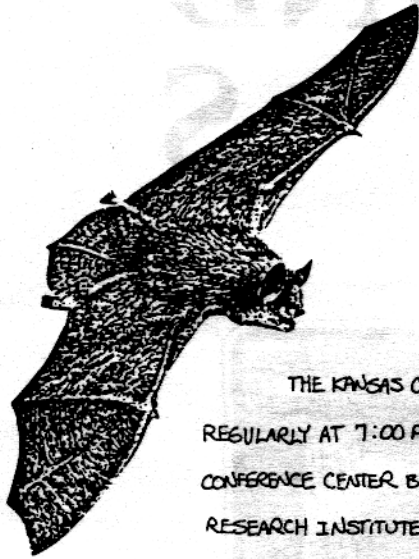


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UNDERGROUND
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· KANSAS CITY AREA GROTTA ·

CALENDAR OF EVENTS



THE KANSAS CITY AREA GROTTO MEETS REGULARLY AT 7:00 P.M. IN THE ARTHUR MAG CONFERENCE CENTER BEHIND THE MIDWEST RESEARCH INSTITUTE ON THE SECOND WEDNESDAY OF EACH MONTH. SOUTHWEST CORNER OF VOLKER BLVD AND CHERRY. VISITORS WELCOME.

THE UNDERGROUND PRESS IS PUBLISHED QUARTERLY BY THE KANSAS CITY AREA GROTTO OF THE NATIONAL SPELEOLOGICAL SOCIETY. SINGLE COPIES AVAILABLE UPON REQUEST, SUBSCRIPTIONS FREE TO GROTTO MEMBERS. ARTICLES ARE PUBLISHED FOR EDUCATIONAL PURPOSES AND DO NOT NECESSARILY REFLECT THE VIEWS OF THE ENTIRE GROTTO, OR THE NATIONAL SPELEOLOGICAL SOCIETY.

KANSAS CITY AREA GROTTO OFFICERS FOR 1986 TERM.

RANDY ROSE (PRESIDENT)	(816)763-6392
RICHARD CRABB (VICE PRESIDENT)	(816)524-6762
BART RAPP (SECRETARY-TREASURER)	(816)561-0432
DAVE PORTER (EQUIPMENT CHAIRMAN)	(816)888-0094

CALENDAR OF UPCOMING EVENTS IN SPELEOLOGY FOR 1986-1987.

NOVEMBER 15 - DECEMBER 15: SPELEOPHOTOGRAPHY 1986 AT THE SLOVAK KRAS MUSEUM AND OF LIPTOVSKY MIKULAS, SKOLSKA 4, 031 80, CZECHOSLOVAKIA. TOPICS: KARST LAND AND CAVING.

DECEMBER 1: DEADLINE FOR N.S.S. BOG ELECTION PETITIONS.

DECEMBER 6-7: SWR WINTER TECHNICAL REGIONAL, CARLSBAD, NEW MEXICO. CONTACT: CAROL BELSKI, 408 SOUTHERN SKY, CARLSBAD, NEW MEXICO 88220 FOR MORE INFORMATION.

DECEMBER 27-28: NSS-CDS CAVE DIVING WORKSHOP 1986, "INNOVATIONS AND EXPLORATIONS." CONTACT: NSS CAVE DIVING SECTION, WINTER WORKSHOP, POST OFFICE BOX 950, BRAWFORD, FLORIDA 32008-0950 FOR MORE INFORMATION.

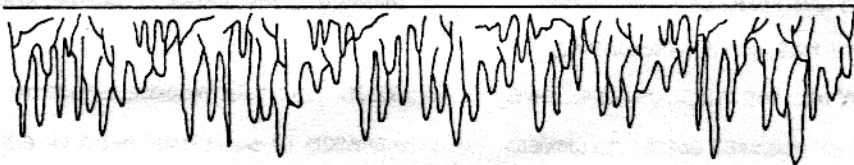
JANUARY 24: MISSOURI SPELEOLOGICAL SURVEY MEETING IN ROLLA, MISSOURI, 10 A.M. GEOLOGICAL SURVEY BUILDING.

FEBRUARY 9-11, 1987. SECOND MULTIDISCIPLINARY CONFERENCE ON SINKHOLES AND THE ENVIRONMENTAL IMPACTS ON KARST. CONTACT: DR. BARRY F. BECK, DIRECTOR, FLORIDA SINKHOLE RESEARCH INSTITUTE, UNIV. OF CENTRAL FLORIDA, ORLANDO, FL 32816.



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PAST GROTTO TRIP REPORTS

NOVEMBER 8: TONY MONROE AND BART RAPP TOOK FOUR PEM-BROKE HILLS STUDENTS ON A NOVICE TRIP INTO PERKINS CAVE.

OCTOBER 24, 25, 26: ELEVEN K.C.A.G. MEMBERS INCLUDING PAUL SEARCY, RICHARD CINDRIC, JERRY CINDRIC, BART RAPP, TONY MONROE, DAVE PORTER, DEAN BEAUCHAMP, BOB KORTE, SUE SCHOLER, MIKE LANCASTER, AND JAY WRIGHT ATTENDED A WEEKEND OUTING AT THE OZARK UNDERGROUND LABORATORY. TOM AND CATHY ALEY TREATED US TO THE MOST INFORMATIVE CAVING WEEKEND EVER AND WE ALL WALKED AWAY WITH A BETTER UNDERSTANDING OF SURFACE - SUBSURFACE RELATIONSHIPS. WE COULD NOT HAVE HAD BETTER HOSTS AND THE WEEKEND WAS FILLED WITH TOM'S WATER TRACING SEMINARS, GREAT ALEY HUMOR, AND A FASCINATING BIOLOGICAL FIELD TRIP BY CATHY INTO THE TUMBLING CREEK CAVE SYSTEM! ON SUNDAY, WE STOPPED BY HERCULES GLADES TO WITNESS A LOSING STREAM AND LOTS OF PEOPLE ENJOYING THE FALL COLORS.

OCTOBER 10, 11, 12: RICHARD CRABB AND LONNIE JOHNSON ATTENDED THE N.C.R.C. BASIC CAVE RESCUE ORIENTATION COURSE HELD AT MERAMEC AND ONONDAGA CAVE STATE PARKS.

SEPTEMBER 19, 20, 21: STEVE PATKE, RICHARD CRABB, LONNIE JOHNSON, RICHARD CLEMENTS, RON LATHER, DAVE ROBERTS, PAUL SEARCY, ANDY KRAMER, AND BART RAPP PARTICIPATED IN A K.C.A.G. WEEKEND OUTING AT SPELEO-HUT #2 NEAR ST. JAMES, MISSOURI. WE SPENT FRIDAY AND SATURDAY IN THE MANY CAVES OF MERAMEC STATE PARK AND SATURDAY'S "HIGHLIGHT" WAS WHEN BART GOT LOST LEAVING EVERYONE TO HAMILTON CAVE WHEN HE HAD JUST BEEN THERE THE DAY BEFORE. ON SUNDAY, THE GROTTO WAS PARTICIPATING IN ONONDAGA'S CENTENNIAL CELEBRATION BY HELPING EUGENE VALE AND THE M.S.S. WITH VARIOUS TASKS THAT

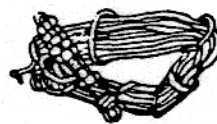
NEEDED TO BE COMPLETED. THE VARIOUS EXHIBITS ON SPELEOLOGY IN ONONDAGA'S ENTRANCE BUILDING WERE VERY INFORMATIVE AND DAN DREES DID AN EXCELLENT JOB EDUCATING THE PUBLIC WITH HIS LIVE BAT IN HAND! A TOUR OF CATHEDRAL CAVE FINISHED OFF OUR WEEKEND AND IT WAS TIME FOR THE LONG TRIP HOME...

SEPTEMBER 13, 14: AFTER ATTENDING THE FALL M.S.S. MEETING IN ROLLA, BART RAPP AND TONY MONROE SPENT SUNDAY SURVEYING IN GREAT SPIRIT CAVE WITH SCOTT HOUSE, MICK SUTTON, SUE HAGEN, DAVE HOFFMAN, PAUL HAUKE AND SEVERAL OTHERS. MOST OF THE TIME WAS SPENT BELLYCRAWLING IN WATER OVER NASTY CHERT AND WISHING I HAD BROUGHT BETTER KNEEPADS FOR PROTECTION.

AUGUST 30: TONY MONROE SPENT THE DAY WITH OTHER M.S.S. MEMBERS IN SURVEYING PARTS OF GREAT SCOTT CAVE LOCATED IN WASHINGTON COUNTY. THIS IS A CONTINUING PROJECT.

AUGUST 29, 30, 31: RANDY ROSE, RICHARD CLEMENTS, PAUL SEARCY, BART RAPP, DEAN BEAUCHAMP, TIM McCLAIN, AND SEVERAL OTHERS SPENT THE WEEKEND EXPLORING AND PHOTOGRAPHING SPELEOTHEMS AT ENNIS CAVE IN STONE COUNTY, ARKANSAS. NEW LEADS WERE DISCOVERED AND SOME VIRGIN PASSAGE CRAWL WERE LOCATED NEAR THE BROAD ROOM. THANKS TO RANDY FOR A GREAT WEEKEND OF CAVING AND HOSPITALITY AS ALWAYS!

AUGUST 23, 24: TONY MONROE AND BART RAPP JOINED SCOTT HOUSE, DOUG BAKER, JIM KAUFMAN, AND DAVE HOFFMAN IN CONTINUING THE POWDER MILL PROJECT ON THE RIVERWAYS. WE SPLIT INTO 2 GROUPS; TONY, SCOTT, AND DAVE PROCEEDING UPSTREAM AND MAPPED A LOW CRAWL TILL IT SUMPED AND BART, DOUG, AND JIM SPENT MOST OF THE TIME CRAWLING IN H SURVEY AND EXTENDED IT TO



A SUMP ALSO. BUT, JUST AS WE THOUGHT WE HAD REACHED THE END, THE PASSAGE OPENED INTO A SECOND LEVEL OF CANYONS AND MEANDER NICHES. A SURVEY WAS STARTED AND THIS KEEPS GOING WITH A NICE AIR FLOW. TIME WILL TELL IF THIS CONNECTS WITH WINDY CRAWL, THE CAVE'S LARGEST SIDE PASSAGE. NOW, IF ONLY WE COULD FIND A WAY AROUND THOSE LONG, TORTUROUS CRAWLS OVER CHERT THAT'S RAZOR SHARP!

AUGUST 21 : RICHARD CRABB, TOM CRABB, LONNIE JOHNSON, AND DAN MANIVELY TOOK A TRIP INTO CARROLL CAVE AND PROCEEDED BACK TO T-JUNCTION AND THEN UP THUNDER RIVER TO THE FIRST WATERFALL. WHEN COMING OUT, THEY CARRIED THE AMMO-BOX OUT PAST THE WATER BARRIER AND BROUGHT SOME SPENT CARBIDE OUT FROM T-JUNCTION. A TRIP WILL BE SCHEDULED TO BRING OUT THE AMMO-BOX THE REMAINING DISTANCE AND TO PICK UP SOME NEW PILES OF CARBIDE SPOTTED ON THIS TRIP IN A PREVIOUSLY-CLEANED AREA! IF YOU USE CARBIDE WHILE CAVING, HAVE THE COMMON COURTESY TO THE CAVE AND PACK IT OUT WITH YOU WHEN YOU LEAVE. "NOTHING BUT FOOTPRINTS"

AUGUST 9 : PAUL SEARCY AND BART RAPP PARTICIPATED IN THE 1986 HUGH DILL ROOM TRIP IN FISHER CAVE AT MERAMEC STATE PARK. AFTER SIX OF US HAD DONNED WETSUITS AND EQUIPMENT, WE THEN PROCEEDED BACK INTO THE HEAVILY-DECORATED WEEPING WILLOW SECTION AND DROPPED INTO A CRAWL WITH A BEAUTIFUL NEAR-MEETING OF A PURE WHITE STRAW AND A RUST BROWN STALAGMITE. NEXT IT WAS OVER A LARGE RIMSTONE BASIN AND INTO THE FIRST LOW WATERCRAWL. THIS OPENED UP INTO A LARGE ROOM WITH NICE HELECTITES, SPATHITES, AND SOME NICE FLOWSTONE. WE CRAWLED UP INTO A SIDE PASSAGE HERE AND EXPLORED SOME TIGHT CRAWLS, BUT ALL GOT TOO TIGHT TO PROCEED ANY FURTHER. THEN ON INTO THE LOWEST WATERCRAWL AND OVER SOME LOW MUD BANKS INTO THE HUGH DILL ROOM. WHAT THIS ROOM LACKS IN NICE SPELEOTHEMS, IT MAKES UP IN SIZE (OVER A FOOTBALL FIELD IN LENGTH),



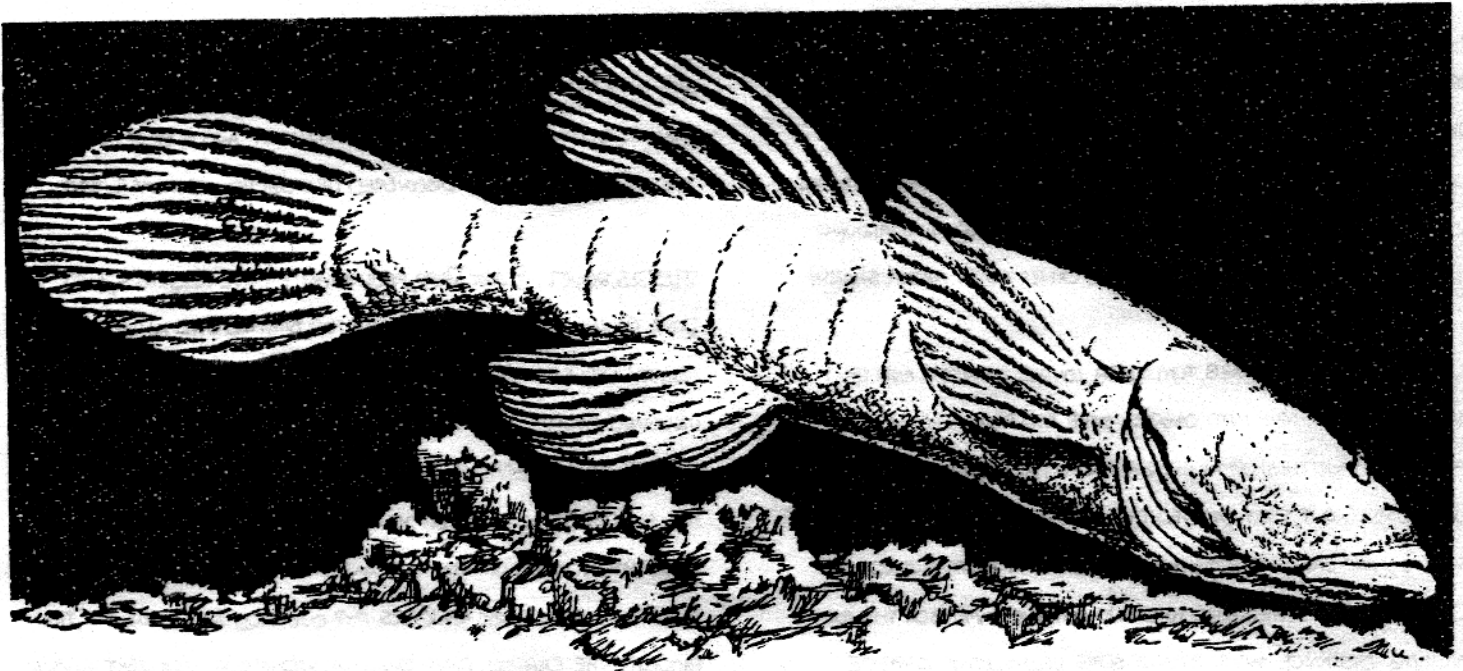
AND WE SPENT A WHILE EXPLORING ITS SIDE PASSAGES. THEN IT WAS BACK OUT INTO THOSE TORTUROUS CRAWLS AND INTO THE COMMERCIAL SECTION. THANKS GOES OUT TO DAN DREES, NATURALIST, AND MOST OF ALL, TEX YOKUM, WHO ORIGINALLY DISCOVERED THIS SECTION OF FISHER CAVE.

JULY 25, 26, 27 : BART RAPP, PAUL SEARCY, DAVE ROBERTS, AND DAVE CONNELLY LEFT KANSAS CITY FOR SMITTLE CAVE IN WRIGHT COUNTY AND SPENT 5 HOURS DOING SOME EXPLORING. SMITTLE HAS AN UNUSUAL DOUBLE ENTRANCE (EACH 40'X40') AND IS UNLIKE MOST LINEAR CAVES BECAUSE IT MAINTAINS ITS HUGE PASSAGE SIZE FOR ALMOST 2500 FEET. WE THEN PROCEEDED TO BENNETT SPRING STATE PARK TO SPEND THE NIGHT AND WERE SURPRISE WHEN WE GOT PULLED OVER BY PARK RANGERS FOR QUESTIONING! EVIDENTLY, THEY THOUGHT THE CARROLL CAVE SIGN WE HAD IN OUR BACK SEAT WAS A STOLEN PARK SIGN. AFTER QUITE A DISCUSSION AND A SHOW OF AN OPERATOR'S LICENSE, WE THEN WENT TO THE CAMPGROUND AREA. NEXT MORNING WE LEFT FOR CARROLL CAVE AND INSTALLED THE ACCESS SIGN INSIDE THE GATE. WE THEN TOOK A TRIP INTO LEFT FORK AND CLEANED UP SOME CARBIDE DUMPS AND WE ARE NOW MONITORING THESE AREAS TO TRY AND CATCH THE ELUSIVE CARBIDE DUMPERS WHO ARE CREATING LOTS OF WORK AND DAMAGE FOR THE CAVE.

JULY 23 : RICHARD CRABB AND LONNIE JOHNSON VISITED ISLAND CAVE IN HA HA TONKA STATE PARK AND HAULED OUT A FULL SACK OF BEER CANS. AFTERWARDS, THEY WENT TO BUNCH CAVE AND TOOK THE CRAWL BACK INTO THE TOWER ROOM. THIS IS QUITE AN IMPRESSIVE CHAMBER AFTER CRAWLING IN THE STREAM BED AND GUANO FOR 400 FEET TO BREAK OUT INTO A 100 FOOT DOME ROOM AND ADJOINING "SHAFT" WITH IMPRESSIVE FLOWSTONE AND CURTAINS OF WHITE CALCITE!



THE OZARK CAVEFISH



THE FISH WAS IN A SHALLOW RIMSTONE POOL IN A SMALL STREAM. BELOW THE POOL, THE STREAM CASCADED DOWN A STEEP SLOPE FOR ABOUT 40 FEET TO A SUMP. THE FISH WAS 15 TO 20 FEET AWAY FROM ME, AND AT FIRST I COULDN'T DECIDE IF IT WAS ALIVE BECAUSE IT WAS JUST DRIFTING VERY SLOWLY. BY THE TIME I CLIMBED AROUND THE POOL TO WHERE IT WAS, I WAS BEGINNING TO THINK THAT MAYBE IT WAS A CRAYFISH BECAUSE OCCASIONALLY IT WOULD MAKE A QUICK "SCOOT." WHEN I FINALLY GOT A CLOSE LOOK AT IT, I REALIZED IT WAS AN OZARK CAVEFISH. THE FISH WOULD DRIFT IN THE SLOW CURRENT UNTIL IT ALMOST STOPPED, THEN IT WOULD GIVE A SINGLE FLIP OF ITS FINN, GET ALL THE MILEAGE OUT OF THAT ONE BIT OF EXERTION THAT IT COULD, AND THEN FLIP AGAIN. WHAT A LOVELY LITTLE WHITE FISH; I WAS SO GLAD TO SEE ONE STILL IN THAT PARTICULAR CAVE. THIS, MY FIRST REAL

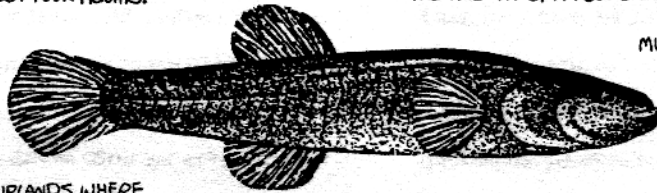
SIGHTING OF AN OZARK CAVEFISH, WAS IN 1979 IN A CAVE IN ARKANSAS WHERE APPROXIMATELY 30 OF THESE FISH HAD BEEN COLLECTED BY A PROFESSOR ABOUT FIFTY YEARS BEFORE. MINE WAS THE FIRST SIGHTING OF AMBYLOPSIS ROSAE IN THAT CAVE SINCE THAT TIME, AND I WAS AMAZED AT HOW SLOWLY THE POPULATION WAS RECOVERING FROM THE DEVASTATION. HABITAT FOR THE OZARK CAVEFISH IS RESTRICTED TO UNDERGROUND WATERS OF THE OZARKS. THE FISH IS BLIND, ONE TO TWO INCHES LONG, AND IS WHITE TO ALMOST TRANSLUCENT. NEXT TO THE ALABAMA CAVEFISH, IT IS PROBABLY THE MOST CAVE-ADAPTED, LEAST ABUNDANT, AND MOST LIMITED IN DISTRIBUTION OF ALL THE CAVEFISHES. ON DECEMBER 3, 1984, WITH THE RECOMMENDATION OF THE FEDERAL FISH AND WILDLIFE SERVICE, THE OZARK CAVEFISH WAS ADDED TO THE FEDERAL LIST OF THREATENED SPECIES UNDER THE PROVISIONS



OF THE ENDANGERED SPECIES ACT OF 1973. THIS DESIGNATION INDICATES THAT THE SPECIES IS LIKELY TO BECOME ENDANGERED IF IMMEDIATE ACTION IS NOT TAKEN TO PROTECT IT. SUCH ACTION REQUIRES HABITAT PROTECTION. THE OZARK CAVEFISH IS KNOWN ONLY FROM NORTHWEST ARKANSAS, SOUTHWEST MISSOURI, AND A SMALL PORTION OF EASTERN OKLAHOMA. IT HAS DISAPPEARED FROM OVER 40 PERCENT OF ITS KNOWN HISTORIC LOCATIONS, AND IT IS DECLINING IN MANY OF THE KNOWN POPULATION SITES AS A RESULT OF HABITAT ALTERATIONS AND COLLECTING. ADDING ALL KNOWN SIGHTINGS OF THE OZARK CAVEFISH TOGETHER, THE TOTAL POPULATION IS PROBABLY LESS THAN 1000 FISH! THE HABITAT OF THE OZARK CAVEFISH IS USUALLY SMALL CAVE STREAMS WITH COARSE RUBBLE SUBSTRATES, BUT IT HAS ALSO BEEN FOUND IN CAVE STREAMS WITH SILT-SAND POOLS. IT EATS COPEPODS, ISOPODS, AMPHIPODS, SMALL SALAMANDERS AND CRAWFISH, AND YOUNG OF ITS OWN SPECIES. ALTHOUGH LIFE HISTORY INFORMATION ON THE OZARK CAVE FISH IS LIMITED, THE FISH MAY LIVE TEN TO TWENTY YEARS, AND PROBABLY DOESN'T START REPRODUCING UNTIL IT IS ABOUT SIX YEARS OLD. AS WITH OTHER FISH BELONGING TO THE FAMILY AMBLYOPSEDAE, THE EGGS AND FRY ARE PROBABLY INCUBATED IN GILL CAVITIES FOR ABOUT FOUR MONTHS.

AS THE FEDERAL THREATENED SPECIES LISTING INDICATES, SOME BAD THINGS ARE HAPPENING TO THIS LITTLE ORGANISM.

BECAUSE IT IS CONFINED TO UNGLACIATED UPLANDS WHERE THE SOLUBLE BEDROCKS OF THE MISSISSIPPIAN AGE LIMESTONES CONTAIN MANY CAVES, SINKHOLES AND SPRINGS, ITS HABITAT IS VERY SUSCEPTABLE TO GROUNDWATER CONTAMINATION. PEOPLE AND THE OZARK CAVEFISH SEEM TO HAVE CHOSEN THE SAME AREAS FOR CONCENTRATED POPULATIONS. SPRINGFIELD, THE THIRD LARGEST CITY IN MISSOURI, AND THE REGION AROUND ROGERS AND SPRINGDALE, ARKANSAS, ARE TWO EXAMPLES. UNFORTUNATELY, AREAS WHICH CONTRIBUTE WATERS TO CAVE STREAMS INHABITED BY THE OZARK CAVEFISH IN ARKANSAS ARE HEAVILY USED BY LARGE POULTRY, HOG, AND DAIRY OPERATIONS. WASTES FROM THESE OPERATIONS ARE HEAVILY AND FREQUENTLY APPLIED TO FIELDS. THESE APPLICATIONS ARE MOST APPROPRIATELY VIEWED AS WASTE



DISPOSAL PRACTICES RATHER AS A FERTILIZATION. SEPTIC SYSTEMS AND MUNICIPAL SEWAGE ADD TO THE ORGANIC LOAD (AND RESULTING OXYGEN DEPLETION) OF CAVE STREAMS INHABITED BY THE OZARK CAVEFISH. IN ADDITION, OTHER AREAS WHICH CONTRIBUTE WATERS TO THE CAVE STREAMS CONTAINING THE OZARK CAVEFISH ARE EXPERIENCING EXTENSIVE INDUSTRIAL AND URBAN DEVELOPMENT. THERE ARE A FEW GOOD THINGS HAPPENING FOR THIS LITTLE CREATURE. CURRENTLY, TWO STUDIES ARE UNDERWAY TO DELINEATE THE RECHARGE AREAS FOR IMPORTANT POPULATIONS OF THE OZARK CAVEFISH, ONE STUDY IS NOW BEING FUNDED BY THE ARKANSAS GAME AND FISH COMMISSION AND THE OTHER BY FANTASTIC CAVERNS OF SPRINGFIELD, MISSOURI. SUCH DELINEATIONS PROVIDE THE BASIS FOR PROTECTION AND MANAGEMENT EFFORTS. AS A RESULT OF A SIMILAR GROUNDWATER STUDY IN ARKANSAS IN 1978, A NEW HIGHWAY NOW UNDER CONSTRUCTION WILL HAVE A MILLION DOLLAR BULGE IN IT TO KEEP IT OUT OF THE RECHARGE AREA FOR THE LARGEST KNOWN POPULATION OF THE OZARK CAVEFISH. SPILLS OCCURRING ALONG THE NEW HIGHWAY WILL NOT IMPACT THIS CRUCIAL CAVE STREAM! IN BROADER PERSPECTIVE, BY PROTECTING THE HABITAT OF A FEW CAVEFISH, WE ARE ALSO PROTECTING OUR OWN, FOR

MUCH OF THE DRINKING WATER IN THOSE SAME

AREAS WHERE THE OZARK CAVEFISH

LIVES IS GROUNDWATER. CERTAIN ORGANISMS

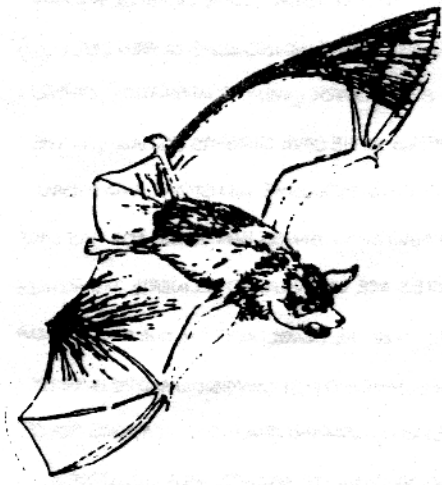
IN OUR ENVIRONMENT, SUCH AS THE OZARK

CAVEFISH, ARE INDICATORS OF THE HEALTH OF OUR ENVIRONMENT. IF THESE ORGANISMS START DISAPPEARING, THEN SOMETHING IS SICK. BY PROTECTING ONE RESOURCE WHICH IS PRECIOUS TO SOME OF US, WE ARE GUARDING ANOTHER RESOURCE WHICH IS VERY PRECIOUS TO ALL OF US. THE END.

THE STORY IS BY CATHY ALEY OF THE OZARK UNDERGROUND LABORATORY.
THIS ARTICLE FIRST APPEARED IN AMERICAN CAVES, THE QUARTERLY OF THE AMERICAN CAVE CONSERVATION ASSOCIATION (ACCA) SUMMER 1986 ISSUE.



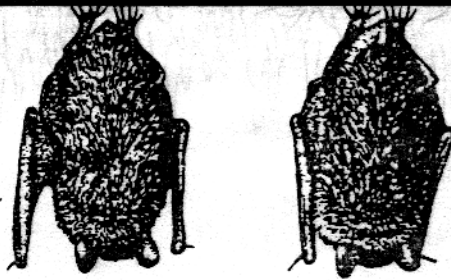
A GUIDE TO SCIENTIFIC NAMES



SCIENTIFIC NAMES ARE AN INTERNATIONAL LANGUAGE. MENTION *MYOTIS SODALIS* AND BIOLOGISTS THROUGHOUT THE WORLD WILL KNOW YOU ARE REFERRING TO A CERTAIN KIND OF BAT THAT LIVES IN THE EASTERN UNITED STATES AND IS KNOWN FOR ITS HABIT OF HIBERNATING IN GREAT MASSES. BUT IF YOU BEGIN TO TALK ABOUT THE INDIAN BAT, THE SOCIAL BAT, OR THE CLUSTER BAT, CONFUSION IS LIKELY TO RESULT. YOUR LISTENER MAY HAVE NO IDEA THAT ALL THESE NAMES REFER TO JUST ONE CREATURE, *MYOTIS SODALIS*. IF YOU BEGIN TO TALK ABOUT CAVE CRICKETS, ON THE OTHER HAND, A LISTENER MAY THINK YOU ARE REFERRING TO THE SPECIES KNOWN AS *CEUTHOPHILLUS STYBIUS*. IN REALITY YOU MAY HAVE BEEN DISCUSSING AN ENTIRELY DIFFERENT SPECIES, *HADENOCEOUS SUBTERRANEUS*. BOTH ANIMALS HAVE THE SAME COMMON NAME. STILL OTHER ANIMALS ARE SO UNFAMILIAR TO MOST PEOPLE THAT THEY HAVE NO COMMON NAMES AT ALL. THE ONLY WAY TO AVOID MISUNDERSTANDING IS TO USE SCIENTIFIC NAMES. THEY ARE A SIMPLE AND EFFECTIVE WAY FOR ACCURATE COMMUNICATION. EVERY SINGLE ONE OF THE HUNDREDS OF THOUSANDS OF DIFFERENT KINDS OF PLANTS AND ANIMALS IN THE WORLD HAS ITS OWN NAME, A DISTINCTIVE SCIENTIFIC NAME. BY USING THESE NAMES, WE ELIMINATE THE POSSIBILITY OF CONFUSION. IF THE NAMES SOME-

TIMES SEEM STRANGE, THIS IS SIMPLY BECAUSE THEY ARE BASED ON A FOREIGN LANGUAGE - LATIN, OR LATINIZED FORMS OF WORDS FROM GREEK AND OTHER TONGUES. YET THE NAMES ARE USED IN EVERYDAY CONVERSATION. CHINCHILLA, GORILLA, PYTHON, OCTOPUS, ZINNIA, PETUNIA, AND MANY OTHER FAMILIAR WORDS ARE PARTS OF SCIENTIFIC NAMES OF WELL-KNOWN PLANTS AND ANIMALS. THE SCIENTIFIC NAME ITSELF CONSISTS OF TWO WORDS. THE FIRST IS CAPITALIZED, THE SECOND IS NOT. USE OF THIS BINOMIAL ("TWO-NAME") SYSTEM OF CLASSIFICATION BEGAN WITH CARL LINNAEUS, AN EIGHTEENTH-CENTURY NATURALIST. BEFORE HIS TIME, SCIENTIFIC NAMES OFTEN INCLUDED STRINGS OF ADJECTIVES THAT RAN ON FOR SEVERAL LINES. BY LIMITING EACH NAME TO JUST TWO WORDS, ONE FOR GENUS, THE OTHER FOR SPECIES, THE BUSINESS OF NAMING WAS VASTLY SIMPLIFIED! BUT WHAT ABOUT THE TWO BATS *MYOTIS SODALIS* AND *MYOTIS LUCIFUGUS*? WHY IS THE WORD *MYOTIS* USED FOR BOTH? THIS IS BECAUSE SCIENTIFIC CLASSIFICATION IS MORE THAN A FILING SYSTEM. IT IS ALSO AN ATTEMPT TO DESCRIBE EVOLUTIONARY RELATIONSHIPS. *MYOTIS SODALIS* AND *MYOTIS LUCIFUGUS* ARE TWO DIFFERENT SPECIES OF BATS, YET THEY HAVE CERTAIN CHARACTERISTICS IN COMMON THAT DISTINGUISH THEM FROM OTHER KINDS OF BATS. BOTH THEREFORE ARE PLACED IN THE SAME GENUS, *MYOTIS*, SINCE THEY PRESUMABLY ARE MORE CLOSELY RELATED TO EACH OTHER THAN TO BATS BELONGING TO THE GENUS *PIPISTRELLUS*, THE GENUS *TADARIDA*, OR ANY OTHER GENUS. (NOTE THAT SOMETIMES WE REFER TO AN ANIMAL ONLY BY ITS GENUS NAME. BY CALLING A BAT SIMPLY *MYOTIS*, WE MEAN THAT IT IS ONE OF THE SEVERAL SPECIES OF THE





MYOTIS BATS WITHOUT SPECIFYING EXACTLY WHICH ONE.) THE NEXT HIGHER GROUPING OF ORGANISMS IS THE FAMILY. MYOTIS PIPISTRELLUS, AND SEVERAL OTHER GENERA (THE PLURAL FORM OF GENUS) ARE LUMPED IN THE FAMILY CALLED VESPERTILIONIDAE, THE SO-CALLED EVENING BATS. THE GENUS TADARIDA, ON THE OTHER HAND, BELONGS TO THE FAMILY MOLOSSIDAE, THE FREE-TAILED BATS. AGAIN, GENERA THAT ARE GROUPED IN THE SAME FAMILY ARE THOUGHT TO BE CLOSELY RELATED TO EACH OTHER. ALL FAMILIES OF BATS IN TURN BELONG TO THE ORDER CHIROPTERA (FLYING MAMMALS), A SUBDIVISION OF THE STILL LARGER CLASS MAMMALIA (MAMMALS). OTHER ORDERS OF MAMMALS INCLUDE THE ORDER RODENTIA (RODENTS), THE ORDER CARNIVORA (FLESH-EATING MAMMALS), AND SO ON. MEMBERS OF EACH ORDER SHARE CHARACTERISTICS THAT SET THEM APART FROM ALL OTHER ORDERS. CLASSES IN TURN ARE GROUPED INTO PHYLA. THUS, MAMMALS, FISH, AMPHIBIANS, REPTILES, BIRDS, AND OTHER CERTAIN ANIMALS ALL BELONG TO THE PHYLUM CHORDATA, ANIMALS THAT POSSESS NOTOCHORDS (PRIMITIVE BACKBONES) AT SOME STAGE IN THEIR LIFE HISTORIES. ALL THE PHYLA OF ANIMALS - CHORDATES, ARTHROPODS, PROTOZOANS, AND SO ON - ARE PLACED FINALLY IN THE OVERALL ANIMAL KINGDOM. THE OTHER GREAT KINGDOM OF LIVING THINGS, THE PLANTS REPRESENTS AN ENTIRELY SEPERATE LINE OF EVOLUTION). THUS WHEN WE REFER TO THE BAT MYOTIS SOCIALIS, WE ARE IN EFFECT SUMMARIZING ALL THE FOLLOWING INFORMATION: KINGDOM - ANIMALIA, PHYLUM - CHORDATA, CLASS - MAMMALIA, ORDER - CHIROPTERA, FAMILY - VESPERTILIONIDAE, GENUS - MYOTIS, AND SPECIES - MYOTIS SOCIALIS (SOCIAL OR INDIANA BAT).

EPTESICUS FUSCUS : BIG BROWN BAT.

MYOTIS GRISESCENS : GRAY BAT.

MYOTIS LUCIFUGAS : LITTLE BROWN BAT.

MYOTIS SOCIALIS : SOCIAL BAT.

PIPISTRELLUS SUBFLAVUS : PIPISTREL.

TADARIDA BRASILIENSIS : FREE-TAIL BAT.

NEOTOMA : PRAIRIE RAT.

PLETHODON GLUTINOSUS : SLIMY SALAMANDER.

TYPHLOTRITON SPELAEUS : DARK BUNO SALAMANDER.

AMBLIOPSIS ROSAE : ROSA'S OZARK CAVEFISH.

HADENOCEBUS SUBTERRANEUS : CAVE CRICKET.

PROCAMBARUS PALLIDUS : CAVE CRAWFISH.

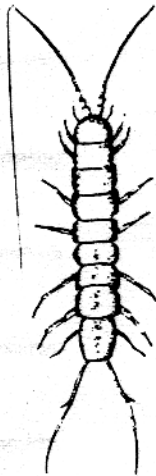


OZARK UNDERGROUND LABORATORY



HOW CAN WE HELP STOP THE WIDESPREAD AND IRREVERSIBLE DAMAGE TO CAVES AND KARSTLANDS CAUSED BY VANDALISM, POLLUTION AND DEVELOPMENT? TOM AND CATHY ALEY'S ANSWER TO THEIR OWN QUESTION IS THE PRIMARY GOAL OF THE OZARK UNDERGROUND LABORATORY NEAR PROTEM, MISSOURI. ACCORDING TO TOM, EDUCATION IS ESSENTIAL. "WE CREATE AN IMPROVED AWARENESS OF THE WAY PEOPLE RELATE TO THE EARTH AROUND THEM THROUGH A BETTER UNDERSTANDING OF HOW THE SURFACE AND SUBSURFACE INTERACT." THE LAB AT TUMBLING CREEK CAVE, OWNED AND OPERATED BY THE ALEYS IS NOW FAMOUS NATIONALLY. IN ADDITION TO PROVIDING BOTH ASSISTANCE AND FACILITIES FOR RESEARCH ON CAVE AND KARST RELATED STUDIES, MORE THAN 1000 PEOPLE FROM MORE THAN 70 SCHOOLS AND COLLEGES PARTICIPATE IN FIELD STUDIES CONDUCTED THERE EACH YEAR. SEVERAL COLLEGES REQUIRE THE COURSE AND OFFER CREDIT. LAB COURSES, OFFERED TO JUNIOR HIGH, HIGH SCHOOL, AND COLLEGE STUDENTS, ARE TAILORED TO THE EDUCATIONAL LEVELS OF THE PARTICIPANTS. THE LENGTH OF THE FIELD STUDY COURSE IS USUALLY ONLY ONE OR TWO DAYS, BUT EACH STUDENT LEAVES WITH A SOUND UNDERSTANDING OF THE RELATIONSHIP BETWEEN KARST AND CAVE ENVIRONMENTS AND THE REST OF THE WORLD. THE ENTIRE SESSION IS TAUGHT AS A FIELD COURSE AT THE LAB WHERE PARTICIPANTS ARE PROVIDED HOUSING AND MEALS AT THE ALEY'S BUNKHOUSE. TOM AND CATHY START BY TAKING THE GROUP TO SEE SURFACE FEATURES, POINTING OUT HOW EACH RELATES TO CAVES. STUDENTS OBSERVE FIRST HAND THE WAY IN WHICH WATER, THE PRIMARY AGENT OF INTERACTION BETWEEN SURFACE AND CAVE, MOVES THROUGH KARST AND AFFECTS THE CAVE AND THE SURFACE. THEY ARE SHOWN HOW SUBTLE VARIABLES IN SURFACE FEATURES AND CONDITIONS WILL HAVE DIFFERENT EFFECTS ON THE SPELEAN ENVIRON-

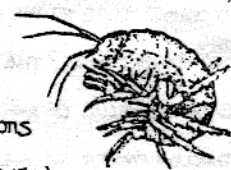
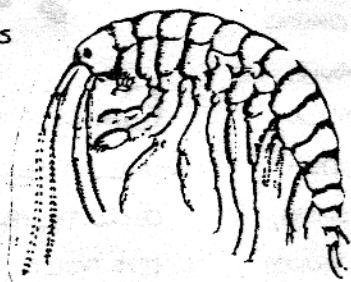
MENT. FOR EXAMPLE, THE ALEYS POINT OUT THAT THE DIFFERENT AMOUNTS OF SUNLIGHT FALLING ON NORTH AND SOUTH FACING SLOPES WILL CAUSE PREDICTABLE DIFFERENCES IN THE TEMPERATURE OF UNDERLYING PASSAGES. AFTER COMPLETING SURFACE DEMONSTRATIONS, EACH GROUP IS TAKEN UNDERGROUND WHERE THEY OBSERVE THE SAME RELATIONSHIPS FROM THE BOTTOM SIDE, REINFORCING THE IDEAS PRESENTED ON THE SURFACE. THEY SEE THE FAUNA AND THE INTERRELATIONSHIP OF VARIOUS SPECIES, FIRST HAND. THE ALEYS SHOW THE NATURAL PROCESSES BY WHICH ECOSYSTEMS, PASSAGES, AND MINERAL DEPOSITS ARE CREATED. THE WAYS IN WHICH SUBTLE CHANGES MAY UPSET NARROW LIMITS OF TOLERANCE, ESSENTIAL TO THE EXISTENCE OF SPECIES AND SPELEOTHEMS Alike. THE UNDERGROUND TRIP GENERALLY TAKES SEVERAL HOURS LONGER THAN THE SURFACE LECTURES, DUE PRIMARILY TO THE INCREASING NUMBERS OF QUESTIONS ASKED AS STUDENTS BEGIN TO GRASP COMPLEX RELATIONSHIPS. THE LAB ALSO OFFERS TRAINING SEMINARS FOR SHOW CAVE MANAGERS AND GUIDES. MORE THAN EIGHT MILLION PEOPLE VISIT SHOW CAVES EACH YEAR PRESENTING A TREMENDOUS POTENTIAL TO EDUCATE THE PUBLIC. TOM'S WORKING THESIS IS THAT THE MESSAGE WHICH SHOW CAVES GIVE IS MORE IMPORTANT THAN THE WORDS USED. IF VISITORS LEAVE WITH AN AWARENESS THAT CAVES ARE NATURAL PHENOMENA WHICH OCCUR EVERYWHERE AND SHOULD BE PROTECTED, MUCH MORE GOOD IS DONE THAN IF THE PAYING VISITOR WAS SIMPLY ENTERTAINED. TOM AND CATHY HEED THEIR OWN ADVICE IN TEACHING VISITORS, BUT THEY DON'T DISCOUNT THE VALUE OF ENTERTAINMENT IN TEACHING. BOTH WORK AS CONSULTANTS ON CAVE MANAGEMENT AND HYDROLOGICAL PROBLEMS THROUGHOUT THE UNITED STATES AND CANADA. THEIR LECTURES ARE SPACED

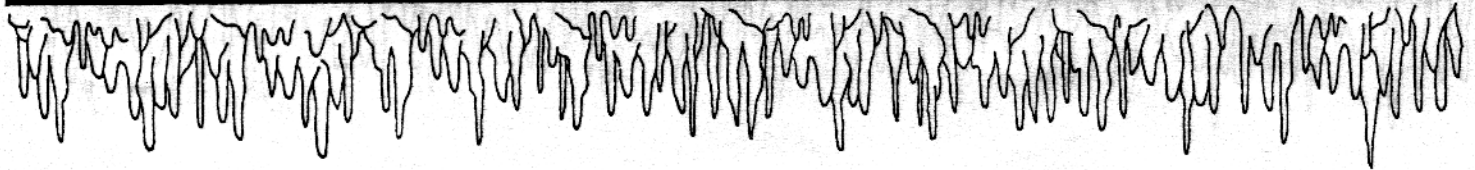


WITH HUMOR AS THEY RELATE EXAMPLES OF PROBLEMS ENCOUNTERED THROUGHOUT THE COUNTRY. THE ALEY HUMOR IS POINTED, HOWEVER. WHEN TOM ASKS, "ARE YOUR COWS DYING FROM WATER THAT SMELLS FUNNY?" AND THEN QUIPS "THEN QUIT FEEDING THEM INSECTICIDE!" PEOPLE LAUGH. BUT THEY WON'T EASILY FORGET THAT SINKHOLES, OFTEN USED AS A CONVENIENT PLACE TO DISPOSE OF EVERYTHING FROM HOUSEHOLD GARBAGE TO TOXIC WASTES, ARE PART OF A KARST SYSTEM. TOM AND CATHY DON'T JUST TEACH AT THE LAB OR WORK ON CONSULTING CONTRACTS. TOM IS ALSO A VOLUNTEER INSTRUCTOR FOR THE NATIONAL CAVE MANAGEMENT TRAINING SEMINARS, CONDUCTED FOR GOVERNMENT AND PRIVATE CAVE MANAGERS THROUGHOUT THE COUNTRY. THEY ALSO CONDUCT RESEARCH AT THE LABORATORY. THIS HAS INCLUDED MICROCLIMATE STUDIES AND ALGAE GROWTH INVESTIGATIONS SEEKING SOLUTIONS TO VARIOUS CAVE MANAGEMENT PROBLEMS. A LARGER PART OF THE RESEARCH AT THE LABORATORY, HOWEVER, IS CONDUCTED BY OUTSIDE ORGANIZATIONS. MOST HAS DEALT PRIMARILY WITH THE COMPLEX BIOLOGICAL COMMUNITY. EDUCATION IS CONSIDERED BY ALEY TO BE THE MOST IMPORTANT TOOL AVAILABLE IN PROTECTING CAVES AND KARST. THAT'S OBVIOUS. TOM POINTS OUT THAT EVEN AS CONSULTANTS THEY ARE PRIMARILY TEACHERS. HE TOLD A GROUP OF NATIONAL PARK TRAINEES DURING A NOVEMBER 1985 CAVE MANAGEMENT SEMINAR, "THE SOLUTIONS TO MOST CAVE MANAGEMENT PROBLEMS ARE USUALLY VERY SIMPLE. THE TOUGHEST PART IS TEACHING THE PERSON WHO HIRES US THAT THE PROBLEM NEEDS TO BE SOLVED." ONE OF THE MOST SERIOUS PROBLEMS, ACCORDING TO THE ALEYS, MAY BE RELATED TO ECONOMICS. TOM HAS IDENTIFIED THE WORST PROBLEM AREAS IN THE UNITED STATES AND FEELS THAT THERE IS A STRONG CORRELATION BETWEEN KARST POLLU-

TION AND THE REGION'S ECONOMIC WELL-BEING. ACCORDING TO TOM, THIN SOILS IN KARST AREAS CONTRIBUTE TO RURAL POVERTY AND POOR EDUCATION. GOOD WATER SUPPLIES IN THESE AREAS ARE DIFFICULT TO LOCATE AND EASILY CONTAMINATED. "THOUSANDS OF PEOPLE IN THE OZARKS," TOM POINTED OUT, "DRINK FROM THEIR OWN SEPTIC TANKS." THE PROBLEM, ACCORDING TO TOM, IS THAT THEY JUST HAVEN'T BEEN MADE AWARE OF THE BASIC PRINCIPLES. HE POINTS OUT THAT 60 PERCENT OF THE WELLS IN KARST REGIONS DO NOT PRODUCE BACTERIOLOGICALLY SAFE WATER. IT'S HARD TO GET RID OF WASTES AND OTHER POLLUTANTS IN KARST AREAS. IT MUST BECOME A MAJOR GOAL, HOWEVER, THE ENVIRONMENTAL WELL-BEING OF THE PEOPLE AND THE ECONOMIC CONCERNS IN THE 15-20 PERCENT OF THE UNITED STATES WHICH

IS KARSTLAND DEPENDS UPON REESTABLISHMENT OF HEALTHY KARST. OZARK UNDERGROUND LABORATORY IS AN IDEAL EDUCATIONAL TOOL. THE INSPIRATION FOR THE LAB CAME FROM THE SONORA LIVING DESERT MUSEUM IN ARIZONA WHICH IS A LIVING MUSEUM AND MODEL OF AN ECOLOGICAL COMMUNITY RATHER THAN A ZOO OR A MUSEUM. TUMBLING CREEK CAVE, IN ADDITION TO ITS BEAUTY, IS HOME TO SO MANY TROGLOBITIC SPECIES IT HAS BEEN DESIGNATED A NATIONAL NATURAL LANDMARK. AMONG THESE ARE 150,000 FEDERALLY ENDANGERED GRAY BATS (MYOTIS GRISESCENS) WHICH, ALONG WITH SEVEN OTHER SPECIES, DEPOSIT THE NUTRIENTS THAT SUPPORT A MYRID OF OTHER SPECIES IN THE CAVE. HYDROLOGICALLY, THE 126-ACRE SITE WHICH IS THE OZARK UNDERGROUND LABORATORY IS A CLASSIC KARST MODEL. HE





AND CATHY AFFECTIONATELY CALL THE LABORATORY BOTH A PLACE AND A CONCEPT. THE CONCEPT IS EDUCATION AND UNDERSTANDING. THE ALEY'S MANAGE IT STRINGENTLY. CONSIDERING THAT MORE THAN 1000 VISIT THE CAVE ANNUALLY, THE ALEY'S HAVE PAVED THE WAY IN DISCOVERING MEANS TO PROTECT THE INTEGRITY OF A CAVE WHILE STILL CAPITALIZING ON ITS BENEFITS AS A TEACHING AID. EVEN THEIR MANAGEMENT PROGRAM SERVES AS A TEACHING MODEL. A NEW ENTRANCE WAS OPENED AT THE END OF A DEAD END PASSAGE, AN ENVIRONMENTAL DOOR WAS INSTALLED AND 2000 FEET OF PRIMITIVE, BUT WELL-DEFINED, TRAIL CONSTRUCTED THROUGH AREAS USED FOR TEACHING. THE ALTERATIONS MAINTAIN MAXIMUM INTEGRITY OF THE CAVE. THE NEW ENTRANCE KEEPS PEOPLE OUT OF THE WAY OF BAT FLIGHTS. THE DOOR PREVENTS CHANGES IN THE AIR FLOW, HUMIDITY AND TEMPERATURE. THE TRAIL PREVENTS ADDITIONAL DAMAGE TO THE CAVE AND AVOIDS UNNECESSARY CONTACT BETWEEN PEOPLE AND BAT ROOSTS. ONE OF THE FIRST PROFESSIONAL CAVE MANAGEMENT SPECIALISTS IN THE UNITED STATES, TOM FIRST STUDIED KARST HYDROLOGY IN THE CARIBBEAN ISLANDS FOR THE OFFICE OF NAVAL RESEARCH. HIS BACKGROUND ALSO INCLUDES RESOURCE MANAGEMENT WITH THE FOREST SERVICE AND EXPERIENCE AS CHIEF HYDROLOGIST FOR A PRIVATE ENGINEERING FIRM. CATHY, WHO IS A LIMNOLOGIST/BIOLOGIST CAME TO THE LAB DIRECTLY FROM COLLEGE. DO TOM AND CATHY TEACH CAVING? THE ANSWER IS, NO! THEY TEACH AN AWARENESS OF THE VALUE OF NATURAL SYSTEMS AND THE NEED TO PROTECT THEM THROUGH PROPER MANAGEMENT. THEY PLAN TO KEEP ON DOING THINGS EXACTLY AS THEY HAVE IN THE PAST. DID AMERICAN CAVE CONSERVATION ASSOCIATION (ACCA) FIND AREAS FOR IMPROVEMENT OR A NEED FOR CHANGE? NO. OUR ONLY REACTION OR A COMPLAINT IS THAT THERE ARE NOT MORE ALEY'S AND OZARK UN-

DERGROUND LABORATORIES, DOING EXACTLY THE SAME THING ALL THROUGHOUT THE NATION! THIS ARTICLE WAS TAKEN FROM THE JANUARY 1986 EDITION OF AMERICAN CAVES, THE QUARTERLY MAGAZINE OF THE AMERICAN CAVE CONSERVATION ASSOCIATION, ENTITLED "EDUCATION AND CAVES; PROFESSIONAL APPROACHES!"



CARBIDE IS HALF OF THE FUEL REQUIRED TO PRODUCE THE ACETYLENE GAS NEEDED FOR THE FLAME IN THE CARBIDE LAMPS USED BY CAVERS. THE PROPER NAME FOR CARBIDE IS CALCIUM CARBIDE (CaC_2). IT IS MADE BY MIXING COKE (C), LIME (CaO) AND LOTS OF ELECTRICAL ENERGY IN A LARGE ELECTRICAL FURNACE AT TEMPERATURES OF $1800^{\circ}C$ - $2100^{\circ}C$. A WHITE-HOT SEMI-LIQUID EMERGES FROM THE FURNACE. AFTER THE MOLTEN CARBIDE SOLIDIFIES AND COOLS, IT IS CRUSHED, THEN IS SEPERATED INTO VARIOUS SIZES. BEFORE PACKING THE CARBIDE, SOME COMPANIES COAT IT WITH OIL TO PREVENT IT FROM OXIDIZING BEFORE ITS TIME. THERE ARE TWO SIZES OF CARBIDE THAT ARE IMPORTANT TO CAVERS. MINER'S GRADE CARBIDE IS THE BEST FOR CAP LAMPS SUCH AS PREMIER AND NUT SIZE IS BEST FOR PETZL CARBIDE LAMPS. WHEN WATER COMES IN CONTACT WITH THE CARBIDE IN LAMPS, IT DECOMPOSES TO FORM ACETYLENE GAS AND CALCIUM HYDROXIDE. THE UNPLEASANT ODOR IS FROM TRACES OF PHOSPHINE.



YOUTH GROUP CAVING



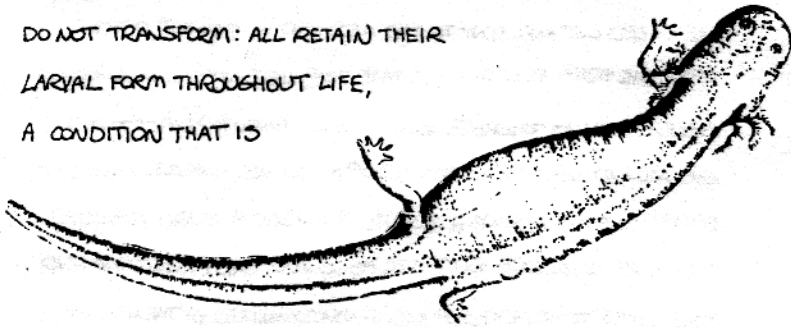
TROUBLESHOOTING BEFORE AND DURING THE TRIP. A SLIDE SHOW AND LECTURE PRESENTING BASIC INFORMATION AND TRAINING IS A GOOD START TOWARD HAVING A YOUTH GROUP READY TO GO ON THEIR FIRST CAVE TRIP. HOWEVER, SEVERAL IMPORTANT DECISIONS STILL NEED TO BE MADE. WHAT CAVE SHOULD WE GO TO? OBVIOUSLY THE FIRST TRIP SHOULD BE FAIRLY SHORT AND SIMPLE. EVALUATE THE GROUP AND KEEP THE TRIP WITHIN THE CAPABILITIES OF THE SLOWEST, YOUNGEST, OR LEAST EXPERIENCED MEMBER. AVOID WET OR EXTREMELY COLD, BREEZY CAVES, IF YOU HONESTLY DON'T FEEL THERE IS A NEARBY CAVE THAT IS WITHIN THE ABILITIES OF THE GROUP, EXPLAIN THIS TO THE LEADER. DON'T BE TEMPTED OR PERSUADED TO TAKE THEM TO A DIFFICULT CAVE AGAINST YOUR BETTER JUDGMENT. SOME PEOPLE ADVOCATE TAKING GROUPS INTO WELL-DECORATED CAVES TO SHOW THEM THE BEAUTY THAT CAN BE FOUND. OTHERS ARGUE THAT A CAVE FULL OF BROKEN, MUDDIED FORMATIONS AND GRAFFITI IS A STRONGER LESSON IN CONSERVATION, THAT'S UP TO YOU. DON'T COUNT ON THE GROUP TO TAKE CARE OF GETTING THE CAVE OWNER'S PERMISSION. DO THIS YOURSELF, WELL AHEAD OF THE SCHEDULED TRIP DATE. WHAT ABOUT SIMPLE VERTICAL CAVING? A LOT OF KIDS HAVE SEEN SOME FORM OF CLIMBING OR RAFFELLING ON TELEVISION AND WANT TO TRY IT. I CAN'T LIST ALL THE REASONS THIS IS NOT A GOOD ACTIVITY TO INCLUDE IN YOUTH GROUP CAVE TRIPS, BUT HERE ARE A FEW: NECESSITY OF MORE COMPLICATED EQUIPMENT; TRAINING NEEDED TO USE IT; GREATLY INCREASED RISK OF SERIOUS ACCIDENTS AND RESULTING RESCUES AND BAD PUBLICITY; TEENAGERS' UNCERTAIN EMOTIONAL MATURITY WHEN UNFORSEEN PROBLEMS OCCUR; LENGTH OF TIME NEEDED FOR A GROUP TO NEGOTIATE A CLIMB OR DROP; NECESSITY OF HAVING MORE EXPERIENCED LEADERS TO WORK WITH THE GROUP. WHAT IF AN ACCIDENT OCCURS? CAREFUL PREPARATION OF PARTICIPANTS, THE USE OF GOOD JUDGMENT IN THE SELECTION OF A

CAVE, AND RESPONSIBLE CONDUCT OF THE CAVE TRIP CAN PREVENT A LOT OF TROUBLE, BUT ACCIDENTS AND INJURIES CAN NEVER BE COMPLETELY PREVENTED. BEFORE THE TRIP, KNOW HOW TO GET TO THE MEDICAL FACILITY NEAREST TO THE CAVE. HAVE PARENTS' WRITTEN PERMISSION FOR THEIR CHILD TO PARTICIPATE IN THE ACTIVITY AND TO RECEIVE EMERGENCY MEDICAL TREATMENT. A HOSPITAL MAY OR MAY NOT ACCEPT THIS, BUT IT COULD SAVE THE LIFE OF A SERIOUSLY INJURED CHILD. IN CASE OF SERIOUS INJURY, SEE THAT NECESSARY FIRST AID IS ADMINISTERED IMMEDIATELY. (HAS YOUR GROTTO TAKEN A FIRST AID OR CPR COURSE RECENTLY? THIS IS A GOOD IDEA EVEN IF YOU'RE NOT LEADING YOUTH GROUPS CAVING.) THEN YOU AND THE OTHER ADULTS NEED TO PLAN THE BEST WAY TO GET THE GROUP OUT OF THE CAVE. BE SURE THAT NECESSARY ACCIDENT REPORTS ARE FILLED OUT AND SENT TO THE NSS AND YOUTH GROUP OFFICES AFTER THE TRIP. AS WITH ANY CAVING TRIP, LEAVE WORD WITH A RESPONSIBLE PERSON AS TO WHERE YOU ARE GOING, WHEN YOU EXPECT TO RETURN, AND HOW TO NOTIFY A RESCUE GROUP IF YOU ARE OVERDUE. MAKE EVERY EFFORT TO AVOID NEEDING A RESCUE. ANY RESCUE IS BAD PUBLICITY; A RESCUE INVOLVING YOUTH GROUPS IS VERY BAD PUBLICITY AS IT IS MORE LIKELY TO BE PICKED UP AND SENSATIONALIZED BY THE NEWS MEDIA. SHOULD WE CHARGE A FEE OR ACCEPT PAYMENT FOR OUR LEADERSHIP? A GROTTO CAN FIND ITSELF FACING SOME EXPENSE IF IT PROVIDES EQUIPMENT FOR A YOUTH GROUP TRIP. IT HAS BEEN AN UNOFFICIAL POLICY NOT TO CHARGE YOUTH GROUPS FOR OUR HELP, BUT IT REALLY IS EACH GROTTO'S DECISION. IN MOST STATES, CHARGING A FEE COULD INCREASE THE LIABILITY OF THOSE INDIVIDUALS AND ORGANIZATIONS RESPONSIBLE FOR LEADING THE TRIP. THIS ARTICLE TAKEN FROM THE OCTOBER 1984 NSS NEWS. IT WAS WRITTEN BY CATHERINE BISHOP, NSS 12100, CHAIRMAN OF YOUTH GROUPS COMM.



OZARK BLIND SALAMANDER

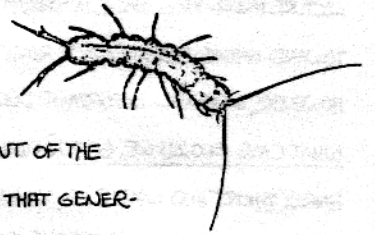
A REMARKABLE SALAMANDER IS FOUND IN CAVES IN THE OZARK MOUNTAINS OF MISSOURI, ARKANSAS, AND OKLAHOMA. THIS CELEBRATED CREATURE, THE OZARK BLIND SALAMANDER (TYPHLOTRITON SPELAEUS), WAS THE FIRST CAVE-DWELLING AMPHIBIAN FOUND IN AMERICA AND ATTRACTED WORLD-WIDE ATTENTION AMONG MANY SCIENTISTS BECAUSE THE ADULTS ARE BLIND AND ALMOST WHITE. THE IMMATURE SALAMANDERS, HOWEVER, ARE SO DIFFERENT FROM THE ADULTS THAT THEY MIGHT EASILY BE MISTAKEN FOR ANOTHER SPECIES: THEY ARE NEITHER BLIND NOR WHITE. THIS OZARK SALAMANDER IS BORN IN THE WATER AND LIVES THERE UNTIL IT TRANSFORMS INTO A LAND CREATURE - A NORMAL PROCEDURE FOR MOST AQUATIC SALAMANDERS. BUT THIS PROCEDURE IS NOT NORMAL FOR TROGLOBITES. IT IS THE CHANGE-OVER, THE METAMORPHOSIS, THAT MAKES THIS SALAMANDER UNIQUE AMONG CAVE SALAMANDERS. FULLY CAVE-ADAPTED SALAMANDERS DO NOT TRANSFORM: ALL RETAIN THEIR LARVAL FORM THROUGHOUT LIFE, A CONDITION THAT IS



CALLED NEOTENY. IN ITS LARVAL, AQUATIC STAGE, THE OZARK BLIND SALAMANDER IS CHUBBY, ITS SKIN IS PIGMENTED, IT CARRIES ON RESPIRATION THROUGH FEATHERY RED GILLS, AND IT HAS SMALL BLACK EYES. BUT AS THIS SALAMANDER MATURES, IT LOSES MOST OF ITS PIGMENT. ITS GILLS DISAPPEAR. TINY BLOOD VESSELS CLOSE TO THE SURFACE TAKE OVER MOST OF THE RESPIRATORY FUNCTION, AND THE RED BLOOD IN THEM GIVES THE SKIN A PINK COLOR. EYELIDS DEVELOP, BUT THEY SOON GROW TOGETHER. BENEATH THEM, THE EYES DEGENERATE; THEY BECOME REDUCED

IN SIZE AND HAVE NO FURTHER FUNCTION. THE HEAD BECOMES QUITE ANGULAR, AND THE BODY AND LEGS GROW LONG AND THIN. THE DARK, CHUBBY, EYED LARVA BECOMES A PALE, THIN BLIND ADULT - CAPABLE OF LIFE OUT OF THE WATER. SPECIALIZED, HIGHLY EFFICIENT SENSE

ORGANS ENABLE THIS SALAMANDER TO LIVE IN TOTAL DARKNESS. IN CERTAIN CAVES IT IS A PERMANENT RESIDENT OF THE DARK INTERIOR, PRODUCING YOUNG THAT GENERATION AFTER GENERATION SHOW CAVE-ADAPTED



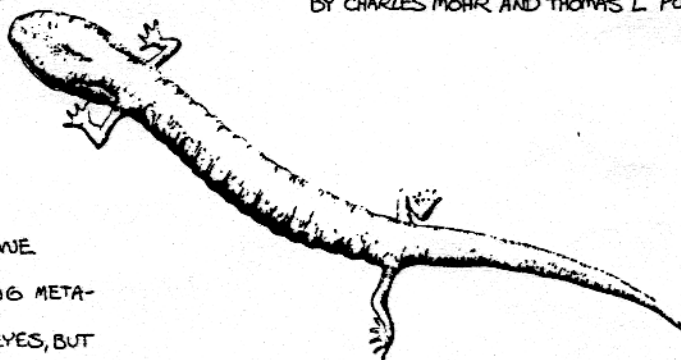
CHARACTERISTICS. IN OTHER APPARENTLY SIMILAR CAVES, YOUNG ARE NEVER FOUND. WHY? APPARENTLY THE OZARK BLIND SALAMANDER LACKS ONE DECISIVE TROGLOBITIC FEATURE: THE CAPACITY TO SURVIVE ON LITTLE FOOD. THE LIFE IT LEADS - ITS HIGH METABOLIC RATE, ITS ACTIVE WAY ON MOVING AROUND, AND ITS METAMORPHOSIS - DEMANDS A FOOD SUPPLY GREATER THAN MOST CAVES PROVIDE. METAMORPHOSIS IS A PARTICULARLY COSTLY PROCESS REQUIRING LARGE AMOUNTS OF FOOD, AND OTHER CAVE-INHABITING SALAMANDERS HAVE ABANDONED IT. THEY SIMPLY LIVE IN THE CONDITION OF NEOTENY, AS "PERMANENT LARVAE." THE OZARK BLIND SALAMANDER REPRESENTS AN IMPORTANT STAGE IN THE EVOLUTIONARY CHAIN THAT PRODUCED CAVE-RESTRICTED CREATURES. IT CANNOT BE CALLED A TROGLOPHILE: IT DOES NOT BREED OUTSIDE. BUT IT ISN'T A TROGLOBITE EITHER. IT IS FOUND ONLY IN CAVES WHERE THE FOOD SUPPLY IS GREATER THAN NORMAL. THIS SALAMANDER FARES PARTICULARLY WELL IN BAT CAVES, WHERE IT FEEDS ON THE ISOPODS, AMPHIPODS, FLAT-WORMS, SPIDERS, AND OTHER SMALL CREATURES THAT GET THEIR NOURISHMENT FROM THE GUANO. IN SUCH A FOOD-RICH HABITAT, ITS WHOLE LIFE CYCLE IS COMPLETED UNDERGROUND. BUT IN CAVES WHERE FOOD IS SCARCE, THE LARVAL SALAMANDERS MUST TRAVEL



TO THE TWILIGHT ZONE OR OUTSIDE TO FIND SUFFICIENT FOOD. OFTEN THE ADULTS, TOO, ARE FOUND OUTSIDE, RETURNING TO THE CAVE ONLY TO BREED. AS YOU MIGHT EXPECT, THOSE INDIVIDUALS THAT LIVE OUTSIDE THE CAVE STILL AVOID LIGHT. THEY PASS THE DAYLIGHT HOURS UNDER ROCKS AND EMERGE ONLY AFTER DARK. THE DISCOVERY THAT THE OZARK BLIND SALAMANDER IS CAPABLE OF A KIND OF DR. JEKYLL - MR. HYDE EXISTANCE, DEPENDING ON THE RICHNESS OF THE FOOD SUPPLY, HAS HELPED TO CLEAR UP AN OLD MISUNDERSTANDING. FROM REPORTS THAT IT MIGHT LIVE OUTSIDE OF CAVES, G. KINGSLEY NOBLE IN THE LATE 1920's CONCLUDED THAT THE DETERIORATION OF ITS EYES IS CAUSED BY LACK OF LIGHT IN THE CAVE ENVIRONMENT AND, THEREFORE, IT IS NOT HEREDITARY. HE THOUGHT THAT THE SALAMANDER'S EYELIDS WOULD REMAIN OPEN AND THAT ITS EYES WOULD BE UNAFFECTED IF ITS METAMORPHOSIS OCCURED WHERE LIGHT WAS PRESENT. AT THE TIME OF HIS DEATH IN 1929, NOBLE WAS CONDUCTING EXPERIMENTS TO SEE IF AN INDIVIDUAL KEPT IN THE LIGHT RETAINS VISION IN ITS ADULT STAGE. LEON STONE OF THE YALE MEDICAL SCHOOL RECENTLY SETTLED THIS QUESTION. AS NOBLE HAD DONE, HE WATCHED THE SALAMANDER TRANSFORM AND WAS ABLE TO FOLLOW THE DETERIORATION OF ITS EYES. STONE FOUND THAT DURING METAMORPHOSIS ITS EYELIDS GROW TOGETHER WHETHER IT LIVES IN DAYLIGHT OR IN TOTAL DARKNESS. BUT EYE DEGENERATION STARTS EVEN BEFORE METAMORPHOSIS. INDEED, THE LARVAL SALAMANDER BEGINS TO NEGLECT VISUAL CLUES. THE RIGHT AND LEFT EYES DEVELOP AT DIFFERENT RATES. STONE RECOGNIZED THAT THE CLOSING OF THE EYELIDS DURING METAMORPHOSIS MIGHT SPEED UP THE DEGENERATION OF THE EYES, BUT HE SHOWED CONCLUSIVELY THAT IT IS NOT THE CAUSE OF THE DEGENERATION. THE LOSS OF SIGHT IN THIS SALAMANDER IS AN INHERITED CHARACTERISTIC. ADULT OZARK BLIND SALAMANDERS

CAN BE SAID TO BE "DOOMED" TO BLINDNESS. SCIENTISTS BELIEVE THAT IT WILL BE ONLY A MATTER OF TIME BEFORE THE SPECIES ACQUIRES THE ADDITIONAL ADAPTATIONS POSSESSED BY MORE SPECIALIZED TROGLOBITES, ADAPTATIONS THAT ADD UP TO THE ABILITY TO FUNCTION ON LITTLE FOOD: METABOLIC ECONOMY WE HAVE CALLED IT. THE DEGREE OF EYE AND PIGMENT DEGENERATION IN RELATED CAVE SPECIES PROBABLY OFFERS THE BEST CLUE TO THE RELATIVE LENGTH OF TIME THEY HAVE BEEN ISOLATED UNDERGROUND. THOSE FORMS WHOSE EYES HAVE DETERIORATED FARTHEST AND WHOSE PIGMENTATION IS MOST DEFICIENT ARE THOUGHT TO HAVE SPENT THE LONGEST TIME IN CAVES. CAVE-DWELLING ANIMALS ARE NOT HANDICAPPED BY THEIR DEFECTIVE EYES OR COLOR LOSS. IN THE DARKNESS, EVEN THOSE ANIMALS WITH GOOD EYES CANNOT USE THEM. A BLIND INDIVIDUAL AND ONE ABLE TO SEE ARE ON THE SAME FOOTING. PROVIDED THEIR OTHER SENSES ARE EQUALLY ACUTE, EACH WILL FARE WELL AND PRODUCE OFFSPRING. BY THE SAME TOKEN, A FALE INDIVIDUAL WILL SUFFER NO DISADVANTAGE. IN THE LIGHTLESS CAVE, ALL ANIMALS ARE INVISIBLE.

THIS ARTICLE WAS TAKEN FROM THE BOOK "THE LIFE OF THE CAVE"
BY CHARLES MOHR AND THOMAS L. POULSON. 1966.



THE UNDERGROUND PRESS

A QUARTERLY PUBLICATION OF
THE KANSAS CITY AREA GROTTO.
90 BART RAPP, KCAG DIRECTOR

MAY YOUR LAMP BE BRIGHT,
AND YOUR CAVES BE LONG.
AND WHEN YOU GO CAVING,
PLEASE TAKE ME ALONG!

