

OPPORTUNITIES FOR CREATIONIST STUDIES AT THE HANSON RANCH, ROXSON, WYOMING

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Abstract

The Hanson ranch at Roxson, Wyoming, has been made available to a limited number of investigators interested in documenting its deposit of Late Cretaceous dinosaur bones in the Lance Formation. A preliminary description of the site and some possible research topics are suggested.

Introduction

The Lance Formation of Eastern Wyoming has been the source for numerous dinosaur bone excavations. In the region of the Hanson Ranch, the common types unearthed have been *Hadrosaurs* (duck-billed), *Triceratops*, *Tyrannosaurus rex*, and *Pachycephalosaurus* (thick-head). Representative fossils are in several museums located around the world. The Hanson family (especially Glenn and Phyllis, Carolyn and Vern Johnson, Al and Brenda Bolwerk) wish that future recoveries from this ranch remain in the local vicinity, including Newcastle, Wyoming, to the north. They also wish that the bones be used to promote a creationist viewpoint, bringing glory to the God of the Bible, rather than an evolutionist viewpoint.

The Hansons have invited a new organization, Foundation Advancing Creation Truth (FACT), headed by Dennis Petersen, to develop the site according to their wishes. In return, FACT reciprocates by inviting interested individuals and families to work through their organization to maximize the scientific productivity of the Hanson Ranch. All people seeking access to the ranch must apply through FACT (P.O. Box 570, El Dorado, CA 95623). Participation fees will be charged. The normal operations of the working cattle ranch are not to be disturbed.

Two expeditions were held in July and August, 1995, the first for an extended weekend and the second for about 10 days. The invited participants were mostly involved in planning for the site and in the process excavated some large leg bones and many bags of nearby bone fragments.

The site, mentioned by Oard (1995a, p. 53) as near Newcastle, is in The Cheyenne River watershed and in the eastern part of the geologic structure known as the Powder River Basin. It is near the rounded coordinates of latitude/longitude 43° 29'N, 104° 28'W and Universal Transverse Mercator (UTM) zone 13 coordinates of 4,815,000 m N, 544,000 m E. The applicable 7.5' topographic quadrangles for the ranch are Threemile Butte, WY (1981) and Morrissey, WY (1982). Orthophotoquad maps showing 1979 aerial images, correctly positioned, have the same names. The 27 June 1994 frames of the National Aerial Photography Program (NAPP) are 7766-24 for the most-centered view and 7766-23 for the stereo pair to the south. Figure 1 shows a portion of frame 24 around the site area. These basic resources

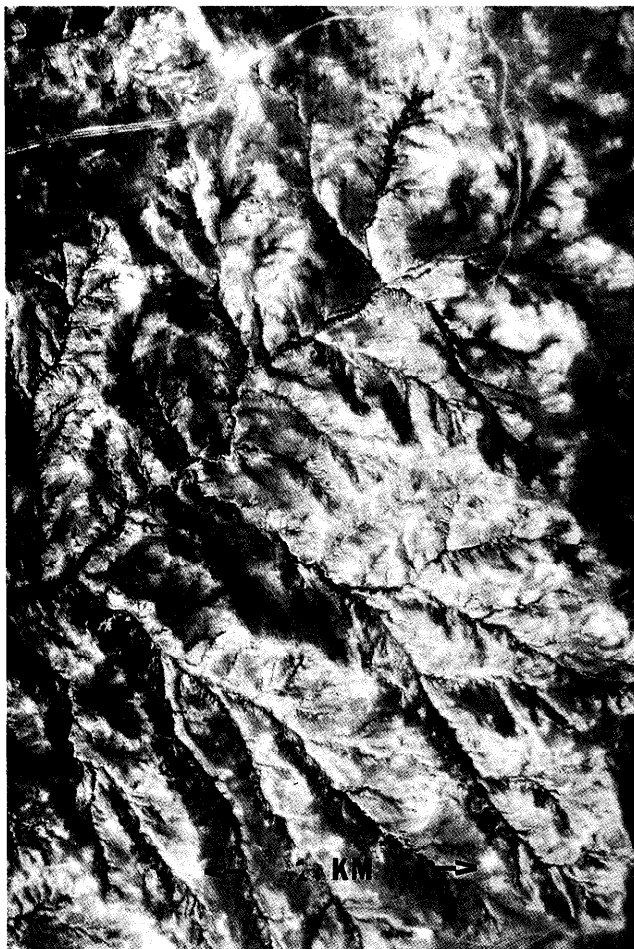


Figure 1. A NAPP aerial photograph of part of the Hanson Ranch shows a gully system formed by headward erosion in soft shales and sandstones of the Lance Formation. All of the other photographs, except for Figure 7, were taken within this view.

can be ordered from appropriate outlets within the Geologic Survey (USGS).

The NAPP aerial photographs, available in only monochrome for this part of Wyoming, can be scanned by a computer to resolutions of better than 3 meters/pixel. This makes them superior to presently available satellite images in terms of resolution. Landsat color images are 15 m/pixel and SPOT panchromatic images are 10 m/pixel. Future satellite images will have resolutions near one m/pixel, but aerial photography with scanned resolutions better than five cm/pixel can be flown with present technology.

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The USGS computers do not recognize any geologic maps with those quadrangle names. The 1:500,000 scale Geologic Map of Wyoming shows all exposed strata in the area as "K1" for the Lance Formation. The key describes the Lance Formation as "Brown and gray sandstone and shale; thin coal and carbonaceous shale beds." A tour of the area shows numerous oil wells with reported depths of about 6000 feet. The Powder River Basin is also known for major coal deposits, with some in the Fort Union Formation (above the Lance Formation) more than 100 feet thick.

Workers from the University of New Orleans have been excavating a small site on the land for the past five years and have finished their field work. Some field notes and fossils have been made available for study.

Site Description

That part of the ranch which is presently being examined is in a mature gully system with continuing headward erosion into otherwise undulating terrain. The area relief ranges from an elevation of 1174 m (3850 ft) to 1308 m (4290 ft). Within this range the Lance Formation has numerous lithologic units. Sandstones range in color through white, gray, tan, brown, and red. Sandstone beds can be thick or thin, cross-bedded or planar, and continuous to intermittent lenses. Consolidation is variable. Shales are light to dark gray and brown. Bentonite may be present. Some peat-like deposits and carbonaceous shales occur in limited areas. Some lenses of sandstone are of breccia of previous sandstones, bones, and other materials. The various colors and rock textures tend to repeat throughout the exposed vertical lithological section, making it challenging to trace particular layers. Structural geologic patterns have not yet been mapped by us but appear to be minor.

The durable sandstone lenses are usually tan to reddish-brown, sometimes with the colors grading into each other at the same elevation. Cross-bedding is sometimes present. Sometimes the layers are undulating with a large amplitude. Major portions of the durable sandstone layers are organized into parallel ridges, some finger-like, with separations of a few meters. The orientations of the ridges vary with depth. The top layers are generally north-south. Some lower layers can be east-west. Some finger-like ridges are disconnected from their neighbors to the extent of having elliptical cross-sections, like those shown in Figure 2. Within each ridge the joint direction is usually perpendicular to the ridge axis. The bedding is almost always horizontal with little undulation, though one series indicated a transport in a northward direction and another in a southward direction. In Figure 3 the bedding has a large vertical amplitude. The top layer on some ridges is reddish, contrasting with the light gray below. The butte in the rear is of dark gray shale, possibly including bentonite, and has slumped to the left.

There are thicker layers of fine, less durable sandstone, generally white and highly cross-bedded, that underlie the durable layers. Some bedding planes continue into the tan or reddish hard sandstone layers above.

The gray and dark gray shale layers tend to degrade to highly cracked and easily erodible mud. It is sus-



Figure 2. A view along an elliptical ridge of durable sandstone. The sandstone has fractured along joints into segments.

pected that such layers will interfere with transportation by vehicle or foot during and after rain events. Such properties are typical of bentonite clays.

Plant fossils appear in numerous layers. In some, including the shales, petrified wood is found. Some sandstone layers contain impressions of broken plant matter with dimensions of several centimeters. A *Meta-sequoia* cone was discovered close to the main dinosaur graveyard.

Most of the dinosaur bones, like those shown in Figures 4 and 5, are or were in the soft sandstone. The bones in Figure 4 are still in place across the middle of the view. The large bone (mostly in shadow) being excavated in Figure 5 was originally from the same layer a few meters away but was then in eroded and slumped soils. A few bones (Figure 6) are found in a hard sandstone "bone breccia" that may offer important clues on the paleoenvironment when the dinosaurs were buried. The Hanson ranch area, called the Dragon's Graveyard, has been estimated to contain anywhere from several hundred to several thousand individual duck-billed dinosaurs. A newspaper report on the dinosaur graveyard erroneously reported 8,000 dinosaurs. Some bone fragments were examined with a scintillation counter and were not found to be radioactive, unlike those at Dinosaur Ridge near Denver (Holroyd, 1992).



Figure 3. The parallel ridges of sandstone in the foreground have undulating bedding with two colors, tan and light gray.



Figure 5. A photograph of a large bone being excavated at the Hanson Ranch.

A set of five dinosaur tracks (Figure 7) discovered about 15 km southwest of the Hanson ranch may also contain clues to the paleoenvironment (Oard, 1995a). The site appears to be in the Lance Formation, but it is not yet known if the tracks are stratigraphically above or below the bone layers of the Hanson Ranch.



Figure 4. Dinosaur bones are still in place in soft sandstone across the center of this view.

The grid system designed for the 1995 recovery of bone pieces is in UTM coordinates, a metric system which appears on all topographic quadrangle maps. The July layouts were done with crude surveying having mostly angular errors. Future surveying will refine the positions. Using the UTM system starts the project in a scientifically acceptable frame of reference that can be related to bone recoveries in neighboring states. It will allow measurements to be incorporated into three-dimensional geographic information systems (GIS).

Conclusion: Possible Research Topics

There are numerous scientific topics that offer research opportunities at the Hanson site. We suggest a few here to show a range of possibilities. Many can be done without travel to Wyoming. Samples from the Hanson site can be provided for study. Bone castings are being offered for sale, to cover their cost of production and to help finance the research.

The orientations, spacings, and internal structures of the parallel sandstone ridges and "fingers" can be mapped. They are likely to give indications of fluid movement directions, speeds, and depths which are important for understanding the depositional conditions for this part of the Lance Formation. The continuity of cross-bedding into some of these harder sandstone lenses from the weaker fine white sandstones below and some of the color changes in the lenses needs to be explained. Are any of these orientations related to the orientations of large bones?

Color aerial photographs at a much higher resolution (1:5000 scale) would help in mapping the various strata, particularly the orientation of sandstone ridges. Special flights could cost a few thousand dollars if contracted. Perhaps someone might have access to groups (military?) who need to practice flying aerial photography. We could suggest the Hanson ranch as a target, similar to what was done for a Civil Air Patrol practice mission by Holroyd (1994). We started our aerial photography program over the Hanson ranch by acquiring more than 32 black and white stereo frames (9x9 inches) at about 1:8000 scale, flown 28 October 1995 by Donahue Aerial Survey of Parker, Colorado.

The several oil companies that have drilled exploratory and production wells in the area undoubtedly



6A



6B

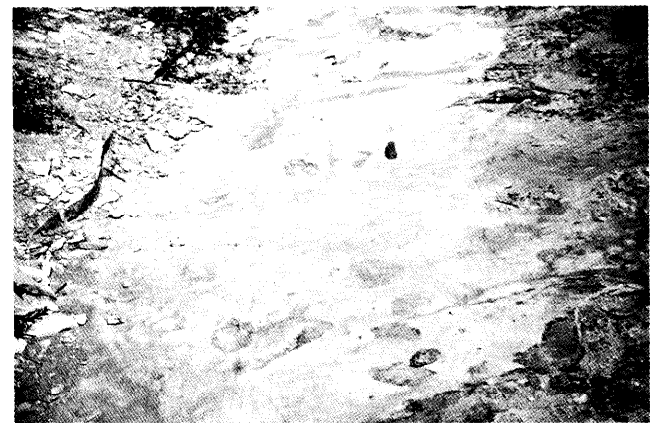
Figure 6. a and b. About 46 meters from Figure 4, and at nearly the same level, hard sandstone encases a large collection of broken bones.

have data on the geologic structure and stratigraphy. Some data are proprietary, but perhaps other data may be released upon inquiry. That would speed our understanding of the region. The USGS has a large collection of rock cores and drilling cuttings at the Core Research Center in Denver. They have no cores of the Lance Formation within about 10 miles of the Hanson ranch. A few nearby drill sites are represented by cuttings in the collection, but most samples are from very deep layers near the oil bearing strata. The Lance Formation cuttings may still be useful for analysis.

Rock samples from the numerous layers can be examined for mineral and grain size distributions, cementing agents, pollen content, mineral alterations, trace elements, and other properties. Concretions are common. What and where are the sources of the materials? Are any, such as the clays, of volcanic origin or are they all erosional products? What plant types are represented? Are they likely to have grown in the area or have floated in from elsewhere (see Oard, 1995b)? What were the ground water properties that may have provided cements and altered the materials? How did these affect the fossilization of bone and plant fragments (see Williams, et al., 1993)? According to Mallory (1972) the Lance Formation in Wyoming is similar in content and stratigraphic location to the Hell Creek



7A



7B

Figure 7. a and b. These dinosaur tracks are in the Lance Formation about 15 km southwest of the Hanson ranch. The knife gives a scale in the two views.

formation in Montana, which is also known for its dinosaur fossils. Table II of Williams and Howe (1993) indicates that the Javelina Formation of the Big Bend area of Texas is correlated with the Hell Creek Formation. Therefore, a comparison of these three formations is appropriate.

Thin section analyses of the bone and plant fossils should be made for the replacement mineralogy and cell structure. The peat-like layers can be examined chemically and microscopically. Perhaps some organic matter remains in the fossils. A simple pH mapping of the weathered rock units may provide some useful data.

There are artifacts to be examined that are more recent than the dinosaur fossils. Some Quaternary deposits have bones (Holroyd found a skull with teeth, a spine of 11 vertebrae, and a leg bone in various locations), though not as frequently as in the dinosaur bone layers. On at least one gentle ridge top are stones in a ring, apparently for supports for teepees (Figure 8). Looking down on a grassy area from a nearby butte (locally called Pike's Peak one can see a large circular structure (Figure 9) with other designs that appears to be a medicine wheel drawn by former native Americans.

Research is needed to tie this region, including the dinosaur remains, into a non-evolutionary, Biblical



Figure 8. This ring of white stones suggests that a tepee was placed here.

Flood model. Was the Lance Formation, being late Cretaceous, deposited in the last stages of the Flood as the water receded from the Plains region? If so, then it would be labeled Upper Flood Event, according to the framework proposed by Froede (1995b). Alternatively, the Lance Formation may have been deposited in the Zenithic or Abative Phases of the Flood, according to a new Biblical geological model developed by Tasman Walker (1994). The present geologic interpretation according to the evolutionary time scale is that the region was at the west side of a receding marine inland sea stretching from the Gulf of Mexico to the Arctic Ocean (Froede, 1995a). The extensive coal deposits nearby suggest rafted debris like that suggested by Woodmorappe (1978), Coffin and Brown (1983), and Austin (1986). The studies suggested here and others that readers may propose should help increase our understanding of the depositional conditions and Biblical time frame of the Lance Formation and its associated fossil remains.

References

CRSQ-Creation Research Society Quarterly.

Austin, S. 1986. Mount St. Helens and catastrophism. in Walsh, R. E., editor. Proceedings of the first international conference on creationism, Volume I. Creation Science Fellowship, Pittsburgh, PA, pp. 3-9.

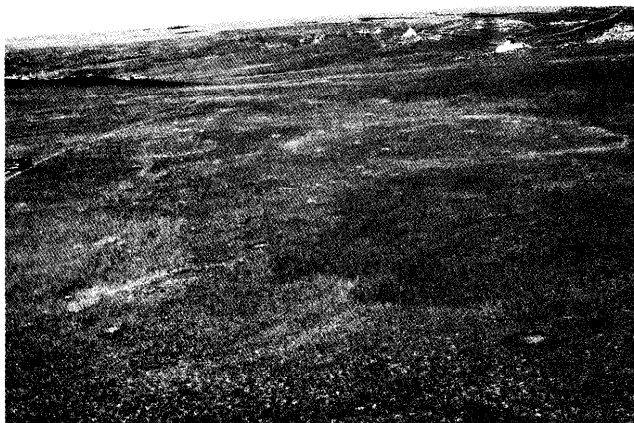


Figure 9. A large circular pattern, just above the center right of light-colored grass suggests that former native Americans made a medicine wheel at the site. The van at the left gives a scale. A design in the grass between the van and the circle may be related.

- Coffin, H. G., and R. B. Brown. 1983. Origin by design. Review and Herald Publishing. Washington D.C.
- Froede, C. R., Jr. 1995a. Late Cretaceous epeiric sea or retreating Floodwater. *CRSQ* 32:13-16.
- Froede, C. R., Jr. 1995b. A proposal for a creationist geological timescale. *CRSQ* 32:90-94.
- Holroyd, E. W., III. 1992. Comments on the fossils of Dinosaur Ridge. *CRSQ* 29:6-13.
- Holroyd, E. W., III. 1994. Bangs Canyon—a valley of boulders. *CRSQ* 31:99-109.
- Mallory, W. W., editor. 1972. Geologic atlas of the Rocky Mountain region. Rocky Mountain Association of Geologists. Denver.
- Oard, M. J. 1995a. Polar dinosaurs and the Genesis Flood. *CRSQ* 32:47-56.
- Oard, M. J. 1995b. Mid and high latitude flora deposited in the Genesis Flood, part II: A creationist hypothesis. *CRSQ* 32:138-141.
- Walker, T. 1994. A Biblical geologic model. in Walsh, R. E. editor. Proceedings of the third international conference on creationism. Creation Science Fellowship. Pittsburgh, PA, pp. 581-592.
- Williams, E. L., and G. F. Howe 1993. Fossil wood of Big Bend National Park, Brewster County, Texas: Part I—geologic setting. *CRSQ* 30:47-54.
- Williams, E. L., G. T. Matzko, G. F. Howe, R. R. White and W. G. Stark 1993. Fossil wood of Big Bend National Park, Brewster County, Texas: Part III—chemical tests performed on wood. *CRSQ* 30:169-176.
- Woodmorappe, J. 1978. A diluvian interpretation of ancient cyclic sedimentation. *CRSQ* 14:189-208.

Quote from Robert Boyle: Chaos Cannot Create a World

... they discerned and acknowledged the necessity of a wise and powerful agent to dispose and fashion this rude matter, and contrive it into so goodly a structure, as we behold, without imagining with Epicurus, that chance should turn chaos into a world. And really it is much more unlikely, that so many admirable creatures that constitute this one exquisite and stupendous fabric of the world should be made by the casual confluence of falling atoms, justling [sic] or knocking one another in the immense vacuity, than that in a printers working house a multitude of small letters, being thrown upon the ground, should fall disposed into such an order, as clearly to exhibit the history of the creation of the world, described in the 3 or 4 first chapters of Genesis, of which history, it may be doubted whether chance may ever be able to dispose the fallen letters into the words of one line.

Boyle, Robert. 1664. Some considerations touching the usefulness of experimental natural philosophy, 2nd edition. R. Davis. Oxford. p. 77. Some words have been converted to modern spellings.

Quote

Psalm 95:4-5

In his hand are the depths of the earth, and the mountain peaks belong to him. The sea is his, for he made it, and his hands formed the dry land.

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