## EXPLANATION OF PLATE I.

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PLATE I. — Iguanodon bernissartensis. IRSNB. 1561. Partly disarticulated skull with lower jaw. Redrawn from photographs.

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D.B. NORMAN. — On the ornithischian dinosaur Iguanodon bernissartensis from the Lower Cretaceous of Bernissart (Belgium)

## EXPLANATION OF PLATE II.

PLATE II. — Iguanodon bernissartensis. IRSNB. 1561. Partly disarticulated skull with lower jaw. Redrawn from photographs.



### EXPLANATION OF PLATE III.

PLATE III. — Iguanodon bernissartensis. IRSNB. 1536. Partly disarticulated skull with lower jaw. Redrawn from photographs.



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#### EXPLANATION OF PLATE IV.

PLATE IV. — Iguanodon bernissartensis. IRSNB. 1536. Partly disarticulated skull with lower jaw. Redrawn from photographs.



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### EXPLANATION OF PLATE V.

PLATE V. — Part of a trackway of footprints which was until recently displayed in the « Dinosaur gallery » of the British Museum (nat. Hist.). The trackway comprises two nearly parallel sets of footprints, one of which exhibits characteristic « megalosaur » prints, the other probably belongs to *Iguanodon*.



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# F — REFERENCES

- ABEL, O., 1912, Grundzüge der Paleobiologie der Wirbeltiere. Stuttgart, xvi + 780 pp., 470 figs.
- ARNOULD, G., 1878, Bassin houiller du couchant de Mons mémoire historique et descriptif. 210 pp., 6 pls. Mons : Hector Manceaux.
- BECKLES, S.H., 1862, On some natural casts of reptilian footprints in the Wealden beds of the Isle of Wight and Swanage. (Q. Jl. geol. Soc. Lond., XVIII : 443-447, figs. 1-4.)
- BERTRAND, C.E., 1903, Les coprolithes de Bernissart. I. Les coprolithes qui ont été attribués aux Iguanodons. (Mem. Mus. R. Hist. nat. Belge (4) : 1-154.)
- BROWN, B., 1912, The osteology of the manus in the Trachodontidae. (Bull. Am. Mus. nat. Hist. 31: 105-108.)
- CASAMIQUELA, R.M. and FASOLA, A., 1968, Sobre pisados de dinosaurios del Cretacico inferior de Colchagua (Chile). (Chile Univ. Fac. Cienc. Fis. Mat., Dep. Geol., Publ., 30: 24 pp., 3 figs., 7 pls., 1 table.)
- CASIER, E., 1960, Les Iguanodons de Bernissart. (Brussels, Inst. R. Sci. nat. Belge, pp. 134, Goemaere : Brussels.)
- CHARIG, A.J. and NEWMAN, B.H., 1962, Footprints in the Purbeck. (New Sci., 14: 234-235, 2 figs.)
- COOMBS, W.P., 1972, The bony eyelid of Euoplocephalus (Reptilia: Ornithischia). (J. Paleont., 46 (5): 637-650, 3 pls., 10 figs.)
- COPE, E.D., 1866, Remarks on fossil reptiles. (Proc. Am. phil. Soc., XI : 16.)
- 1883, On the characters of the skull in the Hadrosauridae. (Proc. Acad. nat. Sci., Philad. 1883: 97-107, pls. iv-6ii.)
- CORNET, F.L., 1878, Sur la rencontre d'ossements d'Iguanodon dans un accident du terrain houiller de Bernissart. (Ann. Soc. géol. Belge, Proc. verb., V : 112-114.)
- Cox, C.B., 1959, On the anatomy of a new dicynodont genus with evidence of the position of the tympanum. (Proc. zool. Soc. Lond., 132: 321-367.)
- CROMPTON, A.W. and CHARIG, A.J., 1962, A new ornithischian dinosaur from the Upper Triassic of South Africa. (Nature, Lond., 196 : 1074-1077.)
- DE PAUW, L.F., 1902, Notes sur les Fouilles du charbonnage de Bernissart. Découverte, solidification et montage des Iguanodons. pp. 1-25, Etterbeek : Brussels.
- DOLLO, L., 1882, Première note sur les dinosauriens de Bernissart. (Bull. Mus. R. Hist. nat. Belg., 1: 55-80, pls. IV-VI.)
- 1883, Note sur la présence chez les oiseaux du « Troisième trochanter » des dinosauriens et sur la fonction de celui-ci. (Bull. Mus. R. Hist. nat. Belg., II : 13-20, pl. 1 / Bull. biol. Fr. Belg., XV : 47-52.)
- 1883a, Troisième note sur les dinosauriens de Bernissart. (Bull. Mus. R. Hist. nat. Belg., II : 85-126, pls. III-V.)

- 1883b, Quatrième note sur les dinosauriens de Bernissart.
   (Bull. Mus. R. Hist. nat. Belg., II : 223-252, pls. IX, X.)
- 1883c, Les iguanodons de Bernissart. (Bull. sci. pédagog. Bruxelles, III : 25-34.)
- 1884, Cinquième note sur les dinosauriens de Bernissart. (Bull. Mus. R. Hist. nat. Belg., III : 120-140, 3 figs., pls. VI, 4 tabs.)
- 1884a, Les découvertes de Bernissart. (Ann. Sci. Géol. (Paris), XVI (6) : pp. 14, pl. X.)
- 1884b, Les dinosauriens. (Revue Quest. scient., XVI, 297-300.)
- 1885, Les iguanodons et les mosasaures. (Ann. Soc. Scient. Bruxelles, IX (1), 92-93.)
- 1885a, Les Iguanodons de Bernissart. (Revue Quest. Scient., XVIII: 5-55.)
- 1885b, L'appareil sternal de l'Iguanodon. (Revue Quest. Scient., XVIII: 664-673.)
- 1886, L'appareil sternal de l'Iguanodon. (Revue Quest. Scient., XIX : 318.)
- 1886a, L'appareil sternal des dinosauriens. (Revue Quest. Scient., XX : 333-334.)
- 1887, Sur la signification du « trochanter pendant » des dinosauriens. (Bull. Soc. belge Géol., 1 proc.-verb., 10-11.)
- -- 1887a, Note sur les ligaments ossifiés des dinosauriens de Bernissart. (Arch. Biol., VII, 249-264, pls. VIII, IX.)
- 1887b, Les ligaments ossifiés des Iguanodons. (Revue Quest. Scient., XXI: 305-307.)
- 1888, Iguanodontidae et Camptonotidae. (C. r. Hebd. Séanc. Acad. Sci., Paris, CVI: 775-777.)
- 1888a, Sur la signification du « trochanter pendant » des dinosauriens. (Bull. biol. Fr. Belg., XIX : 215-224, figs. 1-6.)
- 1890, Note sur les ligaments ossifiés des dinosauriens de Bernissart. [Arch. Biol., VII: 249-264, pls. VIII, IX (1887-1889).]
- 1906, Les allures des iguanodons, d'après les empreintes des pieds et de la queue. (Bull. biol. Fr. Belg., XL: 1-12, 4 figs.)
- 1908, Les allures des iguanodons. (La science au XX<sup>e</sup> siècle. Nouvelle revue illustrée des sciences et leurs applications (Paris), VI : 80-81, fig. 2.)
- 1909, The fossil vertebrates of Belgium. (Ann. N.Y. Acad. Sci., XIX : 99-119, pls. IV-X.)
- 1919, Les vertébrés vivants et fossiles du Musée Royal d'Histoire Naturelle, Bruxelles. [Guide illustré des Musées de Bruxelles. (Touring Club de Belgique). 35 pp.]
- 1923, Le centenaire des iguanodons (1822-1922) (Phil. Trans. R. Soc., (B) CCXII: 67-78, pl. IV.)

- DUPONT, E., 1878, Sur la découverte d'ossements d'**Iguanodon**, de poissons et de végétaux dans la fosse Sainte-Barbe du Charbonnage de Bernissart. (Bull. Acad. r. Belge, XLVI (2): 387.)
- EDINGER, T., 1929, Uber knocherne Scleralringe. (Zool. Jahrb., 51 : 163-226, 61 figs.)
- EDMUND, A.G., 1957, On the special foramina in the jaws of many ornithischian dinosaurs. (Contr. Life. Sci. Div. R. Ont. Mus., 48 : 1-14.)
- GALTON, P.M., 1970, The posture of hadrosaurian dinosaurs. (J. Paleont., 44: 464-473, 5 text-figs.)
- 1974, The ornithischian dinosaur Hypsilophodon from the Wealden of the Isle of Wigh<sup>t</sup>. [Bull. Brit. Mus. nat. Hist. Geol., 25 (1): 1-152, 2 pls., 64 figs. ]
- GALTON, P.M. and JENSEN, J.A., 1975, Hypsilophodon and Iguanodou from the Lower Cretaceous of North America. (Nature, Lond., 257: 668-669.)
- GILMORE, C.W., 1909, Osteology of the Jurassic reptile Camptosaurus, with revision of the species of the genus and description of two new species. (Proc. U.S. Natl. Mus., 36: 197-332.)
- 1933, On the dinosaurian fauna of the Iren Dabasu formation. [Bull. Am. Mus. nat. Hist., 67 (2): 23-78.]
- HEATON, M.J., 1972, The palatal structure of some Canadian Hadrosauridae (Reptilia: Ornithischia). (Can. J. Earth. Sci., 9: 185-205.)
- HEILMANN, G., 1926, The Origin of Birds (Witherby: London.)
- 1928, A restoration of Iguanodon bernissartensis. (Palaeobiologica, 1: 101-102, pl. IX.)
- HOOLEY, R.W., 1925, On the skeleton of Iguanodon atherfieldensis sp.nov., from the Wealden shales of Atherfield (Isle of Wight). (Q. Jl. geol. Soc. Lond., 81 : 1-61.)
- HOPSON, J.A., 1975, The evolution of cranial display structures in hadrosaurian dinosaurs. (Paleobiology, 1:21-43.)
- HULKE, J.W., 1882, Description of some Iguanodon-remains, indicating a new species, I. seelyi. (Q. Jl. geol. Soc. Lond., XXXVIII: 134-144, pl. IV.)
- HUXLEY, T.H., 1868, On the animals which are most nearly intermediate between birds and reptiles. (Proc. R. Soc. Lond., XVI: 243-248.)
- 1870, Further evidence on the affinities between the dinosaurian reptiles and birds. (Q. Jl. geol. Soc. Lond., 26: 12-31.)
- JANENSCH, W., 1955. Der Ornithopode Dysalotosaurus der Tendaguruschichten. [Palaeontographica Suppl. 7 (111): 105-176.]
- KRAUSEL, R., 1922, Die Nahrung von Trachodon. (Paläont. Z. 4: 80.)
- LAMEERE, A. and SEVERIN, G., 1897, Les Insectes de Bernissart. (Ann. Soc. Entomol. Belge, XLI : 35.)
- LAMBE, LH., 1920, The hadrosaur Edmontosaurus from the Upper Cretaceous of Alberta. (Mem. Canada Geol. Surv., 120:1-79.)
- LANGSTON, W., 1960, The vertebrate fauna of the Selma formation of Alabama. VI, The dinosaurs. [Fieldiana (Geol.), 3 (6): 314-360.]

- LAPPARENT, A.F. DE, 1960, Les dinosauriens du Sahara Central (Continentale intercalaire). (Mém. Soc. Géol. France, n.s. 88A : pp. 57, 12 figs., 11 pls.)
- 1960a, Les dinosaurios de Galve Provincia de Teruel, España. (Teruel, 24 : 177-197, 11 figs.)
- 1962, Footprints of dinosaurs in the Lower Cretaceous of Vestpitzbergen — Svalbard. (Årbok. Norsk. Polar. inst., 1960: 14-21.)
- LAPPARENT, A.F. DE and STCHEPINSKY, V., 1968, Les iguanodons de la région de Saint-Dizier (Haute-Marne) (C. r. Hebd. Séanc. Acad. Sci., Paris, 266 : 1370-1372.)
- LAPPARENT A.F. DE and ZBYSZEWSKI, G. (1957), Les dinosauriens du Portugal. Mem. Surv. Geol. Portugal. 2 (n.s.) : 63 pp., 13 figs, 36 pls.
- LEIDY, J., 1858, Hadrosaurus and its discovery. (Proc. Acad. nat. Sci. Philad.: 213-218.)
- LULL, R.S. and WRIGHT, N.E., 1942, Hadrosaurian dinosaurs of North America. (Spec. paper geol. Soc. Am., 40: 1-242.)
- LYDEKKER, R., 1890, Contributions to our knowledge of the dinosaurs of the Wealden and the sauropterygia of the Purbeck and Oxford clay. (Q. Jl. geol. Soc. Lond., XLVI: 36-53, pl. V.)
- MANTELL, G.A., 1825, Notice on the Iguanodon, a newly discovered fossil reptile, from the sandstone of Tilgate Forest, in Sussex. (Phil. Trans. R. Soc., CXV: 179-186, pl. XIV.)
- 1827, Illustrations of the Geology of Sussex: with figures and descriptions of the fossils of Tilgate Forest. 92 pp. + 20 plates. Lupton Rolfe: London.
- 1833, The Geology of the South-East of England. 415 p.
   6 plates. Longman : London.
- 1848, On the structure of the jaws and teeth of the Iguanodon. (Phil. Trans. R. Soc., CXXXVIII: 183-202, pls. XVI-XIX.)
- MARSH, O.C., 1881, Jurassic birds and their allies. (Am. J. Sci., · XXII: 337-340.)
- MORRIS, W.J., 1970, Hadrosaurian dinosaur bills morphology and function. (Los Angeles County Mus. Contrib. Sci., 193, 14 pp.)
- OELRICH, T.M., 1956, The anatomy of the head of Ctenosaura pectinata (Iguanidae) (Misc. Publ. Mus. Zool. Univ. Michigan, 94 : 1-122.)
- OSBORN, H.F., 1917, Skeletal adaptations of Ornitholestes, Struthiomimus and Tyrannosaurus. (Bull. Am. Mus. nat. Hist., 25: 733-771.)
- OSTROM, J.H., 1961, Cranial anatomy of hadrosaurian dinosaurs of North America. (Bull. Am. Mus. nat. Hist., 122: 35-196.)
- 1970, Stratigraphy and paleontology of the Cloverly formation (Lower Cretaceous) of the Big Horn basin of Wyoming and Montana. (Bull. Peabody. Mus. nat. Hist., 35: 1-234.)
- OWEN, R., 1841, Report on British Fossil Reptiles, part II. [Rep. Br. Ass. Advmt. Sci., XI: 60-204 (1841).]
- 1842, On the anatomy of Apteryx australis. Shaw. Part. II. (Myology). [Trans. Zool. Soc. Lond. III (4).]

- 1855, Monograph on the fossil Reptilia of the Wealden and Purbeck formations. Part. II. Dinosauria (Iguanodon). (Wealden). [Palaeontogr. Soc. (Monogr.) VIII: 1-54, pls. I-XIX.]
- 1858, Ibid. Supplement no. I. Dinosauria (Iguanodon). (Wealden). [Palaeontogr. Soc. (Monogr.) X: 1-7, pls. 1-111.]
- 1872, Ibid. Supplement no. IV. Dinosauria (Iguanodou). [Palaeontogr. Soc. (Monogr.) XXV : 1-15.]
- 1877, Monograph on the fossil Reptilia of the Mesozoic formations. Genera Bothriospondylus, Cetiosaurus, Omosaurus. [Palaeontogr. Soc. (Monogr.) part II, XXIV: 15-94, pls. III-XXII (1875.)]
- PARKS, W.A., 1923, Corythosaurus intermedius, a new species of trachodont dinosaur. (Univ. Toronto Stud. Geol. Ser. no. 15 : 5-57, 13 figs., 5 pls.)
- QUINET, G.E., 1972, Bernissart... il y a 125.000.000 d'années. Le règne des Iguanodons. (Inst. R. Sci. nat. Belge., pp. 86, 42 figs. Hayez : Brussels.)
- ROMER, A.S., 1956, Osteology of the Reptiles, 22 pp., 248 figs. Chicago : University of Chicago Press.
- ROZHDESTVENSKII, A.K., 1952, «A new Mongolian iguanodont». [C.R. Acad. Sci. URSS, 84 : 1243-1246, 3 figs. (In Russian).]
- 1966, «New iguanodons from Central Asia. Phylogenetic and taxonomic relationships between late Iguanodontidae and early Hadrosauridae ». [Paleont. Zh. 1966 (3): 103-116, 4 figs., 1 table (In Russian).]
- RUSSELL, L.S., 1940, The sclerotic ring in the Hadrosauridae. (Contr. Pal. R. Ontario. Mus. (3): 1-7, 2 figs., 2 pls.)

- SANTA-LUCA, A., CROMPTON, A.W. and CHARIG, A.J., 1976, A complete skeleton of the Late Triassic ornithischian Heterodontosaurus tucki. (Nature, Lond., 264: 324-328.)
- SEWARD, A.C., 1901, La flore wealdienne de Bernissart (Mém. Mus. R. Hist. nat. Belge, 1 (1).
- STEEL, R., 1969, Ornithischia. Handbuck der Paleoherpetologie ed. O. Kuhn. (Thiel 15) 80 pp. Stuttgart : Gustav Fischer.
- STERNBERG, C.M., 1935, Hooded hadrosaurs of the Belly River series of the Upper Cretaceous: a comparison with description of a new species. (Bull. natl. Mus. Canada, 77 (52): 1-37.)
- 1965, New restoration of hadrosaurian dinosaur. (Natl. Mus. Canada nat. Hist., 30, pp. 5, 2 text-figs.)
- TAQUET, P., 1976, Géologie et paléontologie du gisement de Gadoufaoua (Aptien du Niger). (Cahiers Paléont. Cent. natn. Réch. scient., 1976, pp. 191, 24 pls.)
- TRAQUAIR, R.H., 1911, Les poissons wealdiens de Bernissart. (Mém. Mus. R. Hist. nat. Belge, VI : (1).
- VAN BENEDEN, P.J., 1878, Sur la découverte de reptiles fossiles gigantesques dans le charbonnage de Bernissart, près de Péruwelz. (Bull. Acad. Sci. Belge, (2) XLV: 578-579.)
- 1881, Sur l'arc pelvien chez les dinosauriens de Bernissart.
   (Bull. Acad. R. Belge. Ch. Sci., (3) 1 : 600-608.)
- VERSLUYS, J., 1923, Der Schädel des Skelettes von Trachodon annectens in Senckenberg Museum. (Abh. senckenb. naturforsch. Ges., 38 : 1-19.)
- VON MEYER, H., 1832, Paleologica zur Geschichte der Erde und ihrer Geschöpfe. pp. 560, 8° Frankfurt-am-Main 1832.

# G — INDEX OF ABREVIATIONS

Α	=	articular	J	=	jugal
a.zyg	=	prezygapophysis			
ac	=	acetabulum	k	=	keel
ad.f	=	adductor fossa			
An	=	angular	L	=	lachrymal
an.pu	=	prepubic ramus	1.tr	=	lesser trochanter
20		antorbital foramen	li	_	ligament scars
An	=	alveolar parapet	lip	=	lateral lip on worn dentary teeth
ort	_	articulating surface	I.M	=	lateral malleolus (tibia)
00	_	astragalue			
00 70	_	ascanding process (astrogalus)	Μ	=	maxilla
as.p	_	ascending process (astragalus)	mc	=	metacarpal
asc	_	ascending process (supraoccipital)	Me	=	Meckelian canal
at		auas	mt	=	metatarsal
ax	=	axis			
<b>L</b>	_	horn (menule)	N	=	nasal
0	_	bluest ended (rite)	n.ca	=	neural canal
DI D	=	bruint ended (ribs)	nc.s	=	neuro-central suture
BO	=	basioccipital	פח	=	neural spine
Bpt	=	basipterygoid process	10		nourur opino
Bs	=	basisphenoid	ol	=	olecranon
			Op	=	opisthotic
С	=	carpal	on.s	=	opisthotic suture
с	=	capitulum	Os	_	orbitosphenoid
c.for	=	coracoid foramen	os lige		ossified ligaments
ca	=	calcaneum	ot	_	ossified tendons
Ca.r	=	caudal rib	oht	_	obturator process
Carp	=	carpal bone	001	_	obtulator process
ch	=	chevron (haemal arch)	Р	=	parietal
cn	=	cnemial crest	n	=	primary ridge
Co	_	coronoid	Pnat	_	printing
COT.S	=	coracoid suture	p.at	_	nost-pubic ramus
			p.pu	_	post puble rainus
D		dentary	p.zyg	_	posizygapopitysis
d	_	diapophysis	ra	_	
D (Roma	n n	umeral) = digit number	pa	=	
d cr	=	delto-pectoral crest	Pa	=	predentary
		unto postorar erest	PI	-	preirontal
E	=	exoccinital	Ph		phalanx
es	_	exoccipital suture	Pm	=	premaxilla
Ec	_	ectoptervaoid	Ро	=	postorbital
Ecn	_	ectopter ygold	Pr	=	proötic
r.c.h	-	ectopterygold rannus	pr	=	process
F	_	frontal	Ps	=	parasphenoid
E to	_	flower tender coor	Pt	=	pterygoid
r.ic fo	_	fiexor tendon scar	pt.f	=	post-temporal foramen
10 for		Ienestra ovalis	Pt/Q	=	pterygoid and quadrate flanges
IOF	=	Ioramen (Ioramina)	pt.s	=	pterygoid suture
a ta	_		рц	=	pubis
g.ur		greater trochanter	рц.р	=	pubic peduncle
gı	=	glenoid	paf	=	parietal fissure
gr	=	grooves	Pal	=	palatine
Ь	_	hand (acusement)	Pap	=	paroccipital process
li ha		head (squamosal)	nit	=	area of nituitary fossa
[].S	=	naemai suicus	pre	_	nostorbital suture
ne	=	neel	pos	_	provimal phalany
nr	=	norizontal ridge	pro	_	provinci pilatana
i		· · · · · · · · · · · · · · · · · · ·	bàr	_	Plutes
1g :1	=	intercondylar groove	Q	=	quadrate
:-	=	111um	Q-i	=	quadrato-jugal
IS	=	ischium	Or	=	quadrate ramus
15.11	=	ligament scars on pubis (ischial)	<b>«</b> -		A
ıs.p	=	ischial tuber	r.c	=	replacement crown
int		intermedium	ra	=	radius

# DAVID BRUCE NORMAN --- ON THE ORNITHISCHIAN DINOSAUR IGUANODON

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re ri ra.f		resorption facet rib spine radial facet	sq.p St.hl sep		squamosal process « standard hindlimb » separation of pedicels of haemal arch
ro.c ru.par rad rug rad.c		root-less crown rugose parapophysis radiale rugosities radial condyle	t t (Roman te ti tp	= nu = =	tertiary ridge imeral = distal tarsal tooth crowns tibia transverse process
S	=	splenial	tu	=	tuberculum
s s.s S.sh Sa sc sh		secondary ridge scapular suture splenial shelf surangular muscle scar shaft (of rib)	ul.c ul.f uln Ung		ulna ulnar condyle ulnar facet ulnare ungual phalanx
So Sq Su	=	supraorbital - (palpebral) squamosal supraoccipital	V v.for	=	vomer vascular foramina canal of vena capitis dorsalis (post-temporal
sa.r sp.b sq.b		sacral rib spongy bone squamosal « boss »	w 4th.tr	=	foramen) wear facet fourth trochanter

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