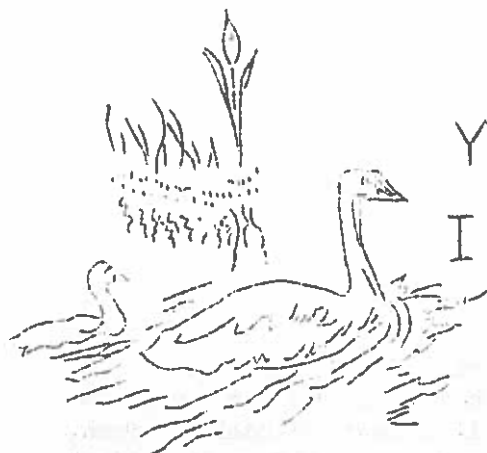




THE YELLOWSTONE INTERPRETER

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The purpose of this publication is to provide scientific and historical data for the use of Park personnel engaged in interpretive activities.

Issues will appear at random, depending upon availability of suitable material, and employees are urged to contribute articles.

The Park historian will serve as editor. Contributions or inquiries concerning published material should be addressed to him.

- C O N T E N T S -

A Biographical Sketch: Gilman Sawtell p. 1

Gas-Killed Birds on the Upper Terraces, Mammoth Hot Springs, by Jerry De Santo p. 3

"GILMAN SAWTELLE, the guide, will forgive me for bringing him before the public by name. I can not rank him with any of the typical pioneers, from Leatherstocking down, who have been familiar in novels of Western life. He affects no singularity of dress or speech, indulges not in long and silent laughter, prefers not an old, single barreled, small bore, muzzle loading Kentucky rifle to the modern arms of precision, does not pretend to see in the night as well as in the daytime, or to follow a trail where there isn't any; misses a shot, now and then, at long range, like any other honest man, reads books and newspapers, and does not despise his kind. A stalwart, blonde, blue-eyed, jovial woodsman is he, who for years has kept a solitary ranch on the bank of Henry's Lake, some sixty miles from the settlement. Half a dozen well built log houses constitute his establishment. There is a comfortable dwelling, a stable, a workshop, a storehouse for skins and game, and an ice house. Mr. Sawtelle's principal business has been spearing trout, packing them in ice, hauling them in wagons to Virginia City, and even as far as Helena, and disposing of them at handsome prices to the busy population, who haven't time to fish for themselves. A farm supplies him with vegetables and grain, the valleys afford him excellent hay, and land and water all about him swarms with game of every kind."

[Rossiter W. Raymond, "Sketches of Western Travel", in The New Northwest (Deer Lodge, M. T.), May 25, 1872, p. 4].

A BIOGRAPHICAL SKETCH

Gilman Sawtell, whose name is remembered by Sawtelle Peak overlooking Henry's Lake, Idaho, was the first settler on the west side of Yellowstone Park area and the builder of the first wagon road into this land of wonders.

He was born December 10, 1836, to Ebenezer and Sally Sawtell, of Groton, Massachusetts. During the War Between the States, Gilman served as a sergeant in Company L, 8th Illinois Cavalry, enlisting from Cherry Valley, Illinois. He married Carrie Livermore near the end of the War, and a son, Eben R., was born in Jackson County, Iowa, as they migrated westward in 1866.

Gilman Sawtell turned up in the little mining town of Nevada (west of Virginia City, Montana), in 1867, and soon moved on to Henry's Lake where he established a ranch and fishery at the northwest end (the present Staley's Springs). By the following year he had constructed a rough wagon road to Virginia City, via Raynold's Pass, and had shipped swan cygnets to New York City for the Central Park Zoo. The Virginia City paper described him as a completely metamorphosed Boston Yankee, making frequent trips there to sell fish and game.

In 1871, E. Rossiter Raymond, the federal mineral surveyor for Montana Territory, hired Sawtell to guide his party into the Yellowstone country from Henry's Lake (reported by C. C. Clawson in the Deer Lodge New Northwest, and by Raymond in his book Camp and Cabin), and in 1872, he was host to Stevenson's contingent of the Hayden Survey, including the Park's new superintendent, N. P. Langford.

During the summer of 1873, Gilman Sawtell extended his wagon road from Henry's Lake over Targhee Pass to the Madison River and up that stream to the Lower Geyser Basin in Yellowstone National Park. That first road was used by many of the 500 persons who visited the Park that season.

The ranch at Henry's Lake suffered during the Nez Perce and Bannock Wars of 1877 and 1878, and was abandoned for a time. When George Marshall began stage service into the Yellowstone over the Virginia City and Henry's Lake route in October of 1880, he used Sawtell's "home" cabin on Bear Creek (near Cameron on the Madison River) and the Henry's Lake ranch as stopover points.

Mrs. Gilman Sawtell died at Virginia City on December 13, 1884, and the family property was conveyed to son Eben in 1890.

Thereafter, Gilman Sawtell appears to have lived as an itinerant prospector until May 19, 1899, when he applied for a position as a forest ranger with the newly-organized service in the Department of Agriculture. At that point he just disappears from the record.

It can be added that Eben R. Sawtell took Homestead Patent No. 2029 on his father's land at Henry's Lake in 1896, selling the same to Edwin Staley on June 18 of that year.

ALH

Editorial note: While the name of Gilman Sawtell is often spelled with a final "e", that is not correct. Letters bearing his signature and correspondence with members of the family in Massachusetts establish "Sawtell" as the correct form.

* * *

The attention of all readers is called to the excellent article, "Wildlife Management in the National Parks", which appeared in The Living Wilderness, No. 83 (Spring to Summer, 1963), pp. 11-19. The same publication also carries an appraisal of the Leopold Report on pp. 20-24.

"The perception of beauty is a moral test".

Thoreau, in Journal, June 21, 1852

"Hast thou named all the birds without a gun; loved the wood-rose and left it on its stalk?" Emerson, in Forbearance.

"In the vaunted works of art,
The master-stroke is Nature's part."

Emerson, in Art

GAS-KILLED BIRDS ON THE UPPER TERRACES MAMMOTH HOT SPRINGS

by

Jerome S. DeSanto

The Upper Terraces of Mammoth Hot Springs are characterized by the presence of active and extinct hot springs along fissures in the travertine. Some of these springs function as fumaroles or bubbling sinks with varying concentrations of several gases. Many of these pockets or caves contain gas or gases in such concentration as to be lethal to birds and small mammals. Carbon dioxide is probably the most common gas. Sulfur dioxide is also present in some caves and hydrogen sulfide may also occur. No analytical samples have been taken and, until they are, no positive statements can be made regarding the number and quantity of gases. It seems reasonable to assume, however, that carbon dioxide is the killing gas and does so by simple asphyxiation. Whether the other, actually poisonous, gases occur in sufficient concentration to be deadly is unknown.

The best known of the killing caves is Stygian Cave, located about 220 yards west of White Elephant Back Terrace. It has been known and named for many years and its lethal qualities were first recognized at least seventy years ago when Olin D. Wheeler wrote, ". . . the latter (Stygian Cave), or the Cave of Death, is so impregnated with arsenic as to be dangerous to life, and around the entrance are the remains of birds, bugs, etc., that have died from inhaling the poisonous fumes". Wheeler may have erred concerning the lethal agent, but his observations indicate that Stygian has been a death trap for many years.¹

The cave itself is about eighteen feet wide and three feet high. It extends back into the hill about eight feet. Cold water from springs above constantly drips over the mouth of the cave forming several small pools. A few feet from the mouth, the temperature rises perceptibly; 12- degrees Fahrenheit has been recorded--and the humidity increases sharply. In the deepest recesses of the cave, sulfur dioxide occurs in strong concentration.

¹ Olin D. Wheeler, 6,000 Miles Through Wonderland. Being a Description of the Marvelous Region Traversed by the Northern Pacific Railroad. (Northern Pacific Railroad, St. Paul, 1893), p. 71.

In 1902, Edgar A. Mearns, an Army surgeon attached to the post at Fort Yellowstone, recommended that "the most important caves" be covered with wire screens. "This will doubtless be done before another season," wrote Mearns, "as the Superintendent and his wife are much interested in the matter."² His optimism was unjustified and in 1907, Stygian Cave remained uncovered.³ Wire netting was finally installed and Milton P. Skinner, first Park Naturalist, noted that fact in 1925.⁴ The covering was only partially effective during the following twenty years and at the present time, no vestiges of it remain. It is not known when or for what reason it was removed.

Another opening, once known as Stalactitic Cave, adjoins Stygian Cave to the south. Occasional reports mention dead birds in Stalactitic Cave but no known kills have occurred there in the past two summers. A few birds have been found in a deep well-like opening just east of Stygian but the majority of caves in the immediate vicinity are apparently free of gas.

The one other major death cave is appropriately, if unofficially, known as "Poison Cave". A few old-timers refer to it as "Old Soda Spring" probably due to its proximity to the feature marked as Soda Spring. Because of the confusion incident to place names in Mammoth, it is difficult to say if this cave was observed very much in years past. It is, however, a deadly spot and the number of dead birds found there closely approximates the kills in Stygian Cave.

Poison Cave, located about 250 yards southwest of Orange Spring Mound, is a pool in a sink rather than an actual cave. The pool is about fifteen feet long and about four feet wide. A heavy algal growth obscures the nature and true depth of the pool and the surface is constantly agitated by the escape of various gases. Rimming the depression are small pockets in the travertine and these openings, together with the pool edge, are the deadliest spots. The water temperature varies from 97 degrees Fahrenheit to 100 degrees Fahrenheit while atmospheric temperatures in the pockets reach 125 degrees Fahrenheit.

2 Edgar A. Mearns, "Feathers Beside the Styx," The Condor, Vol. 5, No. 2, March, 1903, p. 38.

3 See T. S. Palmer, "Notes on the Summer Birds of the Yellowstone National Park," Annual Report of the Superintendent of the Yellowstone National Park. 1907. (Washington, Government Printing Office, 1907), p. 16.

4 Milton P. Skinner, The Birds of the Yellowstone National Park. Roosevelt Wild Life Bulletin, Vol. 3, No. 1 (Syracuse, Roosevelt Wild Life Forest Experiment Station, 1925), p. 85.

While these two caves are the best known and probably the deadliest, many other caves, sinks and fumaroles attract birds and small mammals to their death. The so-called "Grottoes" of White Elephant Back have infrequently furnished specimens, and dead birds have been found in at least ten other openings. Mearns reports finding fifty-eight birds in twelve caves on one day (October 15, 1902).⁵

The summer bird population of the Upper Terraces is not extremely varied but it is occasionally very heavy. The sparsely timbered formation seems to be a favored habitat for a distinctive group of birds that can usually be spotted on any midsummer morning. In early summer, the most conspicuous birds are Cassin's Finches, Oregon (pink-sided) Juncos, Mountain Chickadees, White and Red-breasted Nuthatches, Mountain Bluebirds, Robins Chipping, Vesper and Savannah Sparrow, Violet-green, Cliff and Tree Swallows, Audubon's Warblers and Townsend's Solitaires. As the summer progresses, Common Nighthawks, Pine Siskins, Western Wood Pewees, Western Flycatchers, Townsend's and Wilson's Warblers, Ruby-crowned Kinglets and Brown Creepers are more abundant. Clark's Nutcrackers, Black-billed Magpies and Ravens are regular residents of the area. A few Red-tailed, Swainson's and Sparrow Hawks are usually seen and probably nest near the edge of the terraces. Unidentified falcons have been reported occasionally and one report of a Pigeon Hawk seems authentic. Hairy Woodpeckers, Red-Shafted Flickers, Williamson's Sapsuckers and Yellow-bellied Sapsuckers make up the woodpecker population. Of the owls, the Great Gray, Great Horned and Saw-whet have been infrequently seen but numerous pellets indicate a greater nocturnal activity. Three species--Green-tailed Towhee, Pine Grosbeak and Evening Grosbeak--have been seen only once. Summarizing then, the list of observed species on the Upper Terraces is forty including one questionable sighting.

The reason why birds enter the caves has been long debated. Mearns wrote, sixty years ago, "It is probable that a damp and shady nook offered a sufficient allurements, and that curiosity prompted some to follow companions that had preceded them."⁶ T. S. Palmer, writing in 1907, believed that the birds were seeking shelter on cold nights and so came to their death.⁷ Edmund Sawyer, Park Naturalist in the 1920's, followed this belief until 1927 when he stated that the "bird

⁵ Mearns, p. 37.

⁶ Mearns, p. 37.

⁷ Palmer, "Summer Birds," ;. p. 16.

victims are not particularly attracted by anything at all; but that, in the restlessness characteristic of their spring and autumn movements, they venture into the caves as they do into all manner of accessible places and are then overcome by the gas.⁸ Milton Skinner, perhaps the most qualified observer, believed that the birds were attracted by the water⁹ and the insect life that flourished in the deadliest caves.

My observations of the past two summers lead me to accept Skinner's theory. The fact that both Stygian and Poison Caves contain water as well as abundant insect life, must be significant. On many occasions, I have seen birds flitting about on the damp rocks above Stygian and actively searching out insects. Twice I have seen Chickadees bathing in the small pools at the mouth of Stygian Cave where a longer stay would have been fatal. Furthermore, the great majority of victims are found either in the water or on the very edge. It may be true that ground-loving birds, such as juncos and some sparrows, would seek out any opening or crevice in their busy search for food, but I believe the number of kills would be much less in dry caves.

In the past, observers have indicated that birds entered the caves at night in search of shelter. This does not seem tenable since the perching birds are diurnal in habit and rarely, if ever, are active at night. Furthermore, recent observation has suggested that the victims enter the caves in the afternoon more so than any other time. On two occasions, one in August of 1962 and again on August 30, 1963, live but stricken birds were found in Stygian Cave. In 1962, the casualty was a Pine Siskin found weakly fluttering and drenching wet at the mouth of the cave. After removal, he recovered in about ten minutes and flew off. In 1963, five immature Audubon's Warblers were found in the same spot. One was dead while the other four were gasping for air and scarcely able to move. I was able to remove three of the birds but the other fell into an unreachable spot. Of the three, one recovered almost immediately and flew off. Another required about five minutes to recuperate while the last, apparently much weaker, did not move for at least ten minutes. I took him home and within one half hour he had fully recovered, and I released him. In both cases, the birds must have entered

8 Edmund J. Sawyer, "The Birds in Stygian Cave," Yellowstone Nature Notes, Vol. 2, No. 4, Sept. 18, 1925, p.6. And, "Birds and Poison Caves", Yellowstone Nature Notes, Vol.4, Oct. 31, 1927, p.3.
9 Skinner, p. 86.

the caves shortly before my arrival and in both cases, it was about 5:00 p.m.*

Other conclusions may be drawn from the foregoing observations. It seems that prostration and death are by no means instantaneous or even rapid. This factor is highly variable, though, depending on the concentration of gas. It also appears that the killing gas is carbon dioxide since the recovery of the victims is brought about by available oxygen and suffocation is relieved. Although this is a guess, it seems that the inhalation of poisonous fumes would invariably be fatal despite the removal of the victim to fresh air.

Most of the interest in the caves occurred in the 1920's and before. In addition to Mearns, Palmer, Sawyer and Skinner, other members of the naturalist staff have made occasional reports. Marguerite Lindsley (later Arnold) was perhaps the most diligent and her notes in the Reports of the Naturalist Division and Yellowstone Nature Notes are quite regular.

The lists of bird victims of years ago imply that the caves possessed greater killing power than at present. Mearns' list of 1902 includes Black-billed Magpies and Clark's Nutcrackers,¹⁰ two birds that I have never found dead in the last two summers. Other reports note the discovery of Hermit Thrushes, and I have never seen one nearer than Clematis Gulch, to say nothing of in the caves. This latter fact may be accounted for, however, by a slightly different bird population in the past. It has been suggested that artificial controls have altered the lethal qualities of Stygian since much of the cave seems to have been filled in with rock and dirt. This was probably done when the wire screen was installed, and there is little doubt that this affected the concentration of gas in the pockets of the cave.

Several observers have noted the rapid decomposition of the birds and speculated on the causes. Sawyer credited the heat and gas and claimed that he found only a single bird "sufficiently fresh for preservation."¹¹ Skinner¹² mentioned the

* On September 4, 1963, 8 young Audubon's Warblers were found in Poison Cave. Six were dead and two were still alive and were removed to fresh air. Again the time was within a few minutes of 5:00 p.m.

¹⁰ Mearns, p. 38.

¹¹ Sawyer, "Birds and Poison Caves," p. 3.

¹² Skinner, p. 86

possibility of "sulphurous acid" as the decomposing agent but rejected that idea in favor of the theory that acids and alkalis in solution cause the rapid disappearance. Unquestionably, the heat moisture and chemicals present all hasten the rate of decay but other factors account for the actual disappearance of dead birds. It has been my practice the past two summers to remove the victims to the edge of the caves in order that a reasonably accurate count may be kept. The birds are invariably gone within two days and usually by the following day. On several occasions, they have disappeared within a few hours. There is little doubt that coyotes are the greatest scavengers, and I have frequently encountered them near the caves. Their tracks are often seen leading in and out of Stygian Cave and running the edge of the pool in Poison Cave. Several dead birds left in trees out of the reach of coyotes were removed the following day--probably by ravens, hawks, nutcrackers or magpies. Owls may also account for some of the "cleanup". Probably the coyotes and some scavenger birds visit the area regularly so that it is impossible to keep an exact count of the birds killed unless an observer were to be stationed there at least sixteen hours a day.

Especially heavy kills on certain days may be accounted for by the action and interaction of several factors. It had been thought that climatic conditions were the major control, and although atmospheric temperatures do not seem to be a factor of importance, pressure variation can effect dissipation of gases. The intensity and direction of prevailing winds can also control the concentration of the suffocating gases while a periodic waxing and waning of carbon dioxide could also be a determining factor.

Observations and comparisons of notes of the past two summers, however, indicate that the variation in kills is directly related to the movements of the birds rather than external controls. This had been suggested many years ago when observers stated that the most heavy kills occurred during spring and fall migrations. It is logical to accept this conclusion at face value, but I believe that this statement is not completely accurate. Though I have checked the caves during only one fall migration (until November 1, 1962) and one spring migration (May 1, 1963), several striking comparisons point to another explanation.

During May and June the most common victims were Cassin's Finches. The last finch was found on July 6 (1963) and this compares almost exactly with finch kills of 1962. It is well known that the Cassin's Finch migrates uphill in summer and these observations date this migration through the Upper Terraces, at least, as occurring in early July. To the end of June, 1963, the only other victims were Oregon Juncos and Mountain Chickadees and though most of the other passerine birds have arrived by that time, they had not yet located on the terrace area. The juncos and chickadees are permanent

residents and probably could be found there every month of the year.

The bird population is at its peak on the terraces during July and the number and variety of victims increases correspondingly over June. Of the birds found, all were adults with the single exception of an immature robin found on July 27, 1963; indicating that the young birds were not yet active. Two Western Tanagers, the only ones found in either season, were picked up on July 1 and 2, 1963. These were also the first ones seen on the Upper Terraces this year. Tanagers are frequently seen in that area through July and August but only rarely in the immediate vicinity of the caves. Other birds found in July were Chipping, Vesper and Savannah Sparrows, Audubon's Warblers, Red-breasted Nuthatches, Townsend's Solitaires, Green-tailed Towhees and Juncos.

In August, a few different birds were found in the caves-- indicating, perhaps, a further migration into the area. Pine Siskins are abundant on the terraces at this time, and though the fatalities in 1963 were not as numerous as in 1962, it seems that they were killed in numbers roughly proportionate to their population. Siskins were seen in flocks near the museum in mid June and on the Upper Terraces in mid-July. They were again seen in large restless flocks on the terraces in late August and only a few individuals have been seen since. The discovery of kills is closely related to their observed presence and this tends to substantiate the theory that the number and kind of bird victims tells the story of bird movements in the area.

Empidonax species flycatchers are infrequent victims during August and early September, and I suspect this is due to a changing food supply rather than a migration of the species. It has not been definitely decided but most, if not all, of these birds are Western Flycatchers, while a few may be Traill's Flycatchers.

Most of the birds found through August and September are immatures and Audubon's Warblers are the most frequently found victims. This is to be expected since that is the the most abundant species on the terrace area during August and early September. The sparrow, earlier the most numerous victims, are rarely found in the caves after mid-August and by the first of September, only a few are seen on the Upper Terraces.

The heaviest kill of 1963 occurred on August 4. In Stygian Cave, there were three Red-breasted Nuthatches, four Audubon's Warblers (all immatures), one Vesper Sparrow, one Chipping

Sparrow and seven Savannah Sparrows. Poison Cave yielded four birds--an immature Audubon's Warbler, an unidentifiable warbler, a Pine Siskin and a Savannah Sparrow. At first, I attributed the kill to the weather--it had rained earlier in the day and the humidity was high. But examination of notes of the previous year pointed out a startling coincidence. On the exact date but one year earlier--August 4, 1962--Stygian Cave had also counted its greatest kill of the year. The victims then were six Red-breasted Nuthatches, one Empidonax flycatcher, one Audubon's Warbler, one Pine Siskin, three Savannah Sparrows and three unidentified warblers (probably Audubon's). This may be happenstance and certainly such similar kills on the exact dates is a remarkable occurrence but other observations indicate another conclusion. The bird walks, which we had conducted over the Upper Terraces, became unproductive toward the end of July, and we began to use other areas. The birds were not leaving for the south but were simply leaving the Upper Terraces and moving either up or down.

From late August to the date of this writing, practically all of the victims have been warblers and, excepting one Wilson's Warbler, all Audubon's. From August 30 through September 4, 16 immature Audubon's Warblers were found--five in Stygian Cave and eleven in Poison Cave. Of this number, five were removed alive and recovered--all within a few minutes of 5:00 p.m. My 1962 notes disclose that after early September, only juncos were found in the caves, and it would be interesting to see if the same pattern were followed this fall.

Summary of Conclusions

It is my belief that a close check of the bird victims can furnish a sound basis for the study of bird movements through the Mammoth Terraces area. The following patterns are suggested:

1. Cassin's Finches are in the area from mid-May to early July when they presumably move up hill or to the north.
2. Pine Siskins enter the terrace area in mid-July, stop briefly, migrate uphill and then return through the same area in late August moving downhill. Some birds, however, remain in the area throughout the summer.
3. The sparrows (Chipping, Savannah and Vesper) are abundant on the terraces until late August when the numbers drop off sharply. It is assumed that they move elsewhere, probably downhill, preparatory to the fall migration.
4. Red-breasted Nuthatches are abundant on the Upper Terraces from mid-July to late August. The population

peak occurs in early August, and after that date, the majority of this species migrates to higher (?) areas.

5. Forest warblers (Audubon's, Townsend's and Wilson's) are residents throughout the summer. They are especially conspicuous, however, in late August and early September when the influx of young birds and migrants from the north account for their abundance for a period of several weeks. It is doubtful if the warblers migrate vertically and increases and decreases in numbers may be accounted for by north-south migratory movements.

Other birds, either permanent residents or erratic wanderers, occur too sparsely to indicate patterns of movement but further study may indicate new information.

There are other questions for which I can suggest no answers. For instance, among the birds in which the male and female are readily separable by plumage patterns, a peculiar circumstance has been noted. I have never found a mature male Cassin's Finch, Western Tanager or Audubon's Warbler in any of the death caves. On the other hand, the only Wilson's Warblers ever found were all males. It is unknown whether this situation prevails among other species. Certain species of birds have never been found in the caves despite a frequent ground habit. Among these may be counted the White-breasted Nuthatch, a common resident of the terraces, and the White-crowned Sparrow, considered a common resident in early summer. Robins are rarely found, and I have never found a Mountain Bluebird though both birds are frequently seen on the ground. Size, however, may be a factor with the thrushes.

The caves have furnished records of birds whose presence had not been suspected. In 1912, Palmer found a Calaveras Warbler in Stygian Cave, and this is probably the only authentic record of that bird in the Park.¹³ The first Townsend's Warbler reported in Yellowstone was picked up in Stygian Cave, though it is now realized that the bird is a common resident.¹⁴ It is improbable that such finds will be made in the future though there is always the possibility that some straggler may linger too long in the death traps.

13 T. S. Palmer, "The Calaveras Warbler in the Yellowstone National Park," The Condor, Vol. 14, No. 6, Nov. 1912, p.224.

14 Skinner, p. 86.

BIRDS IN STYGIAN AND POISON CAVES (JUNE 20 - NOVEMBER 1, 1962)

No close count was kept in 1962 so abundance symbols are used.

a=abundant, c=common; (over ten is considered abundant, under common).

Numbers are used when only a few were found.

1 Screech Owl
2 Empidonax sp. Flycatchers
1 Mountain Chickadee
a Red-breasted Nuthatch
2 Robins
a Audubon's Warblers (all female or immature)
4 Wilson's Warblers (both female or immature)
2 Townsend's Warblers (both female or immature)
5 Cassin's Finches
3 Song Sparrows
a Savannah Sparrows
c Chipping Sparrows
1 Green-tailed Towhee
a Pine Siskin
a Oregon Junco
6 unidentified birds
100-125 (approximate total)

BIRDS IN STYGIAN AND POISON CAVES (MAY 1 - SEPTEMBER 5, 1963)

All numbered as an accurate log was kept.

5 Empidonax sp. Flycatchers
2 Mountain Chickadees
11 Red-breasted Nuthatches
1 Robin (immature)
2 Townsend's Solitaires
27 Audubon's Warbler (all female or immature)
1 Wilson's Warbler (male)
1 Ruby-crowned Kinglet (immature)
2 Western Tanagers (female)
7 Cassin's Finches (all female)
22 Savannah Sparrows
10 Chipping Sparrows
3 Vesper Sparrows
3 Green-tailed Towhees
9 Pine Siskins
12 Oregon Juncos
5 unidentified birds
123 total (about evenly divided between Stygian and Poison)

The count here given does not take into consideration any finds or removals other than by myself. Only a rough estimate can be hazarded, but I suspect the total kills in the entire Mammoth area may run well into the hundreds per year. Some have placed the figure at one thousand, but this seems high.

Only a few small mammals are killed in the death caves. For example, in 1963, two cottontails, eight chipmunks and several mice were found in and around Poison Cave. In the deepest recess of Stygian Cave, the skeletal remains of three small coyotes were found this summer. The circumstances under which they met their death, and when it occurred, are unknown.

* * *

The statement in the original Yellowstone Park Act of March 1, 1872, requiring the Secretary of the Interior to "provide against the wanton destruction of the fish and game found within said Park, and against their capture or destruction for the purposes of merchandise or profit", has been criticized as weak and ineffectual; yet, considering the limited progress made toward the conservation of wildlife on this continent to that time, it is remarkable that the Park's wildlife received any thought.

Here is the extent of our concern for a remarkable heritage of wildlife during the two hundred and fifty years from the first English settlement in North America--as seen in the recorded legislation:

"The first game law recorded called for a closed season on deer in Massachusetts in 1694. In 1739, the first game wardens in America were appointed in the Bay State as 'deer wardens'. Delaware prohibited Sunday hunting in 1750.

"The first Federal law, passed in 1776, decreed a closed season on deer in all the Colonies except Georgia. Massachusetts in 1818 prohibited the killing of Robins in the spring of the year. New York, in 1864, was the first State to adopt a hunting license law, and Iowa, in 1878, was first to fix a bag limit on game of any species."

[From "The Conservation of Wildlife", in American Forests, September, 1935, p. 484].