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Tracking Spanish dinosaurs.

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1 BOOK REVIEW

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3 Dinosaur Footprints & Trackways of La Rioja

4 Félix Pérez-Lorente (2015)

5 Indiana University Press (363 pp.)

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7 **Tracking Spanish dinosaurs**

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13 Spain is renowned for the exceptional richness of its Early Cretaceous fossil record. Iconic
14 examples such as the Galve area (Teruel Province) and the site of Las Hoyas (Cuenca
15 Province) are famous worldwide because they document the rich diversity and complex
16 biogeographic history of dinosaurs and other vertebrates. Spain can also claim to host one of
17 the world's most spectacular concentrations of dinosaur tracks and trackways, in the hilly and
18 shrubby landscape of La Rioja. This region, covering part of the Burgos, Soria and La Rioja
19 provinces, has yielded more than 9150 dinosaur footprints since the late 1960s. But this
20 Spanish megatracksite still contains many hidden treasures. New dinosaur tracks and
21 trackways are being discovered every year, alongside body fossils and other traces of various
22 groups of plants, invertebrates and vertebrates. After nearly fifty years of study and the

23 publication of hundreds of scientific papers, there was a crucial need for a comprehensive
24 update about this major landmark in dinosaur ichnology. Félix Pérez-Lorente took up the
25 challenge. This well-known ichnologist delivers a magnificent book on the diverse footprints
26 from La Rioja to which he has dedicated much of his career. Five chapters of unequal length
27 provide a detailed description of this remarkable palaeontological heritage. The first two
28 chapters present the geology of the Cameros Basin, the distribution of the tracksites, as well
29 as the main terms and criteria used for characterizing dinosaur tracks and trackways. Some
30 illustration of the measurements presented throughout the book would have helped readers
31 unfamiliar with standard ichnological techniques. The third chapter represents 75% of the
32 book. It describes in detail about 30 selected tracksites, following the same basic structure:
33 history, location, important stratigraphic and faciological features (oddly presented under the
34 heading “lithology”), ichnotype description and relation with the substrate. The much shorter
35 fourth chapter is devoted to the legal and physical protection of the track-bearing surfaces and
36 outcrops. Félix Pérez-Lorente ends the book with a synthesis of the occurrence and abundance
37 of dinosaur footprints in La Rioja, together with a brief discussion of some remarkable
38 ichnological features, such as interdigital webs and semiplantigrade footprints. A rich
39 bibliography and an index complement this outstanding contribution. However, readers
40 searching for a specific piece of information might sometimes be confused, due to the
41 occasional mismatch between a heading and its actual content.

42 The book is truly remarkable for the amount of original material it contains. New or updated
43 measurements and descriptive statistics are given for many sites, thus offering explicit
44 evidence for the interpretations put forward by the author. Félix Pérez-Lorente provides, with
45 a great deal of humility, a critical overview of ichnological practices and interpretations,
46 sometimes by discussing simple but fundamental issues, such as how to draw the outline of a
47 track and how to measure it. The absence of over-interpretation and of “argument from

48 authority” is really enjoyable. The author sticks to a field-based, pragmatic approach. His
49 convincing interpretations are supported by explicit lines of evidence and are therefore left
50 open to scientific debate in a constructive way. The fact that the author and his research group
51 are “sceptical” about the usefulness of ichnotaxonomic names is emblematic of this
52 philosophy. The book thus contains the description of ichnotypes conservatively assigned to
53 large dinosaur groups such as theropods, sauropods or ornithopods. This avoids an
54 inextricable jungle of ichnotaxonomic names and allows readers to forge their own opinions
55 based on the available evidence from La Rioja. Abundant, high-quality iconography
56 complements the text throughout the book, including many black-and-white photographs, as
57 well as numerous neat interpretative drawings illustrating the various steps of taphonomic,
58 behavioural and biomechanical track-forming processes. These drawings have great
59 pedagogical virtues and are based on the careful consideration of the studied surface relative
60 to the walking surface. The book therefore takes full advantage of the immense diversity of
61 ichnites and foot/substrate interactions documented in the Spanish ichnological bonanza.

62 Pérez-Lorente’s book is also outstanding because it provides valuable insights into
63 conservation issues. The description of the legal and technical measures taken for various
64 tracksites does not gloss over the frequent logistical or human problems associated with this
65 kind of endeavour. Such issues also remind us that protection in La Rioja is not just a matter
66 of fossil tracks but also extends to culture, education and environment. These inputs are
67 particularly useful at a time when many geological sites around the world are in search of
68 protection or are being integrated into in land-use planning and Geoparks. The educational
69 use of the Spanish megatracksite is not described in detail, but the fact that 125 students
70 participate in intensive courses, conferences and field camps each year is reassuring. In the
71 same way, the presentation throughout the book of local popular beliefs about the tracks and

72 their makers is refreshing. Popular wisdom is proven, since some tracks from La Rioja were
73 thought to have been made by giant chickens, which is actually quite close to the truth!

74 Overall, Félix Pérez-Lorente has to be congratulated for sharing his career-long experience in
75 a book that will be the reference for La Rioja and that will undoubtedly serve for the study of
76 tracksites around the world. It is a worthy read for anyone interested in - or fascinated by -
77 these exceptional ichnological wonders and the animals that made them.

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79 Figure caption:

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81 Large theropod footprints along Trackway PP146 from Peñaportillo (Lower Cretaceous,
82 Enciso Group), La Rioja, Spain. Photograph courtesy of Georges Gand.

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