Exoticism in Fayetteville. P. Pellas,[1] R. N. Clayton,[2] R. Wieler[3] and P. Signer.[3] [1]Lab. de Minéralogie du Museum, 61 rue Buffon 75005 Paris, France. [2]Enrico Fermi Institute, University of Chicago, Chicago, IL 60637 USA. [3]ETH-Zurich, NO C 61, CH-8092 Zurich, Switzerland.

Preliminary results on the irradiation history of light fragments in the gas-rich chondrite Fayetteville have shown that 6 out of 7 clasts present similar Ne_c^{-21} and He_c^{-3} concentrations, whereas one (clast "s") contains an excess of ~10% of He_c^{-3} and ~20% of Ne_c^{-21}, thus possibly indicating a specific pre-exposure in the regolith (1). To be sure that the excess of cosmogenic isotopes are not due to a target effect, chemical and mineralogical analyses were performed on the remaining sample of clast "s." The results are the following:

Fe-Ni: 10.6% (L chondrites: 8–11%; H ch.: 17–21%)
Fe/Ni: 3.1 (L ch.: ~4.8; H ch.: ~9.3)
Olivines: Fa 18.0–19.1 (L ch.: 22.5–25.5; H ch.: 16.5–20.5)
Pyroxenes: Fs 14.8–16.0 (L ch.: 18.5–22.5; H ch.: 14.5–18.0)

As the clast presents both an L- (metal abundance, Fe/Ni ratio) and an H-parentage (fayalite and ferrosilite contents in olivine and pyroxene), an oxygen isotopic analysis has finalized the result: clast "s" has an 0–17 excess characteristic of L-chondrites ($\delta 18 = 5.82$; $\delta 17 = 4.58$; $\delta 17 - 0.52$; $\delta 18 = 1.11$). It lies, however, somewhat beyond the heavy end of the range of the L-chondrites analyzed in Chicago.

It must be noted that clast "s" appears on the picture of Fayetteville slices slightly less rusty than the other light clasts of typical H composition. It is unfortunate not to have previously detected such a singularity in order to save more material for future studies.

The K-Ar age of clast "s" (assuming a K content of 870 ppm) corresponds to ~4.3 Ga, similar to the age data of all other analyzed H-clasts. the near absence of shock effects, the textural integration and chemical equilibration with the H host, suggest that this "L" material was trapped by the Fayetteville parent-body at a time when metamorphic processes were still acting in the H asteroid, but later than the accretionary stage suggested by the CRISPY inclusion in the L asteroid (2). This would indicate that the oxygen isotope equilibration is a sluggish process compared to Fe diffusion in silicates. A similar clast, with a silicate fraction showing an oxidized iron content close to that of H chondrites but a much lower content of metal, has been described ("clast 2") in Supuhee (H6) breccia (3).

The equilibration of silicates achieved in clast "s" would apparently discard a first pre-exposure before its trapping by the H-asteroid. Fe diffusion in silicates requires indeed an higher activation energy than He-3 diffusion. Its lower metal content does not also seem sufficient to explain the cosmogenic isotope excesses, thus leaving alive the irradiation history scenario suggested by noble gas and track analyses (4).

Actually, based on oxygen isotopes signature, 6 inclusions of H-group chondrites have already been found in L chondrites, and 1 in a LL chondrite, while only 2 LL xenoliths have been found in one H- and one L-chondritic breccia. Clast "s" in Fayetteville is the first L-clast found in one H-chondrite (R. N. Clayton, personal communication).

Acknowledgements: We are grateful to Dr. Sears for having initiated the Fayetteville Consortium and for having supplied the samples. We also appreciate the effort of the curatorial staff at JSC for the samples preparation. References: 1) Wieler *et al.* (1986) *Meteoritics* **21,** 538. 2) Olsen E. J. *et al.* (1981) *EPSL* **56,** 82. 3) Leitch C. A. and Grossman L. (1977) *Meteoritics* **12,** 125. 4) Wieler *et al.* (1988) *GCA,* in press.

Gunlock, a New Type 3 Ordinary Chondrite with a Golfball-Sized Chondrule. M. Prinz,[1] M. K. Weisberg,[1,2] and C. E. Nehru.[1,2] [1]Amer. Museum Nat. Hist., NY, NY 10024 USA. [2] Brooklyn College (CUNY), Brooklyn, NY 11210 USA.

The Gunlock meteorite was found by Mr. Don Adair on June 22, 1982 while mapping the geology of the Goldstrike Mining District in Washington Co., Utah. Two fragments were found, about 50 m apart, which fit together nicely indicating they were originally one piece. The larger fragment was cut and AMNH received on half which weighed 3.9 kg. The meteorite is black with fresh metal. The outer surface is weathered and tends to exfoliate. A large black (metal-free) mass was found on the edge of the sample, with a beautifully curved contact with the chondrite host. It is rimmed by a thin layer of metal-troilite. This represents about ⅓ of a huge chondrule, most of which is missing. The radius is over 2 cm, and the diameter is estimated by reconstruction to be about 5 cm. This object is clearly droplet-shaped and is a macrochondrule.

Petrologic data for this chondrite indicate some unusual aspects. *Texturally,* the meteorite is a type 3 chondrite. It has sharply defined droplet chondrules ranging in size up to about 1 mm, which contain feldspathic glass. The chondrite host has no opaque matrix. Metal and troilite are present as typical angular grains. The texture of the Golfball chondrule is porphyritic olivine (PO), with a glassy mesostasis. Metal and troilite in the chondrule are in eutectic intergrowths, and are present as small nodules, along fracture surfaces, and as a thin rim surrounding the chondrule. Some metal and troilite grains in the chondrite host have outer margins containing this metal-troilite intergrowth, and the frequency of this added metal decreases away from the chondrule-chondrite contact. The chondrule contains darkened areas which have undergone some shock melting and blackening. *Mineralogically,* olivine and pyroxene in the chondrite host have a fairly narrow comp. range, with ol generally from Fo_{75-82}; some as low as Fo_{64} and as high as Fo_{91} is present. Metal is Ni-rich (8–23%) and inhomogeneous within and between grains; they may have martensitic structure. Olivine in the Golfball chondrule is zoned (Fo_{92-88} and Fo_{88-85}). Chondrule metal is also Ni-rich (7–15%), but less so than in the chondrite host; it has a positive Co *vs.* Ni correlation, in contrast with host chondrite metal.

Discussion. Gunlock and its Golfball chondrule were analyzed for oxygen isotopes (R. N. Clayton, personal communication, 1987) and both have the composition of equilibrated L-group chondrites. Chrondrite and chondrule have also been analyzed for thermoluminescence (F. A. Hasan, personal communication, 1988). These results indicate that the chondrite may be classified as Type 3.4. The natural TL of the chondrite host showed almost no signal and the meteorite may have been reheated during the past 10^5–10^6 years.

Grant County Oregon Daylight Fireball of October 23, 1987. Richard N. Pugh[1] and Daniel J. Kraus.[2] [1]Science Department, Cleveland High School, Portland, OR USA. [2]Chief Research Assistant, Pine Mountain Observatory, University of Oregon, Eugene, OR USA.

A very large daylight fireball occurred at approximately 2:35 P.M. Pacific Daylight Time, October 23, 1987. The fireball was seen over about 186 000 sq. km of Washington and Oregon. It entered the atmosphere over south central Washington at a shallow angle. The angle became steeper as the object fell, until the fireball reversed direction just before it exploded. The end point of the fireball was 24 km, south of Monument, Oregon, latitude 44 degrees 30′, longitude 119 degrees 24′. The fireball was very bright casting shadows in the daylight. Observers in front of the fireball reported it having a diameter of up to 10 times that of the sun. Most observers report a multi-colored bolide with a long tail producing flames, sparks, and smoke.

The fireball blew up at an altitude of about 24 km producing a large blue-white cloud with a black to brown center. The dust cloud appears to have fallen through a thin overcast that was at 6 km. One observer directly under the explosion reported seeing dark specks fall out of the center of the cloud. The dust cloud persisted for over 30 minutes.

Rumblings and sonic booms were heard over about 25 000 sq. km at central Oregon. Most observers heard or felt from one to three very heavy sonic booms, followed by up to 35 pops or cracks like large firecrackers.

There were two reports of people smelling the event. One reported the smell of sulfur, the other the odor of "hot metal." There were several reports of anomalous sound. The furthest was 300 km from the end point of the fireball.

There were three reports of strange animal behavior shortly before the fireball was seen or heard; two were horses acting up, the other was the reaction of dogs just prior to the event.

This information is based on two hundred interviews of people who saw or heard the fireball.

Chondrule Texture/Composition Relations Revisited: Constraints on the Thermal Conditions in the Chondrule Forming Region. Patrick M. Radomsky and Roger H. Hewins. Dept of Geological Sciences, Rutgers University, New Brunswick, NJ 08903 USA.

Chondrule texture is controlled by the abundance of heterogeneous nuclei (*i.e.,* by % melt). The sequence of chondrule textures (GO, PO,