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SUPPLEMENTARY ONLINE MATERIAL FOR

A re-evaluation of the enigmatic dinosauriform *Caseosaurus crosbyensis*
from the Late Triassic of Texas, USA and its implications for
early dinosaur evolution

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1.0 Trees produced in the phylogenetic analyses

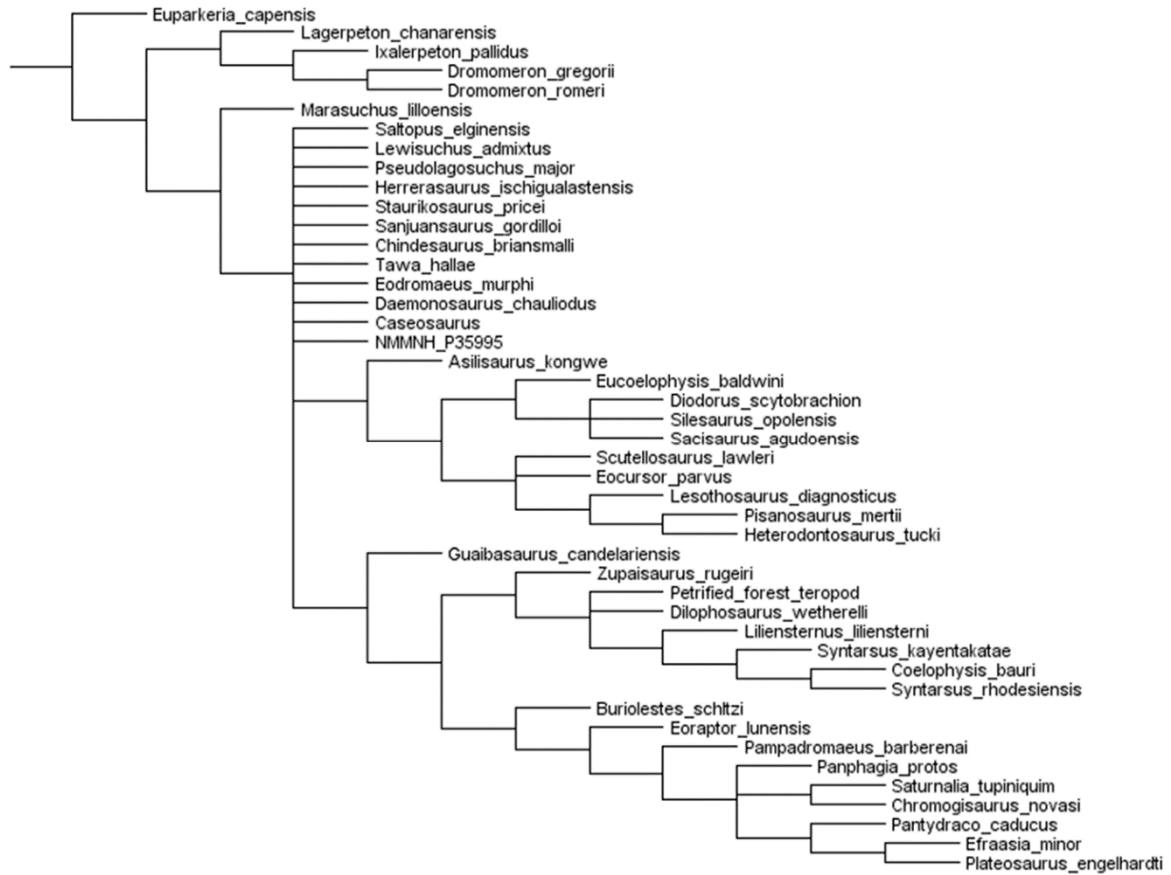


Fig. S1 Strict consensus tree produced in the analysis that used the dataset of Cabreira et al. 2016, prior to the combination of UMMP 8870 and NMMNH P-35993. Here both specimens of *Caseosaurus crosbyensis* are recovered in a large polytomy within Dinosauriformes.

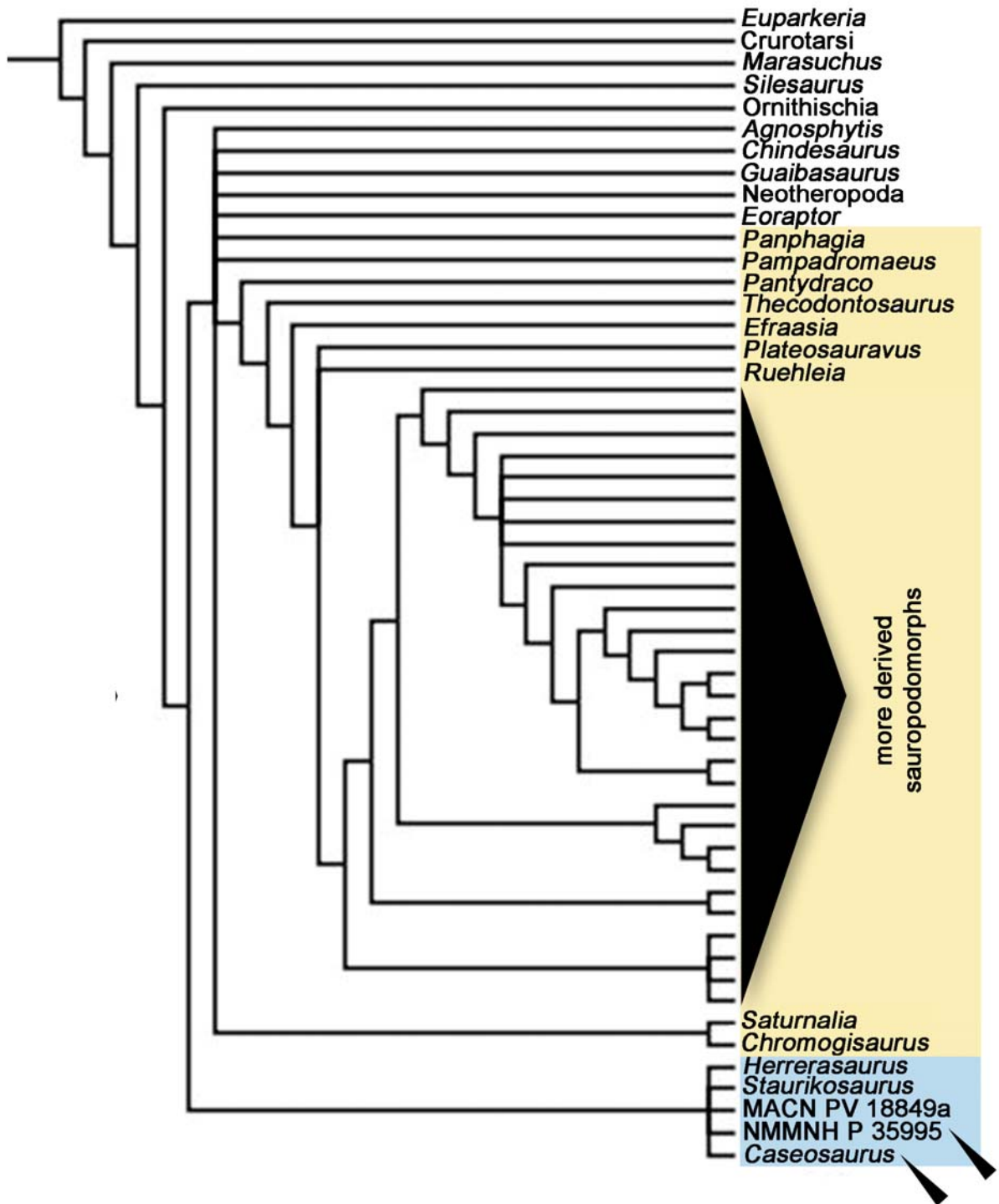


Fig. S2 Results of the phylogenetic analysis that used the modified dataset of Ezcurra (2010) and includes *Caseosaurus crosbyensis* and NMMNH P-35995. Strict consensus tree produced from 78 MPTs of length 1215 steps. Orange rectangle = Sauropodomorpha; Blue rectangle = herrerasaurs; black arrows indicate the positions of *Caseosaurus crosbyensis* and NMMNH P-35995.

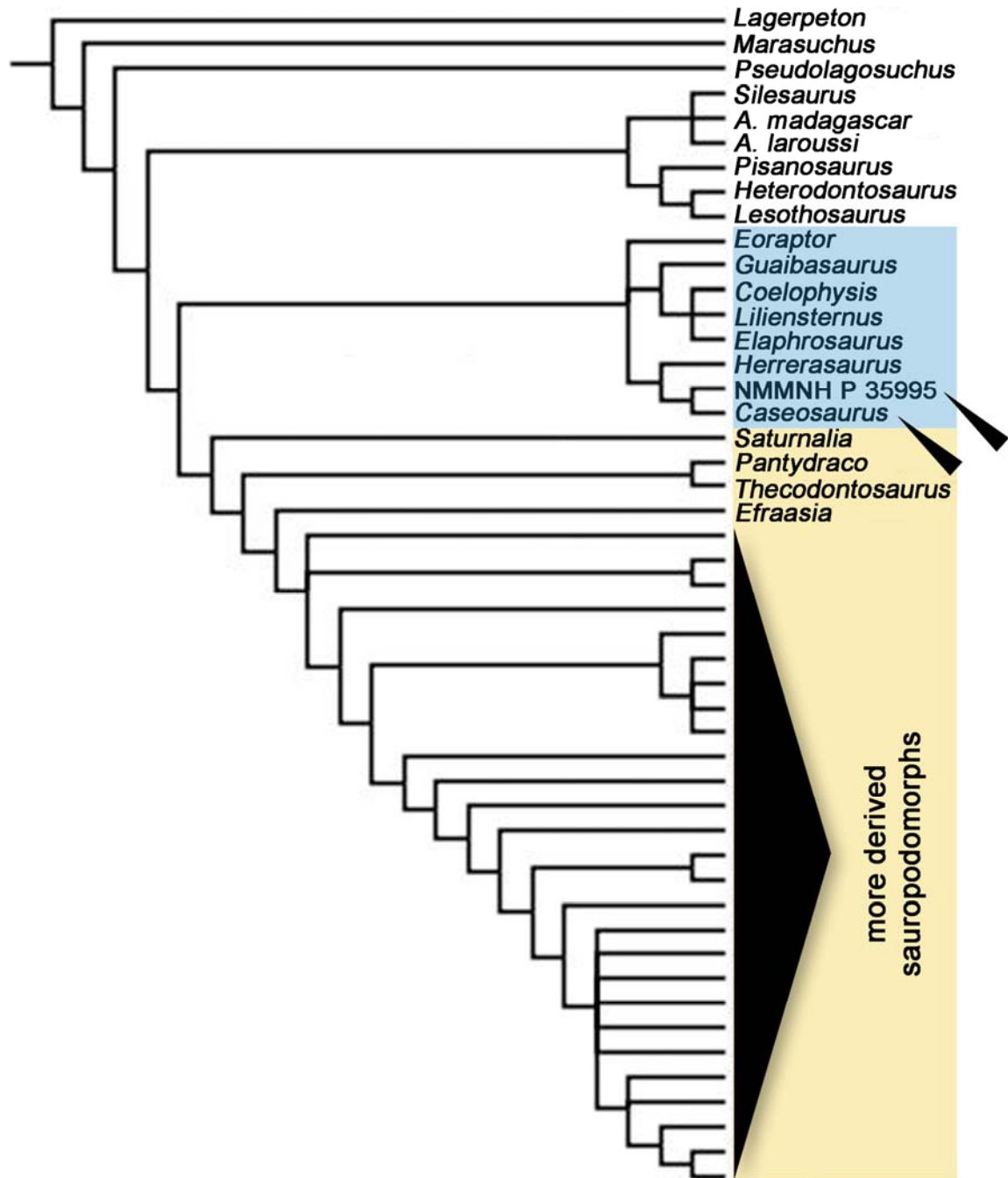


Fig. S3 Results of the phylogenetic analysis that used the dataset of Pol, Garrido & Cerda (2011) and includes *Caseosaurus crosbyensis* and NMMNH P-35995. Strict consensus tree produced from 17 MPTs of length 617 steps showing the positions of *Caseosaurus crosbyensis* and NMMNH P-35995 within Theropoda. This result suggest a very close relationship between *Caseosaurus crosbyensis*, NMMNH P-35995 and *Herrerasaurus ischigualastensis*. Orange rectangle = Sauropodomorpha; Blue rectangle = Theropoda; black arrows indicate the positions of *Caseosaurus crosbyensis* and NMMNH P-35995

2.0 Measurements taken for character data

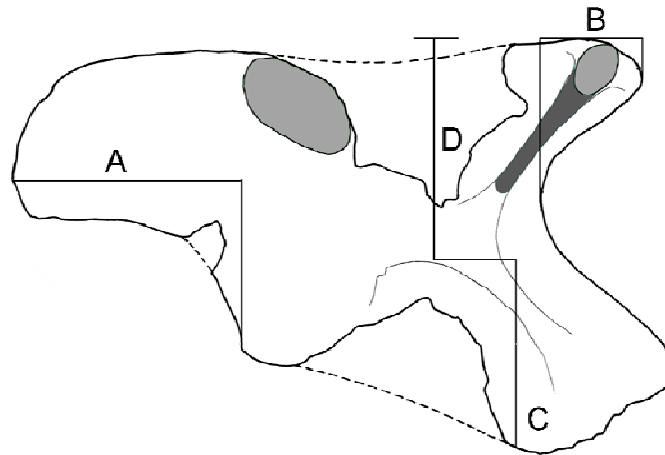


Fig. S4 Measurements taken from the specimen for use in phylogenetic analyses: (A), postacetabular process length; (B), preacetabular process length; (C), height of the acetabular region; (D), dorsoventral height of iliac blade above the acetabulum.

3.0 Characters scores

3.1 Character scored in the dataset of Baron, Norman & Barrett (2017a)

Euparkeria 000000000000-000-0-00100-000000-00000010000110000----
 000100000000100000000000001000010000100010010000-0100000?0000000000---
 0000000001000000000000000000200000000-000-0?0010010000000001000?0000-0000000000-00-
 00001??1100000000000?0??0-?000010000110-
 0000011011100?000????000??000??0?0?10?0?00?0000010000000000000001--00?0000000000-
 000000120?1?00---0001-000100?000?100--000----0?1000-?00000-000000?00-??0?00001000?000-
 0?01?000??00000000000?00000100000000001?00

Postosuchus 0000000000020-010-0-10000-10?000-0020002000110000----
 0000300020000001011110000011100100111020??010011010?0000?000011??00---
 01000210010000?001000200000200000000-000-0000100000000000110100??0-
 ?00??000?100110010?01022?10000?00??00??0?????00000111?11000011100001110-
 100??000??0000000100010000101010000100010000001010000102100??1100?0021002?0---
 1000000100000000100--000----0?1000-000000-000000110-??11001000000100-
 0?0?0000??0??000010100100?10010000000??0?

Saltopus

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Dromomeronromerii

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Dromomerongregorii

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Lagerpeton

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Marasuchus

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Silesaurus 0??01?0000000-000-0-101?0-

00??10?0000?2?00?????0?????0000010??1?1?????000??01?01?00111110110100?0-

110000?1????010100---1001120001?0?????10100010102?????10?1?100-

100020?0?200101011000?0100-002000001101110000001?01?010010100?1000-001?????11000-

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Asilisaurus

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Diodorus

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Pisanosaurus

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Fruitadens

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Heterodontosaurus
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100??100??00?0100?0001?1?1120100001101220100020001001012020111011100101020100011-
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Scelidosaurus 000?1??0100??????????0?0?0??01000-

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Emausaurus 00??1??00??0??100-?000000?0?1000-
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10100000010011000001000??111110001010?0100??1101?01010??1?1??2?00---
01010110110?000001000200110211200000-000-
002021001210100111010??11??01?00011100112??0?11?01?00001?0100?0??001??10?0010110
?011012111011001100-103?1100??000001111211?0010010001001?012101000?000?001?20????-
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Massospondyluskaalae 0????10011100-?10-1111111-1?00??01000020?00111100---
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Panphagia

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Plateosaurus

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Unaysaurus

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Eodromaeus

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Coelophysys

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?10111111111001?110-100001101-
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Syntarsus

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Eoraptor

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100002??????0?01?????????00011101?11?1000??1011?1?10301001002110?00000000000

Procompsognathus

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Riojasaurus 0000010?11?0??0-110?011??000??1001?20??011?100---
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001?011111131010010000000201201101--000?001?20220?-??00001010200---0011-
0010000202110??1011-000101101-
1000020000111001000010??1000111?1????00??10??0?0101?00102?0001????00000?

Vulcanodon

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????????11011????????????????????????????????????1????????????????1101--001??010?012?1-
1?000?11010000---001000?100002121201?01011-001101111-
?????10000?????10?????1010001111110?00100?011----?0000110010?10001?01000000?

Coloradisaurus 00??010011201-?10-11011110?01000-01001?2??0??00---
??10?0003??011?0000100001011011010?11001?011?100120?????????0?00---
010??10011010?001000110011?????00010000-
002?21?0?210100??0?0??1?0?0?00001??011201?0111????????????00??0??????100011010
110111101100?????????0????????????????????1?????????012?010001000000122102??2200
0001010200---0010000??002020101?01011-001??1101-
0000020000111001000010??1??0?11111?0100??0??00030110010110000000000000?

Lufengosaurus 0001????????????????1??1??2?00??100?020??011??00---1?10????01001101-
01000??11011000?0??11001?01??1?0000?0011????0????????1?010?0?????0010????????
0000-000-00??20?0?21010?1110?00??10010200001??011101?01110100000100101001100010?0-
10000010100101111011001100-1?2111001-00??01011211?001001000100020?211101--
00000?12200201-22000001010200---0000000100002020101??10?1-000??1101-
1000020000?11001000010101000111111?11?0110?01011010110010111000000000000?

Dracovenator

0????000102211?11111?101100??0?10?1200?2????1???1????????????????????????????
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000?10?0000001???0?0??
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Cryolophosaurus

00?01????????????????????????????????0?00????10?1?010?100110----

??10100?3?1?1?0?0100000?011??100100100000?????1?0?????0?0?0?0?0????????????????
??10002????????????????????????????????0?0000?????0?0?????1?0??110??101100?00??1??2????0?
??1??1??0?????????????????????????????1?0?01100-
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?0?????20?00200010??1102-001111100-
10000?????1?01100??1??10011111?0?1??11111????????????????????????????????00????

Sinosaurus

0010100011221???111111011000000??0?0012??01100110----

1???000?00011110101100????011001??1?2?11000?01??110000?????????0?00---
0001001?010?000??0000200??0101000000-000-
001010000000001??000??????1??11?????1??0??0??1?12?1??0?????0?0????01??1??100011010
11111111?1?00111??1????????????????????????????11030001?0121120011001010?001?2??20?-
1?10?00201020????01-??020?0??010??1?1??2010??1100-
0?1?021111??101?0?01?1000001??1?????101110?????103????0?0211?201?0?000000

Ignotosaurus

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??000000011101021000000201001????????????????
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Lophostropheus

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10??00?????????????1??0??111111010?????????2??1?001??1??1????????????????????????
??11?3?0?1??21?2?0110?2010?0????????????????

00???011?????????????0?0?????000?0?????????0?000100???000???11???1?101?1?1?0??
???1????????????????????????????????00???1?1?0111111?011110-
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?0010???0?020?010?1??201001?110?-
10000?01??1????11???11??000???1????????????????????0?????10????0?000?00?????

Gongxianosaurus

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?0-????1??1?0?????1?????????00110?010???100?00-
01??1111110????10-
??1??0?0?????????????????0?????????????00????
0??00?0121?0???00?----
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Zupaysaurus 00??1??????????11?????????0000010?0100120201100100----

10100001300010100200001????11100100?????1010?????????????????0?1????00---
00???011010?000???000100?0??????000??000-
?????1?0??0000000?000?0???1?11?
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??10000?????11101101?11???100100111101001011
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Dromomerongigas

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?01?0???

Nyasaasaurus

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??1?????????????1?0?001?010????????????????????????1111
1?01???

00--00??011010?010??0000100?00210100000-00?-
0?13100000001001?010?????????????????????0??1?0??000011??0?0?????????0??????
?0111011?00?10??1????0?????????0??1?????10000001?00101100000020?01001?100211-
?1?0??1?????????00001011000?2000101001001-001111101-
1000020?00010?????????0??1000??10????1??0010?0??0?00?01?0110210000000?00000?

Chromogisaurus

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Agnosphitys_Holotype

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??100000?11?0101?000000200010????????????????
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Dimorphodon 001010000120?????0-01112?0?0000-?1000-20??00-

000????0??0000?0?0?0????0????000????????????????????????????????????00---
00??001000?????????000001?0201200000-000-00230-
0?0?0?000?000?????1?????????????????10?????????????????11????????11010-
??0?0200010110001100-000??0??1?0000000?10?0011201?0?100??0000000??01010?00000?-
??0?11001?000---?????011000?00?0?00--000----0-?????000?0-0?00?0?00-00?0010?1110??0-
1?1?11?1?10000?000001?01?000100000000?0000

NMMNH P-35995

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??10?0?1??1????2??010001000?1????????????????
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3.2 Character scores from the modified dataset of Cabreira et al. (2016)

Euparkeria_capensis

?00100?000000?0100000001000000/1?10110000000/10000000000?000100000100000000
0000000000010000000?0100101000000000??01000001000000??00000100??0??0?0010000?00
?0101000?000000000000010000000000000?0000000/1000000000000000000?00?000?000000000
000000000010?00010000?000

Lagerpeton_chanarensis

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????????????????1?000000000000??0001000?0000010000?0000
0000000000000100010100010?0010010110000010000100?0/211100?01101000011000001010??
??020???????

Dromomeron_gregorii

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???0000000?01010100?00101210101000000?000010????????????????????????????????
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Dromomeron_romeri

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???000000010001010000?10121010110000010000100?011100?011010????????????????
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Ixalerpeton_pallidus

?0??1??11????0????????????????????
0?1??0010?0??010000000000??00????00000????????????????????????0001001?00000?0?0??0
?0?0000000000000100010100010?0020010110100010000????????????????????????????
000001100

Marasuchus_lilloensis

??00?1?1????????0????????????0?000010????01?0
?00000000?0000010000000000?000101000020000????????????????????0/101010/10?10000110
00011011000011101000100/11001100110?00001101000000?0100001?0010001?00?00100110000
00110??0000??0100

1?10001001100010101010101010101010111001000/1111100000000000????????????????????100020/1011
010011100101011111011101/21111012100/1011100110001001/2110020001010110010?0011000
10????1010010?100001021?100011

Sacisaurus_agudoensis

????????0000101????????0????????????????????01????????????1101111011?????
????????????????????????????0??11????????0????????????????????0001/20??101??1100??1
?1?11????10/11/21111012100011100?1000110111002110101?????????????????????????????
??102?????????

Pisanosaurus_mertii

?????????1?0????????????????????????????????????1?111?0111??1?111110??????
?0?????010?????0??0??0?????
?????2????????????????????0001?011010?0011?10?1?111?110?11011????1??1?1??0??1???
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Scutellosaurus_lawleri

?????0????1?0??1????????????0??0????????????????1?0?1?10????2??120111101?????
00??0?0?0?0?101000??10??0001?000011000?0?????00?????01?????00?????11????
?1?01??111100022013100/10111100000110200102111010010211?000001111????????110?1?
??1???????????

Lesothosaurus_diagnosticus

?00000000110000100000100110000?00111010?00000101110?011001112001201111010
01010?00?0100?0??001????111?000????1000101100010????0000000?000?000011111?00001
0?1100?111?0100211020022013000110111000001102001020?1101??1??1??????1?1?0??010100
11??00001010111011?

Eocursor_parvus

?0????????????????????????????????11??1??????1?11100110????201?1110??????
????0?00?1?0?0?0?001?1?0?0????11??01?01????????????????????010022000000100?1??1
11?010?2?111002201310011111?000011020?102011101??1????????????????1??????0????10
10??1111

Heterodontosaurus_tucki

?000011001100121000001001110001?001?001100100101111?1110111100012100101000
11000000001000000011?1001111?000?000110001120001110001110011001100000011?22100000

1001100?111?101021?????2??30?0110111?0000110201???0?1???????1?????11??1000010110
1??1011010001110110

Herrerasaurus_ischigualastensis

?0000101?0000100000100011010001110001000?1?000010010000010001010000000000
?1001?01?111011?0111?00101000111011101?11111/2101010/210111100001001021102010120?1
010001101011111112011111021011001110111?00001002100010011010111101?0020000100110
10101101000000010110????

Staurikosaurus_pricei

?0??0010?00?0?0???0000000000?????
00?011?010?0?01?001001001110111??1010120?101000110111
11111?1??11111021010/100?111?10?0000110210001000101????????????????????????????????0??
?0010???????

Sanjuansaurus_gordilloi

?????????0000100??100000000?????00?
11??1110110011100?10101011101?01111???????1???0?2011
111??????1021021011001111?1000?000002000010001?10?11101?00?01??10?????????????????????
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Panphagia_protos

?0?????????????????1?0?0???1000100011100???11000010000????
??0?11110000?1011?010?????110?01010???002101100??11??00
0???0111111?????????????????1?????????????02000010011010011111?00200?????????0?????????????1
020?1?????

Eoraptor_lunensis

?0110111?00110111101101111000111001010?????100010001?000010?1010/1100000000
000???1??0011000001111010100??1??0?00010121210110??10001011110000201010012101110
1?01100001110111/2121???1??1011??1?1?111?00001102010010011010011111?00200001011101
01011110111111111?????

Pampadromaeus_barberenai

?0021/211?1001110/11??0?101011001?1?????????????0???00000?0???001020100001000
000?????????????????10111010??001?01?1?10?????0?100?????????????????????????100?2101??0???1
?0???1?1?????????111101/21011?011111111??00?101/20????0?????????????????????????????????
?????11?10101???????

Buriolestes_schltzi

?0?21/201110011?01???010???010?1110????????00110001?00?01?010200000000?00
1????????????????01110100100110100010??111200110????0??01????????200121011001?01
?0110111?1111111/2111021011001111111?00001102000010011?10???110????000100???00111
111101000111???????

Saturnalia_tupiniquim

?1????????????????11?1????????????100????????00?1????????????11000010000?????
10?1?110000010101010010011010101010121201111????????????????????1000/121011001?1110
1001110111/21111111021011011111111?00001002010011011010011101?0020/100010?1101011
111110???1021?1?0101

Chromogisaurus_novasi

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????????????????????1????111????1?0201001101101????????????????????????????????020????
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Pantydraco_caducus

?????101?0????????????0?????????101????0?0??10011?0?????10?12?0001001001??
??01111?000??10????????????00?00??11????????????????????0111??1?1?0010?0????
???111/21????????????????1?00001??200??00?1?1?0????????????????0010111210???1
00111?0110

Efraasia_minor

?1?2110100020101?111101???1?00????10000000??1??10011101101?01?2120?00110000?
???10?111100???10101010?0?011010101010121201110011?0101111?11011/2000001022011001?
11100001110112111111021011000111111000001002000011011010011211????00?1001100010
111200???101011?0110

Plateosaurus_engelhardti

?112110100020101111110100110/100?01110000001111001001110110100202120100111
0001011101111101001101110100110110101010100212011100110010111111000000001022011
101?1110100111011211/21110/1102101100011111100000002000010/1111010011201?0020000
101110001011020010010101101110

Chindesaurus_briansmalli

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?????????1011021011001110110?0?001???1?01200010/11011111?1120/10?????????????????
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Guaibasaurus_candelariensis

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??????????1?1111100001110?0??0??111?10110??1111111100111?1??1001210/11101??11100?
01110/111?111?????1?11?00?1?110/110000?012100020011110111101?01200011011100011111
110???020???????

Tawa_hallae

?012211?00020100???1000?001010?0100?1100000100010000000?00?001000000000?001
????11112111111?10111?10?000??0?0?001??1111/210100000101110001001011?1?010120?101?
?011020?1011?1??2?10210221111011110010000110211012000101011111?1121000110110001
1111010111000011?1111

Eodromaeus_murphi

?0?1??0??0011010???????1??0?????1?00????????0????0000100???0?1?000000000000?0?
0011?1??110?0?01?1110?0?????010111?11121011111010?1?0100?1101/210010102101101001
1/21011?10?111??11??1?21?11001?1?????00001012210010011110?111?0?002000011????0???
????0??0020??0101

Coelophysis_bauri

?012212?1002100111001011110/10110100112001000010110000100?1000112000000001
00111111112111101?101011111110010100110111?1?101102111111011111121?12100221111
01?121021?10111111212?0002211200111100100000/11122200????1110110111?002011011001
0111101101010001011110???

Liliensternus_liliensterni

?????????0?1?????????????????1??1?????????????????0000?00?????????000?00?00?????
11?121?110?11010111?11100?0?????????11110?10?????????1?????????210022011111?121021?
10111111212111022112110111110?00001002220020111110010111?0020110?1?????1?1101???0??
?0121???????

Syntarsus_rhodesiensis

?01221211?011000110010?101?????10011201??10?1??0000000?????112000000?010011
???11112111101?101?111111100101001111111210?11211111?11111011121?1210122111101?1

?100??10111111212111022111/2010/1111100?00000112220020111010010111?0020111?1?01011
1101101011?0111?110101

Syntarsus_kayentakatae

?01221211?021010?101101101?10101110??00?1?010010000000?1000112000000?00001
????11112111101?101?111111100101??110111??1????????????????????11?1?????1??1??1?1
021?101111??2?211102?1120011111001000011122200?????10?1?????????111?1?0??111101??
01000101111?1??

Zupaisaurus_rugeiri

?????2??011010?101101011101100011??00????01100?0100?1000??2000000?0000??
1????????????????????????????????????1????????????????????????????????11????????????????
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?1??????

Daemonosaurus_chauliodus

?00011??010100?0010??11001001001??00??111010010000?0000000?00000?0000??
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??0110?????
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Petrified_forest_teropod

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??00221111?1??11021?1?11
1?112?211102?112101111110??0001?021200211111001010?0??0110?100101?11?1????????11
1???????

Dilophosaurus_wetherelli

?0121/2?2?10010010??11?0101101100101?2011001110010010000110?01110000000?00
01111011111210?110101110110110100110111211/210110??11111101100121?1210022011
101?121021?1111111212111022112100/11111010000000212002111110010101?00210111100
10111011010011012111101?0

Caseosaurus

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??1010020?1011?01?????????
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10???00?0102?1??11?????111011?010?001010110001100111101200?10?????201?001101?1?200
2010?????10?10?00??100?0000101?12?0111?0011???1001001111011?10000?010?001100?000?
?0000000??0100?0??0?01?00?10?????1110??21100101100??0??200101110010020100000200011
0102100000?1111100010011?001010000101101000010111101000000110111?1?01?010???10111
?0?01??0011?1010000010011??0????1020000??01?11?110

Antetonitrus

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??111010001?????????????111011110011111110100000011011101?????????????????1011110??
??21?00?0????31?100??1?????????????110??0

Barapasaurus

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00?021001?10?11??1?????????101?00?1?????????11?????????????????????????????????2111002101100
0011110011???11110010?????????????????????????????????1?1?1?????????1?1?????????1?????????0??????????
1?1??????5?????????01?????????0?11?1?1

Blikanasaurus

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100?211?0?1?1????????????????????

Camelotia

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Cetiosaurus

1??01????????????????????????????????
??2??0011110111110100100020?2001?10?1020??101110201010
0???2?????1001??00100???0111101031100100011???????1????????????????????????????2111002?0210
?0010?1?011??1101?00???211112??0???010?111210100010010111????????????????????????????????
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Chindesaurus

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000???1?0????1000??0???001????
?0????????????????0000101110001011100?????10111100??01?110100????????????????????????????
?????1??????0?01??????10?10???

Coloradisaurus

?00?1002?0102?11111?1??1110?1111000?10??00?001?01110101?100100100?1011011011??11
0111??0?1?100101101011101100101010000?1?00?1100200100011?0110??00?001?10011000000
00000000101110??0100100?0?????????0110111121?011?????0????????????????????????????0010
0021100?0?1110110010011110111?00101101000010111010000?0110110??011110?000101??
?001110012?101?0000210021?011?110?0000????????????0

Efraasia

100?1001?010??1?111?112?1110?100???00100100000??0?10??01?1??1??????10?000?1?????011
0100??????10010010??11?011001010100001???1?11001101001011011010000001??001?0000000
000000000110000101000?0110000?0?010011212000111001101022010?11000001110100010000
100021000201100010000001100101101000011110000101100010000001101?001?011010?0?01?1
110001??0011?1010000010002??0??000100001??1111??10

Eucnemosaurus

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??0???01?001100100000??00?0??
????????10000?01100????????11??11
0???0????????????001101?1010?1010110?00000110110????????????????????????????????
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Gongxianosaurus

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????????????????2111?2????0??1101?????1?0??1??0?1?1????1?11??010??10?2?01110
00020005????????????????????

Plateosaurus_ingens

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01?01????????10??
??00?010????????????????????????????????????1??0?0?
??4????????????????110???

Guaibasaurus

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001000?01000?01?0??100??1????110????1?0?????0????110??0?1?00??0?0?000?0111002201
10010000000010?1011000000100100001011010100?0?0111100100?01101?00101110000000010
1100000000001100?00??002?????0111?1111

Herrerasaurus

0000000?010100000000000?00010000000000100000010001010101000100001101000000101?0
000000?1000?0000000?1000000000000000001010001000000100000?000010000011??00101100
00002000000100000101110000110010100?1110??01100000000000012000000100000110110100
10000012000000010000010??01?0101001000010111000101100010000100001000100100101000
0001100010000100100000000?020000000001000001110111011

Isanosaurus

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??0?0?0?????????2??10?0?????????????2?011000?
????????????????????101?0??
????????????????211112??0??001?1?0??
??3?110??1????????????0???

Jingshanosaurus

1001?002??10211111100?0?111011101100?102001??1?10111011101001000???01100000101?21
1001000??1?10110010??11101100101211001????111??010??????1???10100??0011100?1???0000
000000000??10??01000000001000000?0010??11201011100??00??0011?3100100?0100010200001
00021000002111001002??110010110?01001101000010111101010000110110?12011010?00?????
?0101111012010100000010?4????????????????????????

Lessemsaurus

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00????????????????????????????????????0001??1110010110??????0?1?310?????1?0??1???0010002100000
?11?110002??1?10110?111011?10??11111?0?000000100101??011011001??????????11??121
11??00??0??311?????101?????1?1111??10

Lufengosaurus

100???02???0211?1?11?11111111110100101011010000101110101110010?1????0110??0110??01
010100?011010010????0111?11011010100011?00011100200110111?01101000200111001100000
0000000001001101001000000011000000001011112110111001101121011131001012010001020
00010002110000211101100210110010110000101101000010211101010000110110010011110?000
1?111010111001201011000021004101110110?00000??1????1??

Mamenchisaurus

11000113?11120110120000000101112??001112010101011111110120100000111221010000111?2
01?00?????2?111000010010001111111121113?0001110121010000110002?11101010100201100
0110201210000011011111111011001011111100031100100110110012011000100011?0?10?1?31
?21110021011?00011110011000110100100211112??0??010?01121010?1??0?????101011111??
????1101??21?2?021111102??05?1????????????????????????

Massospondylus

1001100210102111111111211011111010000101101000110011011111001000102?01?0110010110
10101??101001001011010101011011010110011100?1110020010011110110100020011100110000
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Melanorosaurus

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1110010111001?111110000110?301100?11??00000?0???????

Neosauropoda

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10011020121100002100111001111110000100111000311001100111100020100000000110001??1?
30021110021021000011110011001110110100211112??0??010?11121010?110000111110101111
11011??111100210200211111021105?11???110200000?01?100??1

Neotheropoda

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Omeisaurus

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Patagosaurus

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Pantydraco

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Unaysaurus

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Vulcanodon

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Yunnanosaurus

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Glacialisaurus

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Pampadromaeus

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3.4 Character scored for the dataset of Pol, Garrido & Cerda (2011)

Lagerpeton_chanarensis

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Marasuchus_lilloensis

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Pseudolagosuchus_major

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Silesaurus_opolensis

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Azendhosaurus_madagascar

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Azendhosaurus_laroussi

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Pisanosaurus_mertii

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Heterodontosaurus_tucki

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Lesothosaurus

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Guaibasaurus_candelariens

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Eoraptor_lunensis

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Herrerasaurus_ischigualas

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Coelophysis_bauri

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Liliensternus_lilienstern

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Elaphrosaurus_bambergi

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Saturnalia_tupiniquim

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Pantyraco_caducus

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Thecodontosaurus_antiquus

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Efraasia_minor

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1000?0211?10001?100001?1?010100

Plateosaurus_engelhardti

01010000001001111021111011001111100010101101000010001001101100000110101101100000
20110111100111101211100000000110120110011100001111010000200010001010011011?100000
111000000110101000000111111110011111000000101002011001110100101001000000100001
000?001010?02110100010100001?10010100

Plateosaurus_gracilis

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Ruehleia_bedheimensis

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Coloradisaurus_brevis

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Massospondylus_carinatus

0101001010110?11212011100101?111111010101100011110101000201??01101101100011100002
01?00?11000111{0
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1000000111121110?11121200?0001010020110011001111010011?1000?00001000?00101?102?1
?100010100001110010200

Lufengosaurus_huenei

010???01?????1?202111100101??11101110111101011?10?01001?0?100??01101??00??00000??1
101?11000111012111?000?0001???200100111?00011100?0000?000100010?000011?0?000?11110
00010111101000000111?12111??111212001?001010020110011001111010011?1000?00001000?0
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Gyposaurus_sinensis

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Yunnanosaurus_huangi

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Riojasaurus_incertus

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?011?0000110101100?01111?102?101??01010?00111001010?

Anchisaurus_polyzelus

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Aardonyx_celestae

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Leonerasaurus_taquetrensis

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Jingshanosaurus_xinwaensis

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Camelotia_borealis

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Melanorosaurus_readi

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Antetonitrus_ingenipes

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Lessemsaurus_sauropoides

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Blikanasaurus_cromptoni

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Vulcanodon_karibaensis

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Kotasaurus_yamanpalliensi

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Isanosaurus_attavipachi

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Barapasaurus_tagorei

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Shunosaurus_lii

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Omeisaurus_maoianus

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Lapparentosaurus_madagasc

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Volkheimeria_chubutiensis

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Patagosaurus_fariasi

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Ferganasaurus_verzilini

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Diplodocus

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01?00111200020111111?011000?1??001002??1?10112102?101011011??101?010??111?1121??0
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Camarasaurus

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1}11011112210020?00111101?0100?0111001001211??101210??00302022111112111?11121201
11012211?330120?0?1?011??100011200020111111??000110?0?1?02????10112102010101101
1110101011?111111121??0?110?1?112?1?211??111111????1?1211

Brachiosaurus

01100111111101112020110101?100001?11111100010?101010010211101111221002?000111101
00?00?01110010012?1??101210??0040?0221111?12121?1122120111012211?330120?0?10011??
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Caseosaurus_crosbyensis

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NMMNH P-35995

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