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The Black Range Naturalist

THIS ISSUE'S CONTRIBUTORS

Russ Bowen - Russ Bowen is a retired meteorologist & NWS/CoCoRaHS observer who lives in Hillsboro. He is also the Assistant Fire Chief of the Hillsboro Volunteer Fire and Rescue Deparment and the minister at the historic Union Church in Hillsboro, New Mexico.

Bob Barnes - Bob Barnes is the editor of The Black Range Naturalist and two websites, www.blackrange3.org and www.birdtrips.org. He lives in Hillsboro, New Mexico.

Harley Shaw - Harley Shaw is a retired researcher with the Arizona Game and Fish Department, specializing in Mountain Lions, Mule Deer, Wild Turkeys, and Desert Bighorn. He has published extensively in his areas of interest which include his role as a Board Director with the Hillsboro Historical Society. He lives in Hillsboro, New Mexico.

Bill Shaw - Bill Shaw (no relation to Harley Shaw) worked on various accounts of "Hillsboro History", including the 1972 flood. Harley Shaw adds opening and closing comments to Bill Shaw's original material.

Hattie Given - Hattie Given was a Hillsboro resident when a flood swept through town on June 10, 1914. We republish her firsthand account of the flood in this issue.

Lloyd Barr - Dr. Barr is a retired professor of Molecular and Integrative Physiology at the University of Illinois, Urbana-Champaign. Most recently he has conducted research on pit vipers with a particular emphasis on physiology. He lives south of Hillsboro, New Mexico.

Nichole Trushell - Nichole Trushell is the founding Director of the Highlands Center of Natural History in Prescott, Arizona. She currently lives and does art in Kingston, New Mexico.

Stephen Siegfried - Among other things, Steve Siegfried is the retired outdoor editor for the Silver City Daily Press. Many of his articles on natural history have been published in magazines and journals. He lives in Hillsboro, New Mexico.

Melody Sears - Melody Sears who lived and did art in Hillsboro for over a decade now lives in Tucson, Arizona. She is exhibited widely and has received several major awards and other forms of recognition.

WATER

Two of the life forces, fire and water, have shaped the Black Range over the eons. In this issue we will focus on the life, destruction, and change which water brings, and has brought, to the Black Range. The range of "water" articles in this issue includes "The Musings of a Meterorologist" by Russ Bowen, four articles about floods on the east side of the Black Range - two which describe the flood events of 1914 and 1972 and two first-hand accounts of those floods.

"Too Much, Too Little", that seems to be how much rain we have experienced in the human history of the range. That is a human perspective about water, the most precious "commodity" on earth. From a natural history perspective, water is about life and change.

This issue also includes articles on the sensory systems of rattlesnakes - " A Rattlesnake's World", by Lloyd Barr; numerical sequences in nature in "Nature's Form and Pattern - As Inspiration for Art and Science" by Nicole Trushell; one of our most beautiful songsters in "The Melodic Canyon Wren" by Stephen Siegfried; and the natural world as it inspires in "The Art of Nature" by Melody Sears.

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The Musings of a Meteorologist

By Russ Bowen

The weather has always held a fascination for me, as I believe it does for most people. It's what people talk about, especially when it's to their disliking. It is common ground and a safe topic of conversation, even among total strangers.

Author and columnist, Barbara Ehrenreich, once said, "We who officially value freedom of speech above life itself seem to have nothing to talk about but the weather."

Well, no offense, Barbara, but I for one, place a great deal of importance in talking about the weather. The weather has influenced the affairs of men for as long as mankind has been around. It has forced the migration of people dependent upon it to grow their food. It has influenced the outcome of wars. It is blamed for the end of species that could not adapt to its changing ways. And the list could go on and on.

The atmosphere that generates our weather is a thin envelope surrounding the globe to a depth of about 15 miles, much like a cellophane wrapper on a package. The earth is heated unevenly by the sun, mainly due to the tilt of its axis (23.5 degrees from its orbital plane). This uneven heating sets the atmosphere in motion. Warm air rises causing lower atmospheric pressure and cold air sinks resulting in higher pressure. Therefore, currents are established with air flowing from areas of higher pressure to areas of lower pressure. This flow, however, is influenced by the spin of the earth, land and sea interaction, and the effects of terrain. A very simplistic description of the atmosphere, but it results in the weather that influences our lives from day to day.

Synoptic meteorology refers to a representation of the weather observed and the atmospheric conditions experienced over a given area at a specific time. Commonly referred to as the weather map, it provides meteorologists with the information needed to analyze pressure systems, fronts, clouds, and precipitation and to track their movement for the purpose of forecasting future weather for a given locale. In times past, meteorological observers would read their equipment a few minutes before the hour in order to post an hourly observation for their station. In our present era, observations are made automatically by weather equipment and maps are generated by computers in a fraction of the time that hand drawn charts required.

In addition to the observing sites located at many airports in the United States, the

National Weather Service established the Cooperative Weather Observation Network in 1890. Currently, there are 8700 volunteer observers or remote recording sites across the United States which make at least one observation a day. Those sites that make a daily observation are establishing a climate record for their various locations, climate referring to the average weather conditions for a specific location over a period of years.

People have been observing the weather and taking note of its changeability for a long time. In the Bible, Solomon wrote, "The wind goeth toward the south, and turneth about unto the north; it whirleth about continually, and the wind returneth again according to his circuits." (Ecclesiastes 1:6) Turns out, that is not a half bad description of the general circulation pattern of the atmosphere and to think that it was written in the 10th century B.C. In the early history of our nation, George Washington, Thomas Jefferson, and Benjamin Franklin were all amateur meteorological observers. Originally, observations of the weather were empirical in nature, i.e. a windy day, turned sharply cooler, a gully washer of a storm, etc. As the science of meteorology progressed, instruments were invented, refined, and standardized to give accurate measurements of the elements.

With regard to meteorological observations, the oldest and simplest of the meteorological instruments is the rain gauge, the first one having been used in Korea about 1440. These collection devices were standardized and distributed over the Korean peninsula, not for the purpose of studying the weather, but for generating tax revenues. The greater the precipitation in an area, the better the crops that would be forthcoming, and the more that farmers could be taxed upon their anticipated income.

The standard rain gauge for the National Weather Service is the 8-inch gauge. The equipment consists of a brass cylinder 8 inches in diameter with a clear plastic collection tube inside and a funnel, also 8 inches in diameter which channels the precipitation into the tube (photo following page). If the collection tube fills, any excess precipitation collects in the brass cylinder to be measured separately.

The collection tube is one tenth the size of the funnel, so the scale is magnified by a factor of 10. A graduated measuring stick is lowered into the collection tube. When the stick is removed, a waterline appears briefly which indicates the amount of precipitation collected. A mark that is one inch high on the measuring stick represents 1/10 of an inch of precipitation; so the accuracy of the measurement is to the nearest 0.01 of an inch.

Precipitation events can be very general and cover a wide expanse of territory,

but they can also be localized, in which case the event can easily miss the network of gauges that the Weather Service has in place. Such was the case on July 28, 1997, when a flash flood on Spring Creek in Fort Collins, Colorado killed 5 people and damaged buildings in the city, including hundreds of millions of dollars in damage to Colorado State University. Former assistant Colorado State Climatologist, Nolan Doesken, in an effort to explain the severity of this flood, requested precipitation reports from private citizens in the area. Surprisingly, he received 300 replies to his inquiry. "The results of the data," Doesken said after analysis, "showed that more than 14 inches of rain fell over southwest Fort Collins, the area where the flood waters originated, while less than 2 inches of rain fell only 3 or 4 miles east of this area." Such great enthusiasm in volunteers and the obvious need for additional timely reporting birthed the meteorological reporting system known as "CoCoRaHS". In the beginning, the first two letters of the name "Co" stood for Colorado where the program began, but when the program began to spread to other states, the name of the program was changed to the "Community Cooperative Rain Hail and Snow" reporting system. This year of 2018, CoCoRaHS is celebrating its 20th anniversary of operation 'with over 20,000 active observers in the United States, Canada, Puerto Rico, the U.S. Virgin Islands and the Bahamas' as described on the CoCoRaHS website. Additional information and the daily reporting of the CoCoRaHS network can be found at https://cocorahs.org/.

The CoCoRaHS reporting system has chosen the 4 inch rain gauge as their standard collection device. The 4 inch rain gauge is all plastic, but the design

is the same as 8 inch gauge. (See photo below.) The 4 inch diameter funnel gathers the precipitation that falls into the smaller measuring tube which is marked in increments of .01 inch, with a full tube measurement of 1.00 inch. Any amount of precipitation over 1.00 inch, collects in the larger cylinder. The original 1.00 inch is emptied and using the funnel, the remaining amount is added to the measuring tube; repeating the process until a total amount for the reporting period is reached.

As evidenced in the pictures, the plastic 4 inch rain gauge is prone to deterioration from the intense Southwestern sunshine or from hail damage, but the good thing is that it can be replaced inexpensively.

Precipitation results from rising air. The Hydrologic Cycle describes the process. Liquid water evaporates from large bodies of water (oceans or large inland lakes) and is transported as water vapor (gaseous water) by the circulation pattern of the atmosphere. Air rises as it

In the colder times of the year, when frozen precipitation is anticipated, the funnel and collection tubes are removed from whichever gauge is being used and the precipitation is collected in the larger cylinder. The cylinder is then moved indoors just before the reporting time, the precipitation is allowed to melt completely, and the liquid is poured into the collection tube for a measurement.

encounters higher terrain, as it is displaced by an air mass of differing quality (known as frontal lifting), or as a column of air generated by the heating of the earth's surface, which is called convection. As air rises, it cools and the water vapor condenses into cloud droplets (back to its liquid state) or ice crystals, if the temperature is below freezing within the cloud. If the droplets

or crystals are of sufficient quantity, they coagulate into larger drops or flakes and fall to the earth. The resultant rivers return the water to the lakes or oceans to repeat the process. This is known as the Hydrologic Cycle.

Hillsboro is a small community in the southwestern portion of Sierra County, New Mexico. The National Weather Service, as mentioned earlier, began its Cooperative Weather Observation Network in 1890 and in January, 1893, J. E. Smith became the first weather observer in Hillsboro, designated as NWS Station 29-4009. The earliest observations are difficult to read due to the age of the documents and the quality of the writing materials. Some observers made very detailed observations, while others were vague. Lapses in reporting were fairly common – once for a year, another occasion for 2 years and 3 months, and still another time for 3 years and 3 months. The greatest lapse in weather observing for Hillsboro occurred from December, 1911 through September, 1924. The reasons for no data over these periods are not given, but it was noted that the reports were frequently late arriving at the National Weather Service Office.

Though reporting was sometimes sketchy, there were some very interesting comments made on some of the reports. On the June report of 1897, there was this remark: On the 29th, a cloud burst on black range caused a heavy flood at this station; several animals were noticed on the head wave. And in June, 1900, the remarks were: Drought is beginning to be felt badly. Wells never known to be so low. Cattlemen becoming anxious.

Good climate data comes from accuracy of reporting and consistency in record keeping. Even though weather observing began very early in the history of Hillsboro, accurate data and consistent reporting were not begun until October of 1934, but they continue consistently up to the present which provides us with an 84 year history of weather.

Mark Twain said, “Climate is what we expect, weather is what we get.” From 84 years of record keeping, we expect 12.31 inches of precipitation in the Hillsboro area. The average per month is displayed in the following chart:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
0.62	0.48	0.34	0.32	0.47	0.76	2.23	2.38	2.05	1.12	0.55	0.83	12.31

The greatest monthly amounts experienced in those 84 years are displayed in the chart on the following page.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2.97	2.45	2.33	2.52	5.45	4.30	5.77	7.93	7.11	4.06	3.64	4.70
1949	1973	1958	1957	1992	2000	2008	1993	1975	1972	1961	1991

The greatest annual precipitation experienced in Hillsboro was 20.33 inches in 1941 and the least was 4.38 inches in 2012. Hillsboro can experience one, two, and even three consecutive months with no precipitation whatsoever. A lengthy period of drought was experienced in the late 1940's and continued well into the 1950's. In the year 1950, Hillsboro had 7.85 inches of precipitation, but it almost all fell in the monsoonal months of July, August and September. Hillsboro had 8 months of the year 1950 with less than 1/10 of an inch per month.

On average, over 50 per cent of the annual precipitation falls in the 3 months of July, August, and September. This is known as the Monsoon Season. The Southwestern United States Monsoon Season is defined as the precipitation that falls from the middle of June through the end of September. The meteorological conditions that are responsible for this monsoon consist of a strong high pressure system with clockwise circulation centered off the southeast coast but elongated westward to Texas (called the Bermuda High) coupled with a thermally induced low pressure system with counter clockwise circulation over the Sonora Desert (called the Thermal Low). The two circulations provide a long fetch of southerly flow of moist tropical air from Central America into Arizona and New Mexico and sometimes far beyond.

The warm temperatures of summer coupled with the moist air mass produce abundant convective activity which is enhanced by the orographic lifting of the mountains. This form of precipitation can produce flash flooding. Normally dry arroyos fill quickly with the heavy rainfall, flowing into one another and increasing in volume on their way to the streams and rivers. Such was the case on July 28, 2006 when the Percha Creek flooded in Hillsboro. Only 0.7 of an inch fell in Hillsboro but much greater amounts were experienced upstream in the Black Range Mountains.

On the afternoon of August 6, 1999, a report from the Kingston Ranger Station about 7 miles west of Hillsboro indicated that over 2.5 inches of rain had fallen in just an hour. The runoff in the Kingston area takes about 2 hours to reach Hillsboro. In that period of time, the

storm had advanced on Hillsboro dropping over an inch and a half of rain locally. The resultant flood sent water well over the tops of both NM Highway 152 bridges in Hillsboro, nearly washing a pickup truck off the west bridge and running an estimated 3 to 4 feet over the top of the east bridge. The measurement from ground level to the bottom of the east bridge is 17 feet, so Percha Creek was running about 20 feet deep at the height of the flood. The picture at the bottom of the previous page, courtesy of Jay Jackson, was taken on Highway 152 in the middle of the east bridge looking west to the intersection of NM Highway 27. The water level had dropped considerably by this time. The picnic table was washed out of the park under the trees to the right.

Of course, the worst flood of recent history in Hillsboro occurred on September 3, 1972 at 1 AM with the loss of 2 lives, a number of vehicles, and with considerable property damage. Water was reportedly running 4 feet deep down Main St. (NM Highway 152) in Hillsboro. Romi Bird, whose house was located on Highway 152 east of the east bridge, recalled awakening to water in her home level with the top of her bed.

Think I've mused long enough! Thanks for your interest.

BUTTERFLIES AND MOTHS OF THE BLACK RANGE

The Butterflies and Moths photo gallery of the Black Range website currently includes 58 species photographed in the Black Range. The 251 photographs were taken by Debora Nicoll, Véronique De Jaegher, Nichole Trushell, Steve Morgan, and Bob Barnes.

You can help grow this resource in three ways:

Submit your own photographs and species "write-ups" for inclusion on the site (you will retain all copyright to your material);

Provide information about location and time of year where additional species can be studied (to bob@birdtrips.org); and

Review the galleries and report errors.

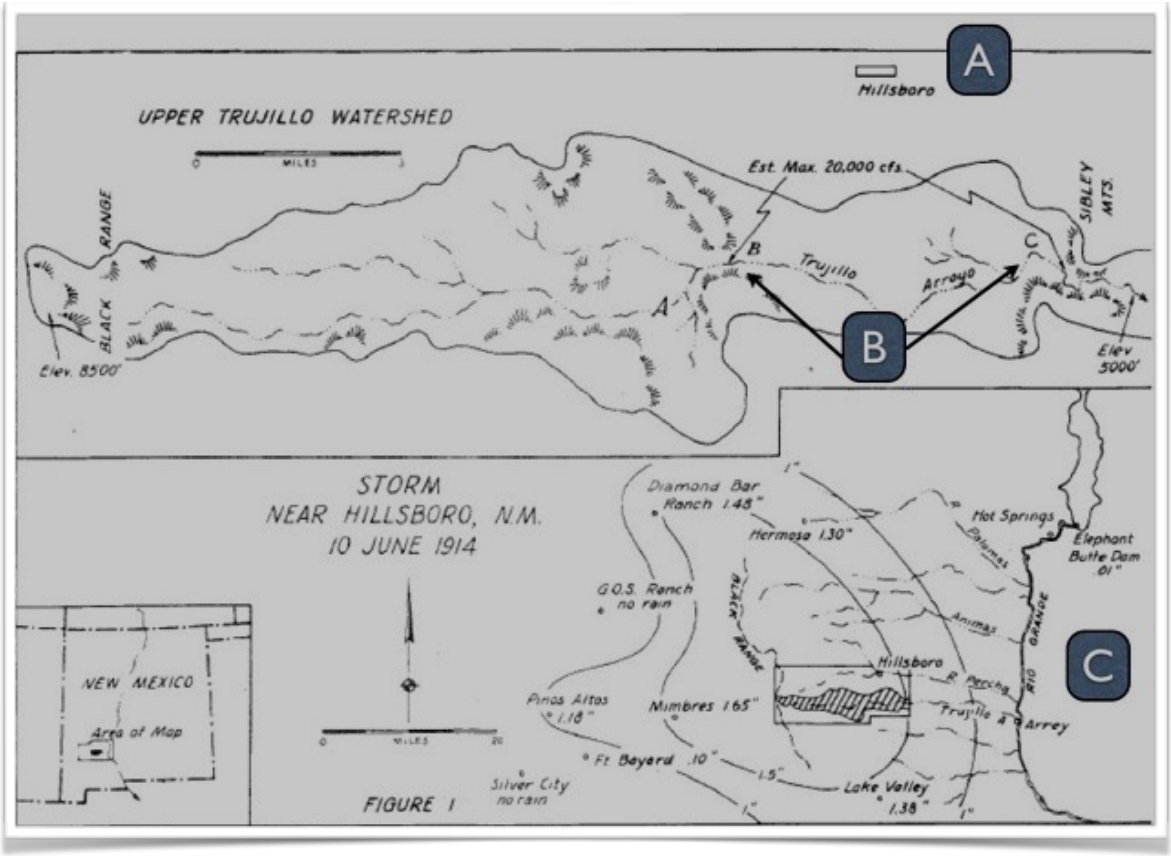
The Pipevine Swallowtail, *Battus philenor*, shown above was photographed by Debora Nicoll.

The Hillsboro Floods of 1914 and 1972

by Bob Barnes

JUNE 10, 1914 - During the night of June 10, 1914, a major storm settled over the Black Range and a significant flash flood swept down Percha Creek on the east side of the range and through Hillsboro. (Luna Leopold, Aldo Leopold's son, wrote of the June 10 event in the TRANSACTIONS OF THE AMERICAN GEOPHYSICAL UNION, *August 1946 [Volume 27, Number IV].* (pp. 535-439) The data referred to here are from that paper.

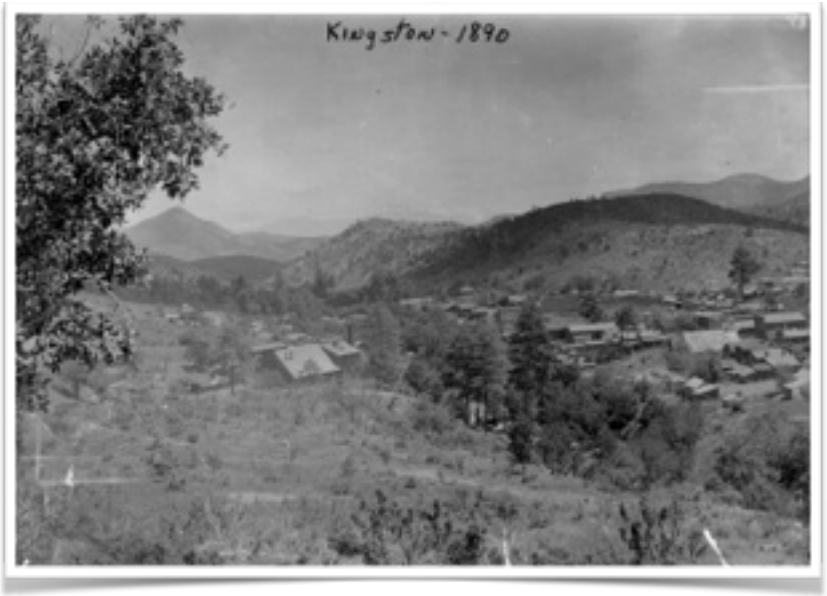
No rainfall gauging stations were located in the Percha drainage at the time of this event. Between 9 and 11:30 that night 1.05 inches fell at Lake Valley; 1.48 inches fell that night at the Diamond Ranch; and between 8 and 11:45 that night 1.3 inches fell in Hermosa. The US Weather Bureau believed that more fell in the Percha drainage than at nearby gauging stations. See the "C" annotation in a graph Leopold included in his paper [link above]. It shows isolines of assumed rainfall amounts and indicates that in excess of 1.5 inches fell in the Hillsboro and Trujillo watersheds that



night. An estimate of the flow 3.5 miles southwest of Hillsboro in the Trujillo drainage indicated that it might have been in the range of 20,000 cubic feet per second. (See “B” annotation.) At the same time that water was raging down the Trujillo, a six-foot wall of water roared through Hillsboro resulting in one death (Murphy) and significant damage. (See “A” annotation for relative location of Hillsboro compared to the Trujillo watershed.) This storm dumped a lot of water over a very wide area in a relatively short period of time.

What were the hillsides like in 1914? I have not been able to locate a photo from that specific date, but the photo at the top of this page, by J. C. Burge, shows slopes which have been heavily logged (to support cooking, smelting, warming, and building). The photo of Kingston taken by Dean Bloodgood in 1904 (middle photograph) shows heavily denuded hillsides, as does the unattributed photo of Kingston from 1890 (bottom). I have not been able to locate photos of South Percha from that era.

Timber harvest, wood gathering, and charcoal production were all “lucrative” professions during these early days of settlement. When compared to clear-cutting and intensive gathering, the destruction created by a fire is relatively benign.



There is one factor yet to assess, if we are to compare the situation in 1914 with the present: the amount of vitrified soil. Five years ago there was a major fire in this area, and there was concern that it vetrified the soil on much of the range, which will increase runoff. I am not knowledgeable in this topic area, but it is clear that most of the soil in the area is not vitrified at present - how much is, is beyond my technical capability.

The 1914 flood was a serious event, and in the unlikely event that a flood of that magnitude were to hit Hillsboro today, significant damage would occur. That is a fact of life which is inescapable if you live in a stream bed.

September 3, 1972

On September 3, 1972, the town of Hillsboro on the east slope of the Black Range experienced a significant high-water event. The US Geological Survey (Loyd A. Waite) issued a report on the event in October 1973. This is a summary of that report: (A) 4 deaths, 2 serious injuries, $846,500 (1972 dollars) in damage in Hillsboro; (B) Most of the flow came down North Percha. 12,200 cubic feet per second (cfs) of water flowed down the Percha, and 20,900 cfs flowed down North Percha; (C) Levees throughout town failed. Water reached 6 feet in Hillsboro; (D) There were two large floods in the recorded past, one in 1877 and the other in 1914. All three floods are assumed to be of the same magnitude; (E) There was no significant fire in the Black Range in the twenty years prior to the 1972 flood; (F) The reported rainfall amounts (below) comport with the recollections of people in the area now. A large storm settled in between Hillsboro and Kingston, extending north into the North Percha drainage (where most of the reported rainfall fell); and (G) Rainfall was significant, far more than has been recorded in the recent past - especially in the North Percha drainage. In the following there is no distinction between rainfall recordings at official and unofficial gages: In Hillsboro, 1.64 inches fell on September 2 and 1.3 inches on September 3; At Emory Pass, 2 inches fell between August 17 and September 6; At 2 miles East of Kingston, 4.45 inches fell during a 2 hour period the night of September 2; At Kingston, 2.1 inches fell; and 3.9 miles Northeast of Kingston, 6 inches fell.

The chart at the top of the following page (from the linked report, above) shows the discharge rates in the Percha drainage during and up to the time of the 1972 flood.

Run-off from this storm was a little more than two (at Caballo Dam) times greater than the previous recorded high (1958), three times greater at Hillsboro than the previous high (1962), and about 1.5 times that of the 1955 high in Kingston.

The likelihood that a flood will exceed the 50-year flood level is 2% in any given year. The discharge associated with the September 3 flood was 1.3 times greater

Station No.	Stream and place of determination	Drainage area (sq mi)	Period of record	Maximum previously known			Maximum September 3, 1972		
				Year	Gage height (ft)	Discharge (ft^3/sec)	Gage height (ft)	Discharge (ft^3/s)	Ratio to 50-yr flood
08361650	Percha Creek near Kingston, N. Mex.	21.5	1953-72	1955	-	2,260	15.8	3,740	1.3
08361700	Percha Creek near Hillsboro, N. Mex.	35.4	1957-72	1962	7.05	4,100	11.7	12,200	3.2
08361800	Percha Creek at Caballo Dam near Arrey, N. Mex.	119	1953-72	1958	4.31	7,260	10.2	15,400	2.1
-	North Percha Creek near Hillsboro, N. Mex.	41.4	-	-	-	-	-	20,900	4.9

than the 50-year level at Kingston, 3.2 times greater at Hillsboro, 2.1 times greater in the Percha at Caballo Dam; and 4.9 times greater at North Percha near Hillsboro. The runoff from this storm was significantly higher than that expected in a 50-year flood.

Four people died in this flood. One man died when the wall of his house collapsed and buried him, one man died when the vehicle he was driving was swept away, and a man and woman who were camping were swept away. In addition, a man and woman were seriously injured when their 103-year old house was destroyed.

At the time of the flood, the levee in Hillsboro was about eight feet high and had riprap slopes. West of town the height of the levee varied between 5 and 8 feet. The levee to the west of town washed out and the rest of the levee system in town was destroyed. (See map from the report on the following page.)

The 1972 flood was a big event; run-off was much greater than that expected in a 50-year flood; levees in town were inadequate for this type of event. The reconstructed levees are higher and, I assume, well constructed. The storm dumped a lot of water in a very short period of time - 4 to 6 inches (depending on location) of rain in a two hour period in an area only a few miles west of Hillsboro - not even as far as Kingston, meaning that the water had little opportunity to soak in or slow down.

Unfortunately there are few similarities between the 1914 flood and the 1972 flood. The 1914 flood was characterized by 1 to 1.5 inches of rain falling over a wide area (basically the east side of the Black Range), while the 1972 storm was much more localized and intense.

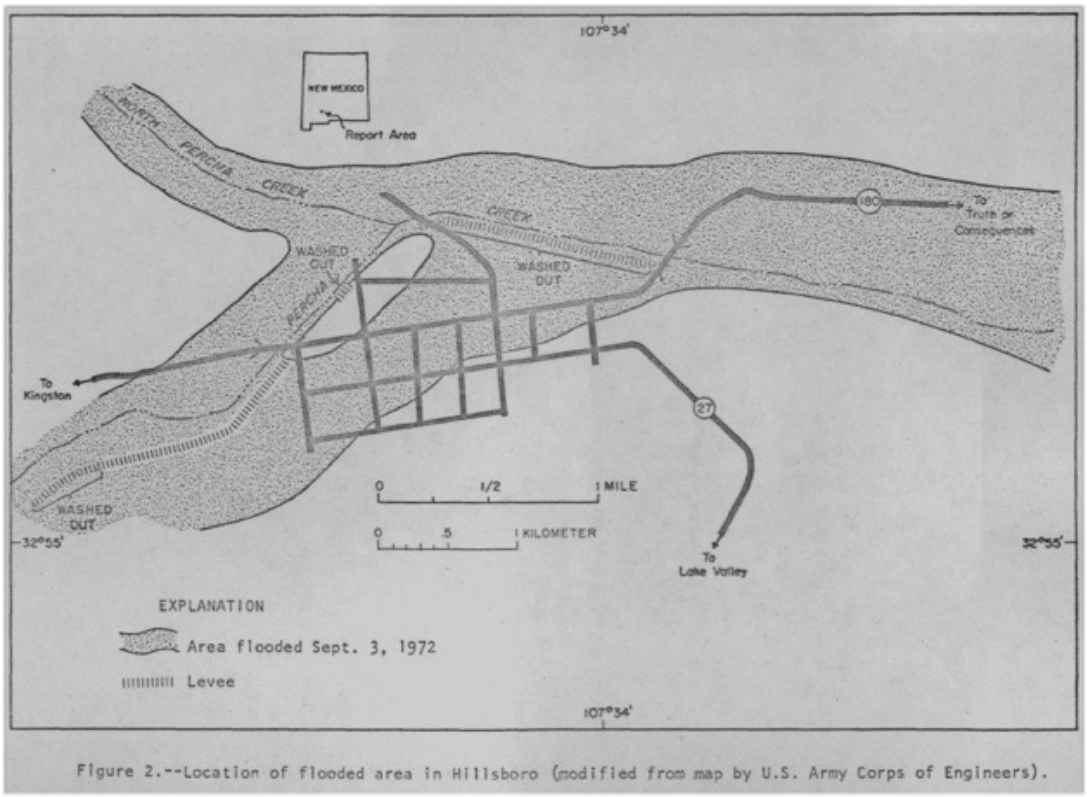


Figure 2.--Location of flooded area in Hillsboro (modified from map by U.S. Army Corps of Engineers).

Although the volume of water falling in the watershed may have been similar, the way it and the topography interacted (except closer to Hillsboro) varied significantly. Flooding in Hillsboro may occur because of multiple types of events.

Arizona Tree Frog Follow-up

Don Precoda followed up his article about life as a Hillsboro Peak Fire Lookout (see last issue) with this: "…the Arizona Tree Frog…has popped up several times over the past 3-4 summers. Once one was picked up in the meadow by visitors and held in such a way as to allow rotational viewing. I learned a green tree frog has a bright yellow underside. The same seasonal 15'x15' basin/bolson used by the frog in the essay is also vital for another different frog that has bumpy skin and different coloration. I have seen babies of both frog types smaller than my pinkie finger nail, in groups of 20 or more moving through the meadow on Hillsboro Peak. My sense is the resident turkey population murder and eat as many as possible."

The 1972 Flood

by Harley Shaw/Bill Shaw

This article originally appeared in Volume 3, Number 1 (February 2010) of the Hillsboro Historical Society Newsletter - *Guajalotes, Zopilotes, y Paisanos*. It is reprinted here with the editor's permission. (Membership in the society is only $25 per year - visit their site for details.)

I (Harley Shaw) excerpted the italicized paragraphs below from a rough draft manuscript in our archives. I believe it to be part of the longer manuscript that Bill Shaw was writing on Hillboro history before a stroke interfered with his ability to write. It is one of several accounts and clippings on the flood in our archive, but, because it was written sometime after the event, seems to be less confusing than the various news stories that immediately followed the flood.

"Barbara Wilken, who ran the Percha Café at the west end of Hillsboro remembered the night of the 1972 flood quite well. Her café was on a property bordered by Percha Creek. In 1972, the creek cut through the northern end of her property bordering the highway. Barbara awoke to the roar of the creek about Midnight on Labor Day Sunday. When she stepped outside to investigate, she plunged to her knees in rushing water. The valley is relatively wide at this point, so fortunately the water, while over the creek banks, was not deep. One reason the water had left the creek channel was Bill and Lil Debeau's [sic--Dubeau] manufactured home, which had washed down against the west end bridge, creating a dam. Bill and Lil had sought refuge in their car and somehow managed to drive through the increasingly deep water to high ground.

Barbara called her husband, Lefty, who was at a rodeo in Arizona. He immediately started home, having to come around through Hatch and back from I-25 because of swollen streams across the other two routes into Hillsboro. By the time Lefty came down White Hill, the flood had created new runoff channels across the lower end of Hillsboro's valley, had caused the collapse of the two story Malloy home, located next to the east bridge. One account says the house was 108 years old in 1972, which would make it present before the 1877 founding of Hillsboro.

On the night of the flood, Nathan Malloy was trying to lead his family to safety, when the walls of the lower floor collapsed. Nathan was carried away by the rushing waters, but managed to pull himself out downstream, badly abraded and suffering a basal skull fracture. One daughter and two sons reached the roof of the house and scrambled to higher ground. The mother, Bobbie, and her younger daughter Julie were trapped in the rubble.

The raging waters rushed down all three of Hillsboro's primary streets, and the few late-night patrons of the S-Bar-X Saloon fled. Floyd McCullough, who had been

playing for a dance and muscian Ed Newton headed for their cars. Both McCullough and Newton were swept away, McCullough's car with him in it. McCullough managed to grab a tree and escape, with the help of the two Malloy sons. Newton drowned, and his body was ultimately found three weeks later in his nearly-buried car, near the Percha Creek Box. The search had been called off for Newton, because a body believed to be his had already been found some eight miles downstream, lodged in a corral at the ranch currently occupied by Ike and Mary Wilton. That badly damaged body had been mistakenly identified as Newton and buried. Disinterment allowed it to be identified as Mike Gurske.

One hero that emerged from this event was the Malloy dog, who continued pacing back and forth across the fallen roof of the Malloy house, whining and whimpering. As the flood subsided, he assumed a crouch amidst the debris of the collapsed building. Chief of the Sierra County Rescue Squad, Neil Baird, wormed himself into the rubble and heard faint cries for help. Mrs. Malloy and her 9-year old daughter, Julie, were still alive, but Mrs. Malloy's arm was pinned and she could not move. Rescuers and residents alike began a hurried excavation. Local miners pitched in, using their experience to shore up the building remains as rescuers removed debris, thereby preventing collapse of the roof on the victims. A large jack was used to lift the ruins far enough to allow Julie to climb free. Mrs. Malloy inched her way out, her arm nearly severed. She had other multiple fractures and injuries, but survived, her arm saved. Before the flood she had been a concert pianist—a skill she retained after her arm had healed."

This account seems accurate as far as it goes, but it leaves some questions unanswered, the most important being how many and who actually died in the flood. Solidly documented were Ed Newton, who died in his car, and Guadalupe Terrazas, who was crushed when the waters collapsed the adobe walls of his house. What is less clear is the identity and circumstances of death of Mike Gurske, who had initially been mistaken for Newton.

One other harrowing account tells of the couple sitting in their camp trailer at the junction of what are now highways 152 and 27 (across the street from Sue's Antiques) until the waters lifted the trailer and took it downstream. People present say that the trailer didn't go far, hung up, and the people were able to get to high ground. The original Geological Survey report of the flood (ed: see link in previous article), dated October 3, 1973, says that there were four deaths:

"One male resident of Hillsboro died when the raging waters collapsed the heavy walls of his adobe home, burying him in the debris [this was obviously Terrazas]. Another man drowned when floodwater swept away his vehicle as he drove along Highway 180 in Hillsboro [Newton—highway 180 is now highway 152]. A man and his wife, camping in the area, were carried into Percha Creek and drowned; their bodies were found in the creek downstream from Hillsboro."

This latter account sounds like the couple in the trailer. Or was there another couple camping in town that were drowned? Was Mike Gurske the male of the couple? Was his wife found later? Never found? Or is the Survey report simply wrong? If so, who was Gurske and how did he drown? To add to the confusion, one local and knowledgeable history buff says that the body found later in the corral turned out to be that of a woman, perhaps the female of the couple? The Geological Survey Report was written a year after the flood, and you would think that the initial inaccuracies of the press would have been sorted out. Or did the geologist writing the Survey report get it wrong and add, once again, to the confusion?

Patti Nunn reviewed this article and then searched the Social Security Death Index online. She found three fatalities associated with the flood:

Name: Guadalupe Terrazas
Last Residence: Hillsboro, New Mexico
Born: 12 December, 1898

Name: Elbert Newton
Last Residence: Truth Or Consequences, New Mexico
Born: 7 Mar 1913

Name: Emil Gurske
Last Residence: Deming, New Mexico
Born: 30 Mar 1903

This supports the contention that only three drowned and that the couple in the trailer escaped. It all goes to show how tangled even fairly recent history can become.

The Flood Which Swept Through The Main Business Street of Hillsboro, New Mexico - June 10, 1914

by Hattie Given

On the evening of June 10, Mother and I started for town to attend our regular O. E. S. meeting. On our way, we stopped at a neighbor's and remarked that we wished that we had brought our umbrella, as the clouds were gathering in the sky. Paul walked down with us; and I said to him, "If it rains you can come for us." We opened our chapter with eight members. The rain soon came down in torrents; and the hail beat upon the windows so that our voices could not be heard across the room. Our Patron had communications, which he read to us, while terrible lightening and crashing thunder rent the air and caused us to cover our eyes and ears; but we finished our work and closed with prayer and Farewell.

By this time the creek had begun to rise and we thought best to make

coffee and have lunch; which we did and sat down and had a jolly time never thinking that it was more than a shower which would make the street muddy. Meanwhile Mr. Murphy, our Worthy Patron, had been out investingating, and told us that we better lie down in the chamber room. The lightining was flashing terribly terribly and heavy thunder was pealing forth. So, to take our attention Brother Murphy told us a story about a Captain who told his men, when under fire, not to duck when the bullets flew by; and when the Captain was admonishing them, a bullet whizzed by his own head and he very naturally ducked; "There," he said, "Don't do it that way, I mean."

This article originally appeared in Volume 2, Number 1 (February 2009) of the Hillsboro Historical Society Newsletter - *Guajalotes, Zopilotes, y Paisanos*. It is reprinted here with the editor's permission. (Membership in the society is only $25 per year - visit their site for deatails.)

Evidently something was drawing Brother Murphy away; for he left us again. Meanwhile the husband of one of our members, himself a star, came to us. Still the storm increased till we could see that the creek was filled from bank to bank when the brilliant flashes of lightening came; and rivers of water were rushing through the yard and down the Main street. Every few minutes the flashes told us that the water was higher, and yet higher. Then great trees and sheds came on the waves.

From the bar-room, across the way, we could see the men standing in groups; then the door was closed; the lights went out. Then a terrible crash of falling timber and glass told us that the whole front of the drug-store had fallen out; still another crash and the backend, where Dr. Given's office was, falls; then farther down the street we could hear crash upon crash as the terrible waves demolished building after building. Higher and higher crept the water. The large, two-story building we were in swayed. Now and then above the roar a scream could be heard. Soon many lanterns dotted the hills directly opposite us; and on rushed the cruel water. When the waves reached the tops of the windows - almost to the floor of the second floor, where we were, the only man with us in the hall advised us to get into a tree which stood close to our hall, but no one would venture even though the floor was shaking under us.

Several of the women were beside themselves; but I felt that the building was still safe and would be safe some time to come. Still it was a horrible sensation to feel the building shaking. Still the water came down; we sat in the open windows pretending to eat crackers, to make the men, who were watching us, think that we felt safe; but we couldn't swallow.

More lanterns dotted the hill and all stood watching us. Then, indeed, we felt that we were doomed. But God designed different. Our work was not yet done.

The rain stopped and the waters began to recede. Doctor Given was the first man to get to us; then Paul; then others; and the hall was soon emptied of all excepting Sister Murphy; she, alone, refused to leave the hall. We knew that she was waiting for Tom; but the thought that Tom (Brother Murphy) would never come never enter our heads. We were carried to the school house hill and left sitting in the coal shed. Soon Doctor Given returned saying, "We think that Tom Murphy has been drowned." Doctor and I once went bact to the hall and then to the Murphy residence; then indeed, we feared the worst. We waited all night and until 11 o'clock a.m. when word came that the body had been found, almost four miles below the town, in a bush 50 feet above the ordinary level of the water. That will give some idea of the enormous proportions of the flood. The bringing in of the body and subsequent burial needs no description. Masons, Odd Fellows, and O. E. S.'s were present to pay tribute to a loved brother. A mason for forty years and a star for four, always faithful even to the last, when he gave his life to help us. For we know, from remarks that he made to several before the flood swept him away, that he considered that we were in imminnent peril and was determined to get to us and do what he could to get us to safe ground even if he died in the attempt. When someone remonstrated with him and tried to keep him from making the attempt to return to the hall, he said, "I'd drown to save my old woman." He did.

We all mourn his loss in company with his estimable wife.

Many buildings were demonlished; some have fallen since. The property loss was great for such a small town. At least two dozen buildings were flooded to a depth of from a few inches to six feet. And, in the business section, several were completely destroyed.

Luna B. Leopold in ***Two Intense Local Floods in New Mexico***, ***Transactions of the American Geophysical Union***, Vol. 27, No. IV, (pp. 535 – 539), reports that Mr. Nations of Arrey told him that Murphy's body was found "hung in a tree near the box canyon some 50 feet out of the channel" – not 50 feet above the ordinary channel of water reported by Given in the article above.

A Rattlesnake's World

by Lloyd Barr

All an animal "knows" about the world comes to it via its senses. So to learn something of what a snake's world is like, we need to learn something about the way they sense the external world.

Imagine, you are standing on the side of a dry creek bed watching a Texas Horned Lizard, what kids call horny toads, when ten feet away, a snake slides out from the grass under a mesquite tree and starts across the creek bed. It is "clearly intent" on going straight across and seems to bustle as it creates its sinusoidal way across the sandy, rocky, terrain. You freeze! The snake is big, more than four feet long and has a thick body, more than two inches thick. No need to attract it's attention! It is moving so fast it is hard to see the dark brown diamond patterns on the skin of its back. The rest of its skin is blotchy, mottled skin, light, tan even. However, it has a rattle on its tail and just ahead of the rattle are the bright, characteristic black and white stripes of the "coon tail". Definitely a Western Diamond Back Rattlesnake. You can't miss the tail because it is waving up and down.

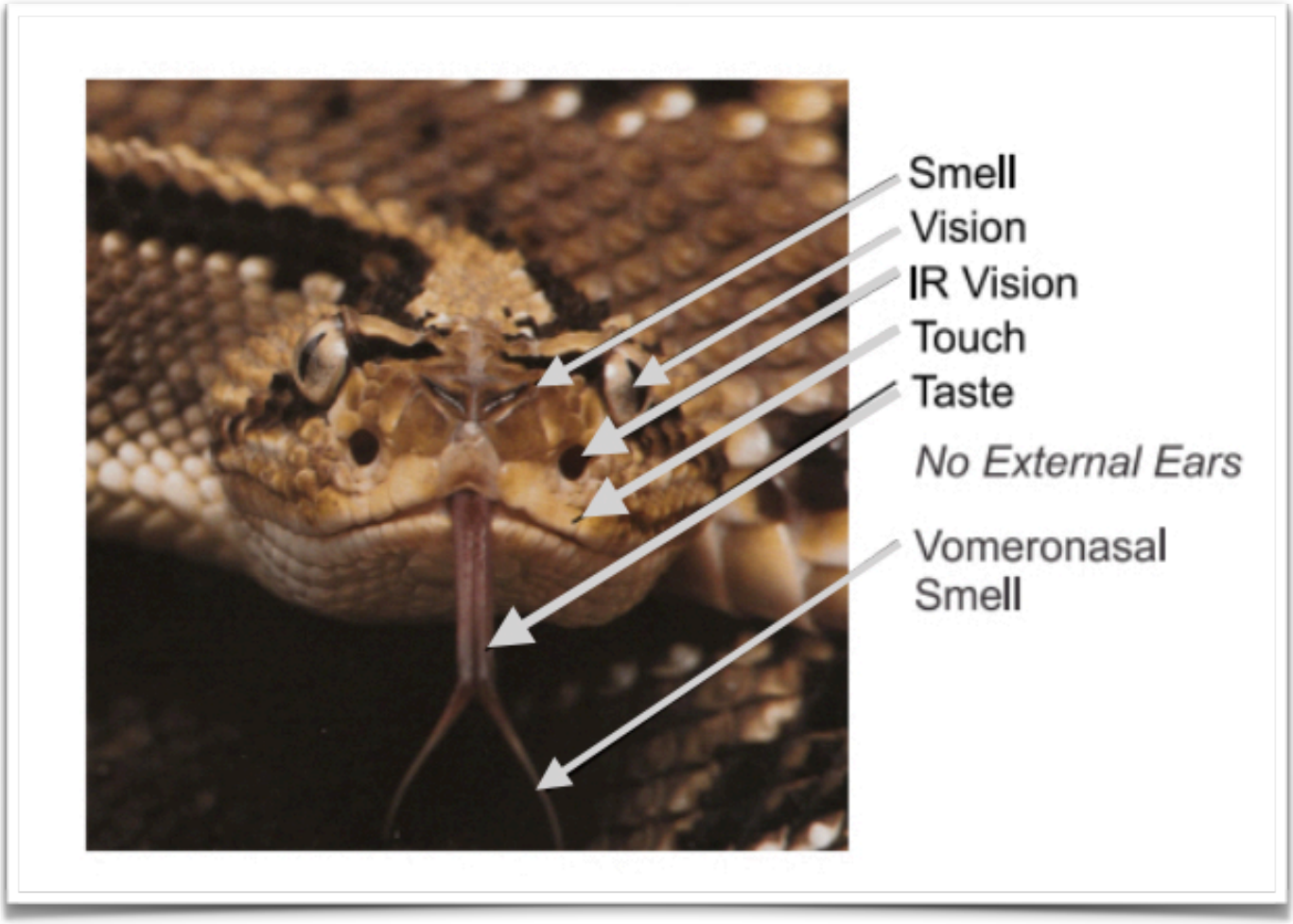
Let's consider what the two animals, snake and human, are experiencing in this encounter. Doing this will bring us very quickly to matters that border on what we cannot ever know, as well as, those things which we probably will know but just don't know now. Experiencing is a brain process involving millions of little nerve cells talking to each other by way of their nerve impulse messages. The parts of the brains of all vertebrates develop from equivalent parts in their embryos and the fine structures in the parts are similar. Moreover, the main brain parts function in similar ways. In the snake, the brain transitions to the spinal cord just below the head just as ours does. Above the spinal cord, the snake brain parts extend forward toward the nose of the snake, instead of growing up and out like the mushroom shaped brain we have. It's as if a map of the brain parts was plotted but on a printer page and then crumpled up as if to toss away. The parts would still be there with their same neighbors but the overall view might seem very different. So, snake brains are not exactly shaped like miniature versions of ours but one can easily see that many parts of a snake brain are similar to ours and that they carry equivalent information.

The nerve cell bodies in brains are clumped together into nuclei; different nuclei have different functions. In the nineteenth century neurophysiologists found certain easily distinguishable cells in the rest of the body are especially sensitive to one particular aspect of the environment. These are the receptor cells and they are connected in various ways to nerves that run up to different nuclei. Mostly, the receptor cells are receptive to particular kinds of vibration, sound, light etc.

As the snake finally turns its head towards you, it brings to bear at least seven senses to collect information about you and what to do next. The two

extra senses, the sensitivity to pheromones and the sensitivity to infrared light, involve whole organs that we don't have.

quantum of light by a pigment molecule in a photoreceptor cell, just as it is in all other vertebrates. Virtually all living



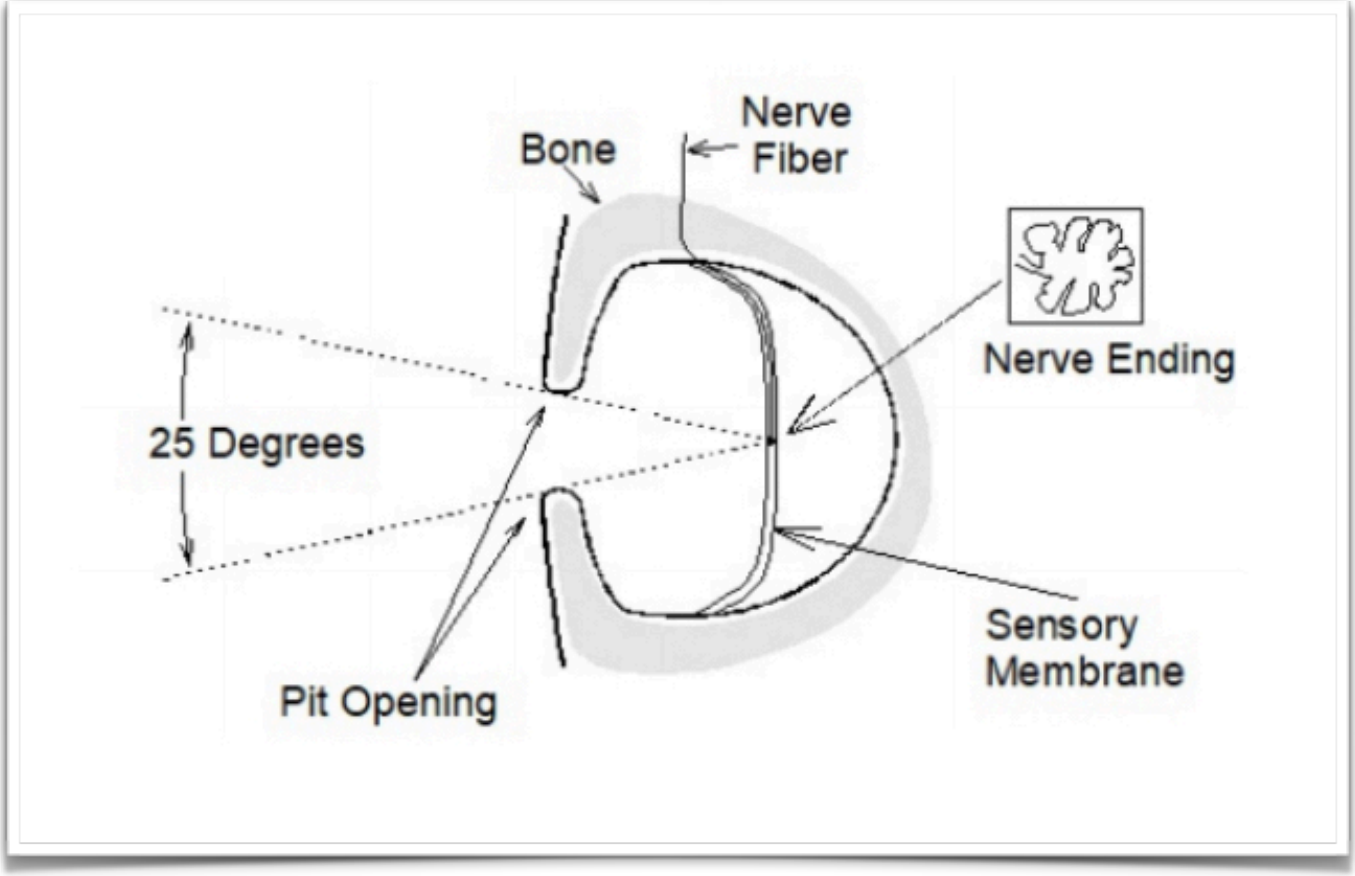
Snake eyes are very similar to ours: lenses, retinas the whole bit. However, the snake eye has far fewer receptors and is not as good an optical device as the human eye. Being blinded would be a death sentence for almost any wild vertebrate. Diamondbacks included, probably, but Diamondbacks also depend heavily on other senses. Nonetheless, they behave as if vision is their primary window to the external world just as it is for most vertebrates. The primary event in snake vision is the absorption of a

things respond in some way to light but vertebrate photoreceptor cells are uniquely sensitive. Their "visual" pigments are members of a very large family of membrane proteins some which go back to when life was still in the one cell stage. Light and life have been intertwined almost from the beginning and visual pigments started very early. While some kind of absorption event is a necessary first step, vision is far more than the detection of light quanta. Instead, we should think of vision in terms

of creating a perceptual image of the external world.

The amount of information necessary to create even a fuzzy perception of a piece of the world is huge. Even a snake's small eye sends to its brain the dual visual system not just with its photoreceptors.

Like cameras, eyes focus light rays from distant objects on a photoresponsive surface, the retina. There the similarity to cameras stops. What the retina sends to



Information from many tens of thousands of photoreceptors with other kinds of sensory information and memory as well. It is not surprising that data-reducing abstraction starts early on. A rattlesnake brain does even more: it integrates its primary light-based visual system with the entirely different infra-red "visual" system. Infra-red quanta have longer wavelengths and are too weak for visual pigments to detect. How the rattlesnake puts all of this together is unknown. In any event, a Diamondback "sees" with a the brain occurs after intense processing of the photo-images and is quite different from the simple image reproduction that a camera provides. The processing involves abstraction of features (lines, etc.) and the perception of objects. The rattler in the creek bed needs to know what are the dangers or opportunities in our encounter; the faster the better, so prior experience is incorporated early in the perception process. At what point the infra red, heat information is

incorporated is not now known. Just the overall size of a discernable object is of vital importance and snakes will turn their heads to get different perspectives just as we do.

Rattlesnakes have special organs which can detect the infrared rays coming from a rodent or a bird. They are unbelievably more sensitive than the heat receptors in our skins. These organs are called pits and since the only animals that have them are certain vipers, these animals are called pit vipers. The organs, themselves, are indeed, little pits in the face about half way down on a line between the eyes and the mouth. In a 4 foot Diamondback, the pits are 4-5 mm. or so in diameter. At a distance, a pit looks like a little black spot. About halfway into the pit from the orifice is an ultra-thin sensory membrane which divides the pit into a front and back. The sensors are simply expanded nerve terminals in the sensory membrane.

It is likely that a rattlesnake is able to extract very little image information from its pits. What it can extract is the warmness, direction and perhaps size of a little bird or mammal. One should not minimize the value of such information, especially on a dark night when other animals might be almost blind. Finally, one might expect that rattlesnakes have brain mechanisms to distinguish warm animals from warm rocks. This not understood at all.

For air breathers like snakes and humans, airborne molecules carry information about nearby food and dangers. The first event of the process of smelling (i.e. olfaction) involves small airborne molecules binding to molecular receptors in the membranes of some cells of the nose. The sources of these odors are usually other animals and plants. A second chemical sense involves molecules that are not volatile, the pheromones. These large molecules are detected by snakes using an organ humans don't have, the vomeronasal organ. This system provides information about other animals, especially other snakes. This system is also a communication system because the molecules provided by some animals identify themselves and their mating availability to others of the same species. The taste, smell, and vomeronasal receptors are specialized by which chemicals of the environment they detect. Detection of environmental molecules is present in all vertebrates and invertebrates.

In contrast with smelling, tasting is almost vestigial in rattlesnakes. There are taste receptor cells, but they are organized into just a few taste buds. In humans and other mammals taste probably became so important because the mammals eat so many different things. Rattlesnakes tend to be more specialized in their food and once a prey is struck, they tend to try to eat it. Diamondbacks probably have fewer than a couple dozen taste buds, while humans have around 4000.

The rattlesnake in the creek bed is sampling molecules from its environment not only with its sense of smell but also with another similar system, the vomeronasal system. The paired vomeronasal organs are structurally

quite similar to the nasal system but more complex. The molecules detected are now referred to in the scientific literature as vomodors to distinguish them from the volatile molecules, the odors, we associate with the sense of smell. Since the non-volatile vomodors are not carried by air currents to the sensors, they must be transported there in some other way. This involves their tongues working in at least two steps. First consider, rattlesnakes tongues are 1) long, 2) have long forked tines, and 3) are rough on their ventral surfaces. The tongue first, picks up non-volatiles by contact with the environment and then, second, folding the tongue back, deposits them into the fluid of the mouth. Then it flicks the tongue back out. Various kinds of evidence, including x-ray video, indicate that the tongue tines do not go into orifices in the vasonasal organ contrary to what was formerly thought. So currently, the forked nature of the snake tongue has no special role in the transport of vomodors.

So, the rattlesnake has a lot of sensory information to go over before it acts. No wonder it is slow.

PHOTO CREDITS FOR THIS ISSUE

Cover Photo: Bob Barnes, taken in the Percha Box, east of Hillsboro

Photographs in "The Musings of a Meteorologist" by Russ Bowen, except for the bottom photo on page 10 which is by Jay Jackson

Photograph of a Pipevine Swallowtail on page 11 by Debora Nicoll

Historic photographs from Kingston on page 13, J. C. Burge and Dean Bloodgood

Illustrations on pages 23 and 24 by Lloyd Barr

Photographs and illustrations on pages 27-31 (except as noted below) by Nichole Trushell

Photograph lower right on page 31 by Bob Barnes

Photograph of Canyon Wren on page 32 by Bob Barnes

Nature's Form and Pattern - as Inspiration for Art and Science

By Nichole Trushell

Step into nature and look closely at a flower. Look at the plant's leaves. You will find lovely, intricate patterns. Count the flower parts. Monocot flowers, like wild onions (photo below), have parts based in threes, most dicot flowers, like wild four o' clocks (photo below), have parts in fives. Look carefully and you will find other patterns -- there are spirals in leaf arrangements, sunflower heads and fern fiddleheads unfurling. Fascinatingly, sunflowers, ferns, seashells, big horn sheep horns and pine cones have the same type of spiral. There is mathematics afoot.

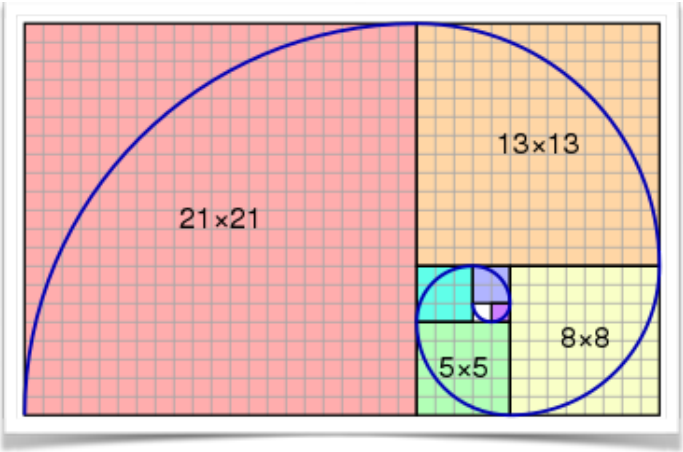
Monocot Flower of the New Mexico Onion, Allium rhizomatum

Dicot Flower of Sweet Four O'Clock, Mirabilis longiflora

The more one looks, the more captivating this becomes; there is a particular mathematical framework and structural efficiency in the beauty we see in nature. One mathematical key to this form and pattern is found in what is called the Fibonacci sequence. This sequence is generated like this: start with 0+1=1, then 1+1=2, 2+1=3, 3+2=5, and so on. That is, compute each successive member in the sequence by adding the last two. The numerical sequence you derive is this: 0, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, 233, 377, 610 and continuing on. These numbers were recognized by Italian

mathematician Leonardo of Pisa, known as "Fibonacci." Who, in 1202, promoted the Arabic notations for numbers instead of Roman, for example, using "29" instead of "XXIX." In *Liber Abaci* (Book of Calculation) he also introduced the Fibonacci series.

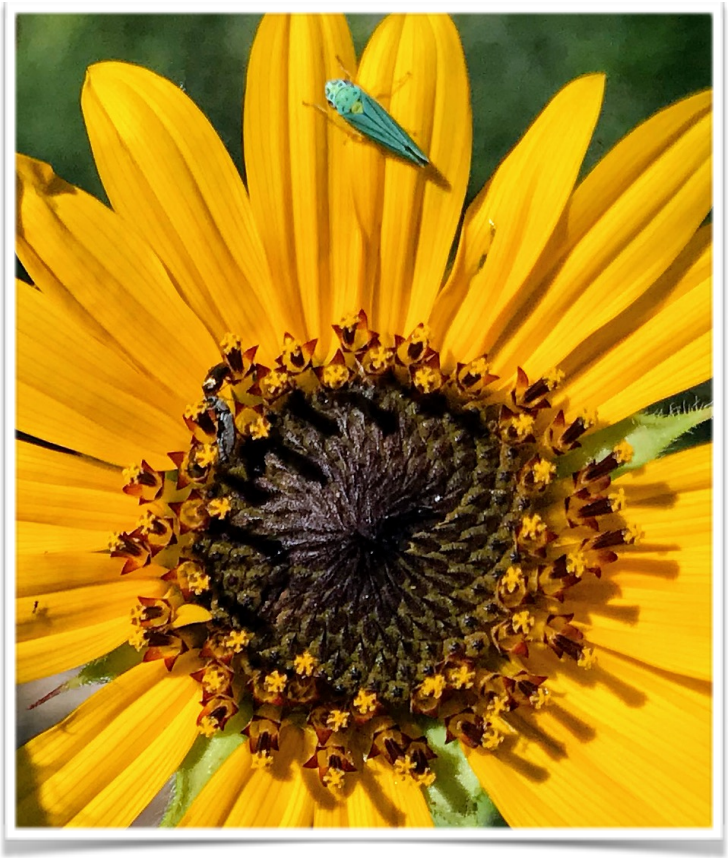
Once this sequence of numbers is recognized, it is truly remarkable how common and dominant Fibonacci numbers are in nature. I've already noted the basis of nature's two flowering plant groups based in 3's and 5's (there are a few plant families based in fours, but these are the exception more than the rule). In botany the numbers also describe phyllotaxy, or how leaves are arranged on stems – they spiral. Some plants have opposite leaf arrangement, that is, two at a node, but even these opposite pairs spiral around the stem. These numbers also describe the spiral configurations of florets and resultant seeds on a sunflower head, the spirals of bracts found on pinecones or the shape of a fern's fiddlehead. Graphically, the way these numbers increase looks like the diagram below.



There are, of course, different types of spirals; this one has a self-similar curve which keeps its shape at all scales. Think of its spiral continuing to grow outward with an unchanging angle -- a radial line from the center makes always the same angle to the curve. This is nature's common spiral.

I am a botanist; my graduate work was in plant taxonomy--the structured science of the details, the patterns, the chemical and genetic traits that make a species unique. With a lifelong scientific perspective, I not only think about these specifics, but consider the advantages their repeating patterns provide. But art is an integral part of me as well; the artist contemplates beauty in the natural world around me and tries to capture it. In my case it has been botanical illustration, and of late, steel sculpture. I consider what it is that brings art to life. In either case, be it science or art, I wonder and am inspired by the Fibonacci sequence.

Let's go back to sunflowers and consider them more carefully. Sunflowers heads, which look like one flower, are actually a collection of tiny flowers. Those called "disk" flowers are in the center of the head, and many species also have "ray" flowers that look like petals. Look closely into the center of a head in the photo on the next page, or find a live sunflower within which you can see details. You will find intricate interlocking spirals created by the arrangement of the developing disk flower buds and opening flowers. The shape of these intricate spirals is described by the Fibonacci mathematics; they are that spiral.



Central Disk Flowers and Fibonacci Spirals of Annual Sunflower, Helianthus anuus

Ponderosa Pine Cone Colored to Show Fibonacci Spirals

And what about gymnosperms, the cone-bearing plants that are even more ancient than flowering plants? Are there Fibonacci patterns in these? Indeed. Any pine cone is also composed of spirals; these are an arrangement of woody bracts. Take some paint and color each spiral differently (colored pine cone photo). You will find a number of spirals, high, low and both directions, but if you track them around the cone, you will find they most commonly reflect a Fibonnaci number. The needle leaves of gymnosperms grow singly or in fascicles of 2's, 3's and 5's.

For creating botanical illustration such patterns are very helpful. For example, if you want to draw a pine cone you lay out the Fibonacci spiral in two directions, then draw the bracts along these lines. There are many similarly spiraled plant structures; look carefully at cauliflowers, pineapples, artichokes, and as noted, there are spirals in leaf arrangements too. (See image on following page.)

But why these numbers? Such mathematical patterns result from function. If you think about light efficiency, it makes sense for plants to add buds, petals, leaves, or bracts

where there is a gap – growing in a way that spreads them out in the best way to catch sunlight, a plant's critical energy source. To do this efficiently, there needs to be a rule. It works best if leaves or other plant parts that gather light are not on top of one another. If parts were arranged using significantly different angles between structures and a lot of overlap, there would be waste as growth occurs. What if there was an arrangement where there was never actual overlap? The ratio of one Fibonacci number to the next describes that type of number – it is never a whole number and it is always changing by a small amount.

What I have shared here is a bit about how patterns work functionally, but how does this inspire? As for my own art, as I said, I am awed by the repeating patterns found in nature. And although sometimes subtle, these patterns are hidden in everything I create. It is because I try to reflect nature. If I am sculpting insects I am careful to adhere to their actual patterns; there are for example a lot of 3's in insects, and they are very symmetrical. But there are also relationships to capture. How large is the head in proportion to the thorax and to the abdomen in a dragonfly? What is the pattern of veins in the wings? What are the patterns in butterflies and moths? How do they differ? How many sections make up each thorax and abdomen? I also sculpt birds and plants. Plants in particular hold the Fibonacci numbers quite obviously and remarkably, as I've described here. So, when I create a plant, I try to capture turns of leaves on a stem, the vein patterns, the flower parts, and in sunflower heads I strive to reflect the complex spirals of the disk flowers; although I must say for this I can only be representational. The spirals are far

Sunflowers, from a Commission in Progress … or just "Steel Sunflowers" point is, there are not leaves on the sculpture yet!

too complex to create with welding! The taxonomist in me looks at relationships of parts that make a species unique, and this influences what I build as well. Someone once said to me that my sculpture was "very different" than a lot they see. I said, "well, I am a biologist." I think my understanding of the mathematical nature of life, and bringing that to what I am sculpting, helps my

pieces reflect nature, even when a piece is abstract and representational.

This is only an introduction, but now that you are aware, look for these numbers and the form and pattern they create! Here is a final question to ponder. These mathematical relationships are functionally the best for plant structures. Obviously there is some of the same efficiency for animals, since we see the Fibonacci spiral in structures as diverse as big horn sheep horns and chambered nautilus shells. But what about human creations? Do these numbers influence our concept of beauty? Do the relationships between these numbers occur in human creations? Art? Architecture? More to explore!

Fireplace screen inspired by Scarlet Morning Glory, *Ipomoea cristulata*

Scarlet Morning Glory, *Ipomoea cristulata*

The Melodic Canyon Wren

by Stephen Siegfried

It's hard to quibble with the decisin of the state Legislature on March 16, 1949, to designate the roadrunner as the New Mexico state bird. Residents of the Land of Enchantment, including the state's lawmakers, were taken by the antics and plumage of this commonly seen, long-tailed cuckoo long before the bird out-raced a cartoon coyote. The choice, though, was one of sight, not sound. Had those same legislators taken their vote with eyes closed beside a watercourse in one of the state's upland canyons, and not in the City of Holy Faith, the state bird most likely would be a little brown wren that makes the sweetest sounds this side of heaven.

The Canyon Wren, (*Catherpes mexicanus conspersus*) is common in New Mexico throughout the year, and wrens from the northern Rocky Mountains winter in the southwestern Unites States and Mexico. The bird is predominatly brown dorsally, with a white breast and throat. The belly below the white bib is a dark reddish-brown, as is the tail. Variations in hue exist between individuals. Males and females are similarly marked, and adults are commonly 5 inches to 5 3/4 inches in length. The bill, as with all wrens, is long, slender and curved down at the end. The species is sometimes confused with the

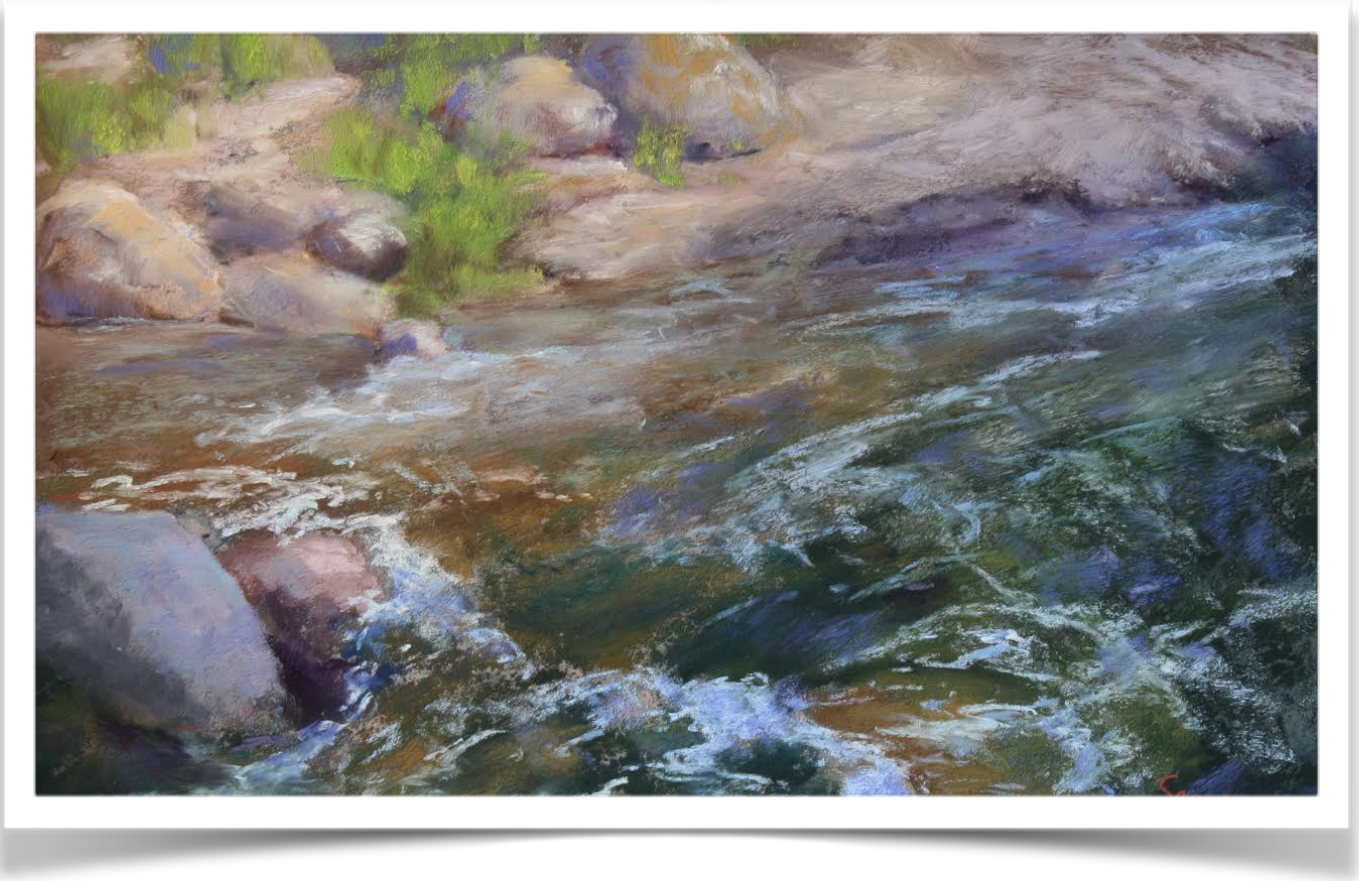
Rock Wren, which is grayer in color and has a streaked breast.

Although more likely to be heard than seen, the wren is commonly found perched on canyon walls, ledges and tree trunks. It is seldom still, characteristically bobbing up and down when not flying or creeping along rock walls. The birds feed on insects and spiders, usually along rock surfaces, and adults are aggressive foragers, especially when they have nestlings. Nests are formed as open-topped cups in rock crevices, caves or along ledges, although buildings are sometimes used as nest sites. Adults first make a base of sticks and grasses, then line the four- to eight-inch nest with feathers, plant down, fur or other soft material. The female lays four to six oval to elliptical eggs, often tinted a pinkish white and marked with reddish-brown dots.

Those who hear the Canyon Wren's resonant scale for the first time can't but wonder from what earthly creature it came. The song ordinarily has seven or eight primary descending notes, but often with a maestro's flourish of repeated notes at beginning and end. The chromatic scale sometimes is repeated twice. The quality of sound does have something to do with the acoustics in the great concert hall of a southwestern canyon. A fisherman hears the song to the accompaniment of the rush and babble of a trout stream. Higher up, nearer the rimrock, hikers pause to listen to the reverberations of notes off canyon walls. The wren's canyonland concerts have moved musicicans to inspiration and made writers wax poetic. It's a Canyon Wren, not a flute, that opens Paul Winter's Canyon Suite, and Page Stegner is but one southwestern writer moved to rapture by the bird.

"Somewhere out there" Stegner writes in *Outposts of Eden*, "beyond the dun domes and the maroon mesas, the layered terraces, broken spires, Jurassic tide flats, a canyon wren practices his haunting scales against a shaded cliff deep in a sandstone gulch. Those clear, descending notes alone are reason enough to revere this vast wilderness." If you've been "out there", you know Stegner knows of what he speaks, that he and a mellifluous little brown bird aren't just whistling Dixie.

"The Melodic Canyon Wren" first appeared in the January-February 1993 issue of *New Mexico Wildlife.* It is reprinted here with the author's permission.



The Art of Nature

by Melody Sears

What compels a landscape artist to spend hours creating a painting of a view in nature when a photograph of the scene would be quicker and more exact?

Most landscapists I have known have spent and continue to spend a great deal of time outdoors, not painting. Some, like me, are privileged to live in beautiful settings where daily walks provide continual opportunities to notice those things that might be missed by a more casual and less frequent visitor.

As artists we develop a vocabulary based on noticing the light and shadows, the relationships between colors, and the shapes and contours of trees and grasses, rocks and streams. This vocabulary enables us to assess a landscape scene and rather than just record it in high-fidelity, to bring out the features that best express our experience of it. I love to set up my easel outdoors and try to capture the essence of a scene in a two-hour small painting, called a "plein air" or field sketch. These vocabulary builders often beautifully capture the momentary experience and feel of a place. Yet more and more often I enjoy using that vocabulary in the studio to paint memories of places I know well,

triggered by one or more snapshots I may have taken months or even years before. In these studio paintings I draw upon all the walks I've ever done, all the trees and shadows and dappled specks of light and grasses and submerged rocks I've ever noticed, all the peace and joy and exhilaration I've felt while out in nature. When it works—when the technical elements of composition and light/dark values, of color harmony and perspective and all the rest are well-conceived and well-executed—the result is a painting I'm proud of.

I believe that landscape fine art, the best of it anyway, should transport us to another realm and allow us to sense the quality of the air there, the temperature, the movement of wind, the silence. For me spending time with fine art is a sensual yet spiritual experience. Furthermore the act of actually creating such artwork is perhaps a form of prayer and gratitude for the natural world in which we live.

Someday I may be too old or infirm to be able to continue my walks outdoors. Nevertheless I will have my art collection to continue to transport me to other realms, both the paintings created by other artists as well as my own work.

Such is the nature of the art of nature.

Melody Sears is a painter of landscapes in pastel who depicts scenes of the natural world found primarily in New Mexico and Arizona, where she has spent most of her life.

Currently her artwork can be viewed at Vertu Fine Art Gallery in Socorro, NM; the Historic Percha Bank Museum and Gallery in Kingston, NM; the Tucson Desert Art Museum Four Corners Gallery in Tucson, AZ; and on her website at www.MelodySearsArt.com

"Surge" is the name of her work shown on the previous page. "Hillside Oak" is shown on the back cover.

This Just In

Melody Sears has just posted the following: "I'm quite pleased that I will be part of a show opening on October 1st called Drawing on Nature. This is a collaboration between The Drawing Studio and Tucson Botanical Gardens, and both have a cherished place in my heart….(AND) My annual calendar is going to the printer at the end of September! This year's will feature desert imagery from not only New Mexico, but also from Arizona, and I think it should appeal to anyone who loves the Southwest, as I do. Price is $20, which includes tax and mailing costs. Please e-mail me at melodysearsart@gmail.com to order yours."

"Hillside Oak" by Melody Sears. She is one of the artists we are proud to showcase in *The Black Range Naturalist.*

RESEARCH

For such a small area, there has been a fair amount of research done within the Black Range - or significant gaps in research depending on your perspective. Are you a "the glass is half full" or "half empty" person? Or are you an engineer who wonders why the glass is twice as big as it needs to be…?

The Summer 2018 issue of The Wild Felid Monitor includes an article by Tricia Rossettie (New Mexico State University) and Rebecca Bolich (Furman University) about the long-term study of Cougars in the Black Range conducted by Furman University. Dr. Travis Perry founded the Furman Cougar Project more than a decade ago and the data gathered is significant and the subject of new techniques of data mining.

"The Furman Cougar Project: looking back and branching out towards the future of conservation biology" by Rossettie and Bolich is one example of what is going on in the Black Range.