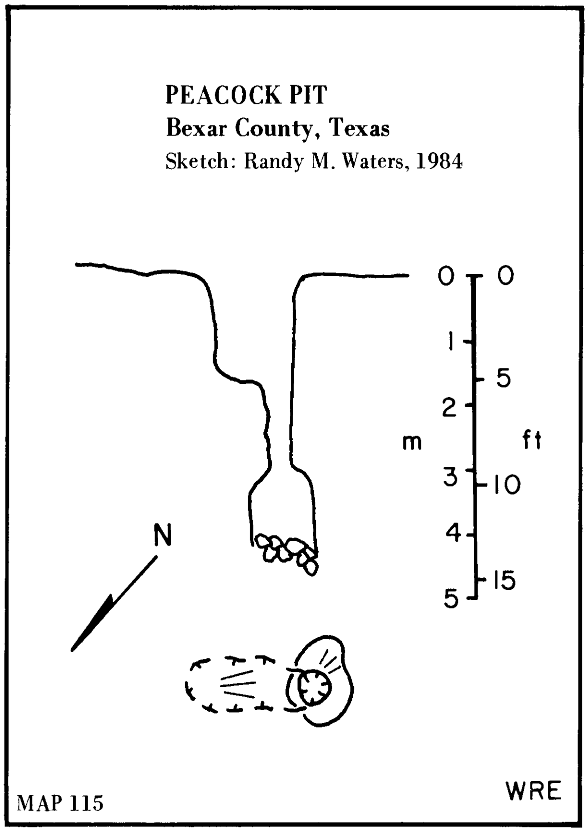
PAPKE HILL CAVE (BCS #145)
Location: Camp Bullis 7.5′
Description: This cave is described in a 1979 letter from Steve White as a "two or three room cave. Right [near] the summit of a hill there is a hole and about a



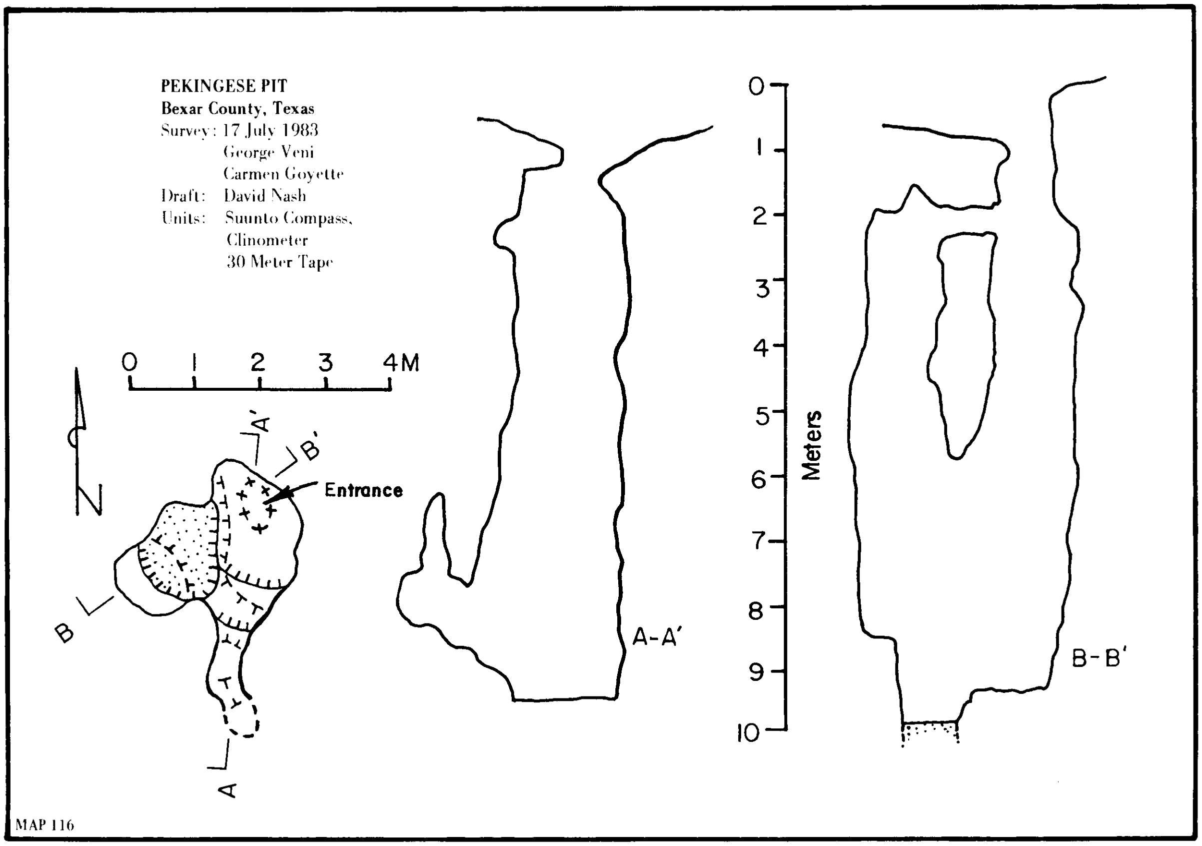
20 ft. [7 m] drop and maybe a domepit. It had a upper and lower level."
History: The cave was discovered and explored by Steve White while stationed at Camp Bullis in 1970-1971.
Geology: The cave is in the upper member of the Glen Rose Formation.
Technique: It is not known if rope is required.

PEACOCK PIT (BCS #185)
Location: Schertz 7.5′
Description: The cave entrance is 1.6 m long by 1 m wide and drops 2 m to a ledge. After a slight offset the cave continues down a second drop that is narrow, 3 m deep, and ends in rock fill. (See Map 115.)
History: The cave was explored by Kurt L. Menking and Randy M. Waters in February 1984.
Geology: The cave is a vadose shaft in the Buda Limestone.

PEKINGESE PIT (BCS #130)
Location: Bulverde 7.5′
Description: A narrow slot, 0.35 m wide by 0.6 m long, enlarges to 1.2 by 3 m at the cave floor, 8 m down. Adjoining the base of the entrance drop is a



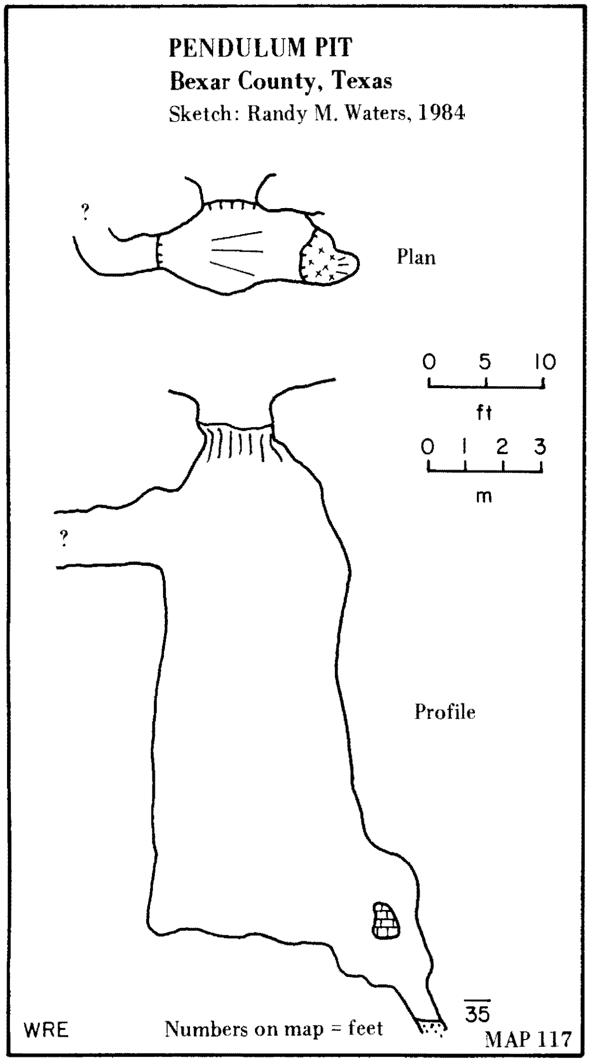
MAP 115



MAP 116

1.3 m drop into another 8 m high domepit to the west. (See Map 116.)
History: Randy M. Waters was shown the cave in 1977. It was mapped by Carmen Goyette and George Veni on 17 July 1983.
Biology: Harvestmen (prob. *Leiobunum townsendii*) and cave crickets (*Ceuthophilus* sp.) were noted.
Geology: The cave was vadosely developed as a recharge pit into the Edwards (Balcones Fault Zone) Aquifer.
Technique: The narrow entrance makes a cable ladder preferable to a rope.
Bibliography: Veni (1983:98; 1985).

PENDULUM PIT (BCS #129)
Location: Bulverde 7.5′
Description: A 1 m high by 1.5 m wide entrance opens into a 10 m deep pit. Near the top of the pit is an unexplored passage approximately 1.5 m high by 0.8 m wide. It extends at least 2 m before curving out of sight. (See Map 117.)



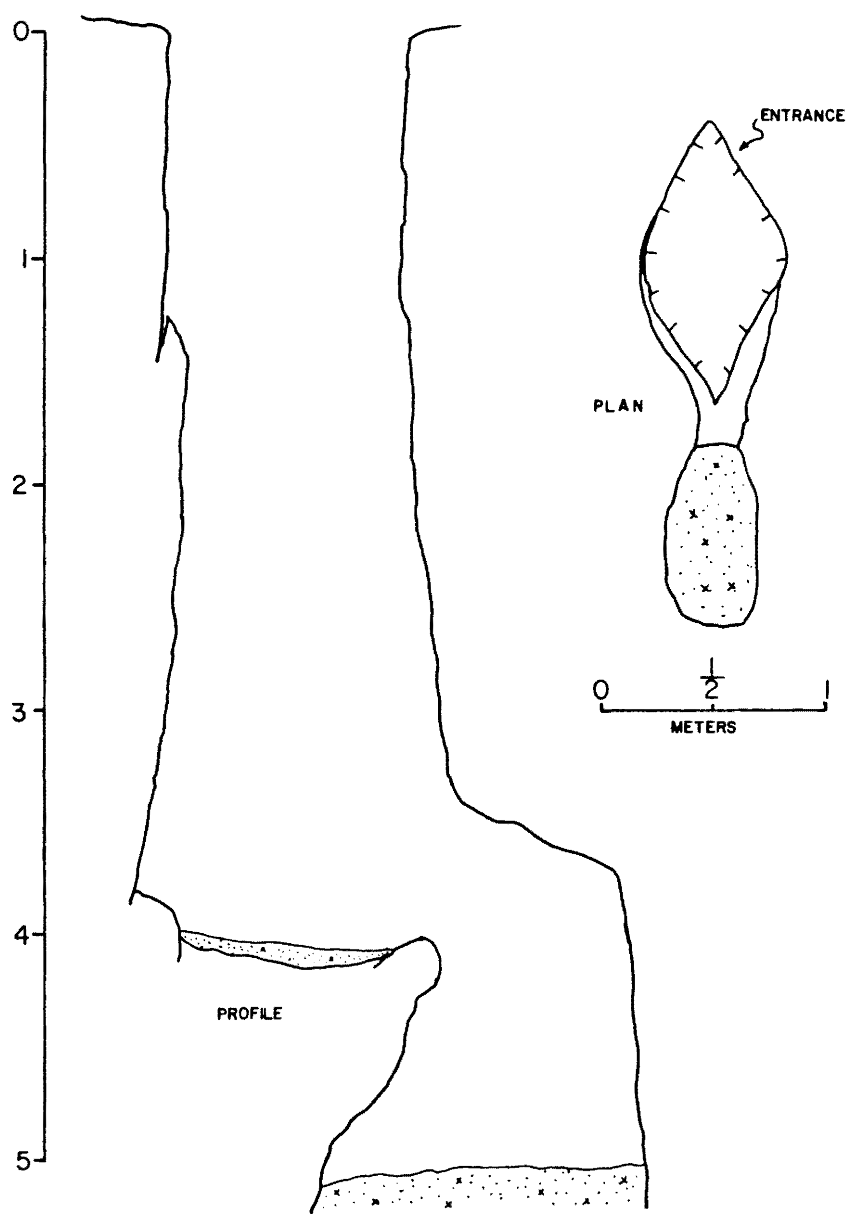
History: The cave was explored on 4 November 1979 by Don Arburn, Kathy Ballard, Tenni Kern, Greg Passmore, and Randy M. Waters. The cave name is for the pendulum motion needed to swing into the unexplored passage.
Geology: The cave is in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer.
Technique: A rope or cable ladder is needed to explore the pit.
Bibliography: Veni (1985).

PERSIMMON PIT (BCS #110)
Location: Castle Hills 7.5′
Description: This is an ovate pit with a small persimmon tree growing along one wall. The cave entrance is approximately 1.1 m long by 0.7 m wide and 4 m deep. A small hole drops 1 m from the pit floor to the end of the cave. (See Map 118.)
History: While lost in the cedar brakes of northern Bexar County, George Veni discovered the pit in the fall of 1976. Three years later he and Randy M. Waters relocated and explored the cave.
Biology: Some harvestmen (prob. *Leiobunum townsendii*) and numerous cave crickets (*Ceuthophilus* sp.) were observed.
Geology: Persimmon Pit drains an area of approximately 400 square meters into the Edwards (Balcones Fault Zone) Aquifer. Development of the pit is vadose and strongly joint controlled.
Bibliography: Veni (1985).

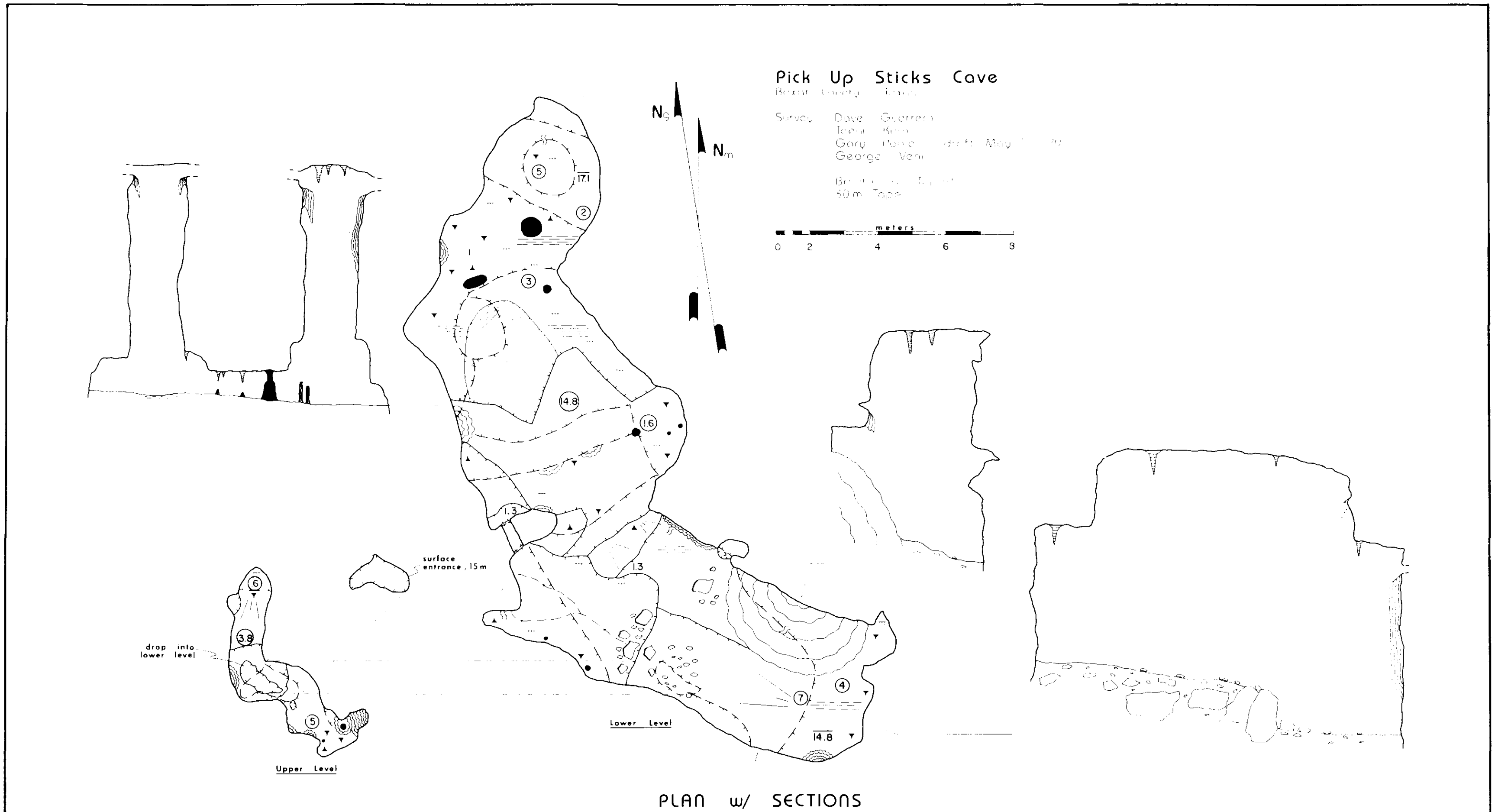
PICK-UP-STICKS CAVE (BCS #50)
Location: Bulverde 7.5′
Description: The entrance pit drops 6 m to a short upper level passage, then continues down 9 m further, through a narrow keyhole, to the floor of the cave. Pick-Up-Sticks is one of the most beautiful caves known in Bexar County. It is a single large room 17 m long by 6 m wide and 9 m high. Although the floor is clay and breakdown, the walls and ceiling are covered with flowstone, stalagmites, stalactites, columns, draperies, and many sodastraws, which average 1 m long. The colors of the various speleothems vary from brown through russet, orange, and gold to white. A squeeze through a flowstone curtain at the north end of the cave leads to a 6 m high dome containing a 2 m long sodastraw—the longest

PERSIMMON PIT
Bexar County, Texas
Sketch: George Veni
Draft: David Nash

No North Arrow Noted

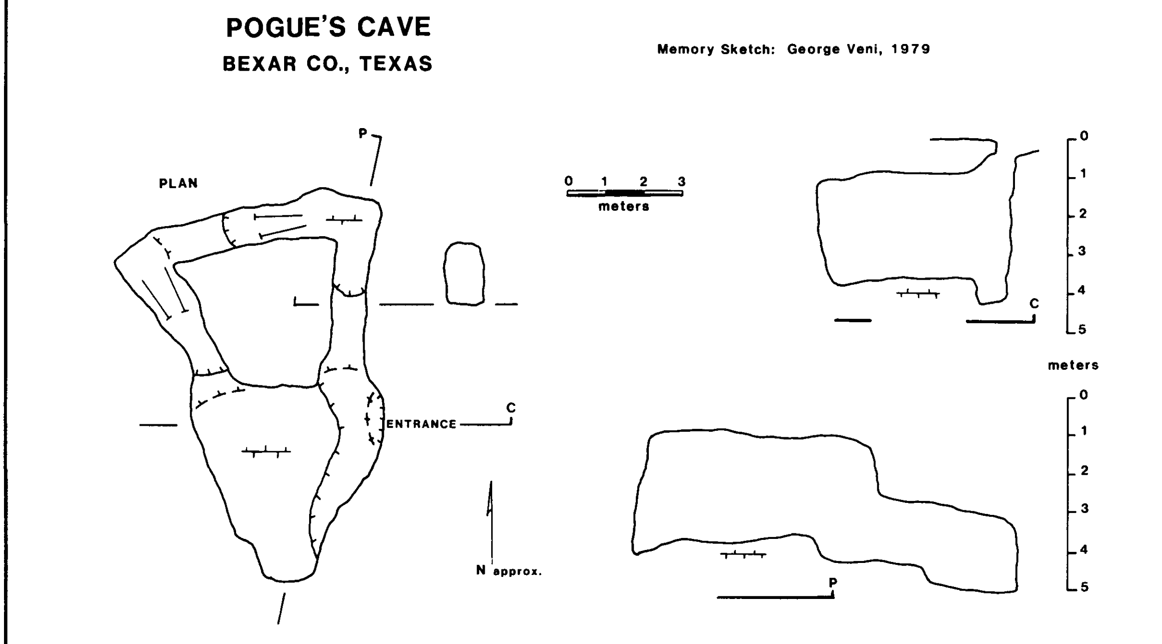


MAP 118



Pick Up Sticks Cave
Survey
Dave
George
meters
0 2 4 6 8
surface entrance, 15 m
drop into lower level
Upper Level
Lower Level
PLAN w/ SECTIONS

Map 119



MAP 120

known in Bexar County. (See Map 119.)

History: Quarrying operations during the early 1970s shaved off the top of a dome to produce the cave entrance. First exploration was in the fall of 1977 by San Antonio Grotto members Teeni Kern, Hope Lally, Gary Poole, Willard Schwartz, and George Veni. They discovered that the quarrying had rattled the cave. Many of its sodastraws had broken off where they attached to the ceiling and were precariously leaning against the cave's walls. The appearance was that of a random toss of thin sticks as in the game "pick-up sticks." On 25 June 1978 Dave Guerrero joined Kern, Poole, and Veni in surveying the cave.

Biology: Cave crickets (*Ceuthophilus* sp.) were observed.

Geology: Developed in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer as a single phreatic chamber, the cave has been modified by vertical shaft development and secondary calcite deposition. Lack of an entrance provided a stable atmospheric and hydrologic environment in which the abundant and long sodastraws could grow.

Technique: A 25 m rope is needed for the pit entrance. The most convenient anchor is an automobile driven next to the pit. Caution is needed near the entrance because of the quarried loose rock and gravel.

Bibliography: Anonymous (1979h:3); Poole (1979a: 2); Veni (1978a:6; 1978d:58; 1985).

POGUE'S CAVE (BCS #51)

Alternate name: Cave Lane Cave

Location: Longhorn 7.5′

Description: A stoopwalk under the owner's house leads to a 3 m ladder-drop into a room, the only one in the cave, about 3.2 m high and 5 m in diameter. A passage from the northeast corner of the room loops 15 m around to rejoin the room at its northwest corner. (See Map 120.)

History: The owner's father wanted to connect his cave with Robber Baron Cave, about 1 km down the road. How much cave there really was to begin with is debatable. Apparently, he was digging and blasting in fissures, hoping one would lead him into Robber Baron. So as not to upset the neighbors, he would blast only when the big jets from the nearby San Antonio International Airport flew overhead. "Damn sonic booms." The cave was visited once by Dottie Kern and George Veni in November 1977.

Geology: Pogue's Cave was blasted out of the Pecan Gap Chalk. Unfortunately for the owner, Robber Baron Cave is developed just below the Pecan Gap in the Austin Chalk. Therefore, the work might have been more productive if the fissures were followed farther down, rather than laterally. Affirming this hypothesis is that three drill holes on that property struck 5 to 7 m high voids at depths of 18 to 23 m, the elevation of primary passage development in Robber Baron Cave.

Bibliography: Veni (1978a:6).

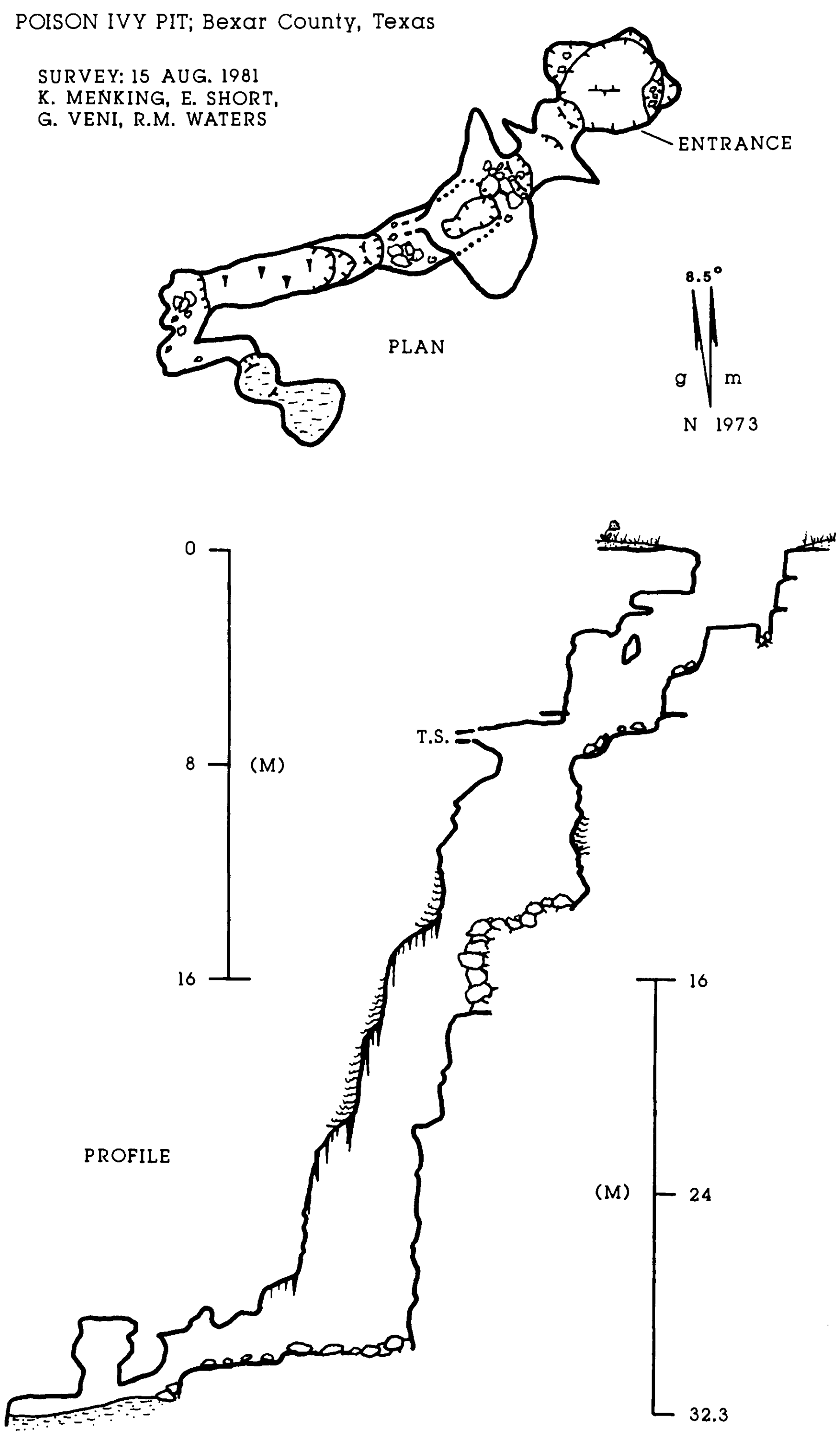
POISON IVY PIT (BCS #52)
Alternate names: Classen's Double Drop Cave; Double Drop Cave; Marbauch's Sink; The Pit; Hunnicutt's Pit; Poison Ivy Cave
Location: Bat Cave 7.5′
Description: Poison Ivy Pit is simply a series of five short consecutive drops that measure 3, 5, 7, 5, and 4 m deep. The cave ends in a mud plug at a depth of 32.3 m. Speleothems are few and small, and the cave's namesake hangs in abundance down its first pit. (See Map 121.)
History: Cavers have known of Poison Ivy Pit for many years. The first documented exploration was by Phil Morey and Bill Russell in 1958. On 21 October 1976 the cave was tape-measured by John Cross, Richard Paine, Chuck Stuehm, George Veni, and Randy M. Waters. That trip was made possible by Stuehm and Waters spraying the ivy with weed killer during the summer of 1976. Since then the ivy has grown back with increased vigor. In August 1981 the cave was surveyed by Kurt L. Menking, Eric Short, George Veni, and Randy M. Waters.
Biology: A collection was made in the cave on 15 August 1981 by Kurt Menking, Eric Short, George Veni, and Randy M. Waters. The following is a list of material collected for study:

Isopods–Trichoniscidae genus and species 1 (troglobite)
Spiders–*Eidmannella rostrata* (troglobite)
Modisimus texanus (troglophile)
Harvestmen–*Leiobunum townsendii* (trogloxene)
Millipedes–*Abacion texense* (accidental)
Cave crickets–*Ceuthophilus (C.) secretus* (trogloxene)
Ground beetles–*Rhadine* sp. (troglobite)
Ants–*Crematogaster (Crematogaster) laeviuscula* (accidental)
Solenopsis invicta (accidental)

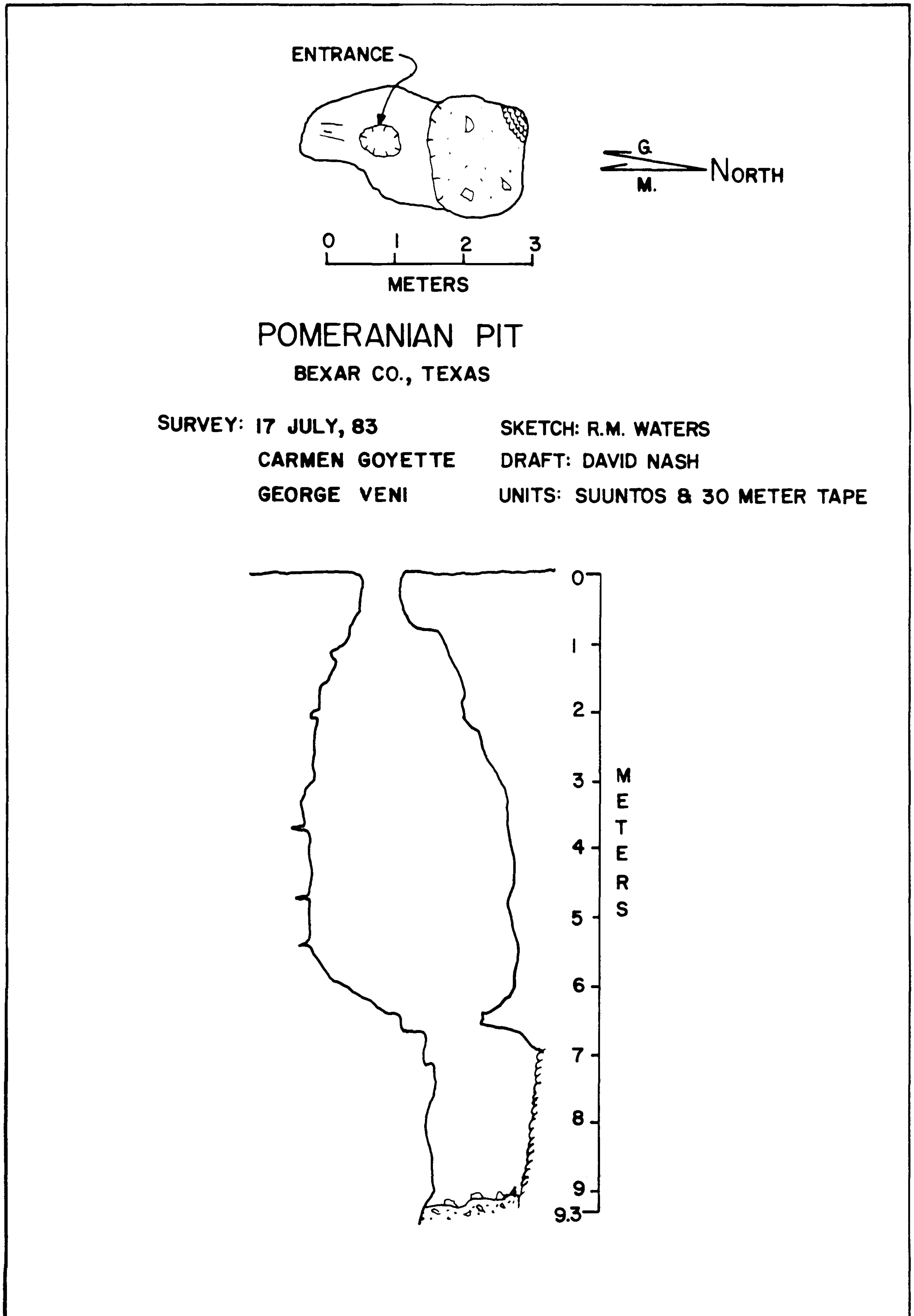
Rattlesnakes (*Crotalus* sp.) have been encountered as deep as the top of the third drop.
Geology: Poison Ivy Pit is formed at the base of a large shallow sink in a well developed karst area. Its vadose morphology is a result of runoff into the sink that recharges the Edwards (Balcones Fault Zone) Aquifer. The cave is developed along a northeast trending joint.
Technique: A tree near the entrance is an excellent rigging point. A 35 m long rope is needed to reach from the tieoff to the 7 and 4 m drops. The other pitches can easily be freeclimbed.
Bibliography: Anonymous (1968e:62; 1968g:120; 1973q:11-12; 1978e:2; 1979p:3); Litsinger (1973b: 10); Reddell (1961b:1); Reddell and Knox (1962: 3-5, 11); Reddell and Russell (1962a:5); Reddell and Smith (1966:3); Veni (1978a:6; 1978f:6-7; 1985); Waters (1977b:119); Widener (1959:81).

POMERANIAN PIT (BCS #158)
Location: Bulverde 7.5′
Description: The entrance is a narrow vertical slot 0.6 m long by 0.2 m wide which drops 6.4 m and enlarges to 1.5 m in diameter. On its north side the pit drops another 2.8 m to the cave's end. (See Map 122.)
History: In 1982 Randy M. Waters was the first caver to see the pit. He had no equipment with him so it remained unexplored until 17 July 1983 when it was surveyed by Carmen Goyette and George Veni. The cave was named after nearby Pomeranian kennels owned by the people who showed the cave to Waters and the survey team.
Biology: An abundance of harvestmen (prob. *Leiobunum townsendii*) and cave crickets (*Ceuthophilus* sp.) were noted.
Geology: Pomeranian Pit is a vertical shaft developed along a north-south joint in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer.
Technique: A cable ladder is needed for this cave. Big people and claustrophobics should look elsewhere for adventure.
Bibliography: Veni (1983:98; 1985).

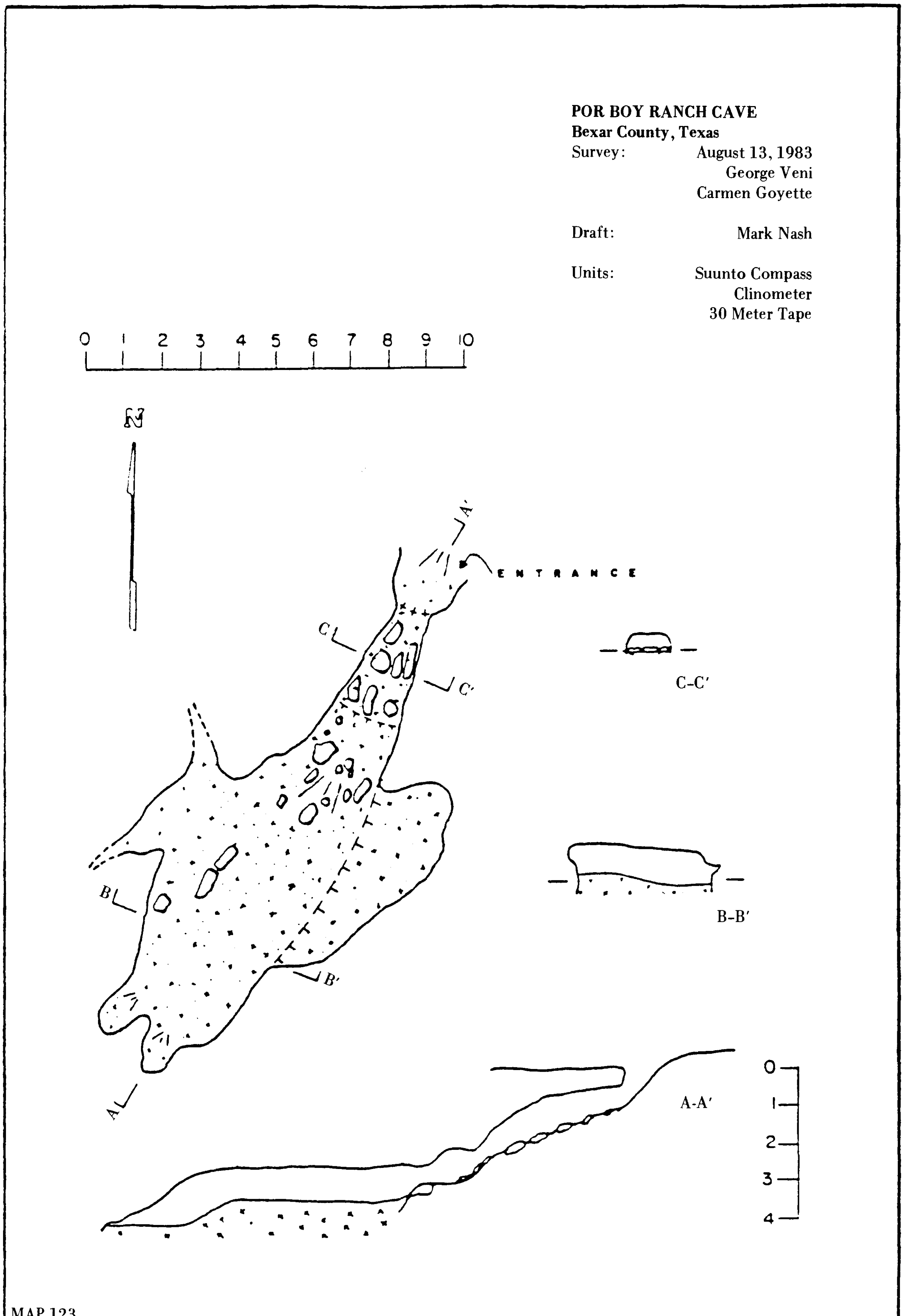
POR BOY RANCH CAVE (BCS #162)
Location: Helotes 7.5′
Description: The sinkhole entrance is almost 1 m deep, 1 m in diameter, and is located in the bank of Helotes Creek. A 0.35 m high crawlway extends 6 m and widens from 0.8 m to a 5 m diameter room. The room is only 0.8 m high, and any continuing passages are filled with the organic soil that has been washed into the cave. (See Map 123; Photo. 24.)
History: On 13 August 1983 Carmen Goyette and George Veni were invited to explore and survey this cave that a Mr. Brauchle had known of and owned for over 80 years (he had just sold the property). Brauchle said that the cave had only been entered twice prior to the survey trip. In the early 1920s a friend of his claimed to have explored the cave over 100 m to an underground stream. Brauchle's mother would not allow him to enter the cave so the second excursion didn't occur for many years, when he entered with his daughter and the family dog. They explored for 10 m to where it was necessary to dig the passage open a little, then continued another 30 m. At that point the passage became too low for them to explore, but the dog went ahead into the darkness. He was gone for some time but "didn't come back wet." By 1983 any access beyond 10 m


POISON IVY PIT; Bexar County, Texas
SURVEY: 15 AUG. 1981
K. MENKING, E. SHORT,
G. VENI, R.M. WATERS
ENTRANCE
PLAN
8.5°
g
m
N 1973
0
8
(M)
16
T.S.
PROFILE
16
(M)
24
32.3

MAP 121


ENTRANCE
G
M.
NORTH
0 1 2 3
METERS
POMERANIAN PIT
BEXAR CO., TEXAS
SURVEY: 17 JULY, 83
CARMEN GOYETTE
GEORGE VENI
SKETCH: R.M. WATERS
DRAFT: DAVID NASH
UNITS: SUUNTOS & 30 METER TAPE
0
1
2
3
4
5
6
7
8
9
9.3
METERS

MAP 122


POR BOY RANCH CAVE
Bexar County, Texas
Survey: August 13, 1983
George Veni
Carmen Goyette
Draft: Mark Nash
Units: Suunto Compass
Clinometer
30 Meter Tape
0 1 2 3 4 5 6 7 8 9 10
N
A'
ENTRANCE
C
C'
C-C'
B
B'
B-B'
A
A-A'
0
1
2
3
4
MAP 123

into the cave would require a great deal of digging.
Biology: The abundant organic debris serves to feed a large faunal population. A large population of the fire ant, *Solenopsis invicta*, was present in the cave. A collection of invertebrates made on 13 August 1983 by George Veni included the following material.

Snails–*Polygyra texasiana* (empty shells)
Scorpions–Prob. *Vaejovis reddelli* (troglophile)
Spiders–Undetermined material
Harvestmen–*Leiobunum townsendii* (trogloxene)
Mites–Undetermined material
Springtails–Undetermined material
Cave crickets–*Ceuthophilus (C.) secretus* (trogloxene)
Beetles–Undetermined material
Ants–*Solenopsis invicta* (?trogloxene)

Geology: Formed as a recharge site for the Edwards (Balcones Fault Zone) Aquifer, the cave is rapidly being filled by the increased sediment load of Helotes Creek. Increasing and poorly-managed land use is increasing soil erosion upstream of the cave. The subsequent fill of this and other caves is hampering effective recharge and recharge storage for the regional groundwater supply.
Bibliography: Veni (1983:99; 1985).

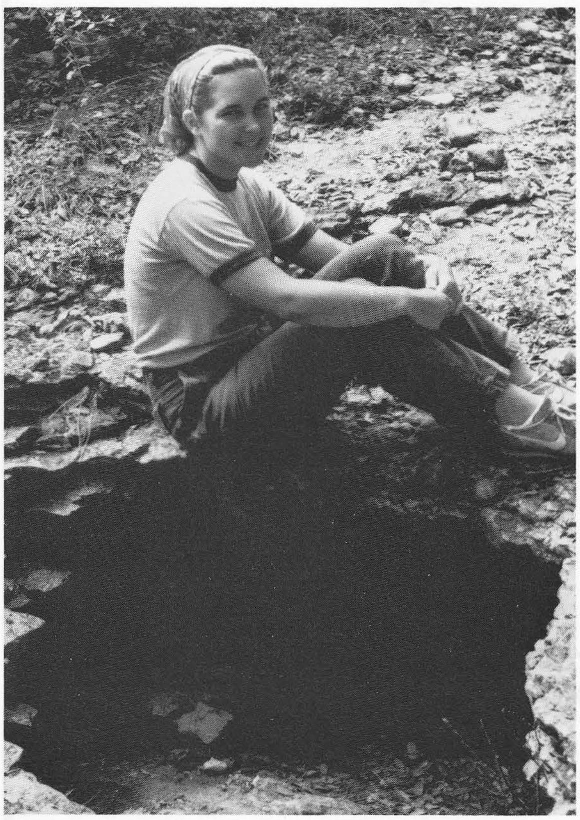


Photo. 24.–Por Boy Ranch Cave and guard Carmen Goyette (George Veni).

PORTLAND CEMENT CAVE (BCS #53)
Alternate names: Quarry Cave; San Antonio Quarry Cave
Location: San Antonio East 7.5′
Description: This is said to be a 20- to 24-m pit, rumored to lead into a large cave system.
History: In the 1930s Guy Halter and his uncles, Guy and Willard Simpson, discovered the pit. They later returned with rope ladders, but before they descended, they were chased off the land and never returned. In 1978 George Veni tried to obtain permission from the Vice President of the Company, Mr. Schmitz, to explore the cave. Schmitz denied the existence of any caves on the land and refused to grant permission for admittance on quarry property. However, one of the Company officials told Veni that a 20 to 24 m deep pit did indeed exist on the property. Another Portland Cement worker thought it might have been covered by a boulder many years ago.
Geology: The cave is in the Austin Chalk. The jointing of the area is primarily northeast-southwest.
Bibliography: Halter (1976); Reddell and Knox (1962:3-4, 29); Reddell and Russell (1962a:6); Reddell and Smith (1966:4); Veni (1978a:6).

POST HOLE (BCS #95)
Location: Van Raub 7.5′
Description: A near vertical drop of 5 m leads to a 7 m long crawl to the northeast. Halfway along the crawl is a 2.2 m high dome. (See Map 124.)
History: The cave was discovered when the area was being cleared and mapped for subdivision. On 8 March 1970 it was visited and mapped by Roger Bartholomew and David Litsinger. The cave name was apparently a pun on the owner's name.
Biology: Many ticks were noted.
Geology: Post Hole is in the Edwards Limestone.

POWERLINE CAVE (BCS #54)
Alternate name: Airport Cave
Location: Longhorn 7.5′
Description: Powerline Cave has been filled. The entrance was a 0.6 m in diameter hole overlooking a creekbed. Through a series of vertical and near vertical drops, never exceeding 1.6 m in diameter, the cave reached a depth of approximately 15 m. At depths of 9 m and 11 m, crawls extended about 5 m before ending.
History: Originally reported as Airport Cave by Fulsom Gilcrey in the early 1960s, it was explored at various times by Bud Frank and others of the University of Texas and Alamo Grottos. By the early 1970s, the cave had become known as Powerline Cave from the new high-voltage lines nearby. In 1971 an attempt

to survey the cave was confounded by poor directions to the site which led the mapping team to what they thought was Powerline but was merely a miserable dig yielding only 2.6 m of passage. The cave was filled in the late 1970s during the construction of an adjacent apartment complex.

Biology: William H. Russell collected the harvestman *Leiobunum townsendii* in May 1964.

Geology: The cave was developed in the Austin Chalk along two joints, one running east-west and the other northeast-southwest.

Meteorology: High levels of CO_2 were noted in the cave. At 9 m it was noticeably bad, and at 11 m carbide lights would not burn.

Bibliography: Anonymous (1968e:62; 1973q:11); Darilek (1971:124-125); Litsinger (1973a:15; 1973b: 10); Reddell (1961b:1; 1970a:409); Reddell and Knox (1962:3-4, 6); Reddell and Russell (1962a:5); Reddell and Smith (1966:2); Rowland and Reddell (1976:12); Veni (1978a:6; 1983:99).

PUTREFACTION CAVE (BCS #131)

Alternate name: Peauture Fracture

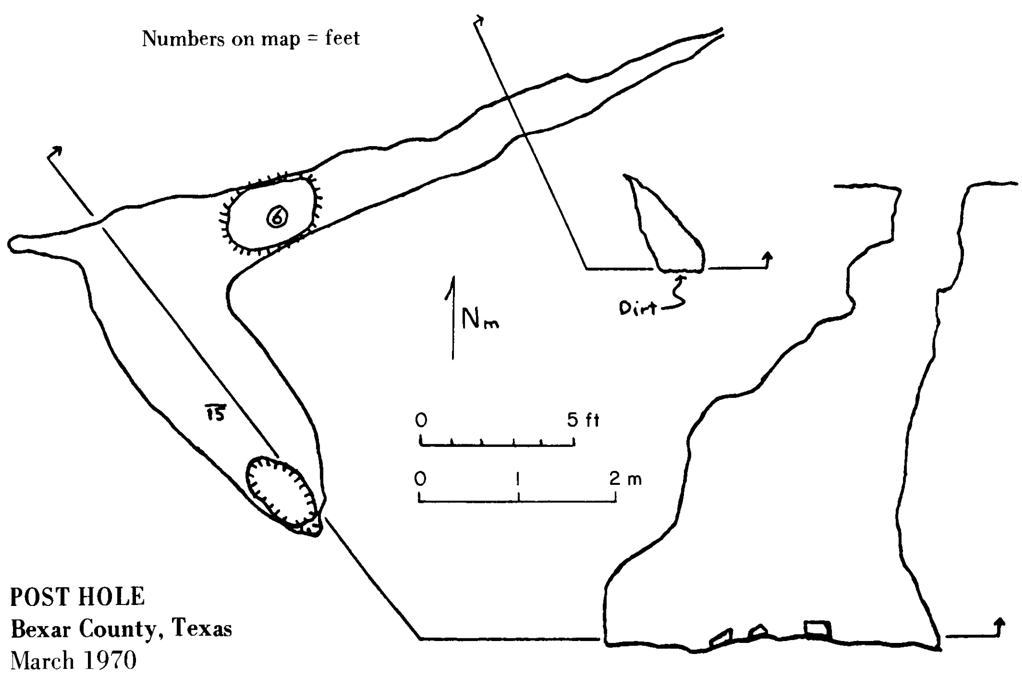
Location: Castle Hills 7.5′

Description: The cave entrance is a 0.8 m diameter pit that drops 2.4 m into a 2.5 m long eastbound passage which then turns south for 6 m. Three meters down the 6 m long passage, the cave continues west for 4 m (going over a 1.3 m deep pit), and then north for 8.5 m through a 1 m high passage decorated with many speleothems. A small pit continues from the end of that passage but is inaccessible due to flowstone blockage. The 6 m long passage has a break-out dome at either end which correspond with two small sinks on the surface. (See Map 125.)

History: Greg Fritz discovered the cave in the fall of 1980. He returned on 5 October of the same year with Randy M. Waters, at which time a dead dog was found there—hence the cave's name. A trip report for a return visit in 1981 unintentionally misspelled the cave name as "Peauture Fracture."

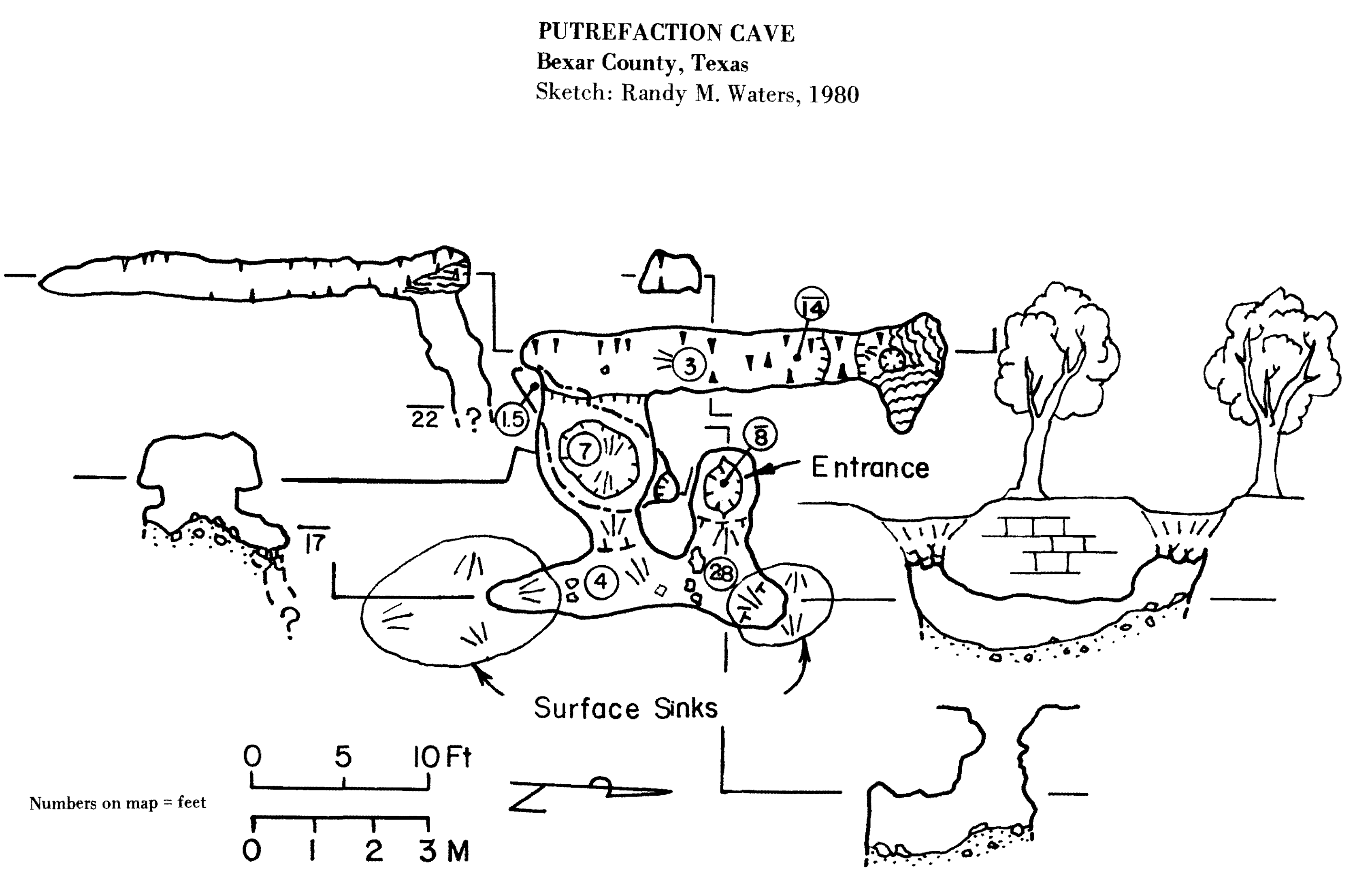
Biology: Cave crickets (*Ceuthophilus* sp.) were observed.

Geology: Located in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer, the cave is developed by runoff from three small sinks. One sink has been solutionally enlarged to form the cave entrance. The 1.3 m deep pit in the 4 m long passage represents a pirating of flow from the flowstone-blocked pit at the end of the cave.



POST HOLE
Bexar County, Texas
March 1970
R. Bartholomew, D. Litsinger

MAP 124


PUTREFACTION CAVE
Bexar County, Texas
Sketch: Randy M. Waters, 1980
22
?
1.5
3
14
7
8
Entrance
17
?
4
28
Surface Sinks
0 5 10 Ft
0 1 2 3 M
N
Numbers on map = feet

MAP 125

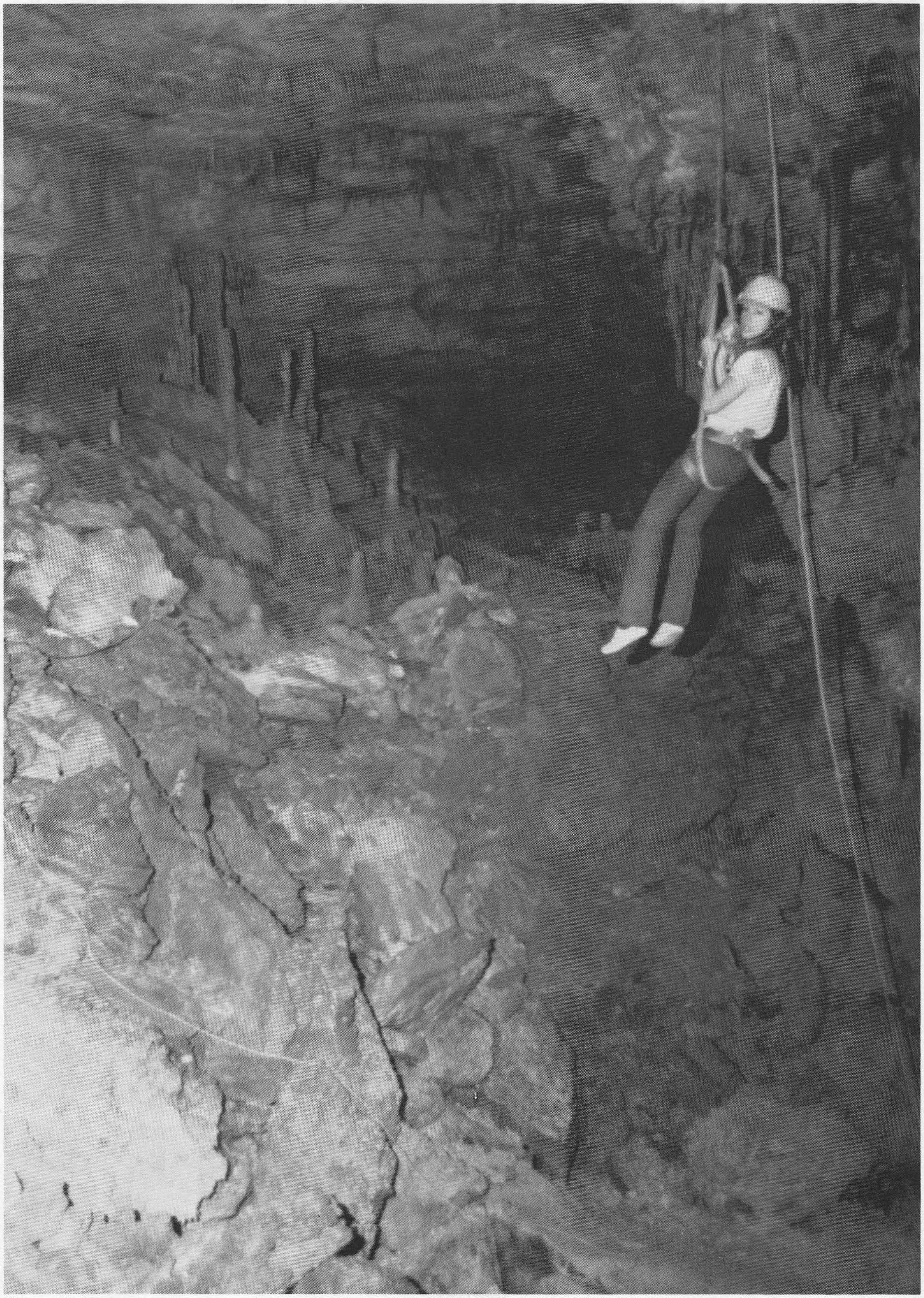
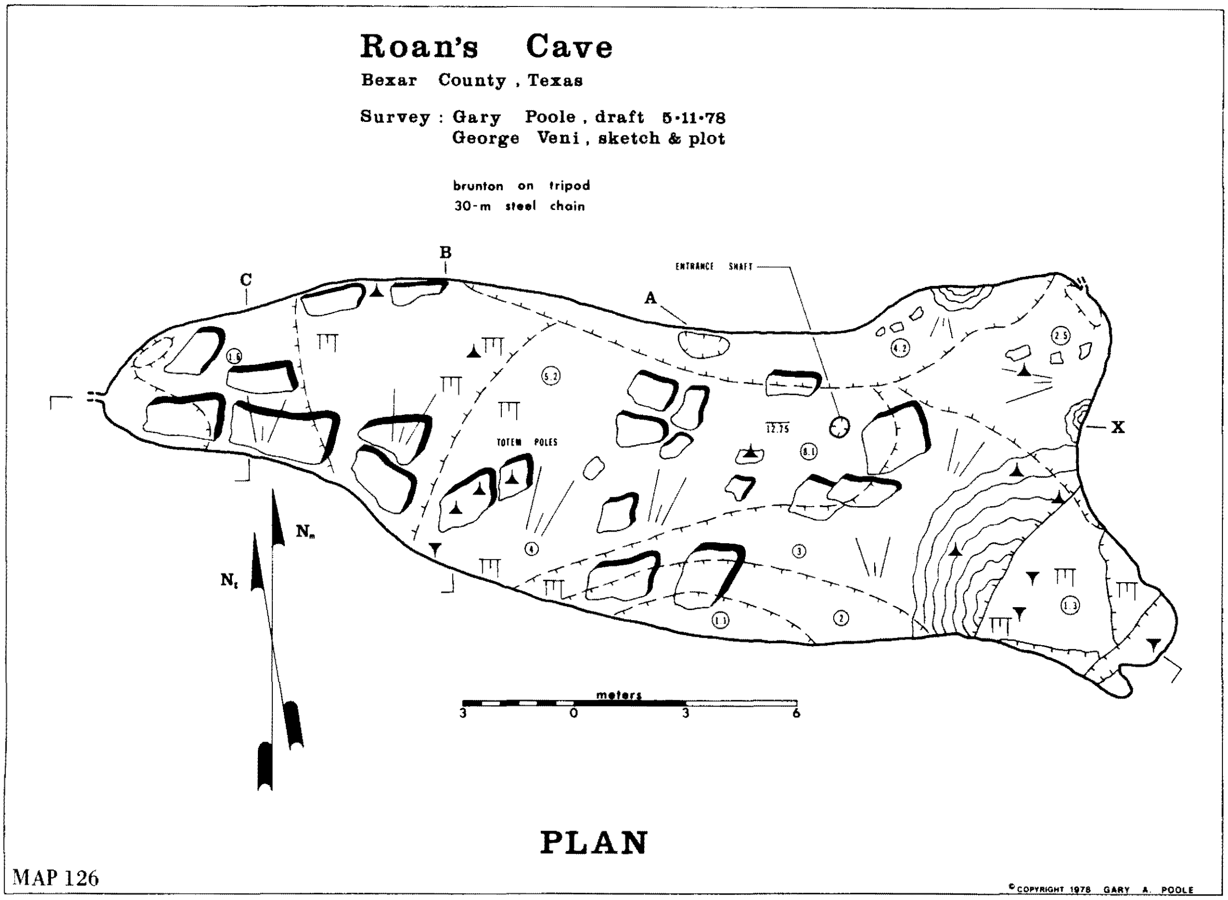


Photo. 25.—Cable ride down into Roan's Cave (George Veni).

Technique: Persistent work with a hammer and chisel could make the distal pit accessible for exploration.
Bibliography: Fritz (1981b:45); Veni (1985).

RESERVOIR #7 CAVE (BCS #165)
Location: Camp Bullis 7.5′
Description: The cave was said to be large but its entrance is now covered by the Camp Bullis reservoir #7 dam, built in the mid-1970s.
Geology: The cave is in the upper member of the Glen Rose Formation. Because of its location in a major stream valley, the cave may indeed have been large and probably had a prominent vadose morphology.

ROAN'S CAVE (BCS #55)
Alternate name: Rona's Cave
Location: Van Raub 7.5′
Description: The 0.46 m diameter drill-hole entrance drops through 4.65 m of solid rock, then 8 m more to the floor. The cave is a single room 27 m long by 8 m wide and 1.5 to 8 m high. The entrance is located over the deepest portion of the cave. Because much of the ceiling is flat, the ceiling height depends on the amount of breakdown that covers the floor. Very attractive dripstone deposits decorate the cave, including the only known totem poles in Bexar County (up to 2 m tall). (See Maps 126-127; Photo. 25.)
History: In the mid-1960s the cave was discovered while drilling for water. On 13 August 1966 Archie Minneman and Wayne Russell lowered a camera down the original 23 cm diameter corehole. They obtained five pictures which revealed a room of substantial size containing some speleothems. Ten years after its discovery, the owners enlarged the shaft to its present diameter. A permanent metal frame and winch was set up over the hole. The Roan family and their neighbors were the cave's first explorers. On 27 September 1977 Gary Poole and George Veni were the first cavers to descend the artificial entrance; they also surveyed the cave on that trip. Since then, the cave has often been visited by members of the San Antonio Grotto.
Biology: A collection of invertebrates made in the cave on 29 September 1984 by Joe Ivy and George Veni included the following material:



MAP 126

Slugs—*Limax* sp. (accidental)
Brown recluse spiders—*Loxosceles reclusa* (troglophile)
Harvestmen—*Leiobunum townsendii* (trogloxene)
Insect larvae—undetermined material
Crickets—*Gryllus* sp. (accidental)
Cave crickets—*Ceuthophilus (C.)* sp. (trogloxene)

Frogs have also been observed in the cave.

Geology: Roan's Cave is in the upper member of the Glen Rose Formation. It served as a paleo-drainage route for groundwater that flowed west to a major surface valley. The confluence of two groundwater paths, from the east and southeast, resulted in a groundwater mixture of higher saturation potential than either source alone. By this mixture the cave was formed, largest to the east where the mixing occurred and tapering smaller to the west with increasing calcium carbonate saturation. A decline in the local water table marked the end of cavern enlargement. Lack of buoyant support from the water resulted in the spalling of thin beds of rock from the ceiling. Currently, the cave is in a period of active secondary calcite deposition.

Meteorology: A strong breeze sometimes blows out of the cave.

Technique: Standard rope or ladder technique could be used in the shaft entrance, but its narrow diameter makes their use impractical. Because of its ease and availability, the fixed winch is generally used for entrance. A 20 m long rope is strongly recommended as a belay. At least one person must remain on the surface to winch people in and out of the cave.

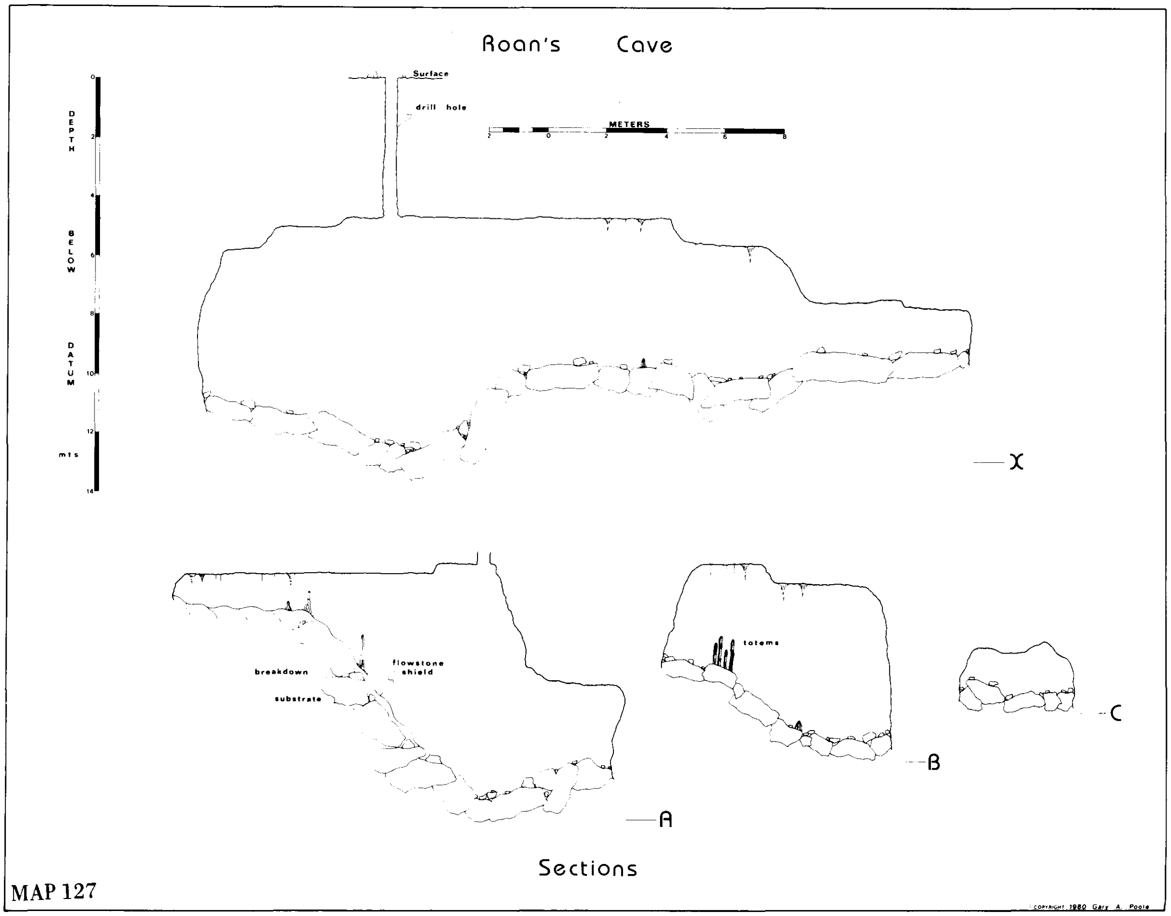
Bibliography: Anonymous (1979k:3; 1979q:3-4); Palit (1984b:27); Poole (1978b:4; 1978c:3); Poole and Passmore (1978:31, 33, 52); Veni (1978a:6; 1978d:58).

ROBBER BARON CAVE (BCS #56)

Alternate names: Robber Baron's Cave; Robber's Cave; Cave Lane Cave; Crystal Cave

Location: Longhorn 7.5′

Description: By far the longest cave in Bexar County, Robber Baron Cave is a complex maze of passages. Its 1336 m of interconnecting corridors are within a roughly triangular area measuring about 100 m on a



MAP 127

side. Located near the northeast corner of the triangle (oriented with the apex pointing south), the entrance sinkhole is 10 m in diameter and ranges from 2 m deep along the east wall to 9.2 m at the west wall. Much of the sinkhole floor is a solid meters-thick layer of dumped refuse, composed of soil, bricks, metals, glass, wood, and concrete. Wooden railroad ties and some of the recovered debris (corrugated sheet metal, logs, and bricks) have been used to terrace the sinkhole. As a result, the trash floor has been stabilized, a definite and safe path has been established through the sinkhole, the sinkhole is aesthetically more attractive, and erosion of the floor, which tends to fill the crawlway entrance at the base of the slope, has been significantly diminished. The crawlway slopes down at a 20-degree angle and after 4.5 m, narrows to 0.5 m high and wide. At this point the cave passage is gated. Beyond the gate lies the maze for which the cave is known. It is composed of 42 major passages, primarily trending east-west and northeast-southwest, which intersect 96 times, thus allowing 316 choices of paths. Attempting to "walk" the reader through that maze would be very difficult, if not futile; the cave is better understood from the map. For that reason many areas of the cave have been named to simplify the tasks of identification and location. The Entrance Hall averages 1.5 m high and wide, and extends 55 m west from the gate to end in breakdown. North of the Hall is the Pavilion Room, named during the cave's commercialization, and the Bedroom, the sleeping-spot for a small underground camp in 1976. There are no true "rooms" in the cave, only enlarged areas of passage intersection. South and parallel to the Entrance Hall is the Lighted Passage, named for the bolts in the ceiling which held electric lights during the cave's commercial years. The west end of the Lighted Passage is the Mystery Breakdown, a collapse area which has been tunneled for 14 m in search of the passage continuation. Debris from the dig elevates the Lighted Passage floor by 0.5 m almost as far east as the Short Cut (one of three small passages connecting the Entrance Hall to the Lighted Passage). Off the Lighted Passage's south wall, the obscure Hidden Passage goes west for 20 m and ends in an unstable breakdown area. At the eastern end of the Lighted Passage is the Graffiti Room, the most colorful part of the cave. South of the Graffiti Room, but not by any direct route, is the Chapel Room. It is named for many sculpted

Photo. 26.–Sinkhole entrance to Robber Baron Cave (David Nash).

clay crosses and a clay motorcycle. The figurines were first noted in 1969 but by 1980, when the gate was installed, most had been destroyed by vandals. A lower level westbound passage extends 20 m from the Chapel Room to the Great Southwest Passage. The G.S.P. is Robber Baron's tallest passage, reaching heights of over 5 m. It is similar to some other passages in the cave in that its walls gradually narrow to a "V" cross section, allowing no true floor to walk on. Three named passages extend west from the G.S.P. Northernmost of these is the Male Passage, named for being the northern companion to the Female Passage, whose cross section "has all the curves." South of the Female Passage is Bitch Passage (B.P.), the most challenging passage in the cave. Former National Speleological Society Vice-President Bob Willis felt such a name was unnecessarily vulgar. However, after taking one look into the passage his only comment was "That's a bitch!" B.P. requires slippery climbs over its V-slot floor. Additionally, the passage is interrupted by abrupt blade-like rises in the floor, which are associated with similar drops in the ceiling. This leaves only a small, sharp window to squeeze through. South and parallel to B.P. is the Domed Passage, unique in the cave for its abundance of domes, and finally the Last Passage, farthest of all from the entrance. The western passage of the two connecting the Domed and Last Passages, achieves the maximum depth in the cave of 16.8 m. Generally, the cave maintains a shallow depth of approximately 14 m. Faint rumblings are often heard from vehicles driving overhead. Little speleothem growth is present in Robber Baron Cave; some passages are adorned with the rare "velvet flowstone," so named for its somewhat velvety texture and deep purple-brown to near black color. Unfortunately, with the exception of flowstone and cave popcorn, vandals have stripped the cave of speleothems. Graffiti, kilometers of string, spray-paint arrows, and trash were left as barter for the formations. Since the cave's gating and clean-up, there has been a slow recovery in speleothem growth. (See Maps 128-131; Photos. 26-33.)

History: The cave was originally called Crystal Cave. Located next to the Old Kings Highway, then the main road from San Antonio to Austin, the cave was frequently visited by curious explorers. In 1918, Arthur and Inez Harp bought the cave and began working to commercialize it. This preparation included: exploration of the cave, excavation of the

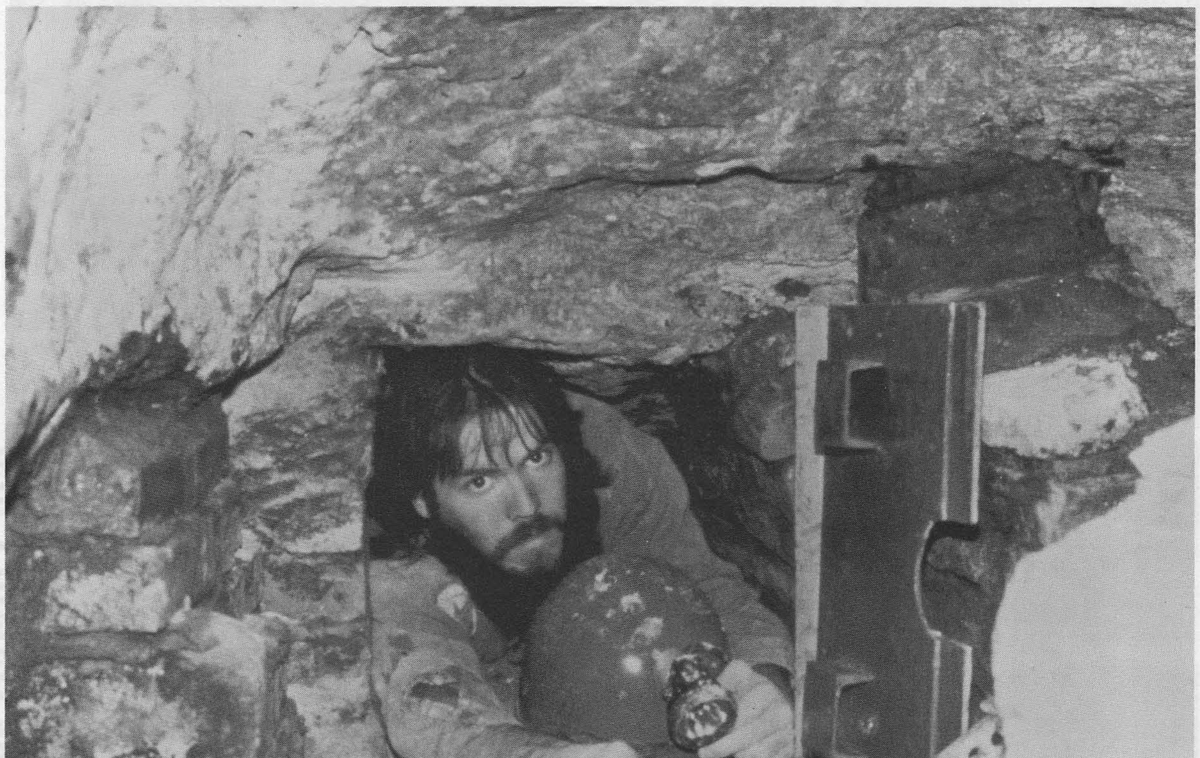


Photo. 27.—Robber Baron Cave gate and gate-maker Randy Waters (Kurt Menking).

crawlway entrance to stoopway size, installation of an iron gate, filling "V"-floored passages with tons of rock and dirt to allow for easy walking, and installing benches and a lighting system. The work proceeded slowly, taking eight years to complete. To support themselves, Inez worked as a chiropractor, and Arthur helped restore the San José Mission and other historic sites at Terrell Wells and Sulphur Springs, Texas. Collapse of the cave entrance set back the commercialization efforts until it was dug open and timbered. Fearful of further collapse, Arthur sank a new entrance into the northern end of the Great Southwest Passage. Regaining his confidence in the main entrance after a few years, Arthur sealed the artificial shaft entrance around 1927. In 1926 the first of an estimated 300,000 people began to tour Robber Baron Cave. The cave name was dreamed up by the Harps to give it an outlaw mystique. To further its legend, Arthur spread stories of Indian massacres (whose "ghosts haunt the cave") and of monks who would escape "bloodthirsty Injuns" by entering Robber Baron Cave and exiting at San Pedro Park 8 km away! Although some of his stories may seem far-fetched to modern readers, they were taken quite seriously at that time. After visiting the cave in 1929, W.A. Ownby wrote for the Dallas *Morning News* that the cave was once a hideout for a band of thieves ruled by a "robber baron":

> If the walls of this cave could talk they probably would reveal tales of crime which cause the blood and thunder stories of the wild and woolly west to pale into insignificance.

Arthur Harp knew what sort of tales appealed to the public and often modeled them after factual recent events. For example, in 1886 the skeleton of Frank Harris was discovered in a "Robber's Cave (BCRP #23). The discovery and ensuing murder trial of Frank and T.S. Scott attracted much publicity. (This cave has yet to be relocated, though it was once thought to be BCS #57, Robber's Cave). In 1910, Charles Merritt Barnes published a rather fanciful volume on the history of San Antonio which included accounts of several "Robber's Caves." The cave's crawlway entrance made it an unlikely choice

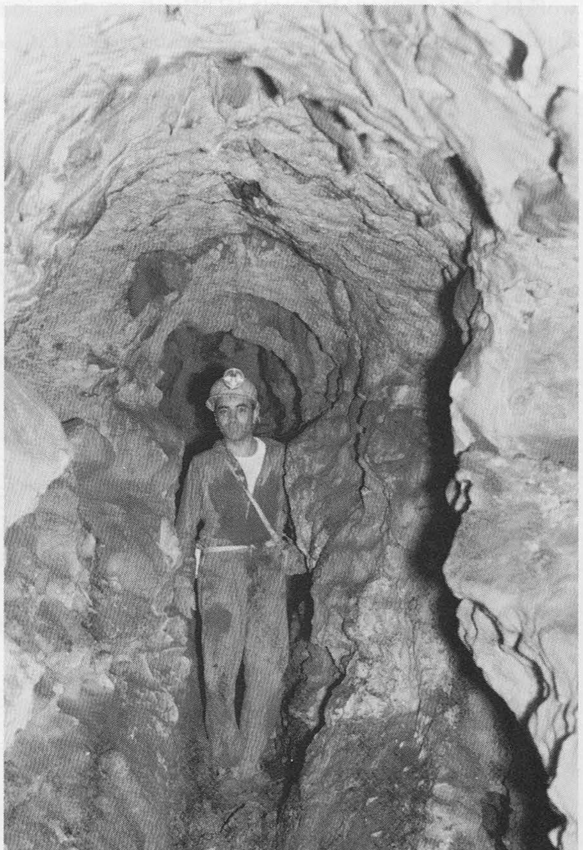
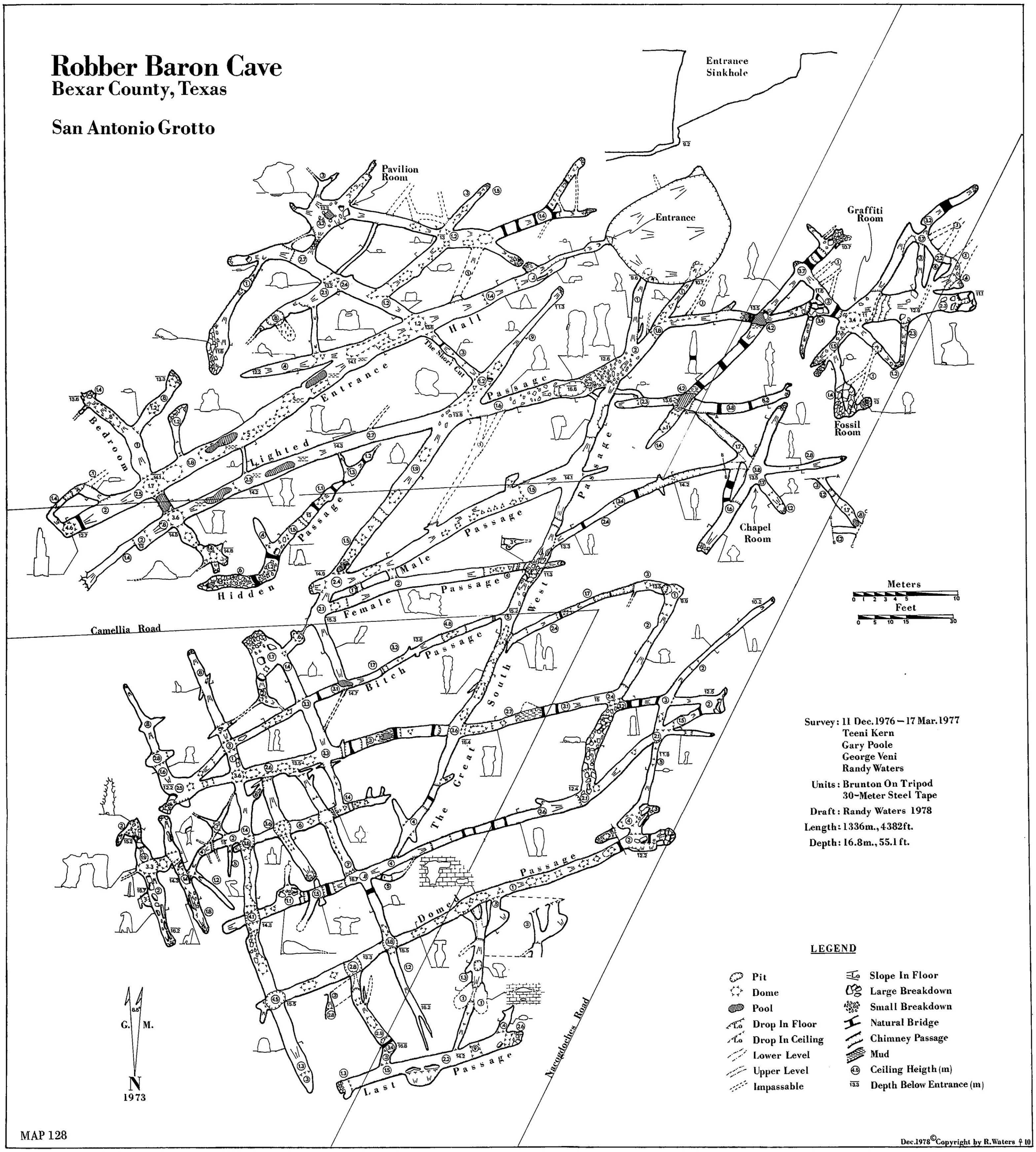


Photo. 28.–Roger Bartholomew in typical walking passage in Robber Baron Cave (Wayne Russell).

Photo. 29.–Roger Bartholomew in typical non-walking passage in Robber Baron Cave (Wayne Russell).



Robber Baron Cave
Bexar County, Texas
San Antonio Grotto
Entrance Sinkhole
Entrance
Pavilion Room
Graffiti Room
Fossil Room
Chapel Room
Bedroom
Lighted Entrance Hall
The Short Cut
Passage
Passage
Hidden Passage
Male Passage
Female Passage
Bitch Passage
The Great South West Passage
Dome Passage
Last Passage
Camellia Road
Nacogdoches Road
Meters
Feet
Survey: 11 Dec. 1976 – 17 Mar. 1977
Teeni Kern
Gary Poole
George Veni
Randy Waters
Units: Brunton On Tripod
30-Meter Steel Tape
Draft: Randy Waters 1978
Length: 1336m., 4382ft.
Depth: 16.8m., 55.1 ft.
LEGEND
Pit
Dome
Pool
Drop In Floor
Drop In Ceiling
Lower Level
Upper Level
Impassable
Slope In Floor
Large Breakdown
Small Breakdown
Natural Bridge
Chimney Passage
Mud
Ceiling Heigth (m)
Depth Below Entrance (m)
G.M.
N
1973
MAP 128
Dec.1978 © Copyright by R.Waters

202A

Photo 30.—Concession stand at the entrance to Robber Baron Cave, circa 1930.

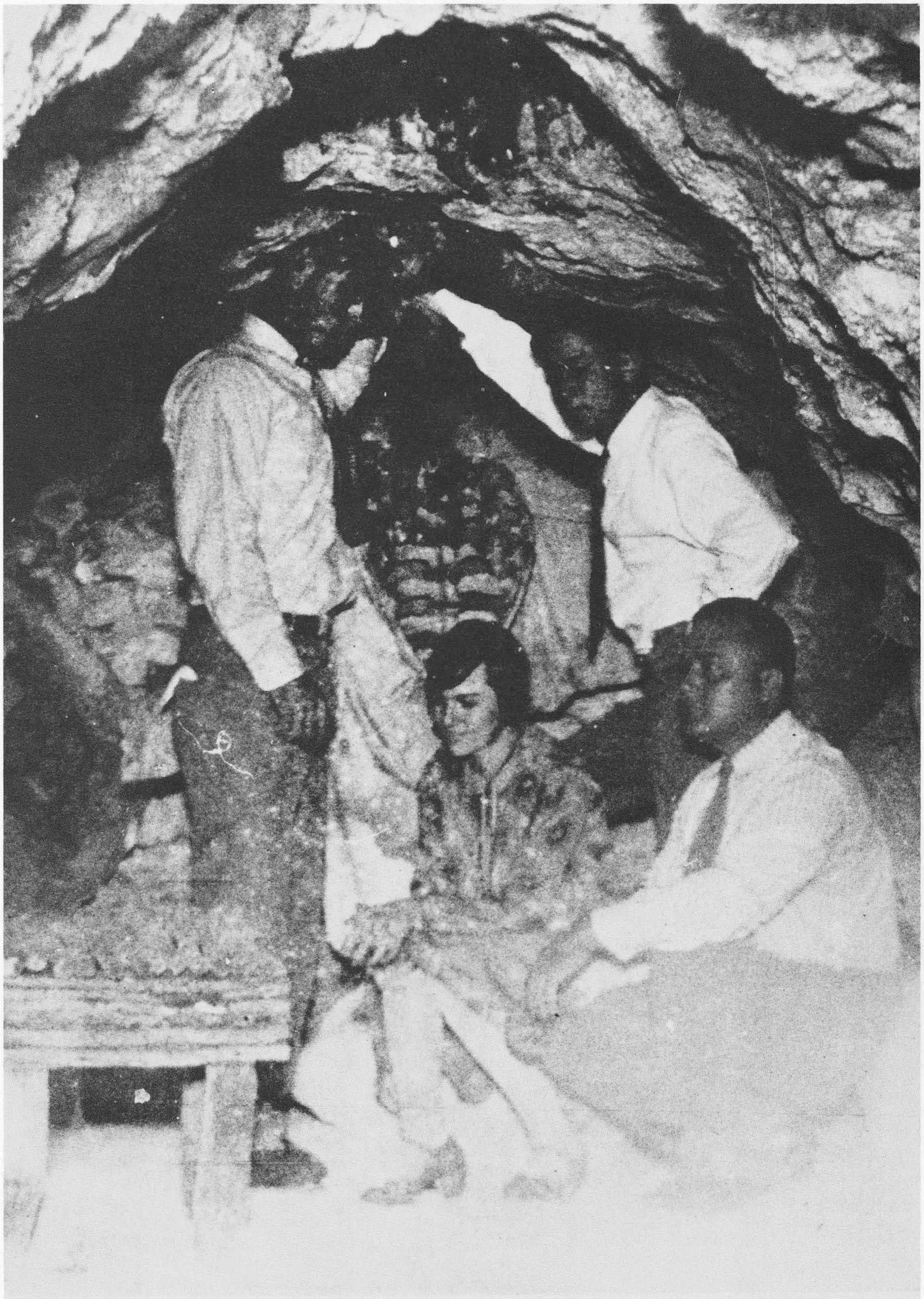
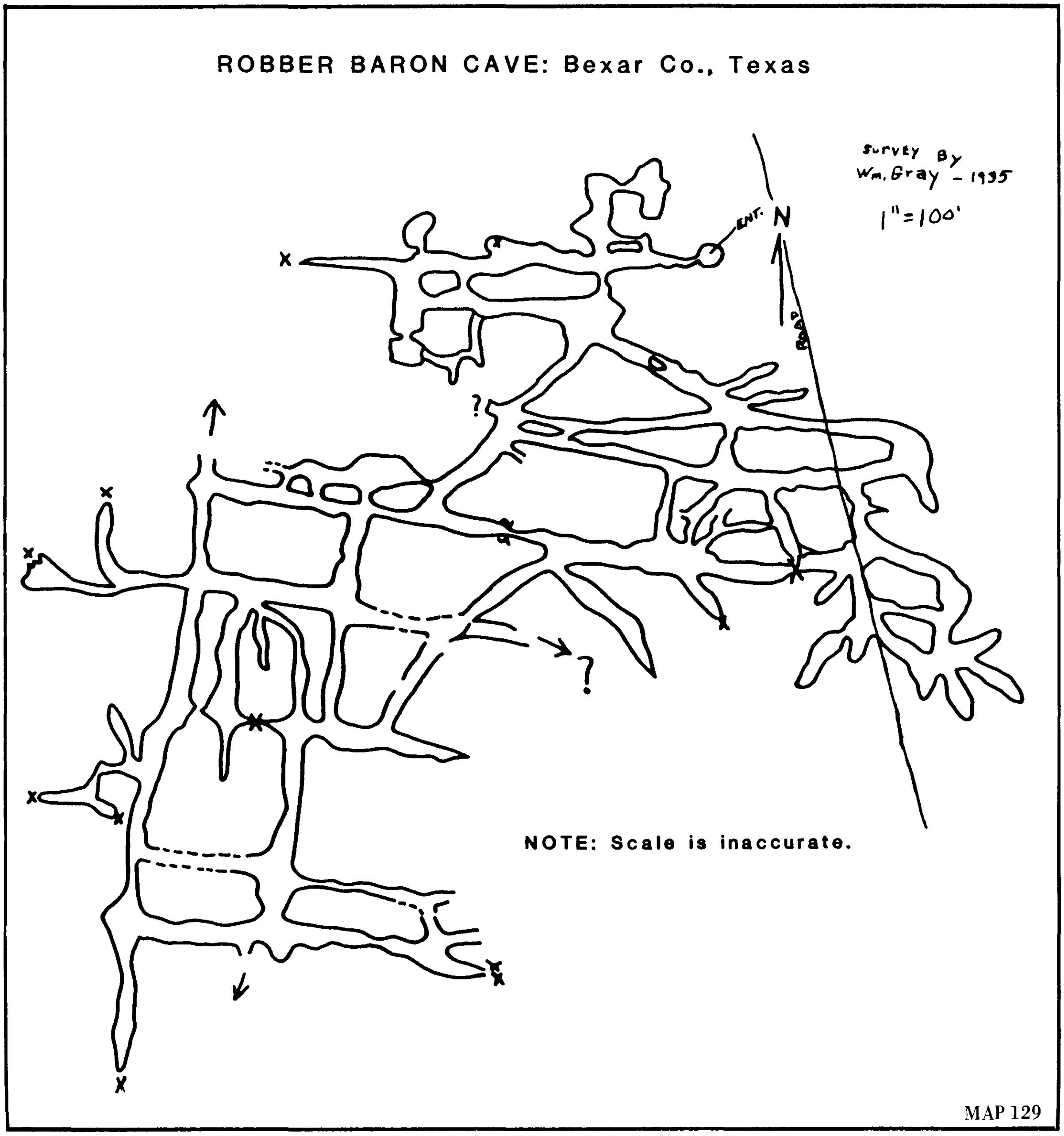
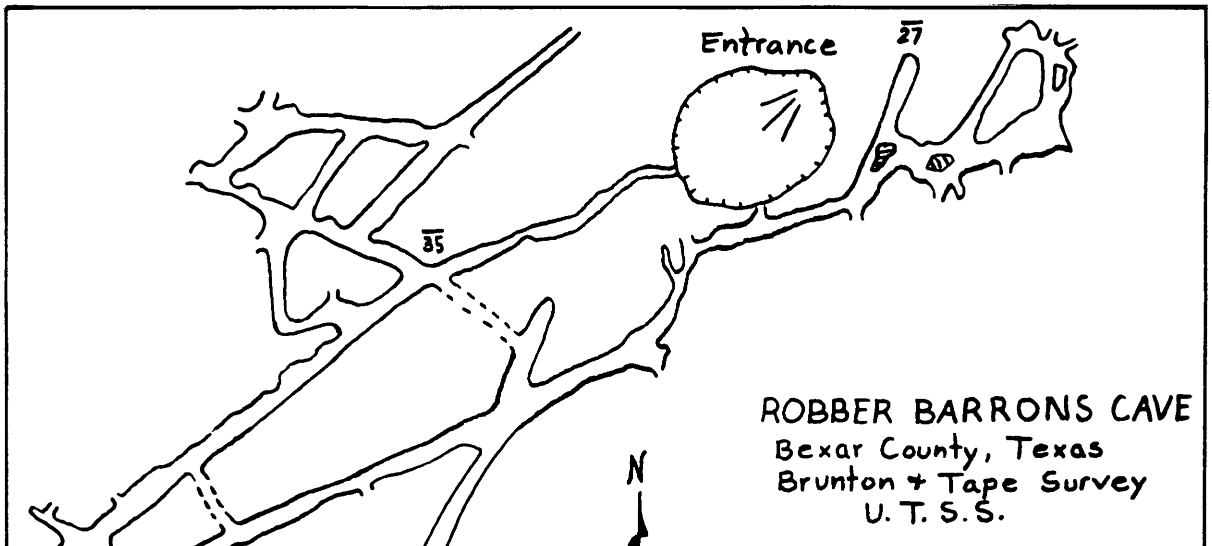


Photo. 31.—Tourists in the Devil's Kitchen in Robber Baron Cave, circa 1930.

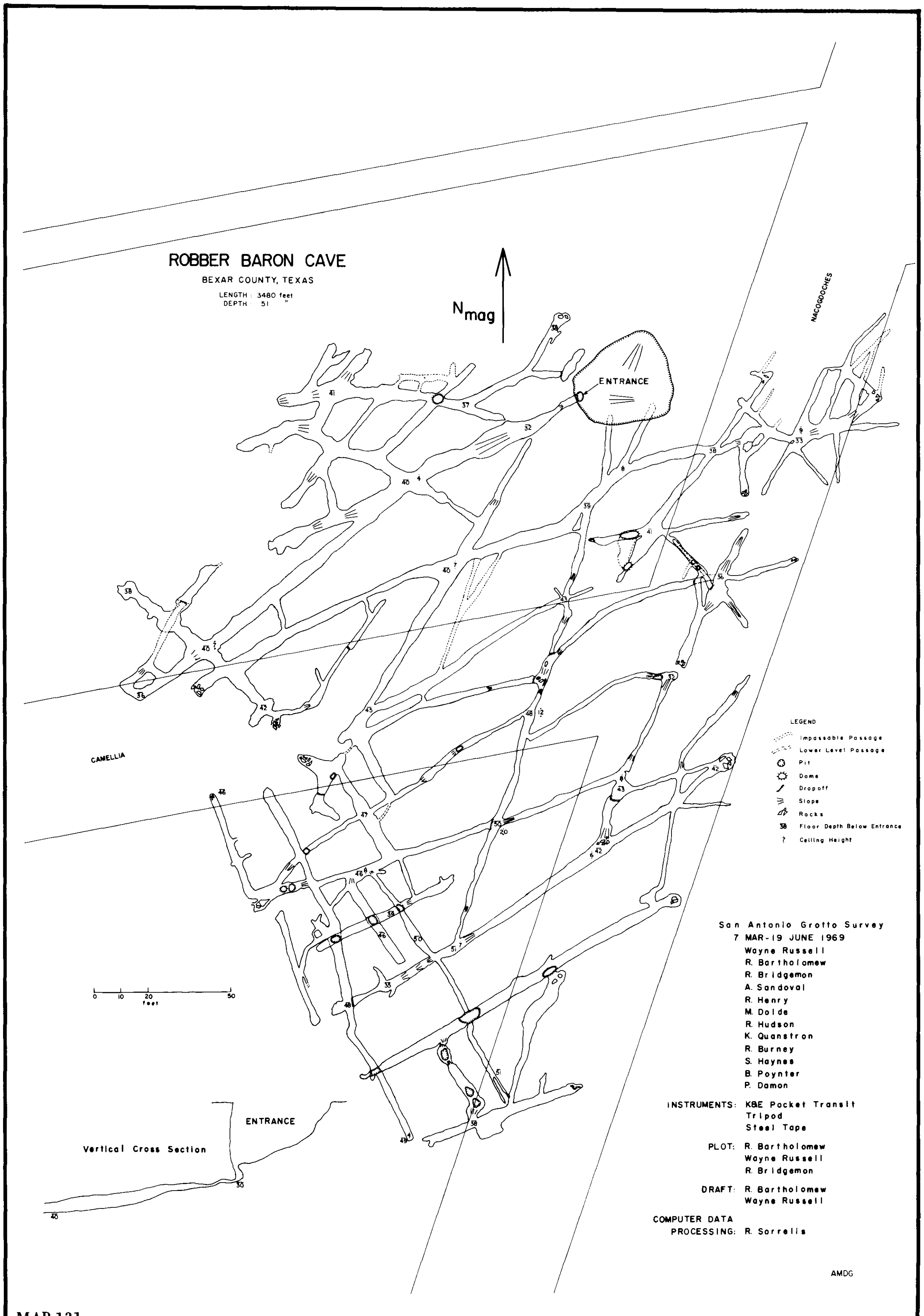
for use by robbers or Indians, yet Harp drew upon Barnes' work as the primary source of legends and ideas to enhance the cave's commercial appeal. The Devil's Kitchen was a room on the tour which was bathed in red light and contained a coffin and skeleton. When Robber Baron Cave first opened to the public only 100 m of passage were lit, but it was expanded to 250 m. For 50 cents Arthur Harp would lead eager tourists down wooden stairs in the sinkhole and then into the cave. First stop was the Pavilion Room (later called Maggie's Den from 1930-1933). The Pavilion Room had a picnic table, and benches and rock slabs to sit on. It served three functions, the first of which was as a waiting area for people to tour the cave. Second, it could be rented out for catered parties. Arthur Harp would lock people into the Pavilion Room so they wouldn't wander off into other parts of the cave, and then would release them at a pre-arranged time. Frank Peña remembers "we use-ta get drunk awful quick in there." Third, during prohibition years the door into the Pavilion Room had a peephole to a speakeasy. Continuing the tour, Harp would lead on down Popcorn Alley (the Entrance Hall), which was considered the prettiest section of the cave, and then turn left to the Lighted Passage. The Devil's Kitchen was in the



now collapsed area at the west end of the Hidden Passage and south of the Lighted Passage. Access was "through the man" (a passage cross section resembling a man's head, neck, and upper body) south into the Lighted Passage's westernmost side passage. The remainder of the tour extended down the Lighted Passage and made a loop through the Male Passage before heading back out to the surface. Harp would occasionally lead off-trail tours for science classes and other interested groups. Self-guided tours were available and to keep people from getting hopelessly lost, Harp blasted shut many passages, thus limiting the cave's extent to what is presently known. Not all passages were blasted at the same time. Some were kept open so Harp could explore them. He camouflaged these passages by constructing artificial walls, plastered with cave clay, so they would appear to a wandering tourist as a natural cave wall. By 1929 however, all passages out of the current 1336 m long cave system were permanently sealed either by Harp or the Gas Company. During that year natural gas pipelines were being laid under Nacogdoches Road



MAP 130


ROBBER BARON CAVE
BEXAR COUNTY, TEXAS
LENGTH: 3480 feet
DEPTH: 51 "
N_{mag}
ENTRANCE
NACOGDOCHES
CAMELLIA
LEGEND
Impassable Passage
Lower Level Passage
Pit
Dome
Dropoff
Slope
Rocks
Floor Depth Below Entrance
Ceiling Height
San Antonio Grotto Survey
7 MAR-19 JUNE 1969
Wayne Russell
R. Bartholomew
R. Bridgemon
A. Sandoval
R. Henry
M. Dolde
R. Hudson
K. Quanstron
R. Burney
S. Haynes
B. Poynter
P. Damon
INSTRUMENTS: K&E Pocket Transit
Tripod
Steel Tape
PLOT: R. Bartholomew
Wayne Russell
R. Bridgemon
DRAFT: R. Bartholomew
Wayne Russell
COMPUTER DATA
PROCESSING: R. Sorrells
0 10 20 50
feet
ENTRANCE
Vertical Cross Section
AMDG

MAP 131

(then the Old Kings Highway). As a result, all underlying passages were blasted shut (notice on the map that passages along the cave's east side end in a relatively straight line under Nacogdoches Road). Advertisement for the cave was primarily by word of mouth and by pictures painted on the Harps' old Whippet truck. The cave's location on one of the main roads into San Antonio and just a few kilometers outside the city was a key factor in developing the public's awareness of it. Just prior to the commercial opening, Arthur Harp guided almost fifty news carriers from the Dallas *Morning News* in order to receive widespread free publicity. Tourists arriving at Robber Baron would find that handbills and small booklets on the cave were available (none of which have been located and would be of great historical interest). To widen the cave's appeal, a small park was established around the entrance. Park amenities included a hotdog stand, beverages, picnic area, playground with a merry-go-round and croquet, and a cable ride for children from the top of the sinkhole down 10 m to the entrance (remains of the cable ride's concrete platform are still on the sinkhole's east rim). In about 1926 the Harps joined in a partnership with a Mr. Strickland, but this only lasted a year or two. In late 1929 Arthur's mother became very ill. As a result, he and Inez moved to Kansas to take care of her and never returned to San Antonio. In 1930 a Mr. Saur assumed management of the cave. In 1933 he had to close the cave as a commercial operation due to lack of public interest, compounded by the Great Depression. Except for the cable ride's concrete platform, an unattached cave gate, and some bolts and electric lines in the Lighted Passage (out of sight on a high ledge), all commercial hardware was removed from the cave by 1934. William Gray produced the first known map of the cave in 1935. About 800 m of passage were included. In 1938 the cave was briefly used to commercially raise mushrooms. After this venture a 40-year battle began between the cave owners, trying to seal the cave for reasons of liability, and the neighborhood kids, who were continually digging it open. A factor of the cave's accessibility that worked for and against both parties was stormwater runoff into the cave. Over the years rains would periodically fill and wash open the entrance crawlway. In May 1950 Robber Baron Cave was included within a 0.18 sq km purchase by its present owner. The lot in which the sinkhole is located cost approximately $100. In the early 1950s, Gordon Danz, Bob Hudson, and members of the St. Mary's University Speleological Society explored the cave. In 1961 seven youths were trapped in the cave by mud and water clogging the entrance crawl. After considerable effort to excavate the crawl, all but one of the boys escaped. The remaining youth was stuck and the San Antonio Fire Department had to haul him out. In other "rescue" efforts in the cave, S.A.F.D. personnel would find their "victims" enjoying the effects of drugs and alcohol. Two trips were made in 1962 to survey Robber Baron Cave. The first was on the evening of 12-13 January. The party consisted of University of Texas Speleological Society members Eugene Blum, James Reddell, A. Richard Smith, and Peggy Walkington. About one week later Reddell and Smith returned with Orion Knox. A total of 550 m were surveyed on these trips and an additional 300 m were explored. From 7 March to 19 June 1969 Roger V. Bartholomew and Wayne Russell led members of the original San Antonio Grotto on the first major survey of the cave. They produced a fine map that showed 1061 m of passage. In 1976 the newly reorganized San Antonio Grotto undertook the resurvey of Robber Baron Cave with one of their primary objectives being to include as much detail as possible. Their search for detail revealed many small passages that had been overlooked in earlier surveys. This raised the total length to 1336 m. Teeni Kern, Gary A. Poole, George Veni, and Randy M. Waters led the effort which lasted from 11 December 1976 to 17 March 1977. Prior to the survey, in November 1976, Veni camped in the cave for a few days to field check the old map, become familiar with the maze, and dig into new passages. Except for the survey efforts, the owner had for many years refused cavers official access to the cave. The San Antonio Grotto has maintained access since 1976, largely because SAG members Veni and Waters used many hundreds of kilos in concrete, brick, and steel to gate the cave in October 1980. "No Trespassing" signs were also installed. If anyone ignored the signs, broke through the gate, and got hurt in the cave, the owner would probably not be liable. Reasonable deterrents had been placed and the violating individual(s) would be guilty of trespassing, and breaking and entering. To date, the gate has been breached three times. The first time was soon after it was installed and some work on it had not been completed. The second incident occurred in late 1982. During the gate construction, one portion of the entrance crawl was bricked-up. The bricks however, were very old and soft thus allowing someone to chisel them out. In response the SAG replaced the bricks with a solid wall of concrete containing reinforcing metal bars. The third incident took place in the fall of 1986 when someone attacked the hard to reach locks with a small, portable cutting torch. Following the gating of the cave in 1980, SAG members felt an effective cave clean-up was finally possible. An article was placed in the *North San Antonio Times* that the cave was gated and a clean-up would take place the weekend of 17-18 January 1981. Anyone interested was invited to help. The purpose of this invitation was to educate the local residents about the value of the cave (historic, geologic, biologic, archeologic), discourage their further use of the sinkhole as a trash dump, inform them about the gate, and invite them to call the SAG if they would like to see the cave. The clean-up was very successful. Most of the trash in the sinkhole was removed. A tour of the cave was given to volunteers as thanks for their participation. Numerous sacks were filled with trash during the tour and removed from the cave. Since the clean-up, the SAG has held periodic trips into the cave that included local youths who would have otherwise tried to break in, saving a lot of wear and tear on the gate. A register placed in the cave since its 1980 gating serves as a continuing record of the cave's history.

When the SAG began their project on Robber Baron Cave in 1976, an advertisement was placed in the San Antonio *Express News* asking for people who had been in the cave during its pre-commercial, commercial, and immediate post-commercial years. Much of the information presented in this historical account was obtained through interviews with many individuals, some of whom were closely involved with the Harps. Of special interest were rumors that had persisted throughout the years of underground rivers, lakes, and of a tremendously extensive maze beyond the cave's present bounds. Given the stories that Arthur Harp had spread, it was difficult to determine what was really true. In this respect the interviews were truly priceless. The late Charles Spang lived near the cave and was a frequent companion of Arthur Harp. Together they installed much of the cave's electric lighting and explored beyond the present limits. One of the areas they visited was where Spang's windmill intersected the cave a few hundred meters east of Nacogdoches Road. The main extent of exploration though, was to the southwest. In that area Harp and Spang found:

- a pit that was too deep to explore;
- a lake and a stream passage;
- that Robber Baron connected to Holmgreen's Hole (BCS #41), an extensive maze cave about 700 m distant;
- and passages which they estimated had led them as far as the Texas Military Institute, 3.2 km to the southwest!

Arthur Michael recalled a deep pit, possibly to water, beyond Popcorn Alley. Ray T. Dixon remembered that in 1927 the cave extended east, well beyond Nacogdoches Road, but its major extent was to the southwest. In that direction about 100 m beyond the Pavilion Room, was the "tunnel to the stream." His estimated distance from the entrance to the stream was about 400 m:

> "Go in about a quarter mile [400 m]. . .step down 4 feet [1.3 m] into a passage about 40-50 feet [12-15 m] long where you crawl on your hands and knees. . .step down, turn right, and go 25-30 feet [8-9 m] to reach the river."

Dixon claimed the river was "about 8 feet [2.7 m] wide and 2 feet [0.6 m] deep," and had a definite current. The river came out of one wall and went into the other. The 2.6 m high and wide passage Dixon was in continued unexplored from the river's far bank. Dixon also mentioned that he saw pinkish-white eyeless fish in the river. To the left of the "step down" following the 12-15 m crawl, Dixon explored 70 m by climbing along the passage walls with a stream far below him. The end of that passage was not reached. Ted Zettner provided the most compelling and verifiable account of the cave's great extent. "The main part of the cave got blocked off," Zettner stated, and to prove it he elaborated on one particular trip he made into the cave in 1925. On that trip it was decided among his group to take as much string as they could carry (so not to get lost) and by using a compass they would set off in one direction as far as they could explore. The passages they were in led them a great distance to the southwest. Eventually they reached a steep mud slope down into a lake room. Like Dixon's river the lake had blind fish in it. Unlike the river, a water well pipe intersected the cave and the lake. Its pump on the surface could be plainly heard in the cave. Zettner and his friends played in the water and then left the cave. In 1925 there was only one windmill in the direction Zettner's group had been traveling. Fiftyone years later, Zettner pinpointed the well's location at 1.4 km southwest of Robber Baron Cave. Upon exiting the cave in 1925, Zettner and company approached the farmer who owned the well to inform him of their discovery. The farmer replied, "So you're the little bastards who muddied my water!" That day had been the only time the farmer pumped muddy water from his well. Connection confirmed. In view of these tales the San Antonio Grotto began digging at various breakdown areas in the cave. The first major excavation site was in the Pavilion Room, but more and more interviews indicated the west end of the Lighted Passage was the main route to the river. In late 1976 Poole, Veni, and Waters were joined by John Cross, Jesse Hernandez, and Chuck Pautz in the first of many assaults upon what is now referred to as the "Mystery Breakdown." Veni and Waters headed the effort and by 1981, 10 m had been tunneled with the use of picks, shovels, hammers, chisels, and buckets. The dig has been a relatively safe venture due to the type of rock involved, the Austin Chalk. After collapse, this soft rock compresses and recompacts itself into a stable matrix of relatively uniform density and consistency. Unlike other rock types where digging in collapse primarily involves the removal of individual breakdown blocks balanced upon each other, the Robber Baron dig is more akin to carving a tunnel (its average size is 1.3 m high and wide). Although some parts of the tunnel have been shored with pressure-treated lumber, it is mostly a precautionary measure. In the tunnel's ten year existence (to the date of this writing) only minor amounts of clay and rock have sporadically flaked off the ceiling. In 1981 the owner became interested in extending the length of his cave. Late that year and in early 1982 he rented a air-powered jack-hammer to assist in the digging effort. A portable air compressor was on the surface and over 100 m of high-pressure hose connected it to the hammer at the Mystery Breakdown. Kurt L. Menking constructed two carts for transporting excavated material out of the tunnel. The motto of the dig was painted on the side of the carts, "Holmgreen's or Bust." So far it has been "bust." The first 10-11 m of the tunnel were dug through a compact rock-clay matrix. The uncollapsed cave walls were also excavated and used as guides for where to dig. The jack-hammered 2-3 m, however, seem to be in an area of major collapse. The walls have been temporarily lost. It appears that that portion of the tunnel is carved through a single large breakdown block. Vibrations from Camelia Road located above the Mystery Breakdown are believed to have added to the collapse. For an example of known recent collapse in the cave, refer to the 1969 map and compare it to the 1977 map. In 1969 a route from the Lighted Passage, through "The Man" and into the Hidden Passage was open (this area is near the Mystery Breakdown and also under Camelia). Eight years later this route had been blocked by progressive collapse. The dig in the Mystery Breakdown has been a grim effort, but it is hoped the end of the collapse will be reached

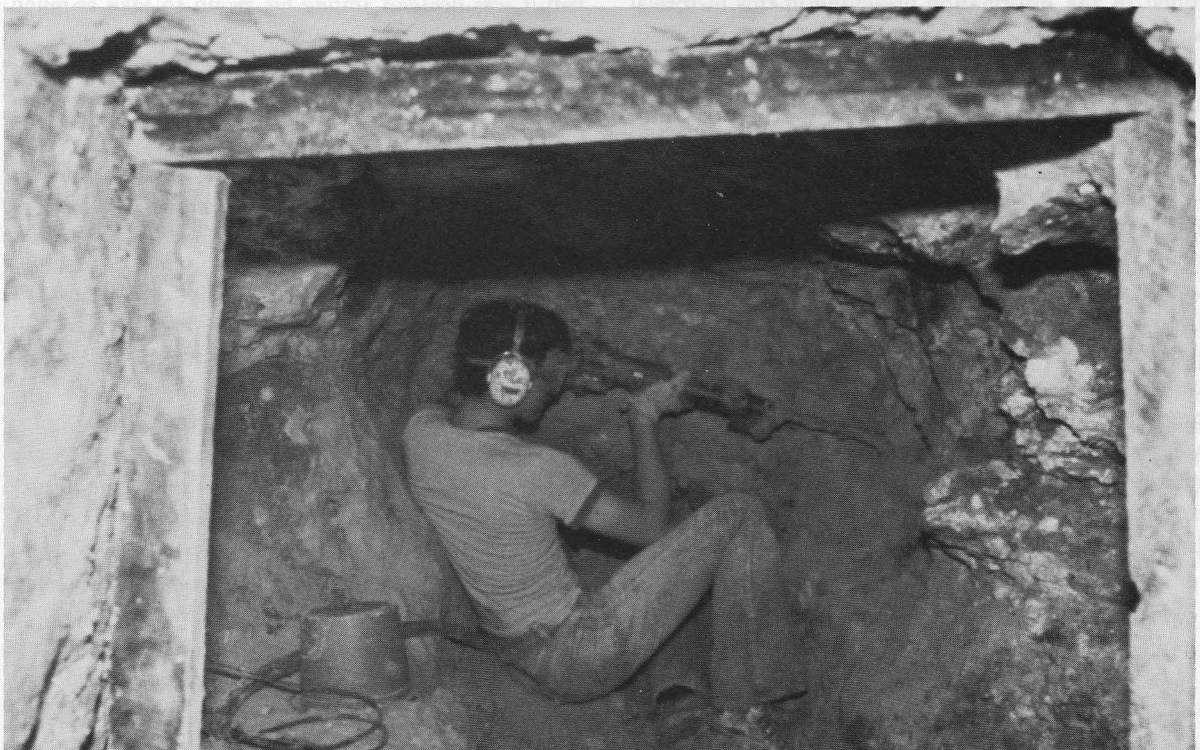


Photo. 32.–Robber Baron Cave. Jackhammer assist in pushing the Mystery Breakdown (George Veni).

under the far side of Camelia Road only 2-3 m away. If the amount of passage per area continues similarly beyond the breakdown, Robber Baron Cave is potentially one of the longest caves in the world and therefore well worth the efforts expended.

Biology: Very little fauna is noticed by the casual explorer visiting Robber Baron Cave. This impression is very misleading because closer inspection shows a diverse and interesting fauna. During clearing of the entrance sink a number of species were collected. This material included earthworms, snails (*Mesodon roemeri*), epigean oniscoid isopods, spiders (*Metaltella simoni, Cicurina varians*, and *Drassyllus* sp.), millipedes (*Oxidus gracilis*), cockroaches (*Periplaneta* sp.), earwigs, assassin bugs (*Triatoma* sp.), click beetle larvae (*Ampedus* sp. and *Conoderus* sp.), and tenebrionid beetles. The spider *Metaltella simoni* is of special interest in that this is an introduced species not previously reported from Texas. A pseudoscorpion, epigean millipedes, and a carabid beetle were collected from the entrance sink by Scott J. Harden on 21 February 1986. Trichoniscid isopods and millipedes are commonly found feeding on decomposing organic debris. The cave's location in an isolated outcrop of Austin Chalk has allowed the evolution of a distinctive complex of troglobites. From 1976-1978 a packrat named "Mickey" lived in the cave and nested in the low (humanly impassable) passage connecting the Lighted Passage to the Male Passage. Mickey Rat is the official mascot of Robber Baron Cave. Invertebrate collections have been made in the cave on 28 February 1969 by Roger V. Bartholomew; in April 1969 by Roger V. Bartholomew; on 26 December 1980 by George Veni; on 17 January 1981 by George Veni; on 10 March 1982 by A.G. Grubbs, Bill Steele, and Randy M. Waters; on 3 April 1982 by A.G. Grubbs; on 11 December 1982 by Randy M. Waters; on 6 April 1983 by Randy M. Waters; on 1 May 1983 by Randy M. Waters; on 9 and 11 December 1983 by Scott Harden and Randy M. Waters; in January 1984 by Randy M. Waters; on 31 March 1985 by Doug Drysdale and Randy M. Waters; and on 21 February 1986 by an unknown collector. The following is a composite list of fauna collected from the cave:

Earthworms—Undetermined material
Snails—*Helicodiscus eigenmanni* (troglophile)
Mesodon roemeri (trogloxene)
Glyphyalinia umbilicata (empty shells)
Zonitoides arboreus (empty shells)
Isopods—Oniscoidea genus and species
Trichoniscidae genus and species 1 (troglobite)
Trichoniscidae genus and species 2 (troglobite)
Pseudoscorpions—Undetermined material (accidental)
Spiders—*Cicurina* n.sp. (troglobite)
Cicurina varians (troglophile)
Metaltella simoni (accidental)
Drassyllus sp. (accidental)
Eidmannella rostrata (troglobite)
Achaearanea tepidariorum (troglophile)
Harvestmen—*Texella* ?n.sp. (troglobite)
Mites—Undetermined material
Centipedes—Lithobiomorpha undetermined
Millipedes—*Cambala speobia* (troglobite)
Speodesmus n.sp. 1 (troglobite)
Oxidus gracilis (troglophile)
Springtails—Undetermined material
Sinella (Coecobrya) caeca (troglophile)
Earwiglike entotrophs—Iapygidae genus and species (troglobite)
Silverfish—*Texoreddellia texensis* (troglobite)
Cave crickets—*Ceuthophilus (Geotettix) cunicularis* (trogloxene)
Earwigs—Undetermined material
German cockroaches—*Euthlastoblatta* sp. (trogloxene)
American cockroaches—*Periplaneta* sp. (accidental)
Assassin bugs—*Triatoma* sp. (trogloxene)
Ground beetles—Carabidae genus and species
Comb-clawed beetles—*Hymenorus* sp. (troglophile)
Click beetles—*Ampedus* sp. (accidental)
Conoderus sp. (accidental)
Telephone-pole beetles—*Micromalthus debilis* (accidental)
Antloving beetles—*Batrisodes* sp. (troglobite)
Lamellicorn beetles—*Cotinis* sp. prob. *texana* (accidental)
Darkling beetles—Tenebrionidae genus and species
Noctuid moths—Noctuinae genus and species
Flies—Undetermined material
Mosquitoes—*Culiseta* sp. prob. *inornatus* (trogloxene)
Blow flies—*Calliphora vicina* (accidental)

The possibility of blind fish in the presently inaccessible stream passage is very intriguing. If the hypothesis for the water source is correct (as detailed in the following geology section), then it may be possible the fish are rising with water out of the Edwards Aquifer. This phenomenon has already been documented for many wells that extend deep into the Edwards. It is also possible that the "blind fish" were troglobitic salamanders of the genus *Eurycea*, a species of which occurs in Elm Springs Cave (BCS #22).

Geology: Robber Baron Cave is a network maze, a horizontal complex of linear passages intersecting at near right angles. Formed within the Austin Chalk, the following theory of cave development is based on Palmer's (1975) study of maze cave genesis. In the vicinity of Robber Baron Cave, water enters the Austin Chalk by downward movement through a 4 m thick caprock of Pecan Gap Chalk. The Pecan Gap is a poorly soluble formation. Meteoric water descends uniformly through its joints to the more soluble Austin Chalk below. The joints are continuous into the Austin. For lack of preferential flow between them, they are solutionally enlarged and interconnected to similar sizes and shapes. Early theories attributed the cave development to phreatic flow, but there is no supporting evidence for this or even for vadose flow. Scallops, scours, meanders, vadose downcutting, and sedimentary depositional indicators are not present. The "blade-like" windows described in Bitch Passage would not form under the hydraulic pressure of phreatic or vadose flow but would develop as individual passage segments, along a common joint, solutionally enlarged towards linear interconnection. In slight variance with Palmer's study, the ceilings of Robber Baron are not developed as expected at the Pecan Gap-Austin Chalk contact. Except for areas of collapse the true solutional ceilings are 6-8 m below the contact. It appears the uppermost part of the Austin is poorly soluble. Enlarged bedding planes are common at the contact of the soluble and less soluble beds in the Austin; examples of this can be found off the Pavilion Room, Great Southwest Passage, Graffiti Room, and many other parts of the cave. As water moves down the passage walls, its dissolutional capacity is progressively diminished, thus accounting for the "V"-slot passage floors. The entrance sinkhole formed by the collapse of an at least four-passage intersection (Entrance Hall, Great Southwest Passage, passage east of the G.S.P., and a passage off the Pavilion Room). Subsequent diversion of surface runoff into the newly collapsed sinkhole served to enhance further collapse and to aggressively break down collapse material and transport it into the cave. This process has deposited substantial volumes of sediment, especially in the Entrance Hall, which until 1982 continued to receive debris-laden runoff. Little runoff presently enters the cave due to terracing within the sinkhole and urbanization of the surrounding landscape, which has channeled away most surface drainage. Structurally, vertical joints have a primary, average strike of N35°E and a secondary strike of approximately N75°E. Along the southwest side of the cave the main joint trend is N30°W and most east-west development is incidental (interconnecting vertical shafts and passages that lie close and parallel to each other). These passages are generally smaller than other passages in the cave and average 2 m deeper. Their northwest-southeast joint sets are attributed to fracturing that probably predates the Balcones fault system. These passages also probably pre-date the passages formed along the Balcones fractures. Numerous vertical shafts have developed where the younger passages have enlarged and intersected the older, deeper passages. Integration of these passages into Robber Baron produced a localized base level for drainage. The older passages may have developed under phreatic flow conditions, but further investigations are needed to confirm this. The question arises as to the geologic possibility for the stream passage claimed by early explorers. Although

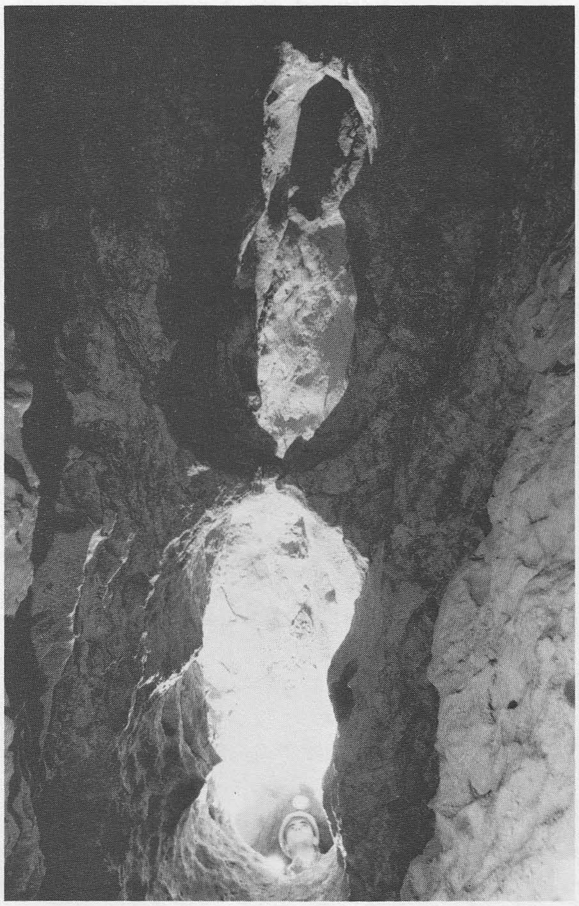


Photo. 33.–Interconnecting domepits in Robber Baron Cave (Wayne Russell).

the Austin Chalk is recognized as a poor to fair water-bearing unit, perched streams have been discovered elsewhere (BCS #143, Isopit), but of greater significance, it is believed that occasional high-yield water wells in the Austin Chalk tap water from the deeper Edwards (Balcones Fault Zone) Aquifer. This water is under artesian pressure and rises along faults into the Austin. Such an origin is likely for the water of Robber Baron Cave's lost river. Increased municipal pumpage has drawn down the level of the Edwards Aquifer. Like many artesian springs and wells in the Edwards, the modern flow regime of Robber Baron's river would probably be seasonally intermittent and dependent upon periods of substantial recharge.

Archeology: It is improbable that artifacts of great age would be found in Robber Baron Cave. Prior to its commercialization, the entrance was much like it was after commercialization—a crawlway that periodically opened and closed due to storm water runoff. It is unlikely that the cave was used as an Indian habitation or as an outlaw hideout (except perhaps for the entrance sinkhole). However, artifacts of its commercialization and of the 1920s can be found. In July 1976 George Veni and Randy M. Waters dug a 3 m deep test pit in the Lighted Passage, 2 m east of its intersection with the Great Southwest Passage. Bottles, stone steps, lights, newspapers, and other miscellaneous items were found. This area was one of the most heavily trafficked in the cave and has filled with 1-2 m of sediment since commercialization.

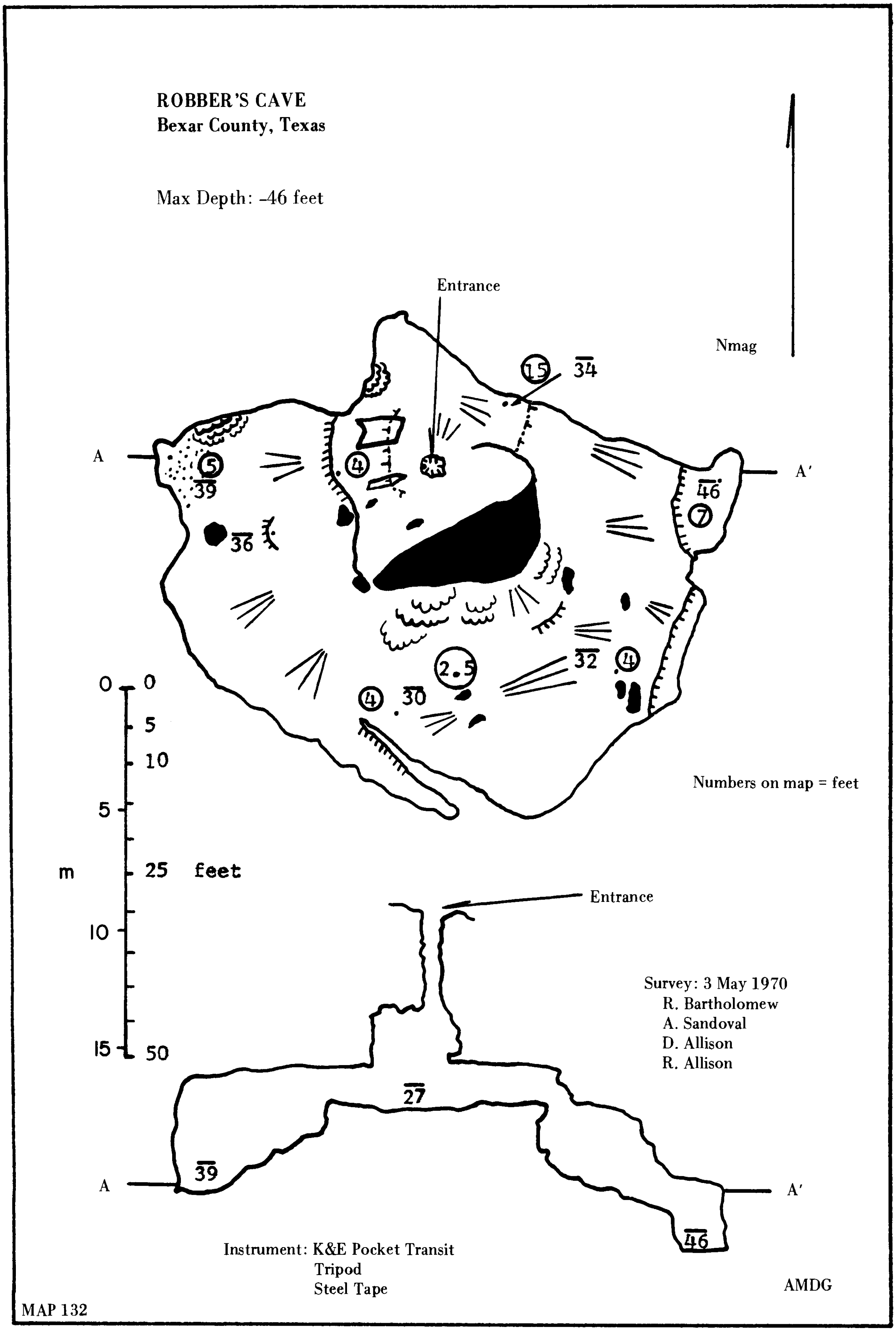
Meteorology: Air flow in the cave has shown considerable variation and merits further research. Over the years it has been noted that strong steady breezes have blown both into and out of the cave; sometimes there has been no air movement for several hours. During the 1976-1977 survey, the cave was observed to "breathe" in and out with each phase lasting about one hour. Although no "bad air" has ever been reported in the cave, some areas circulate less air, and with visitation the CO_2 levels increase temporarily (this is a subjective determination based upon ease of breathing). On 14 September 1986 William R. Elliott took measurements of CO_2 and O_2 levels at several points in the cave. His results follow: 60 m from the entrance (20.5% O_2; 0.38% CO_2); "Mistake Area" (18.3% O_2; 2.75% CO_2); Male Passage (18.9% O_2; 1.8% CO_2); Graffiti Room (20.0% O_2; 0.75% CO_2). The increased CO_2 and decreased O_2 levels were clearly associated with areas of poor air circulation. On the night of 12-13 January 1962, a series of air temperature readings were made by A. Richard Smith between the hours of 10:30 p.m. and 2:30 a.m. The following twelve locations are indicated on the 1962 UTSS map and the results were:

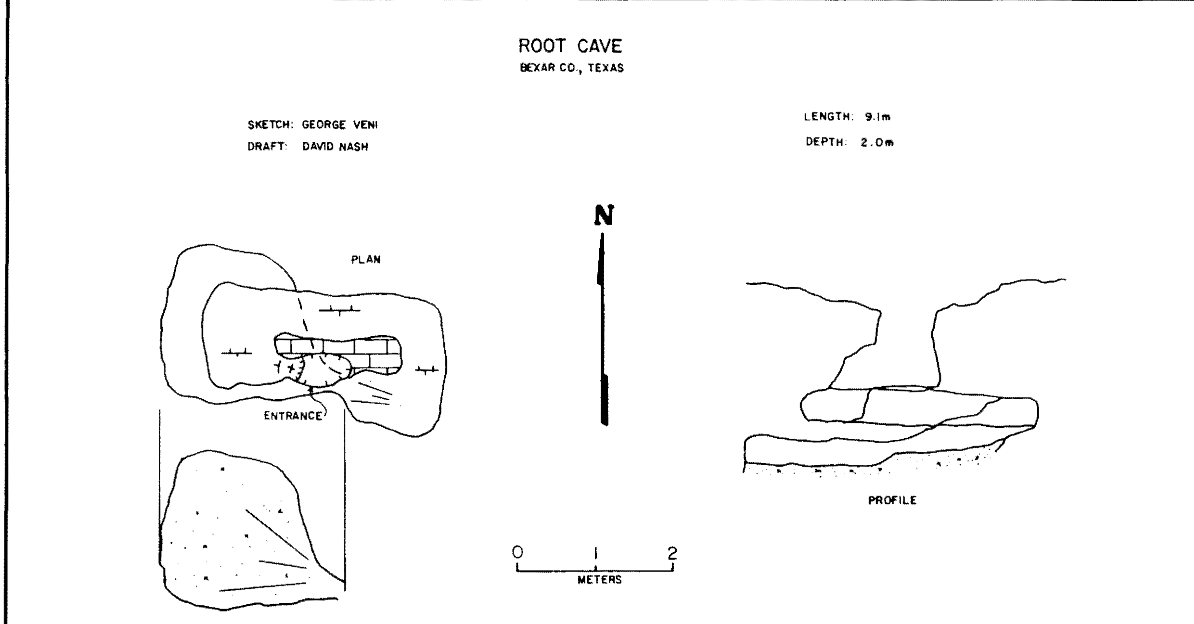
Location	Temp. (°C)
1	-5
2	3
3	13
4	17
5	19
6	20
7	17
8	18
9	20
10	22
11	22
12	22

A strong cold breeze was entering the cave at that time, but it was undectetable beyond location #3. The data indicated simple mixing of cold outside air with warmer cave air. Higher parts of the cave (for example, the Graffiti Room, Chapel Room, and Last Passage) act as heat traps and could probably be correlated with areas of decreased air circulation.

Technique: Except for the keys to the gate, no special equipment is needed for the cave. Robber Baron is an excellent cave in which to train novice cavers. It offers ample opporunity to walk, crawl, stoop, climb, and even to get slightly lost.

Bibliography: Anonymous (1936:483; 1961e; 1962a: 80; 1962c:1; 1963d:130-131; 1965d:40; 1967a:104; 1967c:119; 1969b:26; 1969c:70; 1969d:79; 1969g: 110; 1972; 1973q:12; 1976c:165; 1978h:1; 1979f:1; 1979i:3; 1980c:125; 1980d:104; 1981a:1; 1981b:12; 1982a:56; 1982b:15; 1985a:87); Adams (1976); Anderson (1976); Anderson, Hoover, and Ritchie (1971:159); Arnow (1959:16; 1963:18); Barnes (1910); Bartholomew (1970a:67-69); Craun (1948: 44-45); Dixon (1976); Elliott (1984:27; 1986:44); Gertsch (1984:61); Green (1982:62); Halter (1976); Hudson (1955:5); Hunnam (1976); Ivy (1986:43); Jackson (1948:28); Jorden (1980:62-63); Kastning (1983:477, 516, 519); Lane (1976); Livingston, Sayre, and White (1936:69); Menking (1980:126; 1981:39); Michael (1976); Minton (1986:45); National Speleological Society (1951:18); Nicholson (1933:192); Ownby (1929:8); Palit (1984b:28; 1985a:46; 1985b:87; 1986:16); Palmer (1975:57-76); Parks (1931:133-141); Passmore (1977:36-37; 1978:3); Peña (1976); Pogue (1976); Poole (1978a:2; 1978b:4); Randall (1984:1, 20); Reddell (1961b:1; 1964b:9, 48-49); Reddell and Knox (1962:3-5, 26-29, 2 maps); Reddell and Russell (1962a:6; 1962b:1); Reddell and Smith (1966:3); Russell (1966:31); Smith (1965:160; 1968:4); Smith (1973d:7); Stickle (1937:122); United States Geological Survey (1953); Veni (1978a:6; 1978e:4; 1983: 99; 1984b:12); Walker (1955); Waters (1976c:1;


ROBBER'S CAVE
Bexar County, Texas
Max Depth: -46 feet
Entrance
Nmag
A
A'
15
34
5
39
4
36
46
7
32
2.5
30
0
5
10
25
50
m
feet
15
Numbers on map = feet
Entrance
Survey: 3 May 1970
R. Bartholomew
A. Sandoval
D. Allison
R. Allison
27
39
46
Instrument: K&E Pocket Transit
Tripod
Steel Tape
AMDG
MAP 132



MAP 133

1979:7-9; 1980:126-127; 1983a:73); Wermund, Cepeda, and Luttrell (1978:8); White (1948:47, map); Widener (1959:82); Zettner (1976).

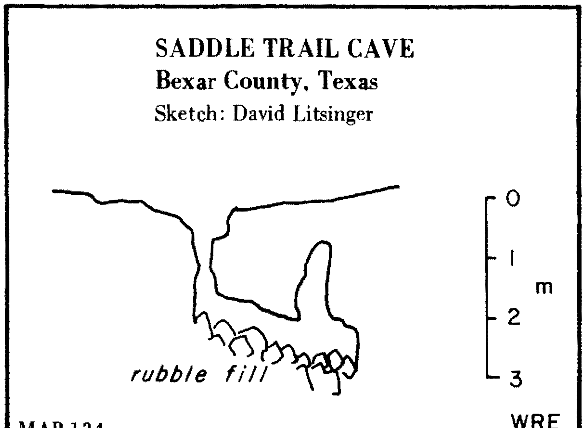
ROBBER'S CAVE (BCS #57)
Alternate names: Aue Cave No. 2; Thurman Cave No. 2
Location: Helotes 7.5′
Description: A 9 m deep pit opens into the middle of a 17 m diameter room. Breakdown and dripstone speleothems slope down and away to the walls for a total depth of 14 m. (See Map 132.)
History: It is not known who first discovered the cave. It was originally thought to be the rumored Robber's Cave (BCRP #23) where a murder victim was dumped in the late 19th century, but no cave known in Bexar County meets that cave's description. This, the known Robber's Cave, was surveyed on 3 May 1970 by D. and R. Allison, Roger V. Bartholomew, and Andy Sandoval. On 3 October 1973 the cave was resurveyed by Kathy Allison, Glenn Darilek, and Mark and Stan Shaw.
Biology: Cave crickets (*Ceuthophilus* sp.) have been observed in the cave. A copperhead, *Ankistrodon contortrix*, was killed at the bottom of the entrance drop on 3 November 1968.
Geology: Robber's Cave is a collapse-modified phreatic chamber developed in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer.
Technique: A cable ladder or handline is helpful in descending the entrance drop.
Bibliography: Anonymous (1968h:149; 1973q:11-12); Bartholomew (1970d:134); Darilek (1973d:101-102; 1973e:372-373); Litsinger (1973a:15; 1973b:10); Passmore (1977:38-39); Reddell (1961b:1); Reddell and Knox (1962:3-4, 6); Reddell and Russell (1962a:5-6); Reddell and Smith (1966:2, 4); Veni (1978a:6; 1985); Waters (1976a:15).

ROOT CAVE (BCS #111)
Location: Castle Hills 7.5′
Description: A hackberry tree grows out of the 1 m deep pit entrance, which is located at the bottom of a 6 m diameter sinkhole. A crawlway leads west from the pit and corkscrews around it, north, east, south, and west again, for 6 m. The passage goes under the entrance pit but is blocked by a large root of the tree. With some digging, the root-blocked passage can be negotiated but the cave ends within 2.5 m. (See Map 133.)
History: The cave has only been visited twice by cavers. It was discovered in 1978 by George Veni and Randy M. Waters, and they returned a year later to dig past the root.
Biology: Spiders, harvestmen (prob. *Leiobunum townsendii*), and cave crickets (*Ceuthophilus* sp.) were observed.
Geology: Root Cave is in the Edwards Limestone and serves to recharge its fault zone aquifer.
Bibliography: Veni (1985).

S.A.C.-KRETE CAVE (BCS #176)
Location: San Antonio East 7.5′
Description and History: During the construction of

San Antonio College (S.A.C.) a cave was opened. Ten truckloads of cement were used to fill and seal the cave.
Geology: The cave is in the Austin Chalk.

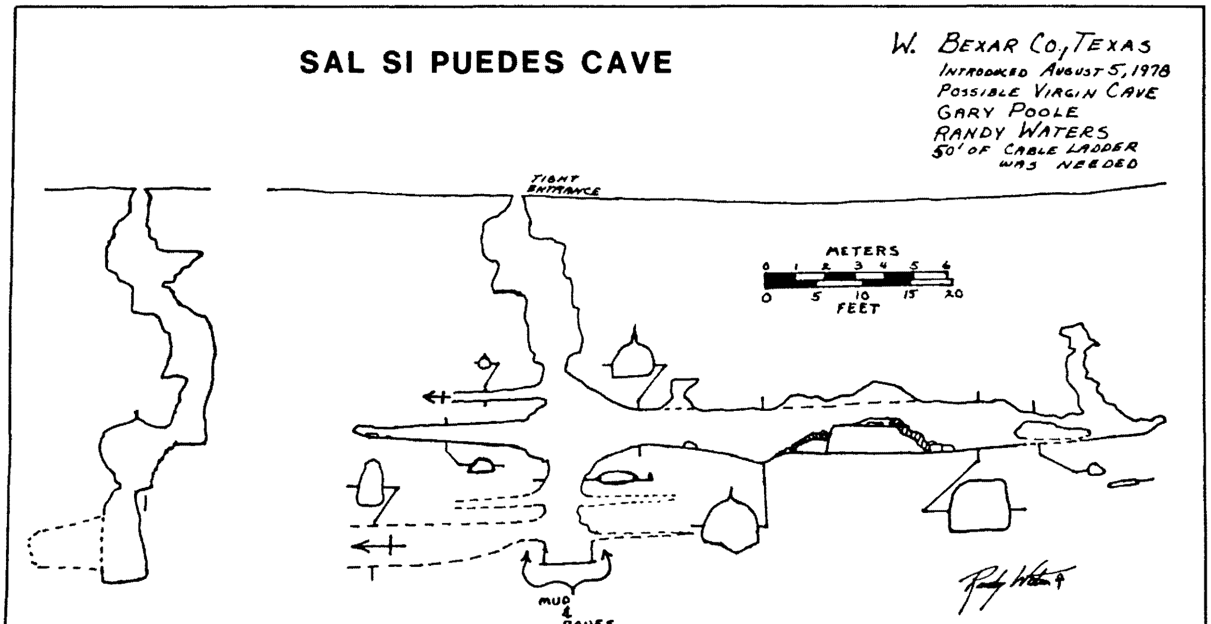
SADDLE TRAIL CAVE (BCS #179)
Location: Van Raub 7.5′
Description: The 0.6 m wide by 2.6 m long entrance pit drops 2 m into a 2.6 m diameter room. The cave once extended for an undetermined distance beyond those limits. A few truckloads of rocks dumped into the cave prevent access to those areas. (See Map 134.)
History: David Litsinger explored Saddle Trail Cave in the late 1960s, soon after a new housing development dumped the rubble into it.
Geology: The cave is in the upper Glen Rose Formation.



MAP 134

SAL SI PUEDES CAVE (BCS #98)
Location: Culebra Hill 7.5′
Description: A tight vertical entrance opens into an irregularly shaped 1.5 m diameter pit. At a depth of 9 m is a 20 m long horizontal passage averaging 1.3 m in height and width. Slightly offset from the 9 m drop, the pit continues 4 m to the bottom of the cave. Some digging is needed to explore a passage at the bottom, which goes at least 6 m and is up to 1.6 m high by 1 m wide. (See Map 135.)
History: The cave was explored on 5 August 1978 by Gary Poole and Randy M. Waters.
Biology: Only cave crickets (*Ceuthophilus* sp.) have been noted.
Geology: Formed in Austin Chalk, the 9 m pit seems to be vadosely developed to a paleo base level at the 20 m long passage. Lowering of the water table renewed vertical shaft development down to the unexplored passage level.
Technique: Two cable ladders are needed for the pits.
Bibliography: Anonymous (1978e:1).

SAM'S CAVE (BCS #60)
Alternate name: Natural Bridge Jr. Cave
Location: Van Raub 7.5′
Description: Two entrances, the larger being 1.3 m long and wide, offer easy climbs down into the first of two rooms, 5 by 3 m and up to 3.2 m high. Down another short easy climb is the adjoining, second room, 4 by 3 by 4 m high. (See Map 136.)
History: The cave has been known to its owner for



MAP 135

many years. The first cavers to explore it were Orion Knox and other members of the St. Mary's University Speleological Society on 30 January 1960.

Biology: Large numbers of harvestmen (prob. *Leiobunum townsendii*) have been observed in the cave.

Geology: Sam's Cave is developed in the upper Glen Rose Formation.

Bibliography: Anonymous (1964d:131; 1970:78; 1973q:12); Hershberger (1966:8); Passmore (1977: 35); Reddell and Knox (1962:3-4, 26); Reddell and Russell (1962a:6); Reddell and Smith (1966:3); Veni (1978a:6).

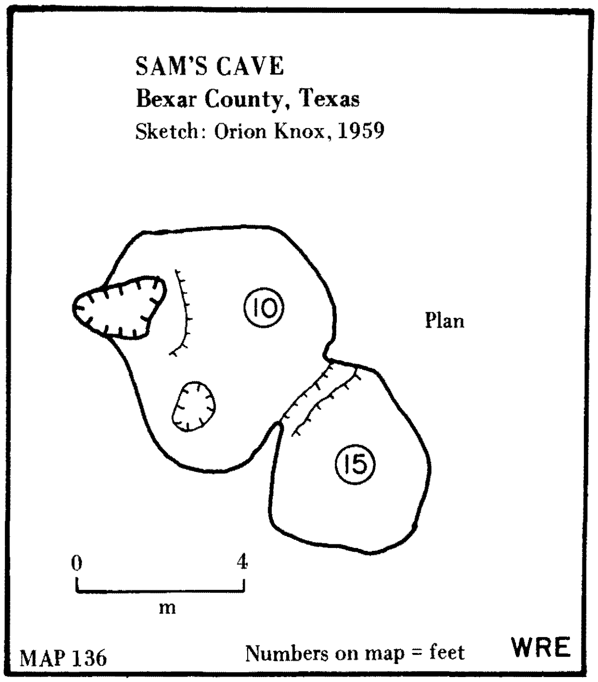
SAN ANTONIO SPRING (BCS #96)

Alternate names: The Headwaters; Head of the River; Blue Hole

Location: San Antonio 7.5′

Description: San Antonio Spring is one of over 100 springs located in the Olmos Flood Basin. A 3.2 m diameter octagonal concrete wall surrounds it. Artesian flow from the spring runs south 100 m to merge with Olmos Creek to form the San Antonio River. When the water level is lower and the spring isn't flowing, a cave is accessible. A steep and narrow passage floored with trash and rubble has been surveyed to a depth of 8.6 m where water-filled passage was encountered. During lower water levels the cave has been explored an additional 4 m, through a very narrow crawlway, to a 2.5 m pit to water. The pit is impassably tight. (See Map 137.)

History: American Indian artifacts dating to over 11,000 years B.P. have been found within the spring area. The area has been designated as the "Source of the River Archeological District" and is on the National Register of Historic Places. American Indian usage of the spring area continued to 1924. Since the establishment of nearby Spanish missions in the early 1700s, the springs have been used for increasing numbers of domestic, agricultural, and industrial purposes until the drilling of artesian wells resulted in diminished use of the springflow. The spring is supposed to maintain the baseflow of the San Antonio River for downtown tourism and, farther downstream, to carry wastewater away from the city. Because current springflow is sporadic, due to drawdown of the water table by increased municipal usage, pumped water wells usually supplement the flow of the San Antonio River. In the early 1970s Glenn Longley using SCUBA dove the spring to the narrow crawl preceding the 2.5 m pit. The first non-SCUBA exploration of the cave was by Randy M. Waters on 13 July 1978. Gary Poole and George Veni surveyed it to a depth of 6.9 m twelve days later. Veni and Waters found the water level even lower on 24 July 1980 and resurveyed the cave to a depth of 8.6 m.

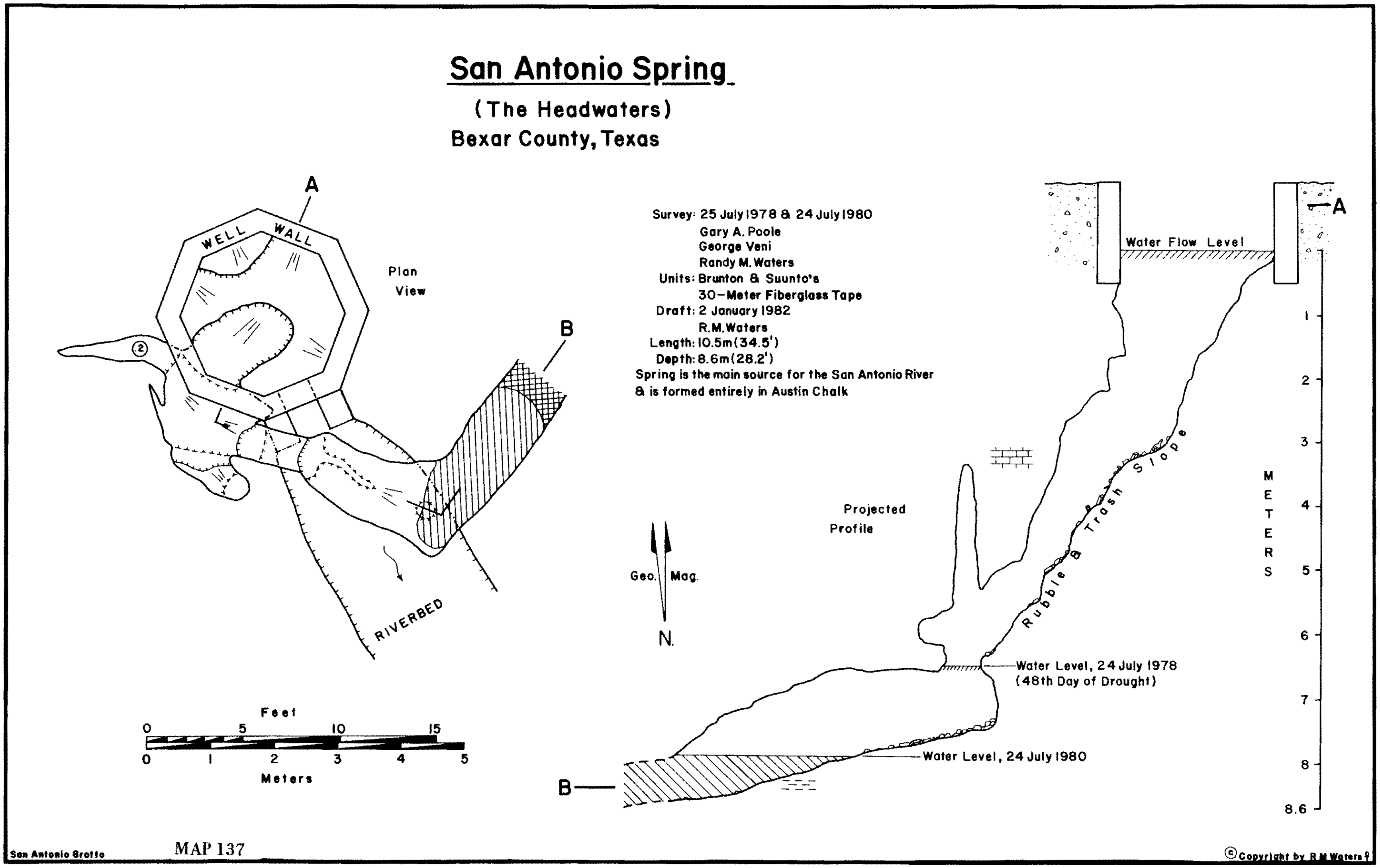


Biology: The spring supports a diverse aquatic and mammalian fauna. Waters (1983c) reported the presence of the characin *Astyanax mexicanus*, cyprinid fish, and the turtle *Chelydra serpentina*.

Geology: The cave was dissolved in the Austin Chalk by artesian water rising along a fault from the confined Edwards (Balcones Fault Zone) Aquifer and by chemically aggressive insurging floodwaters during no-flow conditions. Increased pumpage of the aquifer has lowered its water level so that the spring has become an estevelle—a point of groundwater recharge and discharge. Storm events that occur when the spring isn't flowing result in the backflooding of Olmos Creek, which whirlpools down the spring. At such times a nearby City Water Board Well discharges muddy water and organic debris from the Edwards Aquifer from a depth of over 200 m. This strongly indicates that the storm water runoff is carried into and travels within the deep, confined—supposedly "clean"—section of the aquifer. Large volumes of such unfiltered urban runoff entering the aquifer can have grave consequences for the regional groundwater supply.

Meteorology: High levels of CO_2 are occasionally encountered in the cave.

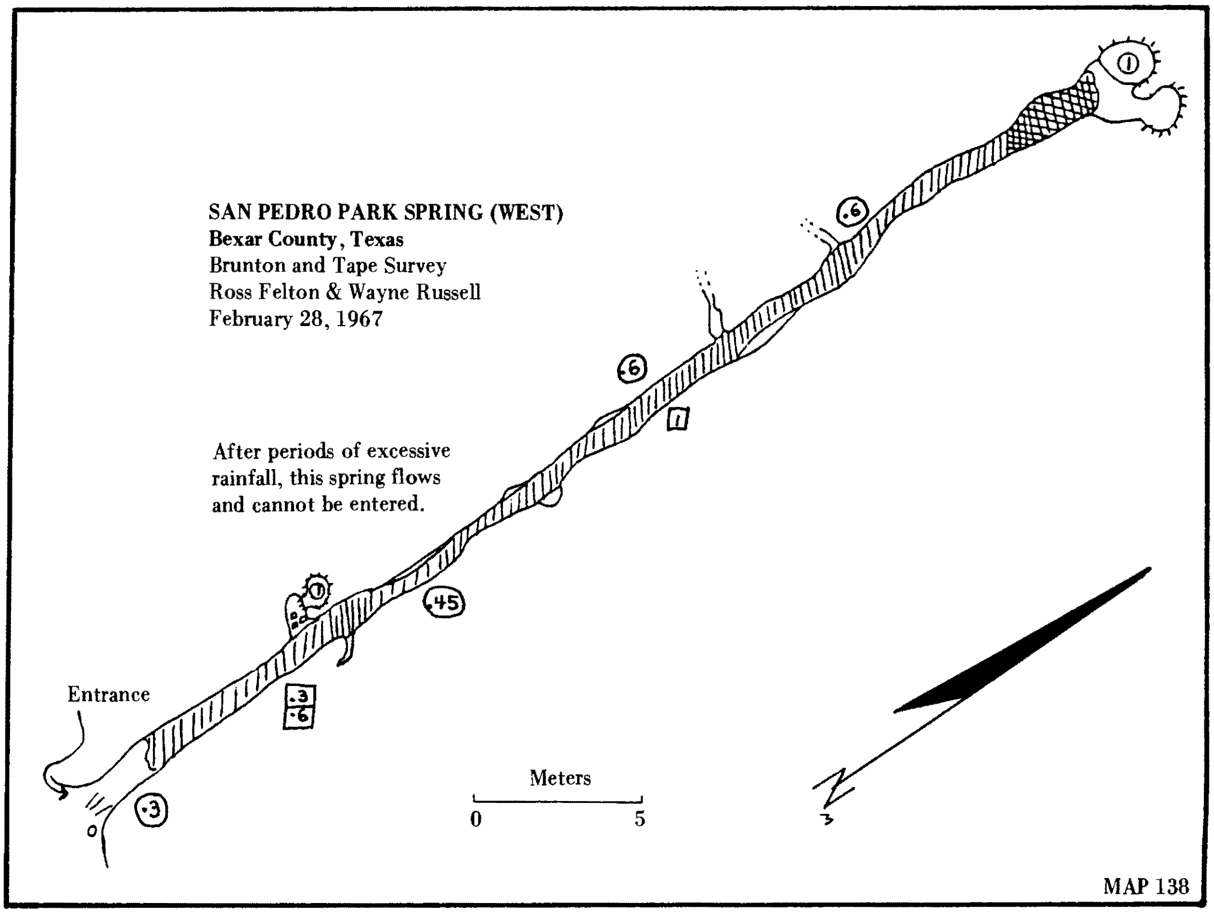
Technique: The 2.5 m pit could be made passable with explosives. Given the spring's historic status, however, it would be difficult (if not impossible) to arrange permission for it.


San Antonio Spring
(The Headwaters)
Bexar County, Texas
Survey: 25 July 1978 & 24 July 1980
Gary A. Poole
George Veni
Randy M. Waters
Units: Brunton & Suunto's
30-Meter Fiberglass Tape
Draft: 2 January 1982
R.M. Waters
Length: 10.5m (34.5')
Depth: 8.6m (28.2')
Spring is the main source for the San Antonio River
& is formed entirely in Austin Chalk
Plan View
WELL WALL
A
B
2
RIVERBED
Feet
0 5 10 15
0 1 2 3 4 5
Meters
Geo. Mag.
N.
Projected Profile
Water Flow Level
Rubble & Trash Slope
Water Level, 24 July 1978
(48th Day of Drought)
Water Level, 24 July 1980
METERS
1 2 3 4 5 6 7 8 8.6
San Antonio Grotto
MAP 137
© Copyright by R.M. Waters

Bibliography: Anonymous (1978a:4; 1980a:74); Arnow (1963:4, 28); Brune (1975:32-33; 1981:70-72, 503); Edwards Underground Water District, and Edwards Aquifer Research and Data Center (1981:17); Garza (1962); Hill (1892); Hill and Vaughan (1898:309); Livingston, Sayre, and White (1936:59, 62, 74, 78-84, 86, 104-105); Meinzer (1927:31, 37-38); Olmstead (1857:156-157); Sayre and Bennett (1942:26); Veni (1983:99); Waters (1983c:75-76); Wright (1916:7, 119-128).

SAN PEDRO BANK CAVES NO. 1 & 2 (BCS #206 & 207)
Location: Longhorn 7.5′
Description and History: Two caves of unknown extent were filled with concrete during the construction of the San Pedro Bank building in 1984.
Geology: The caves were in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer.

SAN PEDRO PARK SPRING (WEST) (BCS #62)
Alternate names: San Pedro Park Spring; San Pedro Park Spring Cave
Location: San Antonio West 7.5′
Description: The spring entrance is 1 m wide by 0.3 m high. The cave is a single passage 36.6 m long, becoming no higher than 1.6 m, and ending in two 1 m high domes. Wayne Russell said that the water issues from a honeycombed back wall, but Randy Waters claimed the passage reaches a constriction. (See Map 138.)
History: Collectively, the San Pedro Park Springs are a group of nine springs in and around San Pedro Park. They have been a popular site since prehistoric times as a domestic and farming water supply and for recreational purposes. They were first used by American Indians for hundreds of years and later by the Spaniards and other European settlers. The springs seldom flow due to increased municipal pumpage of the Edwards Aquifer, which has resulted in a lowering of the local water table. When they do flow, the springs feed a swimming pool and an attractively landscaped streambed that winds through San Pedro Park. Although many caves are reported in the vicinity of San Pedro Park Spring (West), none appear to be this cave, which was surveyed on 28 February 1967 by Ross Felton and Wayne Russell. This is not unusual since water crawls would not be popular with the



casual explorer, especially those of the late 19th century who were armed only with candles or kerosene lanterns. Also, in the past the cave may have been nearly or completely water-filled. In the late 1970s the City of San Antonio's Parks and Recreation Department blocked human access to the cave.

Biology: No cavernicolous fauna has been reported from the spring, although when it was consistently flowing, the spring supported a varied aquatic fauna. A dog, *Canis familiaris*, with a litter of puppies was observed in the cave by James Reddell.

Geology: San Pedro Park Spring was dissolved by artesian waters rising from the Edwards (Balcones Fault Zone) Aquifer along a fault which juxtaposes Pecan Gap Chalk with Austin Chalk.

Bibliography: Anonymous (1971a:4); Brune (1975: 33-34; 1981:69, 72-74); Crook (1967:75-76); Dullnig (1967); Eccleston (1950:24); Everett (1975: 121); Garza (1962); Passmore (1977:40); Pool (1975); Tous (1930a:5; 1930b:9); Veni (1978:6); Wright (1916:136).

SCHERTZ-CIBOLO CAVE (BCS #63)

Alternate names: Schertz Cave; Cibolo Cave

Location: Schertz 7.5′

Description: The cave has been covered by the expansion of Universal City. Prior to its filling, the cave entrance was at the base of a sink 3.4 m long, 2 m wide, and 2.6 m deep. A breakdown-floored slope led into the cave which was a 467 m long maze of crisscrossing passages. Most of the cave was 1.0 to 1.5 m high and 2 to 3 m wide. Breakdown blocked many passages. Cave coral completely lined some of the passages and was the only speleothem in this dry and dusty cave. (See Map 139.)

History: Very popular for many years, Schertz-Cibolo Cave was first reported by White (1948) as being 2.4 km long. Soon after that report the cave was explored by members of the St. Mary's University Speleological Society. In 1960, 230 m of the cave were surveyed by Bob Benfer, Alice Hersch, James Reddell, Bill Russell, and John Zuck. Their notes were lost, and their survey was never completed. On 14 and 28 February 1965 the cave was completely surveyed by Jerry Beckman, Jack Crossley, Joe Grote, James Jasek, and Mike McGee. Urban growth claimed another victim in the early 1970s when the entrance to this fine and geologically significant cave was filled.

Biology: Cave crickets (*Ceuthophilus* sp.) and rattlesnakes (*Crotalus* sp.) have been reported in the cave. During the 1965 survey James Jasek noted an abundance of black scorpions (prob. *Vaejovis reddelli*) on the floors, walls, and ceiling.

Geology: Schertz-Cibolo was the only known large cave in the Pecan Gap Chalk. It was developed along major east-west trending joints. The speleogenetic process that set it apart from the other much smaller caves in the Pecan Gap are unknown since the cave is no longer accessible for field study.

Bibliography: Anonymous (1960c:1-2; 1973q:12); Jasek (1965:65-67; 1975e:183-184); Passmore (1977:41); Reddell (1961b:1; 1967:192); Reddell and Knox (1962:3-5, 31-32); Reddell and Russell (1962a:6); Reddell and Smith (1966:4); Smith (1965:160); Veni (1978a:6; 1978e:4; 1983:98); Waters (1981a:41); White (1948:47, map); Widener (1959:82).

SCHREINER PLACE CAVE (BCS #64)

Location: San Antonio East 7.5′

Description: The cave is about 7 m deep and contains two rooms. One room is about 4 m by 5 m, while the other is about 3 m by 4 m.

History: All that is known about the cave is from a newspaper interview with Victor Herring. His description from the 1940s is as follows:

> The Schreiner Place Cave was large and might have been used as a lookout during battles fought between here and San Pedro Park. It was about 20 feet deep and two big rooms, one about 12X14 feet and another about 10X12 feet.

Geology: The cave is formed in the Austin Chalk.

Bibliography: Anonymous (1972); Veni (1978a:6).

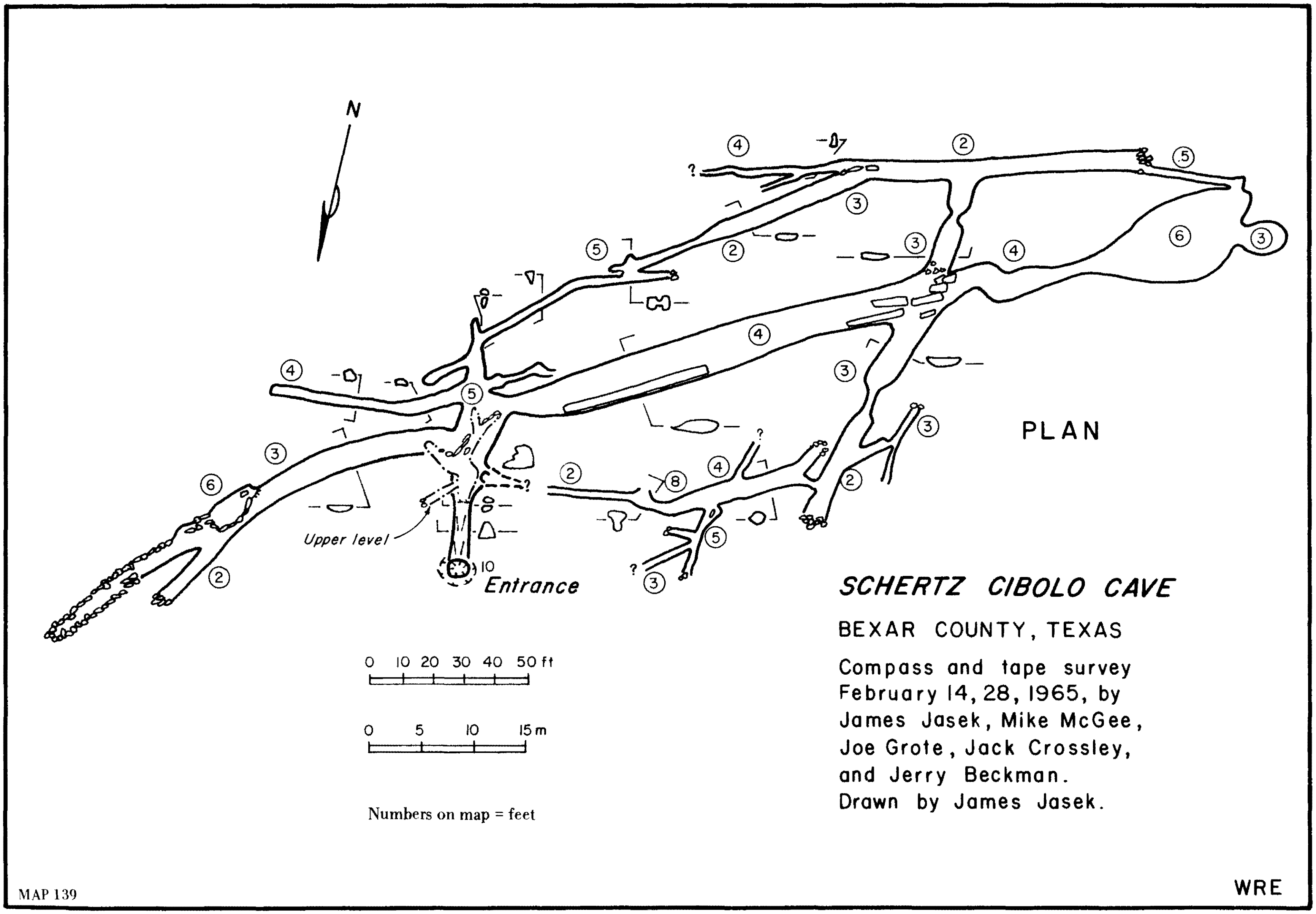
SCORPION CAVE (BCS #65)

Alternate names: Helotes Creek Ranch Cave; La Duquesa Cave

Location: Helotes 7.5′

Description: A 0.5 m diameter hole drops 3.8 m into Scorpion Cave, most of which is a single room 12 m by 2.7 m and 3 m high. East of the entrance is a small hole in the floor that leads into a tiny "room" below. To the northwest the cave drops 2.8 m and ends in an excavated crawlway. The crawlway enlarges after 1.6 m to a 1.6 m diameter by 1.6 m high room. Centered in it is the very narrow, blind, 3.5 m deep, "One Way Pit." (See Map 140.)

History: Greg Passmore first heard of the cave in the early 1970s, and on 9 October 1971 he led Glenn Darilek, Matt Farrar, Scott Harden, Jorga Lindgron, and Bruce Story to survey it. It was named for its location on the Helotes Creek Ranch. Soon afterward, the owner decided to rename the cave "La Duquesa" and the map was redrafted to indicate the change. In 1975 Randy M. Waters rediscovered the cave. He returned with George Veni in May 1976,


N
PLAN
Upper level
10
Entrance
SCHERTZ CIBOLO CAVE
BEXAR COUNTY, TEXAS
Compass and tape survey
February 14, 28, 1965, by
James Jasek, Mike McGee,
Joe Grote, Jack Crossley,
and Jerry Beckman.
Drawn by James Jasek.
0 10 20 30 40 50 ft
0 5 10 15 m
Numbers on map = feet
WRE

MAP 139

and they dug open the crawlway to One Way Pit. Unaware of the previous exploration, they named the cave for its occupants. On 4 March 1977 Scorpion Cave was resurveyed by Terry Inboden, Gary Poole, and George Veni.

Biology: Many black scorpions (prob. *Vaejovis reddelli*), harvestmen (prob. *Leiobunum townsendii*), and cave crickets (*Ceuthophilus* sp.) have been observed in the cave.

Geology: Scorpion Cave initially formed as a phreatic chamber in the Edwards Limestone. Vadose shaft development, collapse, and secondary calcite deposition modified the cave subsequent to the decline of the local water table.

Technique: A cable ladder is quite useful in negotiating the entrance drop.

Bibliography: Anonymous (1978l:2-3); Passmore (1977:42); Poole and Passmore (1978:34, 37, 48); Veni (1978a:6; 1985); Waters (1976b:8).

SCREAMING MEEMIES PIT (BCS #66)

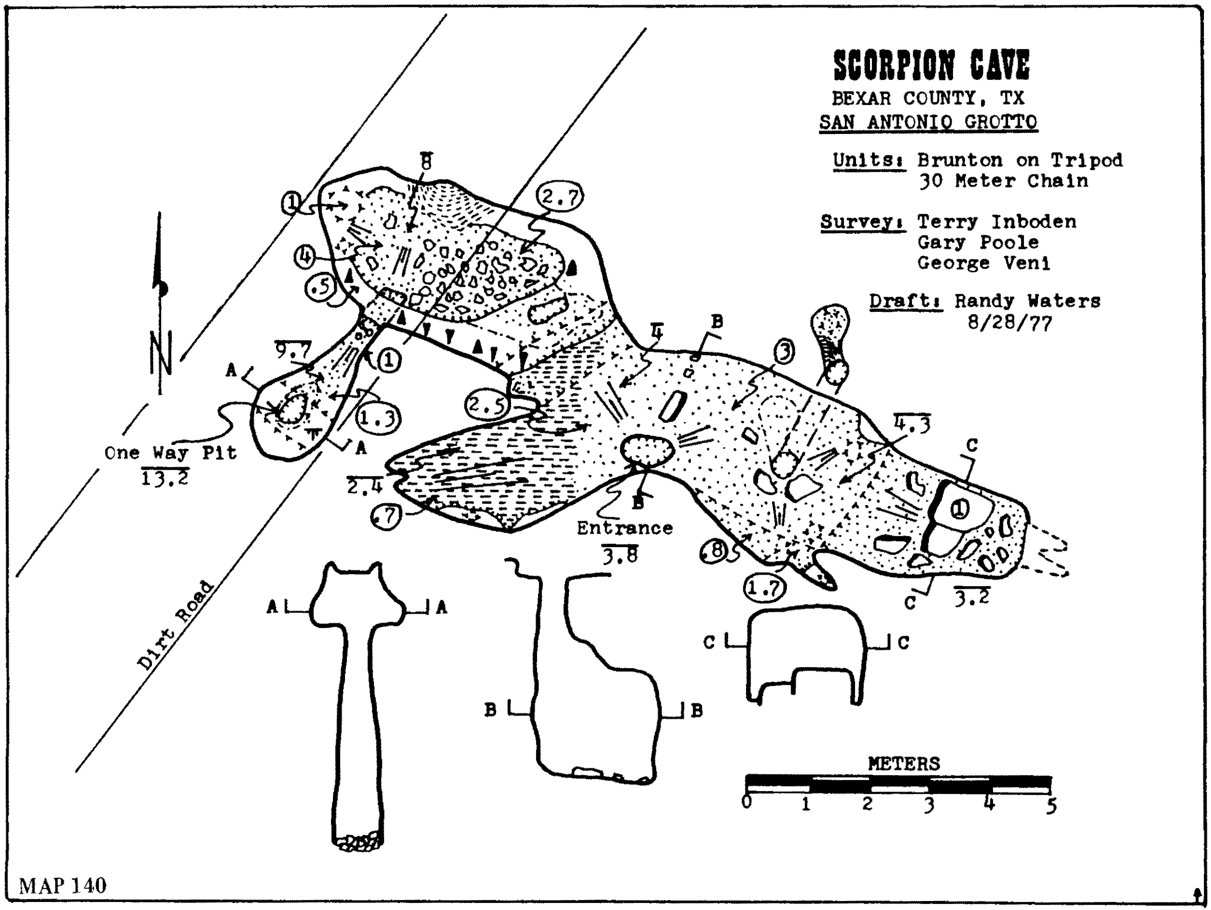
Location: Culebra Hill 7.5′

Description: The pit entrance is 0.4 m in diameter and drops 18.6 m. Its floor plan is roughly triangular, averaging 5 m to a side. Large breakdown blocks fallen from the south wall cover much of the flat dirt floor. A 2 m high fissure extends over 2 m to the southwest before becoming too small. Two pits are in the opposite direction, at the northern apex of the triangle. The first is 1.4 m in diameter and drops 7.5 m where its diameter enlarges slightly to 2.2 m. The second pit is just north of the first but is too small to enter and has an undetermined depth. (See Map 141.)

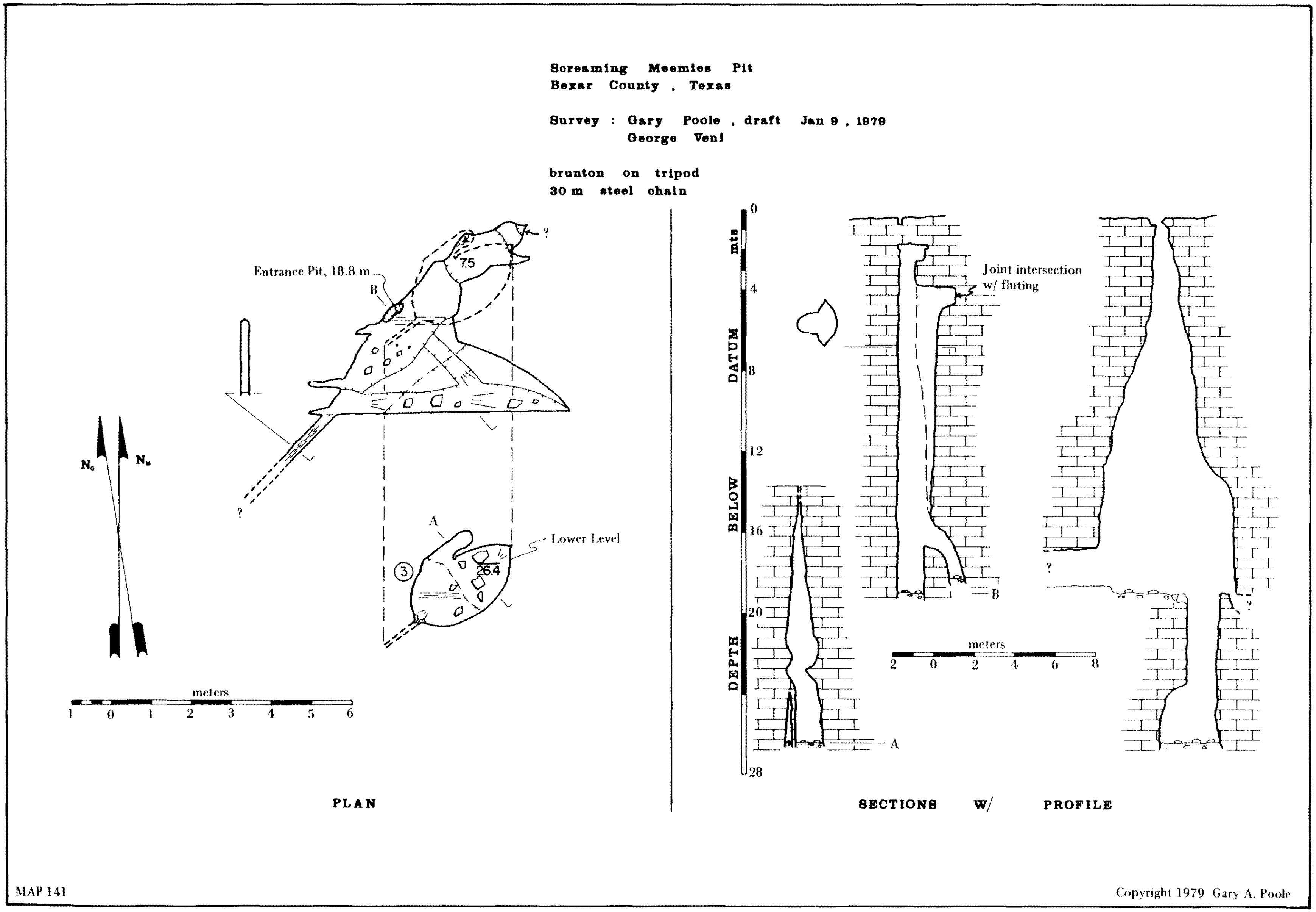
History: The first exploration of the pit was on 11 March 1978 by John R. Cross, Jr., and Gary A. Poole. The owner had known of the cave for some time but had not shown it to anyone. Poole returned on 14 July 1978 to survey it with George Veni. The cave was named as a result of some "hair-grazing" and "spine-tingling" experiences—near misses and minor hits by falling rocks.

Biology: Fauna observed during the survey include spiders, harvestmen (prob. *Leiobunum townsendii*), millipedes, gryllid crickets, and cave crickets (*Ceuthophilus* sp.).

Geology: Screaming Meemies Pit is vadosely developed in the Austin Chalk along a joint trending



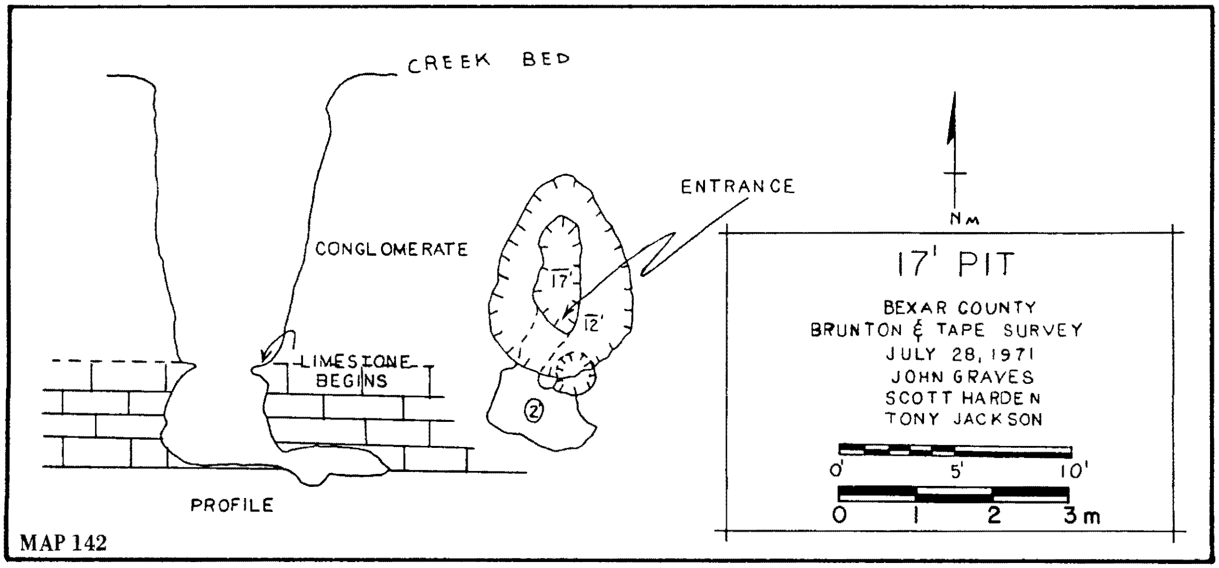
MAP 140


Screaming Meemies Pit
Bexar County , Texas
Survey : Gary Poole , draft Jan 9 , 1979
George Veni
brunton on tripod
30 m steel chain
Entrance Pit, 18.8 m
B
7.5
?
A
3
26.4
Lower Level
N_G
N_M
meters
1 0 1 2 3 4 5 6
PLAN
mts
DATUM
BELOW
DEPTH
0
4
8
12
16
20
28
Joint intersection
w/ fluting
meters
2 0 2 4 6 8
SECTIONS W/ PROFILE
MAP 141
Copyright 1979 Gary A. Poole

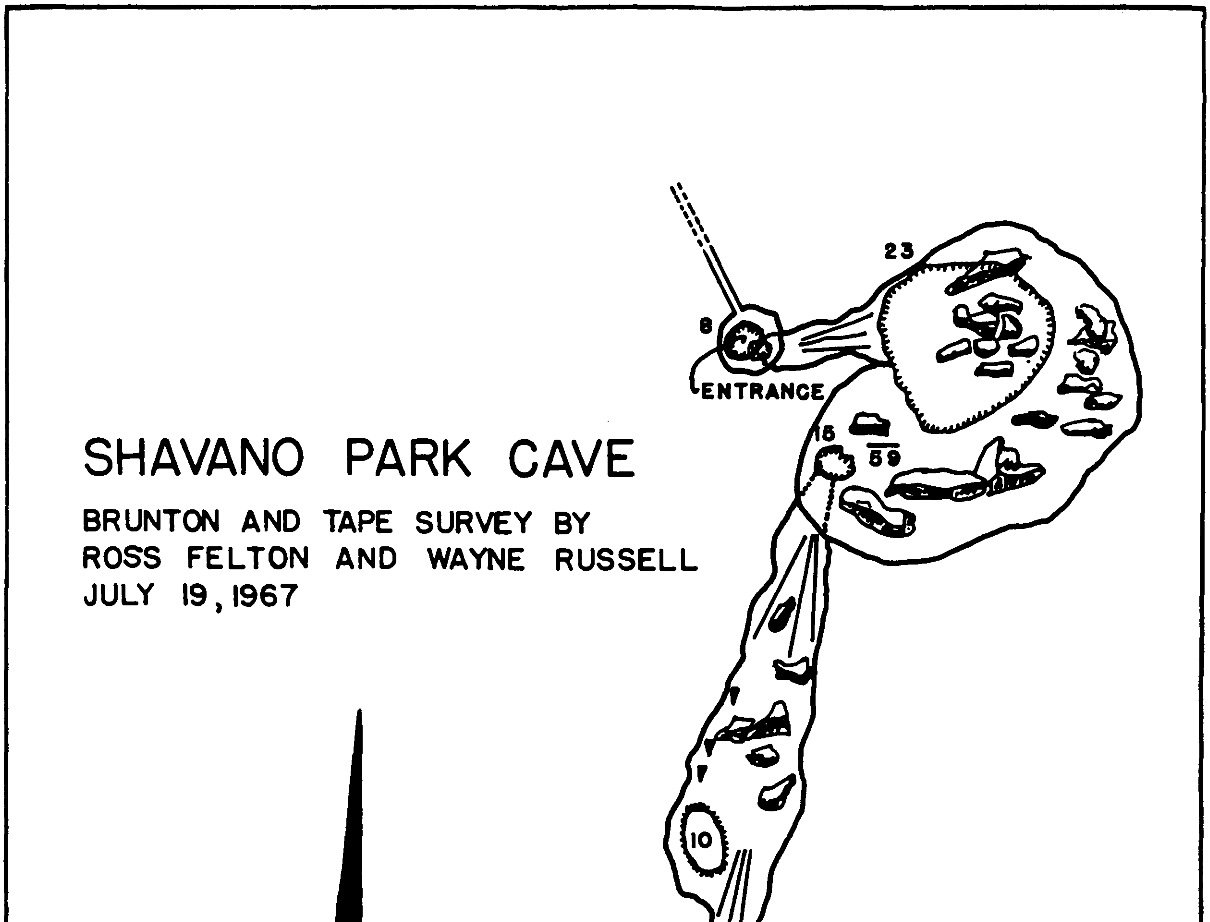
northeast-southwest and a set of secondary east-west joints.
Meteorology: Air circulation in the cave is limited. Although there were no problems in breathing at the start of the four-hour 1978 survey, the CO_2 concentration had noticeably increased by the end of the trip.
Paleontology: Numerous bones were observed in the cave, which acts as a natural trap for small animals. Remains of any great age would not be expected because the entrance's small size indicates that the cave recently opened to the surface.
Technique: Twenty-five meters of rope are needed for both pits. As with many Bexar County pits, it is easier to use an equivalent length of cable ladders because of the narrow entrance.
Bibliography: Anonymous (1978a:4; 1978j:2); Poole (1979b:12-13).

17′ PIT (BCS #108)
Alternate name: Conglomerate Pit
Location: Castle Hills 7.5′
Description: A creekbed pit entrance 2 m wide by 2.5 m long, drops 3.7 m through loosely cemented conglomerate and a further 1.5 m through limestone onto a bedrock floor. A crawlway extension ends within 1 m. (See Map 142.)
History: The cave was discovered and surveyed on 28 July 1971 by John Graves, Scott Harden, and Tony Jackson.
Geology: Groundwater conduits under Panther Creek have channeled much of the creek flow and unconsolidated bed downward to form the pit. The 17′ Pit area serves as a significant recharge site for the Edwards (Balcones Fault Zone) Aquifer. The pit may be very temporary, however, if bedload input from the creek exceeds the cave's ability to transport it into existing bedrock conduits.
Technique: The pit walls are very unstable.
Bibliography: Harden (1971:183); Veni (1985).

SHAVANO PARK CAVE (BCS #67)
Location: Castle Hills 7.5′
Description: A manhole in a concrete slab opens into a small concrete chamber. A subsurface storm water drainage pipe empties into the concrete chamber, and a stoopway leads out. Four meters into the stoopway is a 7.2 m drop into the first room, which is 6.7 by 7.8 by 9 m high. In the southwest corner a hole in the breakdown floor opens into an 11 m long passage that ends at a 2.6 m drop into the terminal room, 8.5 m in diameter, 9 m high, and usually wet. (See Map 143; Photos. 34-35.)
History: Shavano Park Cave was probably discovered during the early 1960s construction of its namesake housing development. At that time the natural cave entrance was modified to maintain and make use of the cave's stormwater drainage capacity. A steel grate was originally placed over the entrance to restrict access, but it didn't last long after the new subdivision became occupied. Ross Felton and Wayne Russell surveyed the cave on 19 July 1967. A new grate has subsequently been bolted onto the concrete slab.
Biology: Spiders, cave crickets (*Ceuthophilus* sp.), cockroaches, and mice were seen in the cave.
Geology: Runoff from about 70,000 square meters recharges the Edwards (Balcones Fault Zone) Aquifer through Shavano Park Cave. Water drains rapidly



MAP 142


SHAVANO PARK CAVE
BRUNTON AND TAPE SURVEY BY
ROSS FELTON AND WAYNE RUSSELL
JULY 19, 1967
23
8
ENTRANCE
15
59
10
8
83
30
N
0 5 10 20 ft
0 1 2 3 4 5 m
Numbers on map = feet

MAP 143

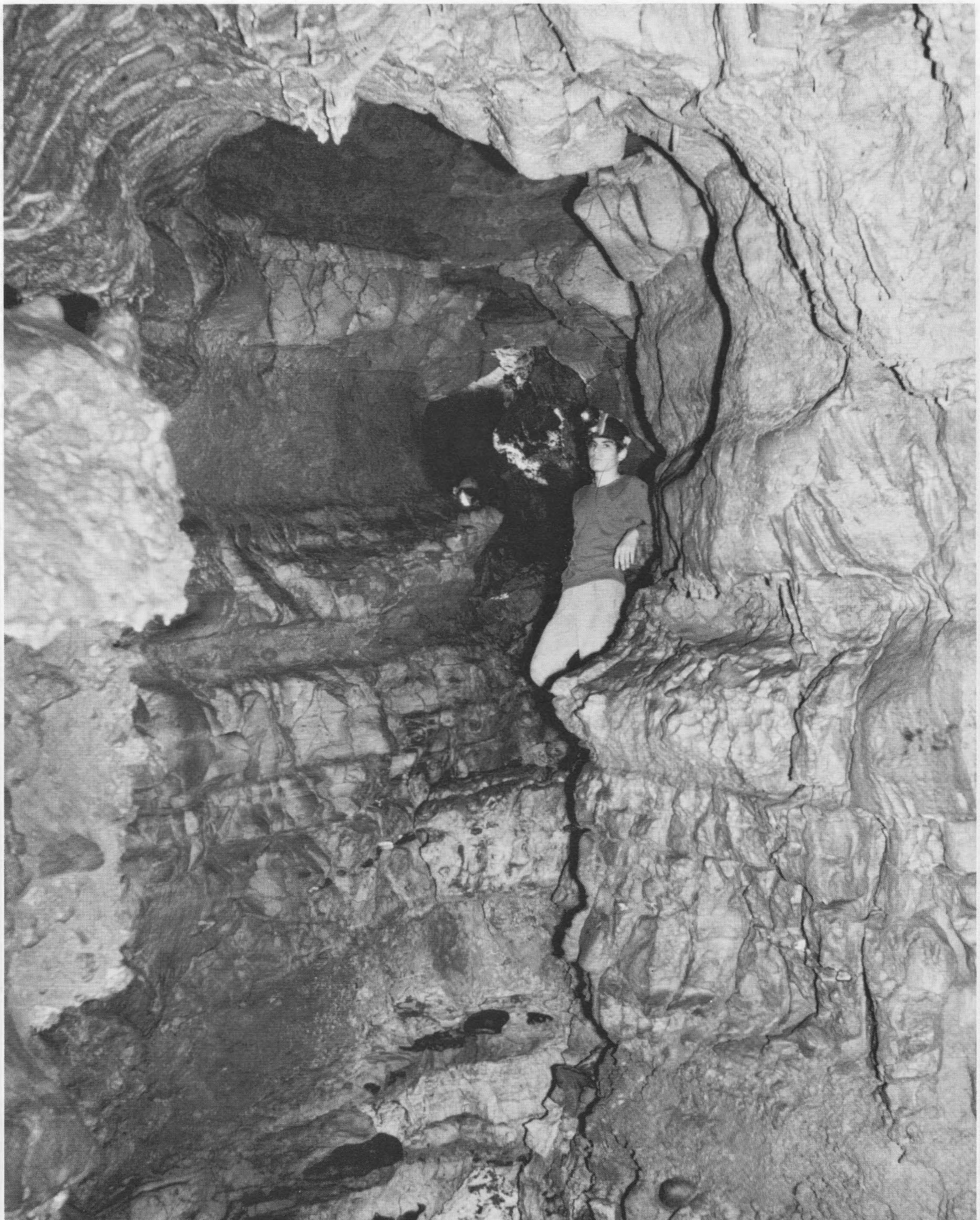


Photo 34.—Andy Sandoval at top of drop into terminal room of Shavano Park Cave (Roger V. Bartholomew).

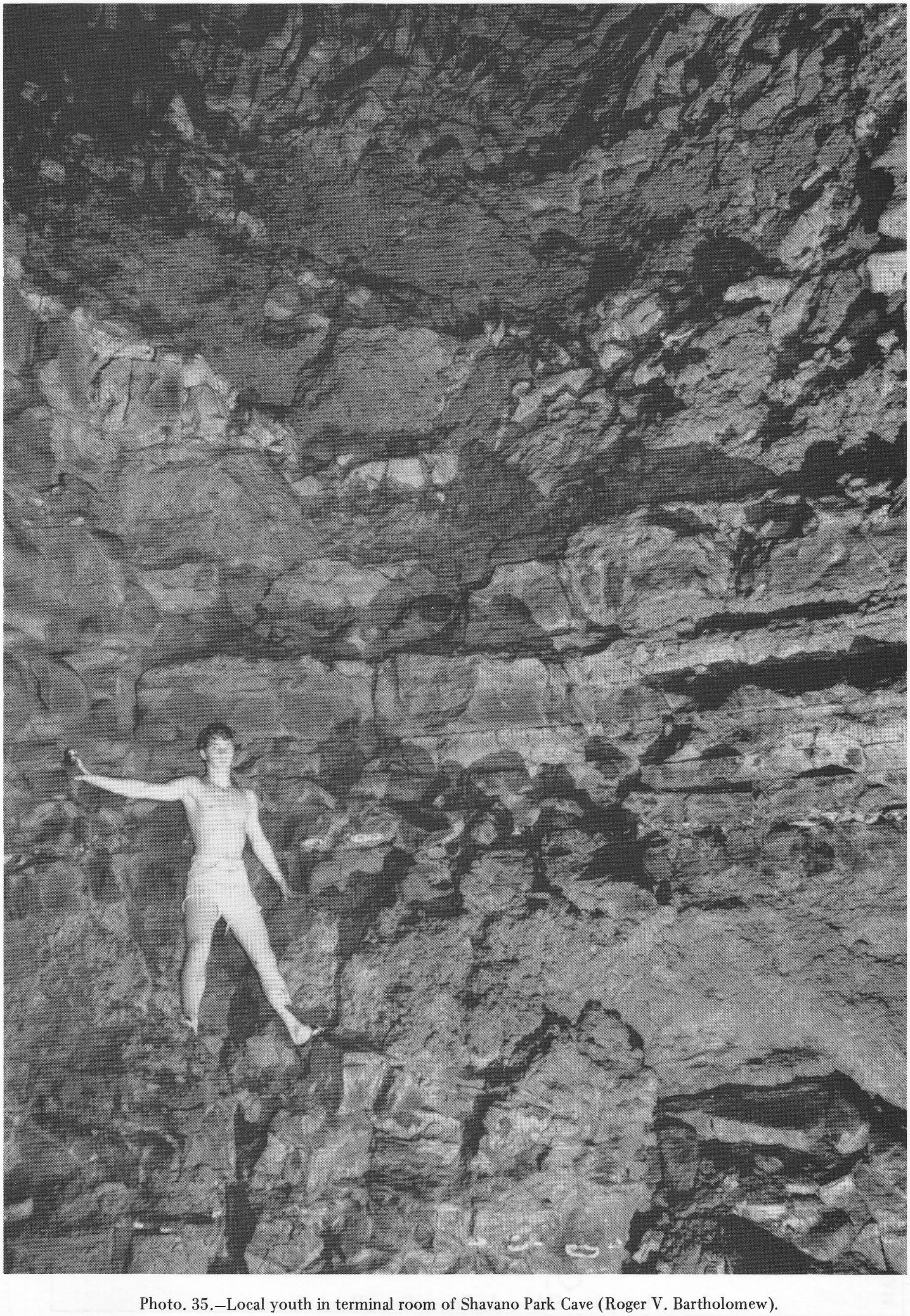


Photo. 35.–Local youth in terminal room of Shavano Park Cave (Roger V. Bartholomew).

through the cave and through the breakdown floor of its terminal room.
Technique: The entrance passage contains some dangerously unstable boulders. A rope or ladder is needed for the 7.2 m pit.
Bibliography: Owens (1967:14); Passmore (1977:47); Smith (1973d:7); Veni (1978a:6; 1985).

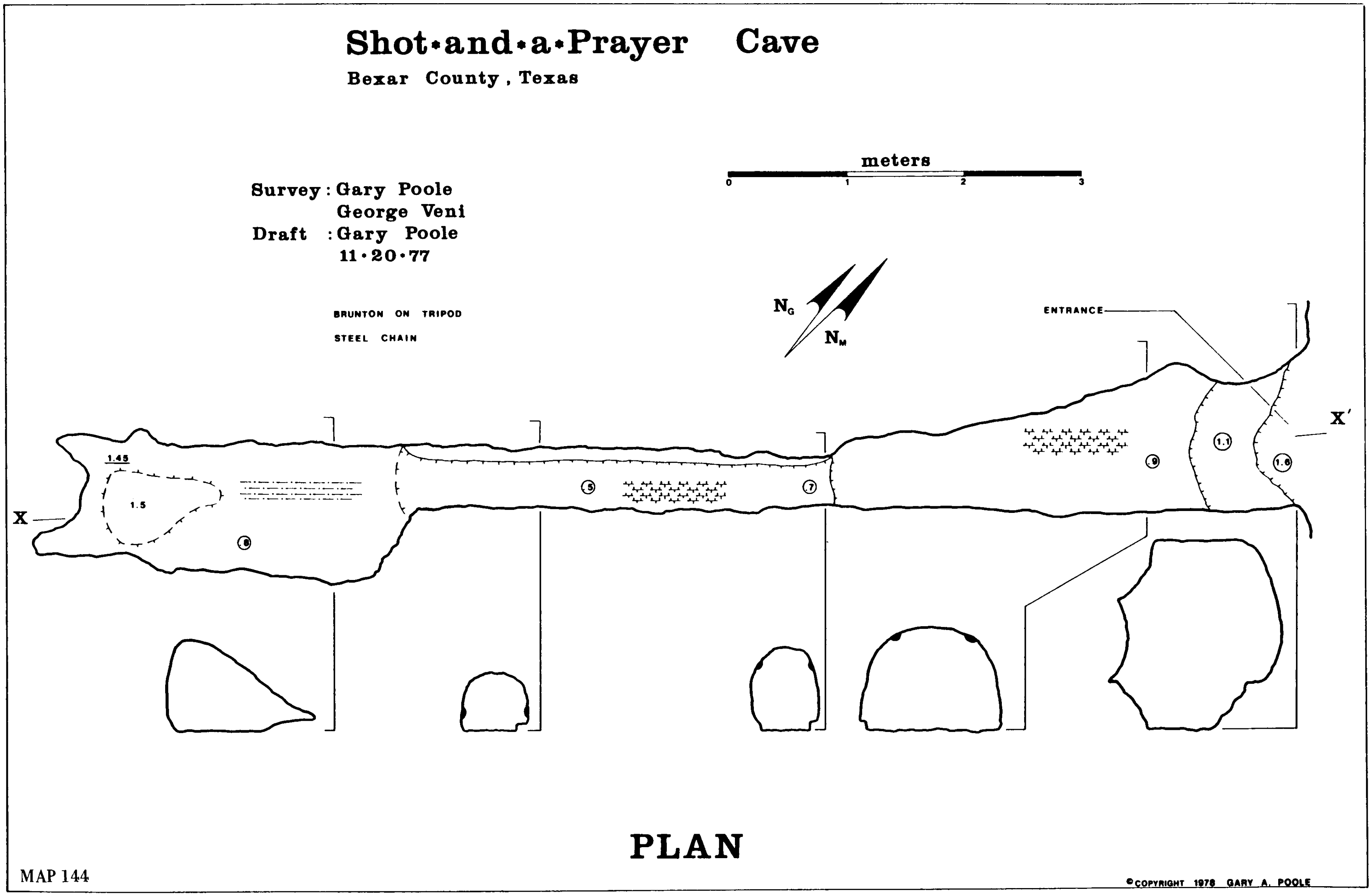
SHOEHORN CAVE (BCS #102)

Alternate name: Cave near Hogan's Cave
Location: Van Raub 7.5′
Description: A 5 m deep pit with an entrance so small that according to David Litsinger "only a greased beanpole with the aid of a shoehorn could get into it."
History: The cave was first reported by Bob Hudson in the mid-1950s but was not entered. It was explored about 1970 by Rick Clements and Robert Penazola. The cave discovery probably coincides with that of Hogan's Cave (BCS #40) located 16 m to the east.
Geology: Shoehorn Cave is vadosely developed in the Edwards Limestone and may be related to nearby Hogan's Cave.
Bibliography: Reddell (1961b:1).

SHOT-AND-A-PRAYER CAVE (BCS #68)

Location: Castle Hills 7.5′
Description: The entrance is a 1 m high by 1.5 m wide hole in a cliff, 7 m above Leon Creek. The cave itself is a 10 m long crawlway, which narrows abruptly past the entrance and enlarges at its end to allow turning room. (See Map 144; Photo. 36.)
History: This well-known cave has been frequented for many years. It was probably discovered during construction of nearby FM 1604. Widening of the same road during 1980 threatened to destroy the cave, but, fortunately, the bridge overhead left the cave intact. The cave was surveyed by Gary Poole and George Veni on 18 October 1977.
Biology: The cave contains harvestmen (prob. *Leiobunum townsendii*) and cave crickets (*Ceuthophilus* sp.); small red mites and a small light-colored centipede were also noted. The troglobitic millipede *Cambala speobia* was collected on 16 February 1984 by Duane Canny and Scott Harden. The cave is probably used as a shelter by surface animals.
Geology: The cave is formed in the uppermost section of the Edwards Limestone.
Bibliography: Anonymous (1979t:3); Poole and Passmore (1978:38-39, 47); Veni (1978a:6; 1983:98; 1985).

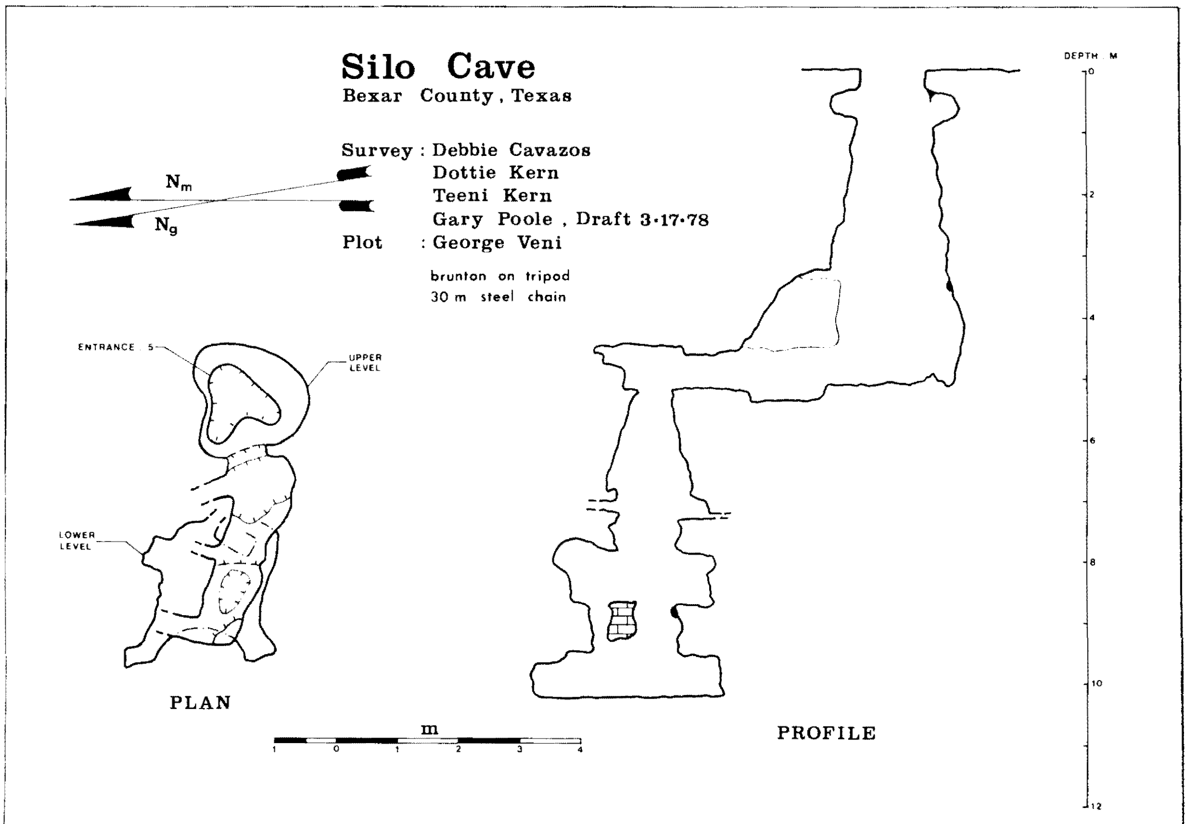
Photo. 36.—Shot-and-a-Prayer Cave (Randy Waters).


Shot•and•a•Prayer Cave
Bexar County, Texas
Survey : Gary Poole
George Veni
Draft : Gary Poole
11•20•77
BRUNTON ON TRIPOD
STEEL CHAIN
meters
0
1
2
3
N_G
N_M
ENTRANCE
X
X′
1.45
1.5
8
5
7
9
1.1
1.6
PLAN
MAP 144
©COPYRIGHT 1978 GARY A. POOLE

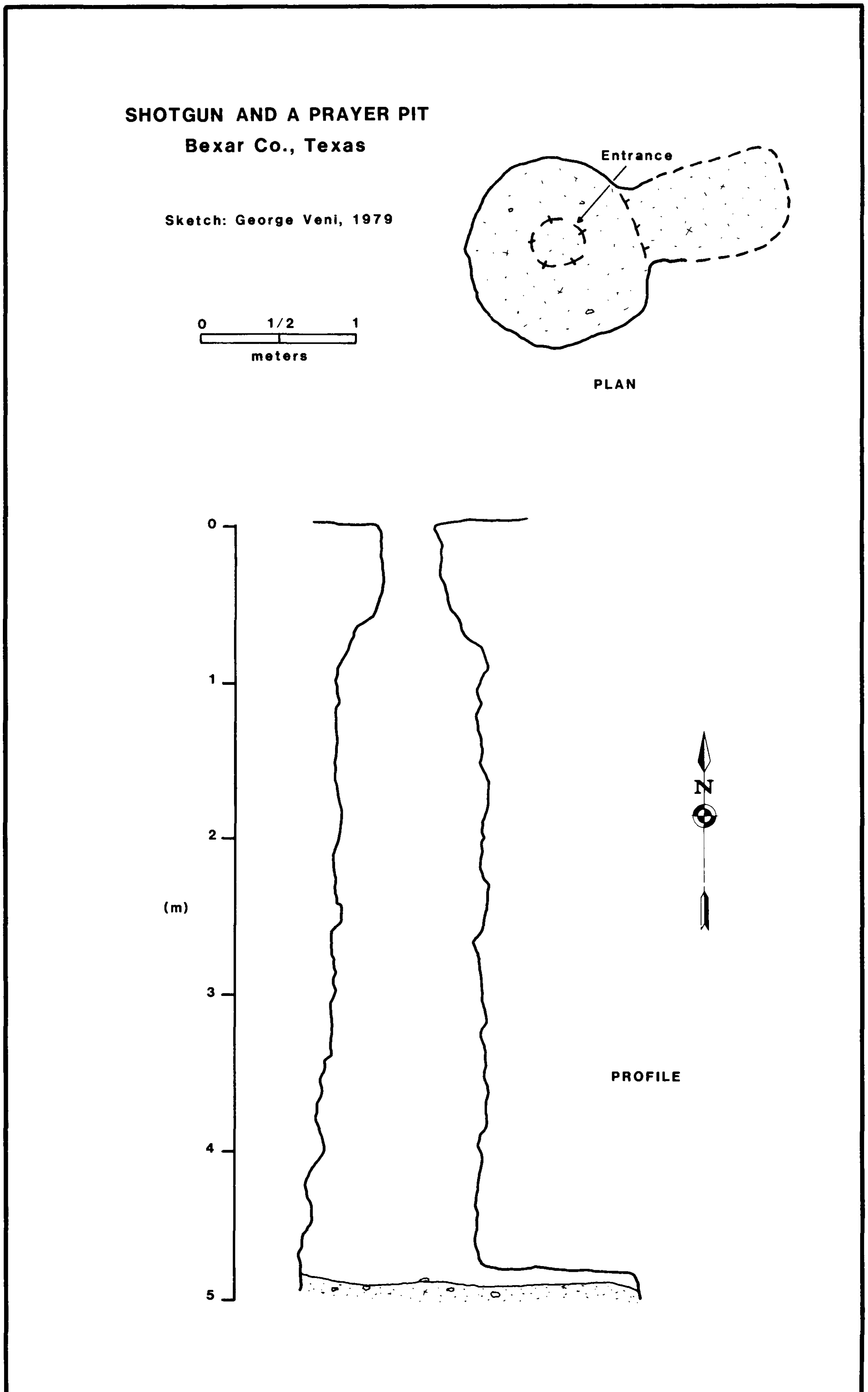
SHOTGUN AND A PRAYER PIT (BCS #126)
Alternate name: Tract 6 Cave 1
Location: Van Raub 7.5′
Description: This cave is an almost 5 m deep pit that slightly bells out past the 0.4 m diameter entrance. (See Map 145.)
History: The cave was first reported on 14 March 1970 by Roger Bartholomew, Rick Clements, and David Litsinger, as the first known cave on tract 6. On 6 June 1979 it was visited by Steve Damon, Scott Harden, Gary Poole, and George Veni.
Biology: Harvestmen (prob. *Leiobunum townsendii*) and cave crickets (*Ceuthophilus* sp.) were observed.
Geology: This small vertical shaft is in the Edwards Limestone.
Technique: Although the pit can be chimneyed by an experienced climber, a safety line is recommended.
Bibliography: Anonymous (1979u:4).

SILO CAVE (BCS #69)
Location: Castle Hills 7.5′
Description: The 1 m diameter entrance pit drops 5 m to a short crawlway, at the end of which is another 5 m deep pit. (See Map 146.)
History: Silo Cave was discovered by Randy M. Waters in 1975 and surveyed on 16 October 1977 by Debbie Cavazos, Dottie Kern, Teeni Kern, and Gary Poole.
Geology: The cave opens on the flood plain of Mud Creek and serves to recharge the Edwards (Balcones Fault Zone) Aquifer.
Bibliography: Passmore (1977:43); Poole (1978c:3); Poole and Passmore (1978:38, 40); Veni (1978a:6; 1985).

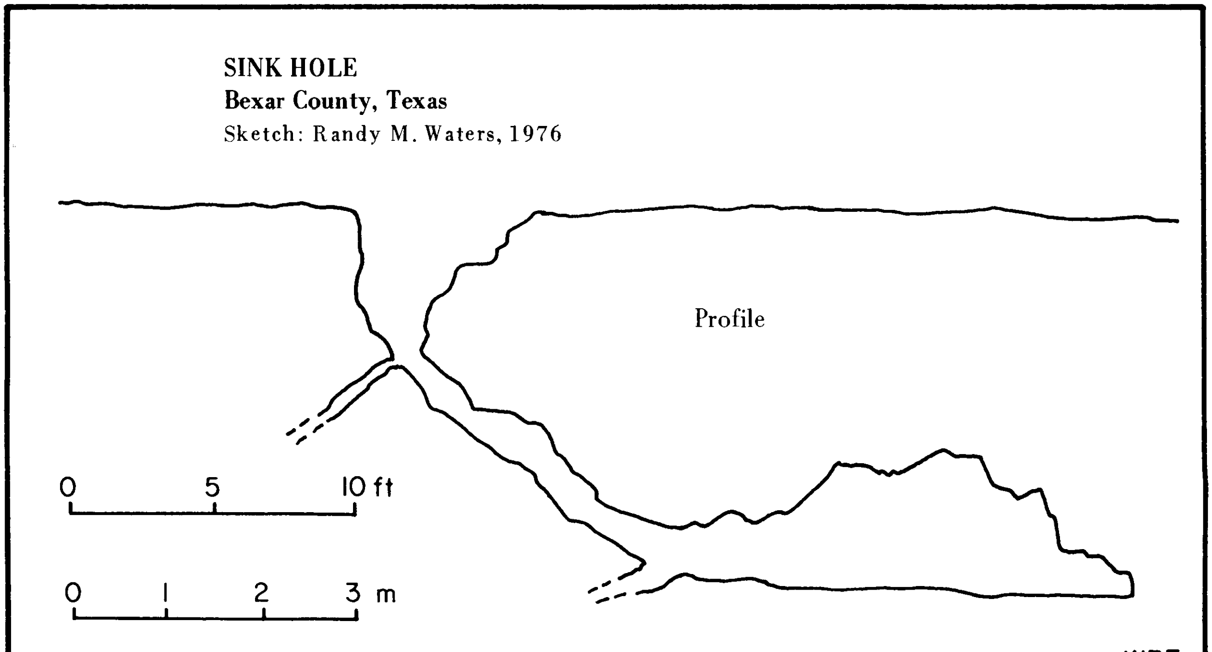
SILO HOLE (BCS #171)
Location: Helotes 7.5′
Description: Silo Hole is a crawlway into a medium-sized room.
History: The cave was opened during silo construction for the owner's farm. Foul-smelling air prevented detailed exploration when it was visited on 8 February 1970 by Roger V. Bartholomew, Al Brandt, David Litsinger, and Al Williams. It is not known if the cave is currently accessible or if it was covered by the silo.
Biology: Cave crickets (*Ceuthophilus* sp.) were noted.
Geology: Silo Hole is developed in the Pecan Gap Chalk.
Meteorology: The poor air quality may have been a



Map 146


SHOTGUN AND A PRAYER PIT
Bexar Co., Texas
Sketch: George Veni, 1979
0
1/2
1
meters
Entrance
PLAN
0
1
2
(m)
3
4
5
N
PROFILE

MAP 145



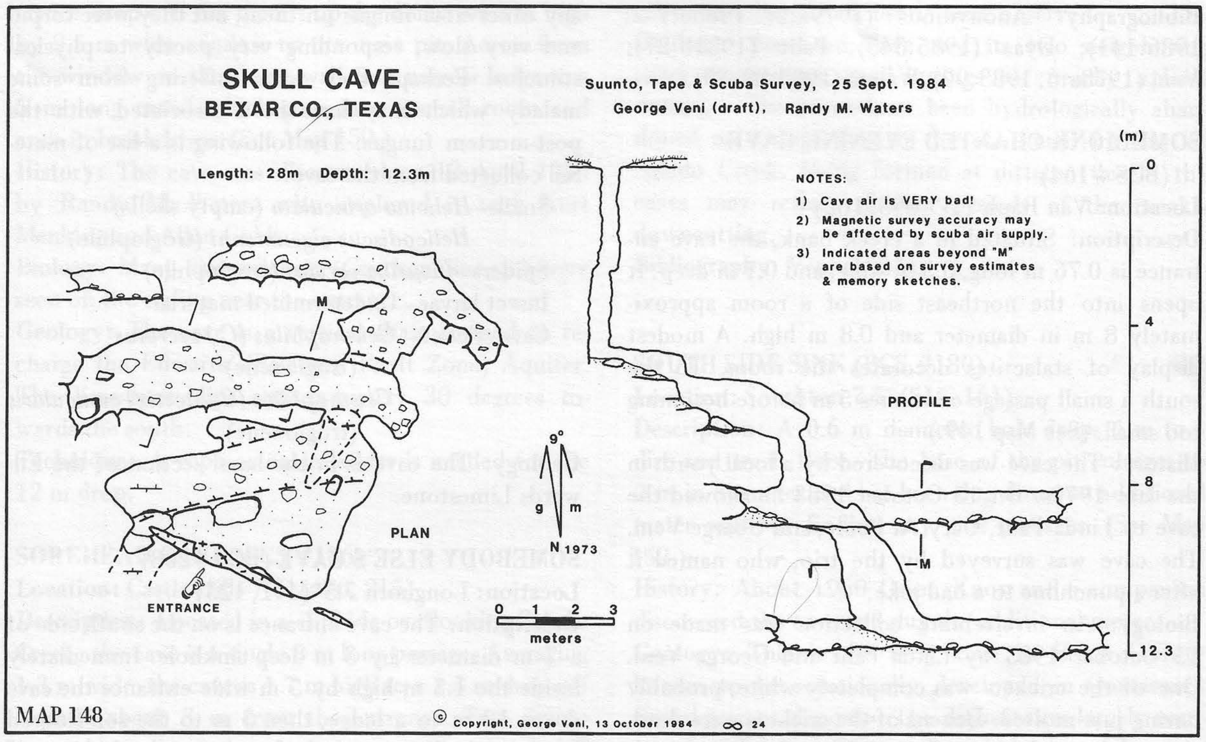
MAP 147

result of poor air circulation following the recent opening of the cave.
Bibliography: Bartholomew (1970b:56).

SINK HOLE (BCS #70)
Alternate name: Sink No. 1 Cave No. 2
Location: Bat Cave 7.5′
Description: From the base of a small sinkhole, a crawlway extends through some collapse for 9 m to a small 1 m high "room." (See Map 147.)
History: During the fall of 1976, members of the San Antonio Grotto dug open and exposed the cave.
Geology: Sink Hole is a recharge point into the Edwards (Balcones Fault Zone) Aquifer.
Bibliography: Passmore (1977:32); Veni (1978a:6; 1985); Waters (1977b:120).

SKULL CAVE (BCS #71)
Location: Castle Hills 7.5′
Description: A 3.6 m long, 0.05 to 0.3 m wide fissure drops 4.8 m to the southwest side of the entrance room, which is approximately 6 m long, 4 m wide, and with ceiling heights above the sloping breakdown floor of 0.3 to 1.2 m. In the northeast corner is a 2.4 m drop to a passage extending 1.6 and 6 m to the east and west. A 2.7 m drop follows the 2.4 m drop and leads into a passage trending 2.5 m and 5 m to the east and west. (See Map 148; Photos. 37-38.)
History: Randy M. Waters discovered the cave in the spring of 1977 and named it as a morbid reminder of its poor air quality. During his first trip in the cave, Waters explored to the top of the 2.4 m drop before being forced to leave by the very high levels of CO_2. Two weeks later, Peggy and Will Schwartz tried to explore the cave but got no further than Waters had. Waters returned a few months later with George Veni. Together they pushed to the 2.4 m drop, and with some difficulty Veni was able to explore the passages beyond. Six years later on 30 July 1983 Veni and Waters returned to survey the cave. On this trip the CO_2 levels were so high they could go no farther than the base of the entrance pit—and there they could stay for only a couple of minutes. On 25 September 1984 Veni and Waters returned with SCUBA as an air supply but only surveyed to the base of the 2.4 m drop before being forced to exit by the bad air.
Biology: Collections were made in the cave on 30 July 1983 and 26 September 1984 by George Veni and Randy M. Waters. The following fauna is recorded from the cave:

Snails—*Euglandina singleyana* (empty shells)
Spiders—Undetermined material
Harvestmen—*Leiobunum townsendii* (trogloxene)
Mites—Undetermined material
Insect larvae—Undetermined material
Springtails—Undetermined material
Cave crickets—*Ceuthophilus* sp. (trogloxene)
Desert cockroaches—*Arenivaga* sp. prob. *bolliana* (trogloxene)
Ground beetles—Carabidae genus and species
Ants—*Leptogenys elongata* (accidental)
Flies—Undetermined material



MAP 148

Photo. 37.—Last chance for breathable air—Randy Waters in entrance of Skull Cave (George Veni).

Geology: Skull Cave is in the Austin Chalk. Its room and adjoining passages are formed by the collapse of an older chamber into a lower void. No remnants of the pre-collapse cave have been observed.

Meteorology: Atmospheric CO_2 levels in this cave are consistently higher than any other cave known in Bexar County. On 24 December 1978 Teeni Kern, Greg Passmore, and Gary Poole measured the CO_2 levels, but results are not available. On 14 September 1986 Bob Cowell, William R. Elliott, and Randy M. Waters took air measurements in the cave. At about 3 m below the surface in the entrance fissure the CO_2 level was 7.7% while the O_2 level was 11.1%. Normal surface CO_2 level is 0.033% and O_2 level is 20.9%. Both the decreased O_2 level and the very high CO_2 level, especially in combination, make the cave *extremely* dangerous. Bad air caves usually have restricted air circulation (decreasing the inflow of fresh air) and substantial volumes of soil humus or decomposing organic debris, both of which produce CO_2. Skull Cave's CO_2 is probably due to very limited air circulation since soil and organic debris are present only in small amounts.

Technique: Avoid the cave! Exposure to the CO_2-laden air could result in unconsciousness in 5 to 10 minutes or less. Even with the aid of a SCUBA air supply during the survey, the surveyors became very dizzy from the cave air they had to inhale while speaking their survey data. Additionally, their eyes became very irritated and watery.

Bibliography: Anonymous (1979a:2; 1985c:1-2; 1986:141); Dyas (1985:345); Palit (1984b:27); Veni (1978a:6; 1983:99); Waters (1985:38-39).

SOME MONK CHANTED EVENING CAVE (BCS #164)

Location: Van Raub 7.5'

Description: Situated in a creek bank, the cave entrance is 0.76 m long, 0.3 m wide, and 0.7 m deep. It opens into the northeast side of a room approximately 8 m in diameter and 0.8 m high. A modest display of stalactites decorates the room. To the south a small passage continues 5 m before becoming too small. (See Map 149.)

History: The cave was discovered by a local youth in the late 1970s. On 15 October 1983 he showed the cave to Linda Palit, Gary A. Poole, and George Veni. The cave was surveyed by the trio, who named it after a punchline to a bad joke.

Biology: An invertebrate collection was made on 15 October 1983 by Linda Palit and George Veni. One of the crickets was completely white, probably having just molted. Dozens of the crickets were dead, strewn about the cave floor, with a fungus growing on their empty husks. The live crickets did not have any observable fungus on them, but they were torpid and very slow, responding very poorly to physical stimulus. Perhaps they were suffering from some malady which may have been associated with the post-mortem fungus. The following is a list of material collected from the cave:

Snails—*Helicina orbiculata* (empty shells)
Helicodiscus eigenmanni (troglophile)
Spiders—*Cicurina varians* (troglophile)
Insect larvae—Undetermined material
Cave crickets—*Ceuthophilus (C.) secretus* (trogloxene)
Ceuthophilus (Geotettix) cunicularis (trogloxene)

Geology: The cave is in the basal section of the Edwards Limestone.

SOMEBODY ELSE'S CAVE (BCS #208)

Location: Longhorn 7.5'

Description: The cave entrance is on the south side of a 7 m diameter by 3 m deep sinkhole. Immediately inside the 1.5 m high by 5 m wide entrance the cave drops 12 m to a ledge, then 3 m to the soil-floored bottom. A dome extends from near the bottom of the cave to near the surface, connecting near the en-

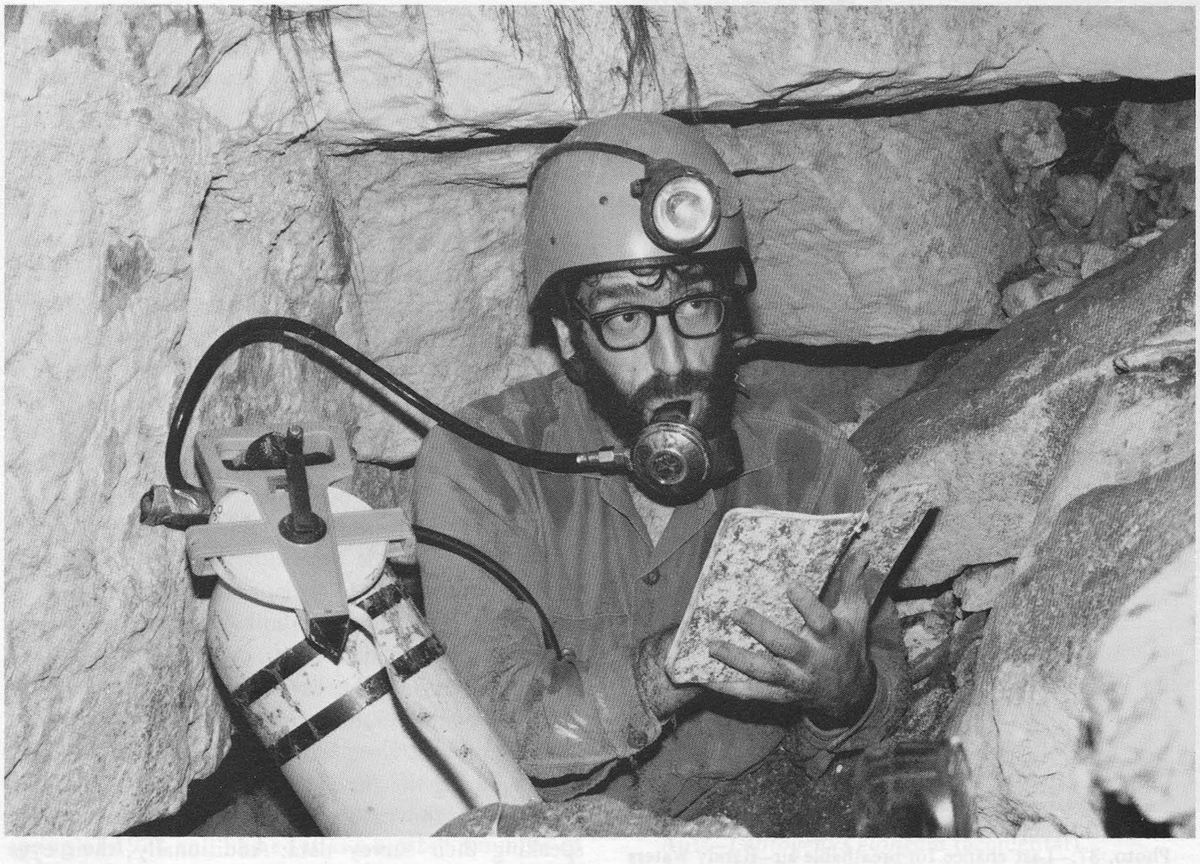
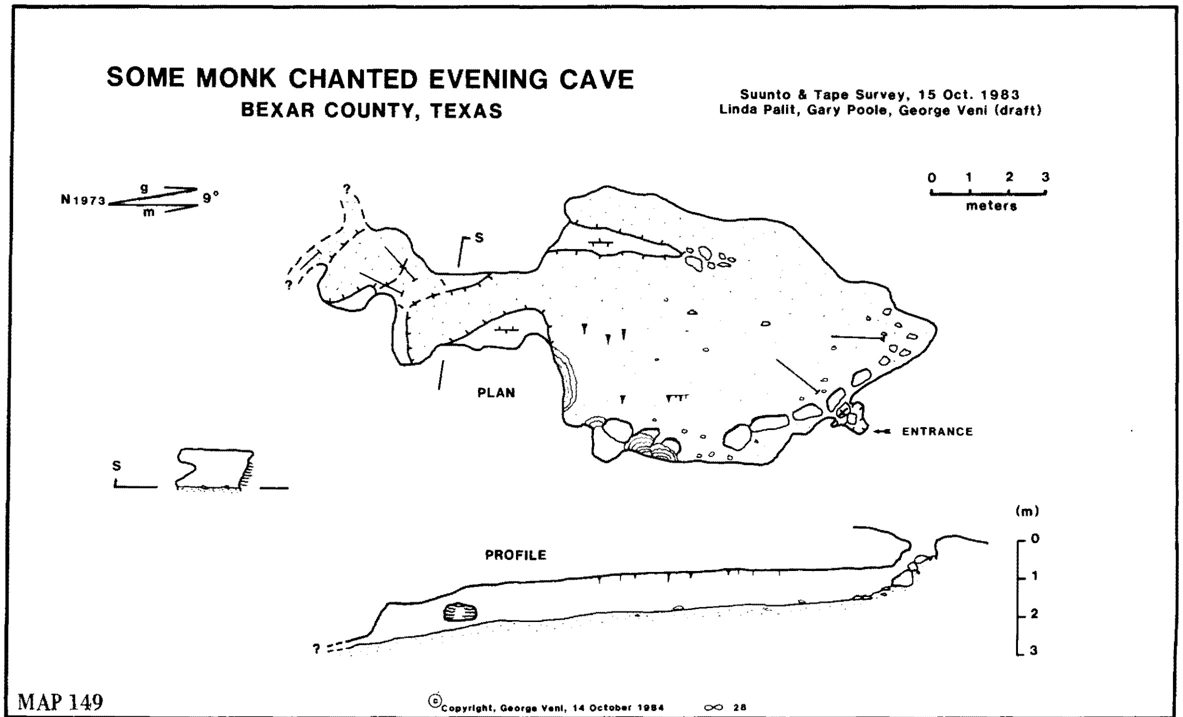


Photo. 38.—George Veni scuba-surveying in Skull Cave (Randy Waters).

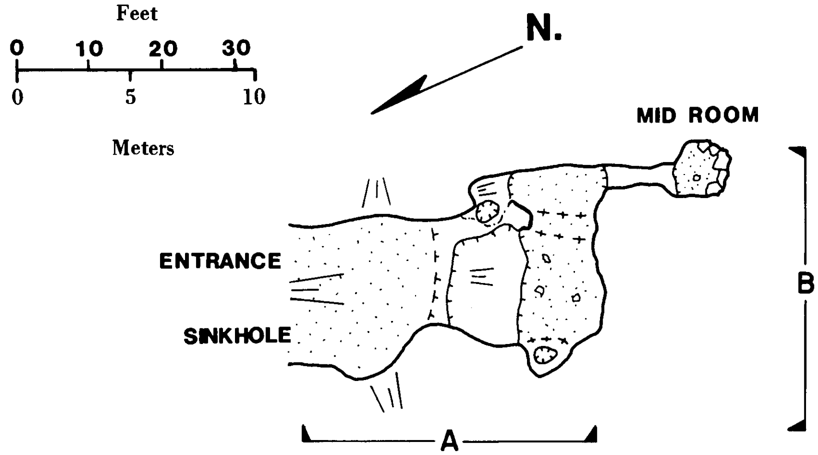
trance drop-off. Six meters up the dome is a 3 m high by 2.5 m wide window to the main pit. Across from the window, in the dome wall, is a narrow ledge to a 5 m long crawl which goes into a small room and ends in breakdown. (See Map 150.)
History: The cave was discovered on 13 April 1986 by Randy M. Waters who explored it with Kurt Menking and Allan Cobb.
Biology: Many cave crickets (*Ceuthophilus* sp.) were seen on the ceiling near the entrance.
Geology: The cave is a vertical shaft formed to recharge the Edwards (Balcones Fault Zone) Aquifer. The limestone dips approximately 30 degrees towards the south.
Technique: A rope or cable ladder is needed for the 12 m drop.

SOREHEAD CAVE (BCS #186)
Location: Castle Hills 7.5′
Description: Located in a cliffside overlooking Salado Creek, the cave is a single 8 m long passage. Averaging 1.3 m wide, the cave is 1.7 m high to a 1.5 m drop-off located about 3 m from the entrance. Two domes near the end of the cave give a ceiling height of almost 5 m. (See Map 151.)
History: This is one of three caves (the others are Crawl and A Prayer Cave, BCS #187; and Horizontal Haven, BCS #188) discovered by Randy M. Waters on 4 March 1984.
Biology: Cave crickets (*Ceuthophilus* sp.) and a centimeter-long black beetle were observed.
Geology: Sorehead Cave and its two neighboring caves formed as small springs for nearby upland drainage. The caves have been hydrologically abandoned as springs due to the continued incising of Salado Creek. Being formed at different levels, the caves may reflect distinct periods of the creek's downcutting.
Bibliography: Veni (1985).

SOUTH SIDE SINK (BCS #180)
Location: Southton 7.5′
Description: A 0.6 m diameter hole drops 4 m to a dirt and trash floor. The base of the pit enlarges to 2 m in diameter and has been dug down an additional meter without finding any side passages. (See Map 152.)
History: About 1960 Orion Knox and a companion discovered the cave and dug the additional meter.
Geology: This is the only cave in Bexar County known to be solutionally developed in Quaternary fluvial terrace deposits. The deposits are largely composed of Edwards Limestone pebbles in a calcareous sand-clay matrix. A small sink drains runoff into the cave, which probably resurges into nearby Salado Creek.
Bibliography: Anonymous (1973q:12); Reddell and Knox (1962:4-5, 33); Reddell and Russell (1962a:6); Reddell and Smith (1966:4).



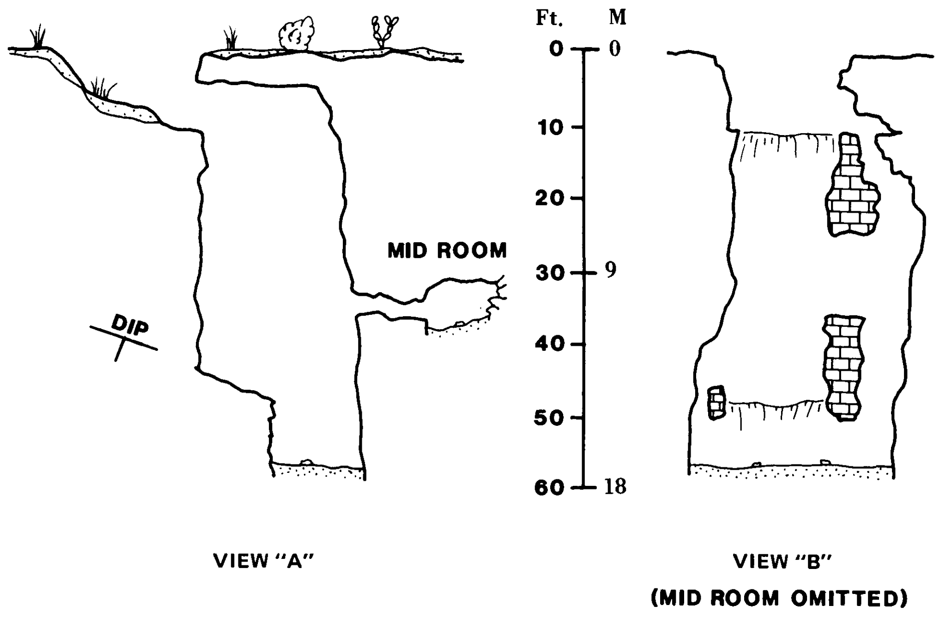
MAP 149



Somebody Else's Cave

Bexar County, Texas

Sketch By R. M. Waters 9/86

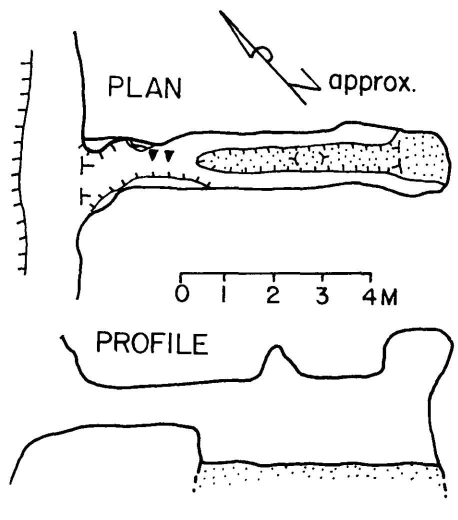


MAP 150

SPENCER'S CAVE (BCS #139)
Location: Helotes 7.5'
Description: Located within a 7 m diameter sinkhole in a creek, the 0.3 m high entrance led 7 m into a room 1.6 m high and 5 m in diameter. In one corner of the room was a 3 m long by 0.3 m high crawl to another 1.6 m high room. The cave continued 10 m as a 0.3 m high by 3 m wide crawlway, then enlarged to 1.6 m high at the terminal breakdown choke. (See Map 153.)
History: A Mr. Barham was reported to have explored the cave for over 100 m "some years" before the first report, written in the mid to late 1950s by Bob Hudson. Hudson stated that, in addition to Barham's account, members of the St. Mary's University Speleological Society visited the cave in the 1950s but were unable to enter because trash dumped in the sink had blocked the entrance. No mention was made of trash when the cave was visited in 1963 by Pete Hilgaford, James Jasek, and Bro. Marvin Sannemann. Although some or all of the trash may have been removed, the 1963 trip noted the cave was filling with sediment; the trash probably was carried underground and buried under more incoming sediment. In 1974 Steve Gutting noted the cave as believed to be destroyed or filled.
Geology: Dissolved in the upper Glen Rose by flood waters, the cave began filling due to the creek's increased bedload and suspended sediment. Increased land usage upstream has resulted in higher rates of soil erosion.
Bibliography: Anonymous (1973q:12); Reddell (1961b:1); Reddell and Knox (1962:3-4, 33); Reddell and Russell (1962a:6); Reddell and Smith (1966:4).

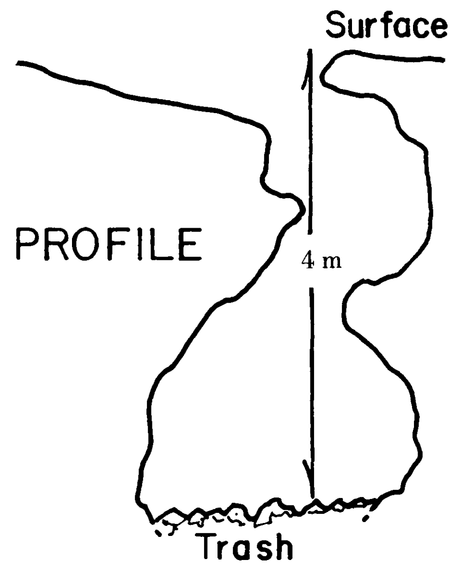
SPIDER HOLE (BCS #101)
Alternate name: Mc Donalds Cave
Location: Helotes 7.5'
Description: A narrow 5 m deep pit dropped to a small room.
History: In 1962 Gary Griner, James Jasek, and Bro. Marvin Sannemann made the first recorded visit to the cave. Greg Passmore explored the cave about ten years later during a visit to Helotes Hilltop Cave (BCS #35), located in the same hill but a few hundred meters to the east. The cave was sealed by a graded road that was put in up the hill in the middle to late 1970s.
Biology: On the 1962 visit spiders and cave crickets (*Ceuthophilus* sp.) were noted.
Geology: The cave was in the Edwards Limestone where it caps a hill. Like nearby Helotes Hilltop Cave, the cave probably drained down to the contact with

SOREHEAD CAVE
Bexar County, Texas
Sketch: Randy M. Waters
4 March 1984

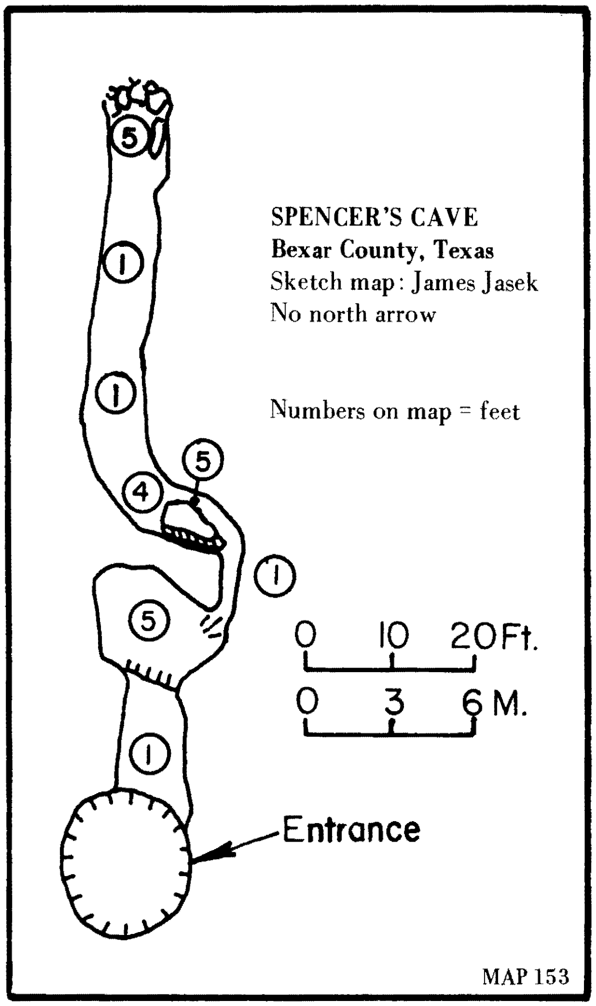


MAP 151

SOUTH SIDE SINK
Bexar County, Texas
Sketch: David Litsinger

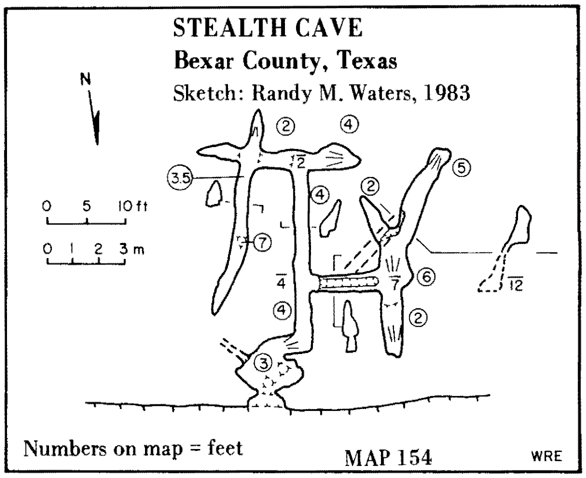


MAP 152



the Glen Rose Formation, where water then followed the gentle dip of the beds to resurge into Helotes Creek from Helotes Blowhole (BCS #34).

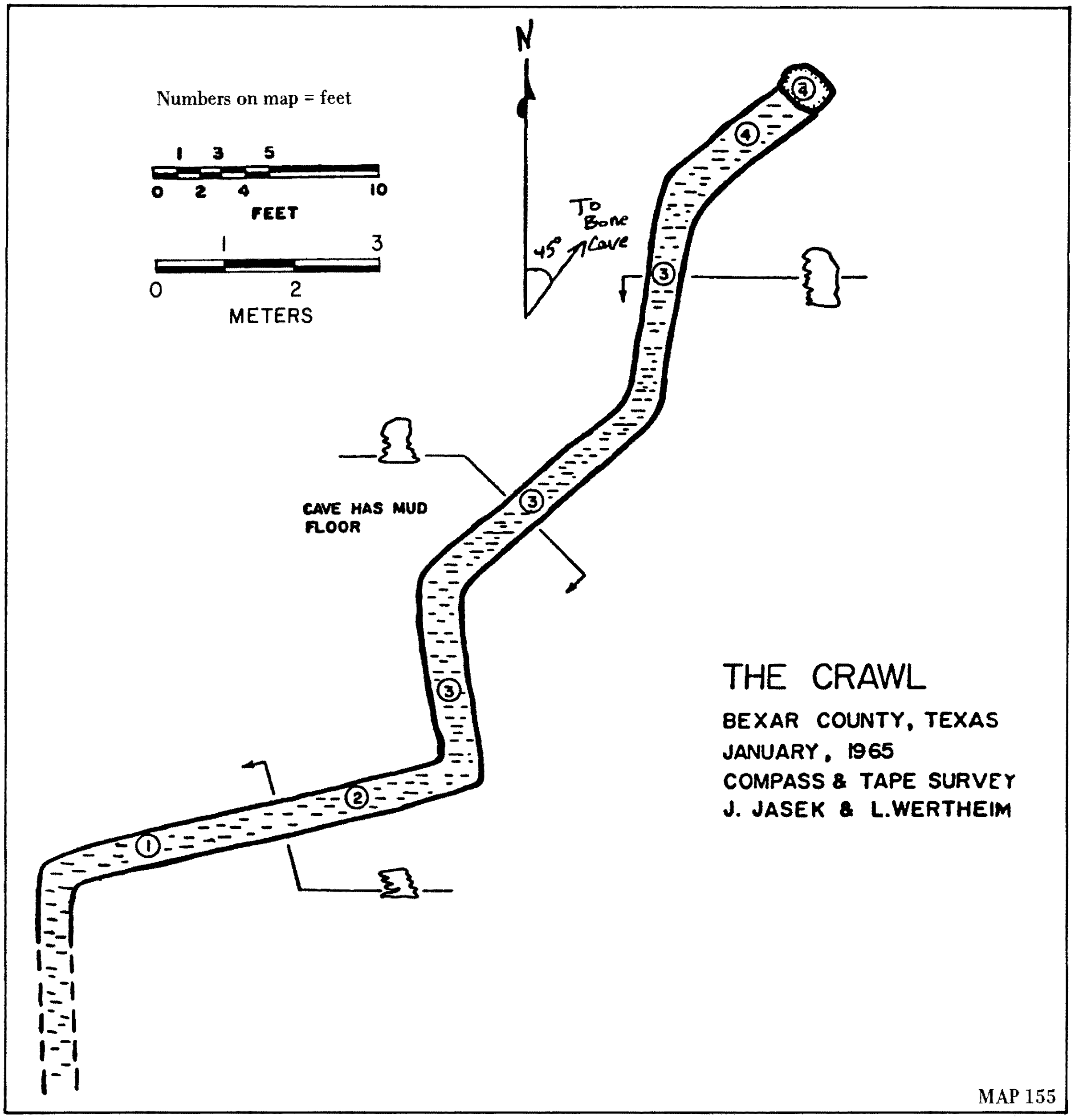
STEALTH CAVE (BCS #178)
Location: Camp Bullis 7.5′
Description: The 2 m diameter by 1 m high entrance room has three entrances into it. The main entrance is low, 1 m wide, and located in a 2 m high bluff. The other entrances are two small shafts in the ceiling. A 1.3 m high by 0.8 m wide passage extends southeast from the room for 7 m, turns left for 1.5 m, then left again back towards the bluff, to end after another 6 m. Three meters into that passage from the entrance room is a 2.5 m long passage to the northwest, which ends in a "T"-intersection. To the right the passage ends in 3 m, and to the left it goes past a small pit for 6 m. The small pit drops 2 m, past a constriction, to an inaccessible lower level. (See Map 154.)
History: Bob Cowell, Kurt L. Menking, and Randy M. Waters discovered and explored the cave on 16 November 1983.
Geology: The cave is developed in the upper Glen Rose Formation and within the flood basin of a man-made reservoir. Subsequent deposition of organic sediment has occurred throughout the cave.



STONE POND CAVE (BCS #61)
Location: Longhorn 7.5′ (521, 490)
Description and History: A cave of unknown extent is reported to have been discovered and sealed during the construction of a pond for the Stone Oak housing development in the summer of 1984.
Geology: The cave was formed in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer.

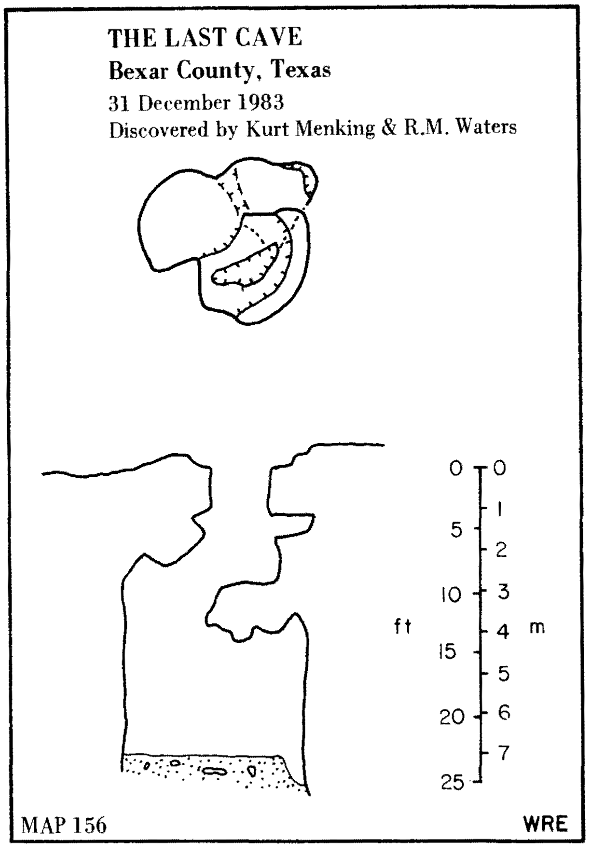
TEZEL ROAD CAVE (BCS #170)
Location: Culebra Hill 7.5′
Description: Tezel Road Cave was a pit approximately 5 m deep.
History: Following a four-day search for his missing coon dog "Blue," Harry Toepperwein discovered both the dog and the pit in which it was trapped on 21 July 1965. In 1977 Gary Poole and George Veni attempted to explore the cave but found it buried under a plowman's floor.
Geology: The cave was in the Austin Chalk.
Bibliography: Cary (1965).

THE CRAWL (BCS #92)
Alternate names: Little Frog Cave; Hitzfelder Crawl
Location: Bulverde 7.5′
Description: The 1 m diameter by 1.3 m deep entrance drops into a crawl that extends 16 m to the southwest. The cave continues too small for exploration. (See Map 155.)



History: Explored and surveyed in January 1965 by James Jasek and L. Wertheim, The Crawl was resurveyed as "Little Frog Cave" on 8 May 1971 by Roger V. Bartholomew and Jorga Lindgron. The Crawl is often visited during trips to Hitzfelder's Bone Hole (BCS #39) located 76 m to the northeast.
Biology: Observed fauna includes harvestmen (prob. *Leiobunum townsendii*) and cave crickets (*Ceuthophilus* sp.)
Geology: The cave is in the Edwards Limestone.
Bibliography: Anonymous (1973k:9-10; 1973q:11); Bartholomew (1973:321); Lindgron (1971:124); Reddell and Smith (1966:3).

THE LAST CAVE (BCS #182)
Location: Longhorn 7.5′
Description: A 1.5 m long, 0.6 m wide pit drops 3 m to a ledge where it enlarges to 2 m in diameter. The pit drops 5 m more to end in a 4 m long, 2 m wide, 3.5 m high room. (See Map 156.)
History: This was the last Bexar County cave discovered in 1983 when it was found and explored by Kurt L. Menking and Randy M. Waters on 31 December of that year.
Geology: The cave is in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer.
Bibliography: Veni (1985).



THURMAN CAVE (BCS #135)
Location: Lacoste NE 7.5′
Description: The cave entrance is a 3 m deep narrow vertical slot followed by a terminal 4 m drop.
History: In 1981 members of the San Antonio Grotto were called to explore the cave, which is located in the owner's front yard. Unfortunately, the entrance is so narrow that only the owner's children were able to explore the cave. According to them, the top of the second drop is tighter than the entrance.
Geology: The cave is vadosely developed in the Austin Chalk at the base of a 5 m diameter shallow sink.
Technique: The cave is only accessible to very slim explorers.

TICK 'N DELIGHT CAVE (BCS #72)
Alternate name: Floating Cave
Location: Bulverde 7.5′
Description: Twin tick-infested sinks, measuring 15 m in diameter and 5 m deep, mark the entrance to the cave. The delight is inside past either the crawlway or narrow drop-in entrance. Tick 'n Delight Cave, one of the best decorated caves in Bexar County, is a single room 40 m long by 13 m wide and averages 1.4 m high. It is noted for its numerous sodastraws and its speleothems which appear to "float" on a cushion of air (where stalagmites, flowstone, and columns have formed and the soft dirt floor underneath them has been washed away). Near the north end is a 6 m drop to a breakdown area which drains water in that section of the cave. Water in the entrance area drains to the cave's southwest corner. (See Map 157; Photo. 39.)
History: For many years the cave had been known only to its owner. In 1977 Gary Poole and George Veni gained access to this property that contained Tick 'n Delight and eight other fine caves. On 25 September 1977 the cave was surveyed by Gary Poole, George Veni, and Randy M. Waters. In 1982 the property was sold for subdivision.
Biology: Besides ticks in the entrance, the cave has the usual assortment of harvestmen (prob. *Leiobunum townsendii*) and cave crickets (*Ceuthophilus* sp.). During 5 years of visitation to the cave, at least one slimy salamander (*Plethodon glutinosus albagula*) has been observed living on the breakdown block under the drop-in entrance.
Geology: Tick 'n Delight Cave is in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer. Collapse at the northern end of the cave has accelerated drainage and accounts for sediment removal from under the many speleothems.
Bibliography: Anonymous (1978a:4; 1978b:2); Veni (1978a:6; 1978d:58; 1985).

TINY TOWN SINK (BCS #72)
Alternate name: 31′ Deep 80′ Sink
Location: Bulverde 7.5′
Description: A shallow 24 m diameter sink dropped 10 m through a 0.8 m diameter hole into a 4 m diameter room. The room was 6.7 m high and had an adjoining 6.5 m high dome. Beyond the dome was a 3 m long crawlway into which the cave drained. (See Map 158.)
History: The cave was first entered on 7 October 1961 by Bud Frank, Ernest Lundelius, and other members of The University of Texas Grotto. They named the cave "31′ Deep 80′ Sink." James Jasek visited the cave in 1964 but knew the cave as "Tiny Town Sink"—named after the nearby Tiny Town Child Day-Care Center. In the early 1970s the widening of U.S. 281 led to the cave's destruction.
Biology: Harvestmen (prob. *Leiobunum townsendii*) and cave crickets (*Ceuthophilus* sp.) were noted in 1964.
Geology: The cave was vadosely developed in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer.
Paleontology: A raccoon skull was collected in 1961.

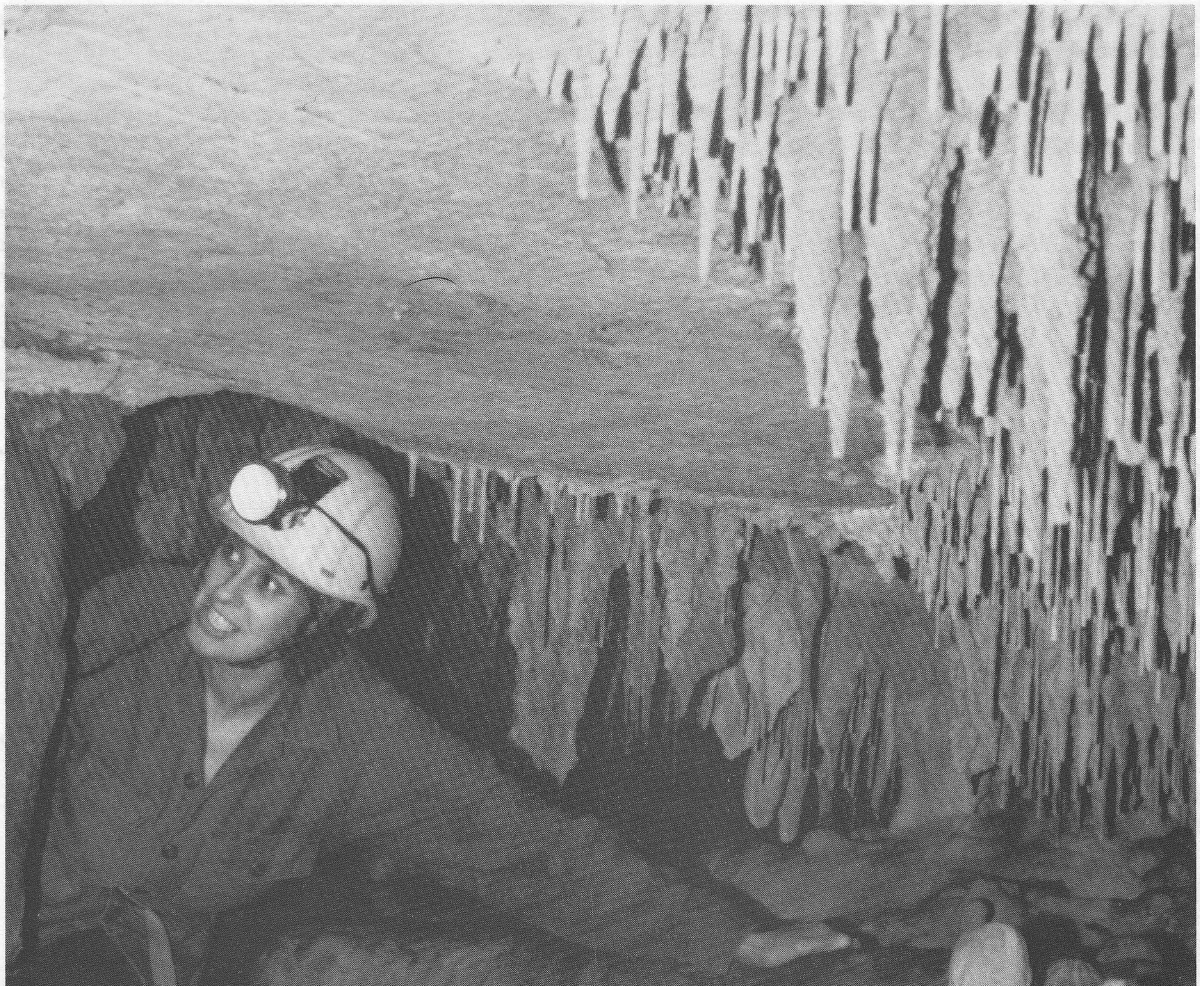


Photo. 39.—Julia Murrell discovering crystalline beauty in Tick 'n Delight Cave (George Veni).

No other bones were found.

Bibliography: Anonymous (1973q:12); Litsinger (1973b:10); Passmore (1977:47); Reddell and Knox (1962:3-4, 35); Reddell and Russell (1962a:6); Reddell and Smith (1966:4); Veni (1978a:6; 1985).

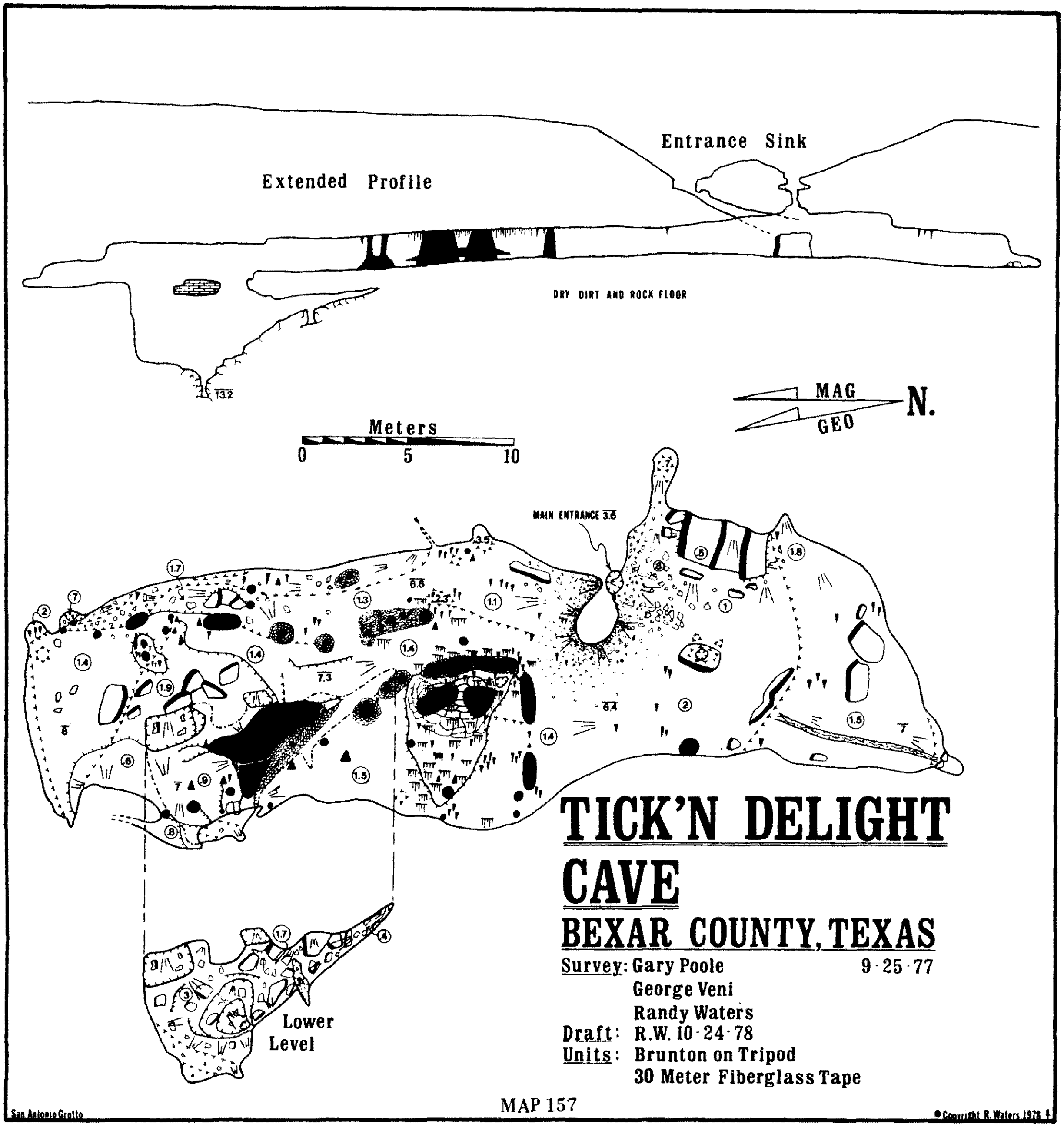
T.M.I. CAVE (BCS #74)

Alternate name: T.M.I. Cave No. 1

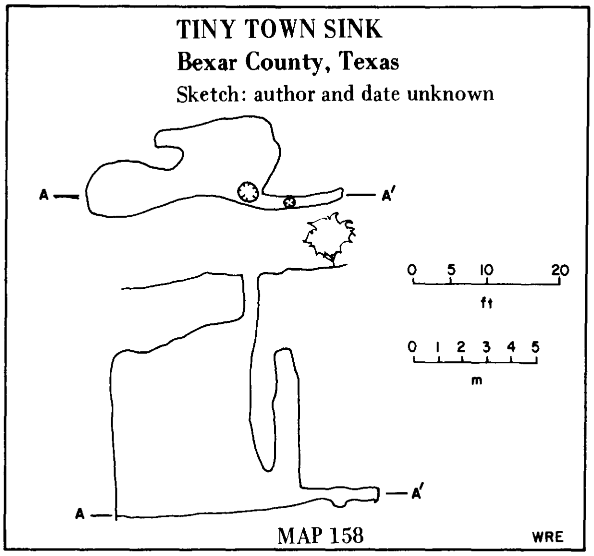
Location: San Antonio East 7.5′

Description: The cave is formed in cliffs along the east bank of Olmos Creek. It is basically a 9 m long, 1 m wide, 1 to 3 m high passage that trends northeast-southwest and is intersected by numerous short side passages. T.M.I. Cave has 9 entrances and a total length of 57.8 m. (See Maps 159-160.)

History: The cave is well known and has been visited for many years. It is named for the Texas Military Institute located near the cave at the top of the cliffs. T.M.I. Cave was first reported by Orion Knox in the late 1950s as having about 13 m of passage. On 11 September 1969 the cave was mapped to a length of 25 m by Alamo Grotto members David Litsinger, John Mallory, Sandy Trout, and Tom Woodley. Ten years later on 2 March 1979 it was resurveyed to its



MAP 157



present length of 57.8 m by George Veni and Randy M. Waters. Comparison of the maps illustrates the evolution of cave cartography in Bexar County and shows a minor change in the cave. This change is best described by referring to profile "B" of the 1979 map. In the main passage is a 1.3 m drop which undercuts to breakdown fill. In 1969 this undercut extended to connect with a lower level passage only 1.7 m away.

Biology: The cave is used as a shelter by various mammals. Harvestmen (prob. *Leiobunum townsendii*) and cave crickets (*Ceuthophilus* sp.) are occasionally present.

Geology: The cave is in the Austin Chalk and formed along a primary northeast-southwest joint and many secondary east-west joints, all of which have been enlarged by floodwaters from Olmos Creek. The upper entrance once captured a small surface stream. Diversion of the stream modified and enlarged some floodwater passages.

Bibliography: Anonymous (1968c:118; 1973q:12; 1979i:3; 1980f:120-121); Passmore (1977:46); Poole and Passmore (1978:38); Reddell and Knox (1962:3-4, 35); Reddell and Russell (1962a:6); Reddell and Smith (1966:4); Veni (1978a:6).

T.M.I. CAVE NO. 2 (BCS #75)

Location: San Antonio East 7.5′

Description: The cave comprises a small passage in the east bank of Olmos Creek that extends 8.5 m to the east before ending in fill. It is 1.3 m high by 2.2 m wide at the entrance but soon reduces to 0.5 by 0.5 m. (See Map 161.)

History: The cave has been locally known for many years. On 2 April 1977 it was surveyed by San Antonio Grotto members Tammy Gass, George Veni, and Randy M. Waters. The cave is named for the nearby Texas Military Institute.

Biology: Cave crickets (*Ceuthophilus* sp.) have been noted, and the cave is occasionally used as a shelter by small animals.

Geology: T.M.I. Cave No. 2 formed as a result of Olmos Creek floodwater enlargement of a joint in the Austin Chalk.

Bibliography: Poole and Passmore (1978:41-42); Veni (1978a:6).

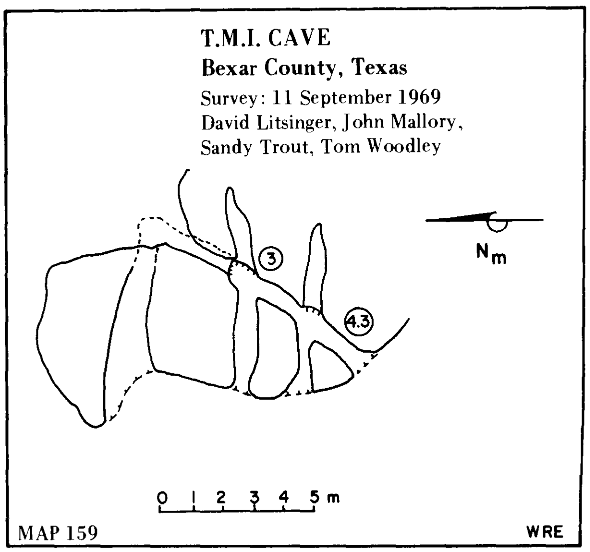
TOAD CAVE (BCS #132)

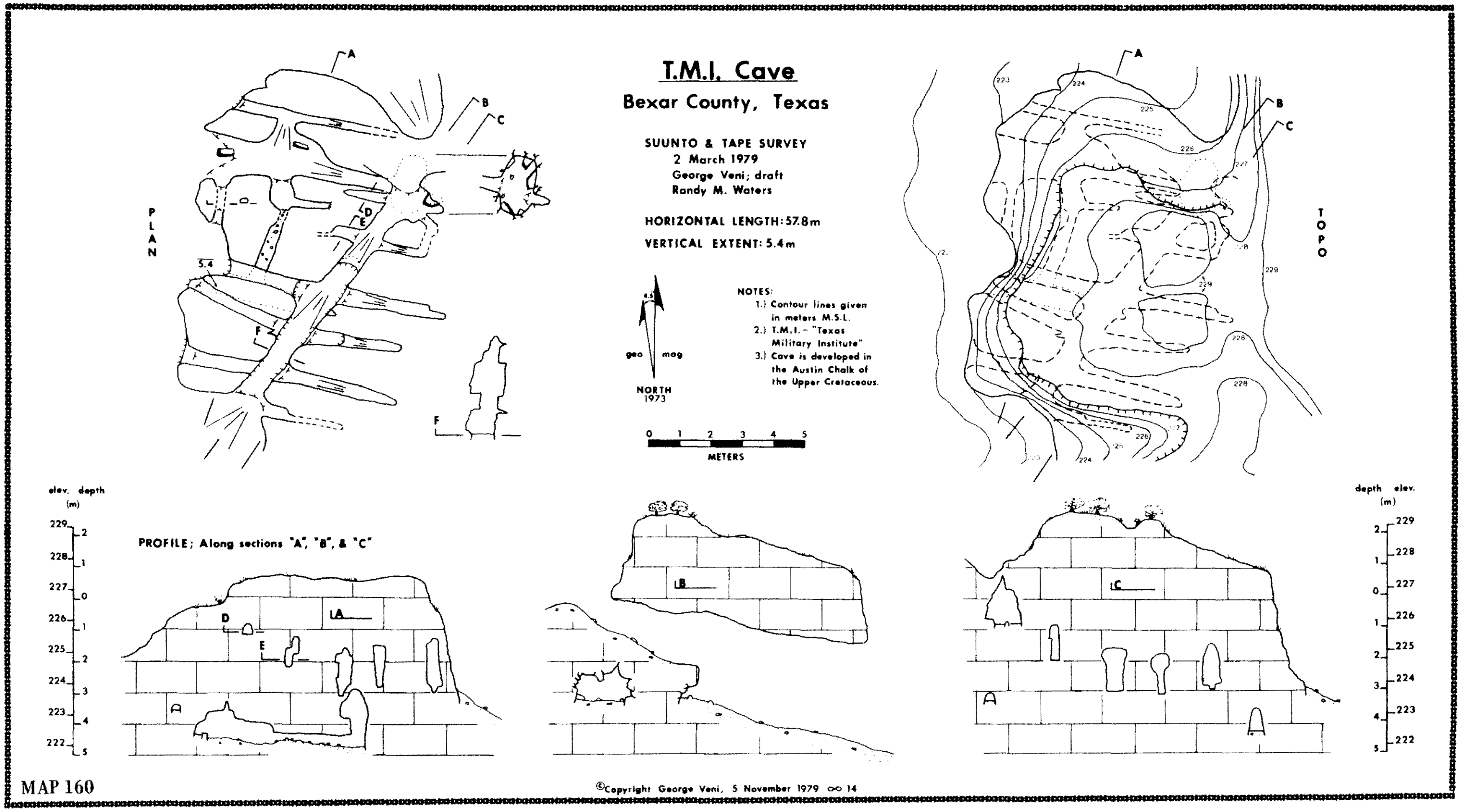
Location: Castle Hills 7.5′

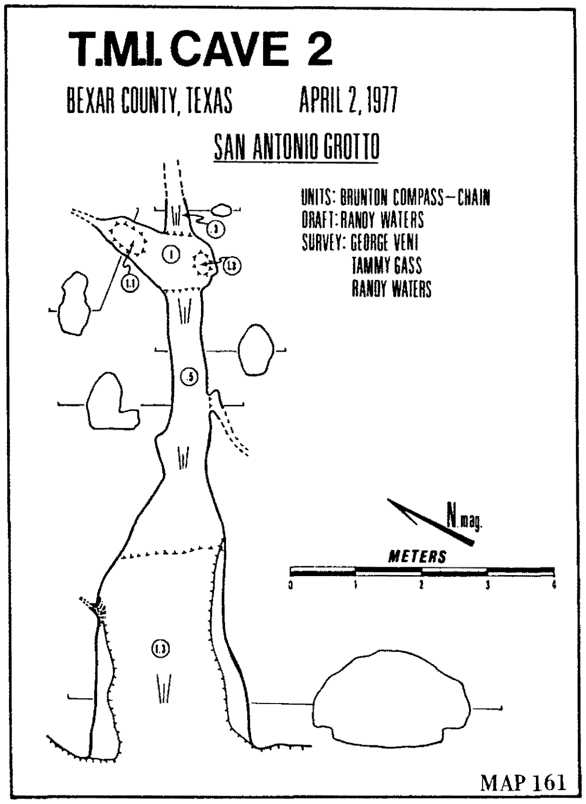
Description: The entrance to the cave is a pit at the base of a shallow 12 m diameter sinkhole. The 0.5 m by 0.4 m oval pit drops 2.3 m into a low wide room that extends 6 m to the south. Three meters into the room is a 1.4 m wide passage to the east that ends at a 3.7 m deep pit. The pit drops into the west side of a 5 m diameter room with a funnel-shaped floor and ceiling heights from 0.4 to 2.4 m. Toad Cave ends in a rectangular pit, 2 m by 1 m by 2 m deep at the base of the funnel. (See Map 162.)

History: In spite of its location near the long known Bet-Ya-Can't-Find-It Cave (BCS #4), Toad Cave was only discovered in the spring of 1980 by Greg Fritz. The main reason for the late discovery was its limited accessibility. As of 1983, urban growth had expanded to within a 5-minute walk of both caves. Eric Short and George Veni surveyed the cave on 10 July 1983.

Biology: Harvestmen (prob. *Leiobunum townsendii*) and cave crickets (*Ceuthophilus* sp.) were observed during the survey. A toad was noted when the cave was discovered.




T.M.I. Cave
Bexar County, Texas
SUUNTO & TAPE SURVEY
2 March 1979
George Veni; draft
Randy M. Waters
HORIZONTAL LENGTH: 57.8 m
VERTICAL EXTENT: 5.4 m
NOTES:
1.) Contour lines given in meters M.S.L.
2.) T.M.I. - "Texas Military Institute"
3.) Cave is developed in the Austin Chalk of the Upper Cretaceous.
geo
mag
NORTH
1973
0 1 2 3 4 5
METERS
PLAN
TOPO
A
B
C
D
E
F
5.4
PROFILE; Along sections "A", "B", & "C"
elev. depth (m)
depth elev. (m)
229
228
227
226
225
224
223
222
MAP 160
©Copyright George Veni, 5 November 1979 ∞ 14



MAP 161

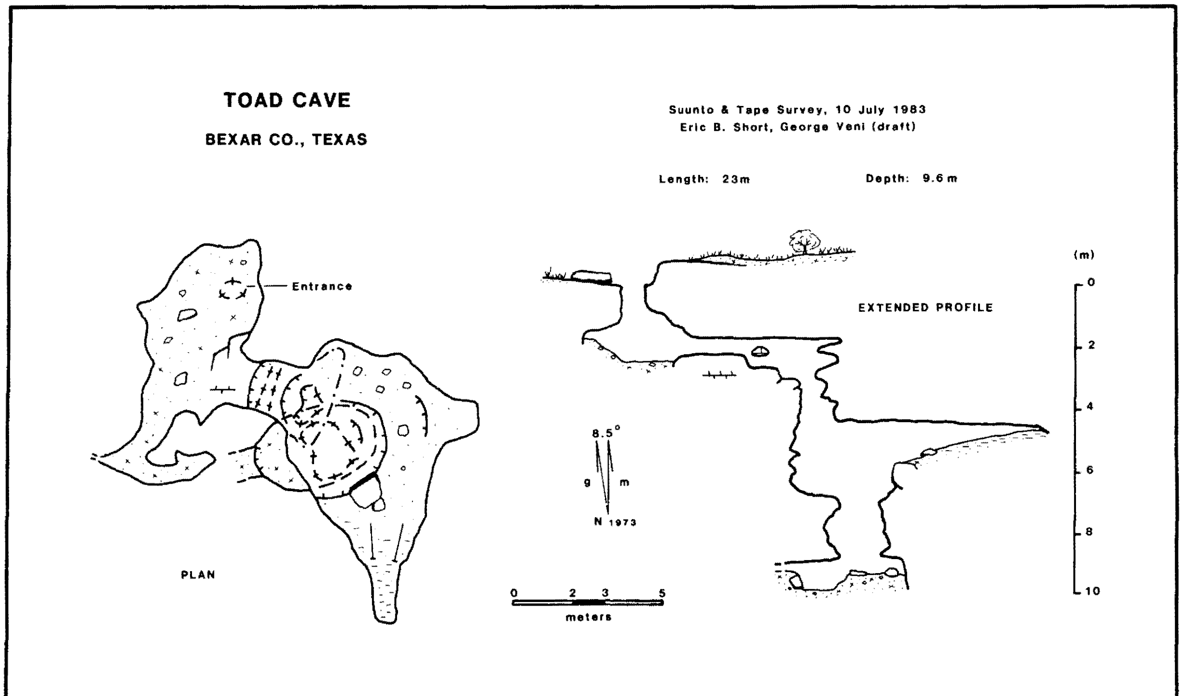
Geology: Two small, seasonally active streamlets feed into this cave which is in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer.
Technique: A large branch is often jammed in the entrance pit to assist with that short climb. A 7 m rope tied to a natural bridge is useful as a belay for the 3.7 m pit.
Bibliography: Anonymous (1980e:46); Veni (1983: 97; 1985).

TOBACCO CAN CAVE (BCS #76)
Alternate names: Tobacco Can Hole; Classen Tobacco Can Hole
Location: Bulverde 7.5′
Description: Tobacco Can Cave is a series of pits, interrupted by small ledges. The 0.6 m diameter entrance drops 5 m, followed by consecutive drops of 1, 4, 2.6, 6.5, 9, and 8 m. (See Map 163.)
History: The cave was first explored in October 1959 by Orion Knox and other members of the Alamo Grotto. Ten years later, on 2 November 1969, it was surveyed by Roger V. Bartholomew, Wayne Russell, and Andy Sandoval.
Geology: The cave was vadosely developed to recharge water into the Edwards (Balcones Fault Zone) Aquifer.
Technique: Vertical equipment is needed for most of the drops.
Bibliography: Anonymous (1969f:115; 1973i:9; 1973q:11); Passmore (1977:12); Reddell and Knox (1962:3-4, 12); Reddell and Russell (1962a:5); Reddell and Smith (1966:3); Veni (1978a:6; 1978f:6; 1985).

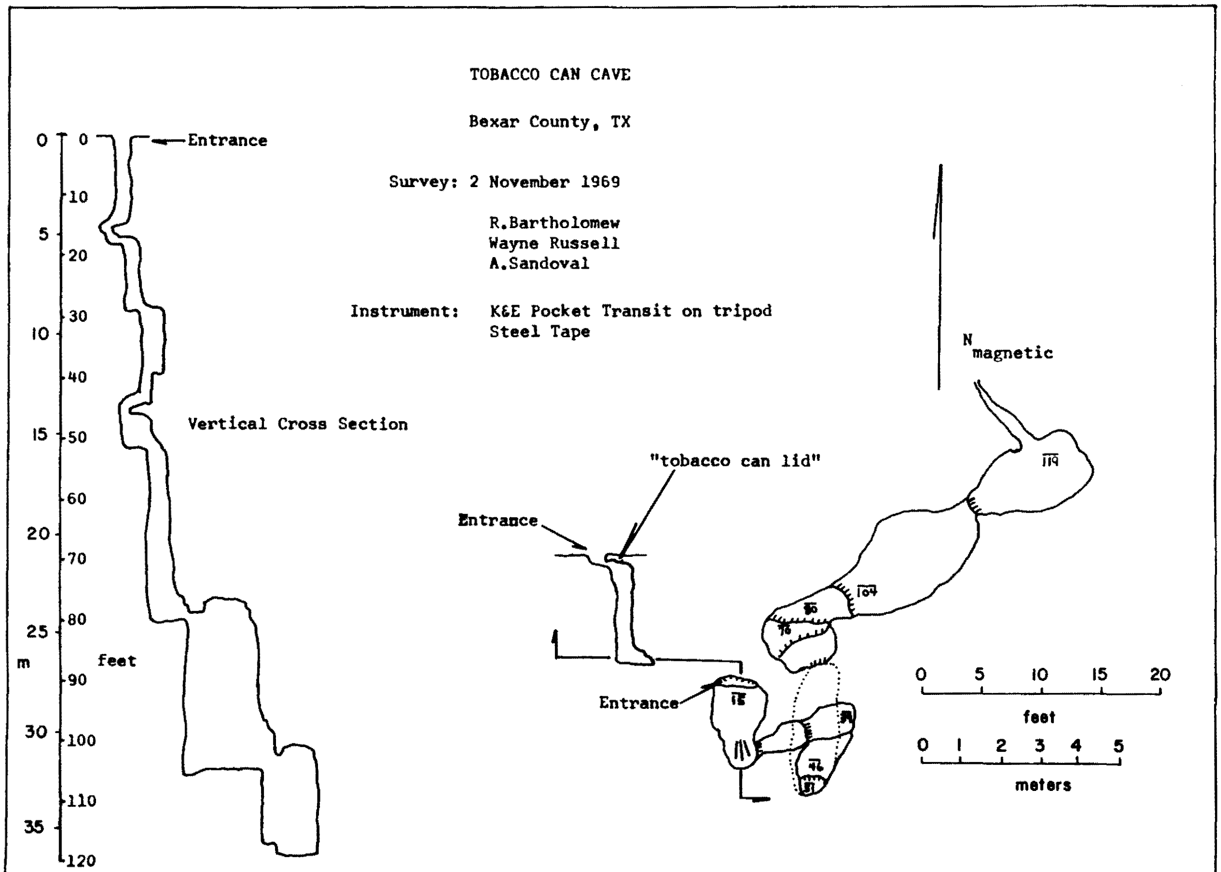
TRACT 6 CAVE 2 (BCS #142)
Location: Van Raub 7.5′
Description: A 0.6 m entrance opens into an 8 m deep pit with no passage extensions.
History: The cave was discovered and explored on 14 March 1970 by Roger V. Bartholomew, Rick Clements, and David Litsinger.
Geology: The cave is a vadose shaft in the Edwards Limestone.
Technique: A belay line or cable ladder is recommended for the pit.

TWIN PITS (BCS #77)
Alternate name: Twin Pits Cave
Location: Bulverde 7.5′
Description: Two pit entrances, each approximately 1 m in diameter, are 2 m apart. The southern pit drops 5 m to a fissure that connects with the 11 m deep northern pit. A 4 m diameter room at the base of the 11 m pit has a 9 m long crawl to a 5 m drop with two passages at the bottom. The small east-trending passage extends 5 m to a pool of water, and the passage to the south continues 4 m to a 6 m breakdown crawl which ends in a pool of water past the breakdown and drops into another pool of water. A water-crawl, not noted during the survey, leads from the pool; this passage has been explored approximately 30 m without reaching its end. (See Maps 164-165.)
History: The first recorded visit to the cave was on 4 February 1973 when it was surveyed by Bob Burdic, Glenn Darilek, Scott Harden, Jorga Lindgron, and Phil Winkler. In October of 1985 Allan Cobb, Jason Ing, and Randy M. Waters visited the cave and discovered the water crawl.
Biology: The fauna of the cave includes one terrestrial troglobite, an isopod of the family Trichoniscidae. The water crawl is inhabited by undetermined tubificid worms and copepods, troglobitic amphipods, and cirolanid isopods. A collection was made in the cave on 13 October 1985 by Allan Cobb. The following is a list of specimens collected:

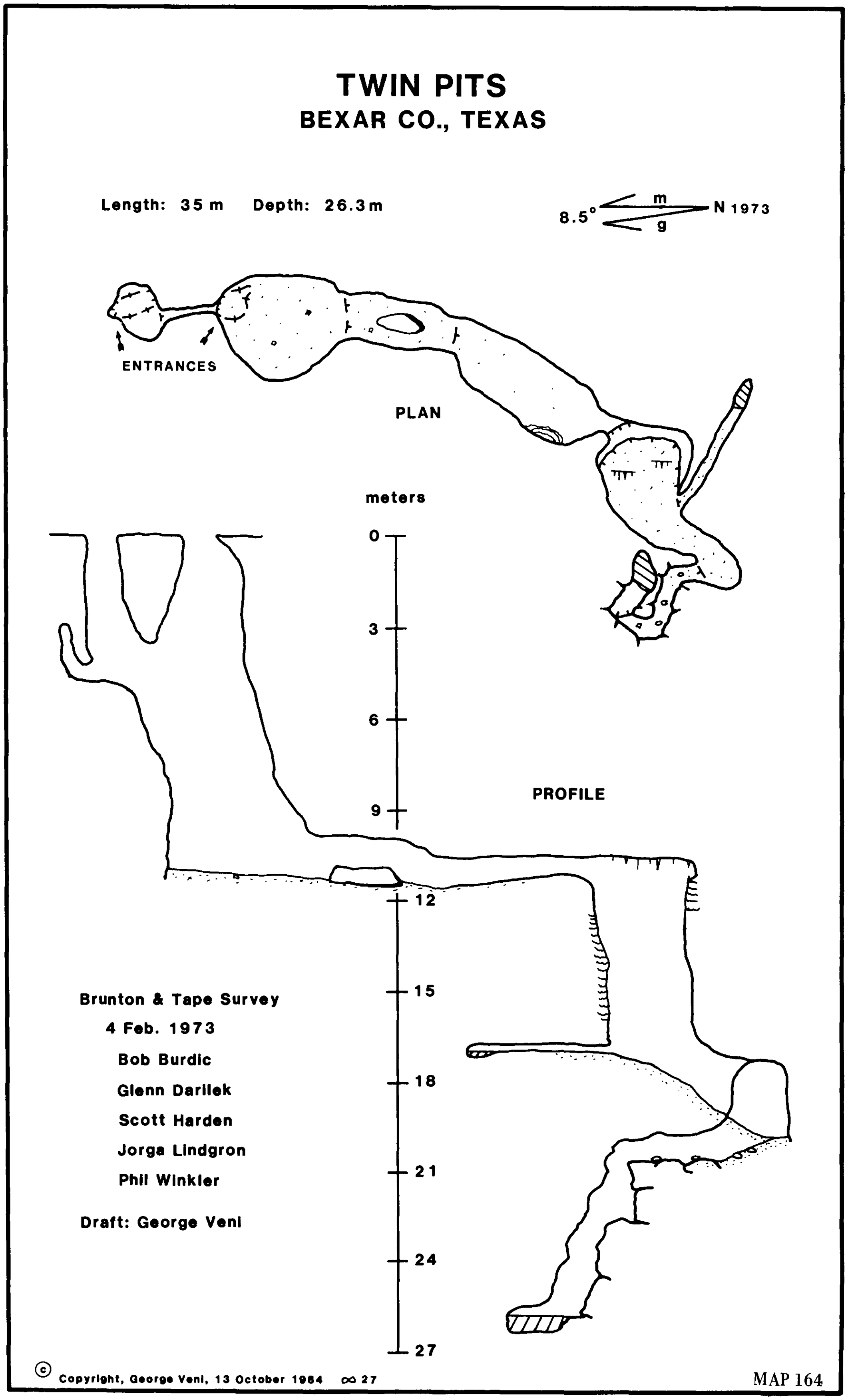
Snails—Undetermined material
Amphipods—*Stygobromus russelli* (troglobite)
Isopods—*Cirolanides texensis* (troglobite)
Trichoniscidae genus and species 1 (troglobite)
Scorpions—Prob. *Vaejovis reddelli* (troglophile)

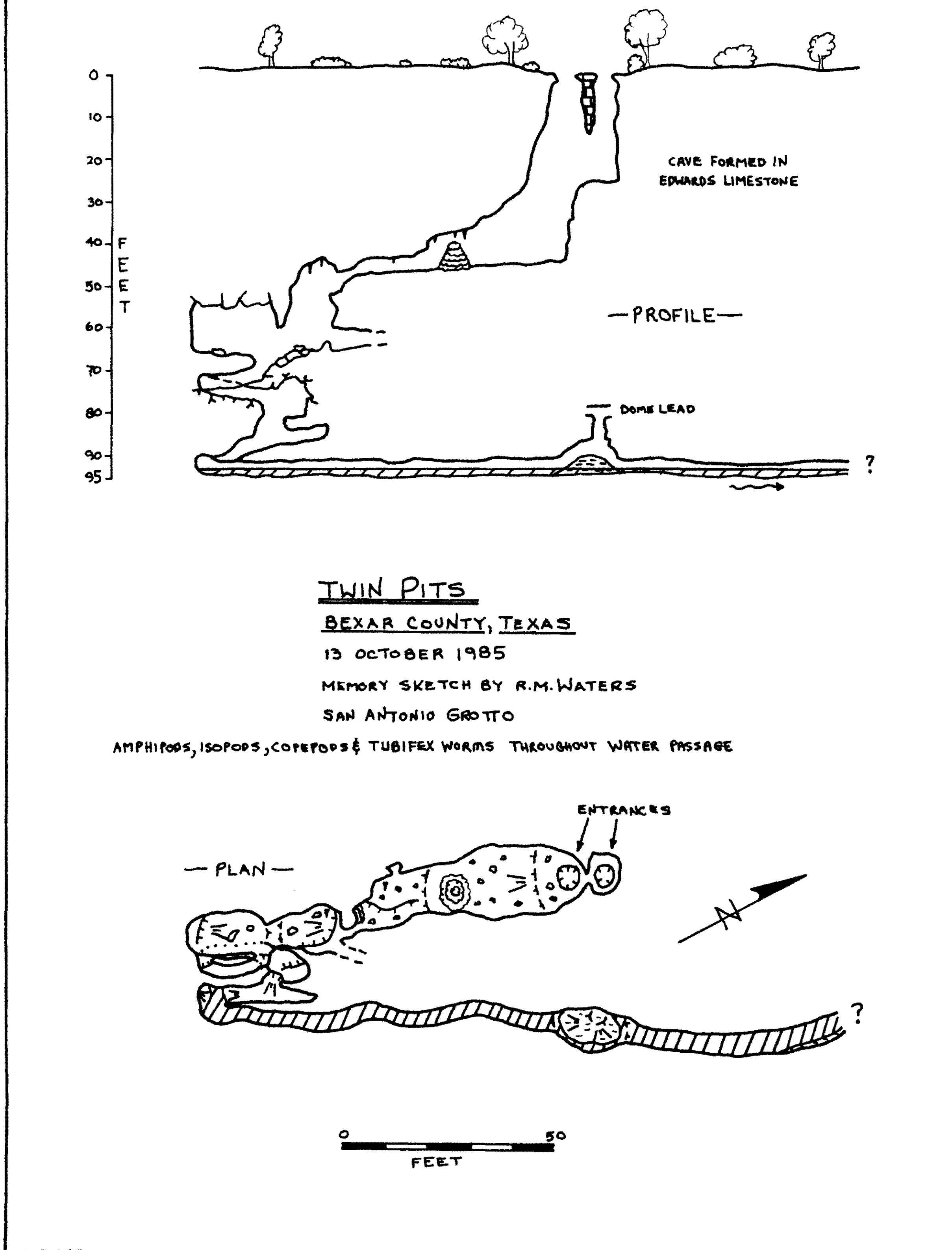


MAP 162



MAP 163


TWIN PITS
BEXAR CO., TEXAS
Length: 35 m Depth: 26.3 m
8.5°
m
g
N 1973
ENTRANCES
PLAN
meters
0
3
6
9
12
15
18
21
24
27
PROFILE
Brunton & Tape Survey
4 Feb. 1973
Bob Burdic
Glenn Darilek
Scott Harden
Jorga Lindgron
Phil Winkler
Draft: George Veni
© Copyright, George Veni, 13 October 1984 ∞ 27
MAP 164



MAP 165

TEXAS SPELEOLOGICAL ASSOCIATION

Spiders—*Cicurina varians* (troglophile)
Springtails—Undetermined material
Predaceous diving beetles—Dytiscidae genus and species

Geology: Twin Pits is in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer.

Archeology: In 1985 a human skull and pelvis was discovered firmly encased in the breakdown area.

Technique: A rope or cable ladder is needed for the 11 m deep entrance pit.

Bibliography: Darilek (1973b:1-2); Elliott and Mitchell (1973:173-174); Palit (1986:16); Veni (1978a:6; 1985); Winkler (1973a:7; 1973b:122; 1973e:2).

2 FOR 1 CAVE; 2 FOR 1 SPRING (BCS #104 & 103)

Location: Bulverde 7.5′

Description: These two caves are in opposite banks of a narrow ravine. 2 For 1 Spring extends into the north bank for 16 m as a 2 m high by 1.6 m wide passage. Water flows out of a small sump onto a mud-covered bedrock floor. Average water/mud depth is 0.4 m. Water exiting the Spring feeds into a 9 m long pond which spans the ravine and whose flow sinks into the soil floor of 2 For 1 Cave. The Cave entrance measures almost 3 m high and wide, but within its 10 m length the ceiling lowers and the walls narrow such that further exploration is impossible without digging. (See Map 166.)

History: In 1978 Dottie and Teeni Kern, Gary Poole, George Veni, and Randy M. Waters were the first cavers to whom the owner had shown the caves. Veni returned with Scott Harden on 30 May 1979 and surveyed the caves.

Biology: Observed fauna includes harvestmen (prob. *Leiobunum townsendii*), cave crickets (*Ceuthophilus* sp.), and minnows in the pond. 2 For 1 Cave serves as a sheltered waterhole for the indigenous terrestrial fauna.

Geology: The caves were actually a single passage truncated by the downcutting of a ravine. Mixing of surface and groundwater resulted in a higher limestone solubility capacity which has enlarged the caves backwards from their entrances. The perennial cave stream, with an average measured flow of 7.56 liters per minute, has never gone dry according to the owner—even during the severe drought of the 1950s. A June 1981 dye trace performed by Scott Harden shows that water from 2 For 1 Cave emerges again at Crescent Spring located 460 m to the southwest. All three caves are in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer.

Bibliography: Anonymous (1978e:1; 1979s:4); Veni (1985).

UNDERWATER CAVE (BCS #78)

Location: Helotes 7.5′

Description: Two elongate shallow pits lead into Underwater Cave. The eastern pit, mostly filled with tree branches and some trash, connects within a meter to the 1.3 m deep main western entrance. Extending southeast 7 m, the entrance stoopway passage intersects a passage from the west, then continues 9 m as a crawl to end in a dirt/organic debris fill. The westbound passage proceeds 4 m, then turns south and forks. The right fork ends in 3 m and the left fork leads down an 8 m long crawl to a side passage from the east. Floodwaters periodically alter the cave. In 1978 the short eastbound side passage connected upward to the presently filled end of the entrance passage. Also in 1978, the southward continuation of the 8 m crawl was only 0.05 m high, but in 1983 that passage had washed out to a height of 0.25 m. Three and a half meters into that newly opened crawlway the passage enlarges to a height of almost 1 m. It could be seen to continue at least another 6 m but bad air prevented exploration (See Map 167.)

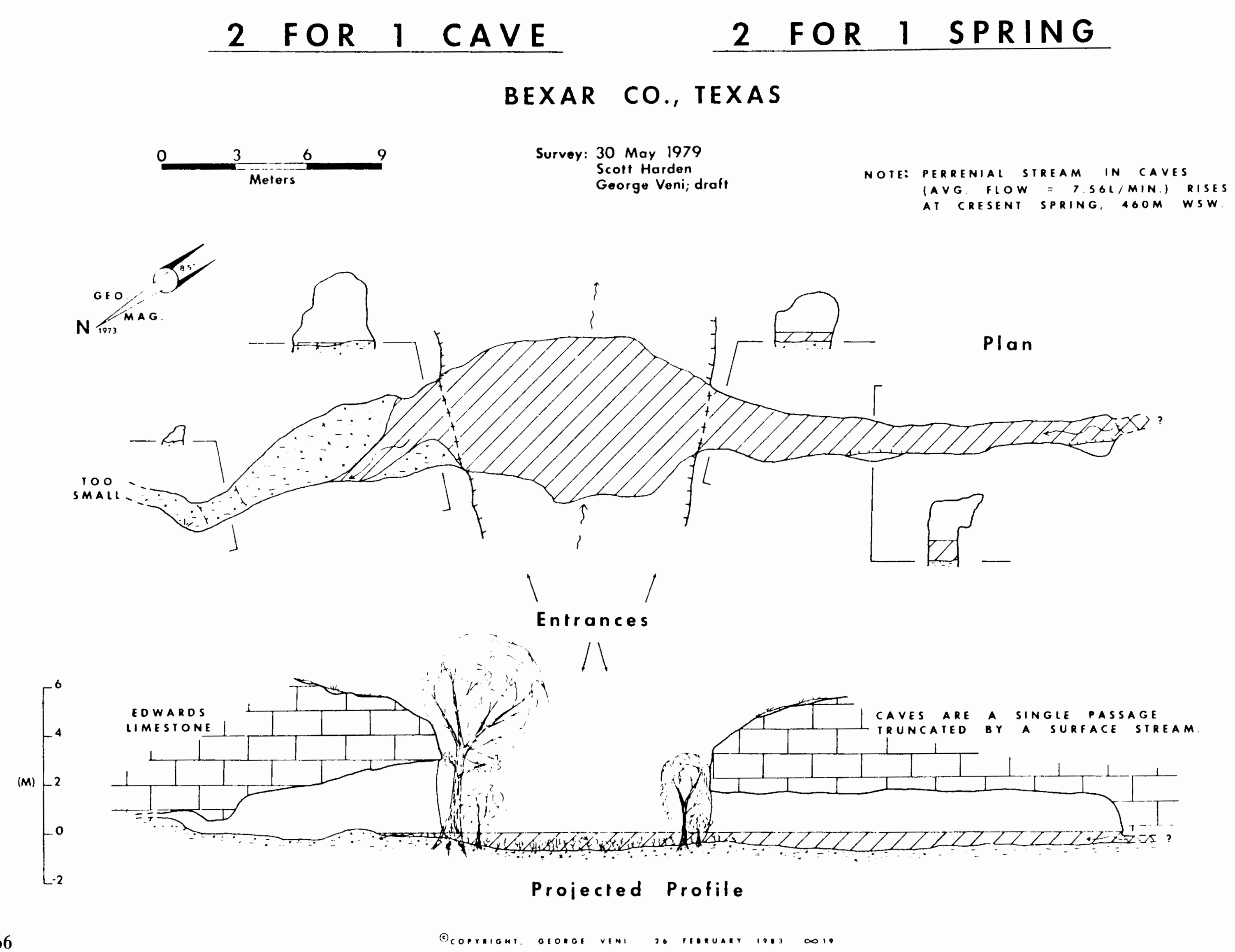
History: In 1972 Greg Passmore and Warnie Meitenschlaeger discovered Underwater Cave and nearby KKYX Cave (BCS #44). The cave was rediscovered by John R. Cross, Jr., George Veni, and Randy M. Waters in 1978. On 26 and 30 July 1983 Underwater Cave was surveyed by Carmen Goyette, Veni, and Waters. The cave was named because of its location in and under Leon Creek. The 1978 exploration occurred beneath a flowing stream.

Biology: An invertebrate collection made on 30 July 1983 by George Veni and Randy M. Waters included the following material:

Snails—*Polygyra texasiana* (empty shells)
Spiders—Linyphiidae genus and species
Harvestmen—*Leiobunum townsendii* (trogloxene)
Centipedes—Scutigeromorpha undetermined
Millipedes—*Oxidus gracilis* (troglophile)
Springtails—Undetermined material
Cave crickets—*Ceuthophilus (C.) secretus* (trogloxene)
German cockroaches—*Euthlastoblatta* sp. (?accidental)
Rove beetles—*Homaeotarsus* sp. (?troglophile)

Other noted fauna include an occasional rattlesnake (*Crotalus* sp.).

Geology: Remnant fluvial deposits and other similar observations testify that passages, and possibly most of the known cave, periodically fill and are cleared of sediment by Leon Creek floodwaters. These floodwaters formed the cave in the Austin Chalk by developing it for its subsurface groundwater storage capa-


2 FOR 1 CAVE
2 FOR 1 SPRING
BEXAR CO., TEXAS
0 3 6 9
Meters
Survey: 30 May 1979
Scott Harden
George Veni; draft
NOTE: PERRENIAL STREAM IN CAVES (AVG. FLOW = 7.56L/MIN.) RISES AT CRESENT SPRING, 460M WSW.
GEO
MAG.
N 1973
85°
Plan
TOO SMALL
Entrances
EDWARDS LIMESTONE
CAVES ARE A SINGLE PASSAGE TRUNCATED BY A SURFACE STREAM.
(M)
6
4
2
0
-2
Projected Profile
©COPYRIGHT, GEORGE VENI 26 FEBRUARY 1983 ∞19

MAP 166

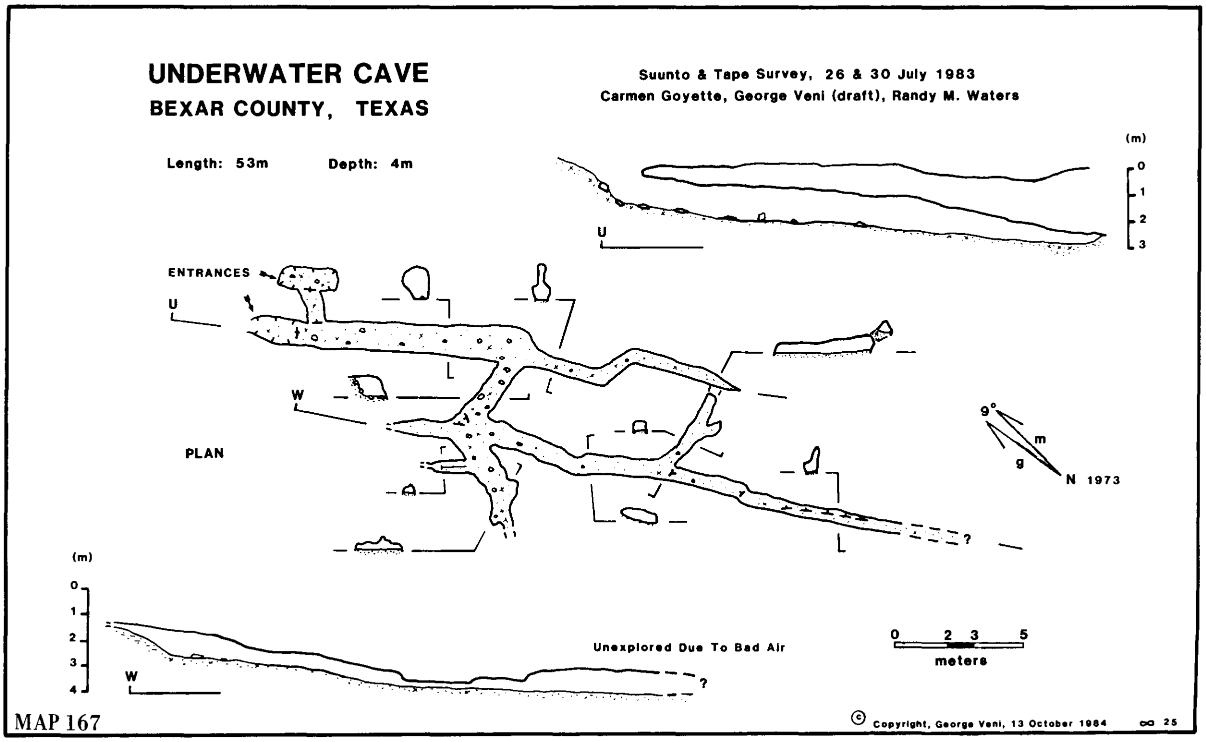
city. Although it hasn't been physically traced, water from the cave probably resurges at seep springs located about 100 m downstream.
Meteorology: In 1978 there were no problems with the air quality in the crawls. Since the connection between the northern and southern crawls has been sealed, air circulation has been reduced, which, when combined with decomposing organic material, has substantially raised the CO_2 content of the cave air.
Technique: Watch out for bad air and rattlesnakes!
Bibliography: Veni (1978a:6; 1983:98).

UNKNOWN CAVE (BCS #107)
Location: Castle Hills 7.5′)
Description: A stoopway sinkhole entrance opens into a room 8 by 7 by 1.4 m high. Four small passages, 2 to 8 m long, extend north-south off this room. (See Map 168.)
History: While cave hunting on 7 March 1979 Randy M. Waters discovered an "unknown cave." He was soon joined by George Veni and they surveyed it. Rocks strewn around the sinkhole entrance indicate the cave was dug open by its original, unknown explorers. On 13 September 1984 Scott Harden and George Veni extended the survey to include the collapse sinkholes overlying the cave.
Biology: An invertebrate collection made on 13 September 1984 by Scott Harden and George Veni included the following material:

Snails–*Helicodiscus eigenmanni* (troglophile)
Spiders–*Achaearanea porteri* (troglophile)
Harvestmen–*Leiobunum townsendii* (trogloxene)
Mites–Undetermined material
Centipedes–Scutigeromorpha undetermined
Cave crickets–*Ceuthophilus (C.) secretus* (trogloxene)
Desert cockroaches–*Arenivaga* sp. prob. *bolliana* (trogloxene)
Assassin bugs–Reduviidae genus and species (trogloxene)
Cave barklice–*Psyllipsocus ramburii* (troglophile)

Beetles have also been observed in the cave.
Geology: Developed in the Edwards (Balcones Fault Zone) Aquifer, Unknown Cave is a single chamber or passage truncated at its north and south ends by collapse. The four passages off the main room simply follow between the breakdown and cave wall.
Bibliography: Anonymous (1979n:4); Palit (1984b:27); Passmore (1977:48); Veni (1985).

VILLA RREAL'S CAVE (BCS #79)
Location: Helotes 7.5′
Description: A 0.6 m diameter, 6.5 m deep pit has a short crawlway at the bottom that leads into a small room 3 by 6 by 1 m high. Large slabs of breakdown cover the floor, and all leads are too small to enter. (See Map 169.)
History: Cavers from the Alamo Grotto made the

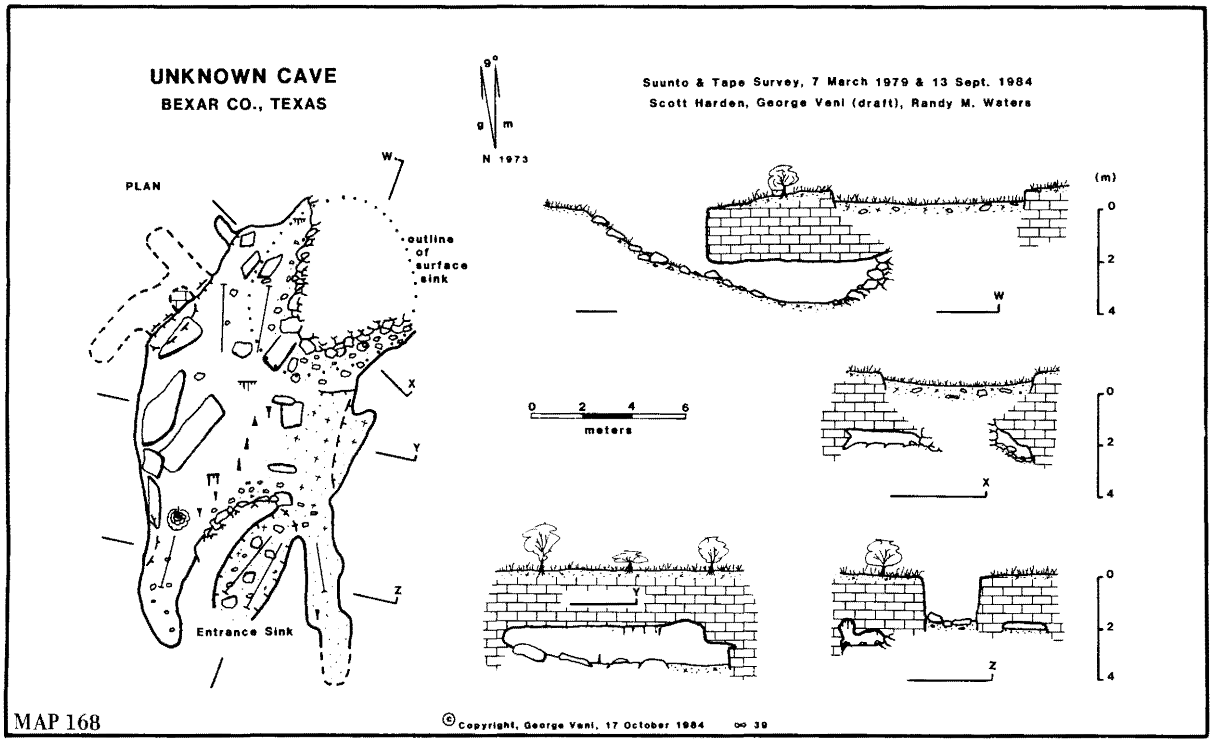


MAP 167

first recorded visit to the cave on 26 December 1964. C. Burns, David Litsinger, and Bro. Schaller surveyed it on 23 February 1968. A futile effort was made to blast into new passages sometime in the early to mid 1960s. Because the hilltop in which the cave is located is often used for outdoor concerts and other public gatherings, Villa Rreal's Cave tends to be well known, well visited, and well vandalized.
Biology: Cave crickets (*Ceuthophilus* sp.) and a frog have been observed.
Geology: Villa Rreal's Cave is a collapse chamber in the Edwards Limestone.
Technique: A handline or cable ladder is helpful in climbing the entrance pit.
Bibliography: Anonymous (1969a:25; 1971b:39); Veni (1978a:6); Waters (1978b:3-4).

VIRGIN CAVE (BCS #80)
Location: Castle Hills 7.5′
Description: A small sink slopes into the hands-and-knees crawlway entrance to a 2.3 m deep pit. Decorated by a flowstone mass along its east wall, the pit is followed by a drop of 4.4 m which opens into a 3.3 m diameter room. On the east wall is a narrow 2.8 m deep pit to a small crawl that ends within 4 m. (See Map 170.)
History: The cave was discovered by Randy M. Waters when he was cave hunting with Gary Poole and George Veni on 24 April 1978. During initial exploration they dug open the 2.8 m pit. On 7 March 1979 Veni and Waters returned to Virgin Cave and surveyed it.
Biology: Harvestmen (prob. *Leiobunum townsendii*), ticks, cave crickets (*Ceuthophilus* sp.), horseflies, a cliff frog (*Syrrhophus marnocki*), and bones of various small mammals were noted during the survey.
Geology: Virgin Cave is in a sinkhole-dotted upland of the Edwards (Balcones Fault Zone) Aquifer recharge zone.
Technique: Exercise caution at the lower level crawl. One wall is a semi-stable matrix of cobbles, clay, and dirt.
Bibliography: Veni (1978a:6; 1985); Waters (1978c:3).

VOIGHT'S BAT CAVE (BCS #81)
Alternate name: Bat Cave
Location: Longhorn 7.5′
Description: A 2.3 m deep entrance pit drops into the northwest corner of a somewhat circular chamber. The cave is about 12 m in diameter, 1 to 4 m high, has a flat dirt/guano floor with breakdown and flowstone along the walls, and a small skylight near its center. (See Map 171.)
History: The cave was first reported by James Jasek as "Bat Cave." He surveyed it on 24 August 1964 with Ray Summars. Thirteen years later the cave was resurveyed by John Cross and George Veni on 29



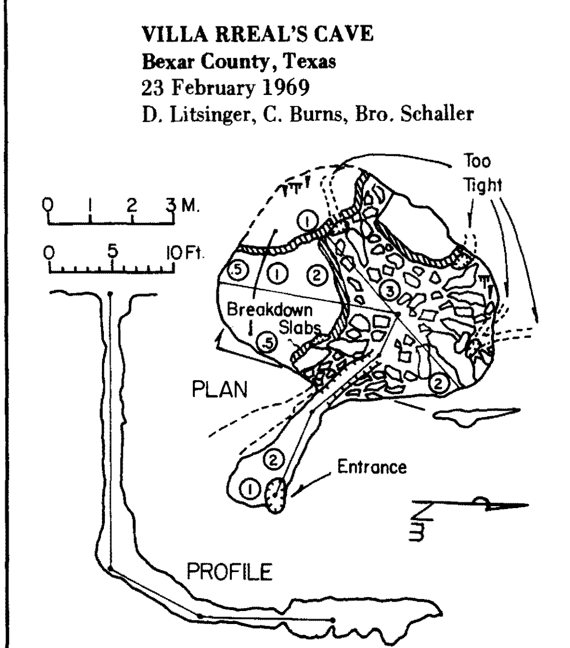
MAP 168

April 1977, who knew it as "Voight's Bat Cave." In 1983 Farm Market Road 1604 was widened to within a few meters of the cave but left the cave undisturbed.

Biology: In 1964 Jasek reported the presence of spiders, harvestmen (prob. *Leiobunum townsendii*), cave crickets (*Ceuthophilus* sp.), frogs, and bats. The 1977 resurvey and trips subsequent to it have noted little to no fauna in the cave, although there seems to be a minor but steady increase in faunal activity; in 1983 a few cave crickets, harvestmen, a couple of frogs, and some scorpions (prob. *Vaejovis reddelli*) were observed. It is not known why the bats abandoned the cave. Although frequent visits by local youths may have been a factor, that would not explain the lack of other fauna. Possibly someone sprayed the cave with toxic chemicals to get rid of the bats, or encroaching urbanization has introduced contaminants that have affected the cave fauna. A small collection of invertebrates made on 13 September 1984 by Scott Harden and George Veni included the following material:

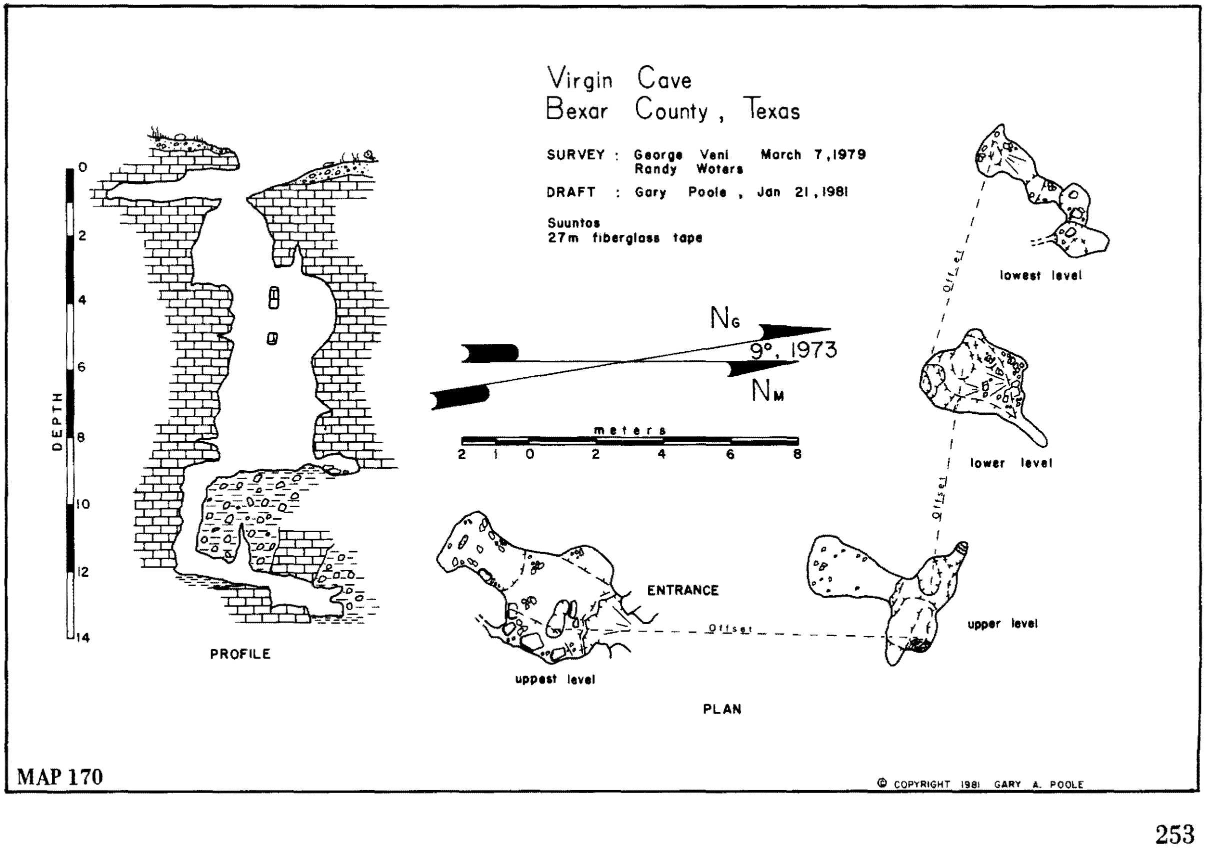
Snails–*Glyphyalinia roemeri* (empty shells)
Isopods–Trichoniscidae genus and species 1 (troglobite)
Spiders–*Eidmannella pallida* (troglophile)
Mites–Undetermined material
Springtails–Undetermined material
Cave crickets–*Ceuthophilus (C.) secretus* (trogloxene)
Ants–*Hypoponera opacior* (accidental)

Geology: Voight's Bat Cave is a phreatic chamber,

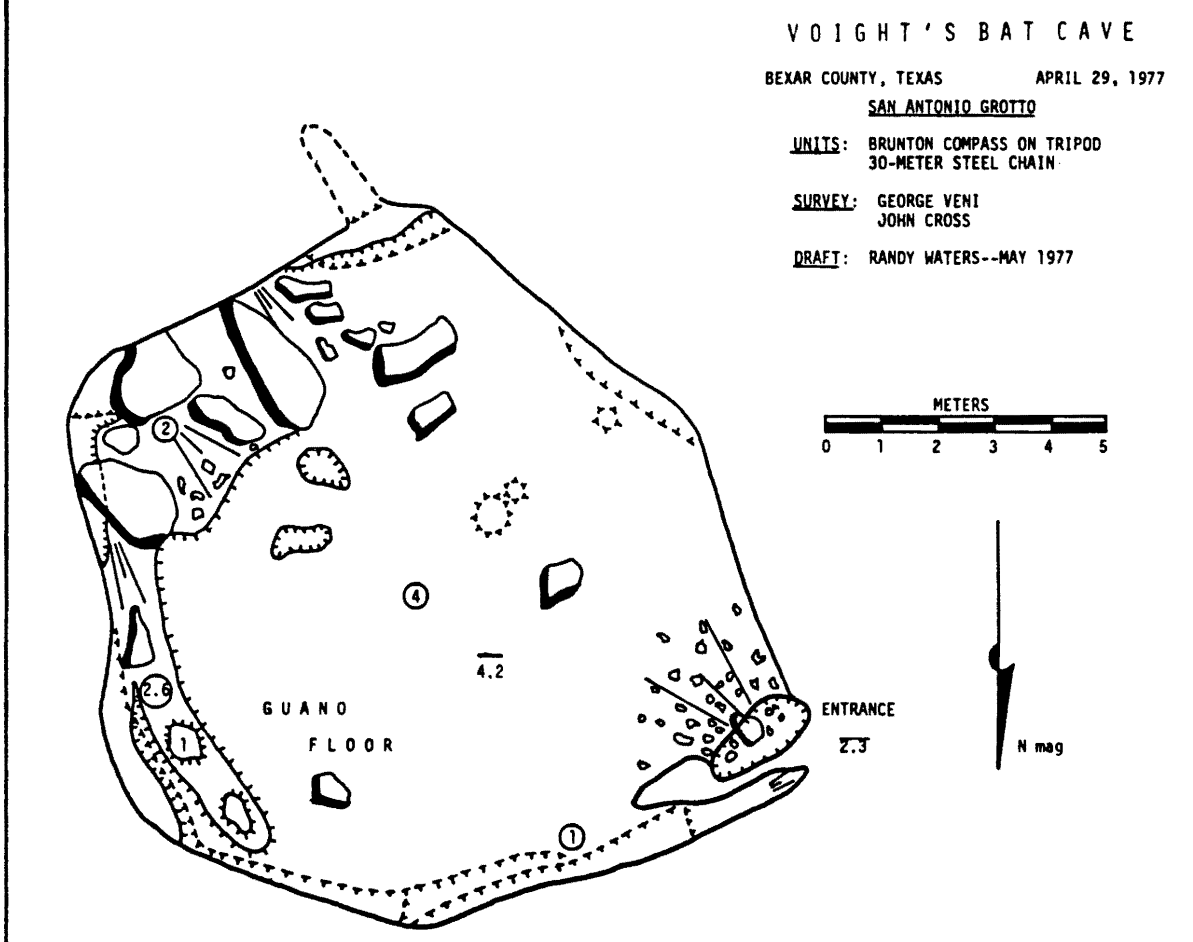


Numbers on map = feet

MAP 169



MAP 170



MAP 171

modified by shaft development and collapse, in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer.

Bibliography: Anonymous (1973q:11); Palit (1986: 16); Passmore (1977:4); Poole and Passmore (1978: 41, 43, 52); Reddell and Smith (1966:2); Veni (1978a:6; 1985); Waters (1983a:73).

WAGNER RANCH FISSURE (BCS #174)

Location: Helotes 7.5′

Description: Located on a hillside, the cave entrance is about 2 m long by 1 m wide and deep. The cave extends 10 m to a small and unexplored crawlway. "One by three meters" were the reported dimensions of the main passage, presumably 1 m wide by 3 m high.

History: Members of the Alamo Grotto visited the cave on 6 March 1965 and on 11 May 1969. A nest of baby vultures at the back of the cave, and the associated stench, discouraged further exploration of the distal crawlway in 1969.

Biology: In addition to the vulture nest, the entrance area contained the checkered garter snake *Thamnophis marcianus marcianus.* Several ticks were unintentionally collected.

Geology: Wagner Ranch Fissure is in the Edwards Limestone.

Bibliography: Veni (1985).

WAGNER RANCH PIT (BCS #181)

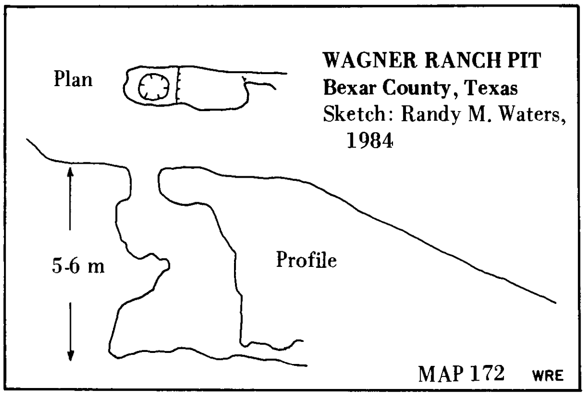
Location: Helotes 7.5′

Description: A 0.6 m diameter hole drops approximately 3 m to a ledge then 3 m to a dirt and rock floor. An impassably tight crawlway extends from the base of the pit. (See Map 172.)

History: On 3 May 1963 James Jasek, Larry Krieder, and Gus Peters were the first cavers to explore the pit. It was rediscovered in late 1982 by Kurt L. Menking and Randy M. Waters.

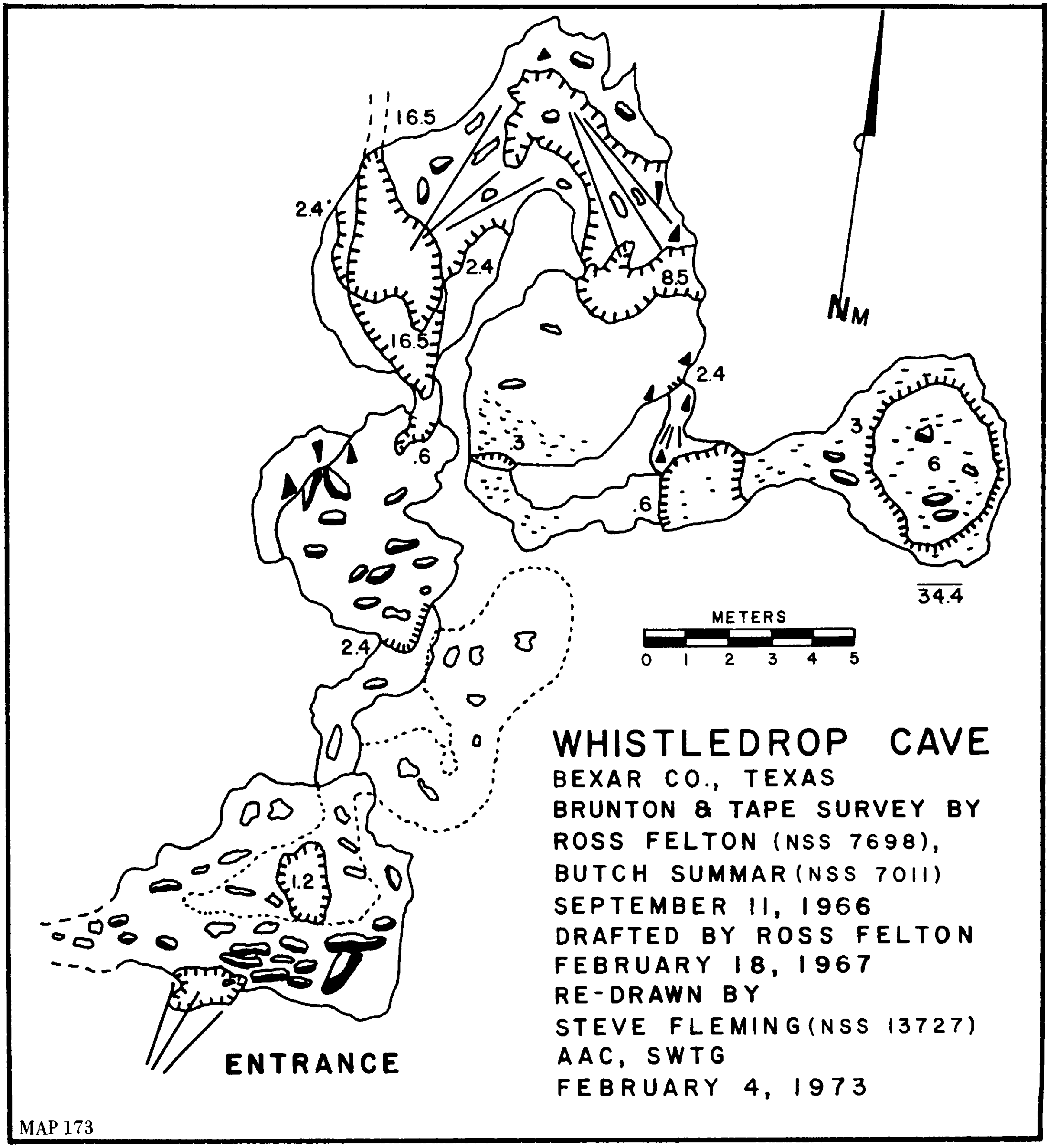
Biology: Spiders and cave crickets (*Ceuthophilus* sp.) were noted in 1963.

Geology: The pit is in the Edwards Limestone.



Meteorology: Intermittent air flow was noted from the crawl on a windy day in 1982.

WHISTLEDROP CAVE (BCS #82)
Location: Bat Cave 7.5′
Description: A small breakdown-filled sink leads into a breakdown-filled room. A hole in the floor drops 1.2 m, then leads to a 2.4 m drop which goes to the longest drop in the cave, 19.4 m—the "Whistledrop." Thirteen meters east from the base of the Whistledrop is an 8.5 m deep pit that is lined with sharp chert blades imbedded in red clay. Two passages ex-



tend from the bottom of the pit, a jagged watercourse and a tight muddy crawl. Both meet at a 4 m deep pit. Six meters further on is the terminus of the cave, a room 5 m in diameter and 6 m high. Not shown on the map is a small passage that sharply turns from the room and slopes steeply downward. This passage takes the cave's drainage but further exploration is not possible. (See Map 173.)

History: In March 1961 the entrance was dug open by Alamo Grotto members Murph Carpenter, Dennis and Merrill Doyle, David and William Gray, Monte Killiam, and Porter Montgomery. The cave was surveyed by Ross Felton and Butch Summar on 11 September 1966.

Geology: Surface runoff in this section of Bexar County is primarily drained to the subsurface through a large number of sinks. Whistledrop is one of many caves in this area of the Edwards (Balcones Fault Zone) Aquifer recharge zone. The cave is almost entirely developed by vadose groundwater movement.

Technique: The 19.4 m and 8.5 m drops require ropes or cable ladders. Caution is advised in rope placement for the 8.5 m pit because of the sharp chert blades.

Bibliography: Anonymous (1961a:58; 1963c:16; 1964b:160; 1969a:25; 1969f:115; 1973q:12; 1973r:13); Doyle (1961:46); Gray (1961:57, 62); Passmore (1977:49-50); Reddell and Knox (1962:3-4, 36); Reddell and Russell (1962a:6); Reddell and Smith (1966:4); Veni (1978a:6; 1978f:6; 1985).

WHITETOP CAVE (BCS #117)

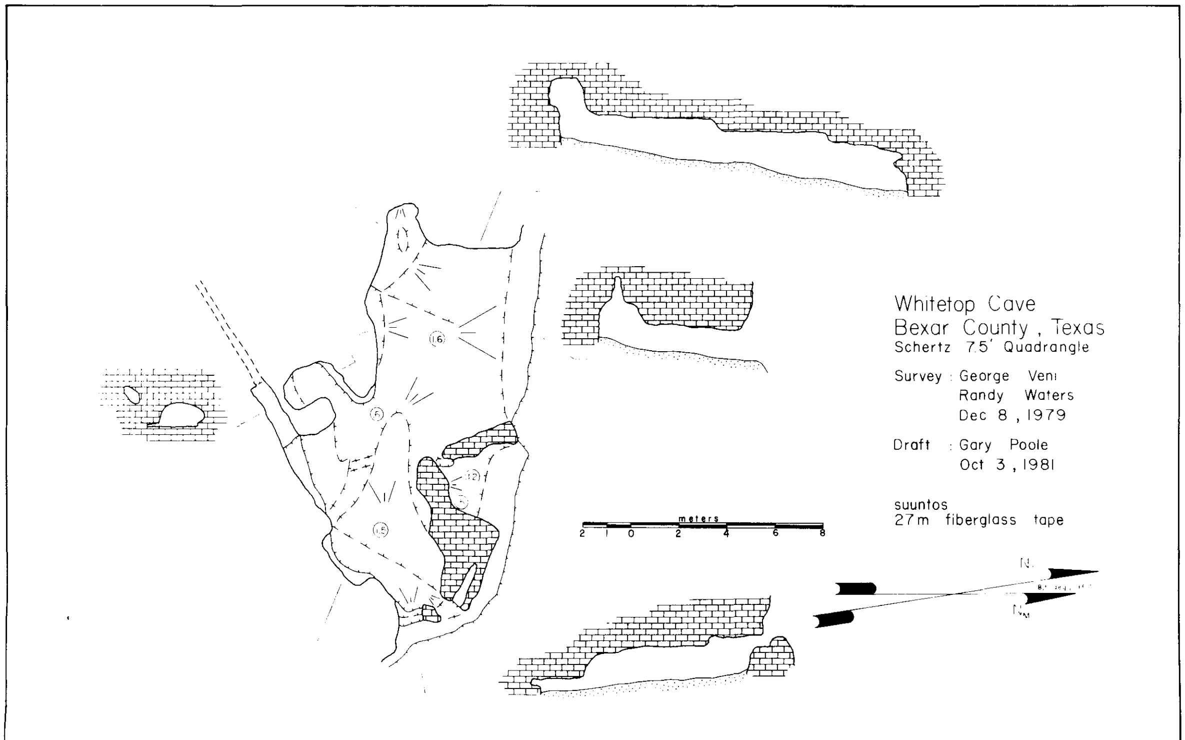
Location: Schertz 7.5′

Description: Whitetop Cave is an irregularly shaped room with four cliffside entrances that overlook Cibolo Creek. From east to west the entrances measure 1 m wide by 0.5 m high, 0.5 by 0.5, 0.3 by 0.2, and 6.5 m by 1.6 m. The room is 15 m long, 5 m wide, and 0.6 to 1.6 m high. One small passage extends southwest from the room for 3 m but becomes too small to follow. The entire floor is covered by a thick deposit of dusty silt. (See Map 174.)

History: This is one of five caves shown to Randy M. Waters in early December of 1979. He returned on 8 December 1979 and surveyed Whitetop Cave with George Veni. The cave is named by local residents for its white rock cliff face.

Biology: No cave-adapted creatures were noted, although Whitetop is used as a shelter by various animals. With the exception of the distal end of the only side passage, the entire cave is within the photic zone.

Geology: Initial cavern development along northeast-southwest joint trends was radically modified by cliff



MAP 174

scouring of Cibolo Creek into the Pecan Gap Chalk cave.
Bibliography: Anonymous (1979bb:1); Waters (1981a:41); Winningham (1985:1-C, 6-C).

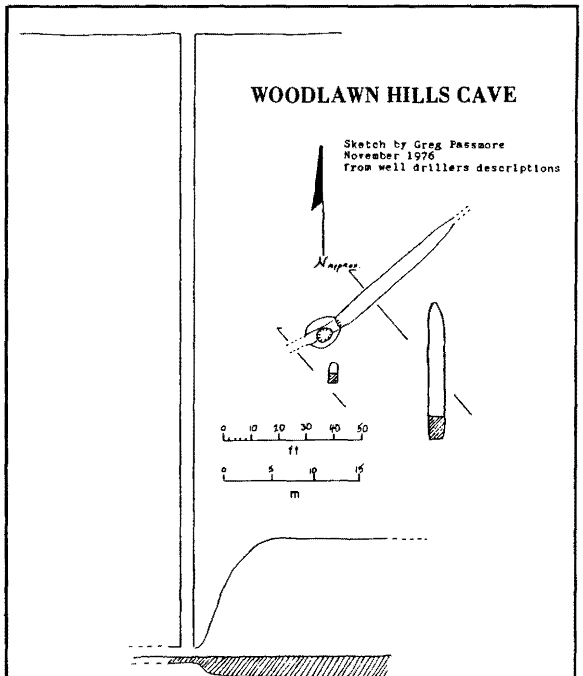
WOMLY PIT (BCS #161)

Location: Lacoste NE 7.5′
Description: The manually enlarged entrance is approximately 1 m long, 0.5 m wide, and drops almost 8 m to the cave floor. No passages extend from the narrow pit except for an impassably tight fissure 2 m below the entrance.
History: On 18 April 1981 while searching for caves, Kurt Menking, Eric Short, and Randy M. Waters noticed a small hole they thought might lead somewhere if enlarged with a sledge hammer. In early 1983 Bob Cowell, Carmen Goyette, Hal Lloyd, and Randy Waters broke into the pit. Only Carmen was small enough to enter the cave. Because of her gender, her exploration could not be described as "manly." It was felt the term "womly" was more appropriate, thus the cave's name.
Biology: Harvestmen (prob. *Leiobunum townsendii*) and a few cave crickets (*Ceuthophilus* sp.) were observed.
Geology: Womly Pit is developed in the Austin Chalk.
Technique: A small body is necessary for slithering down this pit. Hand holds are abundant for the first 5-6 m, but the walls become smoother farther down.

WOODLAWN HILLS CAVE (BCS #83)

Location: San Antonio West 7.5′
Description and History: The primary source of information is from the following letter by Carl Clayton, dated 17 November 1949:

> Very little is known of this cave, the only report I have of it, being several years old, but I do know the entrance is still there as Patrick White and I visited the place. This cave is at the bottom of a 400′ [122 m] brick lined well belonging to the city water works in San Antonio. The well was hand dug about 1900, and the city had a pump room dug at the bottom of the well for pumping water to the surface. However, the dug well had now been abandoned in favor of a drilled well about 200′ [61 m] away, and is still pumping water from the same pool at the 400′ level. The old caretaker of the well is no longer with the company and I was unable to locate him, but it is reported that several years ago, during the inspection of the health department there, the caretaker pointed out some loose bricks in this underground room and the inspector looked



MAP 175

> into a cave which was discovered during the digging of the room. I believe I am correct in stating that the city is now pumping water directly from this cave. Much of the visible portion of the cave is full of water, and because of this Pat and I decided it was not worth the time and trouble of attempting entry. . .It may be that there is too much water yet to enable any exploration at all, but in the foreseeable future, as the water table in the area falls, a large cave may be opened up. . . At present a steel frame is over the mouth of the well, facilitating the rigging of block and tackle for entering the cave. Timing the fall of bricks into the cave placed its depth at almost exactly 400′ to what sounded like a firm bottom.

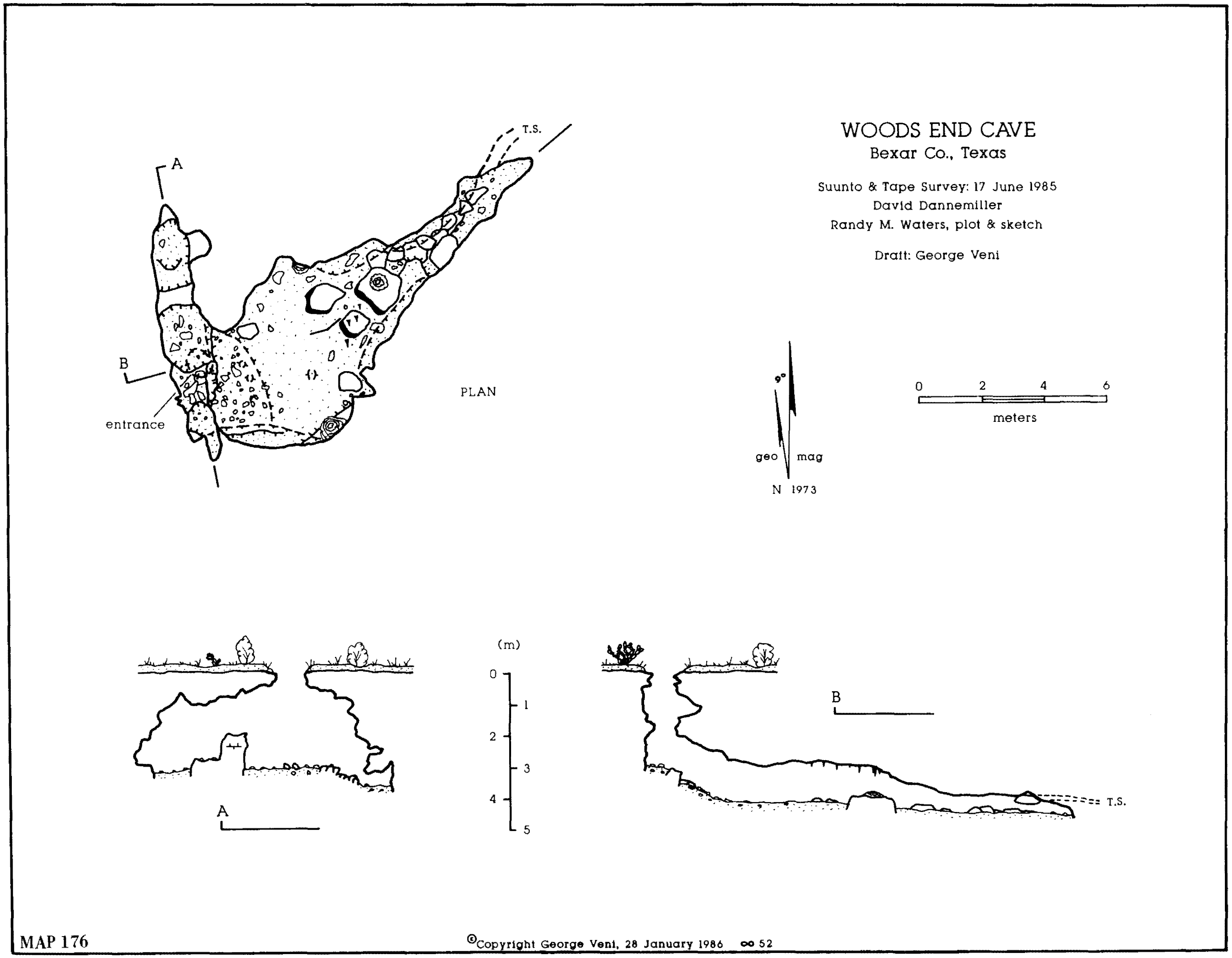
It is likely that the 400′ depth is a misprint for 40′ [12 m] since a 400′ hand dug well is rather unlikely. No modern exploration of the cave has been attempted. (See Map 175.)
Geology: If only 40′ [12 m] deep, the cave is then in the Austin Chalk and probably formed by rising artesian water from the Edwards (Balcones Fault Zone) Aquifer. A depth of 400′ [122 m], is not likely for it would put the cave well into the Edwards Aquifer phreatic zone.
Bibliography: Anonymous (1973q:12); Passmore (1975c:27-28; 1977:51); Reddell and Knox (1962: 3-5, 36); Reddell and Russell (1962a:6); Reddell and Smith (1966:4); Veni (1978a:6).

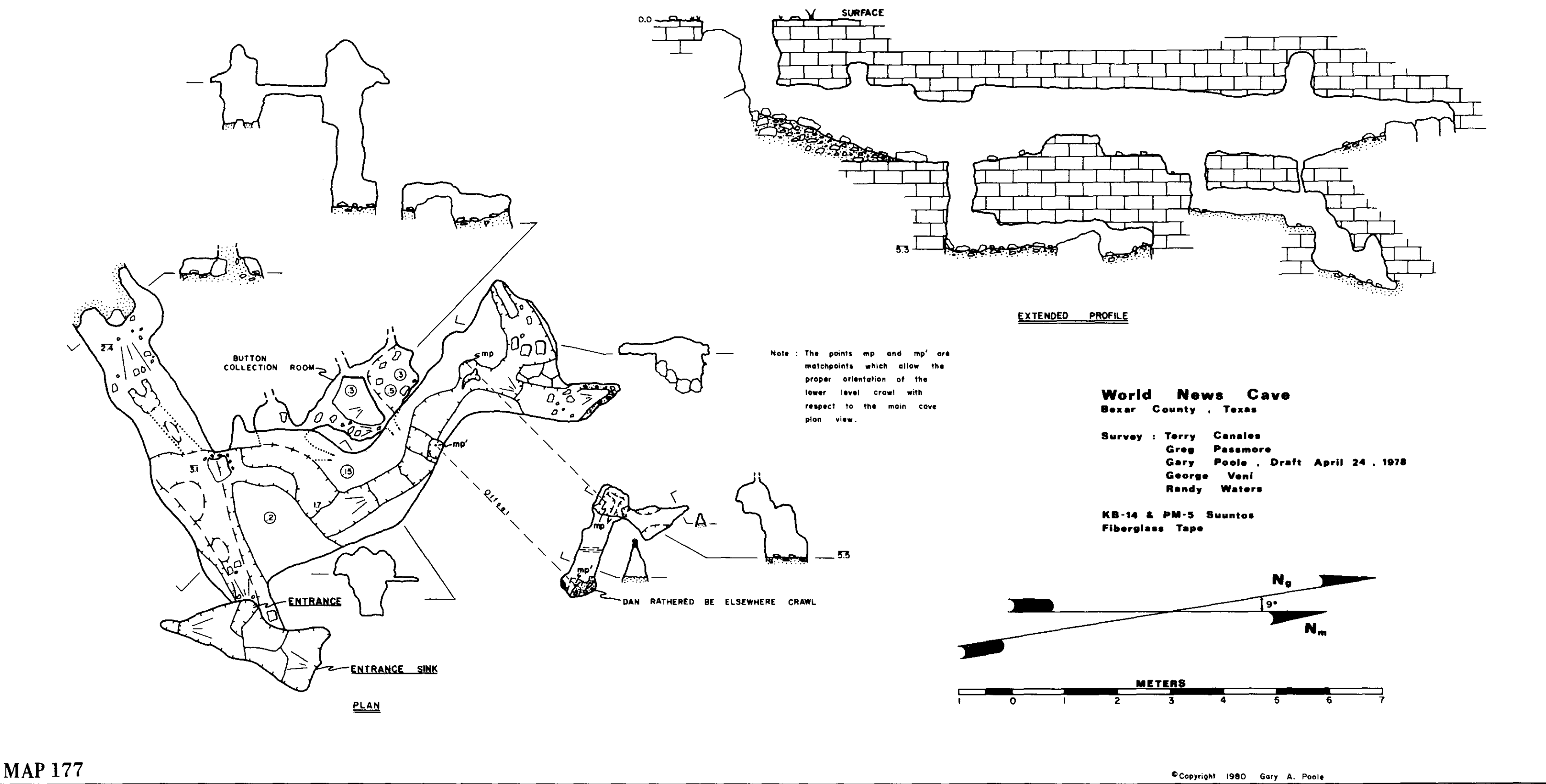
WOODS END CAVE (BCS #194)
Location: Castle Hills 7.5′
Description: The cave entrance was a 1 m diameter by 3.6 m deep pit situated in a shallow sinkhole. At the base of the pit a 2 m high by 1 m wide passage extended 5 m to the north and 3 m to the south. East of the entrance pit the passage sloped down 1.3 m into a 1 m high by 13 m long room. The room was 5 m wide at its west end and narrowed to 1 m towards the northeast. From this end of the room an impassably small crawlway extended into the north wall. (See Map 176.)
History: David Dannemiller learned of the cave the day it was opened by subdivision construction on 17 June 1985. His source was a geologist, hired by the housing development, whose job was to assess caves and sinkholes for the most effective manner in which to fill and seal them. The cave was explored and surveyed by Dannemiller and Randy M. Waters the day it was discovered. The next day the cave was sealed by road construction.
Geology: The cave was formed in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer.
Bibliography: Palit (1985b:87).

WORLD NEWS CAVE (BCS #48)
Alternate name: New's Cave
Location: Helotes 7.5′
Description: A 2 m deep, 2.5 m long, 1 m wide rectangular sinkhole drops into the cave. One small passage goes west 4 m but the main part of the cave heads north as a 7.5 m long canyon passage averaging 2 m wide and 1 to 3 m high. Two holes in the floor lead into two small lower passages, the "Button Collection Room" and the "Dan Rathered Be Elsewhere Crawl." (See Map 177.)
History: The first cavers to explore the cave, and who began the survey, were Terry Canales, Greg Passmore, and Gary Poole when they were shown it in late 1977. Poole returned with George Veni and Randy M. Waters to finish the survey on 24 April 1978. Originally, the cave was referred to as "New's Cave" in reference to the owner. The second survey team modified the name in reference to Waters' desire to complete the survey in time to return home and watch the "World News."
Biology: Harvestmen (prob. *Leiobunum townsendii*) and cave crickets (*Ceuthophilus* sp.) were observed.
Geology: Developed in the upper Glen Rose Formation, World News Cave consists of upper-level phreatic passages, which have been highly modified by vadose downcutting.
Bibliography: Anonymous (1978b:2); Veni (1978a: 6).

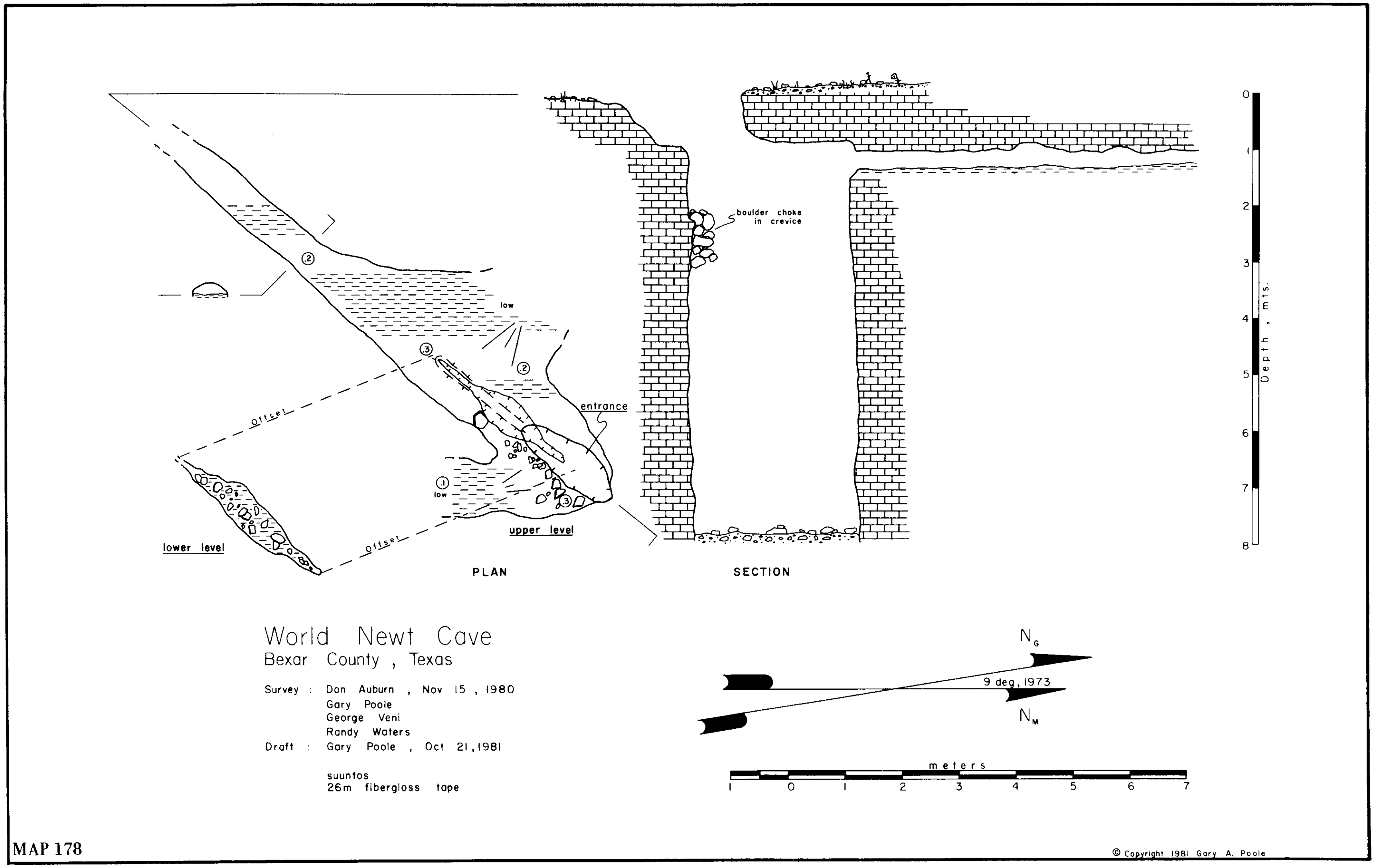
WORLD NEWT CAVE (BCS #148)
Location: Lacoste NE 7.5′
Description: The 2 m long by 0.8 m wide entrance drops 1.2 m into the cave. Low, bedding plane crawls extend a short distance to the north and south, and another extends 6 m to the southwest. Slightly offset from the entrance, a 3 m long by 0.5 m wide pit drops 6.3 m to the end of the cave. (See Map 178.)
History: World Newt Cave was discovered and surveyed on 15 November 1980 by Don Arburn, Gary Poole, George Veni, and Randy M. Waters.
Biology: A small collection of invertebrates was made on 22 November 1980 by George Veni. It included the following material:
Spiders–*Modisimus texanus* (troglophile)
Achaearanea porteri (troglophile)
Cave crickets–*Ceuthophilus (C.)* sp. (trogloxene)
German cockroaches–*Euthlastoblatta* sp. (?accidental)
Beetles–Undetermined material
Geology: A bedding plane 1.2 m below the ground surface collects and directs infiltrating water to the vadosely developed pit. Formed in the Austin Chalk, the cave is primarily developed along a northeast-southwest joint.
Bibliography: Anonymous (1980b:114).

WURZBACH BAT CAVE (BCS #84)
Alternate names: Oak Meadows Cave; Wursback Bat Cave
Location: Lacoste NE 7.5′
Description: Two of the five entrances opening into Wurzbach Bat Cave are within a collapse sinkhole. The southern of the two is discussed later. The passage from the northern entrance is 67 m long, not including a short cut-around. It enlarges from 1.3 m high by 2 m wide to 4.5 m high by 5 m wide, where it joins the Main Room, which is about 12 m in diameter and up to 6 m high, the highest point being at the 0.4 m diameter skylight entrance. In the southeast corner is the cave's main entrance, a 1 m diameter by 3 m deep hole. From the northern end of the Main Room is a narrow, 34 m long crawlway to a small sealed sinkhole entrance. West from the Main Room a passage 3 m high and wide goes 15 m, then turns northeast for 14 m to a left-hand hairpin turn. Some minor upper level passages are present there, but the main corridor extends to the southwest. Beginning at 1 m high and soon reaching heights of 5 m, this 1.4 m wide Linear Passage is 116 m long. It continues beyond the southern end of the "linear" portion by going west 8 m, south 20 m (where it lowers to less than 1 m high), west 3 m, southwest 5 m, and northwest 4 m to its end. Approximately


WOODS END CAVE
Bexar Co., Texas
Suunto & Tape Survey: 17 June 1985
David Dannemiller
Randy M. Waters, plot & sketch
Draft: George Veni
PLAN
A
B
entrance
T.S.
9°
geo
mag
N 1973
0
2
4
6
meters
(m)
0
1
2
3
4
5
A
B
T.S.
MAP 176
©Copyright George Veni, 28 January 1986 ∞ 52

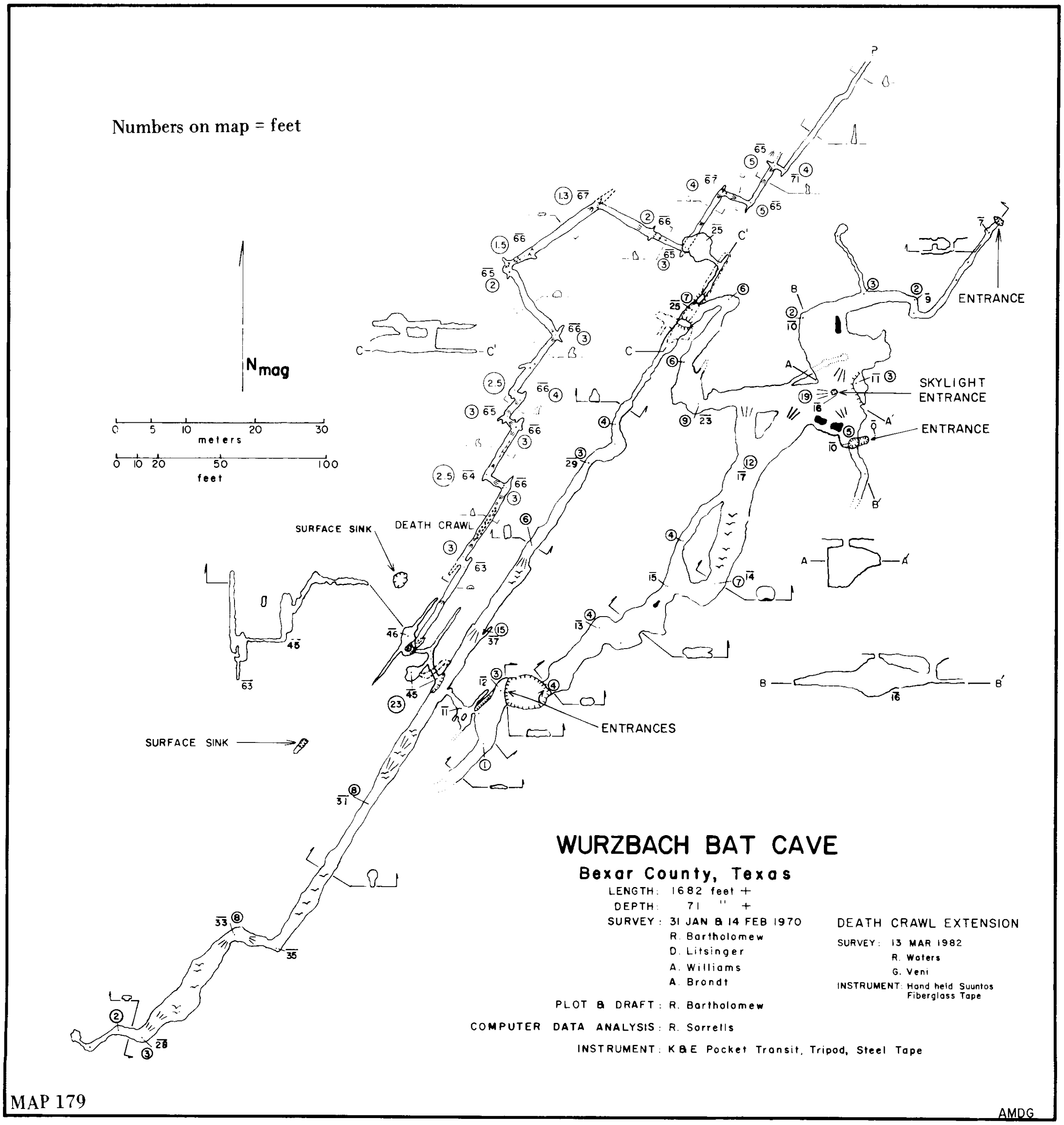

SURFACE
0.0
5.3
EXTENDED PROFILE
BUTTON COLLECTION ROOM
mp
mp'
ENTRANCE
ENTRANCE SINK
PLAN
DAN RATHERED BE ELSEWHERE CRAWL
Note : The points mp and mp' are matchpoints which allow the proper orientation of the lower level crawl with respect to the main cave plan view.
World News Cave
Bexar County , Texas
Survey : Terry Canales
Greg Passmore
Gary Poole , Draft April 24 , 1978
George Veni
Randy Waters
KB-14 & PM-5 Suuntos
Fiberglass Tape
Ng
9°
Nm
METERS
1 0 1 2 3 4 5 6 7
©Copyright 1980 Gary A. Poole

MAP 177


PLAN
SECTION
lower level
upper level
entrance
low
low
offset
offset
boulder choke in crevice
Depth, mts.
0 1 2 3 4 5 6 7 8
World Newt Cave
Bexar County, Texas
Survey : Don Auburn, Nov 15, 1980
Gary Poole
George Veni
Randy Waters
Draft : Gary Poole, Oct 21, 1981
suuntos
26m fiberglass tape
N_G
N_M
9 deg, 1973
meters
1 0 1 2 3 4 5 6 7
© Copyright 1981 Gary A. Poole
MAP 178

mid-way down the initial 116 m of the Linear Passage, a small crawlway high in its east wall connects to the 1.3 m high by 3 m wide southern collapse sinkhole entrance mentioned previously. Opposite the crawl, high in the west wall, is a short passage to some vertical shafts. They are also accessible via a snug crawlway at the deepest part of the Linear Passage (this spot is below the two passages high in the walls). The snug crawl is the outlet for water draining into the cave. Beyond the crawl the watercourse skirts the base of the shafts and goes down Hourglass Pit. Only 2.7 m deep, this tight drop is the most challenging spot in the cave. The base of Hourglass Pit is the beginning of the Death Crawl, which averages 0.5 m high and wide, commonly with an apex-up triangular cross-section. Surveyed and explored for 128 m to the northeast, the end of the Death Crawl has not been reached. (See Map 179; Back Cover; Photos. 40-42.)

History: Graffiti date the cave's exploration to 1896. If the number of dates on the walls can be used to indicate the frequency of visitation to the cave, 1915-1917 and the late 1930s to early 1940s would seem to have been years of heavy traffic. During the



MAP 179

1940s and early 1950s the cave was mined for bat guano. Al Brandt and other members of the St. Mary's University Speleological Society were the first cavers to explore Wurzbach Bat Cave when they visited it in 1957. On 18 May 1968 David Litsinger and Courtney Pennington relocated the cave. Litsinger returned on 31 January 1970 with Roger V. Bartholomew and began to survey it. Two weeks later they returned and completed the survey with the assistance of Brandt and Al Williams. For the next ten years the owner would not allow any further exploration in the cave. In 1980, however, a new owner began subdividing the land for a housing development. On 21 March 1982 members of the San Antonio Grotto regained access to the cave in a deal with the developer. The SAG was granted unlimited access to the cave in return for gating its entrances. Because the cave had become readily accessible (a car could be driven to within 2 m of the main entrance), it was rapidly becoming a popular partying site. The gates would serve to protect the cave from vandalism, protect the bat's roost, and lessen the owner's liability. The crawlway entrance north of the Main Room was permanently sealed with rocks and concrete because

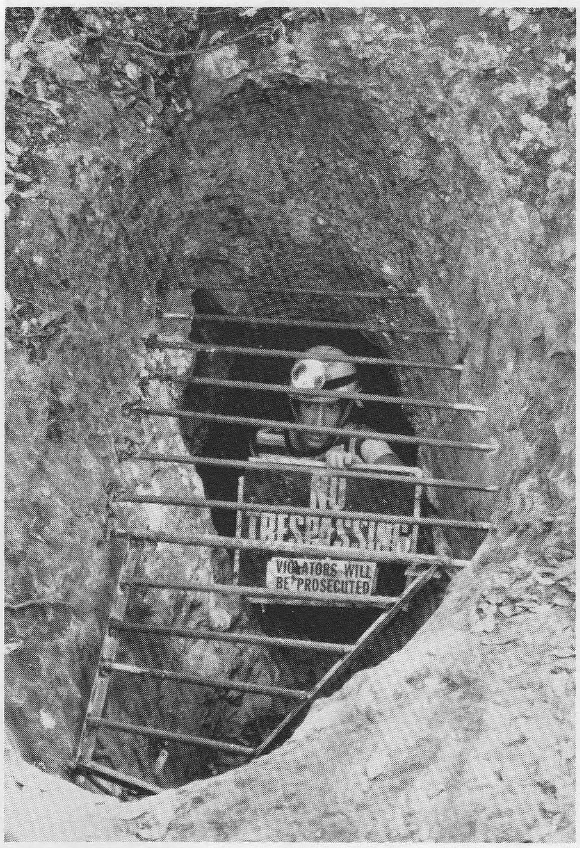


Photo. 40.—"No Tresspassing" warns Mike Johnson at the gated main entrance to Wurzbach Bat Cave (George Veni).

it was on a plot of land to be sold separately from the other four entrances. Bat-accessible gates were placed on the north sinkhole, skylight, and main entrances. Inherent weaknesses in that type of gating resulted in their rapid destruction by vandals. In early March 1982 Randy M. Waters descended Hourglass Pit and explored the first 70 m of the Death Crawl. The passage was named because of its small size, likelihood of flooding, very high CO_2 levels, and the nearly impossible climb out via Hourglass Pit. (When the cave was surveyed in 1970, Hourglass Pit was entered but not bottomed for fear of entrapment.) Waters soon returned with George Veni and surveyed the known length of the crawl. The air was better on that trip than the previous one, and it was noticed that near the limit of Waters' first exploration was a set of old eroded initials carved in the wall. Floodwaters had scoured away the carved date. In late 1982 Wurzbach Bat Cave was sold to a private owner. Until the owner builds a home on the land and fences it off, this fine cave will collect the trash and spray paint of people who gratify their egos through senseless acts of destruction and degradation. In 1985 a Bexar County sheriff's deputy slipped and fell into the cave entrance while investigating a disturbance caused by six teenagers partying in the cave.

Biology: Invertebrate collections were made on 30 January 1969 by Roger V. Bartholomew; on 14 April 1981 by George Veni and Randy M. Waters; and on 4-5 January 1984 by Scott Harden. The following is a list of species identified from the cave:

Spiders—*Cicurina varians* (troglophile)
Meioneta sp. (troglophile)
Eidmannella rostrata (troglobite)
Achaearanea porteri (troglophile)
Harvestmen—*Leiobunum townsendii* (trogloxene)
Hoplobunus madlae (troglobite)
Ticks—*Amblyomma americanum* (parasite)
Mites—Trombidiidae genus and species (parasite of *Ceuthophilus (Geotettix) cunicularis*)
Millipedes—*Abacion texense* (accidental)
Springtails—Undetermined material
Cave crickets—*Ceuthophilus (Geotettix) cunicularis* (trogloxene)
Ground beetles—*Calasoma scrutator* (accidental)
Chlaenius sp. (accidental)
Rhadine sp. (troglobite)
Rove beetles—*Orus (Leucorus) rubens* (troglophile)

An occasional rattlesnake (*Crotalus* sp.) and a colony of several bats make up the cave's vertebrate fauna. Since its development into a hang-out for parties and general rowdiness, most of the bats have abandoned the cave.

Geology: Wurzbach Bat Cave is located in one of the better developed karst areas of Bexar County. What makes this region unique is that it has developed in the Austin Chalk. Two distinct periods occurred in the cave's genesis. The first was a phreatic regime where two groundwater courses converged at the Main Room. These courses were from a small passage near the main entrance and from the larger passage extending to and beyond the collapse sinkhole entrances. The second period of development was morphologically dominated by a rapid decline in the local water table. During this period numerous sinkholes and shafts formed in the area, some of which intersected the cave to form its entrances. Drainage through the cave shifted northwest to the primarily vertical development of a prominent joint that strikes N32°E. Along that joint the Linear Passage was formed. The location of the drain of the Linear Passage resulted from vertical shaft development over Hourglass Pit and from the sinkhole collapse into the cave which diverted ground and surface water to the southern sinkhole entrance. This flow was subsequently pirated along the steepest possible hydraulic gradient–into the Linear Passage. The Death Crawl reflects cavern development at a near-base-level zone. The crawl's small size is also a reflection of its recent development and decreased hydraulic gradient.

Meteorology: CO_2 levels are sometimes high in the Linear Passage and usually high in the Death Crawl.

Technique: No special equipment is needed for the cave except in exploring the Death Crawl. Only thin cavers should attempt descending Hourglass Pit, and a cable ladder or rope is necessary to climb out. Watch out for bad air (cold winter months are usually the best times to explore the crawl), and do not enter the crawl if there is a possibility of rain. Because of the poor air quality in the crawl and the difficulty in climbing up Hourglass Pit, it is a reasonable precaution to place a small portable oxygen bottle at the base of the pit. In the two visits to the Death Crawl in 1982, it was nearly impossible for the explorers to ascend the pit and it would have been so without the aid of the other explorer.

Bibliography: Anonymous (1969a:25; 1985e); Arburn (1980:127); Bartholomew (1970c:56); Ivy (1984:34; 1986:43); Litsinger (1972:151-155); Palit (1986:16); Passmore (1977:52); Rowland and Reddell (1976:13); Veni (1978a:6; 1978e:4; 1978f:6-7; 1983:99); Waters (1981b:62; 1983a:73).

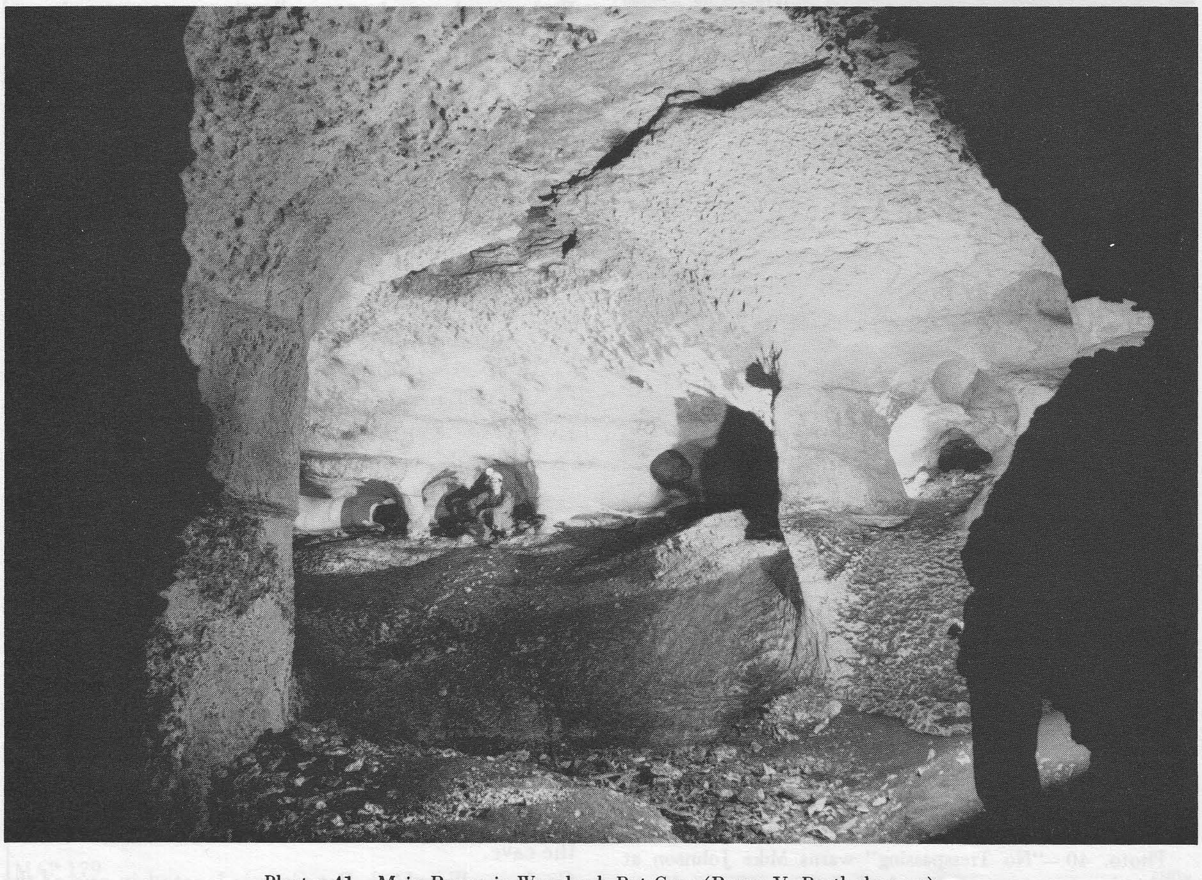


Photo. 41.–Main Room in Wurzbach Bat Cave (Roger V. Bartholomew).

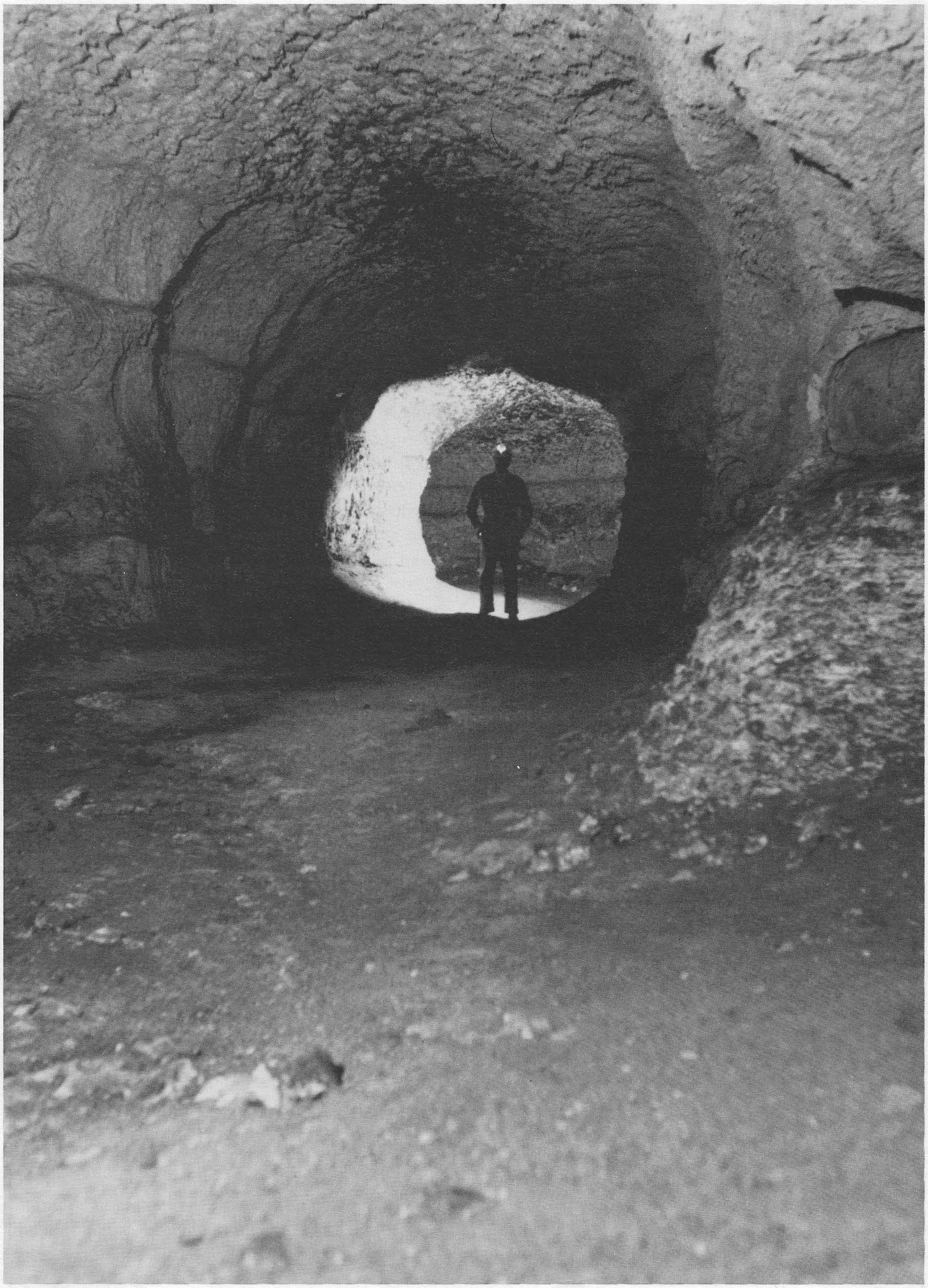
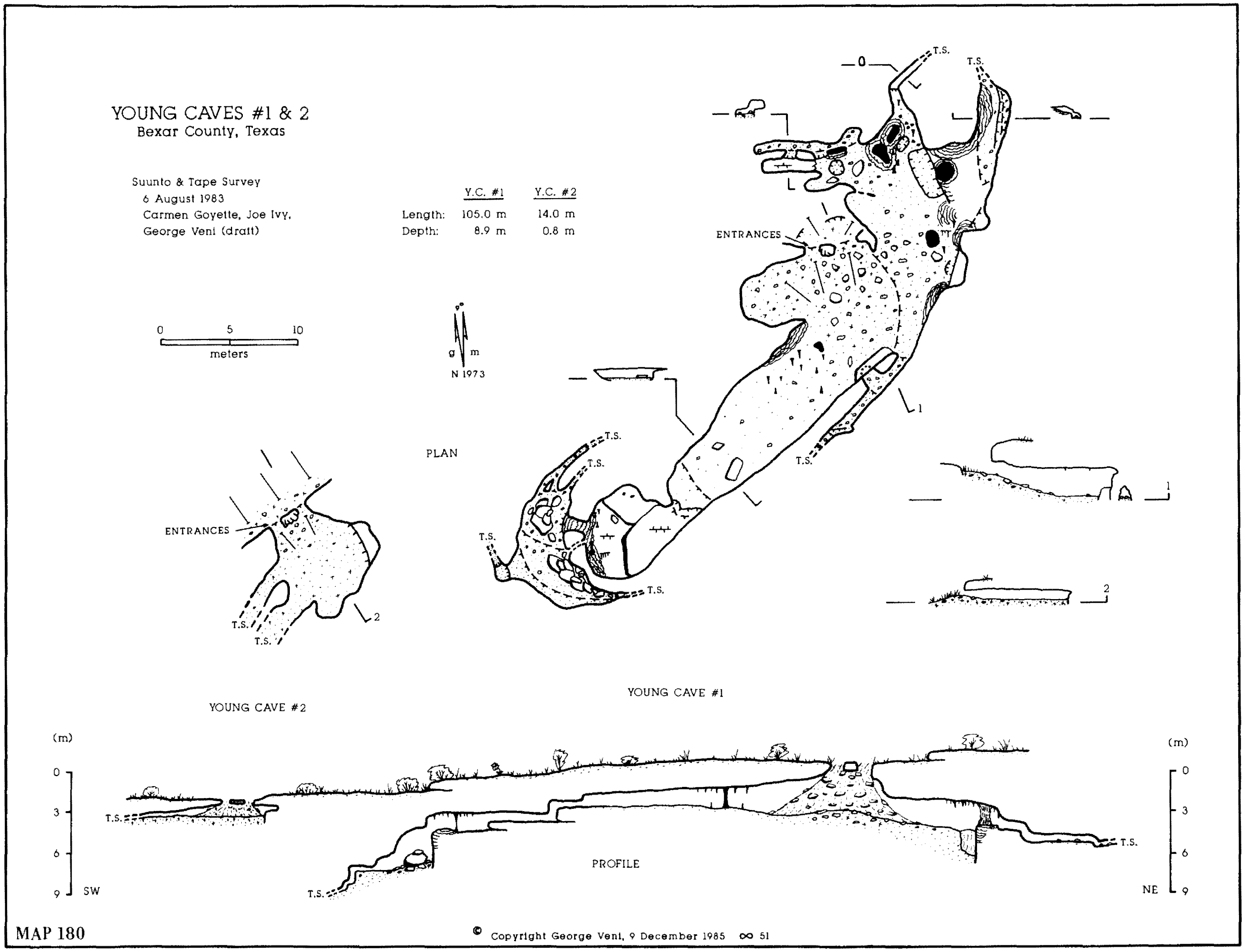


Photo. 42.—Passage from Collapse Sinkhole Entrance, near junction with Main Room, of Wurzbach Bat Cave (Roger V. Bartholomew).


YOUNG CAVES #1 & 2
Bexar County, Texas
Suunto & Tape Survey
6 August 1983
Carmen Goyette, Joe Ivy,
George Veni (draft)
Y.C. #1 Y.C. #2
Length: 105.0 m 14.0 m
Depth: 8.9 m 0.8 m
0 5 10
meters
g m
N 1973
PLAN
ENTRANCES
T.S.
YOUNG CAVE #1
YOUNG CAVE #2
PROFILE
(m)
0
3
6
9
SW
NE
© Copyright George Veni, 9 December 1985 ∞ 51
MAP 180

YOUNG CAVE NO. 1 (BCS #140)
Location: Van Raub 7.5′
Description: This cave is a single large collapse chamber with variations in size and shape that are a function of collapse type and extent. The 1.8 m wide by 0.4 m high entrance opens into an irregular room 9 m in diameter and up to 2 m high. Sloping down to the north is a well decorated second room averaging 11 m in diameter and 2 m high. Minor passages between the breakdown and cave walls do not lead into anything significant. Two pits, 1.4 and 1.2 m deep, have been dug into the floor of this room; their purpose is not known. South of the entrance is a crawlway averaging 0.4 m high by 4 m wide; it extends 20 m to a small 6 m diameter by 1.3 m high formation room. Beyond the stalactites and columns the cave drops almost 2 m out of the decorated collapse room into a small crescent-shaped terminal room. (See Map 180.)
History: Young Cave No. 1 was listed in David Litsinger's Bexar County cave files, but no history was given other than mentioning the presence of the hand-dug pits. They may have been dug in the early 1960s in search of buried federal gold (similar to excavations in Blue Hole No. 1 and Blue Hole No. 2). The cave probably entered Litsinger's files about 1970 when Roger V. Bartholomew was leading many speleological explorations in that area. On 6 August 1983 the cave was surveyed by Carmen Goyette, Joe Ivy, and George Veni. Many broken speleothems attest to a popularity the cave once had, but by 1983 there was little evidence of recent visitation.
Biology: An invertebrate collection made on 6 August 1983 by Joe Ivy and George Veni included the following material:

Snails–*Helicina orbiculata* (empty shells)
Helicodiscus eigenmanni (troglophile)
Isopods–Oniscoidea genus and species
Scorpions–Prob. *Vaejovis reddelli* (troglophile)
Spiders–*Cicurina* n.sp. (troglobite)
Gaucelmus augustinus (troglophile)
Achaearanea porteri (troglophile)
Harvestmen–*Leiobunum townsendii* (trogloxene)
Springtails–Undetermined material
Cave crickets–*Ceuthophilus (C.) secretus* (trogloxene)
Assassin bugs–*Triatoma gerstaeckeri* (trogloxene)
Beetles–Undetermined material
Hymenopterans–Undetermined material
Ants–Formicidae genus and species

Observed but uncollected fauna includes moths, flies, and mosquitoes.
Geology: Young Cave No. 1 formed in the Edwards Limestone as a phreatic chamber that collapsed following the decline of the local water table. Considerable amounts of secondary calcite was deposited in the cave before its entrance was opened to the surface. Incoming runoff deposited large volumes of sediment in the northernmost rooms.
Bibliography: Anonymous (1970:78); Veni (1983: 99).

YOUNG CAVE NO. 2 (BCS #141)
Location: Van Raub 7.5′
Description: Although the bedrock entrance was actually 3.4 m wide, alluvial fill has divided it into two smaller entrances. The larger north entrance is 0.35 m high by 1 m wide; the south entrance is 0.2 m high by 0.9 m wide. Both entrances slope into a single rectangular room, 5 m by 7 m by 0.75 m high. A 3 m wide passage extends to the southwest but is too low to explore. (See Map 180.)
History: Noted in David Litsinger's Bexar County cave files, the cave was probably first explored in the late 1960s when Roger V. Bartholomew was spearheading surveys and explorations in the area. On 6 August 1983 the cave was surveyed by Carmen Goyette, Joe Ivy, and George Veni.
Biology: During the survey spiders, harvestmen (prob. *Leiobunum townsendii*), and cave crickets (*Ceuthophilus* sp.) were observed.
Geology: Developed within the Edwards Limestone, the known cave is at the ceiling of a collapse which has since been buried under the present floor of highly organic soil. A surface ravine, which intersected the cave, accounts for the entrance and soil input.
Bibliography: Anonymous (1970:78); Veni (1983: 99).

UNNAMED CAVES (BCS #58 & 59)
Location: Helotes 7.5′
Description: The caves are located in a roadcut approximately 5 m below the original ground surface. One meter high by 0.6 m wide and lined with cave coral, the entrance to the first cave enlarges after 1 m and opens into a room about 14 m long. Various speleothems and a soft dirt floor are reported. A passage 0.15 m high leads out of the room and appears to go to a pit, but the passage is too small to explore. The second cave may have been connected to the first before roadwork. A small crawlway extends from the second cave entrance to a 3 m diameter room. No speleothems are present but there is some breakdown.
History: The caves were blasted open in late 1976 during road construction for the San Antonio Ranch Development project. Ruth Darilek, Tom Mills, Dick

Montgomery, and Vince Orozco explored and surveyed the caves on 5 December 1976.

Biology: A brown scorpion (prob. *Vaejovis reddelli*) and cave crickets (*Ceuthophilus* sp.) were observed in the first cave, BCS #58.

Geology: The caves are formed in the Edwards Limestone.

Bibliography: Orozco (1976:43–44).

Descriptions of Non-Caves

The guidelines used in this report, defining what qualifies as a cave, are set by the Texas Speleological Survey (TSS). The TSS defines a cave as any natural cavity which measures 25 ft. (7.62 m) long or longer, or 15 ft. (4.57 m) deep or deeper. These lengths and depths must be humanly passable. In addition, the length or depth cannot be exceeded by the height, length, or width of the entrance. The limits were arbitrarily selected to eliminate small solution pockets and large-mouthed cliffside shelters, among others, from what is generally accepted to be a cave. This non-cave subsection discusses some of many Bexar County cavities that, according to TSS criteria, do not qualify as caves. These specific non-caves are presented because they have been often noted in the Bexar County cave files or have been described in speleologic literature.

BLUE HOLE NO. 4 (BCNC #1)
Alternate name: Blue Hole Cave No. 4
Location: Van Raub 7.5′
Description and History: This pit is 3.7 m deep, 0.3 m long, and 0.6 m wide. The base of the pit measures 1 by 3 m. Butch Jubela, Ernest Kalterman, Orion Knox, and Arturo Solis first explored the hole on 28 December 1958. It was surveyed by Ross Felton and Wayne Russell on 1 April 1967. (See Map 16.)
Geology: This vadose shaft is in the Edwards Limestone.
Bibliography: Anonymous (1973q:11); Litsinger (1973a:17); Palit (1984b:28); Passmore (1977:9); Reddell and Knox (1962:3–4, 8); Reddell and Russell (1962a:5); Reddell and Smith (1966:2); Widener (1959:79).

CLIFFSIDE CRAWLS NOS. 1 & 2 (BCNC #2 & 3)
Location: San Geronimo 7.5′
Description and History: Two small crawlways, 3 and 4 m long, were exposed in a road-cut by the expansion of U.S. 16 in 1980. The crawls were explored in July 1983 by San Antonio Grotto members Blythe Batey, Carmen Goyette, Joe Ivy, and George Veni.
Biology: Harvestmen (prob. *Leiobunum townsendii*) and cave crickets (*Ceuthophilus* sp.) were observed.
Geology: Dissolved in the upper Glen Rose Formation, the crawls are upstream channels that fed into Bandera Road Cave (BCS #86), which was destroyed by the road expansion.

DAVE STAND CAVE (BCNC #4)
Location: Helotes 7.5′
Description: Located in a cliff along the base of Helotes Creek, the Dave Stand is a single room approximately 2 m high and wide and 3 m long.
History: This non-cave was discovered on 28 March 1970 by Al Brandt, David Litsinger, Robert Penazola, and Brandt's two daughters. Its name originated when Penazola commented that the cave wasn't large and Brandt replied "Waddya mean small, Dave (2 m tall) can stand up in it!"
Geology: Dave Stand Cave is a small solutional cavity that has been intersected by Helotes Creek. It is in the upper Glen Rose Formation.
Bibliography: Passmore (1977:19).

EVERS ROAD SINK (BCNC #5)
Location: San Antonio West 7.5′
Description and History: This vertical sink was 1 m in diameter and 2.6 m deep. It was washed open by heavy rains in September 1957. Joe Ainsworth and other members of the St. Mary's University Speleological Society were the first cavers to explore the sink. In the late 1960s the hole was paved over during the construction of a gas station.
Geology: The sink formed in the Pecan Gap Chalk.
Bibliography: Reddell and Knox (1962:3, 5, 38); Widener (1959:80).

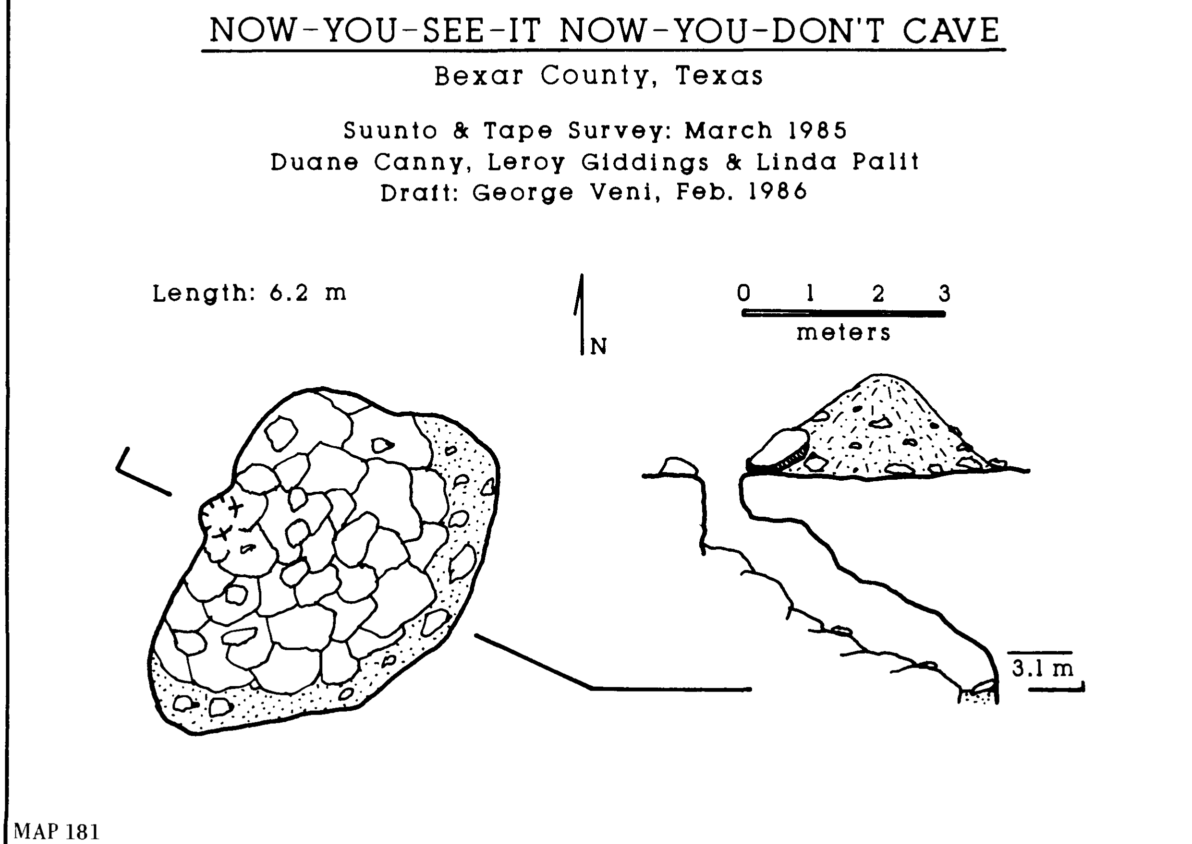
HARD ROCK HOLE (BCNC #6)
Location: Castle Hills 7.5′
Description and History: This narrow shaft, 2.3 m deep, was dug open by George Veni and Randy M.

Waters in 1977. Soon after, it was covered by a housing development.
Geology: The hole was an enlarged joint in the Austin Chalk.

NOW-YOU-SEE-IT NOW-YOU-DON'T CAVE (BCNC #7)
Location: Longhorn 7.5′
Description: A 0.8 m diameter entrance dropped 1 m to a breakdown-covered floor. The floor sloped down into a room and achieved a maximum depth of 3.1 m. The room was semi-circular in plan view and approximately 6 m long by 4 m wide and 1.2 m high. (See Map 181.)
History: This non-cave was discovered and explored in March 1985 by Leroy Giddens, who returned later that month and surveyed it with Duane Canny and Linda Palit. It had just been opened by housing subdivision construction; the same construction sealed it in September 1985.
Biology: Only harvestmen (prob. *Leiobunum townsendii*) were observed, in spite of an intensive search for other fauna.
Geology: This is a small collapsed chamber formed in the Austin Chalk.
Bibliography: Palit (1985a:46).

POND HOLE (BCNC #8)
Location: Longhorn 7.5′
Description and History: About 3 m deep, this small rubble-filled pit is located at the base of a broad shallow sink and under a man-made pond. In the late 1960s Dave Litsinger and Bill Owens were the first cavers to investigate the pit.
Geology: This pit is vadosely developed in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer.

SALADO CREEK SHELTER CAVE (BCNC #9)
Location: Longhorn 7.5′
Description: Two short walls support a caprock measuring 6 m long, 4.5 m wide, and 1 m thick. The room below it is 4.5 m long, 3.5 m wide, and 1.4 m high. (See Map 182.)
History: First mentioned by Orion Knox in a 1962 report on Salado Creek Water Cave (BCNC #10),



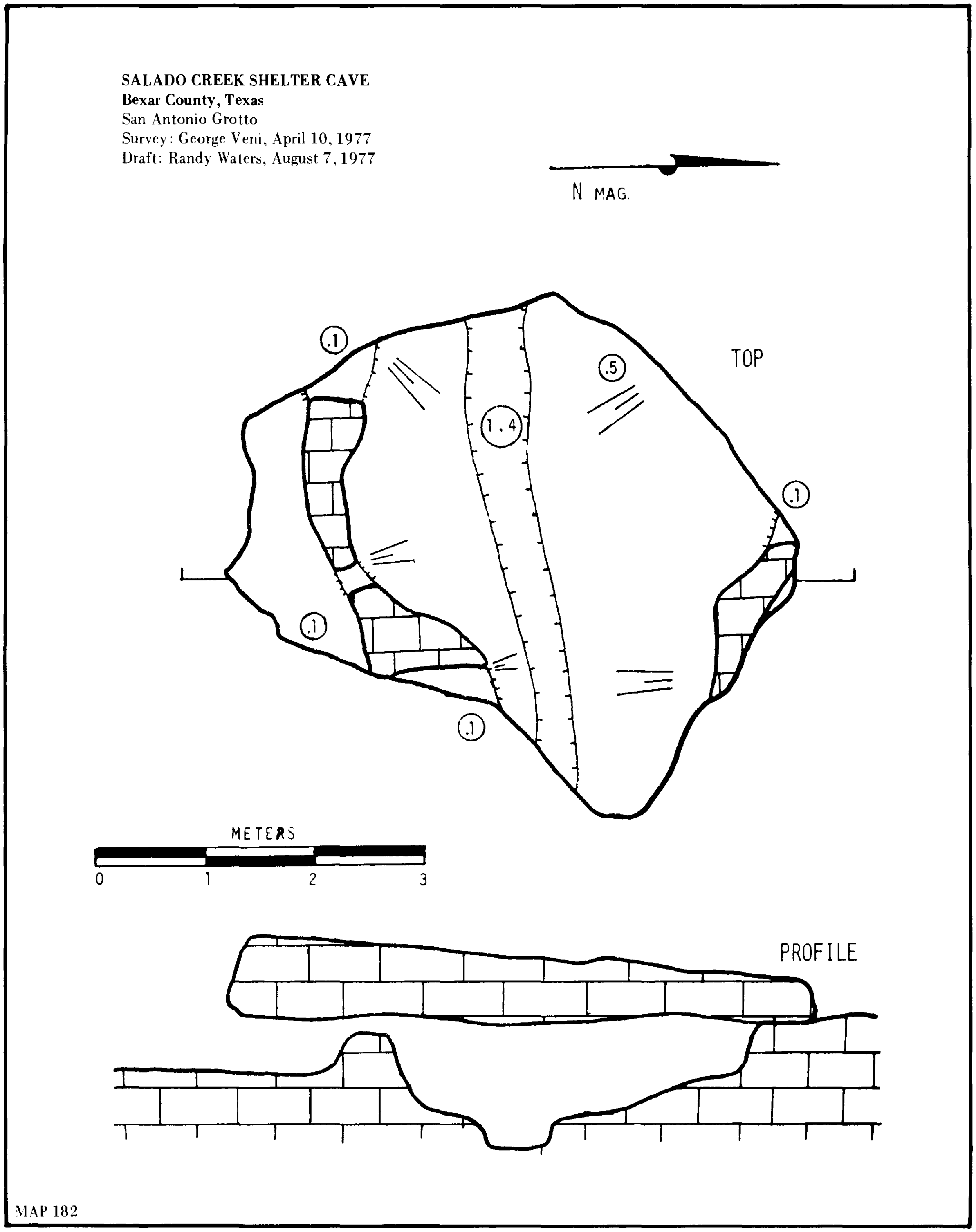
MAP 181

the shelter was also explored by members of the San Antonio Grotto in 1977. On 10 April 1977 it was surveyed by George Veni.

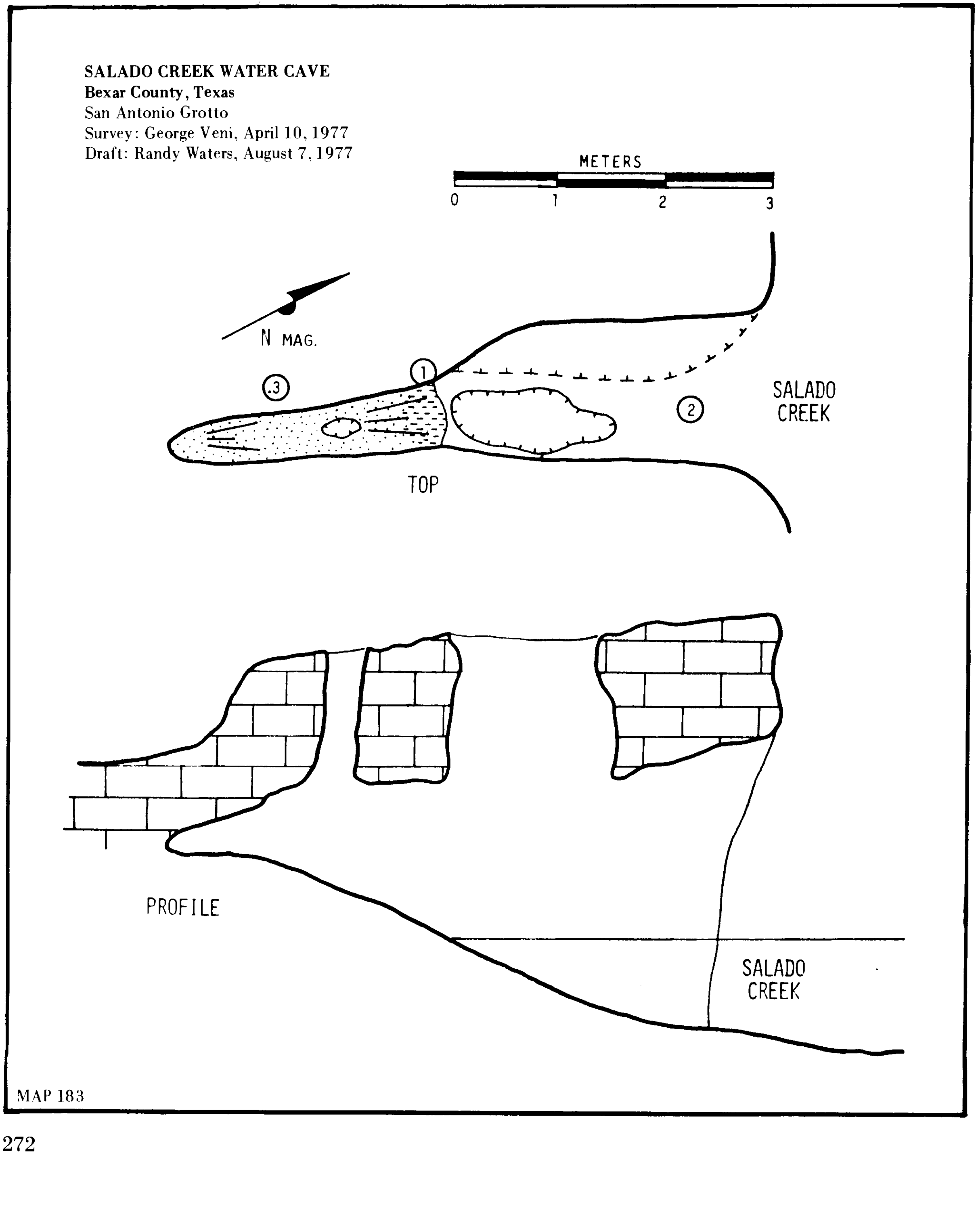
Biology: Various small mammals have occasionally used this shelter.

Geology: Formed in the Austin Chalk, water channels in the floor indicate it developed within a thin bed that was more soluble than the overlying or underlying rock.

Bibliography: Poole and Passmore (1978:34-35, 53); Veni (1978a:6).



SALADO CREEK WATER CAVE (BCNC #10)
Location: Longhorn 7.5′
Description: This non-cave is a single passage measuring 6.5 m long, 0.5 to 2 m wide, and 0.3 to 2 m high. There are three entrances, one in the bank of Salado Creek and two small skylights, one of which is impassably tight. A mud slope extends from the back of the passage down towards the main entrance, where the slope is covered by water from the creek. (See Map 183.)
History: Explored by Orion Knox in 1962 and by members of the San Antonio Grotto in 1977, George Veni surveyed this "water cave" on 10 April 1977.
Biology: Several species of epigean spiders were seen in the cave.
Geology: Salado Creek Water Cave was formed by



MAP 183

ponding flood waters from Salado Creek enlarging a joint in the Austin Chalk.

Bibliography: Anonymous (1973q:12); Poole and Passmore (1978:34, 36, 53); Reddell and Smith (1966:4); Veni (1978a:6).

SCORPION GULCH (BCNC #11)

Location: Castle Hills 7.5′

Description and History: A 0.4 m diameter hole that drops 1.3 m, offsets 1 m, and then drops a very narrow 2 m was dug open in the spring of 1983 by Bob Cowell, Carmen Goyette, Hal Lloyd, and Randy M. Waters.

Biology: Cave crickets (*Ceuthophilus* sp.) and an epigean scorpion were noted.

Geology: This hole is in a small creekbed in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer.

Descriptions of Rumored and Potential Caves

Presented here are rumored caves, explored caves that lack an adequate location for identification, and holes which visibly show potential to open into caves after some excavation. Many other cave leads exist in Bexar County but are not included because of lack of descriptions and very vague locations. These can be pursued by consulting the Bexar County cave files. In addition to the cave descriptions, a map (Fig. 6) is also included in this section indicating the potential for finding new caves in Bexar County. The map is based on geology, presence of known caves, urbanization, and degree of exploration. Each of these factors can have both positive and negative influences upon the likelihood of finding new caves. The Edwards Limestone, Austin Chalk, and lower member of the Glen Rose Formation are good cave-forming units. The upper member of the Glen Rose, Pecan Gap Chalk, and Anacacho Limestone are generally less cavernous. Known caves can be used as indicators, not only of caves existing in an area but of the types of caves within that area. However, for each known cave there is one less cave to be discovered. Urbanization of an area usually rings a death knell for caves, yet the opening of new roads for housing developments increases accessibility for discoveries. Soon after a subdivision road was built within 30 m of Wurzbach Bat Cave (BCS #84), thirteen other caves were found in its vicinity. Degree of exploration is another important factor. BCS #39's history details the thorough investigation of the Hitzfelder Ranch. Following those intensive searches, four caves are known there. Therefore, because it has been so well explored, the potential for finding new caves on that property is rather poor.

The map does not say where caves will or will not occur. It simply gives an approximate, poorly quantified probability of their presence. For example, it is possible the Hitzfelder Ranch has an undiscovered cave but the probability is very low. Unfortunately, areas with the best potential for new caves have gained that status from landowners who have kept their property closed to exploration. A large portion of western Bexar County is an excellent example of this. In that area of prime geologic potential there is only one known cave—and it is the largest chamber in the county!

ANDERSON LOOP CAVES (BCRP #1-6)
Location: Longhorn 7.5′
Description and History: Bike Cave (#1), Deer Cave (#2), Gate Cave (#3), Oak Tree Cave (#4), Voight Cave No. 1 (#5), and Voight Cave No. 2 (#6) were all discovered and explored by Butch Summar in the mid-1960s. They are all close to each other, lie north of Anderson Loop (Farm Market Road 1604), and are said to be small.
Geology: The caves are developed in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer.

AUE CAVE NO. 2 (BCRP #7)
Location: Van Raub 7.5′
Description and History: The cave consists of a sloping entrance into a large breakdown-filled room. It was explored by members of the St. Mary's University Speleological Society in the early 1950s.
Bibliography: Reddell and Knox (1962:3-4, 6); Reddell and Russell (1962a:5); Reddell and Smith (1966:2); Widener (1959:79).

BARNES CAVE (BCRP #8)
Alternate name: Unnamed cave #51
Location: San Antonio East 7.5′
Description and History: Described by Barnes at the turn of the 20th century as a small room about 3 m in diameter and 2.6 m high, the cave has probably been filled by the City of San Antonio.
Bibliography: Barnes (1910:101); Reddell and Knox (1962:3, 5, 37); Reddell and Russell (1962a:6; 1962b:1).

BLOWHOLE OF SAN ANTONIO (BCRP #9)
Location: Castle Hills 7.5′
Description and History: A seasonal stream flows into this sink, which often blows a strong, cool breeze.

George Veni and Randy M. Waters excavated part of the sink in 1976. Much more work is needed before a cave may be accessible.
Geology: Blowhole is developed within the recharge zone of the Edwards (Balcones Fault Zone) Aquifer. At bankfull stage the channel draining into the sink carries an estimated 0.2 cu m per second of runoff. Its drainage basin encompasses 0.81 sq km, including direct runoff with questionable water quality from Interstate 10.
Bibliography: Veni (1982; 1983:99; 1985).

CAINE SINK (BCRP #10)
Location: Longhorn 7.5′
Description and History: This very tight crawlway was 6 m long and had been enlarging with successive rains. It was explored on 23 October 1970 by Calvin Bushholtz, Jeff Dravis, Bob Johnson, Preston Knodell, and Galen A. Maller. The cave was no deeper than 1.5 m below the surface. In 1974, collapse of a large rock blocked the passage.
Geology: The cave is developed in either the Pecan Gap Chalk or the Austin Chalk.

CAVASSES CAVES NOS. 1 & 2 (BCRP #11 & 12)
Location: Lacoste NE 7.5′
Description and History: These two small caves were explored by the St. Mary's University Speleological Society in 1960. The cavers were working with the Bexar County Sheriff's Department in looking for a man, wanted for murder, who was supposed to have hidden or committed suicide in a cave. In 1964 Cavasses Cave No. 2 was filled.
Geology: The caves are developed in the Austin Chalk.
Bibliography: Anonymous (1964f:62); Brandt (1973: 6); Reddell and Knox (1962:3, 5, 10); Reddell and Russell (1962a:5).

CIBOLO CREEK CAVE (BCRP #13)
Location: Unknown
Description and History: Located in the bed of Cibolo Creek was the 1 to 1.3 m long by 0.6 to 1 m wide entrance. The depth and extent of the cave are not known. A constriction in the entrance drop resulted in the entrapment of a youth for a few hours. The date of that incident and the means of extrication are also unknown. Since then, again at an undetermined date, the entrance was covered with concrete.
Bibliography: George (1948:509; 1952:19, pl. 1); Reddell and Knox (1962:5, 10); Reddell and Russell (1962a:6); Reddell and Smith (1966:3).

CULEBRA CREEK CAVE (BCRP #14)
Location: Helotes 7.5′
Description: A cave of unknown extent is said to be located near Culebra Creek.
Geology: The cave is in the Pecan Gap Chalk.

DONELLA CAVE (BCRP #15)
Location: Longhorn 7.5′
Description: This cave was reported to be near the intersection of Donella Drive and Fleetwood Drive. Searches have been unsuccessful and it is probably covered by urban development.
Geology: Donella Cave is in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer.

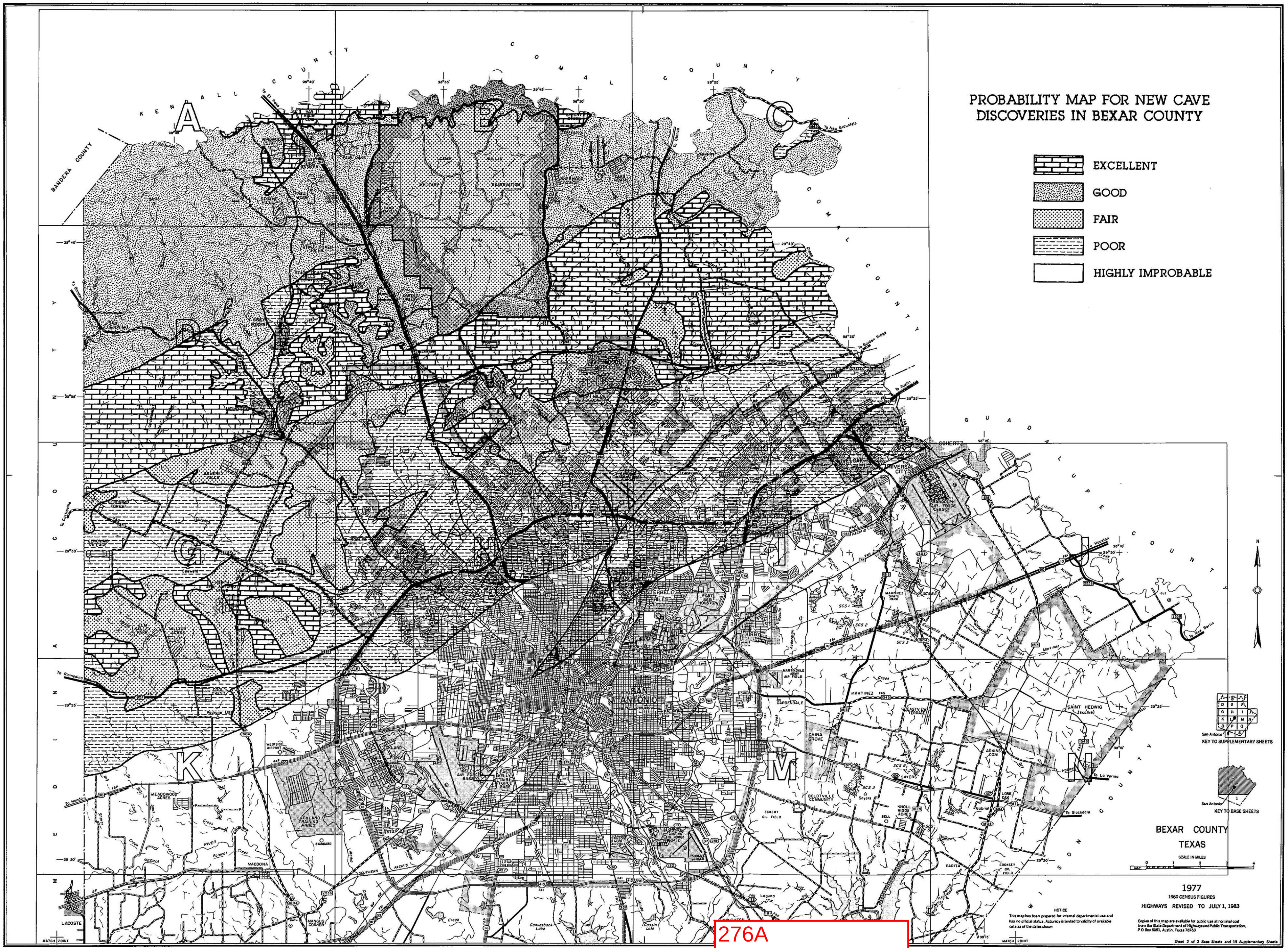
GALLAGHER RANCH CAVE (BCRP #16)
Location: San Geronimo 7.5′
Description: This is an unexplored pit east of San Geronimo Creek.
Geology: The cave is probably in the upper Glen Rose Formation.

INDIAN CAVE (BCRP #17)
Location: Helotes 7.5′ (?)
Description: In 1973 Greg Passmore reported Indian Cave to be a 3 m deep sink with one low passage, which was not explored due to bad air. It may possibly be an unlisted non-cave a few hundred meters west of Hills and Dales Pit (BCS #38).

LAUREL HEIGHTS CAVE (BCRP #18)
Location: San Antonio East 7.5′
Description: This small cave was closed prior to 1929.
Geology: The cave is in the Austin Chalk.
Bibliography: Ownby (1929:8); Reddell and Knox (1962:5, 24); Reddell and Russell (1962a:5); Veni (1978a:5).

LEE RANCH CAVE (BCRP #19)
Location: Helotes 7.5′
Description: "A considerable cave, by no means fully explored" (White, 1948).
Bibliography: White (1948:47, map); Widener (1959: 81).

LEON SPRINGS CAVE (BCRP #20)
Location: Camp Bullis 7.5′
Description and History: Reported to be "a great cavern system extending from Leon Springs, Texas, for some 20 miles [32 km] to the east. The speculation is based upon the belief that a stream resurgence near Schertz is a reappearance of Cibolo Creek which during high water runs into a deep hole just south of


PROBABILITY MAP FOR NEW CAVE
DISCOVERIES IN BEXAR COUNTY
EXCELLENT
GOOD
FAIR
POOR
HIGHLY IMPROBABLE
KENDALL COUNTY
COMAL COUNTY
GUADALUPE COUNTY
WILSON COUNTY
MEDINA COUNTY
BANDERA COUNTY
SAN ANTONIO
UNIVERSAL CITY
SCHERTZ
CONVERSE
KIRBY
CHINA GROVE
SAINT HEDWIG
ADKINS
ELMENDORF
MACDONA
LACOSTE
LACKLAND TRAINING ANNEX
MARTINDALE ARMY AIR FIELD
KEY TO SUPPLEMENTARY SHEETS
KEY TO BASE SHEETS
BEXAR COUNTY
TEXAS
SCALE IN MILES
1977
1980 CENSUS FIGURES
HIGHWAYS REVISED TO JULY 1, 1983
NOTICE
This map has been prepared for internal departmental use and has no official status. Accuracy is limited to validity of available data as of the dates shown
Copies of this map are available for public use at nominal cost from the State Department of Highways and Public Transportation, P O Box 5051, Austin, Texas 78763
Sheet 2 of 2 Base Sheets and 19 Supplementary Sheets
MATCH POINT

276A

Leon Springs" (Anonymous, 1948). Bob Hudson writes:

> I heard of such a cave when I was only a young shaver. The man who was thrilling me with his discovery of the cave said that he used a rope for a vertical drop of some twenty feet [6 m]. There he entered a passage which went off to several large rooms filled with various formations and deep pools of water. He said that the water from the creek ran into the hole when the creek got on a rise, but that ordinarily there was no water flowing into the cave.

Leon Springs Cave may possibly be the now-filled Cibolo Creek Cave (BCRP #13).

Geology: The cave, if it exists, is in the lower Glen Rose Formation.

Bibliography: Anonymous (1948:68); Hudson (n.d.).

LOBO CAVE (BCRP #21)

Alternate name: Unnamed cave

Location: San Antonio East 7.5′

Description: Lobo Cave was reported to be located on Olmos Creek a short distance northeast of San Pedro Park Cave (BCRP #25) in a pasture formerly owned by Dr. F. Herff, Sr. Two entrances, one nearly vertical and 18 in. [0.5 m] in diameter and the other, a small 45° sloping squeezeway, led into the cave's inner rooms at a depth of about 50 ft. [15.2 m]. The following description is from Anonymous (1898):

> This cave has two entrances, the passages of which unite after passing along them a distance of about twenty yards [18.3 m] and becomes so narrow that it is difficult for a stout person to squeeze through it. Persons entering the cave or passing from it are compelled to crawl for a distance of about 100 feet [30.4 m]. It contains two fair sized chambers, one about 12X14 feet [3.7 X 4.3 m] and the other about 30X40 feet [9.1 X 12.2 m], besides a number of smaller ones, merely crevices. In the first named chamber there is a large deposit of guano, the cave having been for years the habitat of innumerable bats. In it were found the bones, teeth and skins of panthers, wolves and other animals which died there. It is possible they were wounded and went there to die or they may have inhabited it and become the victims of the numerous rattlesnakes that hibernate there and are to be found in its crevices, rending it dangerous for exploring parties to go in any but the two large chambers.

History: The first known exploration of this cave is recounted in Anonymous (1897):

> In this chamber the writer shot and killed a wolf and the incident was a very thrilling one to himself and the party of about a dozen who accompanied him. The wolf was encountered suddenly and unexpectedly. The animal was concealed and crouching behind a ledge jutting from the irregular wall. The first intimation of his presence was a fierce growl and sharp, suddenly snapping snarl. The torch then revealed his head, the eyes shining like two live coals. In a second the writer drew and fired his pistol into the animal's brain. When the charge in the weapon exploded it seemed as if all the artillery of a flotilla had gone off at once. The noise was so loud and piercing that it made the entire party deaf for several hours and large fragments were discharged from the roof and walls of the cave, and came dangerously near crushing them as they fell close to them. One piece of stone which fell from the roof must have weighed at least a ton. The bats in thousands swarmed out, disturbed by the explosion, and extinguished several of the torches.

The cave was also explored in 1898 by "a number of the daring spirits of the Fourth Texas Infantry, Superintendent Hume of the Alamo Heights Street Railway and a number of others" (Anonymous, 1898). Barnes (1910) states that he had visited the cave twice but writes "I suppose since the new addition to the city has been opened up in this locality that this cave has been closed up and lost irretrievably."

Bibliography: Anonymous (1897:8; 1898:16); Barnes (1910:101); Reddell and Knox (1962:5, 37); Reddell and Russell (1962a:6; 1962b:1).

RATTLESNAKE CAVE (BCRP #22)

Location: San Antonio East 7.5′

Description and History: This cave is described as follows:

> Another interesting cave, but one which can only be explored in midwinter, is the rattlesnake's cave near the head of the San Antonio river. It is smaller than the others and has but a single chamber. It is reached after traversing a narrow passage in a depth of about sixty feet [18.3 m] and the chamber of this cave is about fifteen feet [4.6 m] wide and fifty feet [15.2 m] long, the height ranging from ten [3 m] to thirty feet [9.1 m]. In it are many crevices, whose interstices are the favorite resorts of rattlers. In winter these reptiles are torpid and they crawl as far out of sight as possible. In summer, however, it is rash folly to attempt to explore this cave, because then these serpents can be seen and the dread sound of their warning rattles heard, not only in the cave itself but in the declivity leading to it, and in which there is no room to combat and kill the deadly things. (Anonymous, 1897)

Barnes (1910) also reports that "it was formerly frequented and occupied by the Comanche and Apache Indians on their raids to this vicinity. . . ." This is unlikely because of the nature of its entrance. The cave has presumably been filled by urban development.

Bibliography: Anonymous (1897:8); Barnes (1910:101); Reddell (1967:192); Reddell and Knox (1962:3-4, 26); Reddell and Russell (1962a:6); Wright (1916:136).

ROBBER'S CAVE (BCRP #23)

Alternate names: Unnamed cave no. 7; Harris Murder Cave

Location: Helotes 7.5′

Description: Robber's Cave remains to be discovered by cavers. A nearby cave bearing the local name "Robber's Cave" (BCS #57) apparently has been locally assumed to be this cave, but the descriptions vary too greatly for them to be identical. The entrance to this cave is described as a very small, nearly circular opening, which drops vertically for about 18 ft. [5.5 m] to a landing. From this point the cave is best described in the words of Judge Boerner, who made the first detailed examination of the cave:

> As we went down, for a space of fourteen feet [4.3 m], the declivity was very narrow and almost perpindicular, but from that point it slanted gently downward for forty feet [12.2 m], in a northerly direction and opened into a chamber whose dimensions we were unable to estimate and we could not explore it. The passage thence curved gradually to the southeast until it formed the opening of a chamber about forty feet [12.2 m] wide and with a high arched roof supported in several places by mammoth stalagmite and stalactite pillars several feet in diameter at the base and summit, but slender in the center. Pendant from the roof were reversed cones of crystal, and cones of similar appearance rose from the floor of the chamber. We proceeded a short distance into this chamber where the stalagmites and stalactites clustered so close we were unable to go farther. We also passed a corridor which led westward, but this we did not enter or explore. Returning to the spot where the skeleton lay [the landing], we ascended about eight feet [2.4 m] where we entered a narrow passage which led a few feet into an immense cavern, capable of containing several regiments of troops. Here, although our lights were dim, the spectacle was a grand one. The stalactites and stalagmites were of the most fantastic shapes. Several of them looked like huge spectres and when closely examined were extremely beautiful. They appeared like petrified persons who stood in statuesque and graceful attitudes. The formation of the heads and limbs were almost as perfect as if chiseled by Pygmalion. In the centre of the chamber was a deep pool of very cold water. Mr. Hunter, who drank therefrom, pronounced the water delicious. The temperature of this cavern was so cool that I got very chilly, and had to return to the surface, where the ladies were, and left Messrs. Marnoch and Hunter to pursue the exploration. They remained there an hour or so longer, and gave a vivid description of the many beauties and grandeur of the cave, which resembled an ancient temple. It would take several days to fully explore the robbers' cave and its many chambers . . . (Anonymous, 1886e)

During a later exploration of the cave, a stalagmite was brought from the cave and given to the San Antonio Express. This account adds additional information on the cave, which even though presumably exaggerated, indicates that this is (or was) an extensive and beautiful cave:

> The stalagmite presented to The Express man is only a fragment of a beautiful and delicate crystal formation which originally was about ten feet [3 m] in length but the fragment is only 26 inches [66 cm] in length and an inch and a quarter [3.2 cm] in diameter. When moistened and held to the light the scintillations from the myriads of crystals are dazzling and brilliant. The process of formation has doubtless required ages to accomplish this single portion, while many of the columns in the cave measure from thirty to fifty [9 to 15 m] and some of them seventy feet [21 m] in length and the diameters of the columns reach from six to eight feet [1.8 to 2.4 m]. Some idea of the antiquity of the robbers' cave can be formed by an examination of these stalagmites. . . .
>
> . . . The party explored one of the largest chambers several hundred yards without losing sight of each other, their lights reflecting the brilliance of the tapering and symmetrical columns, rendering the cave's perfect vista of gems of all hues. The party spent several hours in the caves, and but for the exhausting incident to climbing over the rocky surface and tortuous winding about the colossal columns which fatigued them exceedingly, would have remained longer. (Anonymous, 1886g).

History: Robber's Cave gained considerable notoriety in 1886 with the discovery of the skeleton of Frank Harris in it and the subsequent arrest and trial of Frank Scott for his murder. Frank Scott and his father T. J. Scott were members of a notorious band of desperadoes who terrorized northern Bexar County in the early 1880s. The band included members of the Pitts, Yeager, Brannon, and Scott families. Frank Harris was last seen alive on September 15, 1884. He had unsuccessfully sought to marry T.J. Scott's daughter and upon their disapproval of his proposed match, he threatened to testify against them. This apparently led to his murder by the Scotts. In June 1886 Frank Scott betrayed another member of the gang, Joe Brannon, and led the authorities to him as he fled towards another cave used by the gang as a hideout. Brannon was killed in a gun battle. As revenge for the death of his brother, Carroll Brannon reported to the sheriff in San Antonio that the Scotts had murdered Harris and hidden his body in a cave. On June 9, 1886, Sheriff James Van Riper and Deputy Sheriff Ed Stevens located the cave. A Mexican was lowered into the cave where he found a few skeletal fragments, including part of the skull and a few other bones. From the teeth and items found with the skeleton it was deduced that this was indeed Frank Harris' body. The Mexican could not be persuaded to re-enter the cave since he swore that he had seen a ghost in it. Later in the month, another trip was made to the cave in an attempt to locate more of the skeleton. This is recounted by Judge Boerner in an anonymous article in the San Antonio Daily Express (1886e):

> On last Thursday Messrs. Gabe Marnoch, David Hunter and myself, accompanied by Miss Mary Marnoch and my wife and daughter, went to the mouth of the cave. We first passed a lighted lantern thrown into the cave by means of a rope. When the lantern reached a landing it was struck several times by a large rattlesnake. The lowering of this lantern proved a wise precaution. The snake after expending his fury crawled away and Mr. Marnoch, who was armed with a pistol, was let down with a rope and he was followed by Mr. Hunter and subsequently I followed them. We had two lanterns and on reaching the landing we discovered so many human bones that we at first thought we had found several skeletons, but on close examination they all proved to be portions of Harris skeleton. We found all of the missing pieces of the skull and the lower jaw bone. This latter was in two pieces and two of the teeth were missing. We also found the shoulder blades, pelvis, arms and hands and some ribs and joints of the vertebrae. The quirt which was found was also of peculiar construction. We sent the bones up to the mouth of the cave in a sack with portions of clothing which we also found. We likewise discovered the leg of a calf, which gave us reason to believe that the cave had been the refuge of a man. . .

The only other recorded exploration of the cave was by Capt. W. J. Locke, his sons, his daughter Sadie, and several others in early July 1886 (Anonymous, 1886g). The trial of Frank Scott, as a member of the dreaded Pitts gang and because of his association with caves, was sensational. At one point in the trial, as the bones of Frank Harris were brought out for the jury to examine, an eerie noise was heard. This threw the courtroom into a panic, many being convinced it was the ghost of Frank Harris crying out for revenge. It proved, however, to be the snoring of a well-known Bexar County politician "in a beastly state of intoxication" (Anonymous, 1886c). Frank Scott was convicted on February 10, 1887, and sentenced to life imprisonment.

Bibliography: Anonymous (1886a:5; 1886b:5; 1886c:5; 1886d:5; 1886e:5; 1886f:8; 1886g:5; 1887a:5; 1887b:5; 1887c:5; 1887d:5; 1887e:5; 1887f:5; 1897:8; 1898:16); Barnes (1910:102-103); Reddell and Knox (1962:3-4, 37-38); Reddell and Russell (1962a:6; 1962b:1); Reddell and Smith (1966:3); Wright (1916:137).

ROBBERS' CAVE (BCRP #23)

Location: Helotes 7.5′ (?)

Description and History: Several accounts have confused this cave with Robber's Cave (BCRP #22) and stated that Harris's body was found in it. No description of the cave is available, other than that it was used by the Pitts gang to store their loot and as a hideout from the authorities. Its entrance was quite large and an organ stolen from the Helotes schoolhouse was hidden in it at one time. Barnes (1910) gives a highly fanciful account of the cave and states that it "has never been fully explored and it is not unlikely it is many miles long and in some places very broad. A dog that chased a rabbit into it was gone for three days and emerged nine miles from the point he entered." This account was doubtless taken from Anonymous (1886g), in which Capt. W.J. Locke reports having explored many caves in the vicinity of Robber's Cave (BCRP #22) and gives the following story of one of these caves:

> . . . some time ago his dogs chased a coon into one of the caves. He could hear them baying the coon at least half a mile from the entrance. After an hour or so one of the dogs returned to the mouth of the cave but the others remained inside, and were left there by the hunting party who returned home. One of the dogs returned next morning, and two days after the third dog emerged from the other side of the mountain, two miles and a half distant from where he entered and was completely exhausted and almost famished when he reached home.

Locke does not mention this as being the cave utilized by the Pitts gang as their hideout.

Bibliography: Anonymous (1886g:8; 1897:8; 1898: 16); Barnes (1910:102; 1913:31); House (1949:179-180; 1968:179-180); Wright (1916:136-137).

SAN PEDRO PARK CAVE (BCRP #25)

Location: San Antonio East 7.5′

Description: This cave was located a few hundred meters northeast of San Pedro Park and is best described in Anonymous (1897):

> It was discovered while blasting was being done at the head of San Pedro avenue with a view of extending that thoroughfare to a point north of the present terminus of the avenue. It was entered after passing through a sinous [sic] and tortuous passage barely large enough to admit a person and this passage was about 100 feet [30 m] in length and had an inclination whose angle was about sixty degrees, making it more difficult to ascend than to descend. Bader was accompanied by several other adventurous spirits who found a large subterranean chamber, whose walls were about twenty-five feet [7.6 m] high, the width of the chamber varying from twelve to a hundred feet [3.7 to 30 m]. They never reached the other extremity of it. After they had penetrated its depths to a distance of between three and four hundred feet [91 and 122 m] they encountered a swiftly flowing and clear, as well as very cold, stream of water flowing through it and directly across it. This they attempted to wade. They got into water up to their armpits and then concluded that it was more prudent for them to retire and return to the earth's surface. Their torches lit up the cave for the space of forty or fifty feet [12 or 15 m] around them and they were dazzled by the splendors of the spectacles that they witnessed in its confines. Mammoth stalagmites and stalactites formed huge and gruesome grotesque columns and truncated cones. Their capitals and bases were awe inspiring. A miniature forest of these columns and cones sprung up about and bewildered the explorers.
>
> They spent several hours in the cave and were lost in it for over an hour. Their torches were nearly consumed before they reached the surface, and they had narrow escapes from being lost and overwhelmed in the cavern's depth in utter darkness. Their experience was such a thrilling one that they did not care to repeat it and one of their number swore then and there no one should penetrate it if he could prevent it and so he rolled the large stone down into its entrance.

History and Legends: The above recounted exploration was made in about 1888 by Officer Fred Bader and others. Given the location of the cave and the nature of the Austin Chalk in which the cave was formed, it is unlikely that the cave had the immense speleothems described. It is not unlikely, however, that the group became lost in a complex maze of passages typical of caves in this part of the city. It is also likely that the stream encountered fed San Pedro Park Springs. Passing from the meager history of the cave, we now come to a far more lively account. Barnes's flamboyant pen writes one of the most fascinating legends of Texas cave lore in his continued account of San Pedro Park Cave. This is C. M. Barnes at his best:

> There is a cavern deep and dark and near San Pedro Park. There this treasure is said to be, but all knowledge of this cavern's trace is gone. Into its mouth a huge stone has rolled that stopped and hid its orifice from view. More than a generation ago a last effort was made to find this spot. They are said to have found and rolled away the stone and gone down into the cave taking with them lights and food. Within they found a swollen stream. When they assayed to cross its current was all too swift. There they found a bottle and some wine. As they drank from it their lights burned blue and low and dim and out of the crannies of the cave came the spectres and then the woman and her male escorts fled fast and back to the cavern's mouth. And others went to this selfsame cave and down within and found the wine flask. There were snakes and wolves and bats all there. One fired to kill a wolf. As he fired part of the cavern's roof fell down. [This wolf story is very similar to the history of Lobo Cave, BCRP #21. Artistic license, Mr. Barnes?] Those then there escaped unscathed but in haste, nor went again, although no spectres came. I was with them once but cared no more to search. Untasted was the wine; uncorked its flask was left. Another band of bolder ones again went there. Again their lights burned blue and to them the spectres all four came. Even to the cavern's mouth they pursued. There they held the searchers in thrall until they had rolled back the stone into the cavern's mouth. Since then no others have gone. And now this cave is lost. This treasure still evades all quest.

After a tale like that one wonders what was in that wine they were drinking! Nonetheless, rumors persist of hidden caves in San Pedro Park. The entrance to one is supposed to be in a house on the park grounds and is said to have been explored for at least 500 m by a local geologist (BCRP #54). Another rumor is of a cave that goes to water and whose entrance is under the old San Pedro Park bandstand (BCRP #55). Whether or not these are the same caves is not known. Yet another story claims the cave's boulder-sealed entrance is under San Pedro Avenue, adjacent to the park. At one time a portion of the road would slightly rock when heavy trucks drove over it—the rocking being the big rock covering the cave's entrance. During the commercialization in the 1920s of Robber Baron Cave (BCS #56) located 8 km to the northeast, rumors were spread by the Robber Baron owner that his cave connected to San Pedro Park Cave, then to the Alamo, and that both caves were used as secret escape routes from the ill-fated mission. Quite unlikely, but the tourists loved it.

Geology: San Pedro Park Cave, if it exists, was probably formed by artesian water rising from the Edwards (Balcones Fault Zone) Aquifer along a fault that juxtaposes Pecan Gap Chalk and Austin Chalk. It may have been a resurgence for Edwards water to a higher, paleo-base level (see Geology of Skeleton Cave, BCRP #25).

Bibliography: Anonymous (1897:8; 1898:16; 1964a: 8; 1973q:12); Barnes (1910:89-90, 100-101); Crook (1967:75-76); House (1949:15-16; 1968:15-16); Reddell (1961b:1); Reddell and Knox (1962:3-4, 29, 31); Reddell and Russell (1962a:6); Reddell and Smith (1966:4); Veni (1978a:6); Wright (1916:136).

SKELETON CAVE (BCRP #26)

Location: San Antonio East 7.5′

Description and History: Skeleton Cave, of unknown dimensions, was accidentally blasted open by City of San Antonio workers in the early 1900s.

Geology: Situated in either the Pecan Gap Chalk or Austin Chalk, the cave was possibly developed under conditions similar to San Pedro Park Spring (West) (BCS #62) by artesian waters rising from the confined Edwards (Balcones Fault Zone) Aquifer along a major fault that also marks the contact between the two chalk formations. Vertically anastomosed bedrock in the old quarried cliff of north San Pedro Park is evidence of paleo-phreatic artesian flow. On that premise it may be tentatively assumed that Skeleton Cave and the now sealed San Pedro Park Cave (BCRP #25) formed as springs for artesian flow, discharging from a higher paleo-base level. Diversion of flow to San Pedro Park Springs, a lower and more recent base level, allowed for the alluviation and eventual sealing of Skeleton Cave.

Archeology: The only reference to the cave is from Barnes (1910). He gives the following "archeological" description:

> In it were found the skeletons of Indians of huge stature, some exceeding seven feet in height. Besides these skeletons were found some stone pottery and a number of arrow heads as well as stone spar heads and other relics of a tribe of a aboriginal race. This race evidently had its burial ground in this portion of the cave, which may also be one of the numerous chambers of the treasure cave mentioned in another chapter of this book [San Pedro Park Cave, BCRP #25]. About ten years previous to this time another cluster of corpses or the bones of human beings of similar size and with the same character of relics were unearthed in the same immediate vicinity by another gang of the city's workmen while blasting the rock in this park.

Although some may immediately dismiss the 2+ m statures as exaggerated claims, disarticulated skeletons often give the appearance of such sizes to untrained observers.

Bibliography: Barnes (1910:100); Crook (1967:75); Reddell and Knox (1962:3-4, 32-33); Reddell and Russell (1962a:6); Wright (1916:136).

STEVENS RANCH CAVES NOS. 1-6 (BCRP #27-32)

Alternate names: Briant Stockfarm Caves Nos. 1-6

Location: Lacoste NE 7.5′

Description and History: In late 1960 members of the St. Mary's University Speleological Society assisted the Bexar County Sheriff's Department in a search for a wanted murderer who was either hiding in a cave or had committed suicide in one. Exploration of Stevens Ranch Cave (SRC) No. 1 was prevented by a rattlesnake just inside the cave entrance. SRC No. 2 is a 6.2 m deep pit. From the base of the pit the cave slopes down to a small room and ends. SRC No. 3 has a 3 m deep entrance pit. Offset from the entrance drop is a blind pit 6.2 m deep. No descriptions are available for SRC Nos. 4, 5, and 6. Originally, these caves were known as the Briant Stockfarm Caves, but when ownership of the land changed, so did the cave names.

Biology: A rattlesnake (*Crotalus* sp.) was found in Stevens Ranch Cave No. 1.

Geology: The caves are vadosely developed in the Austin Chalk.

Bibliography: Anonymous (1973q:11); Brandt (1973: 6); Litsinger (1973a:16); Passmore (1977:12); Reddell (1967:192); Reddell and Knox (1962:3, 5, 8-9); Reddell and Russell (1962a:5); Reddell and Smith (1966:2).

TUNNEL CAVE (BCRP #33)
Location: Castle Hills 7.5′
Description: The first of two rooms is described as "unstable" after a heavy rain. A passage through blocks of breakdown leads to a second room that ends in collapse. An unexplored muddy crawlway extends from the first room.
History: John Grayless, Steve Gutting, and Kevin Soat explored the cave on 30 December 1972. In 1983 Gutting vaguely remembered the trip and believes the cave to be located near Elm Springs Cave (BCS #22).
Geology: Tunnel Cave is in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer.
Bibliography: Grayless (1973:91).

UNNAMED CAVE (BCRP #34)
Location: Bat Cave 7.5′
Description and History: During the construction of a major pipeline to San Antonio, a 12 to 15 m wide cave passage was breached. The cave was followed for 800 to 900 m by construction workers without reaching the end. The passage was sealed with the completion of the pipeline construction.
Geology: The cave is in the Edwards Limestone.

UNNAMED CAVE (BCRP #35)
Location: Bat Cave 7.5′
Description and History: A pond near Poison Ivy Pit (BCS #52) is said to have a large rock in it which, when raised, drains the pond into a cave below. Randy M. Waters waded into the water in 1977 and found many large rocks. None of those he tried to lift were the correct rock, and he reports that there are many more stones as yet unturned.
Geology: The cave is probably dissolved primarily by vadose water in the recharge zone in the Edwards (Balcones Fault Zone) Aquifer. This is assumed in view of its location near many caves which formed in that manner.
Bibliography: Waters (1977b:119).

UNNAMED CAVES (BCRP #36 & 37)
Location: Bulverde 7.5′
Description and History: Two pits on Vogel's Peak, 10 to 20 m deep, were discovered by John Graves in the early to middle 1970s.
Geology: The caves are in the upper Glen Rose Formation.

UNNAMED CAVE (BCRP #38)
Location: Bulverde 7.5′
Description: This is a 7 m deep fissure followed by another 7 m deep fissure.
Geology: This fissure is in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer.

UNNAMED CAVES (BCRP #39 & 40)
Location: Bulverde 7.5′
Description: Two caves are reported to be near Dick White Cave (BCS #157) but are undescribed. One might be Twin Pits (BCS #77).
Geology: These caves are probably in the Edwards Limestone.

UNNAMED CAVES (BCRP #41 & 42)
Location: Bulverde 7.5′ and/or Camp Bullis 7.5′
Description: These are reported by hunters to be two fair-sized, well-decorated caves. Other caves may exist on the property, but access for exploration has been refused.
Geology: The caves are developed in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer.

UNNAMED CAVE (BCRP #43)
Location: Camp Bullis 7.5′
Description and History: A 0.6 m long by 0.15 m wide fissure is in the top of a 2 m high cliff along Cibolo Creek. The fissure walls bell out with depth, estimated to be at least 5 m. Randy M. Waters discovered the hole in 1982 and believes it is worthy of an attempt to enlarge the entrance.
Geology: The cave is in the lower Glen Rose Formation.

UNNAMED CAVE (BCRP #44)
Location: Camp Bullis 7.5′
Description and History: Discovered by Bob Cowell, Kurt L. Menking, and Randy M. Waters in November 1983, the hole had been filled with concrete "bombs" used in military exercises. The bombs were removed, but the hole narrowed to an impassable size. Strong airflow encourages a return for further excavation.
Geology: The cave is in the lower Glen Rose Formation.

UNNAMED CAVE (BCRP #45)
Location: Camp Bullis 7.5′ (?)
Description and History: The only reference to this cave is from Anonymous (1930):

> An old cave, thought to have been the rendezvous of frontier badmen, has been found by citizens military training camp students at Camp Bullis.
>
> The students, in a spirit of adventure, ventured into an old cave on the reservation, and now army officers are confronted with the problem of developing the cave into one of the major attractions of the camp or closing it to

prevent other students getting lost in its recesses.

Although existence of the cave was unknown to military authorities, investigation revealed that it had been used in the past. Rough wooden steps, badly decayed and a sort of wire ladder led from the mouth to the first chamber, 30 feet [9.1 m] below. A passage led to another and deeper chamber a short distance away, but the officers who made a brief exploration were unable to determine whether there were passages to other recesses.

The youths who found the cave had little difficulty in descending into it, but when efforts of some of them to get out proved futile, their predicament was reported by their comrades and ropes had to be secured before they could be pulled out.

Bibliography: Anonymous (1930).

UNNAMED CAVE (BCRP #46)

Location: Castle Hills 7.5′

Description and History: Located in the front yard of a Shavano Park residence, the cave is rumored to be "a mile long." Unfortunately it was filled in sometime around 1960. This cave might be Cueva Cave (BCS #17), which has a similar description and is located in the front yard of a housing development near Shavano Park.

Geology: The cave is in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer.

UNNAMED CAVE (BCRP #47)

Location: Longhorn 7.5′ (469, 265)

Description: This is a 6 m diameter, 1 m deep sinkhole that served as a swallet for a small watercourse. Where the water sinks into the sink's headwall is an impassably small passage, which may lead into a cave if the loose dirt fill is excavated.

History: The sinkhole was discovered by Kurt Menking and Randy M. Waters in the spring of 1985.

Geology: This is one of the few true sinking streams in Bexar County. The sinkhole is formed in the recharge zone of the Edwards (Balcones Fault Zone) Aquifer.

UNNAMED CAVE (BCRP #48)

Location: Helotes 7.5′

Description: This undescribed cave is supposedly south of Wagner Ranch Fissure (BCS #174).

Geology: The cave is in the Edwards Limestone.

UNNAMED CAVE (BCRP #49)

Location: Helotes 7.5′

Description: This is a 1 m high tunnel which Floyd New described as being "several hundred yards long" and never explored to its end. The cave description is similar to Helotes Blowhole (BCS #34), but New's location is not.

UNNAMED CAVE (BCRP #50)

Location: San Antonio East 7.5′

Description and History: This cave was first reported in Anonymous (1897) who reports that the cave was discovered

> . . .a few years ago by a property owner on Villita street while having a well sunk on his property. At the depth of twenty-two feet [6.7 m] the well diggers were surprised to drop down about seven feet [2.1 m] and land in a tunnel. Foul air prevented their exploring it to any very great distance. . . There had previous to that time been a number of persons who had claimed to have had similar experiences and made similar discoveries.

Bibliography: Anonymous (1897:8); Everett (1975: 130).

UNNAMED CAVE (BCRP #51)

Location: San Antonio East 7.5′

Description: Don Smith reported a large cave to have existed at the present site of Trinity University.

Geology: The cave was formed in the Austin Chalk.

UNNAMED CAVE (BCRP #52)

Location: San Antonio East 7.5′

Description: A 15 m deep pit near Trinity University was known to Ross Barham in the early part of the 20th century.

UNNAMED CAVE (BCRP #53)

Location: San Antonio East 7.5′

Description: A cave near the intersection of Culebra Road and San Pedro is supposed to have been covered by a parking lot.

Geology: The cave formed in the Pecan Gap Chalk.

UNNAMED CAVE (BCRP #54)

Location: San Antonio East 7.5′

Description: In Laurel Heights a swimming pool drains into a cave.

Geology: The cave is in the Austin Chalk.

UNNAMED CAVE (BCRP #55)
Location: San Antonio East 7.5′
Description and History: The cave entrance is said to be hidden in the basement of San Antonio College's McAllister building. In the late 1970s, John R. Cross checked many of the building's nooks and crannies without finding it. There were, however, many locked areas to which he could not gain access.
Geology: The cave would be developed in the Austin Chalk and may bear some genetic relationship to the nearby San Pedro Park Springs.

UNNAMED CAVE (BCRP #56)
Location: San Antonio West 7.5′
Description and History: The cave entrance is reported to have been in a house located on the grounds of San Pedro Park. At an undetermined date a team of local geologists explored it for a distance of at least 500 m. In 1968 the house was destroyed and its basement filled.
Geology: The cave is in either the Austin or Pecan Gap Chalk and is probably a paleo-stream channel for artesian water associated with the San Pedro Park Springs.
Bibliography: Anonymous (1968c:118).

UNNAMED CAVE (BCRP #57)
Location: San Antonio West 7.5′
Description: This is reported to be a large cave that goes to water. Its entrance is supposed to be under the old San Pedro Park bandstand.
Geology: The cave was probably in the Austin Chalk, dissolved by artesian waters associated with the San Pedro Park Springs only 100 m distant.

UNNAMED CAVE (BCRP #58)
Location: Van Raub 7.5′
Description and History: An extensive cave is located in a "bald hill" near Sam's Cave (BCS #60). The owner of Sam's Cave claims that a trap door leads down a rock staircase (with torch holders in its walls) into the cave.
Geology: The cave is probably in the upper Glen Rose Formation.

UNNAMED CAVE (BCRP #59)
Location: Van Raub 7.5′
Description and History: No description of this cave is available. The earliest account of the cave is in Anonymous (1897):

> Another cave also made famous by crime is the cave discovered at Van Raub station by Wynne Andrews and explored by him and members of the Express staff. In this cave was concealed the body of a man who was murdered by his rival. The rival brought the girl who was the cause of the murder, and ignorant of his having been murdered, to this city, and was about to marry her when the body was found by a party of adventurous explorers. The culprit was captured and is now serving a life sentence, and the innocent cause of the wicked tragedy, after wearing weeds for the victim, has long ago discarded them for bridal robes and is now the mother of several sprightly and robust offspring. The justice of the peace who, acting as the coroner, held the inquest, like the murderer, is also doing time in the penitentiary but for no gory deed like that which stains the hand of the slayer.

Barnes (1910) also recounts this tale, but with his usual embellishments. He gives the name of the murdered man as Cypriano Hernandez, "a young Mexican shepherd." He continues his account of the incident as follows:

> A former lover, whose suit had been favored by her parents, disappeared with her in her second elopement. Not many days afterward a sudden storm coming up, some shepherds drove their flock into a cave. Soon after entering it they were surprised at their collie dogs acting very strange and especially one that had belonged to Hernandez. The dogs kept coming to the goat herds and then running back into the recesses of the cave until the latter followed Hernandez's dog which guided them to his corpse. It was in an advanced state of decomposition but easily identified by the clothing and other objects. . . The faithless bride and her levanting lover have ever since been sought in vain by the law. Probably they disappeared into Mexico.

Bibliography: Anonymous (1897:8; 1898:16); Barnes (1910:103-104).

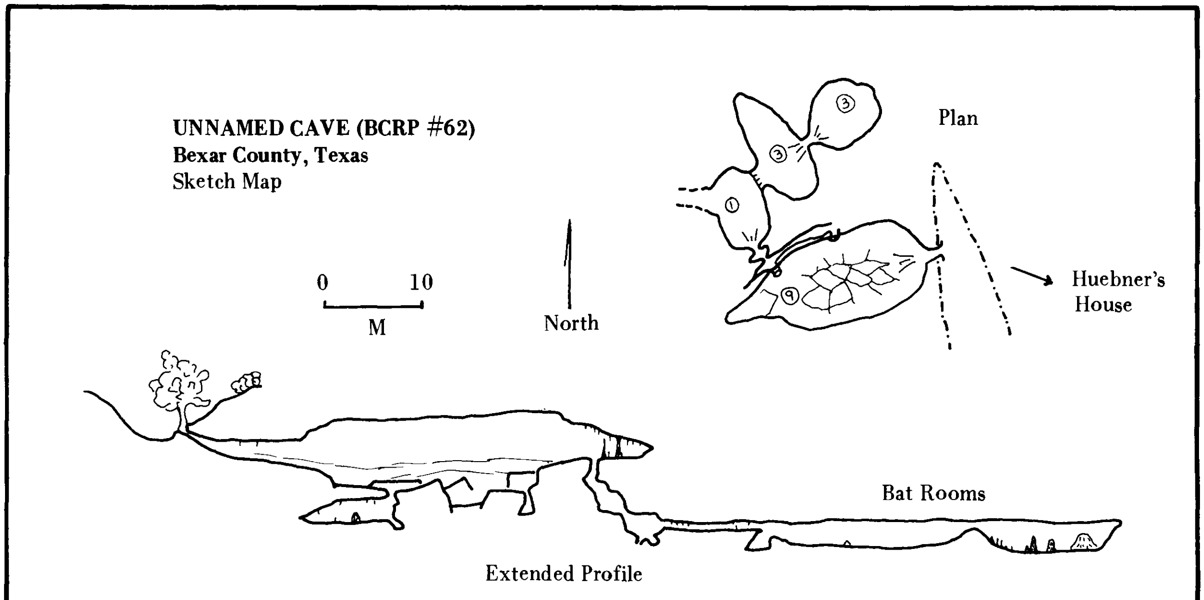
UNNAMED CAVES (BCRP #60-61)
Location: Unknown
Description and History: Reported and partially explored by Wayne Yantis, the first cave is a 5 m deep pit, the second has a 10 m long entrance and drops only 1.5 m to dirt fill, and the third is in the bed of Olmos Creek and receives a great deal of water during floods.

UNNAMED CAVE (BCRP #62)
Location: Unknown
Description: A large cave is located in a creekbed and has four well-decorated rooms. The first and largest room is breakdown-floored, 10 m high, 20 m wide, and 30 m long. A passage at the back of this room

leads to the second room, which is only 1 m high but 12 m in diameter. The last two rooms, which are both bat roosts and 2 m high, are 20 m by 15 m, and 15 m in diameter. (See Map 184.)

History: Only an anonymous, undated sketch of the cave is available.

Bibliography: Passmore (1977).



MAP 184

Descriptions of Artesian Wells and Non-Cave Springs

The section below includes descriptions of artesian wells and non-cave springs which have been biologically investigated.

ARTESIAN WELLS

ALAMO DRESSED BEEF COMPANY WELL

Location: The location of this well is unknown.
Description: No information is available on this well.
Biology: Blind catfish were reported to have emerged from this well but apparently were not preserved.
Bibliography: Hubbs and Bailey (1947); Longley and Karnei (1979a: 1979b).

ARTESIA PUMP STATION WELL (U.S.G.S. Well No. AY-68-37-508)

Alternate names: Artesia Well; Artesia Well No. 4; San Antonio City Board Well No. 4
Location: This well is located at the Artesia Pump Station, about 3.2 km SW of the intersection of Belgium Lane and KONO Road in San Antonio.
Description and Geology: This well was drilled in January 1958. The Edwards Limestone was encountered at a depth of 304 m, with the well extending into the Comanche Peak Formation and ending at a depth of 400 m. Flow was measured at 505 liters per second and the temperature at 27°C.
Biology: The following troglobites have been identified from the well:

Snails–*Phreatodrobia conica*
Thermosbaenaceans–*Monodella texana*
Amphipods–*Parabogidiella americana*
Stygobromus flagellatus
Allotexiweckelia hirsuta
Isopods–*Cirolanides texensis*
Shrimp–*Palaemonetes antrorum*
Catfish–*Satan eurystomus*
Trogloglanis pattersoni

Bibliography: Hershler and Longley (1986); Karnei (1978); Longley and Karnei (1979a; 1979b); Lundberg (1982).

BEXAR METROPOLITAN WATER DISTRICT WELL

Location: Longley and Karnei (1979b) report this as being located "on approximately the 500 block of Carlisle in southwest Bexar County."
Description: This 15 cm diameter irrigation well of an unknown depth has been capped.
Biology: The widemouth blind catfish, *Satan eurystomus*, was reported from this well. Two other catfish of unknown identity were not preserved.
Bibliography: Karnei (1978); Longley and Karnei (1979a; 1979b).

BRACKENRIDGE ZOO WELL

Location: This well is located on the grounds of Brackenridge Zoo in San Antonio.
Description and Geology: This well, drilled in September 1946, encountered the top of the Edwards Limestone at a depth of 64 m and reaches a total depth of 124 m. Flow from the well was 416 liters per second and the temperature was 24.5°C.
Biology: The only species recorded from this well is the snail *Phreatodrobia nugax nugax* and an undetermined genus and species of the isopod family Stenasellidae.
Bibliography: Hershler and Longley (1986); Karnei (1978); Longley and Karnei (1979b).

EL PATIO FOODS WELL

Location: This well was located at the El Patio Foods Plant, 2600 Southwest Military Drive, San Antonio.
Description: This 427 m deep well was capped in 1964 due to infiltration of oil and sulphur from the "bad water zone."
Biology: A single specimen of *Satan eurystomus* was collected from the well on 1 June 1960. Longley and Karnei (1979b) report that "'about fifty' catfish were found when the water tower was drained in 1964. . . .'two types of catfish were present, one with a sucker-type mouth and the other with a flathead catfish type mouth'." It is assumed that the fish

with the sucker-type mouth was *Trogloglanis pattersoni*, but none were preserved.
Bibliography: Hubbs (1971); Karnei (1978); Longley and Karnei (1979a; 1979b); Suttkus (1961).

GEORGE W. BRACKENRIDGE WELL
Location: The definite location of this well is now unknown, but probably is a well located at the intersection of Belgium Lane and KONO Road.
Description: The well believed to be this one is 308 m deep, in poor condition, and Longley and Karnei (1979a) report that it was to be capped "soon."
Biology: The type-specimen of *Trogloglanis pattersoni* was collected in what is assumed to be this well.
Bibliography: Eigenmann (1919); Hubbs (1971); Karnei (1978); Longley and Karnei (1979b); Lundberg (1982).

JOSEPH BOECKE WELL
Alternate name: Boecke Well
Location: This well was located 4.43 km east and 2.02 km north of the Alamo in San Antonio and is now in the right-of-way of IH 35.
Description: This 308 m deep well has been covered by highway construction.
Biology: The second known specimen of *Trogloglanis pattersoni* was collected from this well.
Bibliography: Hubbs (1971); Hubbs and Bailey (1947); Karnei (1978); Longley and Karnei (1979a; 1979b); Lundberg (1982).

LONGHORN PORTLAND CEMENT COMPANY WELL
Location: This well is located at the Longhorn Portland Cement Company northeast of San Antonio.
Description: No description of the well is available.
Biology: The only species reported from this well is the snail *Phreatodrobia nugax inclinata.*
Bibliography: Hershler and Longley (1986).

O.R. MITCHELL WELL (U.S.G.S. Well No. AY-68-43-601)
Alternate name: O.R. Mitchell Well No. 2
Location: This well is located on the O.R. Mitchell Ranch north of Von Ormy approximately 22.5 km SW of San Antonio.
Description and Geology: This well, drilled in April 1946, encountered the Edwards Limestone at a depth of 489 m and reaches a total depth of 583 m. Large, numerous crevices were reported in the Edwards Limestone. The flow rate was 416 liters per second and the temperature was 27°C.
Biology: This well has been extremely productive biologically with the following troglobites reported from it:

Snails–*Phreatodrobia imitata*
Amphipods–*Parabogidiella americana*
Stygobromus flagellatus
Allotexiweckelia hirsuta
Texiweckelia texensis
Texiweckeliopsis insolita
Isopods–*Cirolanides texensis*
Shrimp–*Palaemonetes antrorum*
Catfish–*Satan eurystomus*
Trogloglanis pattersoni

Bibliography: Hershler and Longley (1986); Holsinger and Longley (1980); Hubbs (1971); Karnei (1978); Longley and Karnei (1979a; 1979b); Lundberg (1982); Suttkus (1961).

PERSYN WELL
Location: The location of this well is unknown.
Description: There is no information available on the well.
Biology: Blind catfish were reported to have emerged from the well, but apparently none were preserved.
Bibliography: Hubbs and Bailey (1947); Longley and Karnei (1979a; 1979b).

UNION STOCKYARDS WELL
Location: This well is located at the Union Stockyards in San Antonio.
Description: No description of the well is available.
Biology: The only species reported from this well is the snail *Phreatodrobia nugax nugax.*
Bibliography: Hershler and Longley (1986).

VERSTRAETEN WELL NO. 1 (U.S.G.S. Well No. AY-68-43-608)
Alternate names: Verstraeten Well; Verstraeten Farm Well
Location: This well is located north of Von Ormy, approximately 22.5 km SW of San Antonio.
Description and Geology: This irrigation well was drilled in June 1955 and had a measured flow of 315 liters per second and a temperature of 27°C. The Edwards Limestone was encountered at a depth of 479 m and the total depth of the well is 514 m.
Biology: This very productive well has produced the following troglobites:

Snails–*Phreatodrobia imitata*
Copepods–*Cyclops* sp. 1
Cyclops sp. 2
Thermosbaenaceans–*Monodella texana*
Amphipods–?*Parabogidiella* n.sp.
Parabogidiella americana
Stygobromus flagellatus

Allotexiweckelia hirsuta
Texiweckelia texensis
Texiweckeliopsis insolita
Isopods–Cirolanidae, undescribed genus and species
Cirolanides texensis
Shrimp–*Palaemonetes antrorum*
Catfish–*Trogloglanis pattersoni*

Bibliography: Hershler and Longley (1986); Holsinger and Longley (1980); Karnei (1978); Longley and Karnei (1979b); Lundberg (1982).

VERSTRAETEN WELL NO. 2 (U.S.G.S. Well No. AY-68-43-606)

Location: This well is located north of Von Ormy, approximately 22.5 km SW of San Antonio.

Description and Geology: This irrigation well was drilled in August 1957 to a total depth of 478 m. The Edwards Limestone was encountered at a depth of 477 m. The flow rate was 126 liters per second and the temperature was 27°C.

Biology: The following species have been reported from this well:

Amphipods–*Allotexiweckelia hirsuta*
Isopods–*Cirolanides texensis*
Shrimp–*Palaemonetes antrorum*

Bibliography: Karnei (1978).

WILLIAM KEMPIN WELL

Location: This well was located in southwest San Antonio near the East Kelly Air Force Base.

Description: This 381 m deep well is now covered by development.

Biology: The type-specimen of the catfish *Satan eurystomus* was collected in this well prior to 1938.

Bibliography: Hubbs (1971); Hubbs and Bailey (1947); Karnei (1978); Longley and Karnei (1979a).

NON-CAVE SPRINGS

INTERMITTENT SPRING NEAR LEON SPRINGS

Description: No description is available.

Biology: A small collection by Scott J. Harden and Claire Lindblom on 3 November 1985 included an epigean millipede and a snail. This material remains unstudied.

SPRINGS ALONG SAN ANTONIO RIVER

Description: These are four springs located along a 200 m long stretch of the San Antonio River. The springs discharge an average of 1.3 m above the river.

History: These springs were located and studied by Scott Harden in 1985 and early 1986.

Biology: Scott J. Harden placed mop-heads in the spring openings to attract aquatic invertebrates. Collections were made by Scott J. Harden, Dottie C. Kern, and Claire F. Lindblom on 26 October 1985; and by Scott J. Harden on 7 and 11 November 1985, 5 December 1985, and 10-13 January 1986. The only species thus far identified from the springs are the blind snail *Phreatodrobia nugax nugax*, the copepods *Eucyclops speratus* and *Macrocyclops albidus*, the troglobitic amphipod *Stygobromus russelli*, and the stenasellid isopod *Mexistenasellus* sp. nr. *coahuila*. The following other material was collected: aquatic earthworms, leeches, insect larvae, and elmid beetles.

Geology: Springflows vary from seeps to 20 liters per second. Groundwater temperature was 24°C. The springs discharge from fluviatile Quaternary gravel lenses within a 1.5 m thick alluvial terrace deposit. The water is perched on the Eocene Midway Group and flows down 1.3 m to the San Antonio River. It is not clear if the source of the springflow is a minor alluvial aquifer or pirated water from the river.

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