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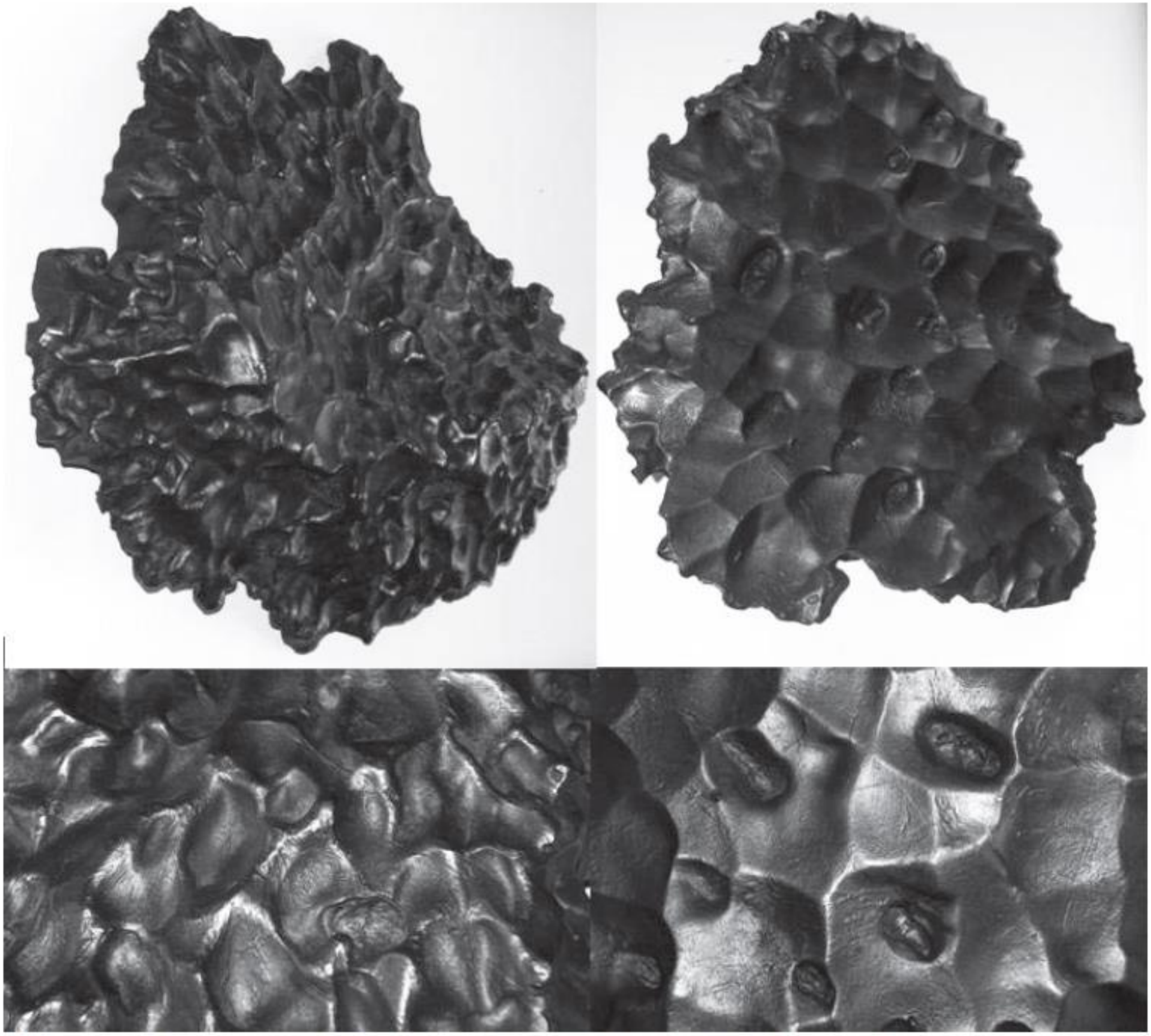
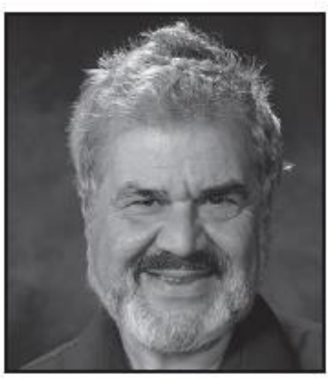
The Meteorites of Arkansas



The Cabin Creek meteorite (plaster cast). Top left, front of meteorite, top right, rear face of meteorite. The meteorite is about 40 cm across. Below, close up views (about 10 cm across) of the frontside showing regmaglyts and streamers, and rear side showing smooth surface and holes where sulfide nodules have been melted away during atmospheric passage.



By Derek Sears

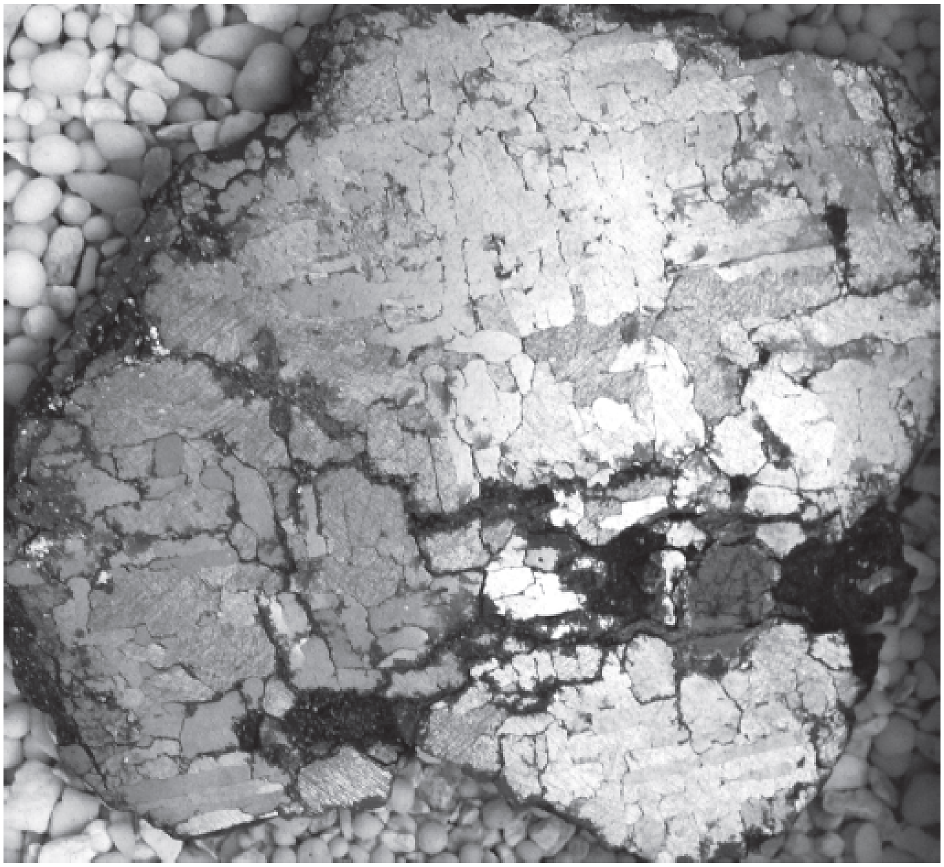
Arkansas is a small rural state in the United States. It is approximately square in shape, covering about 52,086 square miles. In 2010 its population is about 2.7 million. The State can be divided by a northeast-southwest diagonal, with the forested Boston and Ouachita Mountains to the north (separated by the Arkansas River) and the low, flat, generally waterlogged Gulf Coastal Plain to the south. It is as inhospitable to the recovery of meteorites as any place can be. It is no surprise, therefore, that the number of meteorites recovered within the State's borders is very few, only 15. However, they are rich and varied group, with some extremely well known individuals.

In 1988, the Meteoritical Society held its annual meeting in Fayetteville, Arkansas. To mark the event, I gathered every Arkansas meteorite known at the time for an exhibition in the University Museum. I had to forego Cabin Creek, which was too large and too valuable to ship, but Gero Kurat of the Natural History Museum in Vienna sent me a splendid plaster cast that was almost as good, especially since I could keep it. I also wrote a small paperback book, “Thunderstones: A Study of Meteorites Based on the Falls and Finds in Arkansas”. Although the book was not a great hit for the publisher, it proves remarkably popular among the second-hand book circles and is attracting prices that I find bewildering. So there is something of interest in this topic, and I thought it might be worthwhile reviewing the Arkansas meteorites for the readers of *Meteorite*[1], essentially using excerpts from my 1988 book.

The Arkansas Falls

Meteorite falls are a spectacular affair. The effects are among the most spectacular natural phenomena witnessed by man. Far from being fun to witness, they are sometimes described as terrifying. It is no surprise that, in the past, reports of meteorite falls sounded like superstition and that for centuries the intelligentsia refused to believe them. Six of the thirteen Arkansas meteorites were seen to fall. The fall of one of them, Paragould, is probably the best known and most studied of all meteorite falls except, perhaps, for those that were actually photographed. Camera networks have been specially established to photograph meteor trails and several meteorites have fallen into the area occupied by the networks. The Paragould meteorite is one of the largest of any whose fall was observed. It appeared at a time when there was much interest in fall phenomena and meteorite recovery, and when much was written about them.

Following its fall, two men launched systematic surveys involving the press, questionnaires, and detailed interviews: Charles C. Wylie, a Professor of Astronomy at the University of Iowa, and Harvey H. Nininger, who did much in the first half of the twentieth century to recover new meteorites. The Paragould meteorite fell at 4:08 a.m. on February 17, 1910. Some observers at St. Louis and an engineer on the train between Topeka and Burlingame, Kansas, thought they saw an airplane falling in flames. After the fireball, other observers heard explosions "like a sharp peal of thunder, or a blast of dynamite." But the eyewitness reports gathered by C. C. Wylie and H. H. Nininger cannot be improved by shortening or paraphrasing: they demand verbatim reproduction. The following was taken from an account by Wylie:


The Hope, Arkansas, meteorite showing the coarse Widmanstatten structure. (About 10 cm across).

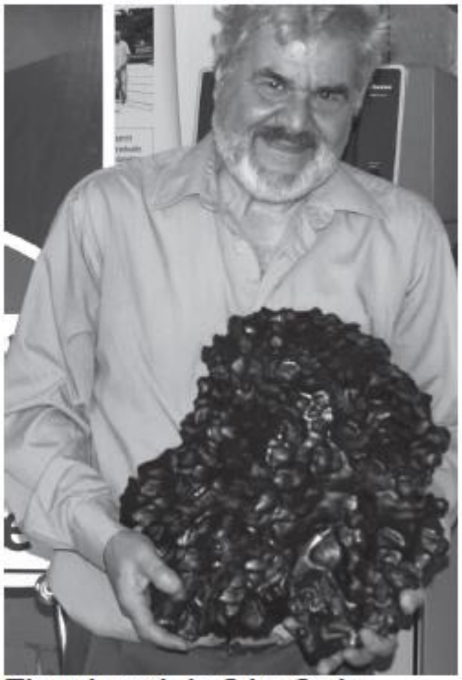
> *“Near Beach Grove, Arkansas, two young men, Charlie Norman and Willie Allison, were going fishing. They were driving in a farm wagon when the landscape lighted up; it seemed to them brighter than day. Looking up they saw a ball of fire with a tail to it coming from the northeast. It passed overhead, and went out at an altitude of about 20 degrees in the southwest. The team, accustomed to bright automobile lights, paid little attention to the display, and the boys drove on without change of pace for perhaps a hundred yards. Here, an explosion which jarred things like an earthquake startled the men and caused the horses to plunge. The first blast seemed to come from about where the meteor had disappeared, and following this a roar as though a big train were passing rolled back along the path of the meteor. It crashed back to over- head in "no time," and then on to the northeast, the rumbling being audible for perhaps half a minute. At this point, according to Charlie, Willie wanted to turn around and go back home. However, when they had quieted the team and talked things over, the two men decided to go on with their fishing trip.”*

In the same article, Wylie also presents one of the most poignant tales concerning a meteorite fall when he describes the Paragould descent:

> *“At Poplar Bluff, Missouri, a father was returning from a trip to the doctor. His child was seriously ill, and his nerves were worn from loss of sleep and worry. In his own words, “I was walking home along the road and all at once the earth lit up as bright as day. I looked up at the Moon and saw a ball of fire with a long tail of fire coming out of the east. It looked like it was going to hit me so I run to get out of its way and just before it got to me it burst into flames and went out. In about one minute the earth shook like an earthquake. When I got in the house my wife was crying and said she believed was a sign our baby was going to die, and we lost our baby four days after that happened.”*

The result of a synthesis of the eyewitness accounts was that a brilliant meteor – between four and six times the size of the full moon – was first seen over southern Indiana, fell to the southwest moving parallel to the Ohio

1 The editors hope this will encourage articles by other authors on the meteorites in their country or region.



The author with the Cabin Creek plaster cast.

River, then passed over southern Missouri and, at a height of 15 km, exploded to produce three major fireballs and innumerable sparks. The fireball disappeared over Paragould, Arkansas, while still at a height of 8 km. The burst was seen over 120 km away. The visual phenomena were followed by detonations and a roar.

Although three fireballs were seen, only two stones were recovered. A few hours after the fall, R. E. Parkinson, a farmer near Finch, found a hole 50 cm deep with a 33.0 kg (73 lb) meteorite at the bottom. After being exhibited in the high school at Paragould, the meteorite passed into the hands of S. H. Perry who then transferred it to the U.S. National Museum in Washington, D.C. Four weeks after this find (March 16), W. H. Hodges, another farmer, discovered a 2.4 m hole on a neighbor's land, a few miles southwest of Finch, where a second fragment of the same meteorite, measuring 40 x 105 cm and weighing 370 kg (800 lb), was recovered. The impact had thrown soil 9 m away, and occasionally 50 m. The meteorite was purchased by Nininger, who sold it to Stanley Field, who donated it to the Field Museum of Natural History, Chicago. In 1987 the Field Museum loaned it to the University of Arkansas, Fayetteville, where it now rests, despite several efforts of the citizens of Paragould to move it there. A third 3.75 kg fragment (8 lb) is now in the American Museum of Natural History, New York.

Because the fall of the Paragould meteorite was so well observed, meteorite specialists could determine the path of the fireball through the atmosphere and thereby calculate its orbit in space. There are only a handful of meteorites for which such calculations are possible, and at best they are only approximate because they depend heavily on the observations of casual and often startled observers. The orbits of these meteorites resemble those of the Apollo and Amor asteroids, which are chunks of rock that orbit the sun in eccentric paths which take them near to, or across, the orbit of the earth. In terms of the life span of the solar system, these orbits are very brief. Typically they can exist for only about ten million years, after which the meteorites are catapulted into a different orbit and ultimately out of the solar system by the gravitational fields of the sun and planets. The meteorites, therefore, must have formed in different orbits and have been thrown into these orbits recently.

An equally colorful account of the final stages of the fall of the Cabin Creek meteorite has also been documented. G. F. Kunz, a mineral dealer from New York who played an active part in recovering meteorites in the United States in the late nineteenth century recorded details of the fall.

"The noise was heard 75 miles away and was likened to a loud report followed by a hissing sound as if hot metal had come in contact with water. It caused a general alarm among the people and teams of horses twenty five miles distant becoming frightened, broke loose, and ran away. In Webb City, Franklin County, on the south side of the Arkansas River, a number of bells kept on sale in a store are said to have been caused to tinkle. Cabin Creek is on the north side of the Arkansas River."

The meteorite fell 75 m from the house of Christopher C. Shandy in Cabin Creek (now Lamar), Johnson County, Arkansas.

"Mrs. Shandy states that about three o'clock on the afternoon of the 27th of March, 1886, while in her house she heard a very loud report, which caused the dishes in the closet to rattle and which she described as louder than any thunder she had ever heard. At first she thought it was caused by a bombshell, and ran out of the house in time to see the limbs fall from the tops of a tall pine tree, which, she says, stands about 75 yards from her dwelling."

At about 6:00 p.m. Mrs. Shandy, her husband, and their hired man discovered a large hole around which fresh soil had been thrown 9 m into surrounding trees. They dug, and, after "a steam or exhalation arose," found an iron meteorite "as

The Fayetteville, Arkansas, meteorite. The orientation block is 1 cm.

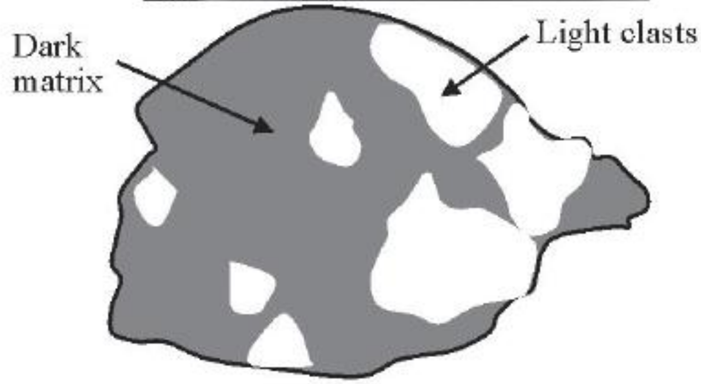
hot as the men could well handle." The colorful history of the Cabin Creek meteorite did not end there. Mr. Shandy sold the meteorite to B. Caraway, the mayor, who also witnessed the fall. Mr. Caraway, in turn, sold it to Colonel J. C. Betten, a lawyer from Eureka Springs. Betten published pamphlets describing the iron and offered a view of the "veritable wonder" for a fee of twenty-five cents. Kunz purchased the iron, and it passed, with the rest of his collection of ninety-one meteorites, to the Naturhistorisches Museum in Vienna around 1890. The 42 kg Cabin Creek meteorite is one of the most photographed, yet least studied, meteorites. The two facts are related; it would take a courageous curator to cut the beautiful iron, though it might well prove scientifically valuable to do so. The Russellville Democrat newspaper (April 29th, 1886) reported the fall in breathless, yet understandable, prose:

"We looked at the strange thing and wondered what it was and where it came from. The noise it made when it struck the earth's atmosphere on the 27th of March and came whizzing to earth near Knoxville, will never be forgotten, neither will anyone who looked at it ever forget it."

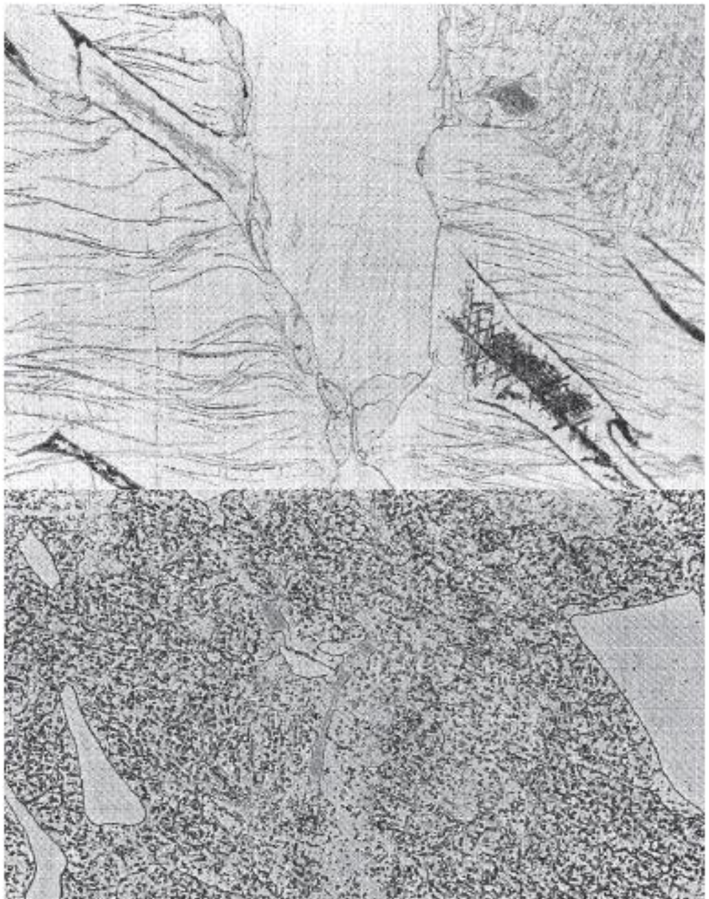
It is a spectacular plate-shape, 44 x 39 cm, and only 7.5 cm thick. One side is flat with large shallow pits; the other is deeply ridged and dented with 3-4 cm diameter depressions sometimes called "regmaglypts," which are thought to have been formed by turbulent sculpturing by air currents during atmospheric passage. Its overall shape reflects the orientation of the meteorite during fall. Meteorites adopt a maximum drag configuration during fall, so that a plate-shaped object presents its largest face to the direction of flight. There are many fine hairs and other textures resulting from the flow of liquid metal which became "frozen" at the moment of impact with the dense, lower levels of the atmosphere.

Miller is another Arkansas meteorite which remained intact during fall and became an oriented stone. It has been described as heart-shaped, about 30 cm across and l5 cm thick (weight 16.5 kg). Except for a few small places where chipping has occurred, it is uniformly covered with a thin layer of black crust. It is the normal shape for an oriented stone meteorite, and many similar examples are known. It is no accident that the shape of the meteorite is reminiscent of spacecraft heat shields. The low thermal conductivity, high heat content, and the manner in which heat is rapidly removed by run-off of molten material cause the interior of the stone to remain remarkably cool during the atmospheric passage. Depths as little as 0.5 cm in the meteorite have never been heated above 250oC despite the fact that the amount of heat generated is enough to dissociate and ionize molecules of air. The black crust, or fusion crust, typically a millimeter or so in thickness, is a mixture of glass, magnetite (F3O4), and the occasional high-melting-point mineral. The surface texture of the crust on various sides of the meteorite differs considerably, reflecting the motion of the fluid material during atmospheric passage: smooth at front; warty or rough at the rear; with long, fine, drawn-out hairs of material at the sides.

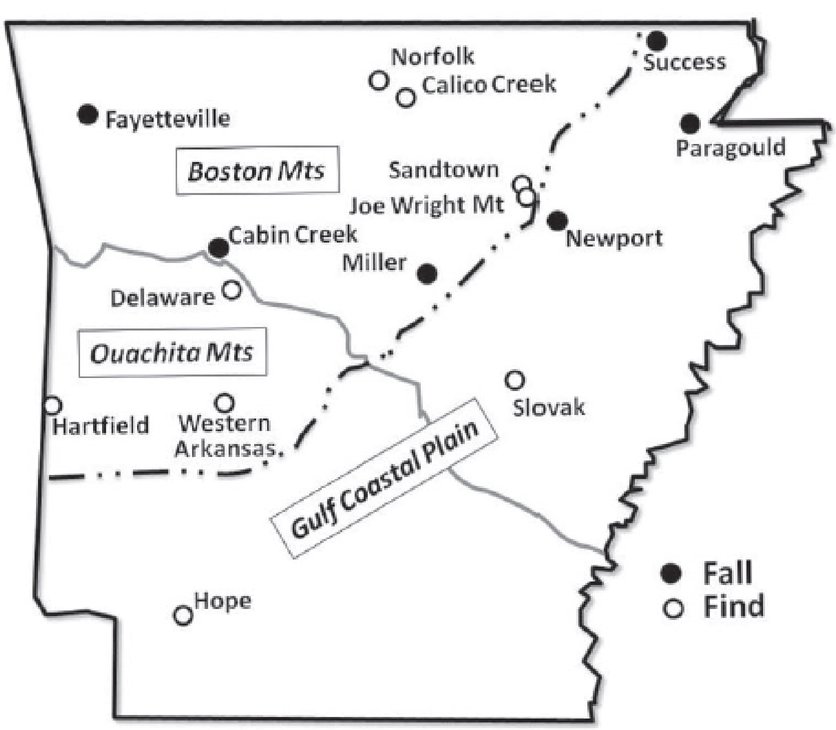
The fall of the Miller meteorite seems to have been a relatively quiet affair, according to the few words offered by C. A. Reed. The meteor was likened to the flight of a white pigeon, but moving much faster. It was reported to have raised a cloud of dust in a dirt road and made a 50 cm hole. It is now in the



The light-dark structure of the Fayetteville meteorite.



Photomicrographs of the the Joe Wright Mountain (top) and the Sandtown meteorites, showing the difference in structure. Field of view about 5 mm across.



Map showing the fall and find locations of the Arkansas meteorites.

American Museum of Natural History, New York.

The meteorite most recently witnessed in Arkansas fell on December 26, 1934, at 11:58 a.m. just 6 km west of Fayetteville. Because of its time of descent, visual effects do not feature as prominently in the accounts as they do for the Paragould. D. P. Richardson recounted that while cutting wood, Pearl Conley and Ray Brisco heard an explosion, then a rumbling and a dull thud. The air around them was disturbed "as if the breeze just died" and cattle in a nearby field behaved strangely. Upon investigation they found a 18-30 cm diameter hole from which they excavated a warm, 2.3 kg meteorite at 50 cm depth. At greater distances from the fall site, observers heard several sharp explosions and lesser explosions "which faded into rumbling," and there were several reports by observers who thought they saw falling airplanes. Six days later a second 108 g stone was found 6 km to the northeast of the fall site of the larger mass. The larger mass is entirely covered in fusion crust and shows signs of being oriented in the atmosphere. The smaller stone shows more than one generation of crust, and one face, presumably exposed later in the flight than the others, shows a less developed crust. Both stones were collected from their finders by Davis Richardson, Chairman of the Mathematics Department at the University of Arkansas in Fayetteville, and are now part of the University of Arkansas Museum collections.

Even the non-specialist would recognize the Fayetteville meteorite as distinct from most ordinary chondrites. On a flat, ground surface one sees a quite definite structure. Instead of the usual gray, fine-grained mass interspersed with flecks of shiny metal and sulfide, Fayetteville consists of irregular fragments of normal chondrite material ranging in size from several centimeters to a dimension barely perceptible, surrounded by a darker material. The darker material is not as uniform in appearance as the lighter material, or clasts, but contains several black inclusions and even a nodule of metal a centimeter or so across. The Fayetteville meteorite is one of the best examples of a so-called regolith breccia, a rock that was once part of the very surface of a body in space. “Regolith” is the loosely consolidated material on the surface of a body; while "breccia" means a rock which is composed of a variety of smaller rock fragments. The surface of this body was continually stirred up by repeated impact by micrometeorites so that fragments of normal meteorite material became imbedded in a "soil" which later became compacted to produce the dark material of the final meteorite. A plethora of interesting effects have been observed in the dark matrix.

Virtually nothing is known about the fall of the two remaining Arkansas meteorite falls, Success and Norfork. The fall of the Norfork meteorite was observed by Isaac C. Luther, who the next day found a 1.05 kg iron in a hole 120 cm deep. The meteorite has beautiful stria (small strings of material) caused by the movement of molten material on its surface during fall. The mass became part of Nininger's collection and is now at the Center for Meteorite Studies in Tempe, Arizona. The fall of the Success meteorite was announced briefly in the Meteoritical Bulletin, published by the Soviet Academy of Sciences, for 1915. The 1.5 kg mass is now housed in the Smithsonian Institution.

The Arkansas Finds

Probably the best known of the Arkansas meteorite finds is Joe Wright Mountain. The conditions of the find of this meteorite were given in 1886 by W. E. Hidden who reproduced a letter from Mr. John Hindman of Elmo, Arkansas. Hindman wrote:

This meteor was found about the last of June, 1884, by my stepson George W. Price, on a mountain known as the "Joe Wright Mountain," a small eminence situated about seven miles east of Batesville (Independence County, Arkansas). The soil there was cut into deep gullies, which, farther down the mountain side converged into one. It was where these gullies met that the meteor was found. The town of Sulphur Rock is about three miles distant, southwest, from the place of the discovery.'

According to Buchwald and Hidden, the meteorite is a 48.7 kg iron measuring 40 x 20 x 15 cm. Its surface is too weathered to show any atmospheric sculpturing except perhaps 2-5 cm depressions which may be remnants of remaglypts. The history of the iron is largely undocumented, but the meteorite was in the Vienna collection by 1889. It is now well studied and well distributed; at least eighteen museums world-wide have samples of the iron.

A few years after the discovery of the Joe Wright Mountain meteorite, a second mass of iron meteorite, weighing 9.4 kg, was found in the same area (in fact, 16 km north and 10 km west) Within a year of discovery, it became part of the collection of the Field Museum

The Fifteen Arkansas Meteorites

Meteorite and county	Date of fall or find	Location	Mass (kg)	Description
Cabin Creek *Johnson County*	Fell 3:17 pm March 27, 1886	35°27'N, 93°19'W	49.2	IIA iron, structurally Om
Calico Rock *Izard County*	Found 1938	35°6'N, 92°9'W	7.28	IIA iron, structurally H
Delaware *Logan County*	Found 1972	35°17'N, 93°30'W	8.346	L4 chondrite
Fayetteville *Washington County*	Fell 11:58 am December 26,1934	36°3'N, 94°10'W	2.28	H chondrite regolith breccia
Hatfield *Polk County*	Found 1941	34°29'N, 94°27'W	0.021	Class unknown, structurally Om
Hope *Hempstead County*	Found 1955 (or before)	33°41' N, 93°36' W	6.8	Class unknown, structurally Og
Joe Wright Mountain *Independence County*	Found 1884	35°49'N, 91°32'W	42.7	IIIAB iron, structurally Om
Miller *Cleburn County*	Fell 9:00 am July 13, 1930	35°24'N, 91°16'W	16.7	H5 chondrite
Newport *Jackson County*	Found 1923	35°36'N, 95°16'W	5.6	Pallasite
Norfolk *Baxter County*	Fell October 1918	36°13'N, 92°17'W	1.05	IIIA iron, structurally Om
Paragould *Green County*	Fell 4:08 am February 17, 1930	36.4°N, 90°30'W	408	LL5 chondrite
Sandtown *Independence County*	Found 1938	35°56'N, 91°38'W	9.4	IIIA iron, structurally Om
Slovak *Prairie County*	Found early 1960s	34°38'N, 91°32'W	8.22	H5 chondrite
Success *Clay County*	Fell April 18, 1924	36°29'N, 90°40'W	3.5	L6 chondrite
Western Arkansas *Montgomery County*	Found before 1890	34°30'N, 93°30'W	1.75	IVA iron, structurally Of

of Natural History in Chicago. From the time of its discovery until recently, this meteorite was thought to be a fragment of the Joe Wright Mountain meteorite, but Buchwald has found that its internal structure is very different from that of the older iron and that it is altogether a separate meteorite, which he calls Sandtown.

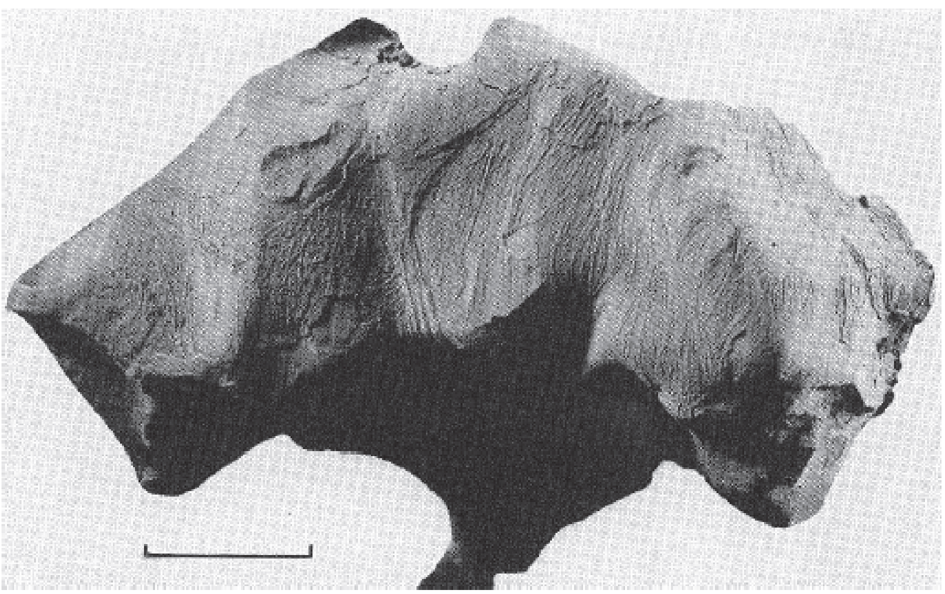
Sandtown is a medium octahedrite with the usual Widm-anstatten structure of kamacite plates and residual taenite fields. The taenite is high-Ni Fe,Ni alloy with face-centered-cubic crystal structure, while kamacite is the low-Ni Fe,Ni alloy with body-centered-cubic crystal structure. In Sandtown, the taenite has transformed into various fine-grained mixtures of kamac-ite and taenite called plessite which contains phosphides and other minor minerals. The meteorite has obviously not been on earth long. Fusion crust is still present in places, and there is a 1-4 mm thick zone of metal around the edges of the meteorite which has been severely heated during atmospheric passage. For most iron meteorites fines, these effects of atmospheric passage have been corroded away.

The most interesting feature of this meteorite is that, through-out the whole mass of the iron, the kamacite has a peculiar texture, as if it had decomposed into numerous smaller grains with a large number of fine taenite grains scattered throughout it. Sometimes the taenite grains are lined up. The texture is the result of the meteorite undergoing an intense shock (>130 kb) such as would be produced by two large objects colliding, and then being held at -400oC for a long time afterwards.

The Newport meteorite was found in 1921, but not recognized as a meteorite until it was brought to Harvey Nininger as a result of the publicity he generated over the fall of Paragould. It was originally a 5.6 kg mass, approximately cylindrical in shape. When cut, it was found to have an internal structure very unlike any of the Arkansas meteorites so far described. It consists of a network of metallic iron-nickel (with 10.7% nickel) which encloses nodules of the silicate olivine. The remarkable point is the relative abundance of the two phases; the metal constitutes 56.1 volume percent of the meteorite, while the olivine is 37.0 volume percent. In addition, there is 4.7 volume percent troilite and 2.2 volume percent schreibersite. The metal has undergone conversion into the kamacite and taenite phases, and a weakly-formed Widmanstatten pattern exists. The first meteorite discovered with such peculiar properties is known as the Pallas iron, and there are now over forty similar meteorites constituting the pallasite class. As recently as 2009 the citizens of Newport were being offered rewards for locating additional masses of their meteorite.

The discoveries of the Calico Rock and Hatfield meteorites seem to have prompted little excitement, and few details have been recorded. A certain A. Harmon found a peculiar brick- shaped 7.78 kg mass of iron near Calico Rock, Izard County, in 1938. It was acquired in 1964 by R. A. Orti and unfortunately remains in private possession, essentially unavailable for serious study, though small samples have been sent to the national museums in Washington, London. and Copenhagen. The curious shape of the mass is the result of breakup along crystal faces. The Hatfield meteorite first appeared in the literature as an entry in the catalog of Harvey H. Nininger's collection. A 21 g specimen was said to have been found in 1941. Along with half of Nininger's collection, it passed to the Center for Meteorite Studies at Arizona State University in 1970.

The history of the Western Arkansas meteorite is only marginally better documented than that of the previous two meteorites. G. M. Merrill reported that by 1916 it was a part of the F. A. Canfield collection of meteorites bequeathed to the Smithsonian Institution, where it resides today. Canfield's label, attached to the specimen, read: "Mr. Wilson said a native mountaineer brought the specimen to him in Joplin, Montgomery County, and that it was presented to I. Price Wetterill, June , 1890." V. F. Buchwald describes the meteorite as an 8 x 6 x 6 cm mass weighing 1.75 kg. It is apparently part of a larger mass, now lost, and bears numerous hammer and chisel marks. Its internal structure indicates that the entire mass has been artificially heated to ~800oC.



The Norfork, Arkansas, meteorite. Scale bar 1 cm.

Western Arkansas is a fine octahedrite whose plates of kamacite have been deformed slightly. It also contains extensive "shear zones," areas where one part of the meteorite has moved with respect to another. These effects are due to some kind of cosmic collision. The kamacite in the meteorite has decomposed to produce a distinctive texture (referred to as α2) indicating reheating to about 800oC and then fairly rapid cooling; Jain and Lipschutz thought this process was also a result of extraterrestrial events. However, Buchwald found that the weathering products had also been heated to 800oC, indicating that the reheating occurred on earth. He also found chisel and hammer marks, indicating that some of the violence experienced by Western Arkansas was caused by the hand of man. It is not uncommon for iron meteorites to undergo an intense shock event, although only a handful of irons display the effects of subsequent prolonged heating that the Sandtown encountered. Most importantly, nearly all members of the IIIAB class show the shock transformation texture (the so-called e structure), whereas it is absent in classes IAB or the low half of IIAB (sometimes known as IIA). Many of group IVA have been shocked and reheated, whereas many of group IIB have been reheated but not shocked.

The only two stone meteorites found in Arkansas are Slovak and Delaware. Frank Halligan, a farmer who lives near Carlisle found a large conspicuous stone lying in a fence row on prairie-type rolling ground near the small town of Slovak (34o 78' 7" N, 91" 31" 39' W) in 1960 or 1961. For over twenty years he kept the meteorite in his mechanical workshop, but to his knowledge it did not suffer any reheating or mechanical treatment. In 1982 Jim Wescott, a meteorite dealer from Sedona, Arizona, recognized the stone as a meteorite. The main mass was donated to the University of Arkansas Museum. Before being cut, the stone weighed 8.27kg and was an irregular mass measuring approximately 23 x 23 x 12 cm. The stone is uniformly weathered brown, but hints of fusion crust are present suggesting that the meteorite has undergone very little weathering. One face, however, is somewhat smoother than the other, especially at certain locations around the edges, a fact that may reflect atmospheric sculpturing. Pieces chipped from the edges of the mass reveal a black interior.

Mention might also be made of the Pocahontas meteorite, a rock that sits on a concrete slab outside the town library. Harvey Nininger visited this site in the 1950s and told the citizens that it was not a meteorite. Kyle Guimon, then a graduate student working on meteorites at the University of Arkansas in Fayetteville, visited the town in the 1980s and likewise informed the librarian that the stone was not a meteorite. But to this day the stone, probably local iron-stained limestone, sits snuggly within its black iron fence alongside the U.S. flag with the words, "This METEOR fell 1859. Donated by K.H. Kieth" engraved confidently in its surface.

Two meteorite finds that have been added to the catalog of Arkansas meteorites since I published "Thunderstones" are Delaware and Hope. Delaware was found in Logan County, Arkansas, USA (35°17' N, 93°30' W) in 1972 but only reported in the literature when Allan Shaw, a meteorite dealer from Sedona, Arizona, purchased it in the early 1990s. A single 8.346 kg stone was found by Daniel Michaelson, a 12-year-old boy, while hunting for arrowheads with his father.

Hope was found sometime before 1955 when it was listed in the Meteoritical Bulletin, then published by E. L. Krinov in Russia, as being Boaz, Alabama. However, a letter apparently in the Smithsonian written by O.E. Monnig, Fort Worth, Texas, states that the meteorite was actually found near Hope, Hempstead County, Arkansas (33 o 41' N., 93o 36' W). Hope is an iron meteorite that is highly unstable to weathering and needs to be kept in a desiccator.

What has always struck me about the Arkansas meteorites is not their number, which as I said above is very small for a state this size, but the importance of this small group and the number of classes and processes they represent. There are irons, stony-irons, and stones. There are a remarkable number of observed falls. There is the most interesting of the rare regolith breccias. There is arguably the most beautiful of all meteorites, certainly one of the most photographed, Cabin Creek. So they make a wonderful basis for a tutorial on meteorites, but, perhaps more interesting, they make a statement about Arkansas, its geography, its history, and its people.

The Paragould, Arkansas, meteorite. The long length of the meteorite is about 70 cm