



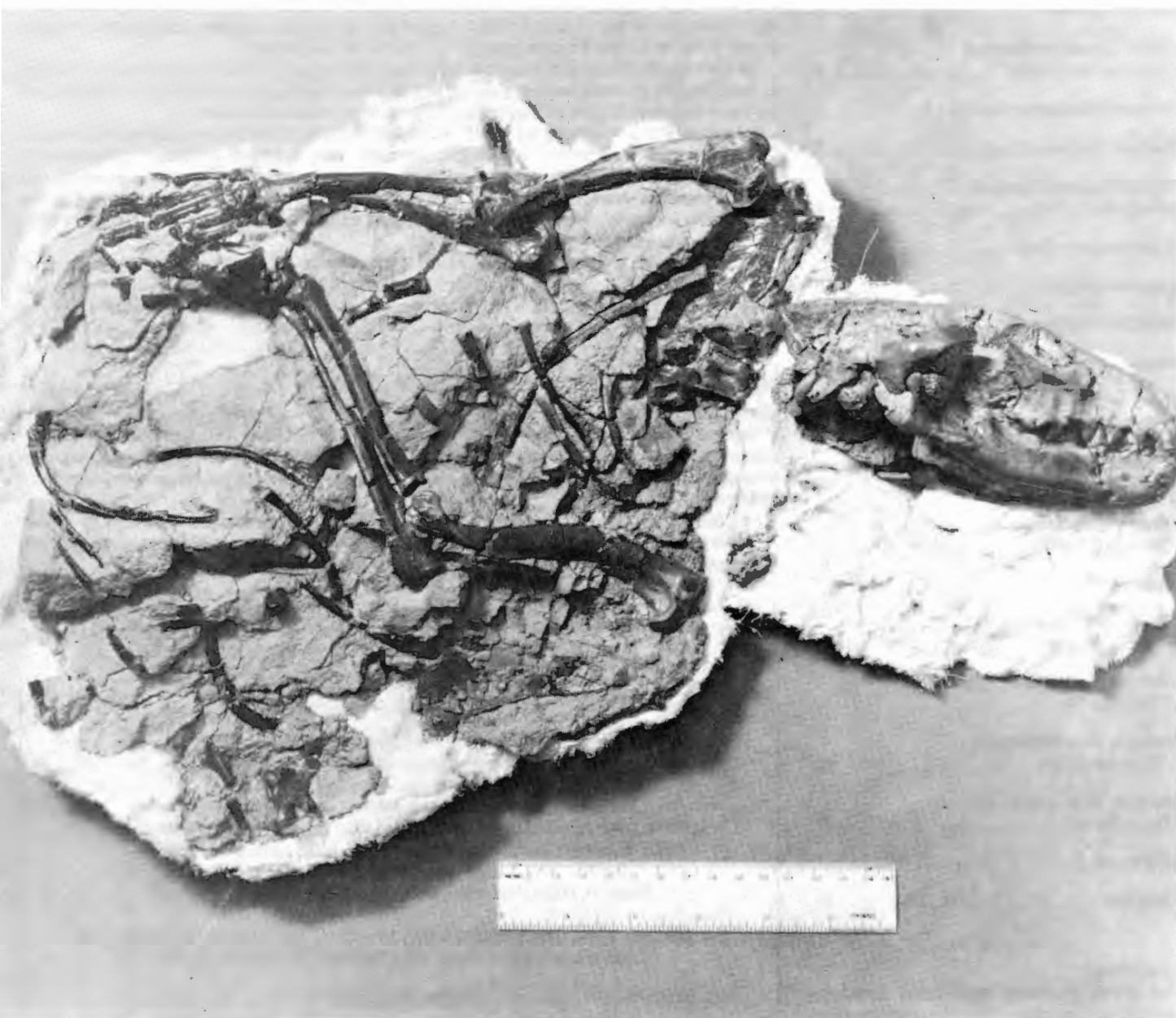
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Cover Photo:

This recently discovered dog skeleton, tentatively identified as Hesperocyon, may be the most complete of its type ever found in the John Day formation.

Paleontological Baseline Established at John Day Fossil Beds

By Kim Sikoryak

Recently authorized as a National Monument in 1974, the John Day Fossil Beds of eastern Oregon have been recognized as a paleontological resource for over 100 years. Preserving a remarkably complete record of the terrestrial life of the Tertiary period – that time after the extinction of the dinosaurs and before the Ice Age – the colorful badlands of the upper John Day basin were visited by some of the greatest paleontologists of the 19th Century.

The frenzied activity of those early years tapered off after 1900. Amateur fossil hunting became a much pursued post-war recreation in Oregon and, facing such disruptive activities at their research localities, professional workers, with a few notable exceptions, soon quit the field. With the protection afforded by inclusion in the National Park System, these important deposits are once again available for study.

As a first step, park management contacted two leading students of the region in 1976. J. Arnold Shottwell of the University of Oregon reported on the scientific history and significance of the new park and John M. Rensberger, then at the University of California, provided basic paleontologic information regarding park holdings. It soon became evident that park staff would have to quickly establish ties to the professional community and master basic field and curatorial techniques if resources were to be protected from significant loss.

Concentrated effort was directed toward the John Day Formation. This geologic unit is the most richly fossiliferous and is undergoing the most rapid erosion. The soft, brittle claystone, derived from 20-30 million year old volcanic ash deposits of the ancestral Cascades, houses excellently preserved mammalian fossils as well as turtles, lizards, snails and plant materials. Remains are scattered over thousands of acres of badlands and are challenging to spot. Every rain coats the surface with a fresh layer of slick, pasty mud. Below the surface, fossils rapidly disintegrate due to the effect of invading moisture. If not removed quickly after discovery, specimens soon are lost.

With the cooperation of Dr. John Ruben of Oregon State University, the park began a systematic overview of the John Day Formation beds on the Monument in 1978. By 1980, it was apparent that erosion had exposed considerable new material at the surface. The most significant finds were excavated and taken to OSU for preparation. A series of exhibits of actual fossil material was the first fruit of this effort and generated considerable visitor interest.

Imprecise locality data have greatly limited the usefulness of historic collections. Current paleontological analyses demand much more specific site data. Since the John Day beds span so great a period of time, paleontologists feel certain that the diversity of mammalian species found here represents developmental stages of phyletic lines: series of ancestors and descendants. But with poor locality control, the stratigraphic position of specimens is indeterminable. The data are simply not complete enough to indicate who descended from whom.

John Rensberger made the first move toward resolving this situation in the early 1970s. Studying the abundant teeth and jaws of pocket gophers, he was

able to erect a series of biostratigraphic zones using the presence of various species of these fast-evolving rodents as mileposts through the column of sediments. This work addressed the uppermost parts of the formation, however, which rarely occur in the park. Such a system, while academically valuable, could not be effectively used to map newly found specimens on a routine basis.

John Ruben solved the problem in 1981. With the aid of the Oregon Air Guard, he produced high resolution stereo-pair photographs that year and in 1982. Dr. Hugh Wagner, of the California Academy of Sciences, joined the research effort, using the air-photos to plot exposed material and correlate findings to facilitate further research and aid park management. To date, over 1000 specimens have been recovered from the field and mapped with such precision that researchers can return to within a meter or two of collection sites. This degree of spatial control over such a large area is probably unprecedented and portends major research opportunities.

The wealth of specimens and data generated by 1984 was such that a permanent full-time museum technician position was created at the park to insure responsible curation and expand interpretive opportunities. Fossil remains are in many ways the orphan children of NPS museum collections (see Superintendent's corner, Fall, 1984). The park interpreter and

museum technician have broken much new ground, working to maximize the potential of recovered specimens and insure standard treatment and data collection.

The outlook is optimistic. A modern, though modest, fossil preparation laboratory is now in operation on site. This facilitates in-house preparation of exhibit specimens, is available to researchers with materials needing immediate attention, and allows visitors to witness the challenging but exciting work of freeing remains from the rock. Investigation has begun regarding computerization of site data and catalog information. A system for secure yet visible storage of teeth and small jaws has been developed. And the beginnings of fuller understanding of why concentrations of fossils occur where they do is helping park management to decide manpower allocation and trail design. A second, more ambitious series of exhibits nears completion, displaying the tremendous rewards this groundwork effort already has yielded.

We've literally just scratched the surface. Though park staff can now salvage, stabilize, and curate materials that otherwise would be lost, the full potential of John Day Fossil Beds awaits renewed professional activity. Paleontologists, the park, and the public will reap the benefits.

Sikoryak is Park Ranger (Interpretation) at John Day Fossil Beds National Monument.



Rough terrain and scattered deposits make for challenging field work. Dr. Hugh Wagner excavates a rhino jaw in Blue Basin.