March 1971

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Larry Fattig

Alan Swenson

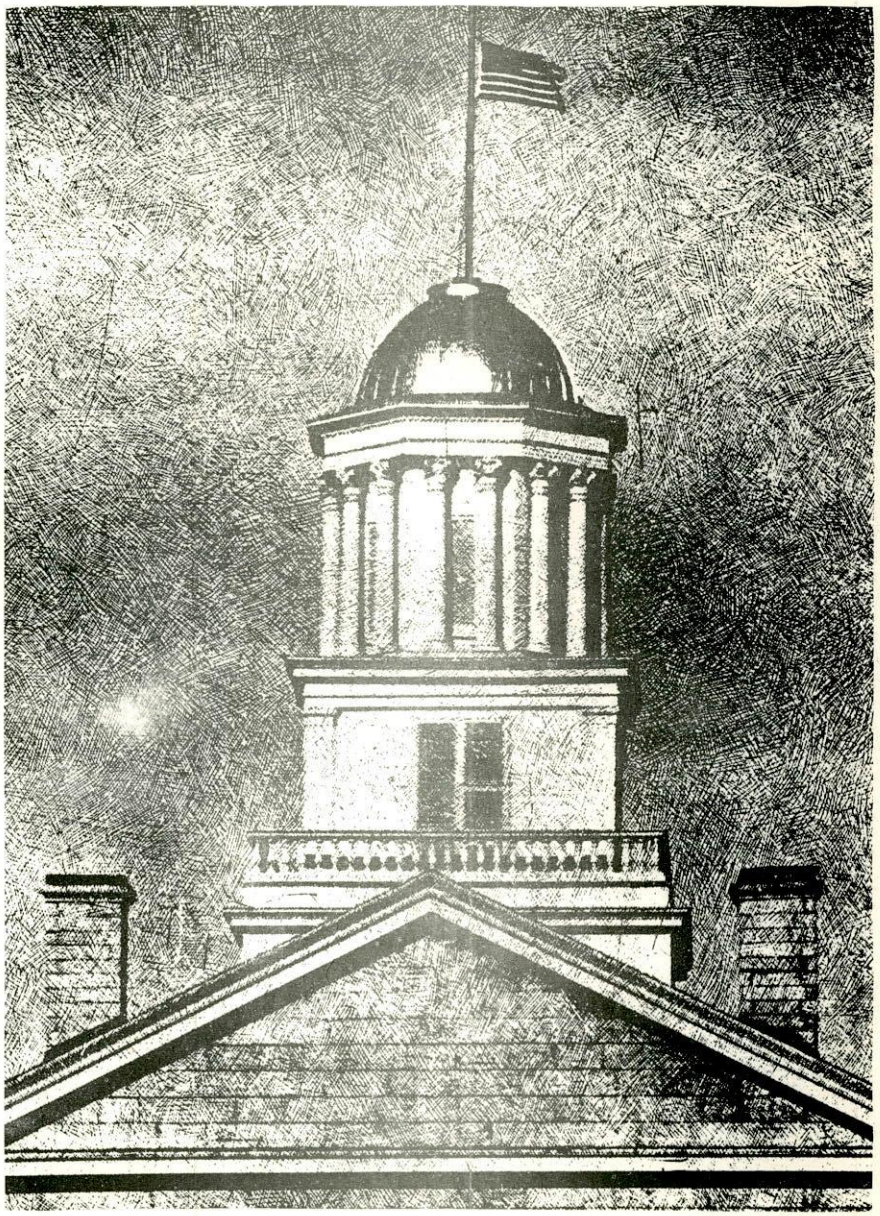
Vol. 7 #2

INTERCOM

Published Semi-spasmodically By

THE IOWA GROTTO

National Speleological Society



Volume VII Issue 2

March — April 1971

IOWA GROTTO INTERCOM
P. O. Box 228
Iowa City, Iowa 52240

The *Intercom* is printed in six issues each year by the Iowa Grotto, NSS. Subscriptions are two dollars for six issues, or free in exchange for similar publications of other grottos.

INTERCOM STAFF

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Lithophotography: John Johnson and Joe Novotny

COVER PICTURE: On the weekend of March 20 and 21, 1971, the Iowa Grotto hosted Seminar '71 on the campus of the University of Iowa in Iowa City, Iowa. The photo on the cover of this issue shows the outstanding landmark on the campus, the Old Capitol Building.

Iowa City *Press Citizen* photo by Joe Novotny

Printed in March 1971 and March 1974

IOWA GROTTO
National Speleological Society
P.O. Box 228
Iowa City, Iowa 52240

Volume Seven Issue Two

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SEMINAR '71

On March 20 and 21, 1971, the Iowa Grotto hosted Seminar '71 on the campus of the University of Iowa in Iowa City, Iowa. The two-day caving seminar was attended by 144 people from thirteen mid-west and eastern states. The farthest state represented was New York. At least Twelve caving organizations had members attending Seminar '71.

The idea of an annual seminar started in the spring of 1969 with the first meeting of Missouri cavers in St. Louis. March 1970 saw the second annual seminar again in St. Louis with attendance over two hundred people from many parts of the country. This year's session, the third annual seminar session, was an educational meeting on cave related subjects and techniques.

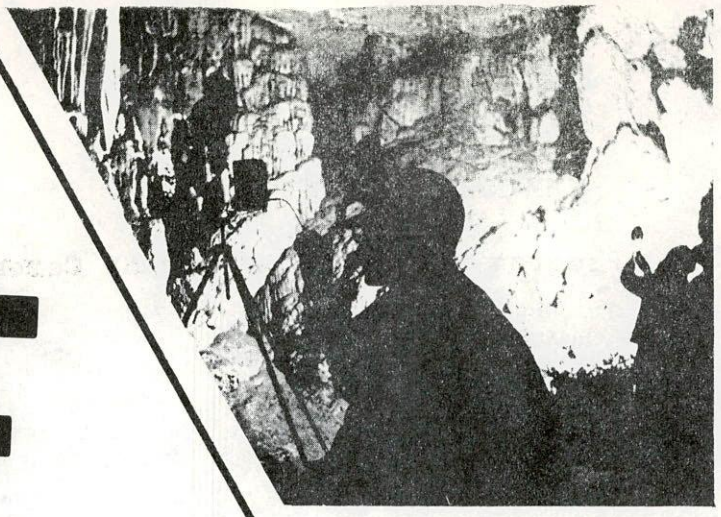
Nine topics were chosen for the seminar program, with times spaced so no topic would have to compete against another. Each session was planned for one full hour in length with a fifteen minute break between sessions. The long break provided a buffer zone in case a session ran overtime.

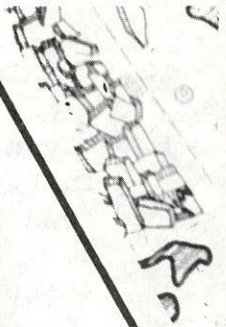
The eleven sessions, on nine different topics, all went well. The only session presented on Saturday morning was a group discussion on grotto publications conducted by the Iowa Grotto. After lunch, Bill Mixon, chairman of the Internal Organization Committee, led a discussion session on how chapters are chartered, their obligation to the society, and the services available to them from the society. The third session was an interesting presentation on the ecology of the cave by Dr. Kenneth Christiansen, Professor of Biology, from Grinnell College in Grinnell, Iowa. Rane Curl, N.S.S. President, gave an informative talk on caving accidents and caving safety in the United States. The last session on Saturday was in two parts. Roy Davis, developer and operator of Cumberland Caverns in Tennessee, gave a light but descriptive presentation on advanced cave photography. Simultaneously, John Johnson, from the Iowa Grotto, taught a session on the introduction to photographic equipment and terms. Sunday started with another two-part session. Dave Nicholson, a graduate student in mechanical engineering, presented the results of his study on the technical aspects of vertical caving. At the same time, Iowa Grotto vertical caver, Bruce Juel, gave a very interesting talk on fundamental vertical techniques. The next session, on land owner relations, was given by Earl Biffle, chairman of the Missouri Valley Ozark Region. After lunch, Dr. Holmes Semken from the University of Iowa, gave a presentation on vertebrate paleontology. The last session of the seminar was given by Don Rimbach on his techniques developed in Welch Spring and Devil's Well Cave Spring System in Missouri.

On Saturday evening, a banquet was held at the Colony Village Restaurant in the famous Amana Colonies. The banquet was served family style, all you could eat. A choice of ham or oven baked steak was offered. The editor of the Windy City Speleonews, who likes to poke jabs at most caving banquets, said he couldn't complain about this one. At the banquet, Dr. Donald McDonald gave a very interesting talk on the subject speleology and the environmental crisis.

The following fifty-two page seminar booklet was prepared for distribution to all people attending Seminar '71. The booklet contains biographies of the speakers as well as outlines, charts, sketches, etc. relating to the topics presented. Eighteen pages of information on vertical caving alone, is included. The publication was planned to minimize the need for taking notes during the talks. The Iowa Grotto hopes you find this parcel of caving information of interest. Additional copies of the seminar booklet are still available for one dollar each, from the Iowa Grotto, P.O. Box 228, Iowa City, Iowa 52240.

SEMINAR '71





BETTER CAVING

THROUGH EDUCATION

SEMINAR COMMITTEE

JOHN JOHNSON	Program, Banquet, Master of Ceremonies
TOM HRUSKA	Communications
LARRY FATTIG	Publications
ALAN SWENSON	Publications
DAVE NICHOLSON	Publications
STEVE SCARFF	Lodging, Dining
DAVE JAGNOW	Lodging
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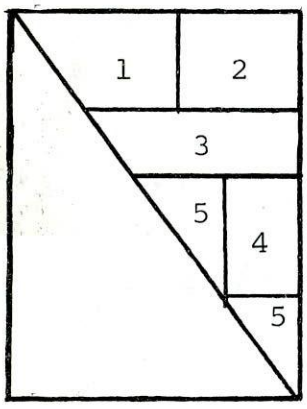
Prof. E. D. ALTON	University Relations

ABOUT THE COVER



1. Advanced photographic techniques in Fantastic Caverns, Missouri, 1968 N.S.S. Convention. Herold Herington silhouetted, Flash man Becky Jagnow, Dave Jagnow is the photographer.

2. Bob Thrun demonstrating a well slung seat.

3. Occasionally we dig into new Iowa caves.

4. Jim Hedges after expedition into Hunters Cave, Jackson County, Iowa. One of the hazards of this cave is the network of bailing twine strung by local cavers. These two balls were removed in August 1968.

5. Map of Hunters Cave by Jim Hedges.

WELCOME TO SEMINAR '71

The Iowa Grotto wishes to extend its welcome to all attending Seminar '71. We are in hopes you will find this third in the Seminar Series a continued growth of the educational process in caving.

We are sure you will recognise some prominent names in the NSS among the speakers this year. These men were all chosen for their knowledge in the fields of work in caving.

The Seminar Series, we feel, will grow to become a major educational activity of the region, and hopefully the NSS. With continued co-operation and work such as we have found throughout the NSS in setting up this Seminar, it cannot fail to grow in importance among cavers across the country.

The Iowa Grotto wishes to extend its thanks to the officers of the MVOR, in particular Donna Mroczkowski and Earl Biffle, the NSS and all those who have helped in organizing this Seminar. We also wish to extend a special thanks to the speakers for taking time from their busy schedules to participate in Seminar '71

Thankyou for attending

John W. Johnson

Iowa Grotto

IOWA GROTTO OFFICERS

Becky Jagnow	Chairman
Dave Nicholson	Vice Chairman
Tom Hruska	Secretary-Treasurer

SCHEDULE OF EVENTS FOR SEMINAR '71

Before 11 AM	Registration- Wisconsin Room, Iowa Union
10:30 - 11:00	Opening Activities- Room 225
11:00 - 12:00	Publications: Iowa Grotto- Ideas and techniques for improving our publications. Rm 225
12:00 - 1:00	Lunch Break
1:00 - 2:00	Internal Organizations: Bill Mixon- Ways to improve communications between grottoes and the N.S.S. and recommendations to increase N.S.S. memberships. Room 225
2:15 - 3:15	Ecology of the Cave: Dr. Ken Christiansen- Relationship of life to the cave environment. Room 225
3:30 - 4:30	Rescue Techniques: Rane Curl- Caving accidents and caving safety. Room 225
4:45 - 5:45	Advanced Cave Photography: Roy Davis- Techniques and unusual methods of cave photography. Room 225
4:45 - 5:45	Introduction to Photography: John Johnson- Introduction to photographic equipment and terms. Room 321
7:30	Banquet: Colony Village on Interstate 80 West.

Sunday, March 21

9:30 - 10:45	Technical Aspects of Vertical Caving: Dave Nicholson- Test results and advanced techniques in vertical equipment. Room 225
9:30 - 10:45	Practical Vertical Caving: Bruce Jule- Introduction to vertical caving techniques. Rm 321
11:00 - 12:00	Land Owner Relations: Earl Biffle- Bettering our relations with cave owners. Room 225
12:00 - 1:00	Lunch Break
1:00 - 2:00	Vertebrate Paleontology: Dr. Holmes Semken- The accumulation, excavation, and interpretation of fossil vertebrates from cave deposits. Rm 225
2:15 - 3:15	Advanced Cave Diving: Don Rimbach- Techniques developed in Welch Spring and Devil's Well Cave Spring System in Missouri. Room 225
3:15 - 3:30	A look to the Future! Room 225

IOWA GROTTO
National Speleological Society
Box 228
Iowa City, Iowa 52240

Volume Seven Issue Two

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PUBLICATIONS

RECOMMENDATIONS FOR GROTTO NEWS LETTERS

FROM THE NSS LIBRARIAN

1. Cover: Title of the publication- do not change it in the middle of a volume.
Volume and Issue number
Month and year of issue.

2. Masterhead: Same as above, plus: Name of Grotto
Name and address of editor.

3. Margins: Right hand page: 1½" on the left; 3/4 on right
Left hand page: 3/4 on the left; 1½ on right
Comment: If this seems to give you paper trouble try using fewer words and a different "layout".
Suggested Tools: Webster's Dictionary; Roget's Theasaurus; U.S. Superintendent of Documents. Style Manule; Word division supplement. This last costs $.35 from the superintendent of Documents.

4. Pagination: Continuous for the volume, not per issue only. If you are printing on both sides of the paper, the right hand page is always an odd number while the left hand is always an even number. If it is desirable to leave a page blank, just count it in and continue with your numbering. Plates do not necessarily have to be numbered in the pagination.

5. Departmentalize your contents then keep the arrangement consistent for every issue.

6. Maps and Drawings: Do not run them through the middle of the volume for much will be lost when the center is sewn into the spine of the bound volume.

7. Page Size; Use the standard letter sizes, either 8"by 10", or 8½" by 11"; Never legal size- 8½" by 13". Do not change paper size in the middle of a volume.

8. Index at the end of the volume with a cumulated index at the end of 5 years.

9. Running titles and issue dates are advisable on every page- either top or bottom- just keep it consistant whichever you choose.

10. Number of copies for the Library: 4 preferred
2 copies are bound.
2 remain in loose-leaf binders.

(Mrs.) Julia S. Day
former NSS Librarian

Some additional information will be presented from the floor.

INTERNAL ORGANIZATIONS SESSION

Bill Mixon

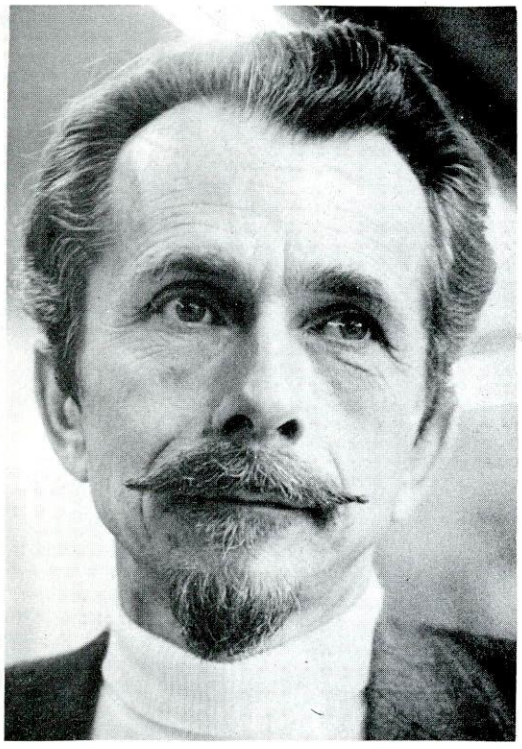
NSS 5728S

I started caving at the time the Windy City. Grotto was founded ten years ago. I've held several offices in that grotto, including editing the Windy City Speleonews since June 1964. My caving has been mostly in the midwest, with excursions to New Mexico, Mexico, and Canada plus six of the last seven conventions. I became chairman of the Internal Organizations Committee in June 1969 and am a candidate for NSS director this spring.

This informal session will be an opportunity to discuss any aspects of grottos and their relationship to the national Society that are of interest to those attending. I and other NSS officers and committee chairmen will be there to answer questions concerning how chapters are chartered, their obligations to the society, and the services available to them from the society. Anyone whoes grotto has had either success or problems in areas such as safety training, programs for meetings, or conservation projects is invited to describe them so that everyone can benefit from their experiences and the discussions that will, I hope, follow.

ECOLOGY OF THE CAVE

Kenneth Christiansen



B.A. Boston University 1948

Ph.D. Harvard 1951

Professor of Biology,
Grinnell College

Fellow of the N.S.S.

Among other things Dr. Christiansen has worked on evolution behavior and ecology of cave collembola. He has done extensive field studies on U.S. cave forms and worked at Laboratorie Souterrains in France for extended periods in 1962 and 1967-68. He Maintains an artifical cave chamber for experimental studies at Grinnell.

CAVE ECOLOGY

I. Caves as habitats

a) cave islands
b) Terrestrial versus aquatic
c) Demands and possibilities

II. Cave Animals

a) who is a cavenycole
b) Classification by habit
c) Classification by form

III. Aquatic environments

a) Types
   1) underground rivers
   2) lakes and rimstone pools
   3) phreatic water and crevices
b) Special conditions
   1) Flooding
   2) Food
   3) Light
   4) Stability and competition

IV. Terrestrial Environments

a) Origin of cave animals
b) Subdivision
   1) entryway
   2) profondeur
   3) mixed caves
   4) underground rivers
   5) artificial caves
c) Flora
d) Food
e) Light
f) Climate and stability

V. Evolutionary effects
   a) Life cycles
   b) diet, feeding and metabolism
   c) Form and convergence
   d) behaviour

VI. Ecological Interactions

a) Cave adaptation and mobility
b) Partitioning and sharing
c) Complexity of factor interaction
d) Cave uniqueness

VII. Caves as ecological - evolutionary laboratories.

CAVING ACCIDENTS AND CAVING SAFETY

Rane L. Curl

BIOGRAPHY

Joined the NSS in 1952 following summer employment in West Virginia. While a graduate student at MIT, became chairman of Boston Grotto ('53-'54). Received an Sc.D. in Chemical Engineering in 1955 and joined Shell Development Co. in Emeryville, California.

Founding member of the San Francisco Bay chapter of the NSS ('58) and Chairman subsequently ('58-'60). Became chairman of the NSS Safety committee in 1958 and elected to the NSS Board of Governors in 1959, serving until 1962. Chairman of the California Region of the NSS in 1960 and editor of the California Caver. Organized and was Chairman of the Black Chasm Cave Nature Preserve (a joint NSS-Nature Conservancy Project) in 1960.

Attended the third International Congress of Speleology in Austria in 1961 as a representative of the NSS and subsequently lived in England and Holland until 1964, returning as Professor of Chemical Engineering at the University of Michigan in 1964. Returned to Chairmanship of NSS Safety Committee in 1965 and re-elected to Board of Governors in 1967. Elected President in 1970 and President-Elect in 1971.

Author of a number of speleological articles published in the California Caver, NSS NEWS, NSS Bulletin, SCIENCE, Journal of Geology, and elsewhere. Interested in cave mineralogy (especially aragonite), geomorphology and cave-patterns, geochemical and geophysical processes of cavern development. Author of American Caving Accidents- 1967; 1968; 1969; 1970.

Member NSS, Cave Research Foundation, Spelean History Association, Cave research Group (Great Britain), Pengelly Trust, Sierra Club, AAAS, American Institute of Chemical Engineers, American Chemical Society, National Association of Watch and Clock Collectors.

CAVING ACCIDENTS AND CAVING SAFETY

Rane L. Curl

The NSS commenced detailed analysis and reporting of caving accidents in 1967 with the appearance of American Caving Accidents. The series has continued with editions for 1968 and 1969. Over this period certain general trends have been noted and conclusions reached.

Most accidents involve a fall, although falling objects, exposure, burns and drowning contribute to nearly half of all accidents. If one single major cause can be assigned to most accidents, it would be inexperience, followed closely by inadequate equipment, which is very similar and related. Other contributory causes are bad weather, poor physical condition, and poor caving party management.

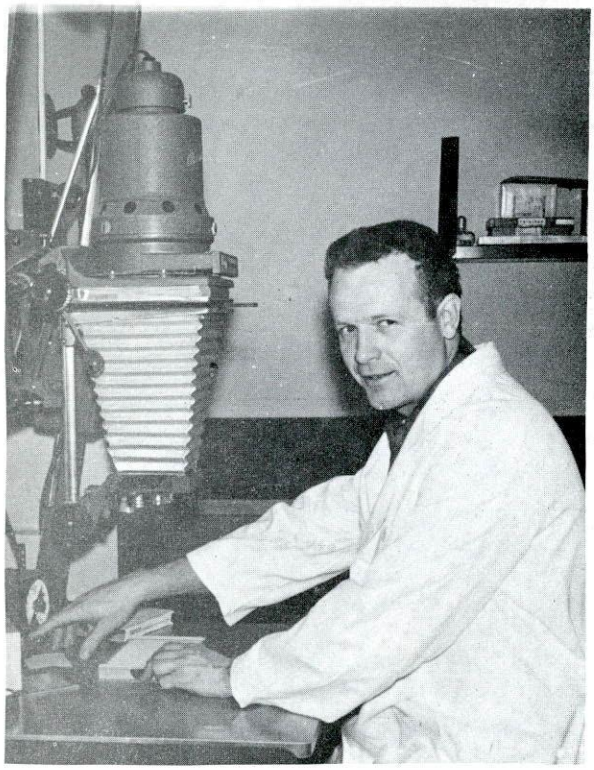
Two-thirds of all caving accidents occur in the 15-25 years age group, with over half of those to people age 15-20. Since the average age of "cavers" is probably greater than this, this data relate to the age-inexperience correlation. Most victims of caving accidents have no affiliation with an organized caving group.

It is difficult to identify "seasonal" trends in the rate of caving accidents, although the two months in which the greatest number have occurred are March and December.

At best, the reporting of caving accidents is incomplete and sketchy. Unless the accident reaches newspapers or the participants are responsible members of the NSS, information is usually not obtainable. Personal embarrassement is apparently a large contributor to this-as well, perhaps, as a wish to "forget". Nevertheless the accurate reporting and analysis of caving accidents should be an important part of caving safety. The very fact that most accidents occur to inexperienced cavers shows that whatever contributes to gaining experience will reduce the incident rate- and reading about the causes and consequences of the accidents that have occurred is a particularly sobering experience.

ADVANCED CAVE PHOTOGRAPHY

Roy Davis



Began caving in 1949. Visited well over 1000 American caves. Educated at David Lipscomb College, Nashville, Tenn.; Ordained Minister of First Christian Church. Member of 3-man team employed by Tenn. Div. of Geology to research Tenn. caves--resulting in Bulletin 64, "The Caves of Tennesee." Past NSS Board member (8 years); Past Editor NSS NEWS; Developer & Operator Cumberland Caverns, Tenn., only Commercial Cave Consultant in country--having been associated with development of 17 U.S. caves; Participant, as photographer, of 1964 Rio Camuy Expedition sponsored by Natl. Geographic Society & Explorers Club; Participant, as commercial cave consultant on 1966 Rio Camuy expedition sponsored by Commonwealth of Puerto Rico; Participated as photographer and "rope man" on Guatemala Expedition sponsored by ABC TV & Explorers Club. Conceived and established Natl. Caves Assn., an organization of American show caves; current Secretary & Treasurer of that organization. Editor of DOWN UNDER, NCA publication, and SPELEONEWS, Nashville Grotto newsletter. Operate private printing & photo plant.

SUMMARY OF ADVANCED PHOTOGRAPHIC SEMINAR

I. LECTURE

A. Purposes for making underground photographs

B. Basic equipment and how to carry it

C. Lighting methods--including multiple sources, silhouette, flashpowder, etc.

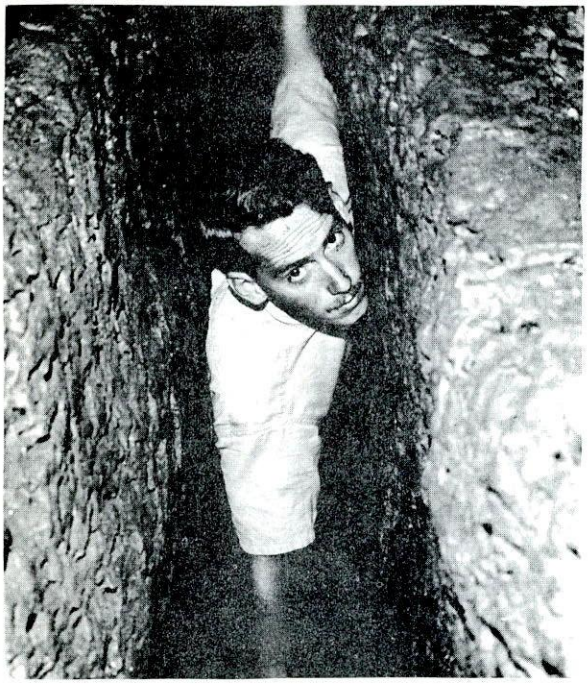
D. Some darkroom tricks

II. SLIDE SHOW.

III. DISCUSSION PERIOD.

INTRODUCTION TO PHOTOGRAPHY

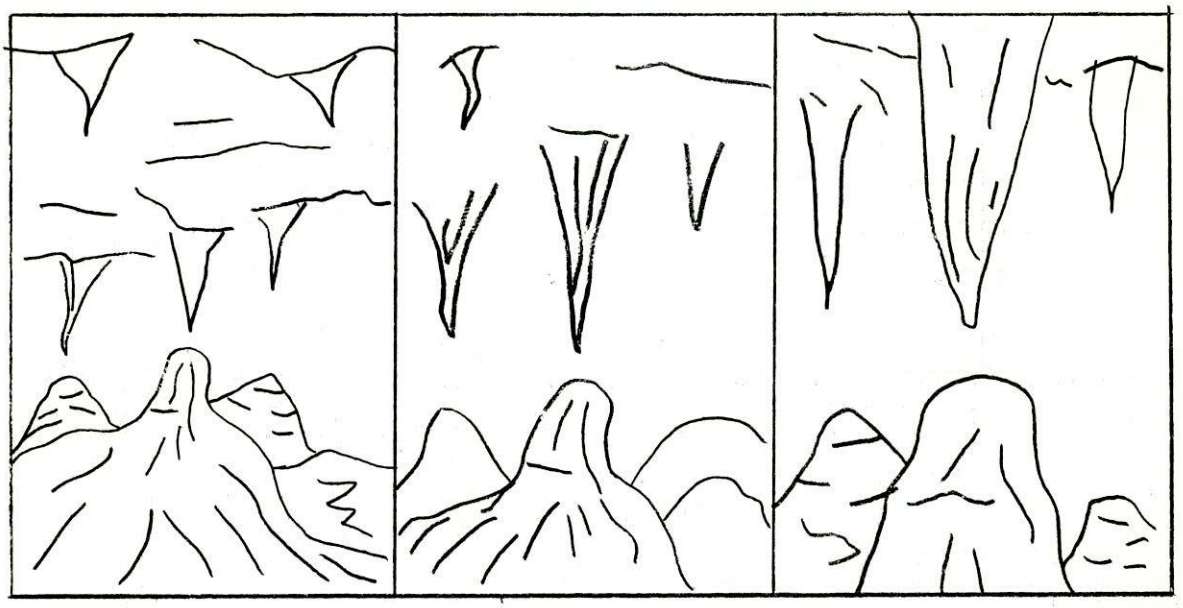
John Johnson



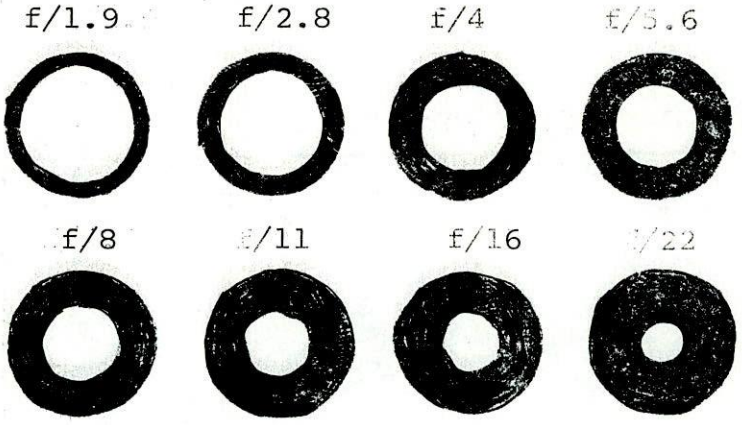
John is a photographer, he worked on a publication as a staff member in high school, attended the University of Iowa where he majored in radio and television communication. He was a cadet in AFROTC. He is currently a member of the Iowa Grotto and the NSS.

This talk deals primarily with the equipment necessary to start in photography, and its use. And in terms used in photographic work. The talk is designed for people with very little of no knowledge in photography.

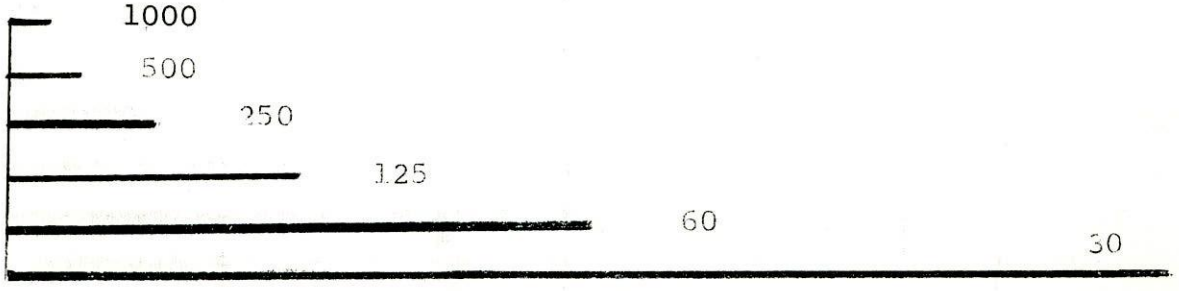
LENSES



Wide Angle Normal Telephoto

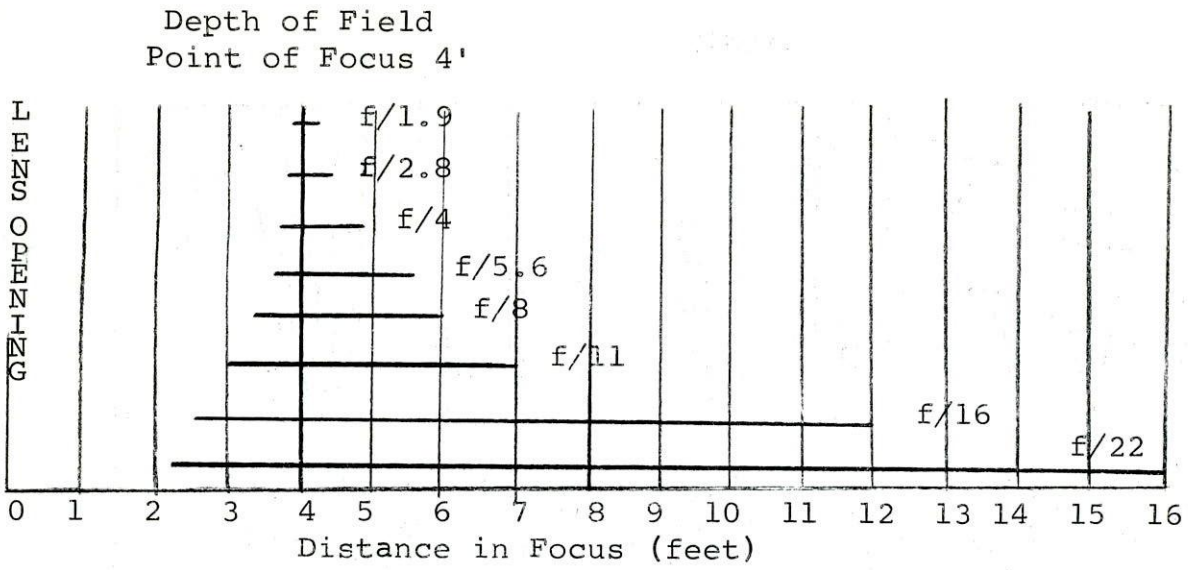


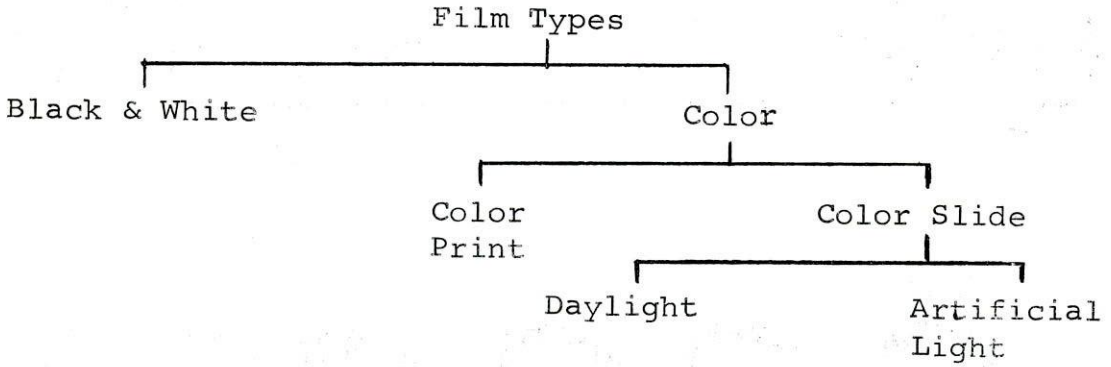
AMOUNT OF LIGHT TO FILM--LENS OPENING

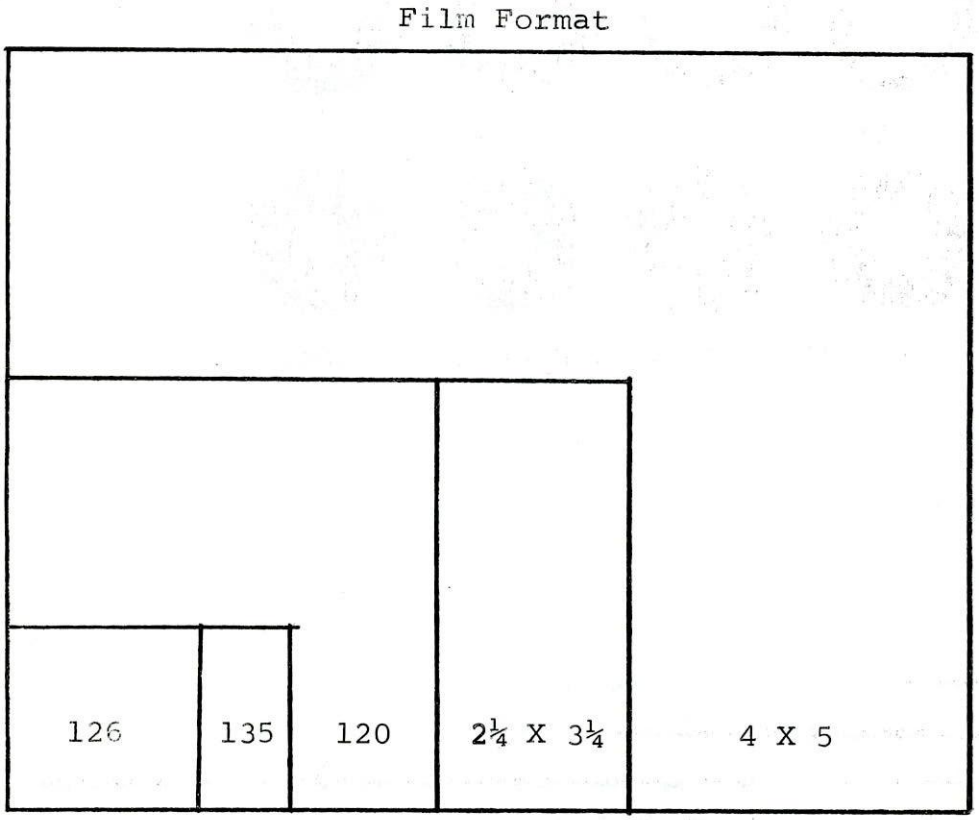


SHUTTER SPEED

AMOUNT OF LIGHT

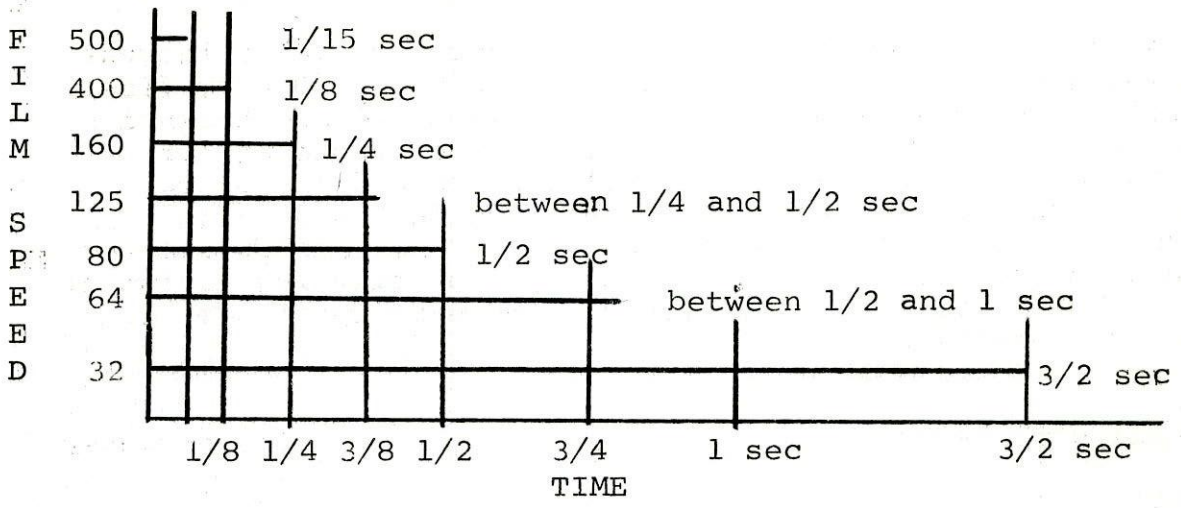






FILM SPEED (ASA)

Lens opening f/8 well lit room



The answer will be the proper f number
distance in feet) guide number

USA FILM SPEED	shooting dist. @1/30 or less Any Setting				EXPOSURE GUIDE NUMBERS									
					Any Setting	M Sync. Only				35 mm Focal Plane Only				
	f 22	f 16	f 11	f 8	up to 1/30	1/60	1/125	1/250	1/500	1/60	1/125	1/250	1/500	1/1000
25	5'	7'	10'	14'	110	90	75	55	40	100	70	50	35	25
32-50	7'	9'	13'	18'	140	110	95	70	50	125	90	65	45	32
64-100	9'	13'	18'	25'	200	160	135	100	70	180	125	90	65	45
125-200	13'	18'	25'	35'	280	220	190	140	100	250	180	125	90	65
250-400	18'	25'	35'	50'	400	320	270	200	140	350	250	180	125	90
500-800	25'	35'	50'	70'	550	450	370	280	200	500	350	250	180	125

ADVANCED VERTICAL TECHNOLOGY

Auto-biography of Speaker:

Dave Nicholson NSS 10895 BSME from the University of Iowa

I began caving in Iowa about four years ago. My major intrest in climbing and the technology of climbing began with my first vertical climbing session. The man who inspired and trained me, Harold Harington, was very interested in the technology of climbing equipment himself and some of it rubbed off on me. The first two years of climbing were spent in learning the various techniques in use by other people. As time progressed, I became interested in doing some testing of climbing equipment myself. The contents of this lecture are made up of some of those test results.

Outline of Lecture	Slide Number
I. Knot Tests	
A) Construction Details of rope used	#2
1) Kern - Mantle	
2) 7/16 " diameter	
3) 63 yarns in core	
4) 48 yarns in sheath	
B) Tensile test method	
1) Riehle testometer used	#3
2) 6 " per min. head separation	
3) Three wrap, knotless anchor	#4
C) Security test method	
1) Special loaded knot shaker	#5
2) Detail of eccentric of shaker	#6
3) All knots tested with 150 pounds were secure	
D) Results of tensile tests	
1) Grapevine knot (Double English knot, Double Fisherman's knot)	#7
a) 4470 ± 165 pounds	
b) Strongest of all knots tested	
c) Securest of all knots tested	
d) Very difficult to untie	
e) Very easy to tie, no problems if tied backward	
2) Barrel knot (Blood knot)	#8
a) 4273 ± 276 pounds	
b) Second strongest of those tested	
c) Not very secure unless "set" very well with a lot of force	
e) Difficult to untie	
f) Very difficult to tie and dangerous if tied backward	
3) Double Figure-Eight bend	#9
a) 3923 ± 93 pounds	

b) Sufficiently strong for excellent saftey factor
c) Not as secure as Grapevine knot but very good if ends are whipped to the standing line
d) Quite easy to untie, even after having been tightened with a large load
e) Easy to tie but can be dangerous if tied backward

4) Two Bowlines (Bowline bend) #10
a) 3546 ± 131 pounds
b) Still quite strong
c) Fairly secure if tied well and ends are whipped to standing line
d) Very easy to untie
e) Easy to tie but bulky and uses a lot of rope

5) Flemish bend (Figure-Eight bend) #11
a) 3523 ± 409 pounds
b) Still strong but very sensitive to how it is tied
c) Very secure if properly tied
d) Fairly easy to untie
e) Easy to tie, but difficult to work the slack out properly

6) Carrick Bend (Full Carrick bend, Sailor's knot, Anchor bend) #12
a) 3120 ± 173 pounds
b) Not very strong
c) Not very secure
d) Fairly easy to untie
e) Difficult to tie correctly, and very easy to tie incorrectly

7) Water knot (English knot, Fisherman's knot, Angler's knot) #13
a) 3010 ± 71 pounds
b) Not strong at all comparatively
c) Quite secure
d) Difficult to untie
e) Easy to tie and not important if tied backward

8) Modified Midshipman's hitch #14
a) 5137 ± 257 pounds
b) Extremely strong for anchoring a line around a four inch or less anchor
c) Quite secure if worked properly
d) Easy to untie
e) Easy to tie
f) If it is the only support in anchoring a line, the free end should be secured with half hitches or something

9) Ultimate Strength over a 4 inch diameter #15

a) 4880 ± 100 pounds
b) As strong as any rope needs to be
c) Higher strengths would be available if tested on larger diameter anchors
d) Each sample broke at the point of contact of the standing line and the anchor surface

E) Conclusions of Knot Tests #16

1) All knots tested retained at least 60% original unknotted strength. This indicates that the rope is quite safe even with the worst knot tested.
2) Strongest, most secure knot is the Grapevine bend (#3)
3) Best all around knot is the Double Figure-Eight bend (#5)
4) Unsuitable because of difficulty in tying are: Barrel knot (#4), Two Bowlines (#6), Flemish bend (#7), and Carrick bend (#8)
5) Unsuitable because of low strength and difficulty in untying is the Fisherman's bend (#9)
6) The strength of the unknotted rope (#2) will increase with an increased radius of anchor. The actual strength of a completely unknotted rope is impossible to determine. Blue Water II should be good for around 6,000 pounds. Unfortunately there is usually a weak link in the chain (the climber).
7) The Modified Midshipman's hitch (#1) should be used as the main supporting knot when the diameter of the anchor is four inches or less. This will result in a significant increase in strength over the unknotted anchor (#2) wound around the same four inch or less anchor and tied elsewhere. For anchors 5 inches or greater, it would probably be better to use the unknotted anchor method (#2) and tie a back-up knot on another anchor.

II. Climbing Device Tests

A) Tensile Test Method
1) Riehle testometer
2) 6 " per min head separation
3) Standing line anchored with bowline knot
4) Sling for climbing device anchored through loop

B) Devices Tested
1) Jumar #17
2) Hiebler
3) Knots #18
a) Prussik
b) Bachmann
c) Hedden

d) Spong

4) Sling materials
   a) 1/4 " soft braided nylon
   b) 5/16 " new manilla
   c) 5/16 " braided polyethylene

C) Test Results #19

1) Jumars
   a) Held better on Goldline than Sampson
   b) Did not completely break either rope
   c) There was no damage to the core of Sampson
   d) No apparent damage to jumar
   e) Very strong and secure

2) Hiebler
   a) Slid some on both ropes
   b) Rope shifted to the side of the cam and became wedged between cam and body
   c) Both hieblers available for testing were damaged on the Sampson rope on their first trials. With conservation in mind, the third test was by-passed.
   d) The Hiebler used on the Goldline bent the hinge-pin so extensively at only 820 pounds that the rope could not be removed.
   e) Because of the extreame damage to the Hieblers and the standing line, the tests of these devices were discontinued.

3) Nylon slings
   a) Held well with all knots
   b) Generally, nylon held better on Sampson than Goldline
   c) Slings broke at knot except for Bachmann which broke at the knot forming a loop
   d) There was very little slipping

4) Manilla Slings
   a) Prussik knots gave the best performance
   b) Very poor performance on Sampson with the other knots
   c) The Hedden and Spong knots on Goldline gave better results
   d) Two possible causes for poor performance
      (1) New stiff rope slings
      (2) "Backward" knots (against the lay of the rope)

5) Plastic Slings
   a) A very wide range of values were obtained due to the difficulty in "setting" the knots
   b) Generally, the Goldline held better that the Sampson
   c) All of the knots slipped to some extent, some very badly

D) Conclusions from Test Results

1) In general, the clibing devices held better on Goldline than Sampson

2) The Jumar is a very good rope gripping device
3) The Hiebler is a very poor rope gripping device due to its structual weakness
4) Manilla and polyethylene are not as good for knots as nylon
5) The Bachmann knot with nylon rope is probably the best climbing knot

III. Rappel Rack Construction #20

A) Material and equipment needed
1) 30 " of 1040-1045 hotrolled 3/8 " rod
2) One 3/8-16 nut
3) Heat source
a) Propane torch
b) Oxy-Acelylene torch
c) Forge with air blower from vacum cleaner
(1) Coal fired
(2) Charcoal Brickets
4) 1 1/4 " O.D. iron pipe or similar object
5) Vice-grips or large pliers
6) Leather gloves
7) 3/8-16 threading die

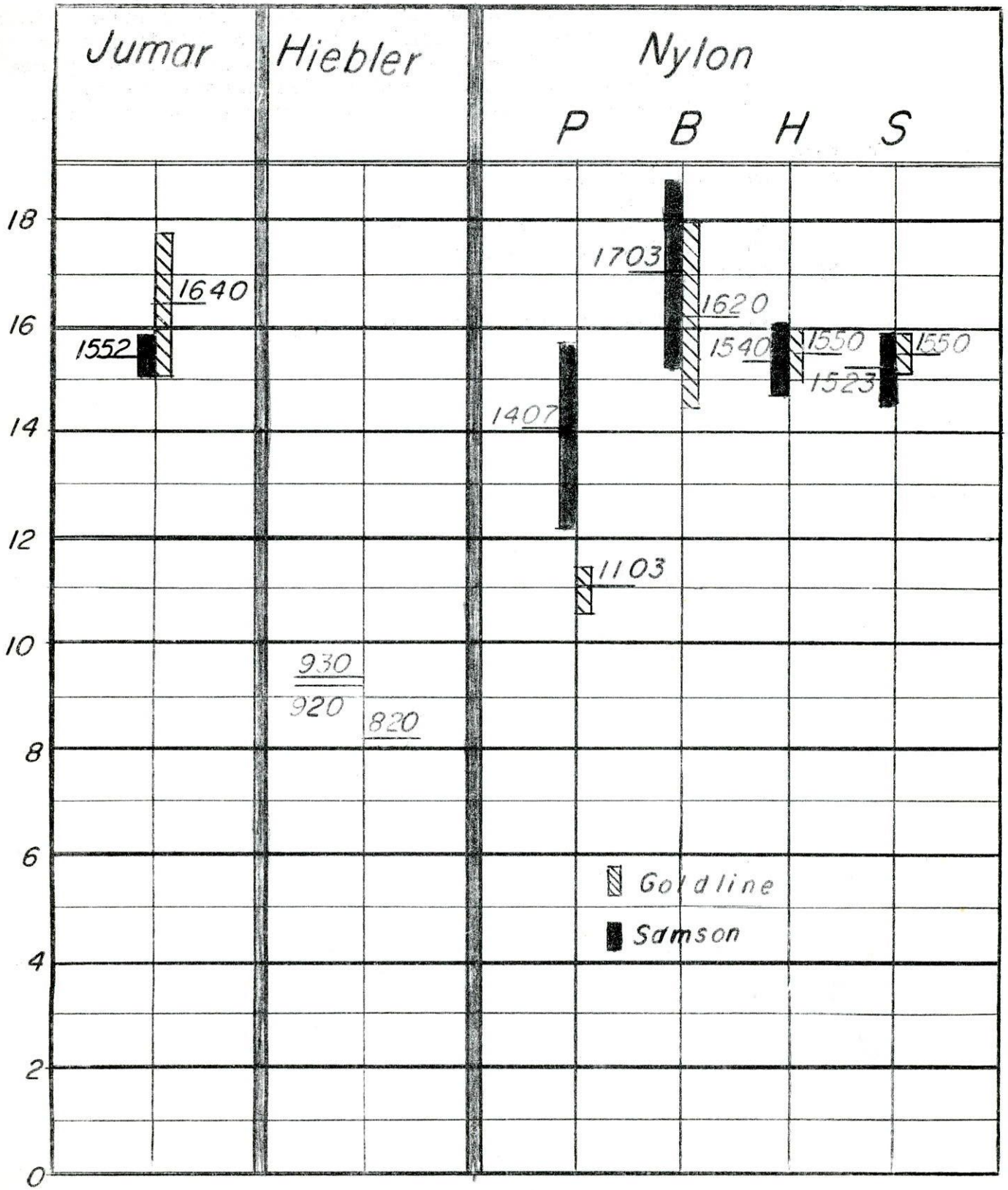
B) Technique
1) Thread 1/2 inch of one end of the 30 inch rod
2) Measure and mark a point 9 inches from the threaded end with soap stone so it can be seen when the rod is heated
3) Heat as large an area as possible with the heat source at the point marked, moving toward the unthreaded end of the rod
4) When an area is red hot, bend the rod over the 1 1/4 inch pipe (held in a vice or something) as far as possible by hand
5) Reheat a section next to the bent section
6) Bend the newly heated section as before
7) Continue in this mannor untill a half circle is formed with the two ends of the rod parallel
8) Adjust the width of the two ends to fit the brake bars that are to be used. Reheat a part of the bend if necessary to adjust this width
9) Mark a point on the long end of the bent rod about 2 1/4 inches from a point across from the short end
10) Heat the long end of the rod at this point and begin bending a pig-tail for anchoring the rack. The opening between the threaded end and the pig-tail may be adjusted to suit by heating and bending the pig-tail additionaly
11) Use the vice-grips or pliers to grip the hot end of the rod when bending the pig-tail
12) Use the hammer whenever necessary to help form the bends in the rod
13) Allow the newly formed rack to air cool without quenching in water. Quenching may make the rack

brittle and dangerous

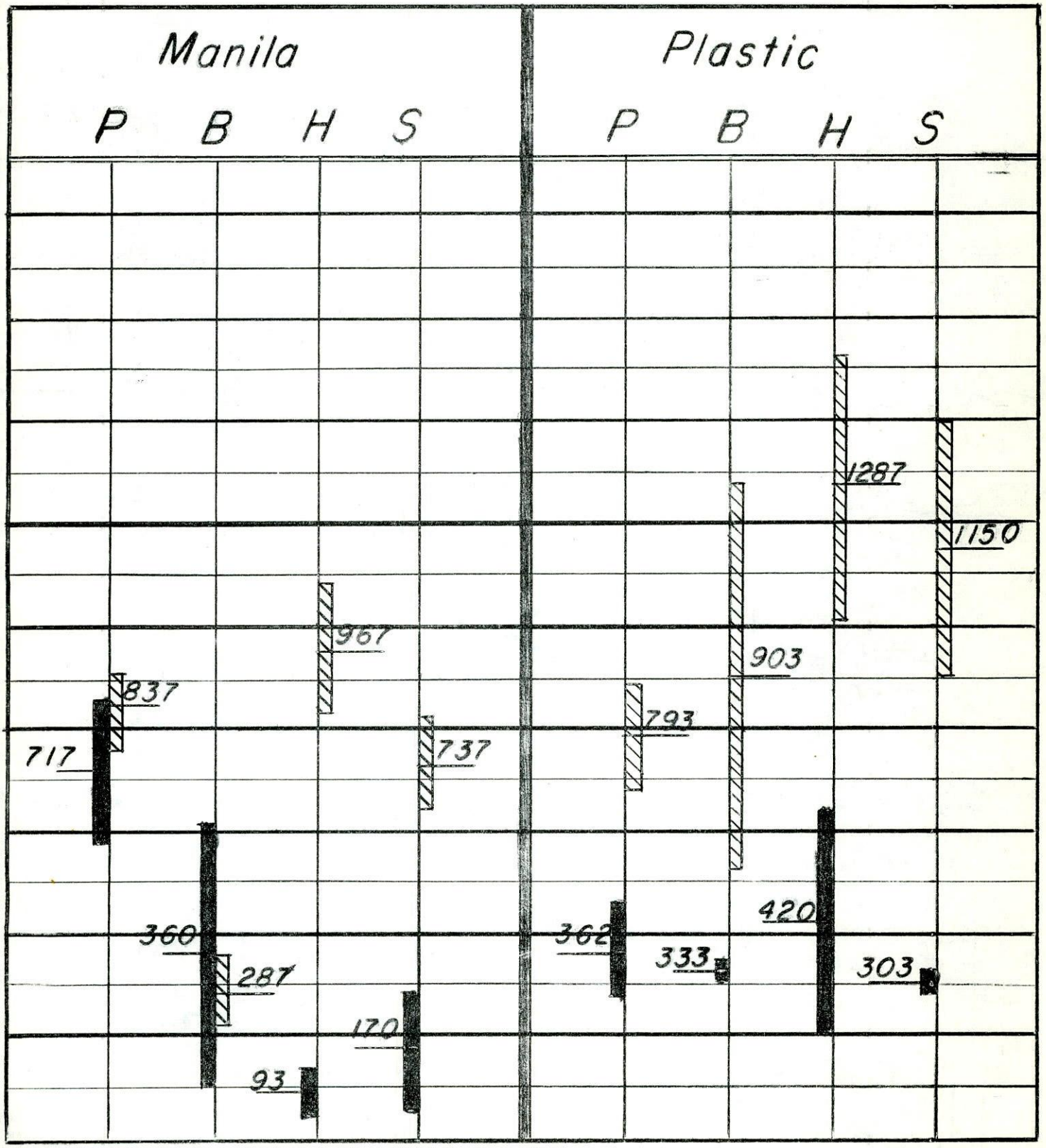
C) Assembly of Rack and Bars
   1) Use at least six good aluminum brake bars
   2) Slide the bars over the threaded section, one with the slot facing up and the next with the slot down
   3) After all six bars are on the rack, it is not necessary to slide the bars over the rounded section at the top of the rack, place the 3/8-16 nut on the threaded section and tighten securly in place
   4) It is problbly best and by far cheaper to use commercially available bars such as REI or Holubar

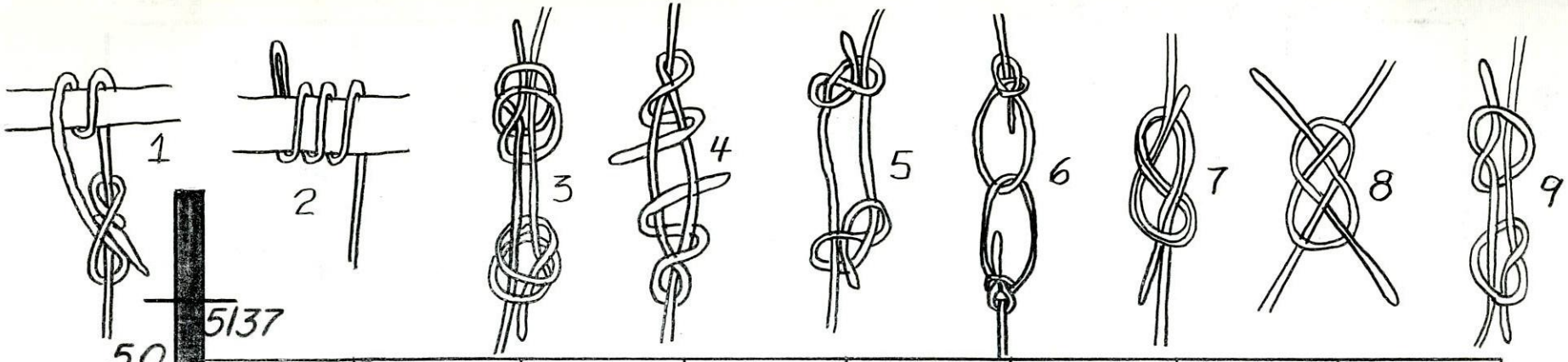
IV. Miss.
   A) Dynamic Belying
      1) Purpose
      2) Equipment for training
      3) Method for training
   B) Sewn Webbing
      1) Purpose
      2) Technology of sewn seat slings

An Evaluation of



Some Climbing Devices

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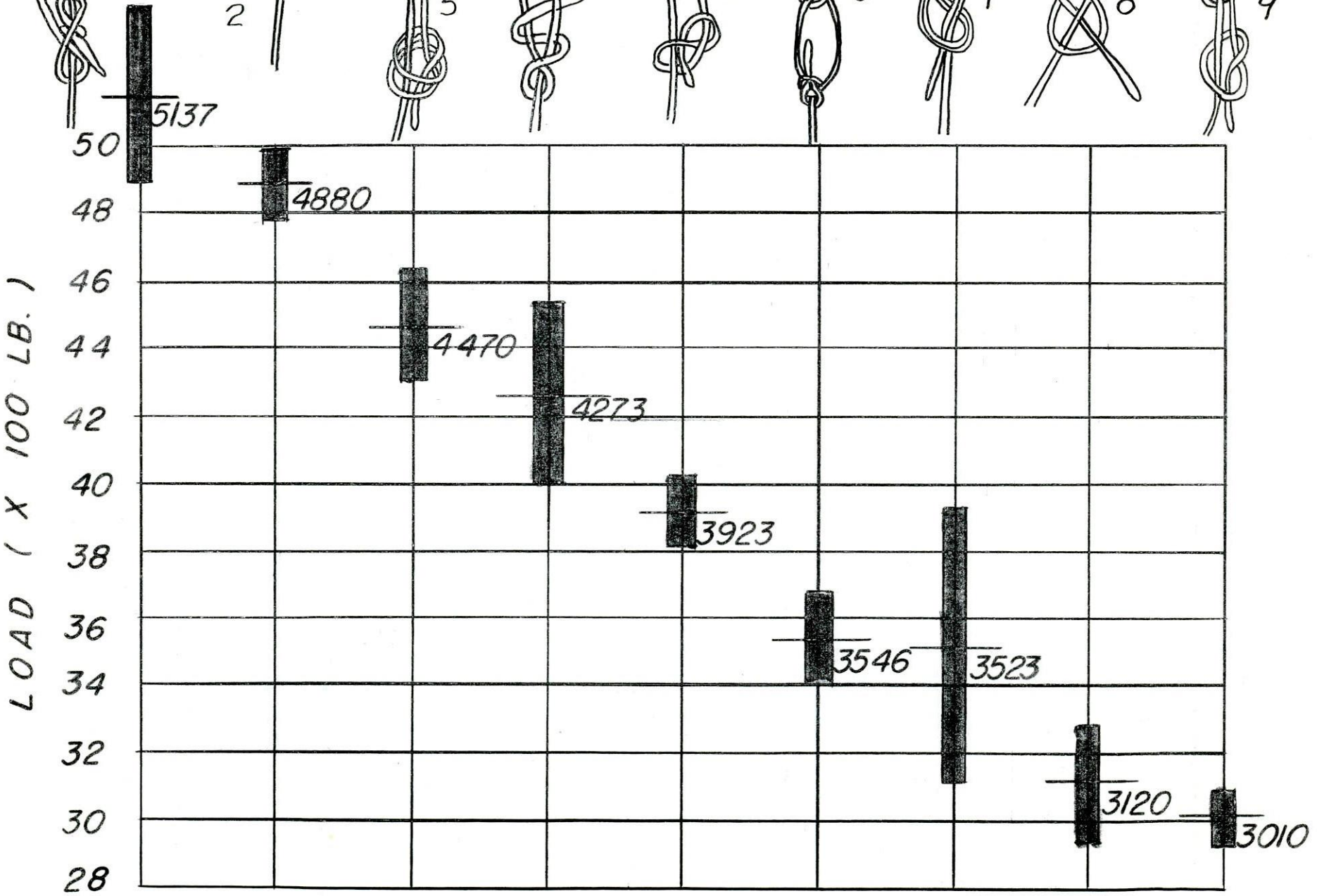
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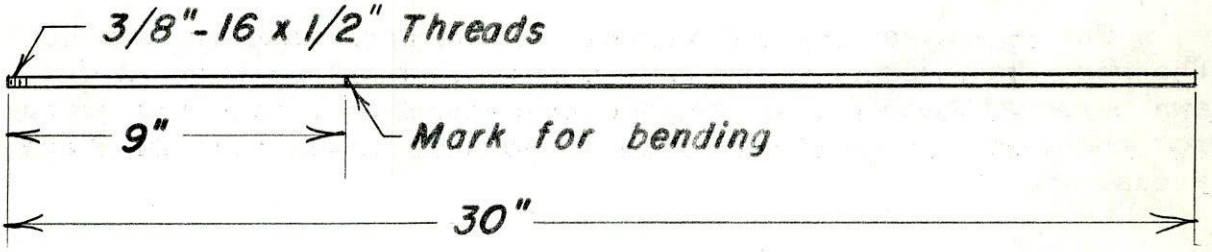
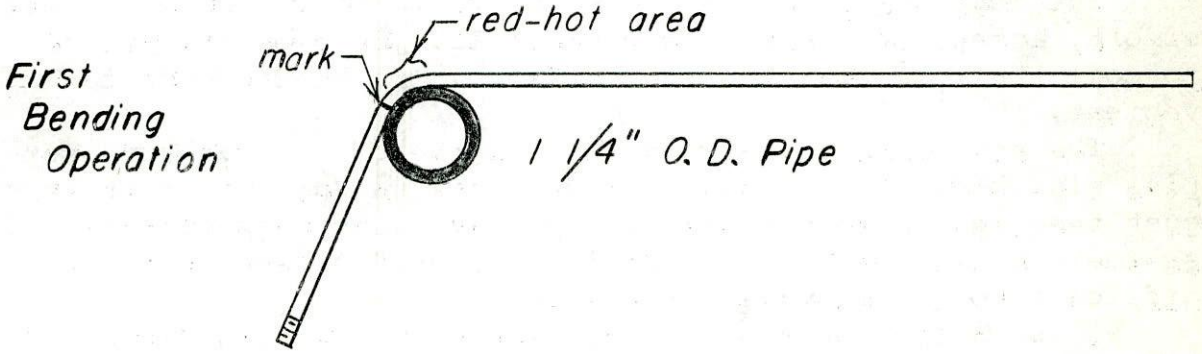
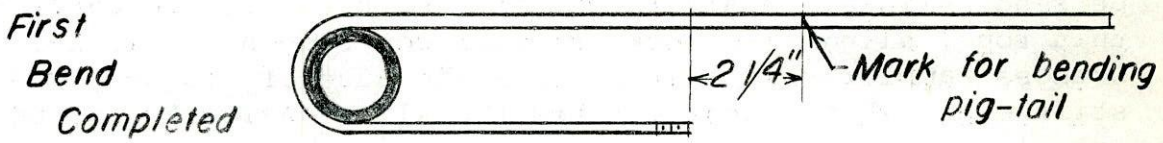
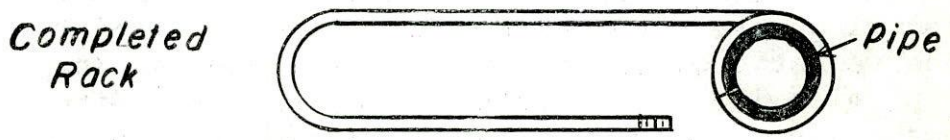
Rack Construction









FUNDAMENTAL VERTICAL TECHNIQUES

Bruce Juel

The equipment and techniques herein described may not be the best for everyone, but have proven themselves through my own personal experience, and are presented as a starting point for those who currently have no pronounced preference in these areas.

The Equipment

I use Bluewater II rope. It is of kernmantel construction, having a solid core of parallel nylon fibers in a woven nylon sheath. The construction is such that the rope has no tendency to spin upon loading, very little stretch, and is stiff and abrasion resistant. Its ultimate tensile strength approaches 5000 pounds.

The rope bag is an army surplus rocket bag. It will, with effort, accept 200 feet of Bluewater II. Some people prefer to coil the rope, but I find stuffing it to be far more convenient.

The equipment is carried through the cave in an army surplus side bag. It is ideal for vertical caving, since it is just the right size and has a very convenient compartmentalization scheme. A back pack is not desirable, partly because it is difficult to get at while on the rope.

I use a sewn seat sling, consisting of two leg rings attached to a waist ring with tubular sling material in front. One steps into the rings and then secures the waist ring with a locking 'biner. Locking carabiners are a must for securing personal slings. Don't forget to lock them, and be careful that rope, sling, and rock friction don't open the locks. I chose Rambler seat belt material because of its body and stiffness. This property makes the sling easier to put on and greatly reduces the tendency to twist and kink. Some people prefer to use the thinner, softer General Motors belt material for ease of sewing and stowing. This design is fail-safe since a failure of any component will not result in free-fall. It gives you complete freedom to move your legs about, which is a great advantage in using the Texas Juel Method (discussed later) or in climbing while wearing the sling. If the back of the leg rings are attached to the back of the waist ring with either elastic or innertube material, the leg loops will be held up, allowing you to walk, climb, or crawl without hinderance. Since the major load is carried by the leg loops while in use, the tendence to squeeze the hips is minimal. An interesting feature is that unloaded, the 'biner is hori-

zontal giving a comfortable fit. Under load, it will be vertical, giving a snug fit. This should be considered in construction. This type of sling's major advantage is that it has almost no inclination to squeeze, cut, crush, or otherwise mutilate certain prized possessions.

Standard caribiners are clipped to the outsides of the leg rings so the Jumars and the brake bar rack can be attached when not in use.

The rappel rack I use is a compact model made from 300 series stainless steel and anodized 7075 aluminum. The bars are alternately offset from the rack to give greater contact area with the rope. One side of each bar has a slot rather than a hole, so that the rack can be attached to the rope instead of threading the end of the rope through the rack. Most of you will probably choose to purchase bars from R.E.I. and a rack from one of the several cavers who make them. Beware of those with welded construction. An improperly applied weld can kill you.

I use a Millet chest sling, also secured with a locking caribiner. This is the one with the greatest tendency to open, even after being locked. There are few things more supprising than for your chest sling to release, dropping you backwards such that you hang upside down in the Jumar slings.

Jumars are devices which will slide up the rope, but not down. They accomplish this through the action of a cam, which pivots to bear against the rope. The harder the Jumar is pulled, the harder the cam presses. If the teeth on the cam become severely worn, you may find that they won't hold occasionally. The old aluminum cams were bad in this respect, but later vintage Jumars are equipped with more abrasion-resistant stainless steel. The rope cannot escape the attached Jumar, since the colored locks restrict the opening of the cam. The slings attach to the feet, allowing the legs, which are much stronger than the arms, to do all the work. My slings are nylon rope, but flat or tubular material is superior, since it doesn't stretch as much. Stretch in the slings robs you of a portion of each step. I have attached a thimble to the long sling at as high a point as possible without chest sling interference. This allows me to hook into the seat sling for a rest or for taking pictures.

Ankle loops keep the Jumar slings on. They are worth their weight in gold when you fall away from the rope. The best loops are securely sewn from flat or tubular nylon sling material. The loops should be just large enough to slip over your foot with the boot off.

I use Raichle Palu climbing boots, but Nam boots are preferable, if you can get them in your size. The Montagna cleat pattern in Vibram rubber is excellent for rock climbing and mud walking. The big disadvantage is that with $30 climbing

boots, I have a marked reluctance to wade in knee-deep water.

A helmet is a must in vertical work. A man knocked unconscious by a falling object while a hundred feet from the bottom is not in an enviable position. A chin strap should always be used on a safety helmet when a fall is possible.

I'm in a minority on the question, but I believe that electric is the only way in vertical work. Burning the rope in two just above your head can leave you in need of a good life insurance policy. The greater reliability and reduced maintenance of electric are a tremendous advantage. There was a time when electrics weren't practical, since each set of batteries was good for only about four hours. With the new alkaline energizers, bright light for over 25 hours is normal. I'm told they are rechargeable. Extra bulbs for both lights are carried in the headlamp. I also carry four extra batteries, even though I seldom have need of them.

A spare flashlight is carried in the sidepack, equipped with bands cut from a bicycle innertube for attachment to the arm.

Good thick leather gloves are an aid in rappelling. They get stiff when soaked and then dried, so losen them up before attempting a rappel. The rope is difficult to grip with a stiff glove.

Only extended cave explorations call for a canteen, but if you carry a carbide rope-burner, you need one for water supply and for putting out fires.

If going into a cave known to be cold (Iowa caves) exceptionally muddy (Iowa caves), or requiring a lot of crawling (Iowa caves), I wear a dacron trog suit. It has a pocket on the back to accept the battery pack. The knees are reinforced with heavy canvas and two layers of innertube. Mud does not cling to it, it is nonabsorbent, and is quite strong and abrasion resistant.

Knots

Generally speaking, with Bluewater, knots which require the rope to bend over itself are not the most desirable , it simply cannot bend over a diameter equal to itself and still grip tightly enough to provide the required locking action.

The following knots will take care of the vast majority of climbing situations with Bluewater:

1. Bowline
2. Bowline on a coil
3. Round turns with two half hitches
4. Flemish bend
5. Figure 8 loop
6. Prusik

The good old bowline is simple and strong, almost foolproof, and resistant to jamming, even while wet. It does, however, have a very nasty tendency to shake loose, and should always be backed up with an overhand knot.

When the end of a rope is to be tied around a person, the bowline-on-a-coil should always be used, since it distributes load over a much broader area. Again, always secure with an overhand.

The flemish bend, also known as the figure-8 bend, is one of the best for tying two ropes together. It doesn't require any severe bends in the rope, and is therefore stronger and easier to untie after taking a heavy load. It is tied by making a figure-8 in one rope and then following it through in the reverse direction with the end of the other.

The figure-8 loop is the best way to tie into the middle of the rope, such as you might need to do to anchor a belayer or to tie into a carabiner. It is tied by taking a section of rope, doubling it, and tying a figure 8 with the doubled length. In the unusual situation where it's not feasible to drop the loop around the object (and the end isn't too far away), the loop can be tied in the same manner as the bend, threading one end through a single figure 8.

When securing a line to a tree, I prefer to use the round turn and two half hitches. It is tied by taking the line twice around the tree and then putting a clove hitch onto the standing line.

Again, it should be emphasized that is is unwise to trust any knot that isn't backed up with an overhand (or two, as required).

Belaying

When to belay is simply a matter of judgement, but the rule of thumb is to belay with over 15 feet of exposure, and less when the probability or consequences of a fall is high. In the case where the belayer is nearly directly above the belayee, as is typical, the sitting belay is often used. I suggest that Sierra Club's "Freedom of the Hills" be consulted for details and other techniques.

The belayer should be anchored, unless his is an absolutely "bomb-proof" position. The rope should pass up between his legs and then behind him, above the anchor rope. The free end must never be released, since the relatively small tension it provides, in conjunction with the friction across the back, are the key to the problem. The support provided by the hand on the standing line is insignificant. As the climber moves up, the following motions are used, assuming

the free end is on the left side:

1. Right hand moves up, left hand down, pulling up slack.
2. Right hand moves down and grasps both ropes.
3. Left hand slides up, never releasing the rope, in preparation for the next cycle.

The arm holding the free end must not be allowed to move too far back. This increases the danger that the arm will be jerked around behind the belayer, dropping the belayee. There must always be enough rope available to lower the climber to a safe level, unless you (and a strong friend) are prepared to hoist him up.

Rappelling

The rack can be attached to the rope either before or after it is clipped to the seat sling, but I prefer the latter for safety ressons. The rope is placed through the bars (not touch-ingthe top of the rack) such that it holds the bars on. Three to five bars are necessary, depending upon the rack, rope, and rope contaminants. The rope should always exit off a bar, not wrapped around a leg of the rack. Bars not in use should be snapped into the rack to retain the rope. While rappelling, jumaring equipment should always be carried ready for employ-ment, since racks go only down, and nowhere when jammed.

To remove one bar while in transit (bar addition is very similar):

A. Lift the free end upward.
B. Remove extras.
C. Switch rope to the other side, lift the rope, and remove one bar.
D. Snap in extras.

To go over the edge:

A. Make a final equipment check.
B. If the anchor point is above the rack, the best way is to place your insteps widely apart on the edge and lean back into space.
C. If the anchor point is not so fortunately placed, slither over the edge, but don't release the free end. Lean back and proceed.

The proper position while against a wall is to lean well back (usually about 70° to the wall) with the feet against the wall and legs spread wide. The extra hand is either on the standing line or the top of the rack to prevent toppling back-wards. It is often desirable to turn slightly, in order to view the area below. Take care that your descent rate is within reason to avoid rack and hand heat buildup.

Bounce rappelling is fun, but rather hazardous due to the rope abuse and increased probability of striking objects.

Stopping on the rope is accomplished by tying a half

hitch to the standing line with a loop of free line. The loop is then passed over the open leg of the rack. An alternate method is to wrap the free end aroung one thigh three or four times.

Care should be taken to avoid entangling coats, shirts, hair, gloves, and other objects in the rack. If this does happen, the upper Jumar is rigged through the chest sling and the rack cleared.

In order to rappel past a knot:

A. Rappel almost to the knot.
B. Rig the upper Jumar through the chest sling.
C. Detach the rack and reattach it just below the knot.
D. Attach the lower Jumar and climb down by thumbing the cams.
E. Detach upper Jumar.
F. Detach lower Jumar.

Jumaring
(Modified Jumar Method)

With the Modified Jumar Method, the left sling extends from the left foot to the left Jumar, which just clears the chest sling 'biner in the standing position with the Jumar sling loaded. The right Jumar attaches to the right foot and is just long enough that a couple of fingers can be inserted in the handle. Climbing is accomplished by alternately standing in one sling while raising the other foot and Jumar. The rope passes through the chest sling and the long Jumar sling passes through the chest sling 'biner. Thumbing the lower Jumar cam open before raising it allows the rope to slide through much more easily.

It is possible to climb past a knot as follows:

A. Bring both Jumars as high as they will comfortably go.
B. Stand, unclip, and reclip the upper Jumar above the knot.
C. Stand, unclip, and reclip the lower Jumar above the knot.

Climbing over an edge is done as follows:

A. Bring both Jumars as high as they will comfortably go.
B. Stand, unclip, and reclip the upper Jumar above the edge. It's important that the rope pass through the chest sling to keep you from falling backwards. One should hang onto the rope with the free hand regardless of whether the rope is through the chest sling or not.

C. Climb over.

Jumars should always be carried ready for use while rappelling. The conversion is accomplished as follows:

A. Tie off rack.
B. Rig upper Jumar through chest sling.
C. Derig rack.
D. Pass the end of the rope through the chest sling.
E. Rig lower Jumar.

Texas Juel Method

Here's a method that came to me after a nightmare of 800 - 900 feet of bloody-kneed contact climbing. It bears a slight resemblance to the Texas method, which originally used a knot attached to the seat sling (which required attention during each cycle) and another knot operating above and attached to one foot. The Texas Juel Method, converted to easily and quickly from the other method I use, attaches the Jumar with the short sling to both the seat sling and chest sling by passing the locking 'biners through the large opening of the device. The rope channel of the Jumar is away from the body to facilitate rope attachment and to prevent clothing from becoming entangled. This attachment to the chest sling eliminates the necessity to pull the Jumar up the rope with each cycle, freeing one hand for other pursuits. I cram the unused foot sling into my pants to get it out of the way. The other Jumar attaches above, the sling passing through the chest sling down to one foot (I prefer the left). Passing it through the spare 'biner attached to the seat sling leg ring will increase efficiency by eliminating the tendency of the leg to kick forward or to the side under power. It also keeps the sling where it should be when the sling is slack.

Upward progress is made by raising the left leg and Jumar simultaneously, and then standing. The method allows an arm and a leg to be completely free to assist by conventional rock climbing or to just keep you off the wall. Practically speaking, both legs are often used for conventional climbing. Some might prefer to attach an extra loop for the other foot, but switching feet occasionally, or putting one foot over the other works satisfactorily for the longer climbs where little contact is present.

Over-the-edge and over-the-knot are sufficiently similar to the other Jumar technique that if you can do it with one method, you can do it with the other.

Auto-belay

Occasionally during an ascent, stretches that could be free-climbed are encountered. These could provide a welcome change from Jumaring, except that no belay is available. By rigging the chest sling-to-seat sling Jumar as in the Texas Juel Method, the pitch can be negotiated by conventional rock-scrambling procedures. If there's the slightest possibility that you may slip and swing away from the wall or that you will climb into a precarious position, the other Jumar should be carried so that ascent by the Texas Juel Method can be safely initiated.

LAND OWNER RELATIONS

Earl (Biff) Biffle

Physicist and Electrical engineer with the Missouri State Highway Department.

Executive Director of Speleo Research Association.

Member of MMV, MSS, GGG, MVOR, and NSS.

Present Chairman of the MVOR.

Caving since age 12.

1. General Cave Owner-Caver relations.

2. Cave Preservation.

3. Cave ownership, and cave control by cavers.

4. Conservation and conservation projects.

Congradulations due, Mr. and Mrs. Earl Biffle

VERTEBRATE PALEONTOLOGY

Dr. Holmes A. Semken

BIOGRAPHY

Dr. Holmes A. Semken is a native of Maryville, Tennessee, who moved to Rockdale, Texas, during his senior year of high school. He entered the University of Texas in 1953 as a geology major and shortly became a member of the University of Texas Grotto and the N.S.S. (R3390). He was president of the Grotto for two years. While exploring Longhorn Cavern, Burnett County, Texas, he discovered a bear skull and other fossil vertebrates in the cavern. Subsequent investigation revealed extensive fossil deposits. An investigation of the vertebrate stratigraphy became the subject of his master's thesis. After a tour in the military and a year's employment in the Vertebrate Division of the Smithsonian Institution, he entered the University of Michigan and received his degree in 1965. His interest in fossil mammals from caverns has continued until the present time.

THE ACCUMULATION, EXCAVATION, AND INTERPRETATION OF FOSSIL VERTEBRATES FROM CAVE DEPOSITS

Caverns have been noted for accumulations of fossil vertebrates since the early 1500's as the search for the "ebur fossile" became a fashionable and economic pursuit. Later, investigations into the nature of extinct "cyclopsians" (mammoth skulls) from caverns demonstrated that deverse and well preserved collections of various extinct animals were common in caverns.

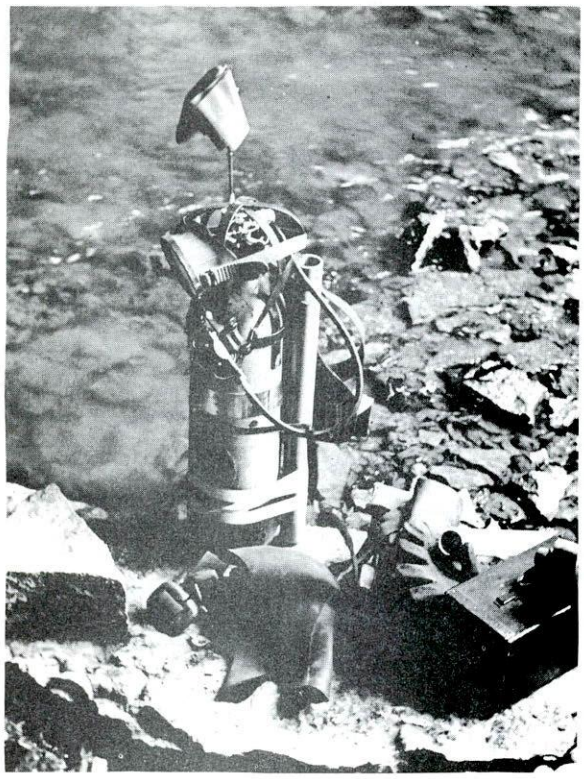
Modern investigations have centered on caverns for three reasons. (1) Fossils collected from caverns usually are well preserved. (2) Vertebrates collected from caverns ordinarily are not reworked. Thus, a gradual accumulation of specimens over a period of years yields an opportunity to investigate gradual shifts in populations. And (3) bone accumulations from caverns frequently are very diverse as they were gathered by owls. As owls "sample" during all seasons and over a redius of ten miles for their cavern roost, they provide specimens from a variety of microenvironments.

Therefore, faunal lists from caverns are extensive and allow elaborate paleoecological interpretations. Climatic fluctuations recorded from Rattlesnake Cave, Longhorn Cavern, Meyer Cave, Peccary Cave, and New Paris Number Four illustrate the value of these investigations.

Bone caves usually are discovered by the location of large bones in cave sediments. Ecological interpretations, however, are based on small animals which usually are not obvious to the eye. These specimens are recovered by removing cave sediment, drying the matrix, and subsequently wet screening through window screen.

CAVE DIVING

Don Rimbach



I began diving in springs in 1958 simply as a means of studying them. Classic theories of phreatic development had all been based on deductive studies of highly modified air filled caves. With the imvention of the aqualung, study of caves still in the phreatic state became possible. The nearby Ozarks contained the greatest collection of such springs and caves in the world and the idea of having such a significant but untouched field of investigation open to me has held my interest ever since.

Leaving college in 1968 I joined my fathers engineering firm as a field representative. In this work and my spring study I travel over 1000 miles per week average. That job provided me with the income necessary to finance trips and equipment development with the result that over half the weekends of the past two pears have been spent on two sites alone.

My partner in the project for the past 3 years , Mike Tatalovich spends a great deal of his spare time designing and building the more specialized equipment such as our lights. He is presently beginning construction of a devise for verbal communications which is smaller than a pack of cigarettes. This, and a surveying depth guage should be in prototype stage by the time of the seminar. Mike concentrates his efforts on photography, the success of which will be evident from his slides at the seminar. He is also working on a lighting system with which he can take movies in clear, air filled caves up to 100' away.

Our goal is to have in another year a professional quality lecture of mass media style available on a fee basis to supplyment our expenses. It will consist of color movies and slides depicting the unique and significant nature of springs, their supply systems and our continuing efforts to understand both.

ADVANCED CAVE DIVING

A. EQUIPMENT

1. MODIFIED - We have found it necessary to modify every item of sport diving equipment to promote safety, usefulness, and recovery in event of loss. (5 examples)

2. NEW - Many new types of equipment have been designed, built and perfected. Underwater lighting alone so far has cost over $700. We are presently building a surveying depth guage readable to 1/10 of a foot to 150 feet. (5 examples)

B. TECHNIQUES

1. All new techniques are pool or lake tested prior to use in the spring conduit. (several examples)

2. Rule of thumb: Maximum simplicity provides maximum safety and productivity.

3. Underwater surveying is a most difficult technique. (detailed explanation of rpogress so far.)

C. SAFETY

1. Perceptiveness to potential danger is key to safety.

2. Detailed discussion of dive during equipment preparation.

3. Final review at dropline.

4. No deviation from plan once dive begins.

D. SITES

1. DEVIL'S WELL
   a. Largest underground lake in North America.
   b. 20,000 square foot surface area 125' below valley floor.
   c. One mile from spring that drains it.
   d. Soundings up to 88', dives to 150' so far.
   e. Contains Missouri's highest water fall (90'), rises 40' after heavy rains.

2. WELCH SPRING
   a. Missouri's sixth largest spring.
   b. World's only large spring (constant flow of 50 cfs+) rising deep within a large cave of commercial quality.
   c. Owned by National Park Service
   d. Gated to protect largest blind fish population in a National Park outside Mammoth Cave.

PROGRAM WILL INCLUDE:

1. Equipment display
2. Movies and slides
3. Scale models of these sites

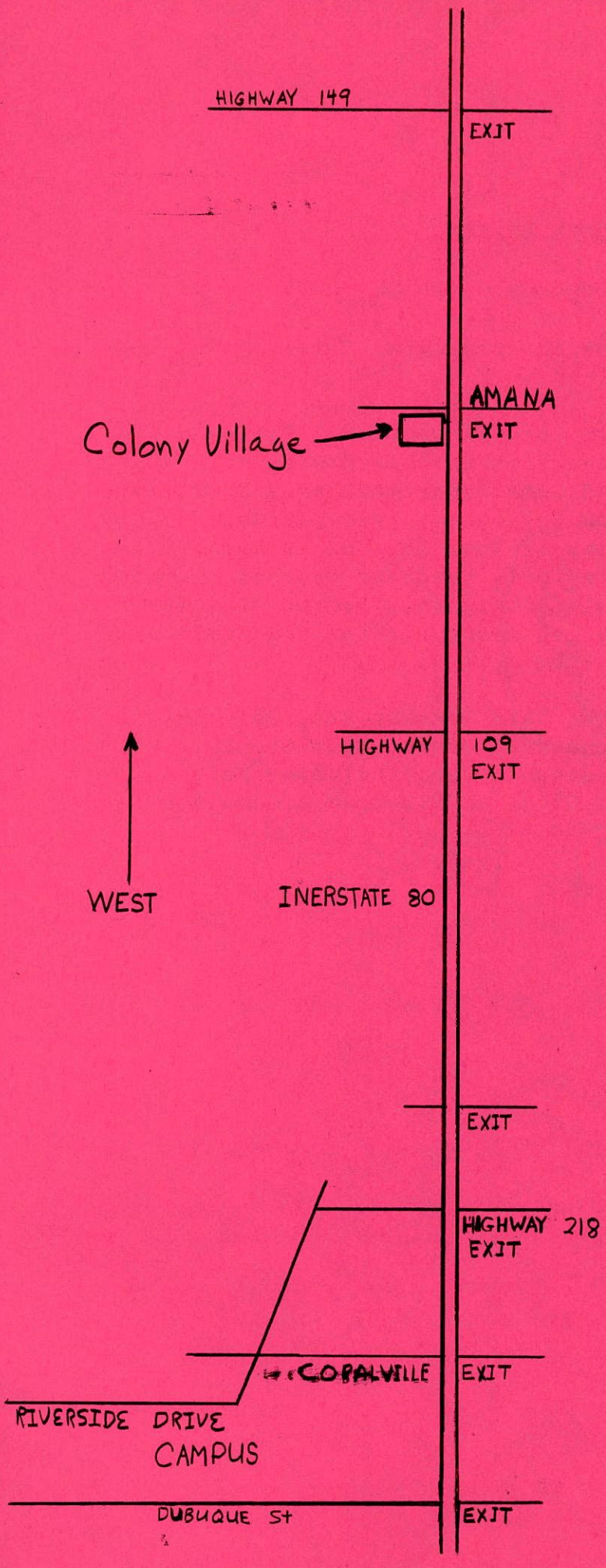
BANQUET SPEECH

Donald B. McDonald, Ph.D.

Speleology and the Environmental Crisis

Born and reared in Salt Lake City, Utah. Recieved his B.S., M.S., and Ph.D. degrees from the University of Utah. Worked for the Utah Fish and Game Department as a biologist. Taught for 2 years at Carbon College in Price, Utah. Joined the faculty at the University of Iowa in 1962 in the Civil Engineering Department. Presently teaching courses in the Environmental Engineering Division. Is director of a water quality study of the Coralville Reservoir for the Army Corps of Engineers.

One time chairman of the Salt Lake Grotto, Salt Lake City, Utah, and also past chairman of the Iowa Grotto. Has done work in a number of western caves, including Neff's Canyon Cave above Salt Lake City, and in Iowa around the Dubuque area.



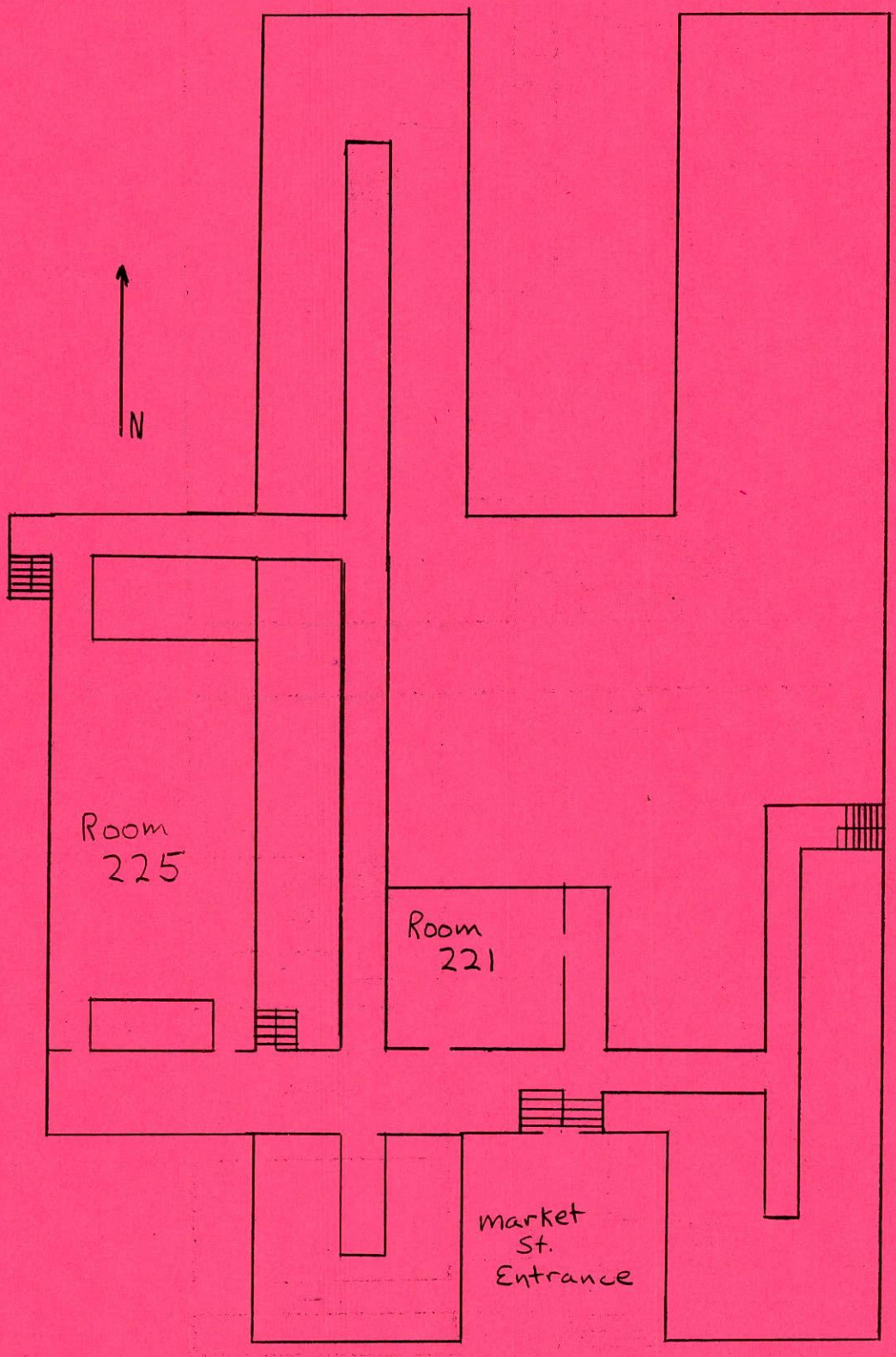
BANQUET:

Colony Village, at the Amana Exit on Interstate 80, 20 miles west of Iowa City.

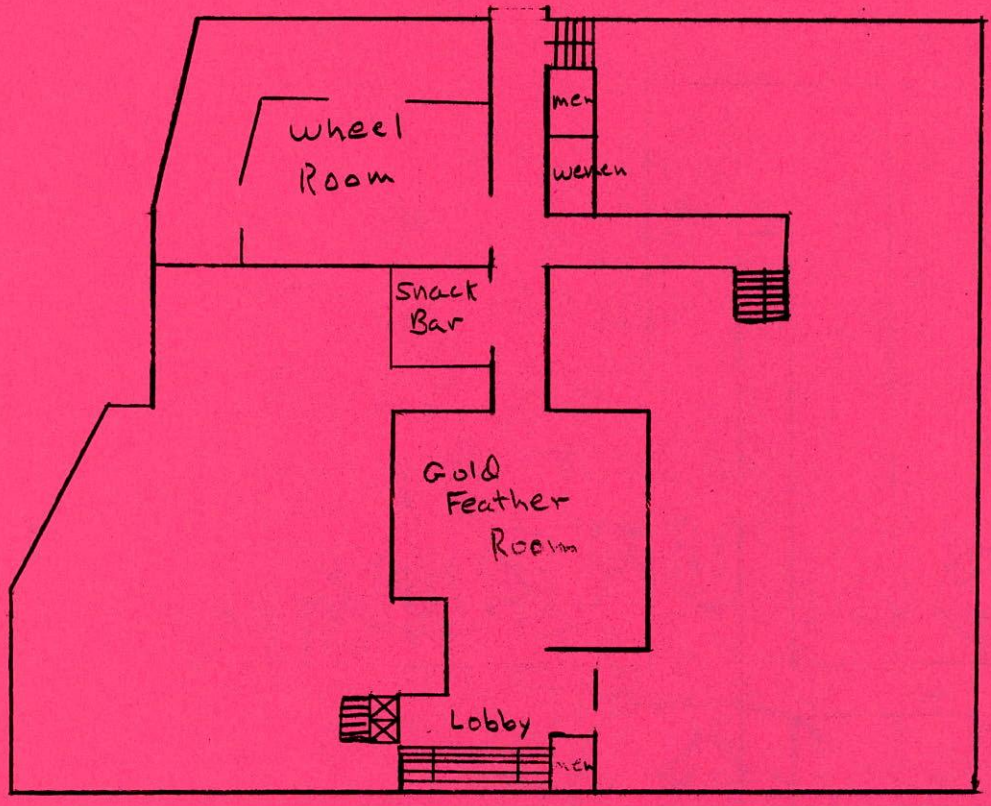
On Saturday evening, the banquet will be held at the nationally famous Amana Colonies, west of Iowa City. A choice of Ham or Oven Baked Steak dinner will be provided in the traditional "Amana Family Style", with serving dishes on the table.

The banquet is limited to the first 200 persons requesting reservations.

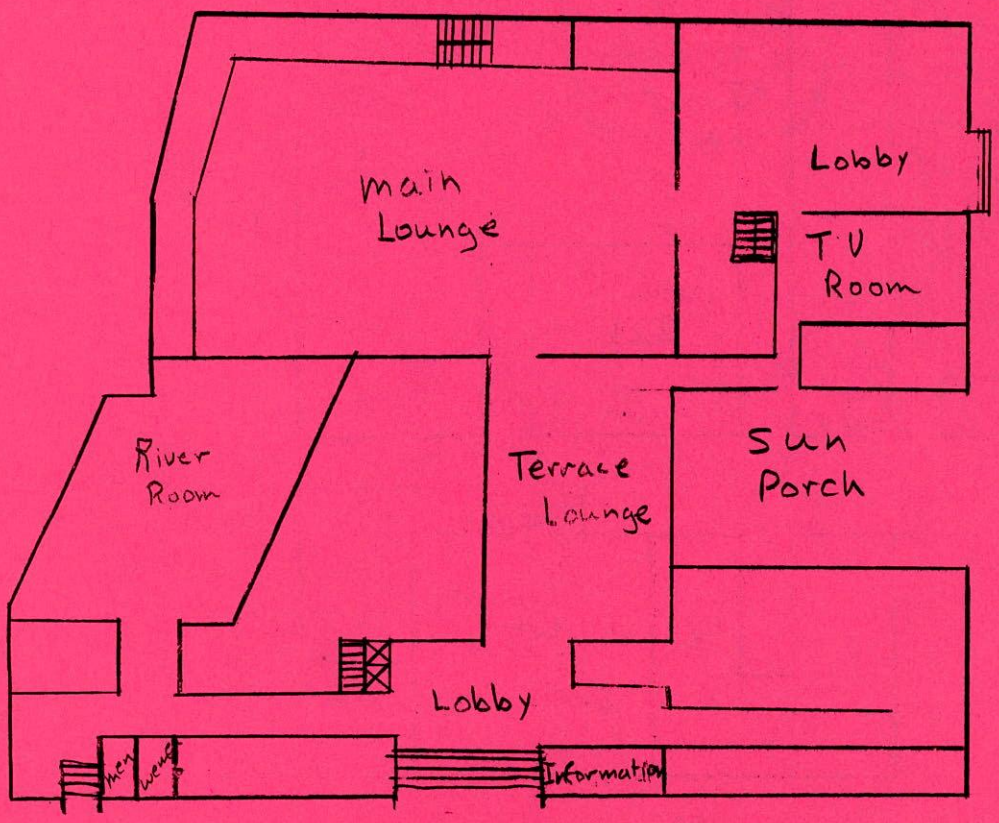
SECOND FLOOR CHEMISTRY BOTONY BUILDING



IOWA MEMORIAL UNION

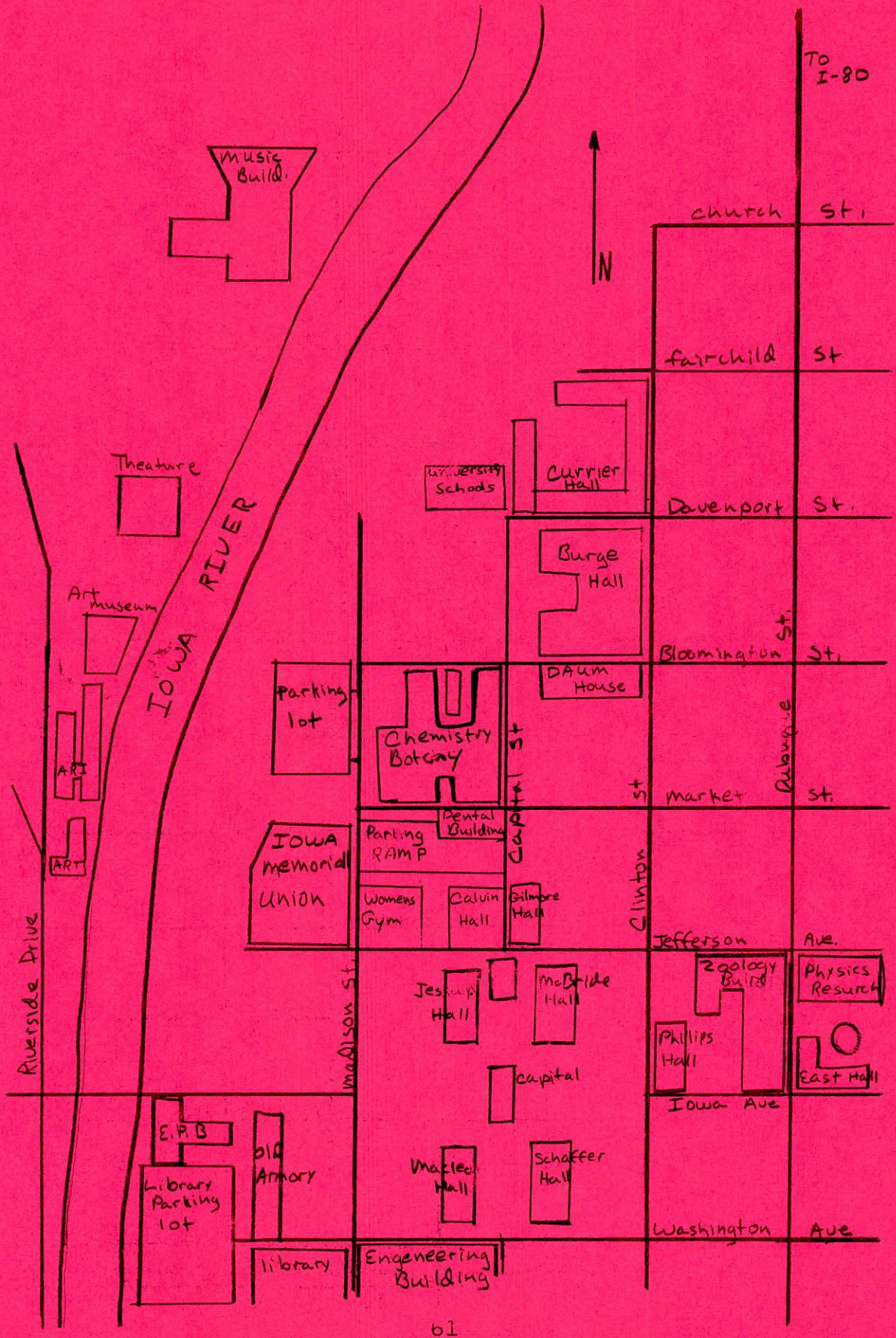


Basement

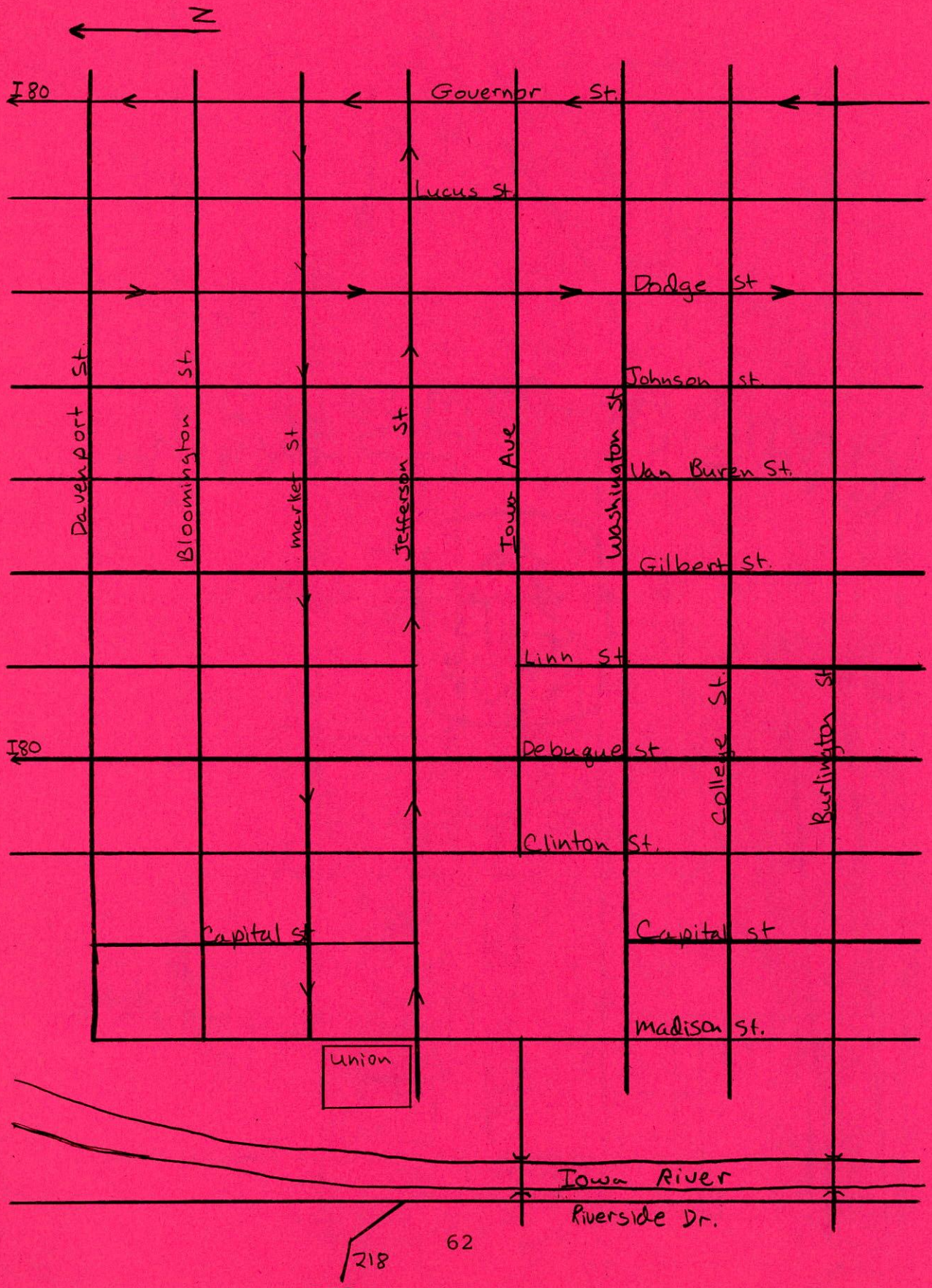


First Floor

UNIVERSITY OF IOWA CAMPUS



IOWA CITY


N
I80
Governor St.
Lucus St.
Dodge St
Johnson st.
Van Buren St.
Gilbert St.
Linn St
Debuque st
Clinton St.
Capital st
Capital st
madison st.
Davenport St.
Bloomington St.
market st
Jefferson St.
Iowa Ave
Washington St
College St.
Burlington St
I80
Union
Iowa River
Riverside Dr.
218
I80

PLACES TO EAT IN IOWA CITY

WALKING DISTANCE

The Iowa Memorial Union--There are several places to eat in the Union, among these are the Wheel Room and the Gold Feather Room downstairs for fast service, and the River Room upstairs for good food.

Henries--15 East Washington fast service

Burger Chef--101 South Clinton fast service

Heap Big Beef--117 South Clinton fast service, occasionally good food

Leo's Cafe--127 Iowa Ave. fairly good food

Hamburg Inn--119 Iowa Ave. and also at 214 North Linn good food

Joe's Place--115 Iowa Ave. good food and beverages

The Mill--314 East Burlington good food and beverages

The Airliner--22 South Clinton good food and beverages

Robert's Smorgastable--120 East Burlington all you can eat, food generally good

The Best Steak House--117 South Dubuque good atmosphere and good food, specializes in steaks.

FARTHER OUT

Hawk I - Skelly restaurant--1st Ave. Coralville and I 80 open all night

Ming Gardens--Highway 6 West Chinese and American foods

Carousel Inn and restaurants--Highway 6 West two cocktail lounges, good food and good atmosphere

Robin Hood Room--The Mall shopping center, 5th and Sycamour Rich atmosphere, fine food and beverages

There are several other restaurants along the Interstate that are open all night.

PLACES TO EAT IN IOWA CITY (cont.)

AMANA COLONIES

Ox Yoke Inn--Homestead Famous Amana family style foods, German and American food and beverages.

Colony Village Restaurant--Junction I 80 and Road L Family style German and American foods, German beer.

Colony Inn--Homestead Family style Amana foods and beverages German beer

Above is a partial list of places to eat in the Iowa City area. The list is divided into three headings, places within walking distance, some better places farther out, and the Amana Colonies. No trip to Iowa is complete without a visit to the famous Amana colonies.