THE TECH TROGLODYTE

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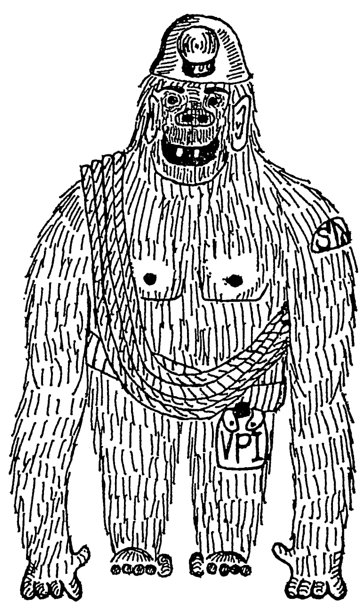

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EDITOR'S COLUMN

With the publication of Douglas' Caves of Virginia, in 1964 more and more Virginia caves were visited by cavers. Gradually, it was realized that while many more caves were known to exist, descriptions were not always accurate and information and maps not as complete as they could be and should be. In some heavily limestoned areas, only one big cave might be known. Many maps were hurried sketches, done at a time when it was more essential to locate as many caves in an area as possible, rather than to explore it in full detail.

While Douglas continued accepting information on Virginia caves after the book was published, very little new data was turned in. Cavers seemed more interested in seeing already known caves rather than discovering new caves and virgin passage. Soon, however, the era of "pioneer caving" passed with people realizing that much more work had to be done for full knowledge of Virginia's caves and cave systems.

In the spring of 1965, the Virginia Cave Survey project was turned over to John R. Holsinger, presently of East Tennessee State University. He worked to instill interest in this project with the grottoes within the Virginia Region. At that time only the VPI Grotto responded with the most interest. The project was divided into counties, with individuals taking one county or more. In October 1965, at the Virginia Region annual meeting, members of the VPI Grotto were officially assigned to work in Bland, Craig, Pulaski, Russell, Smyth, Tazewell, Washington, and Wythe Counties, with a heavy involvement in the Butler-Sinking Creek System in Bath County and in Millers Cove Cave in Roanoke County. The University of Virginia Grotto took on Alleghany County, particularly the mapping of Paxton's and Carter Caves and Gilley Cave in Lee County, while Holsinger and his group from the University of Kentucky continued their work in Lee, Scott and Wise Counties. Other individuals agreed to take on small areas or caves in their own territory. This distribution did leave, however, most of the northern Virginia counties untouched.

At the Virginia Region annual meeting of October 1966, a second Virginia Cave Survey meeting was held. To the great surprise of this editor, many more persons, representing the entire Region attended and were eager to push cave passages, many FRO's (for record only) and map as many caves as possible. All the counties have been assigned, although some caves which need surveying are as yet unspoken for. These are predominantly in Lee, Scott and Wise Counties which are accessible only on long weekends.

As to the distribution of the work being done on the project, VPI still retains the bulk of the counties. Unfortunately, there are only two deeply interested persons with ability to initiate such trips; one of which will graduate in December 1966. Holsinger himself continues to work in Lee, Scott and Wise Counties, and is gradually taking over the western part of Washington County. Phil Lucas, an independent caver in Staunton, Virginia, has volunteered to check leads in Augusta, Bath, and Highland Counties. Members of the Roanoke Extension of the U.Va. Grotto plan to check leads in Botetourt and Roanoke Counties. Very fortunately, and I think to the surprise of many already involved in the project, members of the George Washington University Grotto, in specific, Hugh Howard, have taken over the work in the northern Virginia, i.e., Clarke, Frederick, Page, and Shenandoah.

As a very interested member of this project, I am confident that this particular work, under the directorship of Dr. John Holsinger, will be ready for publication in 1970, as hoped.

Anne Whittemore

AVAILABLE CAVE MAPS

Since Caves of Virginia was published in 1964, members of the VPI Student Grotto have been preparing maps for a supplement to that book. They have mapped a number of caves for the first time, and have remapped others, presently appearing in the book, to include large previously unknown portions of the caves. All surveys have been done with a Brunton compass and tape. We would like to offer these maps to anyone who wishes to purchase a copy, with the following stipulations. We must hold all orders until there are enough to warrant the cost of reproduction. All maps will be mailed folded and the cost will cover mailing charges. The cost will be 50¢ per map with the exception of the Miller's Cove map at $1.00. Send your order, along with your remittance, name and address to Cave Maps, 504½ S. Main Street, Blacksburg, Virginia 24060.

Banes' Spring Cave, Bland County, Virginia, by R.E. Whittemore.
Curve Saltpeter Cave, Giles County, Virginia, by Cletus D. Lee.
Giant Caverns, Giles County, Virginia, by Ed Morgan.
Harris Cave, Giles County, Virginia, by Ed Morgan.
Link's Cave, Giles County, Virginia, by Ed Morgan.
Pig Hole, Giles County, Virginia, by Wes Thorne.
Spruce Run Mountain Cave, Giles County, Virginia, by Tom Roehr.
Slusser's Chapel Cave, Montgomery County, Virginia, by R.E. Whittemore.
Ferrell's Cave, Pulaski County, Virginia, by Ed Morgan.
50-foot Hell Cave, Pulaski County, Virginia, by Ed Morgan.
Miller's Cove Cave, Roanoke County, Virginia, by R.E. Whittemore.
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Dead Air Cave, Smyth County, Virginia, by R.E. Whittemore.
Interstate 81 Cave, Smyth County, Virginia, by R.E. Whittemore.
Cassell Farm Cave, Tazewell County, Virginia, by R.E. Whittemore.
Higginbotham's Cave #2, Tazewell County, Virginia, by R.E. Whittemore.
Steele's Cave, Tazewell County, Virginia, by R.E. Whittemore.
Ward Cove Cave, Tazewell County, Virginia, by R.E. Whittemore.
Brass Kettle Hole, Washington County, Virginia, by Ed Morgan.
Cribb Cave, Washington County, Virginia, by Ed Morgan.

THE FINE ART OF CAVE MAKING - OR "HOW TO MAKE NOTHING OUT OF SOMETHING

Everyone has, at one time or another, been charging down the "big, new, virgin- type passage and found himself suddenly face to face with a huge impassable pile of breakdown, an impossibly tight crawl, or some other obstruction that quickly terminates exploration. It is true that the cave has to end somewhere but more often than not, it continues beyond the obstruction. Caves were not ma e for people; most of them don't even have entrances.

There are several solutions to the problem. Most people would utter foul language or perhaps just cry quietly. I've watched some of the even more primitive types even try digging. Aside from being generally unpleasant, digging usually takes a lot of time. The first thing to do is light a cigarette. Don't try to enjoy the cigarette - the idea is to make some smoke. Settle down and watch the air movements. If the smoke curls in quiet circles above your head and if non-smoker type cavers near you begin coughing, you may have reached the "end"; but, if the smoke zooms into a small hole in the breakdown, chances are that there is a 'big cave' beyond. If the air is blowing <u>out</u> of the hole, the prediction is still true. Now, of course, the air may actually be blowing in or out of another entrance, but the idea is that the air is going (or coming) from somewhere.

If the obstruction is fairly small and easily moved, digging is probably more practical, but there is a limit to what you can move by hand. Where digging becomes impractical, there is a better way: Explosives.

The first thing to consider about explosives is safety. Explosives are inherently dangerous things to handle; however, these dangers can be minimized by a thorough knowledge of safety precautions, handling procedures, and techniques involved. There are a lot of very important rules. Only a few that apply to cave blasting will be mentioned here. I would strongly suggest that anyone who is seriously interested in learning about explosives, handling procedures, etc., obtain a copy of the <u>Blaster's Handbook</u>, which is published by E.I. Dupont De Nemours and Co., Explosives Department, Wilmington, Delaware. The price is five dollars, but it is well worth the investment.

<u>A word of Caution</u>: Don't attempt to use explosives (in caves or otherwise) without first becoming familiar with the proper techniques and procedures involved.

There are hundreds of different types of explosives on the commercial market. Of the dynamites, several of the more common types are very useful in caves. Dynamites are rated in strength according to the percentage of nitroglycerine by weight which they contain. The two types most commonly available are 40% and 60%. Power and energy concepts can be rather misleading when applied to explosives. For example, 60% dynamite is not twice as strong as 30%. The stength of dynamite refers to its energy content, which in turn, determines the force and power it develops and the work it is capable of doing. Another important consideration is the velocity of detonation which also determines what a particular explosive will do.

Dynamites range in velocity from about 4000 to about 23,000 feet per second. A high-velocity explosive will produce a greater shattering effect.

PROPERTIES OF STRAIGHT DYNAMITES

WT. STRENGTH OR GRADE	DENSITY CARTRIDGES PER 50 LBS. 1¼" x 8"	VELOCITY FT. PER SECOND	WATER RESISTENCE	FUMES
30%	102	11,600	POOR	POOR
40%	102	13,800	GOOD	VERY POOR
50%	104	16,100	GOOD	VERY POOR
60%	106	18,200	EXCELLENT	VERY POOR

As shown above, 60% dynamite has a higher velocity than 40%. The higher velocity and strength result in an effective shattering action when used on hard material such as limestone. Low velocity 30% dyanmi produces a less powerful shattering effect but is more practical in moving quantites of material such as dirt, cobbles, or clay fill.

Other properties such as density, water resistance, and fuse characteristics should also be considered when selecting the type of explosives to be used in any situation.

Straight dynamite is composed of nitroglycerine, wood pulp, and sodium nitrate. The following equation is used to describe the complete detonation:

$$2C_3H_5(NO_3)_3 + 6NaNO_3 + C_6H_{10}O_5 \text{ ---- } 9CO_2 + 6N_2 + 10H_2O + 2O_2 + 3Na_2CO_3$$

The fume products often present quite a problem in caves. Dynamite fumes consist principally of carbon dioxide, nitrogen, and steam which are actually non-toxic; however, carbon monoxide and nitrogen oxides may be present. This is why air circulation in the blasting area is desirable - especially if repeated blasts are made the same day in the same place. A small dynamite blast can "fog" 1000 feet of cave passage quite easily.

To carry dynamite in caves a .30 or .50 caliber army ammunition box is excellent. The box is mainly to prevent the cartridges from getting mashed into a useless mess - dynamite is rather soft. Fresh dynamite is probably not as sensitive as you may suspect; it is very difficult to detonate without a blasting cap. But explosives can be unpredictable, so handle with care anyway. Don't use the old dynamite that your grandpa had left over from blasting out stumps several years ago. The nitroglycerine in older dynamite tends to settle and form sensitive spots. The old cartridges will sometimes have the glycerine leaking out of the wrapper. If you ever have occasion to handle leaking cartridges use gloves. Nitroglycerine is absorbed directly into the blood stream through your hands. It can give you a headache that you won't soon forget. It is also a good idea to wear gloves when inserting a blasting cap into a dynamite cartridge. A nitro headache is extremely painful.

Keep carbide lights away from dynamite (and any explosives). The dynamite probably won't detonate but it may burn rather violently; the blasting caps will detonate. This brings up another important point: Keep the caps separate from the dynamite until you are ready to prime the charge.

Primers

Blasting caps are manufactured in many different types and sizes. Electric detonators are useful in caves, but since I'm prejudiced toward the cap and fuse method it will be explained here.

A number six blasting cap (or equivalent) is the most common type of dynamite primer. A larger number eight cap will do the same job, but it isn't really necessary for most dynamites. Blasting caps are much more sensitive to shock and sparks than dynamite. Note: (again) keep carbide lamp flames away from caps. The best method for carrying caps into a cave is to insert them in styrofoam and place them inside a small sturdy box. Don't carry them inside the dynamite box. Also, blasting caps must be kept dry.

Fuse

One of the most common types of fuse sold in the East is Clover Brand (orange) wax-coated safety fuse. It is water resistant, very flexible and burns at about 120 seconds per yard; however, there are many things that can affect the burning time, so if in doubt, test a piece.

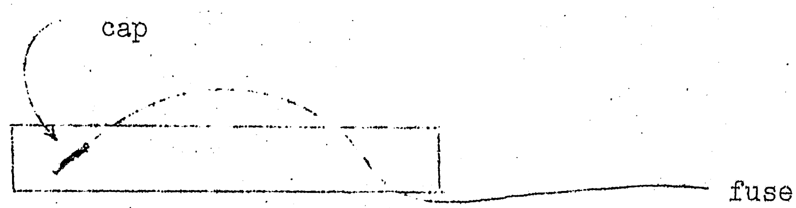
Crimping

The easiest and safest way to connect the cap and fuse is by making a watertight crimp using hand-type cap crimpers. Cap crimpers also have a convenient fuse cutter and dynamite punch. They are made from a non-sparking metal and are well worth the investment. To insure a good waterproof connection between the cap and fuse, it is best to make a square cut across the fuse and make two crimps about 1/8 inch apart.

Priming Dynamite

There are several common methods used to insert the cap into the dynamite cartridge. The easiest way is to punch two holes in the cartridge and lace the fuse. This method is good because no tape is needed (See figure 1). A pencil makes a good dynamite punch. Remember: nitro headaches are bad. Wear gloves.

The preceeding directions were not intended to be complete; for detailed, step-by-step instructions see the Blaster's Handbook.



(Figure 1). Single dynamite cartridge primed with blasting cap.

Now we can proceed to something a little more useful: the applications of explosives to cave making. By now it should be obvious that merely detonating dynamite is a simple sort of thing and it's only a little more complicated than setting off a firecracker; however, the true art of blasting is the skill with which the charge is placed. The whole idea of cave blasting is to move an obstruction or fracture it so that it can be moved by hand. If the charge is placed improperly, the blast may just make a lot of noise or, at the same time, it may make the obstruction more permanent. A bad choice of explosives can give similar results. Because of so many variables it is impossible to state with certainty exactly how much dynamite is required to move or fracture a given quantity of material. There are three things to consider: (1) choice of explosive, (2) quantity of explosive, (3) placement of the charge.

With these things in mind let's consider some hypothetical problems. One of the most common obstructions is a sand, clay, and gravel fill. In a situation such as this it is necessary to loosen or move material rather than to break it. For such a problem a low velocity explosive is more practical, i.e., 30% dynamite. If the fill is small, say about three cubic feet, one cartridge properly plaeed will probably be enough to loosen it so that it can be removed by hand.

The secret of placeing the charge so as to take advantage of the resulting explosive force is confinement. In mining applications, this condition is fulfilled by using drill holes and loading them with explosives. Because of the confinement, failure of the rock occurs along the open face. Since rotary power drills are not normally available in most caves, other methods of confining the charge are necessary. A small hole can usually be made in the gravel and clay fill. Further confinement can sometimes be accomplished by placing a heavy rock over the charge or by mudcapping. The efficiency of the blast is greatly increased by confining the charge.

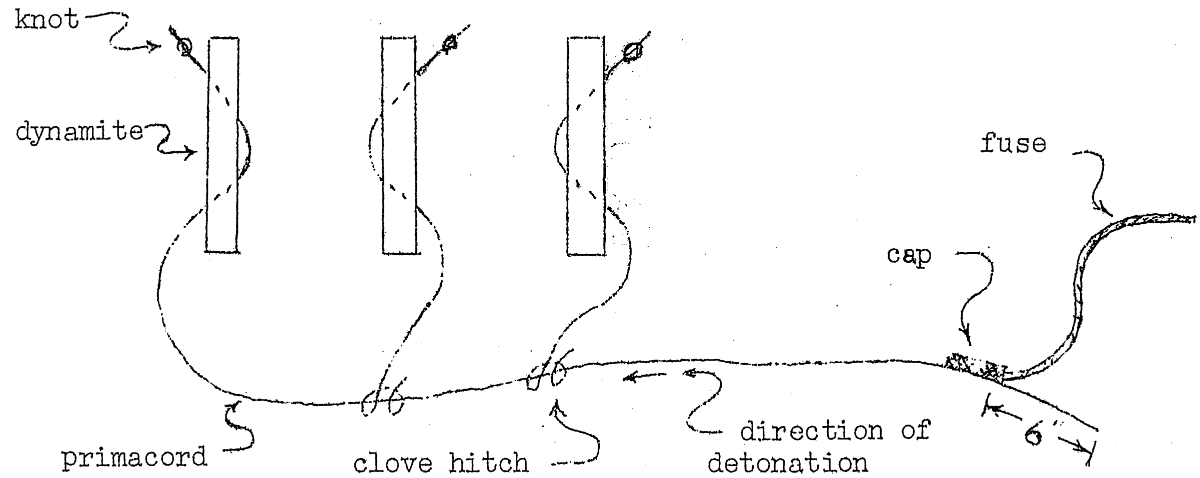
Another common obstacle is the boulder. There are two common methods used to eliminate boulders:

(1) Snakeholing Method -- A small spade can be used to dig a hole beneath the rock large enough to pack the dynamite under and against the rock. The charge must be in aontact with the rock in order to break it. DuPont recommends two $1\frac{1}{4}$"x8" cartridges per foot of thickness at the point opposite the charge; however, thick rocks will need more dynamite per foot of thickness than thin ones. The more solidly the charge is packed against the rock the greater the resulting force against it. When it is necessary to use several cartridges in a composite charge, it is best to slit them open and carefully tamp the charge into place with a wooden stick. But remember: caps are sensitive, so don't ever tamp the primer charge. It should be carefully placed in the hole last and not opened. The primer cartridge consists of a dynamite cartridge primed with a blasting cap. When the primer charge has been placed, sand or moist clay should be placed over the charge and pressed down lightly. After the charge is covered by several inches, the remainder of the hole should be firmly packed with additional sand, clay, or mud.

(2) Mudcapping Method -- Mudcapping is usually the most practical method for "boulder breaking" in caves. The cartridges are placed on the boulder in close contact with each other and covered with a three- or four-inch layer of mud. According to DuPont, the confinement provided by the mud reduces the amount of explosives required by about 25%. Thick, pucky cave mud works very well. But, again, skill in placing the charge is just as important. It is usually not too difficult to recognize the bedding planes on a limestone or sandstone boulder. Dynamite is quite effective if the cartridges are placed with their axis parallel to the bedding plane.

Instantaneous firing: multiple charges

Quite often it is necessary and practical to detonate two or more separate dynamite charges at the same moment. For example, several small charges properly placed on a particulare boulder and detonated instantaneously are usually more effective than an equal amount of explosives applied as a single charge. A detonating fuse called primacord is used to accomplish this. Primacord is composed of a high-velocity explosive contained in a fabric or plastic cord which resembles 3/16" clothesline. The separate charges are primed by lacing one or two cartridges in each charge with primacord and then detonating the primacord with a blasting cap. The detonation velocity of primacord is about 21,000 feet per second, so the result is essentially instantaneous: the cap detonates the primacord which in turn detonates the dynamite charges.



(Figure 2). Primacord trunk line system.

The use of primacord makes possible a number of very effective blasting techniques but there are a few tricks that should be used if you want to get good results:

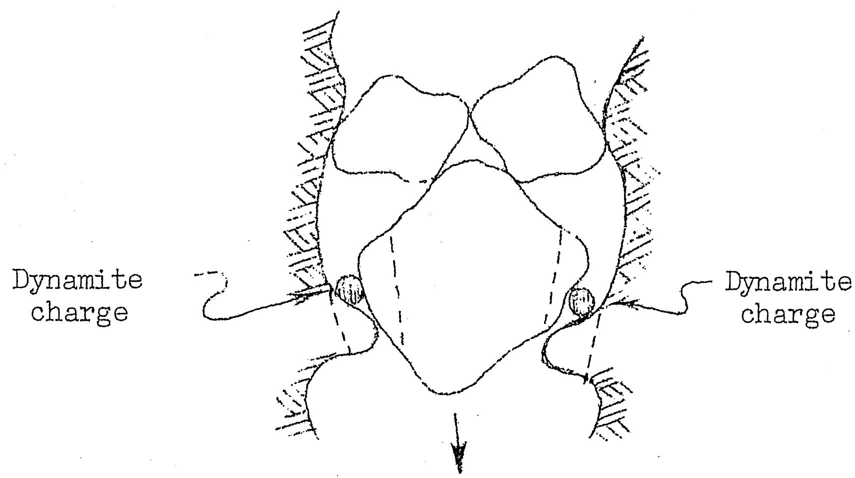
(1) The detonation of primacord is quite often unpredictable; sometimes it is unidirectional. For this reason don't place the blasting cap in the middle of a primacord line connecting two charges. Always prime it about six inches from an end and always point the closed end of the cap in the desired direction of detonation. The cap is simply taped parallel to the primacord with electrical or adhesive tape.

(2) The separate charges can be connected to a single primacord trunk line which can be detonated at one end. There are several knots which can be used to make connections with a trunk line. In principle, a knot which provides sufficient surface area and close contact between two lengths of primacord is good; however, the following are recommended:
(a) clove hitch - for connecting branch line to trunk line.
(b) square knot - for splicing two lengths of primacord.

Directions on how to tie these two rare, complicated knots are left to individual research by the reader.

Primacord techniques are very effective when applied to chockstones or when blasting through massive breakdown. For example, consider the following problem - a chockstone.

(Figure 3). Passage in cross-section.



The size and thickness of the rock will determine the size of the charge to be used. The most effective method would be to apply two separate charges as shown in figure 3, and detonate with primacord by using the techniques previously illustrated. A common mistake would be to place only one charge. This may work, but chances of success are smaller.

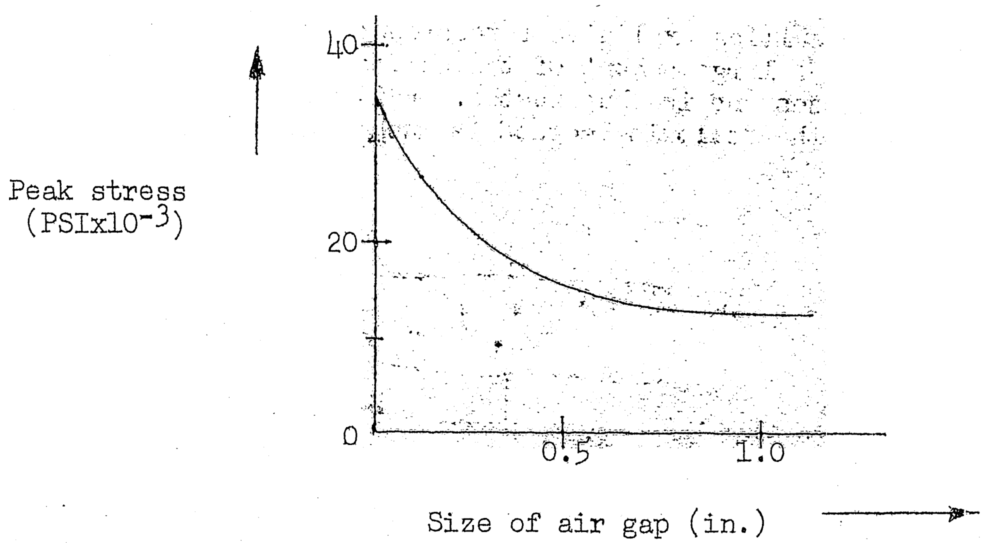
Blasting through breakdown can be rather complicated and it is sometimes a very dangerous undertaking. Removing the "keystones" with explosives is very effective but it is somewhat hazardous. Multiple charges placed at strategic points and connected with a primacord system is probably the best technique.

Other common obstructions often encountered are speleothems in the form of stalactites, stalagmites, and calcite flowstone. Because of the physical properties of calcite, it is relatively easy to fracture with a high velocity explosive. A contact charge and mudcap is generally the most effective method. Primacord techniques are sometimes applicable but they are usually not essential. The best way to break small stalactites is with a hammer. Explosives are extremely effective when used to eliminate small stalactites, but it's not quite "sporting". Large stalactites or fat stalagmites can be removed with a fairly small contact charge of dynamite provided the cartridge is in good contact with the formation. This can be accomplished by bending the cartridge to conform with the surface and applying a mudcap.

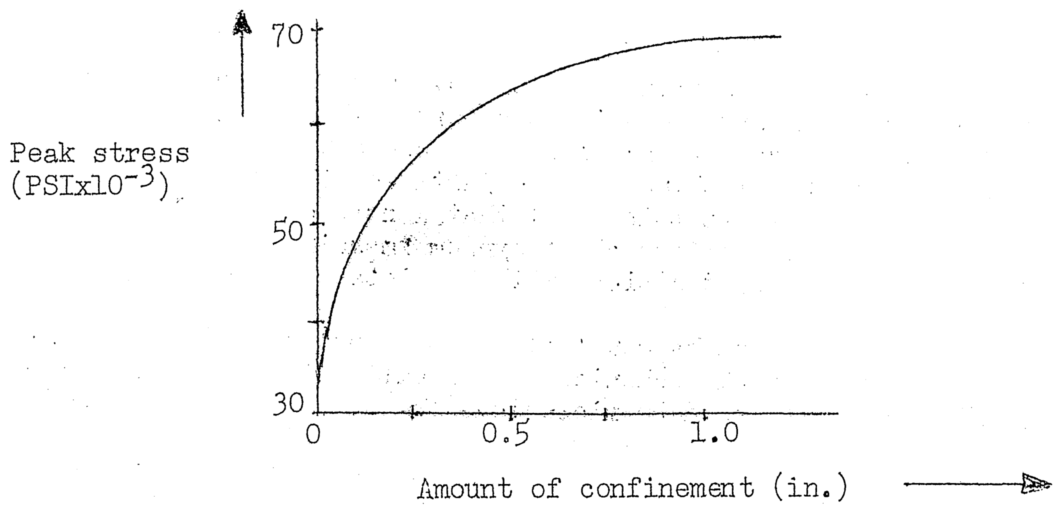
The preceeding discussion probably sounds rather sacrilegious to many respectable, conservation-minded cavers. This is one of those rare instances where caving philosophy and conservation ethics are in direct opposition, but I think the end justifies the means. The reader will please note at this point that I have carefully refrained from including any suggestions about gypsum smashing and helictite blasting. In this case, decisions will be dictated by conscience.

It should be obvious by now that common sense and a little elementary knowledge of rock mechanics are essential in almost any type of cave blasting. It would be ridiculous to even attempt to describe and evaluate all of the possible situations and problems that can occur; however, a simple analysis of a few important mechanical characteristics of rock is very helpful for determining where the charge should be placed. The efficiency of a blast is dependent upon the type of explosive, the condition and type of rock, the geometrical distribution of the charges on the surface of the rock, and the coupling between the explosive and rock.

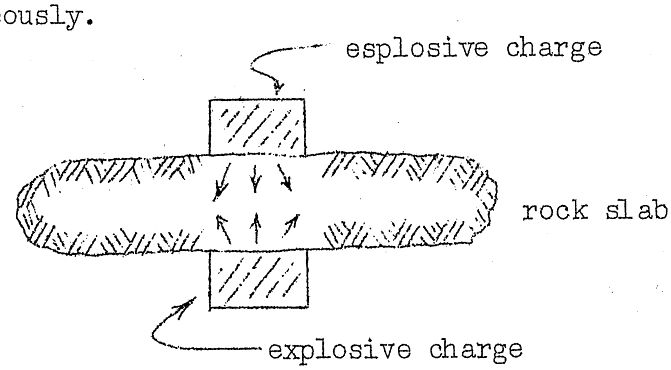
The internal stress developed in the rock as a result of the explosive force determines the fracture and extent of fragmentation which occurs. A given quantity of explosive will tramsmit more energy and thus develop a higher internal stress if the charge is in close contact with the rock. The following graph should illustrate how an air gap between the explosive and rock affects the peak stress. For a one-inch air gap the peak stress is only about one third as great as for a direct contact charge.



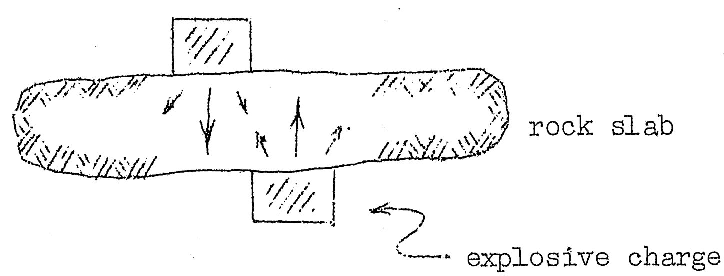
As mentioned before, confinement of the charge is very desirable. The following graph can be used to show that even a small amount of confinement greatly increases the peak stress.



Fracture of the rock can occur through failure as a result of internal tension, compression, or shear stresses. Failure can occur most readily by tension or shear. Consider the following example: two equal charges are placed as shown on opposite sides of a slab or rock and detonated simultaneously.



Most of the resulting explosive forces contribute to internal compressive stresses. A large amount of the explosive energy is used to develop these stresses and is thus wasted. Failure may still occur as a result; however, the following method is much more efficient.



In this method failure occurs more as a result of the shear and tensive stresses than by compression and usually a greater amount of fracturing will result. Delay firing of multiple charges can be used to minimize the loss of efficiency through compression but this topic is beyond the scope of this article. (See: Blaster's Handbook)

Military explosives and demolitions such as TNT, composition C-3 and C-4 are the ultimate in sophisticated high-velocity explosives. Composition C-4 is so effective that it could best be described as "instant cave"; however, since these explosives are very difficult to obtain they will not be discussed any further. (See: Explosives and Demolitions, U.S. Army Field Manual FM5-25).

"Sifon-Go" is too dangerous to be used in caves so this topic will be dismissed also. (See Tech Troglodyte; Vol. 4, No. 2, page 60-A).

Since a good technical caving article is not complete without a few hairy equations, several will be presented here. The mathematics are not included to decorate this article or snow the reader. The following analysis is useful as a qualitative method for determining the approximate amount of explosives required to blast a particular rock. But since the conditions are ideal, it should be considered as Advanced Theoretical Cave Making.

The energy or work that a given explosive is capable of producing at detonation is usually stated in foot-tons per pound of explosive. The characteristics of any detonation are determined by the manner in which a given volume of explosives (at relatively low temperature) changes to a large volume of gas (at a high temperature). The total work, assuming no heat loss, is determined as:

$$\text{WORK} = \int_{V1}^{V2} p\,dV$$

where V=volume, p=pressure. However, since the process is not adiabatic the following data has been determined on this basis. The preceding relationship is interesting but an understanding of it is not essential.

EXPLOSIVE	ENERGY (foot-tons/pound of explosive), E
30% Dynamite	721
40% Dynamite	750
60% Dynamite	800
75% Dynamite	830

The amount of work necessary to cause fracturing of a rock mass is determined by the number of foot-pounds per square foot of fracture area required. The fracture area (after detonation) should not be confused with the surface area (before detonation).

ROCK	FRACTURE (foot-pounds/square foot), f
Limestone	208
Sandstone	541

For most practical applications in cave blasting, the optimum fracture area for a cubic foot of rock is roughly 11,500 square feet. From this the total fracture area can be easily calculated for the volume of rock which is to be blasted. For example, for two cubic feet it is necessary to produce (2x11,500=23,000) square feet of fracture area; for one-half cubic feet the total fracture area would be ($\frac{1}{2}$x11,500=5750) square feet. This relationship is somewhat arbitrary; however, for most situations encountered in cave blasting it is accurate enough when used to calculate contact charges confined by a mudcap.

The following equation can now be used to describe the relationship between explosive and rock. It can be used to calculate the quantity of a particular explosive necessary to blast a given type and quantity of rock. Data has been presented for the common dynamites and the rock that is most often found in caves.

$$P = \frac{fA}{2000E}$$

P=number of pounds of explosive.
f=fracture energy of rock.
A=total fracture area of rock to be blasted.
E=explosive energy of dynamite.

The application of this equation is relatively easy but it should not be used as a substitute for common sense when calculating the charge size. One of the best methods for practicing blasting is to set up an experiment with small "blasting problems". I would strongly suggest practicing the basic techniques above ground, say in an abandoned quarry, before trying them in a cave.

Example Problem

How much 60% dynamite applied as an external charge is needed to blast three cubic feet of limestone?

Solution: A = 3x11,500 = 34,500 sq. feet, total fracture area.
f = 208 foot-pounds/sq. feet, fracture energy for limestone.
E = 800 foot-tons/pound of explosive, explosive energy for 60% dynamite.
P = ? pounds of 60% dyamite required.

Substituting in the equation:

$$P = fA/2000\ E$$

$$P = \frac{(208\ \text{ft-lbs/ft}^2)(34{,}500\ \text{ft}^2)}{(2000\ \text{lbs/ton})(800\ \text{ft-tons/lb of explosive})}$$

$$P = 7.176 \times 10^6 / 1.6 \times 10^6\ \text{lbs.}$$

$$P = 4.5\ \text{pounds of 60\% dynamite.}$$

A single cartridge of dynamite weighs about 0.5 pounds. Therefore about nine cartridges would be needed to blast three cubic feet of limestone. But, again, this is only approximate.

In conclusion, several points should be emphasized. The most important of these is safety. Don't attempt any type of blasting until you are thoroughly familiar with the rules of the game. It goes without saying that explosives are a powerful tool if used correctly. But if abused or used improperly, they are deadly. It is impossible for an article such as this to discuss all the safety rules, handling procedures, and situations which can occur. Only the most basic principles and those pertaining especially to cave blasting have been presented here.

Some final words: explosives have a nasty habit of making incredibly loud noises. In a cave the pressure waves are sometimes amplified and carbide lights are often extinguished, even hundreds of feet from the blast. Don't stay near the blast and don't be too anxious to crawl back into the hole to examine the results. Dynamite fumes are deadly; two cavers recently lost their lives because of this.

Don't attempt any type of "solo" blasting. At least two people must be present while lighting the fuse. When the fuse ignites it often puts out the carbide lamp flame used to light it. Dynamite is relatively inexpensive; the cost is only about 20¢ per cartridge. But don't forget to check the local regulations governing the transportation and use of explosives.

Be careful and good cave making.

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Mike Hamilton

Submitted for publication June, 1966

STEELE'S CAVE, TAZEWELL COUNTY, VIRGINIA

Steele's Cave, within the town limits of Tazewell, Virginia, is found twenty feet from the road on property owned by the County Poor Farm. The cave is at an elevation of 2600 feet in the side of a rounded limestone ridge.

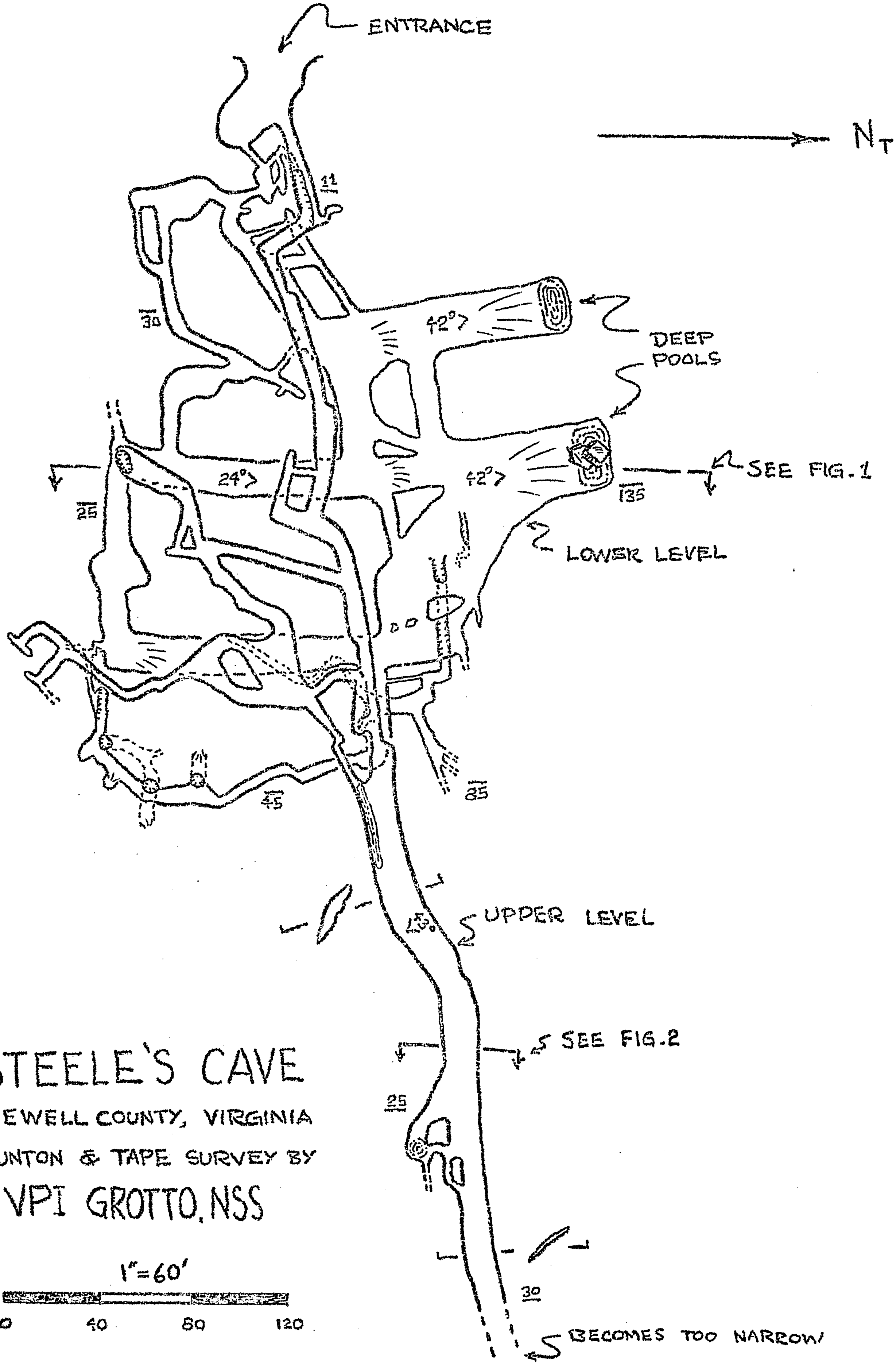
The cave was briefly discussed in McGill's "Notes on Undeveloped Caves on Virginia", NSS Bulletin, No. 8, July, 1946, page 6. He noted that it is in Beekmantown limestone. Dr. Byron Cooper, presently head of the Department of Geology, Virginia Polytechnic Institute, mentioned the cave in his section on underground drainage in Geology of the Burkes Garden Quadrangle, 1944.

A Brunton and tape survey was made on the cave by Anne, Barry, and R.E. Whittemore, J. Craig Peters, Tom Roehr, Ray Womack, Bob Simonds and Roy Clark. The work was completed in two trips during the fall of 1965. With all the data assembled, the cave was found to have 1500 feet of passage with three distinct levels, making the map somewhat difficult to draw.

With regard to regional geology, the cave is in the Tennessee River watershed, but close to the watershed divide between the Ohio(New) and Tennessee(Clinch) Rivers. In one instance, at Gratton, the divide is about $4\frac{1}{2}$ miles to the northeast while the divide is only $2\frac{1}{2}$ miles to the southeast at the source of Little Creek on Rich Mountain. The limestone in which Steele's Cave is developed dips 42° NNW, while the strike parallels the mountains, which run WSW.

The cave is middle-aged, being located in a fairly mature karst area. It is near the surface; for the most part it is high above the water table and is quite dry. The deep pools, at the ends of the northern-most developed passage, are at the water table. These pools mark a culmination of cavern development in the cave, and are unlike any features found in the rest of the cave. There are no flowing streams within the cave at present; in fact, any water which enters the cave (usually overflow of the nearby surface stream) sinks immediately. The water in the pools does not appear to be flowing, although it would seem that the water would be moving toward the Clinch River one mile away at Burkes Garden Station.

A small unnamed stream is shown on the Burkes Garden topographical quadrangle as flowing past the cave entrance. On both trips we saw no water in this stream. According to Cooper, this stream once flowed into the cave and came out one-quarter mile away. This, I feel, is not true, because the abandoned stream channel in the cave is above the present entrance. It is more likely that a stream from within the cave on the upper level fed the surface stream, and as a result of further downcutting was pirated to the lower cave level and abandoned the surface stream. This would appear to be the case since the lower level is below the entrance. True stream features are almost non-existent in this lower passage near the entrance so as to lead one to believe that the passage did not serve as a water channel for very long, for water found easier ways to reach the water table.



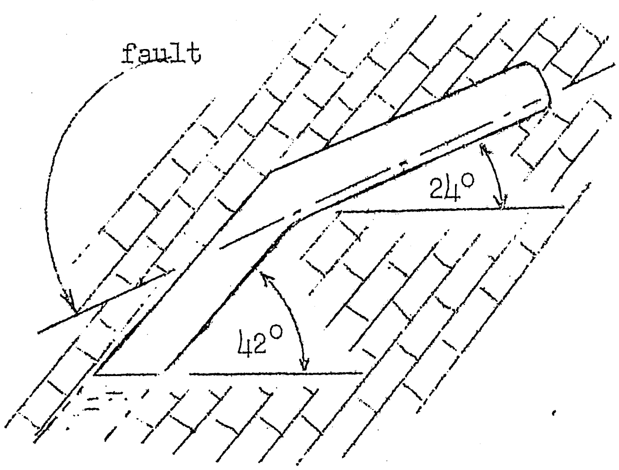
STEELE'S CAVE

TAZEWELL COUNTY, VIRGINIA

BRUNTON & TAPE SURVEY BY

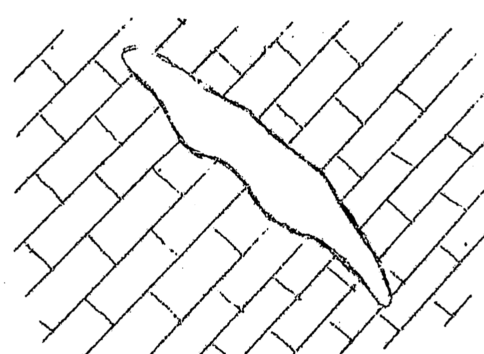
VPI GROTTO, NSS

Structurally, the cave is of a chopped-up solutional development. As discussed above, the upper level once served as a stream channel with its mouth near the entrance. The lower level was, meanwhile, being developed below the water table. Faulting occurred in the phreatic zone which for some reason did not affect the upper level, but only the middle section of the lower level. Piracy of the upper level stream occurred, perhaps via the connection between the two levels (see map). At this time the water table dropped, and the phreatic fill in the lower level was cleared out by solutional means. The floor of the lower level is the floor of the fault; its dip is 24° as compared to the bedding planes (see figure 1).



The main lower level is rectangular with two parallel passages about 45 feet away from each other and being connected only in two places. The floor of these passages is the footwall of the fault and dips at 24°. The big room above the pools is composed of rectangular slabs and ends at the first parallel passage. On either side of this large passage are small passages formed along joints. It is interesting to note these small passages have no counterparts on the other side of the loarge passage, which is also the other side of the fault.

With regard to detailed cave description, the upper level begins near the entrance as a wide keyhole with a flat floor in the side of the entrance room. A small upclimb is necessary about 30 feet past the entrance before continuing. Near the end, the passage becomes an inclined canyon dipping at 43° (see figure 2). A side passage from the upper level going in a southwesterly direction comes into the lower passage above a pile of breakdown. The connection is steep and slippery; it is not the easiest way to get to the lower level, but is quite direct. There are many formations in the upper passage, and the entrance rimstone covers the floor.



From the entrance, the lower level, i.e., the fault-fractured section and the connecting passages, can be reached by two winding crawlways. The narrower one is rocky-floored and sinuous coming into the main lower level near its connection with the upper level (see map). The wider crawlway enters the slab room about six feet above it on the western end. Crossing the slab room, one can get to the second parallel passage by either chimneying about 80 feet above the pools or by a southern connection over breakdown and mud. The second parallel passage is unlike the first in that its floor is mud-covered and is inundated with pits. A small hole at the top of this one-time phreatic conduit leads to a crawlway and a small, well-decorated passage which makes two left turns and comes into the second section (from the crawlway and the well-decorated passage) was untouched by the fault as was the section of the lower level near the entrance.

While not a large cave in regard to length, Steele's Cave is interesting geologically as it holds a key to events of the past. It appears to be still developing on the lowest level, although not very actively, and with further exploration, especially in regard to the deep pools, may hold a key to the drainage of the immediate area. Certainly, it is a cave to see when you are in Tazewell County, Virginia.

L. Anne Whittemore

Submitted for publication November 15, 1966.

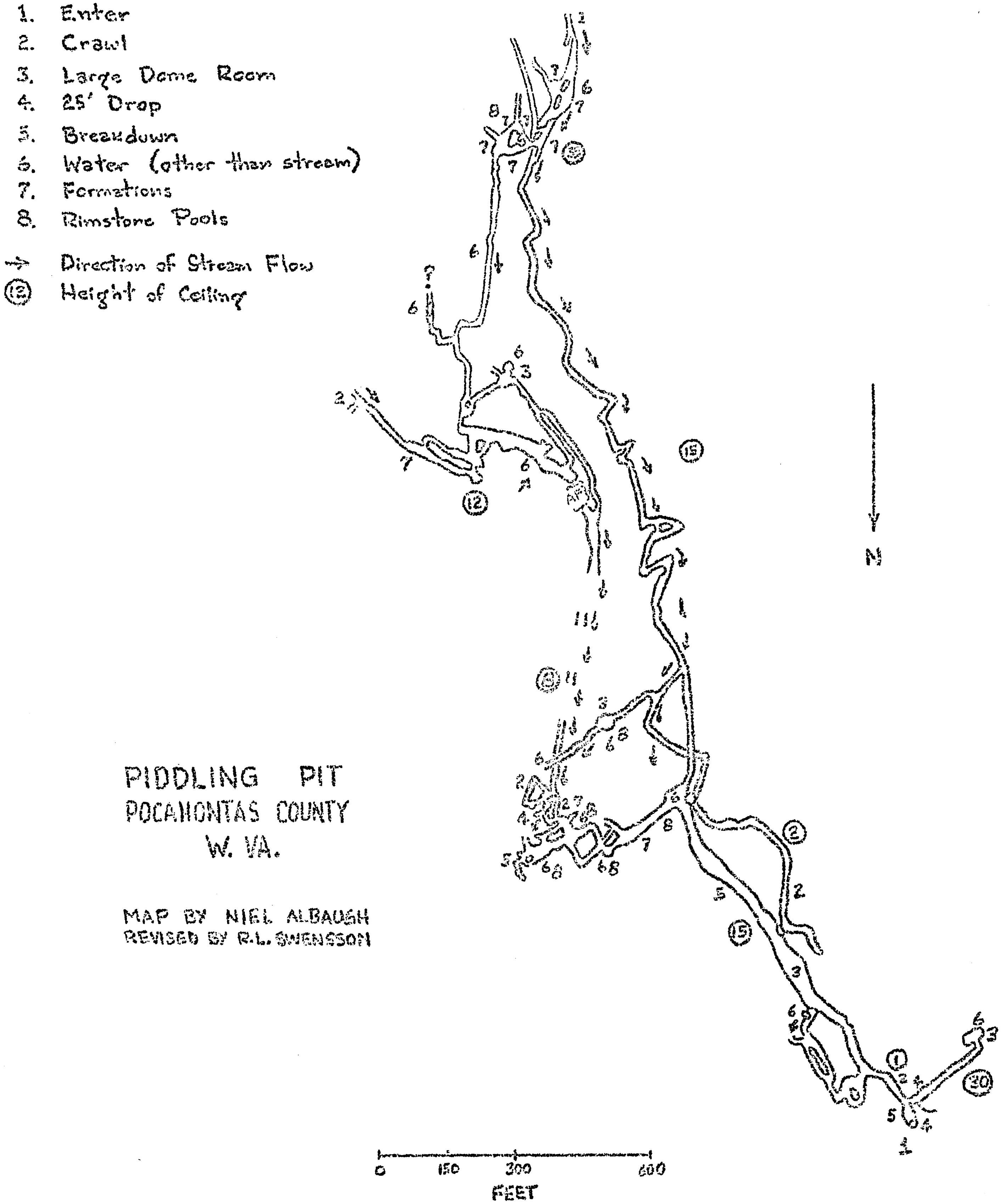
PIDDLING PIT

Piddling Pit is on the east side of Cloverlick Mountain about half-way between Cass and Marlinton in Pocahontis County, West Virginia. The caves are about 2 miles along the dirt road from Cloverlick around Cloverlick Mountain, and about $1\frac{1}{2}$ miles up the hill. A stream flows into a large cave (Canis Major) in a rock overhang. This cave in now being mapped by cavers at the National Radio Astronomy Observatory at Green Bank. 400 feet Southeast of the entrance to Canis Major is the entrance to Piddling Pit. There are some very quiet cavers in D.C. who have explored this cave fully, but since they would not respond, I assume they are dead for all practical purposes.

The accompanying map was made with tape and (not a Brunton) compass by Niel Albaugh of the National Radio Astronomy Observatory in Green Bank. I have added and revised it to the present form after many trips, some surveying (with Brunton), some just pacing off with a compass. The unconnected passage (follow arrows) exists but has not been mapped.

The entrance is a 25 foot drop. 35 feet away is another 25 foot drop to 200 feet of side passage ending in a high dome pit. At the top of the second drop is 100 feet of tight, dry, crawl. The cave then opens up and trends South-southeast for about 900 feet to an intersection. The east branch goes over 300 feet to much very small breakdown and a fissure drop of 25 feet. The south branch goes over 1500 feet (as the bat flies) to the formation rooms. The formations are numerous, untouched, and beautiful. Beyond the formation rooms were found some deep pools. We dropped 15 pound rocks from 35 feet up. 6 seconds after hitting the surface, each rock would give a retort, thus it had finally hit bottom.

A passage heads back north toward the entrance from the formation rooms for 700 feet where the passage assumes many different characteristics. Well over 1000 feet from that area is a small room which is at the bottom of the 25 foot fissure drop into the east branch.


1. Enter
2. Crawl
3. Large Dome Room
4. 25' Drop
5. Breakdown
6. Water (other than stream)
7. Formations
8. Rimstone Pools
→ Direction of Stream Flow
(12) Height of Ceiling
PIDDLING PIT
POCAHONTAS COUNTY
W. VA.
MAP BY NIEL ALBAUGH
REVISED BY R.L. SWENSSON
N
0
150
300
600
FEET

There is still good possibilty for more passage in Piddling Pit and Canis Major. The stream flow and standing water in both caves are most interesting. Information on these caves (and others) can be obtained from Niel Albaugh (NRAO), Gary Bream (Drexel), Mike Byorie (Ga. Tech.) or myself (VPI) at the NRAO at Green Bank.

Bob Swensson

Submitted for publication March, 1966.

VPI Grotto Banquet, 1966

The night of March 12, 1966, the VPI Grotto held their first annual Grotto Banquet which was coordinated by Ed Bauer. It was held at the University Club near our campus, conveniently located so that most of the Grotto members could attend. A purpose of this social event was to bring back many of the grotto's old-timers of which there are many. Unfortunately, only a few came, all of whom we were glad to see.

The banquet began at 6:30 p.m. with 65 persons being served. After dinner, we retired to the basement of the Hall for entertainment. The Hall was decorated to give a cave atmosphere, complete with the Cave Club's own mascot, The Troglodyte. John E. Cooper, our guest speaker, was presented with a large brush (presumbably for brushing his now nonexistent beard) by the Mistress of Ceremonies, Anne Whittemore. John then gave us an informative and colorful slide show of his travels through Cuba looking for salamanders and other reptiles and,occasionally, visiting caves. We enjoyed his show a great deal, and were pleased that he was able to come.

Some of the "old-timers" present were Stan Carts, Ackie Loyd, Ed Day, Bill Biggers, and Lew Bicking. The door prize was given to Doug Yeatts of VPI, after Martha Cooper pulled his name from a bag. He was awarded a gigantic carbide lamp and helmet assembled by Tom Vigour and Paul Holbert.

To conclude the entertainment, R.E. Whittemore presented the VPI Grotto Annual Achievement Awards and Guano Clusters aided by Sandy Bell and two guitarists, John Eads and Jack Keat. Guano Clusters were distributed to noteworthy individuals as follows: Ackie Loyd, as a past president of the Grotto; Ed Day, for being the original instigator devoted to ridding the club of the now-extinct leadership system; Bill Biggers, known well for his genorousity in getting VPI cavers out of harrowing jams with his Magic Coat; Lew Bicking, for his act in almost eliminating three prominent VPI Cavers in a flooded cave one year; and lastly, to John Cooper, for being present.

The Achievement Awards are given annually to members of the Grotto to commend them for their actions during the past year. This year's presentations were well-selected, with a song and/or speech and a small gift accompanying each award. For instance, the John Holsinger Vertical Caver Award was given to John Peduzzi, honoring his confusing and somewhat annoying experiences in Sites Cave and Clover Hollow Cave. He was presented with a three-runged rope ladder to use in future jams. Paul Helbert was given the Tim Schoechle Give-Up-Caving-and-Go-Climbing Award. For his gift, Paul received an ice piton. Drip, drip. The Sam Dunaway Grubby Caver Award went to Tom Vigour (who else?). Tom was given a bar of soap and a razor blade so that someone else will have a chance to compete for the award next year! Given a megaphone so that people will hear his trip reports more easily, Bob Simonds received the Joseph Overman Outstanding Trip Report Award for the shocking report of a trip to Aunt Nellie's Hole during which local ruffians bombarded the cave with cherry bombs. The Gregg H. Marland Award for Leadership went, for the second year, to Ed Bauer. With a red, lit cherry bomb in his hand, Ed remembered a trip to Aunt Nellie's Hole several weeks previous. The award left Bob Simonds, Cletus Lee, Gary Scofield, and Larry Wuensh quite astounded.

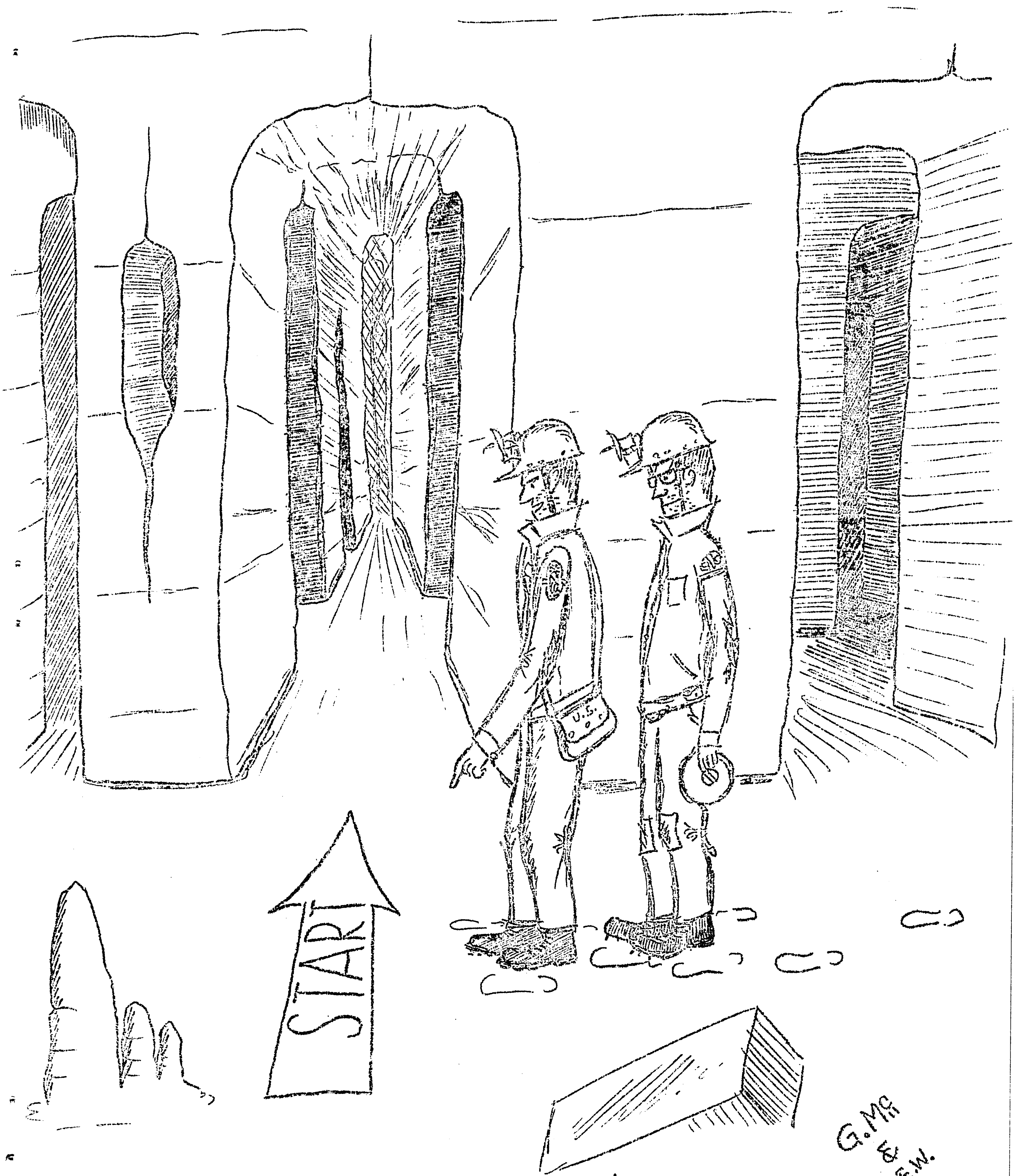
Who should be honored with the Ed Day Driving Award, but Jim Cooper. Seems he received a $105.00 speeding ticket in Carroll County, Virginia. "Whitt" presented him with a Driving Rules & Regulations Manual for the State of Virginia. The Roger T. Eubank Most Dedicated Caver Award went to Tom Roehr who bravely hiked all the way to Aunt Nellie's Hole one bitter day in the snow and wind. Tom was pleased to accept a mud piton. The Dan Meier Equipment Award was given to two people this year. First to Gene Harrison, for his remarkable second light source (VPI Spotlight) attached permently to his hard hat brim. Someone swiped the valuable hardhat and placed a candle on the other side of the brim so that Gene now has three light sources on his hat. The second person to receive this award was Hank Harjes, who worked with great deligence to develop a cave radio. His efforts were properly rewarded by his gift: two cans tied end-to-end with a string. The Wayne Elliot Sex Award was given to Jack Keat for his activities at the February 1966, Virginia Region Council Meeting. He received a large pair of female unmentionables. Rick Keener qualified for the Mason Sproul Cave Disaster Award. He received a Guano Cluster which should remind him of his part in the Catawba Murder Hole debacle. This year the Mike Youso Jewish Caver Award went to Craig Peters who, in order to save the club money, insisted on slanted eyes for the ape on the Grotto patches.

So comes to an end, the first Annual Banquet. All those who helped make the event a success are indeed thanked. We all adjourned to the home of Roberta and Hank Harjes for a branewpardy. Peace.

Anne Whittemore

Submitted for publication: April 14, 1966.


I Thought the former said RIM stone pools!
G. McC.
&
R.E.W.



THIS REALLY IS A MAZE CAVE!

RESCUE?!

Recently three members of the VPI Grotto planned a fake cave rescue, independent of the club, for the purposes of providing the club, as a whole, some first-hand experience in a rescue situation. Contrary to conservative thought, most of the members were not informed that it was practice.

Old Mill Cave, about five miles from VPI, consists of less then 1000 feet of stream passage. A fifteen foot crawl yields the entrance room and a very tight squeeze leads to the stream. About 500 feet upstream is a siphon, near which I was to have fallen and "pulled a ligament in my leg". Jack Keat and myself went into the cave with my sleeping bag and George (Stoney) Stonikinis rolled around in the entrance room to get wet and muddy. Stoney then drove back to Tech and arrived at the meeting about ten minutes after it had started. He said that I was hurt in Old Mill and that he had taken a sleeping bag to me. The meeting was eventually adjourned and less than 50 minutes later 16 people were entering the cave with six more outside. Three people were told that the rescue would be a fake (two on the inside and one on the outside of the cave) and one pretended to call a doctor before they left for the cave. He had also reminded everyone of the Catawba Murder Hole incident and told everyone not to call for any assistance as it was not needed, nor was the publicity that goes with it.

Meanwhile back in the cave, Jack and I decided to save them 100 feet of passage by saying that we had gone part way but I then became too exhausted to help. I purposefully became thoroughly wet and was uncontrollably shivering when the first group arrived. As there are no dangerous places in the cave, many thought that it was a joke until they saw me shivering. As I had only gotten <u>under</u> my sleeping bag, I was ably placed in it (actually it was placed around me) and I was carried most of the way with it on me. I was carried by teams at times, and passed over bodies at other (tighter) times. At the tight spot the sleeping bag was removed and I was pulled through. We waited in the entrance room for all to catch up among jokes and singing by the members of the rescue team. It was at this time that most of my worries about inconveniencing many people were dispelled due to the joviality of the group at the time. The twenty feet out were easy and Jack then announced that it was only practice. The 500 feet were covered in less than 1½ hours.

A few constructive obsevations: the club did very well, both in assembling and carrying out the rescue, but it was under ideal conditions, i.e., short cave, time not stressed, no cuts or fractures. no drops or traverses, and the club was already assembled when the accident was announced Even so I believe that the club was just as capable should these adverse conditions arise.

Although it was often mentioned by many members of the rescue team, my head was often not supported. It is quite tiring and demoralizing for the victim to support his own head.

Another problem I encountered was a lack of a situation during which I could relieve my bladder. The natural processes of the victim should be remembered.

Another consideration, should it be a long trip out, is wet clothes on the victim.

My thanks to the club for coming after me. Although I heard of no conflicts (we even had our famous "orgy" afterwards) I am sorry for any inconveniences which developed. I believe that the trip did a good deal towards accomplishing its purpose, even though I would not recommend this method of realism in most situations.

by R.L. Swenson

Submitted for publication: Aug. 9, 1966

LETTERS TO THE EDITOR

November 8, 1966

Annie and Whitt,

The last issue of the "Trog" was very good.

My new address:
Box 228 Lot #15 Rt. 6
Salisbury, N.C. 28144

Please send any mailings of interest.

Charles Maus

* * * *

November 30, 1966

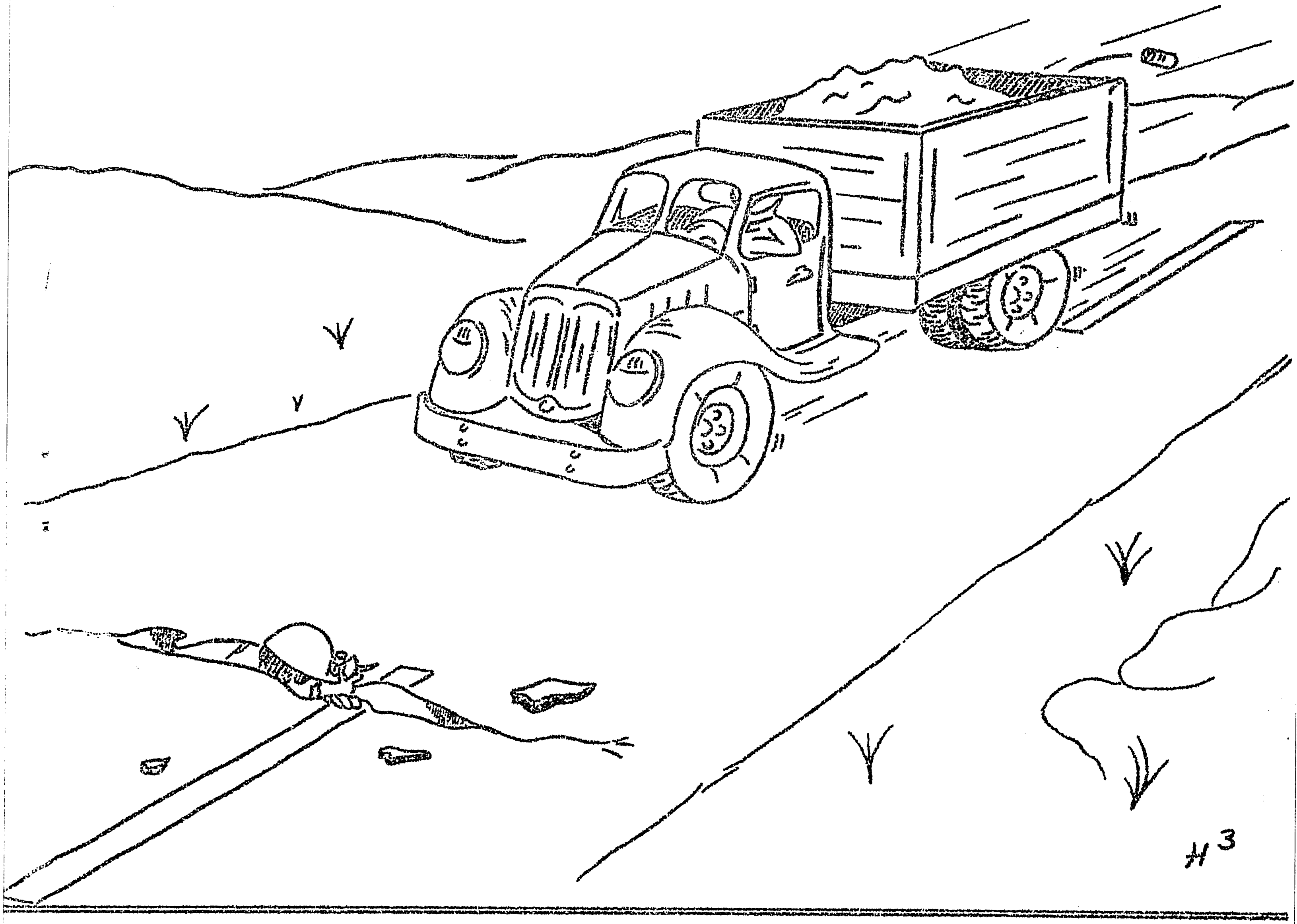
Anne and Whitt,

Here is an article for the next "Trog". I enjoyed the last one especially the last page advertising KARST.

Grotto is going great.

Ed Bauer

Edd's voice sonnded as if
he'd found something big!



THAT BLAST DID IT MIKE!

FANTASTIC KLEIN BOTTLE CAVE

Tazewell County, Virginia, has some pretty incredible caves. For example, there is Steele's Cave, a combination solutional and fault cave. There are Higginbotham's Caves, a pair of vertical caverns that can test anyone's limits of endurance. There are the caves at Glenwood Church that have very few close rivals for sheer beauty. There are other oddities such as Fallen Rock, Ward Cove, and Maiden Spring, some of which have yet to be fully explored. And one I know of in particular will have to stay unexplored. It is known locally as Klein Bottle Cave. It is owned by a Mr. Klein, and, as one might expect, the entrance is littered with old bottles. On a recent trip to Tazewell County, my brother, Barry, and I undertook to explore and, if possible, map this cave. Before the ordeal had run its course, however, I decided that Mobeus Cave in Indiana wasn't so amazing after all.

The entrance to Klein Bottle Cave is in the side of a low hill, and takes the form of a small, conical sink. At first, there appeared to be no passable opening, but after a few minutes of prodding around, we managed to force our way through some stubborn brush into the dank entrance room. The thick growth of weeds sprang back and all but hid the entrance from view. This caused the entrance room to become immediately darker than that to which our eyes could rapidly adjust. Not wishing to waste any time, however, we waded through the pile of bottles and began groping our way deeper into the cave; I on the left wall, and Barry on the right (no pun intended). Our eyes gradually became accustomed to the dark, and we found ourselves in a rather tubular passage curving to the left. I was attempting to make a rough survey of the cave by Brunton and pacing. According to my notes, the passage seemed to be making a loop and heading toward the entrance; but just as I was expecting to make a closure, the walls diverged to form a room of colossal dimensions. We continued along our respective walls, and Barry was out of sight in no time. Neither my carbide lamp, my VPI spotlight, nor my candle would display the opposite wall or the ceiling. I continued my survey for future reference. After several minutes of pacing, I noticed that my wall was continuing to diverge. "Holy infinity, Barry," I exclaimed, "this is a big room!"

"It sure is!" His muffled answer seemed to come simultaneously from beyond the wall and somewhere back in the room.

My lamp was rapidly growing dim, but I continued groping along the wall, hoping to discover some sort of terminus. Just as my lamp was about to fail, I noticed a faint glimmer of daylight and soon found myself sitting in a pile of old bottles. Barry was standing by the opposite wall, looking bewildered. We forced our way back through the weeds into the blinding daylight..

"At least you'll be able to make a good closure," said Barry.

"Holy humus, Barry, the Brunton is full of dirt!" I said. Sure enough, where a magnetic needle once swang free, there was nothing but soil under the glass.

"Holy cow, Whitt, let's go get a hamburger."

On our way by Mr. Klein's house, we stopped to ask him why he had thrown away all those bottles.

"Never could fill them up," he explained. Ignorant landowners.

I had hoped that plotting out my survey notes would be apocalyptic, but the plan became such an inexplicable conglomeration of superimposed loops, that I discarded them in disgust.

To settle my nerves, I decided to visit a small, easy cave. The next weekend I found myself in 3-D Maze Cave in Rockingham County. On my way across the field, a farmer stopped me and asked if I had ever been to 4-D Maze Cave. Perceiving that I had encountered another farmer of negligible intelligence, I asked, "Do you realize that three dimensions represent the three valid intergals of a point, the first being a line, the second being a plane surface, and the third being a solid figure?"

"Of course," he said, blankly.

"Then how can there be a 4-D Maze Cave when such is beyond the realm of physical reality?" I asked.

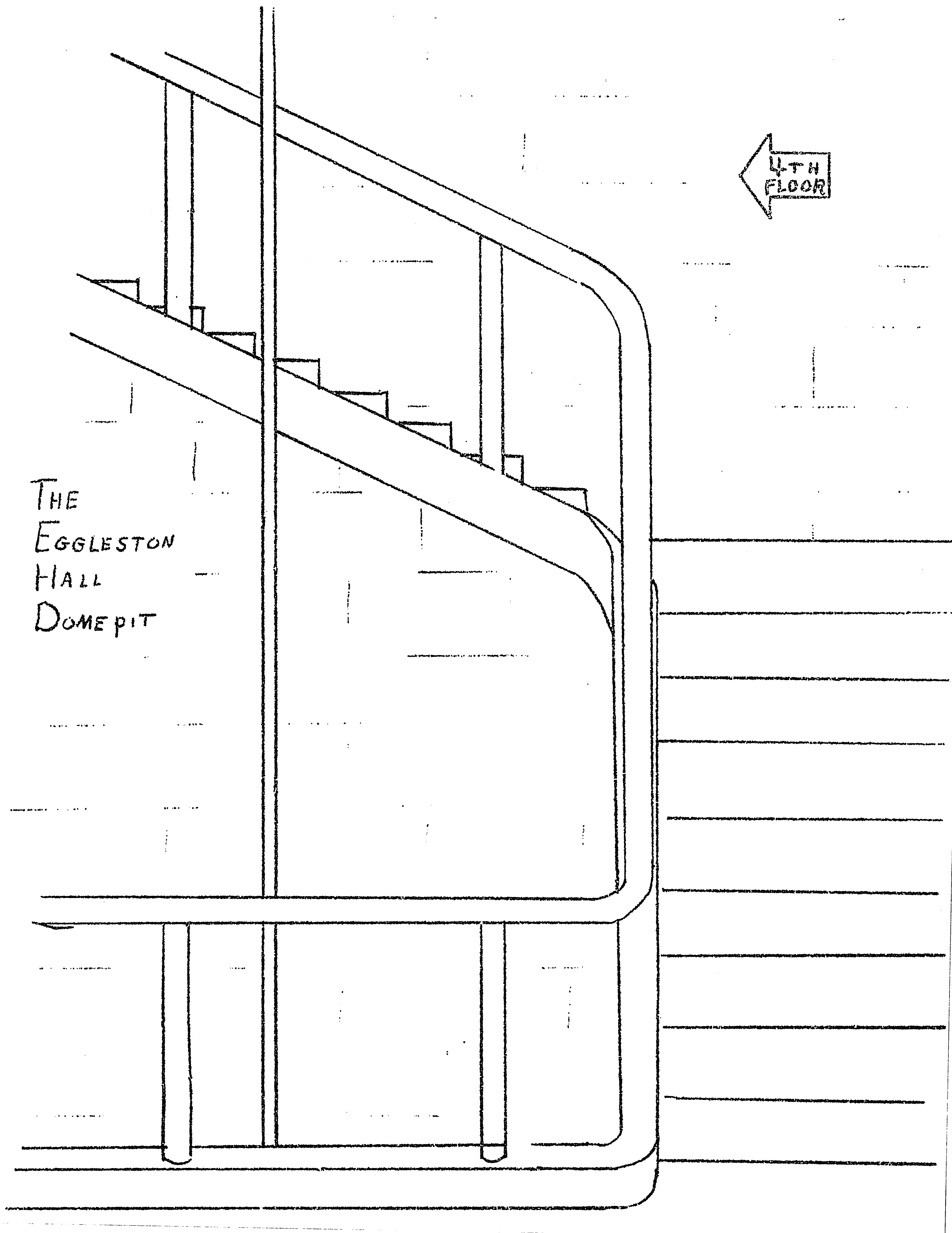
"See for yourself," he chuckled.

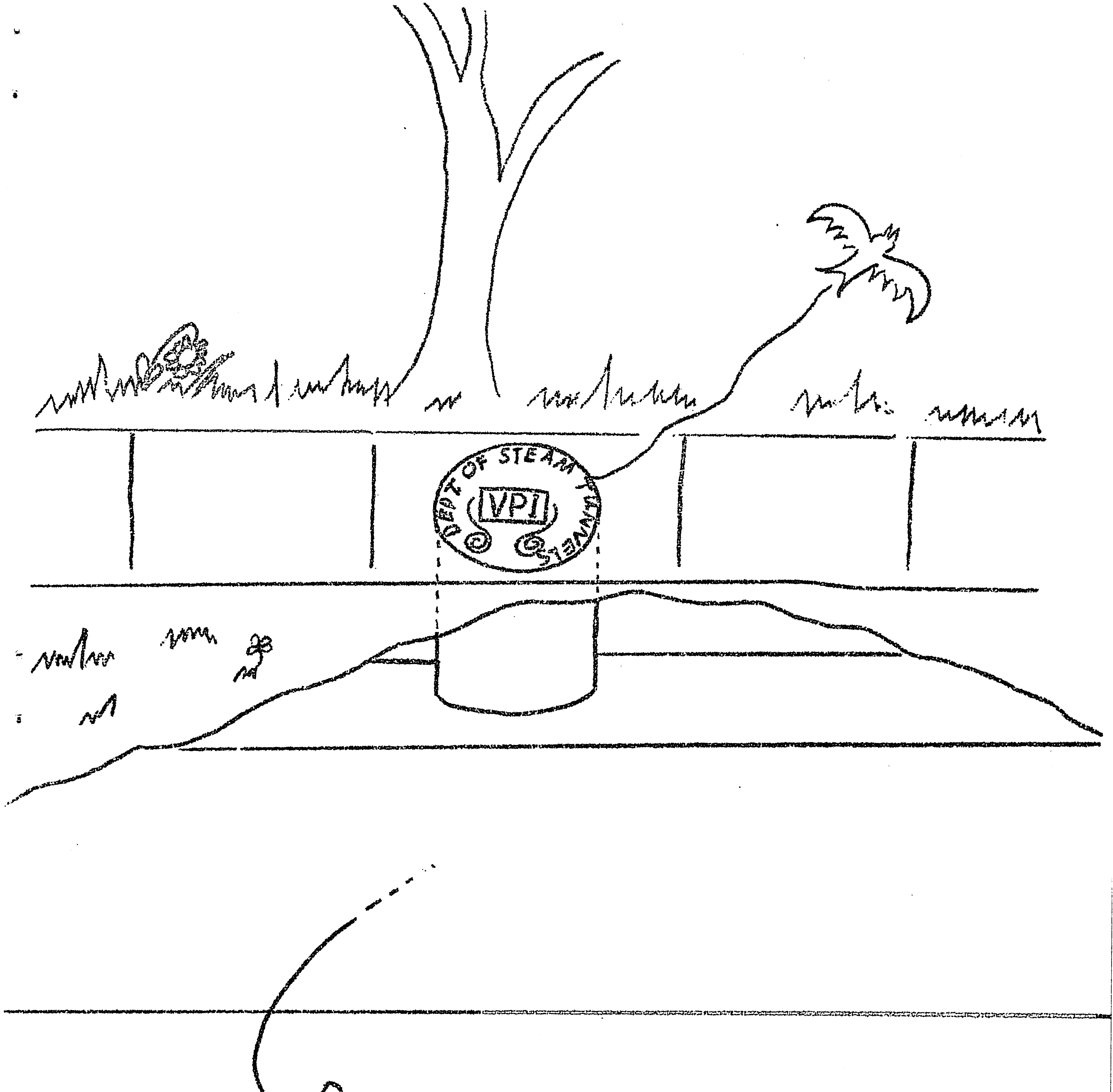
Hoping to prove the farmer wrong, I quickly located the entrance and began to explore it. Anticipating a complex labyrinth, I smoked an arrow onto the wall to point the way out. The arrow immediately turned into the hand of a clock and began to revolve slowly. The farmer was right. If I arrive at the arrows at the right time, they will point out.

Holy Myotis, Barry, I'm sticking to Batcaves from now on!

R.E. Whittemore

Submitted for publication March 28, 1966.


4TH FLOOR
THE EGGLESTON HALL DOMEPIT



DROWN THE LIGHTS, HERE COME THE CAMPUS FUZZ!!

AN EDITORIAL

It has been called to the attention of the Troglodyte staff that this august journal is, from time to time, more regionally oriented than club oriented. With the recent increase in dues, largely to cover Troglodyte expenses, it seems that perhaps this regional orientation is out of perspective with the purpose of this journal. Here, then, to curb this situation by getting the club into the paper, is ...

IMPROBABE GROTTO NEWS ITEMS

Bill Grenoble and Tom Harris, after twenty grueling hours in New River Cave, finally discovered the legendary back entrance, only to find that Tom Roehr had gated it the day before. They were forced to retrace their steps through the cave.

Conspicuous in their absence on this trip were John Eads, Mike Youso, and Jim Cooper. Planning to meet Bill at the entrance, they had left an hour earlier on motorcycles, but, through a navigational error, discovered Dead Air Cave.

Reek Keener boasted that he would attempt to Jumar the 300 foot face of the Ripplemead Quarry, despite warnings of loose rocks. Unfortunately, the only person who showed up to witness the event was a reporter from the Roanoke Times.

Sam Dunaway went siphoning in Miller's Cove Cave last Sunday afternoon. Stripping down to the altoghether, he dove through a promising-looking siphon and emerged in a surface spring, only to find himself in the midst of a church picnic. He was forced to retrace his steps through the cave.

R.E. Whittemore finally succeeded in locating the Forest Room in New River Cave, but when he attempted to leave the cave, he found that Bill Grenoble and Tom Harris had blasted the entrance shut.

Larry Wuensch has finally discovered a connection between Teddy Bear Cave and the VPI steam tunnels.

Ed Morgan returned to James Cave to finish the survey only to discover that surface erosion had reduced it to nothing more than a few more undulations in the valley.

Jack O'Meara attempted to pass a note from the back of Tom's Land Rover to Stoney's car by flying it on the end of a piece of thread. The note was so lengthy that the wind drag pulled Jack from the vehicle. Fortunately, Stoney was able to grab the note as it went by and towed Jack through erractic gyrations for several miles before he found a soft spot in the median strip.

Tom Roehr tried to follow the phone lines over Walker Mountain in his Land Rover, but somehow ended up stuck in a large snowdrift.

Henry Stevens, perhaps better known as (cough! pant! wheeze! shudder! gasp! choke!) STEELMAN, explored a 500 foot deep pit in Greenbrier County, West Virginia, and subsequently discovered a large cave system at the bottom. He abandoned the survey, however, when he discovered that the other entrance is Link's Cave.

As they were exploring the lower passages of Pig Hole, Wes Thorne and Rick Keener discovered that the triple wells were not actually wells but natural formations.

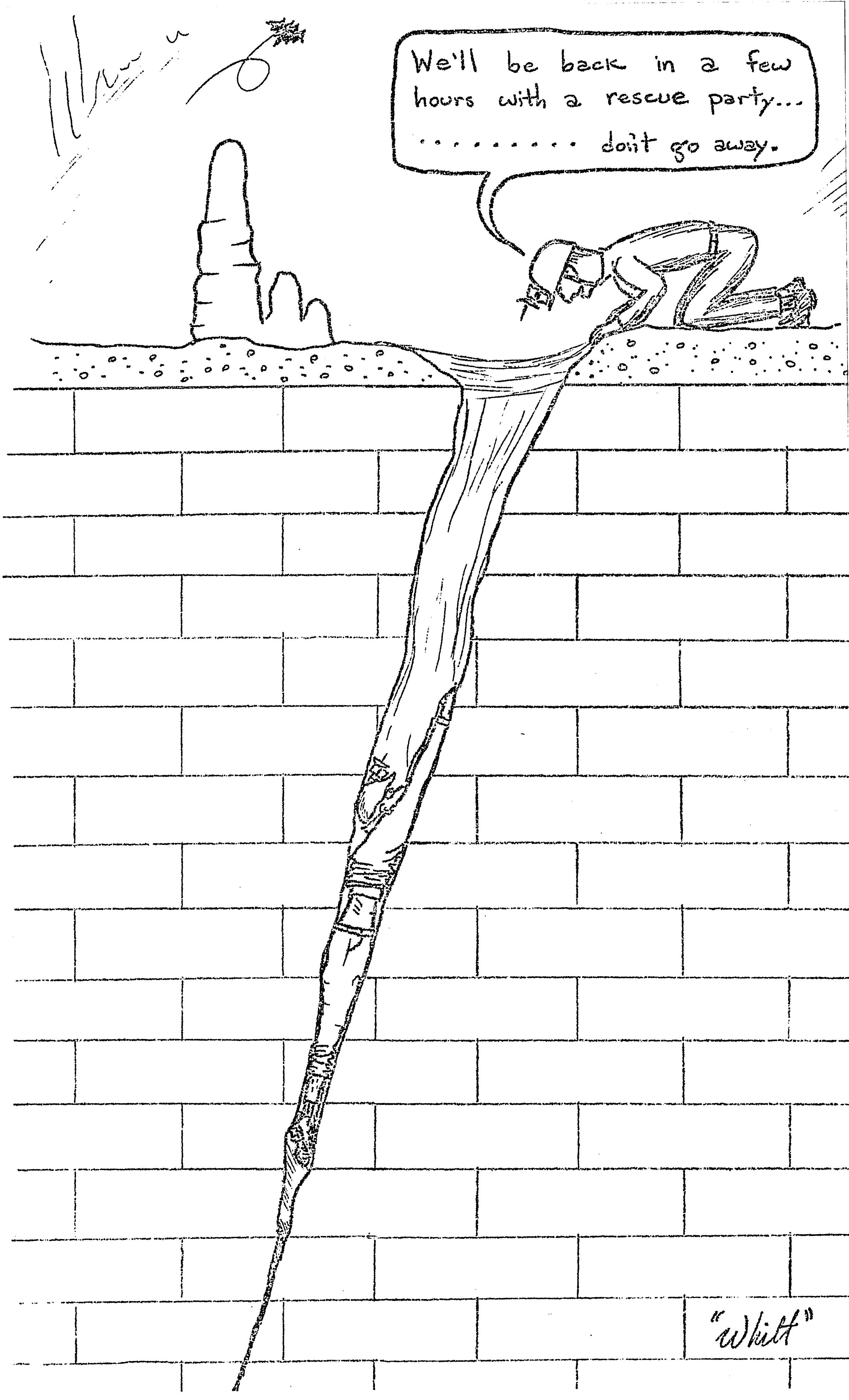
R.E. Whittemore recently completed the long awaited for map of Miller's Cove Cave. However, when presented to the VPI Print Shop for reproduction, a bottle of ink eradicator was accidentally spilled on the map. He was forced to retrace the cave.

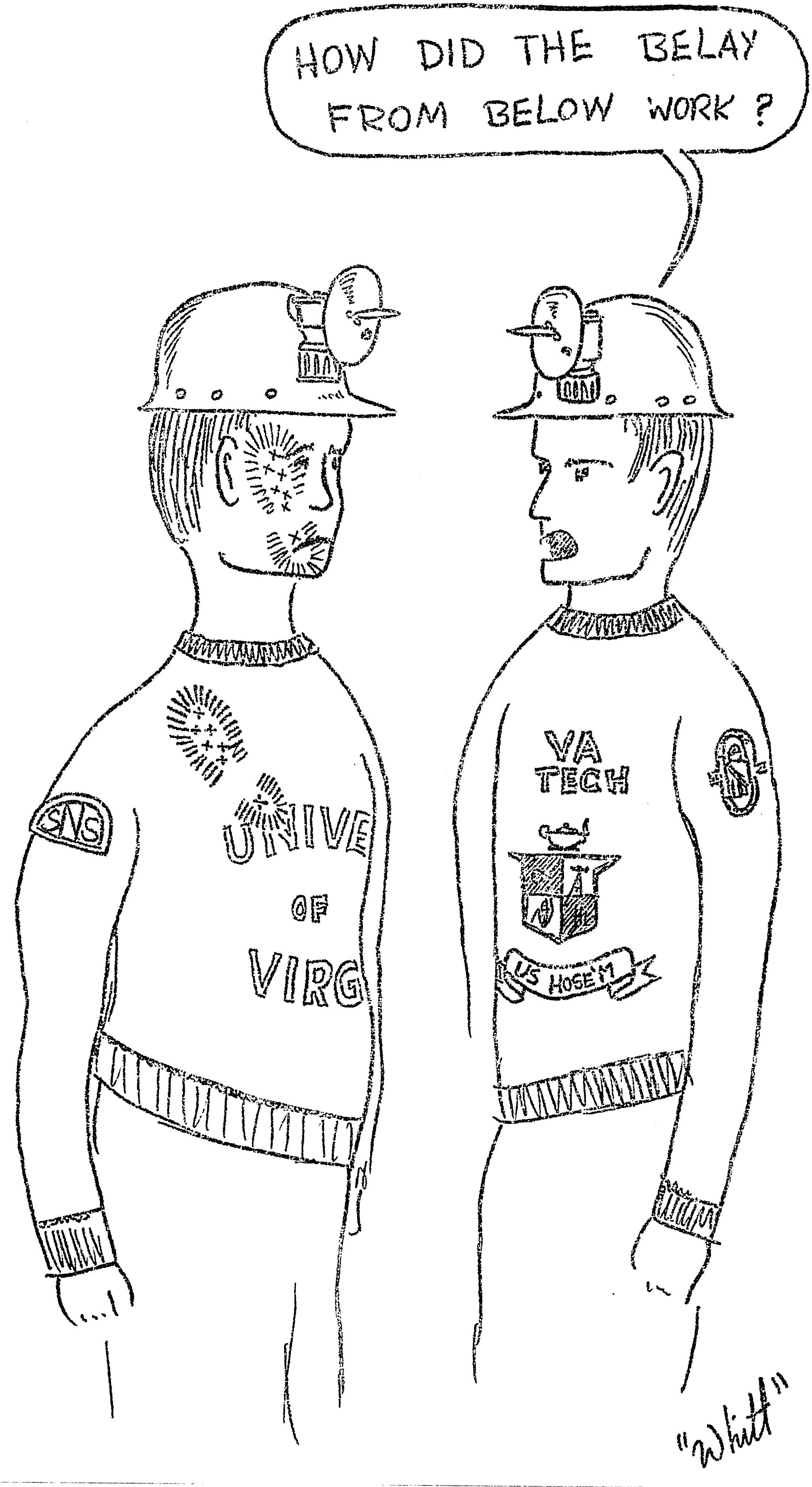
While attempting to finish the mapping of Marlboro Country in Butler's Cave, Tom Vigour, Rick Keener, Richard Beck, and Bill Royster found many signs of constant caver activity. They noticed that all the boot prints seen were impregnated with small spike holes. They surmised that Marlboro Country was evidently connected with another cave system.

Tom Roehr reports that his discussion with Dr. Cooper of the Geology Dept. has enlightened him on the recent closing of New River Cave. Dr. Cooper says the entrance was quite evidently blasted shut through no fault of the cave.

The Editors


Would you please catch the phone for me?
"Whit"


We'll be back in a few hours with a rescue party... .... don't go away.
"Whit"


HOW DID THE BELAY FROM BELOW WORK ?
SNS
UNIVE
OF
VIRG
VA TECH
US HOSE'M
"Whitt"

TRIP REPORTS

WARD COVE CAVE 4/9/65, 10/9/65 by Cletus Lee

Personnel: Anne Whittemore, R.E. Whittemore, Barry Whittemore, Rich Johnson.

The purpose of this trip was to complete the mapping of Ward Cove Cave.

We left the VPI campus about 1:30 Saturday afternoon, and arrived in Thompson Valley at about 5:00 p.m. Whitt decided we had a little time to kill before going to Ward Cove, so we went searching for the Lost Mill Caves.

The car was parked on the road near the location of the caves. From there, the five of us went treking over the nearby hills, poking in little holes and running from bulls. After about an hour of this, Barry and I stumbled onto this tremendous sinkhole about 75 feet deep and 100 feet in diameter. We were attracted to this direction by the sound of a large volume of water rushing by at an enormous pace. The The water was flowing from the cave through the sink and down into a siphon pool.

Meanwhile, Whitt, Anne and Rich had found Lost Mill #3 which had a stream flowing in the direction of Lost Mill #1.

At this point, we decided to get started toward Ward Cove. Arriving at the cave a little after dark, we carried our gear up to the "kitchen" area in the entrance. At 8:00 we started caving. After crossing the pit area near the entrance we ran down the "freight train" passage to a side passage which Earl Thierry said ended in a slit 150 feet from a fifty-foot pit.

Four of us (excluding Anne) rappelled some 30 feet down the pit and swung over to a small ledge. From here we began to map some 200 feet of a side passage. After mapping the side passage, we explored the rest of the other passage. On the previous mapping expedition the upper level of the passage had been explored, but the lower level was left virgin. On this trip, however, it lost its virginity.

Since it was getting late and we were getting hungry, we decided to call it a night. We crossed the pit by swinging out on a cable ladder which we had previously rigged. From here we proceeded back to the entrance and ate supper.

When we finished supper it was 12:30. We went to bed, determined to get an early start the next day. We managed to get up the next morning around 8:00 and had breakfast By the time we started mapping again it was 10:00.

TRIP REPORTS

Having crossed the pit again, we began to map the upper passage. After some hairy chimneying, we managed to get up to the crawling passage. This passage ended in a small room with a slit in the ceiling. Since Barry was thinnest, he offered to slide through the slit if we would give him help. We did.

After mapping the upper section, we chimneyed down 30 feet to the lower passage which was a dry streambed. In one of the dome pits a colony of fossil Bryzoans was found. We finished mapping the cave at about 3:30 and came out.

As we were leaving the Ward Cove area, we checked out the Thompson Canyon Caves and came up with some promising leads. Also in a small pit near Thompsons Canyon a previously unreported cave was found. It could possibly be 200 feet or more in length. After checking this area over, we headed back to VPI.

CROSSROADS CAVE 3/23/66 by Steve Evans

Personnel: George Stonikinis, Rick Keener.

At 8:00 a.m. George cut classes and picked up Rick and myself, so that we might enjoy, once again, the adventures of "underground cave exploring". We finally arrived at the cave site and prepared to enter the cave at 3:00 p.m. There were, of course, nasty remarks made about my knee pads. (i.e., Meowoooo, Pansy, etc.)

The entrance is located on the side of a shallow sinkhole next to Rt. 625. We entered the cave and immediately perceived that the Caves of Virginia book was right; it was, in fact, a maze cave. After spending much time exploring an unmapped section of the cave, we moved to the canyon section and started the long chimney above the stream. At 7:00 p.m. we turned back towards the entrance and started out.

"Out?"

"It's this way I think."

"No, I think it's way!"

"Here's a formation, remember passing it?"

"No!" and etc. to the entrance.

We spent six hours in the cave - and got home 2:00 a.m.

Note: My knees were fine!

TRIP REPORTS

COON PIT 7/30/66 by George Stonikinis

Personnel: Gene Harrison, Jim Weeks.

We investigated a pit approximately 1500 yards due west of Coon Cave, on the side of the second hill beyond the farmer's house. It consists of a 45 foot chimney leading to a room six by twelve feet. Several salamanders and cave bugs were found. The entrance is usually covered by brush and several logs. We were not the first to have entered it.

WARD COVE CAVE 11/21/65, 3/5/66, 4/8/66 by Barry Whittemore

"A high arched entrance leads to 1300 feet of explored passage. This is a huge cave with great possibilities. There are several unexplored leads. Ladders and ropes are necessary." (Earl Thierry, Caves of Virginia, p. 530).

Once again the team of Whittemore, Whittemore, and Whittemore, Brunton and tape in hand, were drawn to the wild unknown of southwestern Virginia.

On November 21, 1965, after a group of us had finished surveying Steele's Cave, we decided to have a look at the fabled Ward Cove Cave. The cave was easily found and in less than an hour we had run through all of the previously mapped area and were out again, our appetites whetted for our next trip to Tazewell County.

On March 5th and 6th, 1966, Whitt, Annie and I set out to survey the cave. We mapped across the easy entrance pit and turned left on the main channel (previously unmapped) where we picked up 700 feet of walking and easy crawling passage which ended in breakdown. We then resurveyed the remaining 1300 feet of running passage. One of the interesting features of the tunnel is that while it is basically straight, the passage winds from side to side between eight-foot high banks of gray mud. This compound looks remarkably like weathered stone until one tries to climb it. This section is terminated by a rainwell and a pool. A narrow fissure heading into this room contains some of the finest pucky mud I've ever seen; it's great for putting out Gremlin lamps.

While the Terrific Trio was hard at work with the Brunton and tape, the two other members of the party - trainees Ray "The Mighty Midget" Womack and Rich Johnson - were given a rope and ladder so that they might do some exploration work on their own.

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They journeyed to a side crawl which leads to a pendulum pit. A fissure passage on the opposite side was reported to pinch out after 150 feet. They crossed the pit and explored several hundred feet of cave including some good-sized crawlways. But alas, Monday morning classes once again caught up with us and we were forced to drag back to "Bleaksburg" once again.

One month later (April 9-10) we eagerly returned with high hopes of virgin passage. Our dreams were sustained in that we found a lot of passage (1100 feet beyond the pit), but traversing it, much less surveying it, was another story. We (Whitt, Rich, Cletus Lee and I - Annie stayed outside and talked to cowboys) averaged only one hundred feet per minute.

An interesting biological note: I spotted what I believe to have been one of the famed long-eared bats (Plecotus townsendii virginianus).

(For further details on the last trip, see Cletus Lee's report in this issue. Also, the full map of Ward Cove Cave is now complete).

GOODWINS CAVE 1/8/66 by Richard Beck

Personnel: Hank Harjes, Dick Gerling, Chris Bernowskij, Tom Roehr, Bob Simonds.

The purpose of this trip was to clean up this cave and thereby fulfill the conservation project requirement necessary for membership in the VPI Grotto.

When we entered the cave that afternoon, we saw what appeared to be the remains of a Roman orgy. Beer cans, paper, burnt logs, cinder-blocks, flashbulbs, and even a crowbar littered the floor. All of this being buried and removed, we proceeded into a short crawlway in which I found an unique formation - three empty quart bottles.

The next room was not quite as badly littered but it was much larger and trash collection was more difficult as the refuse covered a larger area. One corner appeared to be a cave register complete with Davy Crockett's carbide signature. Inspite of its marred condition, the room was beautiful although some of the formations were broken. We soon found out how they were broken.

Shortly, after the completion of cleaning this room, we met a group of high school cavers. They showed us how not to keep a cave beautiful. One of their party picked up a piece of breakdown and knocked a formation from the ceiling for his "collection". This

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The next day Ray and I decided to try to explore past the fifty foot pit that we had seen the night before. We, therefore, carried the cable ladder into the cave. The others planned to finish mapping the trunk passage. Ray and I crossed the pit by climbing twenty feet down the ladder, swinging to a smaller pit forming in the side of the larger one, and chimneying up the smaller one. At the top, we were greeted by one of the cave's few formations. This passage leads straight back seventy feet to a passage leading to the right. This side passage is a three hundred foot, mud-filled crawl that ends in breakdown. The rest of the cave is over a mud partition to the left of that main passage. There we found a dome pit with a large opening twenty feet up its wall. To the left of the dome pit is a fissure that we crossed to another mud partition. On the other side of the partition there is a sharp decline to a hole. This hole along with the fissure leads to a lower passage twenty to thirty feet below that level. Over the hole, Ray and I chimneyed up twenty feet to an upper lead. This lead is a winding passage that progresses from a walking to a crawling passage and ends in a small room. After that Ray and I joined the others, and we returned to VPI.