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Clemmie Gill School
of
Science and Conservation

Report on the Springville Area

"HAUGHTON'S CAVE"

(material gathered by
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Mountain Home State Forest)

TULARE COUNTY SUPERINTENDENT OF SCHOOLS OFFICE
J. POST WILLIAMS, Superintendent
202 County Civic Center
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Early Trails and Roads

The more one learns about the locations of the Indian villages of the Tule River and the customs of the aboriginal tribes the more likely it appears that all early travel by white men followed the routes used by the Indians for hunting, food-gathering, trade and visiting. These trails were soon modified to suit the needs of the packers, who, with their pack mules and horses, carried supplies to sheep camps, mines, and other mountain activities. Still later many of the routes were converted to roads and even to paved highways.

For instance, the trail (still sometimes referred to as the Old Indian Trail) that connected the Yaudanchi village north of Hilo with the Balwisha village on the South Fork of the Kaweah is now the approximate route of the present road over Blue Ridge through Grouse Valley. The main village of the Yokod (Yokohl) tribe was near the present city of Exeter. The trail that connected it with the Yaudanchi villages on the North Fork above Springville was very likely the route chosen by Jamison and later by Jordan for the western section of their trans-Sierra trails. The present Yokohl Valley road runs mostly northeast of this route. The Deer Creek and Balch Park roads apparently follow quite closely the Yaudanchi-Tubatulabal food-gathering and trading trails. Donald Witt states that there is evidence of many populous Indian villages along Fish Creek, which is about half-way between Springville and the Owens Lake country along the route of the Jordan Trail. There seems little doubt that there were well-used trails connecting the Yaudanchi villages with their Kaweahan neighbors to the east. In fact, F. F. Latta (20) quotes an old Indian named Ishe as saying, with reference to trading among Indian tribes before 1850, "Our men...go across the mountains from Tule River where white men built that Jordan Trail." It is said by members of the Jordan family that Mr. Jordan was guided by Indians on his first trips across this area.

The Jamison or Coso Trail. Stop some spring day along Highway 65 between Strathmore and Lindsay in Tulare County and look northeastward toward the High Sierras. Their western outposts will still be gleaming white with the winters snow. Now, mentally, "time machine" yourself back to a corresponding day in 1860. Word has just reached Visalia that rich silver strikes have been made just east of this mountain range, southeast of Owens Lake in the Coso Mountains (See section on "Discovery"). Men of the Visalia-Portorville area who heard about the strike probably looked at the Sierras from the Stockton-Los Angeles Road (later the route of the Butterfield Overland Mail and now part of Highway 65) and wondered if there wasn't a shorter, cooler, better-watered route to the Coso Silver County.

Now let your eyes follow the Sierra skyline from north to south. Slightly north of due east from where you stand there appears to be a gap in the "garden wall". This is the timbered ridge now known as the Mountain Home area, lying just south of Moses Mountain. A little further south the mountains seem to rise again where Jordan Peak presents its snowy western face.

W. A. Chalfant, in his book "The Story of Inyo", says that by

July, 1860, parties were leaving Visalia almost daily for the Cone diggings. Many of these parties - perhaps most of them during the summer months - went by this short-cut route (about 95 miles, according to B. W. Farley compared to 120 by the Walker Pass route. B. W. Farley's description of his route indicates that he followed a trail elsewhere called the Dennison (or Denison, or Coso) Trail. This trail apparently preceded the better-known Jordan and Hockett trails across the same general area. Very little is known about it. Still less is remembered about the man for whom it was named. We assume there was such a man because there is a Dennison Mtn., Ridge, and Peak and there was a Dennison School District in that vicinity.

The route of the Dennison Trail can be deduced from references to it in a toll road application made in 1870 (See section "Roads to the Kimsey Mill"), from the official Tulare County Map of 1884, and from the memories of a very few oldtimers. Mr. Irvy Elston of Springville says it left the old Butterfield Overland Mail Route between the present locations of Strathmore and Farmersville, and went through Spanish Camp, probably by way of Yokohl Valley. From Spanish Camp (which is at the head of Lewis Creek) it went south and east past the present Springville Rodeo grounds on the Clemmie Gill ranch, crossed the North Fork of the Tule near "Sycamore Spring or Camp" (probably Cramer Crossing near the old Mountain View School house), and then headed northeast over McDonald Hill to Hamelberis. From there it climbed the main ridge between Bear and Hamelberis Creeks through the present Otis Lawson ranch to the location of the Balch Park road near Brownie Meadow (Farley's "summit of the first ridge").

About there it entered the redwoods, and it went eastward "among these monsters for several miles", as Mr. Farley said, probably passing by the great tree that then stood majestically on what is now merely the "Centennial Stump". This tree's measurements were approximately those given by Farley. From the place now known as Shake Camp the original trail probably went east over Maggie Mountain and down Alpine Creek and through Coyote Pass. This is the route described to Elston by his father who took sheep over the trail in 1879. The routing past Summit Lake as shown on the Official County Map of 1884 may have been a change made later to connect with Hockett's Trail. At any rate, it probably crossed Kern River near the mouth of Golden Trout Creek. Farley mentioned two prominent mountains, one white and one black, that are well-known landmarks in that vicinity.

The Dennison Trail may have been in use before 1860. There is a considerable body of tradition about a traffic in stolen horses across this part of the Sierras that may have begun before that year. It is said that horses were stolen in the San Joaquin Valley and driven by approximately this route to the Owens Lake Country, and there, for the sake of efficiency, stolen Owens Lake horses were brought on the return trip to sell to the San Joaquin people who had so unfortunately lost their means of transportation. The name of Tiburcio Vasquez is sometimes mentioned in connection with this trade.

The Jordan Trail. The story of John Jordan, his dream of a road

across the Sierras from Visalia to Owens Lake, and his tragic death at Kern Flats make a fascinating story even though only a small part of it can be authenticated. More legends and misinformation appear to be available about the Jordan Trail than any of the other routes through this area.

B. W. Farley in his 1860 letter already quoted, wrote, "a good pack trail can be made over which ordinary mules can pack 250 pounds at an expense not to exceed $800-1000" from Visalia to the Coso Mines. He also stated with reference to Visalia as an outfitting point for the Owens Lake mining area, that Stockton merchants, "wish to divert the great future trade of the place to their own city by cutting a trail from the head of navigation on the San Joaquin River to Visalia" to prevent that area from being supplied by "southern ports".

There was a lot of verbal activity about this time over the matter of building roads across the Sierra. Chalfant (21) says that a company was formed to build a road to Owens Lake and was granted a charter by the legislature of 1862, the road to run... "between Deer Creek and Kings River..., thence across the Sierra Nevada mountains to a point between the north end of Owens Lake and the north end of Little Lake". Twenty-eight applications for franchise were filed but apparently nothing came of this effort. However, while all this talk and legislative action was going on a Visalia man named John Jordan and his son William F. Jordan were going ahead with a trail project under authority given by the Tulare Board of Supervisors. The right-of-way was 33 feet wide and the trail was to be completed in two years. The Jordans did not petition for a wagon road right-of-way but the Board of Supervisors wrote this into their agreement that a wagon road was to be completed within five years.

The Jordan petition is on file at the Tulare County Court House. The full text is as follows: "Your petitioner would respectfully petition your Honorable Board to have made and declared open, a pack trail or passway leading from Tulare Valley across the mountains to the South end of Big Owens lake, said trail to commence at George E. Loug's residence, passing through Yokall (sic) Valley and thence Easterly across the mountains to the said lake, and would further petition your Honorable Board, that the right-of-way and privilidge (sic) of constructing the said trail be given and granted to John and William F. Jordan, the applicants and petitioners herein, and for whom your petitioners will ever pray-". It was signed by 21 men and one woman, and filed Nov.1, 1861.

The Jordans probably did most of their work on this trail before this petition was presented, because it was only 5 months later that the project came to a tragic end. John Jordan was drowned in April, 1862 while he and 3 of his sons were rafting some of their freight across Kern River at Kern Flats. His sons did not carry on the project.

The various routes of Jordan's trails are not easy to pin down. Jordan's first route through the Mountain Home country is reported by Elster and supported by members of the Jordan family, as being the same

as the Dennison Trail up the ridge from Rancheria through the Otis Lawson place to about the site of the old Frazier Mill. At that point they believe his trail turned southeast through Balch Park, thence to a crossing of what was then called the Middle Fork of the Tule River (now called the Wishon Fork or North Fork of the Middle Fork) above the present Camp Wishon, thence up the ridge north of Nossack Creek and over Jordan Peak and east across Junction Meadows. (See Map No.). The earliest map found that shows any of these trails is the government survey township plat of 1878 by P. Y. Baker which shows the Jordan Trail following the approximate route of the present Bear Creek road past the section line between Sections 10 and 11, and thence easterly toward the river crossing mentioned above, thus missing Balch Park by over a mile. An undated map (probably put out about 1883) by Elliott and Company of San Francisco shows, probably erroneously, the Jordan Trail going up through Dillonwood and the Summit Lake area.

There is another statement in a manuscript (19) that "nearly all the sheepmen then (1884) entered the mountains by what is known as the Jordan Trail, through the Indian Reservation via the Putnam Mill... The trail then crossed the South Fork of the Middle Fork of the Tule River just above the Nelson place...then through White Meadows to the Little Kern and finally to Trout Meadows and the lakes, and on to Kern Flat".

Probably Jordan's name was erroneously applied to the part of this trail west of Nelsons.

Claude Jordan says his grandfather had a summer route through the higher country and a lower route to use when the snow was deep.

The western terminus and headquarters of Jordan's Trail was his ranch near Rocky Hill east of the site of Exeter. He brought his freight by "bull-team" from Stockton according to Claude Jordan and transferred it to pack animals at this ranch. John Jordan came originally from Pennsylvania and had seen service in Texas with Sam Houston in the Mexican War before coming to California. He had experience as a surveyor and is said to have been more interested in an eventual wagon road across the Sierras than in a toll trail. He had 12 children and his descendents are numerous in California. (He is not to be confused with his nephew Capt. John F. Jordan of slightly later Tulare County history). A redwood tree in Balch Park has been officially named for John Jordan (See Appendix) and a plaque is being installed there by the Jordan family.

The Jordan Trail can still be found at certain points by use of P. Y. Baker's survey notes of October 1878. For instance, in the Bear Creek drainage, Baker found the "Jordan Trail bearing east and west" almost exactly where the Old Frazier Road branches off the present county road. A half-mile east he "set a granite stone...10 links north of Jordan Trail for quarter-corner" between Sections 4 and 9. One can still follow the impressions of an old trail easterly from this point across Mr. Natalaff's pasture and into his orchard. Old trails are still visible further east where Baker records crossing the Jordan Trail

while running lines between sections 10 and 11 on October 2h, 1878 and sections 11 and 12 on October 23. The Jordan Trail from Rancheria to Jordan Peak was apparently used by the U. S. Forest Service as the route of one of their first telephone lines into the back country.

The Hockett Trail. The idea of a toll trail to Owens Lake from Visalia did not end with John Jordan's death. The Tulare County Board of Supervisors on Dec. 11, 1862, had granted to Henry Cowden, Lyman Martin, and John B. Hockett permission to build a pack trail commencing "at a point in the Tulare Valley near where the Kaviah (sic) River leave the foothills" and thence easterly across the Sierras to the "foot of Big Owens Lake between Haiwee Meadows and the Lone Pine Tree". On August 3, 1864, Cowden presented a sworn statement that the three men above named had completed the trail at a cost of $1000.00 and asked permission to charge tolls. The Supervisors thereupon set toll rates of 50¢ for a mule or horse, 25¢ per head of cattle, 5¢ per sheep or hog, and 25¢ for a man on foot. This trail became the best known of the three old trails. Dyer (67) in 1898, said it was marked by "peculiar blazes" and further, "The Hockett Trail was made in early days and today it remains a plain, well-blazed track from Lone Pine through to Visalia. Its approximate route as of about 1864 is shown on Map No.___. In one of its many changes of location it may have passed through the Dillonwood country as there are reports of an old "H" trail in that area.

Clarence King on his first attempt to climb Mt. Whitney from the south in July, 1864, followed the Hockett Trail, judging from J. D. Whitney's description of his route (65). He reported that at that date the trail was constructed only to the Kern River and that, "the old trail bent southward" at that point.

Other Trails. There are several other named trails in our area. One which was in use when the area was surveying in 1883 ran from Kincaid's Sawmill site past to Shake Camp, high up on Mosse Mtn. It can still be found at a few locations described on W. H. Norway's survey notes where it crossed the section lines northwest and northeast of Camp Lena. This has been referred to as the "Tuohy Sheep Trail" (Ld) but this seems doubtful because Tuohy is thought to have taken more direct routes from his ranch to the Tuohy and South Fork meadows. It was probably built as an extension of the Kincaid Mill road after 1870, for the use of stockmen. George Wray who lived between the Dillon ranch and the Kincaid Mill may have had a part in it.

Shepman who went into the mountains in the sixties and later used these trails and marked out additional ones. Later the U. S. Forest Service built an extensive trail system. The trail from Shake Camp to Alpine Meadows, sometimes called the Griswold Cutoff was built by Art Griswold about 1930 in connection with his pack station.

Summary and Recommendations: (Con.)

formations in the chamber. In addition a trail could be developed from this chamber back to the base of the fifth drop, which would then give the visitor a view of an underground waterfall, an extremely rare phenomenon which should not be underestimated. Such a development would be practical only if a shorter artificial entrance can be located which enters the cave at the Mountain Room. On the basis of life specimens collected near the top of this chamber, and the lack of such life for a considerable distance preceding it, our belief is that such a passage could easily be built, or possibly already exists at present. This would be easily determined by a detailed mapping and study project of high accuracy. But it should be noted that all the indications are in favor of such a passage, the lack of which would be the only stumbling block to the commercial development.

Even with the existence of this passage, the trail system still remains of high importance. The value of a strategic trail system has either been overlooked, or of necessity ignored, in all the present commercial caverns of California. In Haughton's Cave, there exists an opportunity to build a carefully designed trail system which would magnify the beauties of the caves by a large factor. Similarly a lighting system, while fairly economical as compared to other caves due to the concentration of the attractions in a single room, also has large potentialities for showing off the various limestone features to their best advantage.

In short, a careful survey in advance of actual construction work will render benefits entirely out of proportion to the time and cost spent on it.

Due to its close proximity to Los Angeles, combined with the accompanying stand of redwoods, which is one of the finest to be found anywhere, we believe that this cave has definite commercial possibilities as a recreational resource, and that the above actions should be taken, and that a further and detailed survey should be made.

In closing this report, we should like to express appreciation for the cooperation of the State Division of Forestry in general, and to Bear Creek Camp in particular, without whose invaluable aid and assistance, this project could not have been accomplished in the limited time which was available.

R.D.

Haughton Cave

Edward W. Haughton did not get around very much socially, but he did get around in the woods. And one day, probably while looking for a good piece of redwood timberland, he found a big limestone cave in a sharp little gorge at the foot of a high cliff. He almost failed to come back from that trip and people remembered the story he told so well that they called the cave Haughton's Cave.

Haughton's story, as remember by Elster, is that he went down into the cave (it can be entered only by an almost vertical passage) with only pitch-wood torches for light. Between the smoke of the torch which almost suffocated him and the darkness without it, he felt fortunate to get out alive. This was in or prior to 1884, because the Official Tulare County Map of that year shows the cave with Haughton's name. The location is about three-fourths of a mile southeast of the actual location as known today. It is barely possible that he found an entrance not known now. In the nineties when tourists began to flock to Mountain Home, this cave was given quite a bit of publicity (15) and Jesse Hoskins regularly took people down into the cave by means of fir-tree ladders made by cutting trees and leaving the branches "trimmed long" for steps (9). The cave was usually called Crystal Cave during this period. Haughton was a bachelor and he was English. He seems to have pronounced his name "Horton". He settled on what is now known as the Bear Creek Ranch in Section 9, probably before the road was built in 1884. By the end of that year he had also acquired, probably as a "timber and stone claim", the east quarter of Section 35 including the sites of Frasier's Mill and Coburn's "upper mill" on the Coburn Fork of Bear Creek. His sawmill partnerships have already been mentioned.

He is said to have been a good friend of Frank Knowles, but not of his other neighbor, John Gaffney, who, with John's sister Ann, ran the half-way house or hotel at Rancheria. This is not surprising since John was as Irish as Haughton was English. And Gaffney's hogs coming the three miles up the road and getting into Haughton's garden didn't help neighborly relations. Haughton used to shoot the hogs. Mrs. Ola Hobbs tells the story that one day along about 1903, Avon Coburn found that Haughton had died at his well-kept bachelor cabin, and he stopped at Gaffney's on his way to town and told him the news. John's reaction was, "Sure, and he's probably in Hell by now, a yellin' and shootin' at my pigs.

Haughton's place has often been referred to as "the Coburn dump", because it was the lumber drying yard at the lower end of Coburn's flume. After Haughton's death, it was found that the land he had actually owned was not where his improvements were. A man named Northrop therefore homesteaded the improved property. Two of Northrop's children were buried there in 1915, in the picturesque cemetery site visible from the road. Pete Planchon (Father of Bill Planchon, Northops son-in-law), and Jake Garner were later owners of this ranch, and it is now operated by the Ratzlaff family as a productive apple orchard.

There are other caves in the Mountain Home Area, but only one or two have ever been entered. An undated clipping in the Tulare County library tells of Alf Powell running a prospecting tunnel "into a labyrinth of limestone caves" in that area and taking out some ore that appeared silver-bearing. This was probably the one called the Galena Cave, the exact location of which is unknown. It is supposed to be on Maggie Mountain in the south side of the Silver Creek drainage. A man named Bill Rose is also said to have discovered it. Rose's grave is in the forest area up-river from Camp Wishon.

There is an old mine shaft, now caved in, on the north side of Silver Creek that also could have been a cave entrance. The four "sinkholes" north of Shake Camp show that the roofs of underground caverns have collapsed in that area at various times in the past.

Haughton's Cave

Haughton's Cave in Mountain Home State Forest is locally referred to as "Crystal Cave", although no single crystals were encountered by the survey during their explorations. The name "Haughton's Cave" is derived from a map published in the Annual Report of the Acting Superintendent of Sequoia National Park to the Secretary of the Interior, in 1906, though the word "cave" alone is marked at the corresponding location on the Official Map of Tulare County of 1884. Hence we know that the cave was discovered prior to that date, probably by a man named Haughton. Evidence of visitation, at least in the upper levels, was encountered, though it is certain that only a very few have ever succeeded in making the difficult climb down to the Mountain Room.

The Survey devoted three full days to the exploration and study of this remarkable cavern, at the request of the State Division of Forestry, who sought a report on the commercial and scenic potentialities of the interior, and a general idea of what it contained. The resulting report was indeed favorable, for it is an exceptional cave, in excellent condition; though engineering drawbacks may prohibit development of the attraction. Unless a complete map proves otherwise, it seems necessary to drill down from the surface into the main chamber--The Mountain Room--in order to afford practicable entry.

Setting

The cave is situated in Mountain Home State Forest at an elevation of approximately 6500 feet on the watershed of the North Fork of the Middle Fork of the Tule River. Being at this elevation, snow covers the region in winter, but it becomes accessible, with little difficulty in late spring and summer. Sequoia gigantea tower over its entrance; indeed a large section of the trunk of one of these redwoods has become buried into the cave passage below the entrance doline. White Fir, ponderosa pine, and cedar fill out the Transition Zone forest, and obscure the outcrops of metasediments in which the cave--has formed--presumable marbles of Triassic age. The region in the vicinity of the entrance is truly a mountain Karst, there being dolines and ponors scattered about the dense forest. The streams behave only as Karst streams do, and comprehending their pattern is a study in itself.

A doline in the centerline of a steep water course intercepts the stream at the surface and funnels it into an underlying ponor communicating with the cavern interior. Here the water plummets into the darkness, splashing over a fallen log and forming a dense curtain through which the visitor must pass, which he does, to be sure, quite rapidly. The stream bed, or dry thalweg, beyond the doline contains no water for at least 1/3 mile, where, near the marble contact, water resurges by gentle seepage. Whether this resurgence constitutes the entire volume captured by the doline, or even the same current, remains to be determined by hydrological experiments. Other crevices in the marble nearby emit rapid drafts of cold air, suggesting atmospheric communication with the cavern, but none could be entered.

In order to explore the cavern without having to climb beneath

voluminous waterfalls, an attempt was made to divert the flow from the entrance doline, by short-circuiting it around and into the thalweg beyond. At best, this process did not remove all of the flow from the waterfalls underground; nor did it succeed in channelling the flow down the thalweg at the surface, for within 50 feet of the point of diversion, it found a second ponor--previously buried, down which the entire current plunged, not to be seen again until the Mountain Room, 300 feet below; nor is the identification of this second stream in that region confirmed as yet. Thus the cave lies underneath a series of glutenous ponors, similar to the system of El Fondo de les Tarradelles in Spain, reported by Montoriol Pous (1952).

Description

The stream proceeds from the entrance down into the darkness of the cave network, along which it has selected the most direct downward routes for its course of least resistance. In places it has clearly pirated flow from former overhead passages, and the swift current seems still to be searching with its chemical water some more precipitous route. Six times in its course from the surface to the Mountain Chamber the stream plummets over a brink, the largest of these falls being 55 feet high, forming the backwall of a longitudinal dome chamber, already described in detail on page 63. Another 25 foot fall has likewise generated such a speleogen. Though the rock floor of this stream bed is over most of its course littered with stream cobbles, there appears to be little corrosion taking place today, for contradictory evidence is painfully made known to the explorer as he descends the rope ladder down the course of the 55 foot waterfall, in the sharp lamina or vertical projections of insoluble material that protrude for more than a foot from the blue veined marble walls. (Pl) Dome Chamber niches are found at the foot of at least one of the falls, and potholes--whether of vadose or phreatic origin is uncertain--must be leaped farther along near the entrance of the stream into the Mountain Room. All along the route above the 55 foot falls, radiate side passages which remain unexplores; whether some of these conduct to the channel of the second stream is yet to be determined.

The Mountain Room is the highlight of the cavern. Fully 450 feet in slope length (along its sloping floor), over 100 feet high and 100 feet wide, this single chanber comprises the largest cavity in California and Nevada known to the Western Speleological Institute. The floor is veritably a mountain itself, offering some difficult scrambling in places to surmount: the uphill extremity of the floor is almost on a level with the ceiling of the lower end. The entrance stream emerges into the lower end of the Room, joins with the second stream that enters from along the rocks slightly higher up, and then continues its deliberate course against the lower wall and on over a 30 foot brink into an unexplored labyrinth below.

The feeble carbide lamps seem like mere candles in their futile attempt to illuminate this chamber. The walls and ceiling are for the most part bare, for breakdown seems to be continually stripping them of deposited material, and at the same time increasing the volume of the dark void. Nevertheless, like constellations in a storm-clad sky,

colonies of brilliant, white draperies and stalactites, catch the illumination of the lamps and reflect their image from the protected alcoves of the chamber.

One is immediately attracted to these segregated colonies, for their very isolation helps to magnify their splendor. There comes to mind especially the drapery of PL. 58, which for delicacy and grace stands out as the foremost cave feature ever encountered by the members of the Survey. The unviolated preservation of this drapery alone merits whatever expense may be necessary to protect Haughton's Cave. Other features of the Mountain Room are shown in the plates dealing with the cave, and include gours and rimstone, refulgant stalactites and stalagmites, stalactite ribbons formed along ceiling joints, cave pearls, flowstone cascades, to mention but a few.

The soils which contribute to much of the volume of the underground mountain, appear to have been derived from slumping near the upper end of the chamber. In this region one can climb up narrow chimneys of foreign boulders, where he encounters tree roots, small rodent bones, dung, and insects and snails not present through the remainder of the accessible route of entry. The presence of this material suggests that the surface lies not far above, and is probably expressed outdoors as an Einsturzdoline (Cf. Chap. IV), similar to that of the entrance swallet, but lacking the ponor and stream. Perhaps the surface stream originally entered the cave at this point prior to being pirated by the upstream ponors. The evidence points toward such a course of events.

Speleogens throughout the Mountain Room all indicate phreatic solution, and the slight vadose modifications along the stream channel speak for themselves. Bedding plane ceilings, dissolved breakdown, wall and ceiling pockets all point to phreatic solution under slow circulation, for nowhere in the cave were recorded the tell-tale flutes indicative of rapid phreatic flow. Sediments were undoubtedly present at one time, but little evidence of them remains today, though much of it is probably buried beneath the debris of the floor.

Geologic History

1. Since it underlies the general level of Balch Park by only a few hundred feet, we may attribute solution of the cave--both of the Mountain Room and the adjacent network--to the Chagoopa Erosion Cycle of the Pliocene Time. Moses Mountain higher up represents the local extension of the Boreal Surface. Solution of the Mountain Room was encouraged by intense fracturing of the beds, and continual rockfall; the remainder of the cave, as known, is dissolved out along joint planes. (cf. Fig 5.8)A.

2. Upon uplift during early Pleistocene, the great chamber was drained and flushed of any phreatic fill which it may have accumulated, with the result that intense rockfall ensued due to loss of buoyant support. This continual flaking off destroyed speleothems as they were forming, except where protected. A surface stream may have forced its way into the upper roof of the chamber washing in with it the debris, possibly

containing fossils, that reposes along the slopes of the underground mountain today. Conceivable the cave was once open at that point. Meanwhile, the receding water table continued to expose the phreatic network of interconnecting passages to the atmosphere. Fig. 58 B.

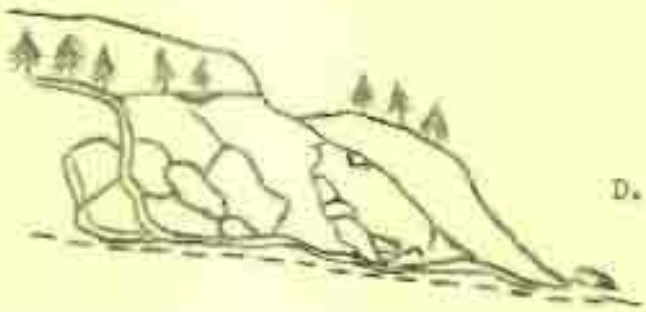
3. With increased surface erosion, to which glacial run-off undoubtedly contributed, the epigene stream, which formerly invaded the ceiling of the Mountain Room, became pirated by an upstream ponor which channelled its flow into the first available network circuit. Cobbles became introduced into its path during pluvial periods. (fig. 58c)

4. One-by-one the stream proceeded from one ponor to the next up-stream opening as erosion made them available, for the next always shortened the route of travel, as far as the descending stream was concerned. At present the ponor which receives the stream is merely of this series; undoubtedly in time it will succeed in making its way into a hole farther upstream as yet uncovered, and thereby abandon its present course. (58d)

A. Pliocene Erosion Surface, phreatic caverns.

B. Invasion of Mountain Chamber by stream immediately after uplift.

C. Pirating of cave stream by upstream ponor and network passages.



D. Present day route of stream thru more direct passages.

Figure 5.8. Evolution of Haughton's Cave.