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## Monograph

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# Diversity and taxonomy of the Late Triassic sauropodomorphs (Saurischia, Sauropodomorpha) stored in the Palaeontological Collection of Tübingen, Germany, historically referred to *Plateosaurus*

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**Abstract.** The genus *Plateosaurus* is one of the most challenging aspects of early-diverging sauropodomorph taxonomy, with a total of 29 names and a century of revisions. As a result, nomina dubia have been treated as synonyms of *Plateosaurus trossingensis*, adding to the confusion about the extent of morphological variability. Here, we provide a thorough revision of the taxonomy proposed by von Huene as well as the subsequent taxonomic interpretations of *Plateosaurus* through a complete inventory of the specimens stored in the Palaeontological Collection of Tübingen. We reassess the status of the specimens in the collection and propose that the sauropodomorph-bearing layers are not necessarily monospecific. Most of the original fieldwork documentation has been lost, but we use the taxonomy established by von Huene as a historical reference point to reconstruct what was known at the time. This revised taxonomy of *Plateosaurus* narrows the genus to three species: *Pl. trossingensis*, *Pl. longiceps*, and *Pl. gracilis* (as a metataxon), and restricts the genera *Gresslyosaurus* and *Pachysaurus* to large and robust individuals, as pragmatic decisions aimed to test their affinities to other Late Triassic sauropodomorphs. Future studies should consider not only morphological variability, but also stratigraphy, palaeogeography, and environmental data when delineating species within and outside the *Plateosaurus* plexus.

**Keywords.** Sauropodomorpha, Late Triassic, Trossingen Formation, Löwenstein Formation, *Plateosaurus* plexus.

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## Introduction

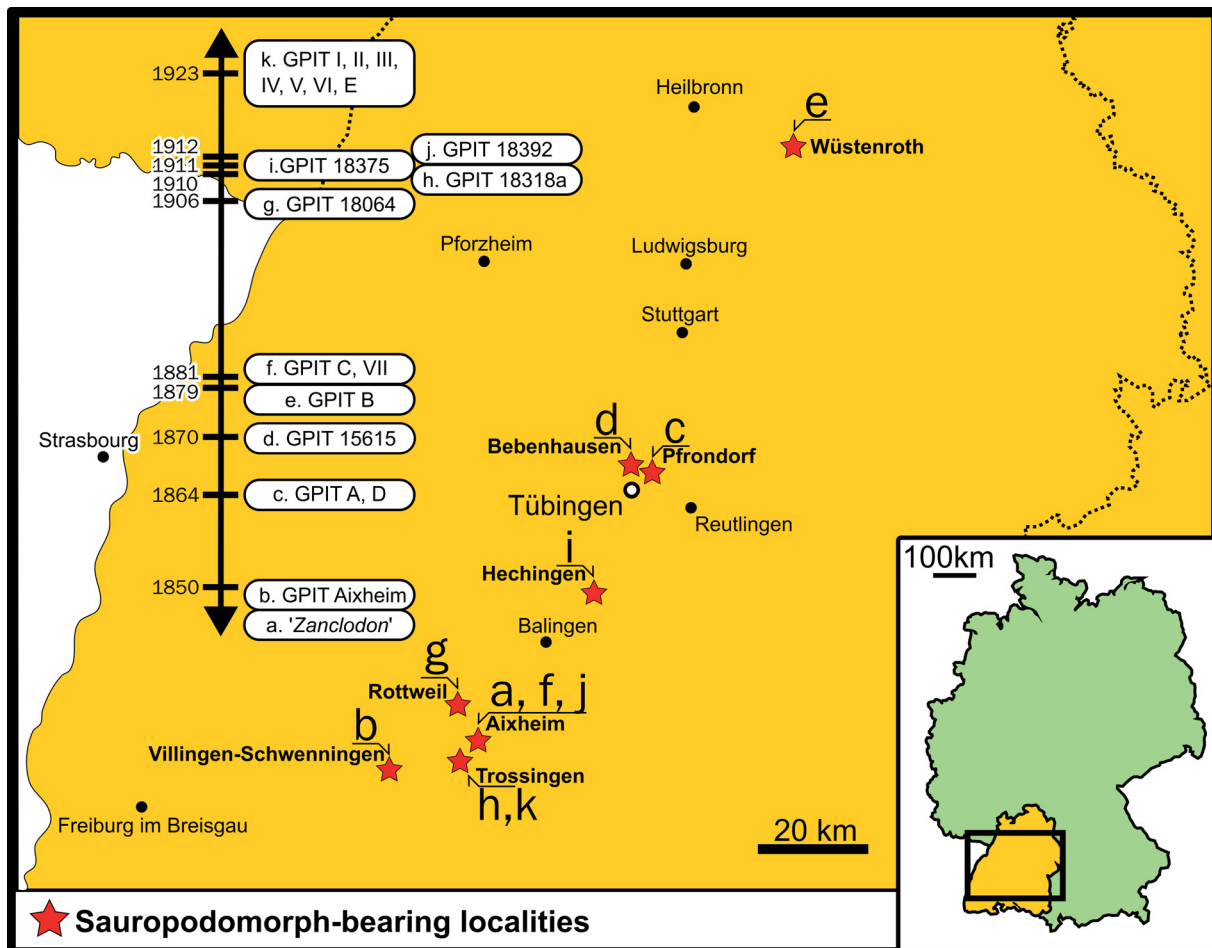
The first remains of *Plateosaurus* were found by Johann Friedrich Engelhardt (1797–1837) in 1834 and were first described in 1837 by the German palaeontologist Christian Erich Hermann von Meyer (1801–1869) (Moser 2003). Chronologically, it was the sixth dinosaur to be named, after *Megalosaurus* Buckland & Conybeare, in Buckland 1824, *Iguanodon* Mantell, 1825, *Hylaeosaurus* Mantell, 1833, *Streptospondylus* von Meyer, 1832 and *Thecodontosaurus* Riley & Stutchbury, 1836 – the first three of these were considered the diagnostic taxa for the new vertebrate group of the Dinosauria defined by Owen (1842). Since then, more than 100 skeletons have been attributed to *Plateosaurus*, mainly found in several regions of Baden-Württemberg (Fig. 1). These regions lie within the historical-cultural region of Swabia, Germany, where it has the nickname of the ‘Swabian lindworm’ – a mythical creature with a snake-like body that is common in the folklore of Central and Northern Europe (Reinacher 2021).

The taxonomy of the genus *Plateosaurus* is complicated by several names that have been established over the past two centuries. The following considerations are important to facilitate the reading of this taxonomic monograph.

1. *Zanclodon* is a valid name that today refers to an archosauromorph of uncertain affinities (see *Zanclodon* Plieninger, 1846 in the Systematic palaeontology section below). During the second half of the 19<sup>th</sup> century, Friedrich August von Quenstedt (1809–1889), who from 1837 held the newly created Chair of Mineralogy and Geognosis of the Eberhard-Karls University of Tübingen, used the term *Zanclodon* to describe any reptilian fossil remains from the Knollenmergel (Fraas 1896; Seidl *et al.* 2021) (labels a–e in Fig. 1). In this manuscript, the term “*Zanclodon*” in double quotations is used to mean the sauropodomorph remains to differentiate it from the valid name *Zanclodon*.
2. *Teratosaurus* is a valid name that today refers to an early-branching rauisuchian (see *Teratosaurus* Meyer, 1861 in the Systematic palaeontology section below). Fraas (1896) attempted to replace the name *Zanclodon* to refer to the material collected by Quenstedt (labels a–e in Fig. 1). In that publication (Fraas 1896: 18), the maxilla originally designated as the type material of *Teratosaurus* was included in *Zanclodon*, leading to the establishment of the name *Zanclodon suevicus* (Mayer, 1861). Von Huene (1907) determined that the material referred to as “*Zanclodon*” should be restricted only to the type species of the genus *Zanclodon*, resurrected *Teratosaurus* and applied it to the dinosaur remains that Quenstedt collected (labels a–g in Fig. 1). In this manuscript, “*Teratosaurus*” in double quotations is used to mean the sauropodomorph remains to differentiate it from the valid name *Teratosaurus*.
3. The genus *Sellosaurus* von Huene, 1907 has been synonymized with *Plateosaurus* (see the Systematic palaeontology section below), and all the specimens of the genus have been included within the metataxon *Plateosaurus gracilis* (von Huene, 1905). However, because a more thorough revision of this taxon is meant to be published elsewhere, we use the term ‘*Sellosaurus*’ in single quotations to denote that the genus is not considered valid.
4. The genus *Gresslyosaurus* Rüttimeyer, 1856 is considered valid following Rauhut *et al.* (2020).
5. The genus ‘*Pachysaurus*’ is considered invalid in the literature but is resurrected in this manuscript. Before the Systematic palaeontology section, we use ‘*Pachysaurus*’ in single quotations to denote the opinions of the literature. This convention of putting names in single quotations to denote they are considered invalid (nomina dubia) is followed through this monograph to facilitate the reading.

The Paleontological Collection in Tübingen, with a history spanning two centuries (Werneburg & Böhme 2018; Seidl *et al.* 2021), houses more than 20 skeletons of sauropodomorph dinosaurs. These specimens have been attributed to as many as nine different species, each of which was first named and described by the German palaeontologist Friedrich von Huene (1875–1969) in the first half of the 20<sup>th</sup> century (Galton 2001a) (Table 1). For this paper, archival information, literature and first-hand assessment of over 400 bones were revised (Appendix 1). The archival information includes three unpublished figures currently on display in the exhibition of the Stratigraphic Hall in the Palaeontological Collection of Tübingen. The figures are framed in a box case and do not have an accession or catalogue number.

Although the sauropodomorph remains in the Palaeontological Collection of Tübingen have often been referred to as *Plateosaurus* in recent decades (e.g., Sander & Klein 2005; Prieto-Márquez & Norell 2011; Hofmann & Sander 2014), the prevailing taxonomic view in the early 2000s was that most names established before 1932 should be treated as nomina dubia (Galton 2001a; Moser 2003) (labels a–k in Fig. 1). This paper therefore presents a catalogue of the species ‘shelved’ as nomina dubia and puts together the information that we currently have on their provenance and preservation and contrasts it with the assumptions made in the taxonomy proposed by von Huene (namely, different morphotypes in different ages), Galton (namely, a comparison with the more complete material with diagnostic features),



**Fig. 1.** Map showing the city of Tübingen, Baden-Württemberg, in the centre of the localities of the specimens described in this paper. The second map places Baden-Württemberg within Germany. The timeline shows the chronology in which the specimens were first excavated but not described. The date of the excavation of ‘*Zanclodon*’ is the only one that is not certain (see Results – Mid-19<sup>th</sup> century). Map data: Google, GeoBasis-DE/BKG.

**Table 1.** Relation of the old catalogue or historical numbers as given by von Huene (unpublished, figs 12, 22, 25–26) [1], by Hungerbühler (1998) [2] and Galton (1990, 2001a) [3], their most original referral in von Huene (1908, 1915, 1932), Hungerbühler (1998) and Galton (1990, 2001a), and the taxonomic status proposed in this revision. Abbreviations: H = the specimen is the holotype; R = the specimen is referred to as. The name of historical specimen “GPIT V” should be ‘*Pachysaurus wetzeli*’ as this is the first version of the name in von Huene (1932: 72); ‘*Pachysaurus wetzelianus*’ is then first used later in von Huene (1932: 105). The second version of the name has been used only eleven times since 1972, thus we revert to the original ‘*Pa. wetzeli*’ following ICZN Articles 23.9.1.1 and 23.9.1.2 (ICZN 2019).

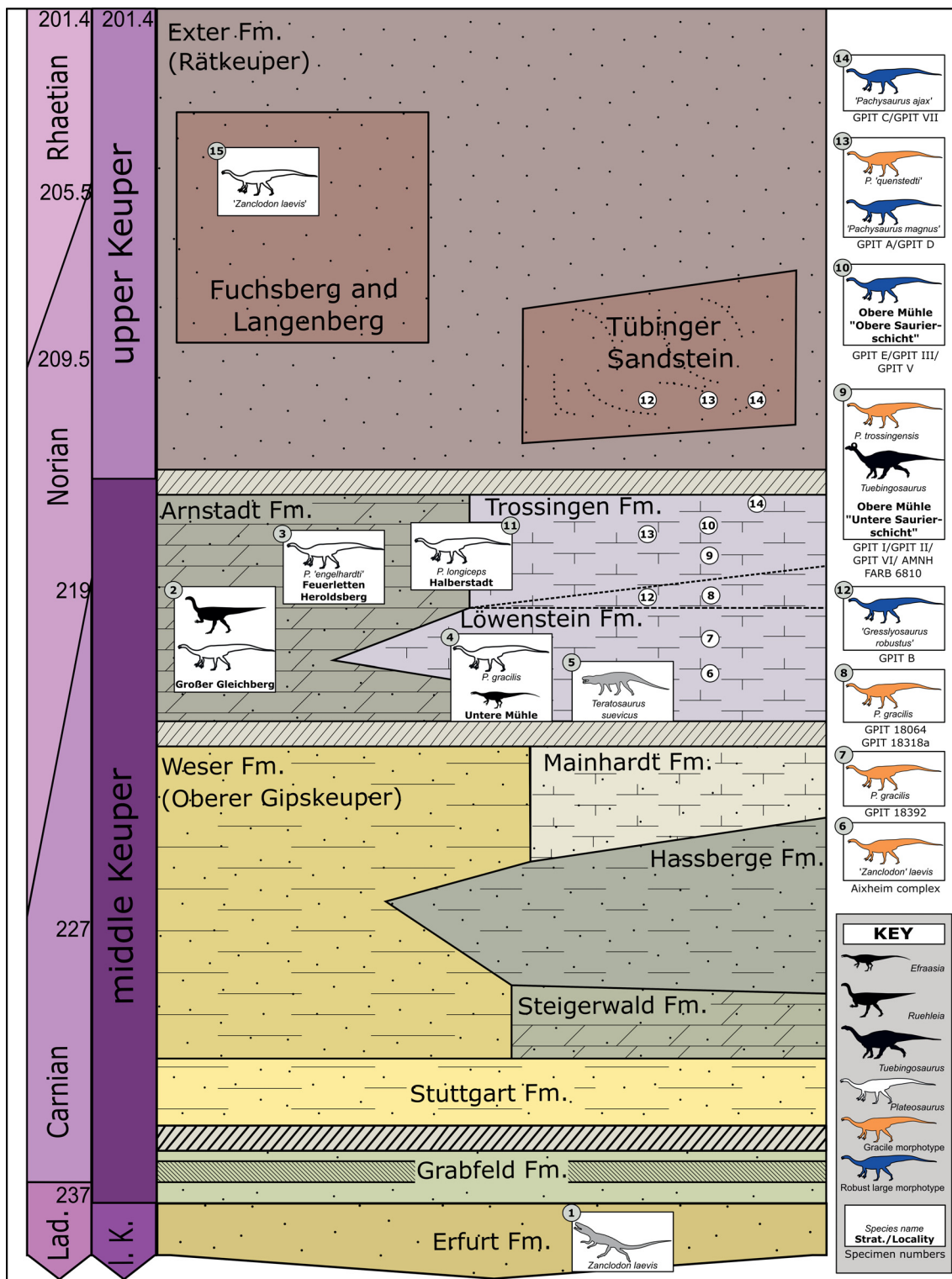
Historical numbers	Referred to as	Proposed taxonomic status
“GPIT I” [1]	<i>Plateosaurus</i> ‘ <i>quenstedti</i> ’ (R)	<i>Plateosaurus trossingensis</i>
“GPIT II” [1, partim]	<i>Plateosaurus</i> ‘ <i>quenstedti</i> ’ (R)	<i>Plateosaurus trossingensis</i>
“GPIT II” [1, partim]	<i>Plateosaurus</i> ‘ <i>erlenbergiensis</i> ’ (R)	<i>Plateosaurus trossingensis</i>
“GPIT III” [1]	<i>Gresslyosaurus</i> ‘ <i>robustus</i> ’ (H)	Incertae sedis
“GPIT IV” [1, partim]	<i>Gresslyosaurus</i> ‘ <i>plieningeri</i> ’ (R)	<i>Tuebingosaurus maierfritzorum</i>
“GPIT V” [1]	‘ <i>Pachysaurus wetzeli</i> ’ (H)	incertae sedis
“GPIT VI” [1]	<i>Plateosaurus</i> ‘ <i>quenstedti</i> ’ (R)	incertae sedis
“GPIT 18064” [2]	‘ <i>Teratosaurus trossingensis</i> ’ (H)	<i>Plateosaurus gracilis</i>
“GPIT 18318a” [2]	‘ <i>Sellosaurus hermannianus</i> ’ (R)	<i>Plateosaurus gracilis</i>
“GPIT 18375” [2]	<i>Plateosaurus</i> sp. (Friedrichstraße)	<i>Plateosaurus</i> sp.
“GPIT 18392” [2]	‘ <i>Teratosaurus suevicus</i> ’ (R)	<i>Plateosaurus gracilis</i>
“GPIT A” [3]	<i>Plateosaurus</i> ‘ <i>quenstedti</i> ’ (H)	<i>Plateosaurus trossingensis</i>
“GPIT B” [3]	<i>Gresslyosaurus</i> ‘ <i>robustus</i> ’ (H)	incertae sedis
“GPIT C” [3]/“GPIT VII” [1]	‘ <i>Pachysaurus ajax</i> ’ (H)	incertae sedis
“GPIT D” [3]	‘ <i>Pachysaurus magnus</i> ’ (H)	incertae sedis
“GPIT E” [3]	‘ <i>Pachysaurus giganteus</i> ’ (H)	nomen dubium

and the taxonomy based on comparisons with the holotype of *Pl. trossingensis* Fraas, 1913, a species that was designated as the type species of the genus *Plateosaurus* in 2019 (ICZN 2019).

The work involving the material from the Palaeontological Collection has led to the coexistence of multiple specimen numbers in the literature, making it difficult to track the taxonomic changes. The official abbreviation for the collection is GPIT, and the new numbers use the code GPIT-PV. The historical numbers are a combination of entry numbers and excavation numbers. To facilitate reading, the historical numbers are given in double quotation marks – e.g., “GPIT 18064” – and numbers without quotation marks refer to the current specimen numbers. There are three types of GPIT numbers used in this monograph: specimen numbers that refer to individual bones, skeleton numbers that refer to mounted skeletons or bones reported in the literature, and historical numbers that refer to excavation numbers (for instance, GPIT 18392 corresponds to the 1912 excavation of dinosaurs in Trossingen). Skeleton numbers may include individual elements that were given their own specimen number, as they were partially or temporarily dissociated.

### Sauropodomorphs from Central Europe

Historically, the taxonomy of early-diverging sauropodomorphs from Germany included several genera that reflected different morphotypes from different geological ages. “*Zanclodon*”, “*Teratosaurus*”, and ‘*Sellosaurus*’ corresponded to the oldest specimens from the Stubensandstein (Late Triassic) (numbers 1, 4–8 in Fig. 2), whereas *Gresslyosaurus*, ‘*Pachysaurus*’ and *Plateosaurus* corresponded to the geologically youngest specimens from the Trossingen Formation (numbers 9–14 in Fig. 2). “*Zanclodon*” and



**Fig. 2.** Stratigraphic section of the middle and upper Keuper of the Germanic Basin as exposed in Baden-Württemberg (right), and Bavaria and Saxony-Anhalt (both on the left). The numbers represent the findings described in the text. *Zanclodon laevis* (Plieninger, 1846) is restricted to an archosauromorph of uncertain affinities from the Ladinian (Erfurt Formation). Sauropodomorphs appear towards the upper part of the middle Keuper, which may be of late Carnian or early Norian age. The black silhouettes represent specimens not currently classified as *Plateosaurus* Meyer, 1837.

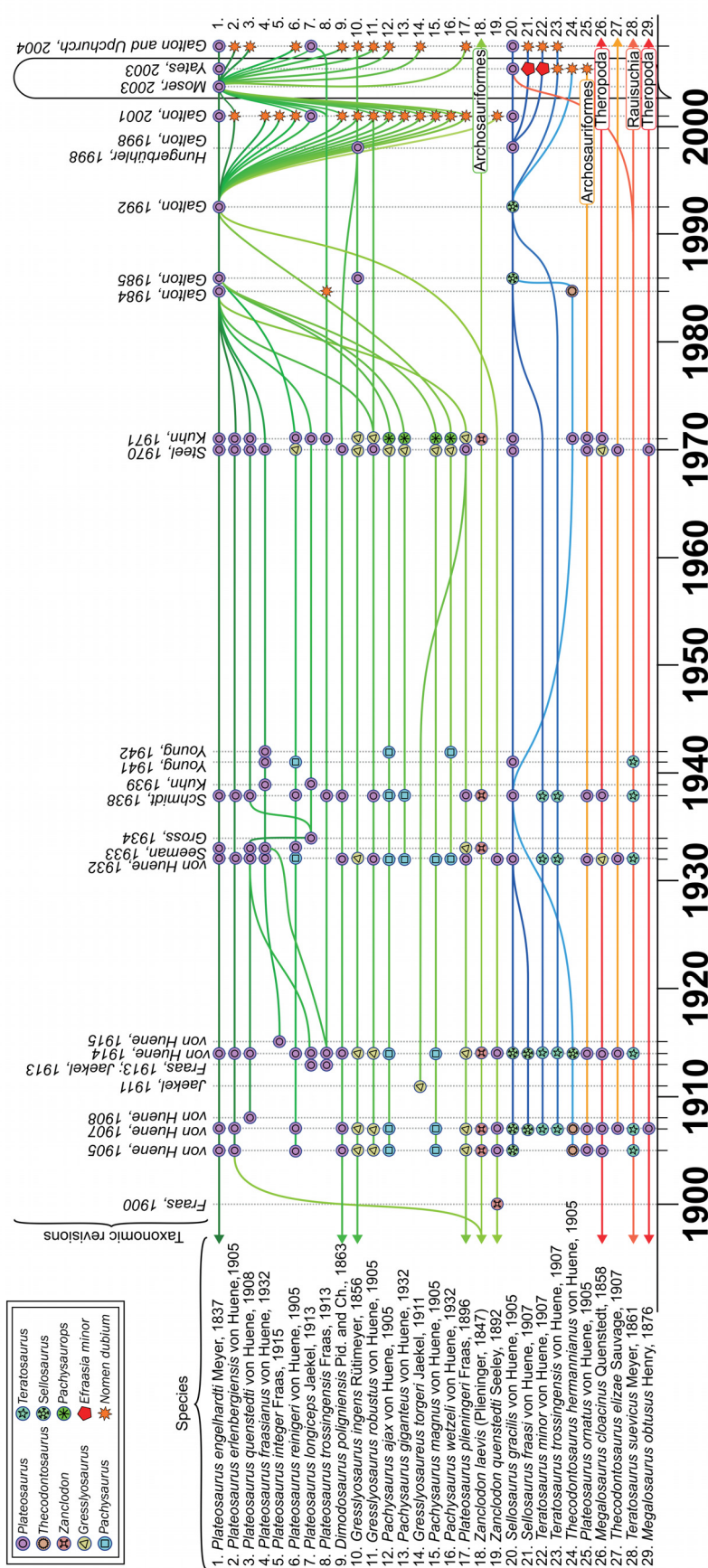
“*Teratosaurus*” (numbers 1–2 in Fig. 2) had gracile and small morphotypes, comparable to those seen in *Thecodontosaurus* from the Rhaetian of England (Galton 2005; Galton *et al.* 2007), whereas ‘*Sellosaurus*’ corresponded to bulkier, medium-sized animals. From the younger layers in the Trossingen Formation, no small-sized gracile morphotypes have been recovered to this day. The smallest morphotypes are bulkier, medium-sized animals initially referred to as *Plateosaurus*, whereas the more robust and large-sized morphotypes were referred to as either *Gresslyosaurus* or ‘*Pachysaurus*’.

Von Huene (1907) published descriptions of the specimens housed at the Palaeontological Collection of the University of Tübingen that had been collected during the 19<sup>th</sup> century. Between 1921 and 1923, von Huene made several expeditions to the Obere Mühle quarry, Trossingen, Germany, co-sponsored by the American Natural History Museum (AMNH), where he found additional skeletons that he later described in 1932 (von Huene 1932; Weishampel & Westphal 1986) (label k in Fig. 1). The well-studied specimen referred to as *Pl. trossingensis* on display in the American Natural History Museum (AMNH), specimen AMNH FARB 6810 (also referred to as *Pl. erlenbergiensis* von Huene, 1905), was also found in the excavation that took place between 1921–1923 in Trossingen. The specimen AMNH FARB 6810 was shipped to the United States as an arrangement between von Huene and the curator of the AMNH at the time (see Reinacher 2021, for more details). Galton (1999, 2000, 2001a, 2001b) published updated notes on the specimens but not always with new illustrations.

Moser (2003) recognized that the taxonomy of sauropodomorphs from Europe had gone through three phases: a monospecific initial phase (1837–1905), diversification and confusion (1905–1980) and a contemporaneous monospecific third phase (1980–2003). However, when following the taxonomy through the 20<sup>th</sup> century, the second phase is not as confused as portrayed (Fig. 3). There is some stability among the authors, who mostly disagree on the validity of genera such as ‘*Pachysaurus*’ but not on the number of species considered as valid. The validity of the species was questioned in the 1980s (Fig. 3), with several species being considered as nomina dubia (Galton 2001a, 2001b) based on the apparent morphometric similarity and the influence of taphonomic processes (Galton 1984a, 1984b, 1985a, 1986, 1990; Weishampel 1984; Weishampel & Westphal 1986; Weishampel & Chapman 1990; Galton & Upchurch 2004) (Fig. 3). On the other hand, Moser (2003) argued that some of these nomina dubia were, instead, subjective junior synonyms of *Plateosaurus* ‘*engelhardti*’ Meyer, 1837 (species 1 in Fig. 3), an opinion followed by several researchers.

The syntype material of *Plateosaurus* ‘*engelhardti*’, the original type species of *Plateosaurus* described by von Meyer (1837), is very uninformative and lacks too many diagnostic features to differentiate it from other specimens (for more details, see Regalado Fernández & Werneburg 2022). Additional skeletons referred to as *Pl.* ‘*engelhardti*’ were collected by Emil Schutz (1916–1974) in the Klettgau Formation, Switzerland, between 1952 and 1954 (Galton 1986). There are also several remains excavated from the upper part of the Keuper of Lons-le-Saunier (Jura) in France that have not yet been described but have been referred to as *Pl.* ‘*engelhardti*’ (Allain & Pereda Suberbiola 2003). Nonetheless, in 2019, the ICZN designated *Pl. trossingensis* Fraas, 1913 (species 8 in Fig. 3) as the type species of the genus *Plateosaurus*, the holotype of which is the almost complete skeleton SMNS 13200 from the Trossingen quarry (Galton 2012, 2013; Sues 2013; ICZN 2019). This action effectively resolved the issue of having uninformative syntypes. As *Plateosaurus trossingensis* was previously considered by Galton (2001a) to be a junior synonym of *Pl. longiceps* Jaekel, 1913, a reassessment of the status of all the other material previously referred to as *Pl. longiceps* is needed (Schaffer & Schoch 2022). A review of *Pl. trossingensis* and *Pl.* ‘*engelhardti*’ in the literature can be found in Regalado Fernández & Werneburg (2022).

Generally, when the features in type material are considered non-diagnostic, nomina dubia are produced as a way to set aside the previous taxonomy and allow for a new taxonomy that focuses on more complete material (Mones 1989). The holotypes in the Tübingen collection correspond to *Plateosaurus*



**Fig. 3.** Timeline showing changes in the taxonomic placement of the specimens of early-diverging sauropodomorphs considered to be *Plateosaurus* Meyer, 1837 from 1900 to 2004. This timeline considers only papers discussing taxonomy and papers describing and naming new species. Lines indicate continuity or change in specimen composition of species across revisions. Arrows outside the timeline indicate that the taxa were named before 1900 and/or are still valid after 2004. When more lines depart from one node, part of the specimens included in that species were referred to as different species. Lines converging in one node indicate that the specimens were lumped together into the species in the node. Stars at the end of a line indicate that in the taxonomic revision, the name became either a nomen dubium or a nomen nudum. Lines continuing after this point indicate that the specimens were referred to the new node. This timeline does not include specimens removed from the genus *Plateosaurus*, namely *Efraasia* (von Huene, 1907–1908), *Ruehleia* Galton, 2001, *Camelotia* Galton, 1985 and *Tuebingosaurus* Regalado Fernández & Werneburg, 2022. The green lines correspond to species that have been synonymized with *Pl. trossingensis* Fraas, 1913, and the blue lines correspond to those that have been synonymized with *Pl. gracilis* (von Huene, 1905). The orange-red lines refer to species removed from Sauropodomorpha Huene, 1932 altogether. Changes after 2004 are discussed in the text.

‘*quenstedti*’ von Huene, 1908 (species 3 in Fig. 3), *Gresslyosaurus* ‘*robustus*’ von Huene, 1905 (species 11 in Fig. 3), ‘*Pachysaurus ajax*’ von Huene, 1905 (species 12 in Fig. 3), ‘*Pachysaurus giganteus*’ von Huene, 1932 (species 13 in Fig. 3), ‘*Pachysaurus magnus*’ von Huene, 1905 (species 15 in Fig. 3), and ‘*Pachysaurus wetzeli*’ von Huene, 1932 (species 16 in Fig. 3), and several specimens referred to these species (Appendix 1).

Currently, there are three species of *Plateosaurus* considered valid in the literature:

1. *Plateosaurus trossingensis* (species 8 in Fig. 3).
2. *Plateosaurus longiceps* (species 7 in Fig. 3).
3. *Plateosaurus gracilis* (species 20 in Fig. 3).

### Geological outline

The stratigraphic framework used in this paper (Fig. 2) is a synthesis of the sedimentological and geological reconstructions proposed in the literature (Hungerbühler 1998; Eetzold & Schweizer 2005; Geyer & Gwinner 2011; Lucas *et al.* 2012; Jordan *et al.* 2016; Franz *et al.* 2018). The German Trias Supergroup is a lithostratigraphic unit deposited during the Triassic period and consists of three subunits: Buntsandstein (oldest), Muschelkalk and Keuper (youngest). Before the new formal subdivisions of the Triassic were established in 1985, these units were used as part of the geological scale, and it is not always possible to determine whether a reference in the literature pertains to a temporal or a stratigraphic definition. The Triassic layers in the German Trias Supergroup were deposited in a basin that covered most of Europe: the Buntsandstein comprises mostly continental facies, the Muschelkalk consists exclusively of marine facies, and the Keuper has been described as a more transitional facies. The Keuper is further subdivided into three units: the lower Keuper (*Unterkeuper*, I.K. in Fig. 2), the middle Keuper (*Mittlerer Keuper*, Fig. 2) and the upper Keuper (*Oberer Keuper*, Fig. 2).

The lower Keuper (also known as *Kohlenkeuper* or *Lettenkohle*) is a continental facies consisting of greyish clays intercalated with coloured sandstone and dolomitic limestone. The lower Keuper corresponds to the Erfurt Formation (Nitsch & Hagdorn 2015; Franz *et al.* 2018). The type material of *Zanclodon* comes from the Erfurt Formation. It has been identified as a maxilla from an early-branching archosauromorph (number 1 in Fig. 2) that lived before the Carnian – currently proposed as the origin age of dinosaurs (Benton *et al.* 2018; Bernardi *et al.* 2018).

The middle Keuper (*Hauptkeuper* or *Gipskeuper*) overlays the Erfurt Formation and is the largest unit of the Keuper consisting of a series of marls, gypsum and dolomite. The lowest part (Grabfeld Formation) is, in a strict sense, the Gipskeuper and shows the most continental part of the series, as it consists of cyclic deposits of mudstones and evaporites. The Grabfeld Formation has been proposed to correspond to the upper Ladinian and lower Carnian. The Stuttgart Formation overlies it in a disconformity that occupies the rest of the lower Carnian. It is mainly a sequence of fluvial and lacustrine sediments dated to the middle Carnian. It is then overlain by the Weser Formation, which interlocks with the Steigerwald, Hassberge and Mainhardt formations. These three units correspond to the upper part of the Carnian. Finally, overlaying these continental sequences, we have the Arnstadt Formation and the Löwenstein Formation, dated to the middle Norian (Fig. 2).

The Arnstadt Formation corresponds to sediments deposited in a sporadically flooded basin and is rich in paleosoils and limestones that indicate long periods of aridity. The sauropodomorph material recovered from this lithostratigraphic unit corresponds to *Ruehleia* Galton, 2001, collected from the Großer Gleichberg near Römhild in Thuringia (number 2 in Fig. 2). The syntype of *Pl.* ‘*engelhardti*’ (species 1 in Fig. 3), the original type species of the genus *Plateosaurus* (von Meyer 1837), consists of a few remains of several individuals collected from the *Plateosaurus*-Konglomerat beds, also known as the “*Zanclodon*”-Breccia, of the Feuerletten outcrop (number 3 in Fig. 2) near Heroldsberg, Nuremberg, within the cultural region of Franconia, Bavaria, Germany (von Meyer 1839, 1855; von Huene 1907; Urlichs 1966; Glut 1997; Galton 2000). The syntype material is currently housed in the University Friedrich-Alexander-Erlangen-Nürnberg – Institute for Geology and Mineralogy, Germany, and includes



two dorsal vertebrae, a sacrum with three vertebrae, a couple of caudal vertebrae, the distal part of the femur and part of a metatarsal (Galton 2000). Other findings from Franconia, including the complete skeleton deposited in the Bavarian State Collection for Paleontology and Geology (BSP 1962 I 153), were also referred to as *Pl. 'engelhardti'* (Wellnhofer 1993; Moser 2003) (number 3 in Fig. 2).

The Löwenstein Formation consists of light-coloured sandstones with alternate layers of conglomerate. This is the stratigraphic level where sauropodomorphs first appear in the German Trias Supergroup (Fig. 2). From the locality of Untere Mühle comes the material currently referred to as *Efraasia* (von Huene, 1907–1908) (Galton 1973; Galton & Bakker 1985; Yates 2003) and the type material of *Plateosaurus gracilis* (Hungerbühler 1998; Galton 2001c; Yates 2003) (number 4 in Fig. 2). The type material of *Teratosaurus suevicus* Mayer, 1861, which is currently considered a rauisuchian maxilla, also comes from the Löwenstein Formation (number 5 in Fig. 2). According to Hungerbühler (1998), the Aixheim specimens, known as the “*Zanclodon*” complex, were acquired before 1889 by Friedrich August von Quenstedt (1809–1889) (number 6 in Fig. 2), and may correspond to the oldest material in the Palaeontological Collection in Tübingen. This material includes elements from the manus and pes and several vertebrae (see Before 1850 in the Results section). From sandstones in the Löwenstein Formation come the specimen with the historical number “GPIT 18392” (number 7 in Fig. 2) and the specimens “GPIT 18064” and “GPIT 18318a” (number 8 in Fig. 2). However, due to the unclear boundary between the Löwenstein and Trossingen formations, there is a possibility that these specimens might come from the lowest part of the Trossingen Formation instead. Overlaying the Löwenstein Formation is the Trossingen Formation, which interlocks with the Arnstadt Formation as well. The Trossingen Formation is a uniform sequence of brown to red mudstones that are interspersed with limestone nodules – this is the reason why the Trossingen Formation is also recognized as the Knollenmergel, the nodular marl. It has been suggested that the Trossingen Formation corresponds to the Sevatian age of the German Basin system (Kozur & Weems 2010).

Most of the specimens in the collection came from the expedition led by von Huene in 1922–1923 to the Obere Mühle’s outcrop of the Trossingen Formation, near the city of Trossingen (label k in Fig. 1 and numbers 9–10 in Fig. 2). From the lower layer come the specimens historically referred to as “GPIT I”, “GPIT II”, “GPIT IV” (number 9 in Fig. 2, labelled as *Tuebingosaurus*) and “GPIT VI”, but it also includes the specimen AMNH FARB 6810 (number 9 in Fig. 2). “GPIT I”, “GPIT II” (a composite), and “GPIT VI” were interpreted by von Huene as having a gracile morphotype (number 9 in Fig. 2). From the upper layer, the *Obere Saurierschicht*, we have the specimens historically referred to as “GPIT E”, “GPIT III” and “GPIT V”, which are of a somewhat robust morphotype (number 10 in Fig. 2). The species, *Pl. longiceps*, includes the holotype with a complete skull deposited in the Museum of Natural History Berlin (MB.R.1937) from the Bäracke-Limpricht brick-clay (upper part of the Trossingen Formation) from the city of Halberstadt, Saxony-Anhalt, Germany (Galton 2001a) (number 12 in Fig. 2), along with several skeletons (about 13) from the same quarry that are considered to be hypodigms (Galton 2001b). Nevertheless, the name *Pl. longiceps* has been applied to several other skeletons, extending its stratigraphic range. This includes several skeletons obtained from the Upper Stubensandstein from Trossingen (von Huene 1932; Galton 1984a, 1985b, 1990, 2001c), several skeletons collected from the Knollenmergel from Trossingen, Tübingen and Stuttgart (von Huene 1907; Galton 1984b, 1985a, 2001a), and several skeletons collected from the Obere Bunte Mergel of Frick (Galton 1986, 2001a; Sander 1992). Outside of Germany, the name *Pl. longiceps* has been given to skeletons from Fleming Fjord Formation of Jameson Land, Greenland (Jenkins *et al.* 1994; Galton 2001a), and also to several skeletons from Saint-Nicolas-de-Port (Meurthe-et-Moselle), Violot (Haute-Marne), Le Chapoux (Ain), and Lons-le-Saunier (Jury) in France (von Huene 1907; Cuny & Mazin 1993; Galton 1998, 2001a, 2001b; Allain & Pereda Suberbiola 2003).

The end of the Keuper is the Exter Formation, which overlays the Arnstadt and Trossingen formations on a disconformity. The Exter Formation primarily consists of clastic clay, silt, and sandstone with alternate carbonates and has been reconstructed as a deltaic basin deposited during the Rhaetian. The specimen of *Gresslyosaurus* ‘*robustus*’ was discovered near Bebenhausen (label d in Fig. 1), a small suburb of Tübingen. Although it has been considered coetaneous to the middle Keuper, recent sedimentological surveys indicate that some exposures correspond to the Rhaetic Sandstone (Tübinger Sandstein), which may correspond to fragments of the Exter Formation (Clemens & Martin 2014). *Plateosaurus* ‘*quenstedti*’ and ‘*Pachysaurus magnus*’ were discovered in the vicinity of Tübingen, near the town of Pfrondorf (label c in Fig. 1), but probably not as part of one assemblage (number 13 in Fig. 2); the bones referred to as *Pl.* ‘*quenstedti*’ correspond with a gracile morphotype (number 13 in Fig. 2) and those referred to as ‘*Pa. magnus*’ are from robust morphotypes (number 13 in Fig. 2). Possibly, the geologically youngest specimen is ‘*Pa. ajax*’ (historically referred to as “GPIT C”/“GPIT VII”, see Table 1) (number 14 in Fig. 2). Finally, from the Exter Formation, there is only one report of sauropodomorph material, a partial femur, initially identified as “*Zanclodon*” *laevis* and currently referred to as *Plateosaurus* sp. (Barth *et al.* 2014) (number 15 in Fig. 2).

### Outline of taxonomic traditions

Alpha taxonomy is defined as the branch of taxonomy concerned with the discovery, description and naming of species and genera based on morphology (Turrill 1938), and was later expanded to encompass any attempt to delineate and delimit species and subspecies (Steyskal 1965). Beta taxonomy (systematics), on the other hand, involves a phylogenetic reconstruction to understand the evolutionary history of species and produce a hierarchical arrangement (Mayr 1968). The taxonomy of early-diverging sauropodomorphs from Europe, which spans more than a century, reflects the different frameworks used to develop taxonomic opinions. The system developed by von Huene (Taxonomy 1 in Fig. 4) is consistent with what is known as alpha taxonomy based solely on morphology. In contrast, the system that originated in the late 20<sup>th</sup> century (Taxonomy 2 in Fig. 4) incorporated taphonomy, ecology and physiology, similar to the alpha taxonomy *sensu* Steyskal (1965).

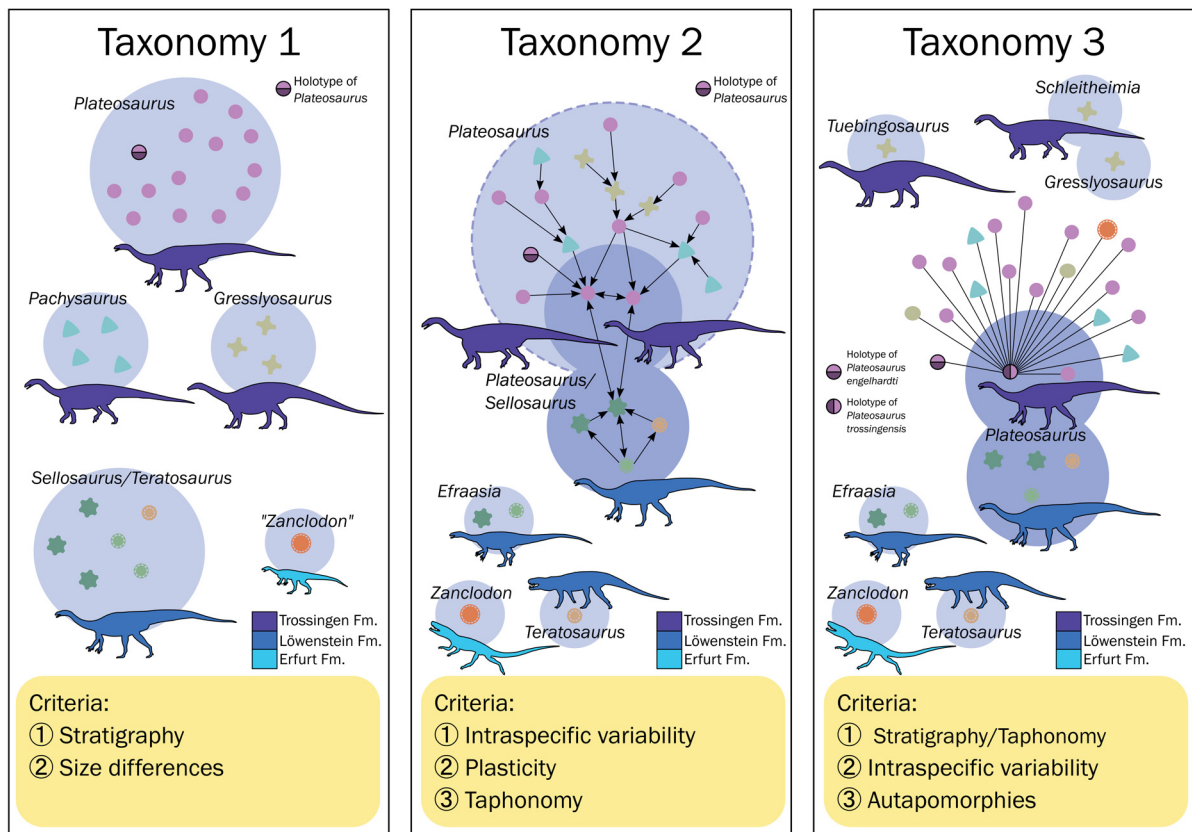
Taxonomy not only provides a description of individuals and their relationships, but also gives us an insight into the historical hypotheses and theoretical frameworks of how the specimens were interpreted. The criteria used by von Huene (1907, 1914, 1915, 1932) to name new species of *Plateosaurus* were morphological and stratigraphic (Fig. 4). In general, von Huene assumed that all the animals died within a short time in mud traps in the desert (Weishampel & Westphal 1986). Therefore, the criteria he used to delineate a species in the first half of the century differed from the biological concept of species established later (Allmon 2013). In the second half of the 20<sup>th</sup> century, the framework changed. The criteria for delineating species became stricter as there was an attempt to align the palaeontological concept of species with the biological one. However, the sauropodomorph assemblages were mainly considered monospecific and deposited simultaneously (Galton 1984, 1985a; Sander 1992). Thus, the two taxonomies are based on different assumptions (Fig. 4). Here, we propose that a new taxonomy for *Plateosaurus* requires a comparison of each specimen with the holotype of the type species *Pl. trossingensis*. A restricted definition of *Pl. trossingensis* has been proposed considering specimens SMNS 13200, GPIT-PV-30784 and AMNH FARB 6810 because they were collected from the same bone bed (Regalado Fernández & Werneburg 2022), and this work aims to provide a catalogue of the specimens that are no longer part of *Plateosaurus*.

The morphotype-based system was employed throughout most of the 20<sup>th</sup> century (Fig. 3). However, at the turn of the 21<sup>st</sup> century, the morphotype variation was interpreted as intraspecific. As a result, species were lumped into fewer species (Fig. 4). Moser (2003) proposed that much of the variation could be explained by diagenetic deformation. In addition, some large morphotypes were enlarged as part of the fossilisation process. For instance, the bones of the holotype of ‘*Pachysaurus wetzeli*’ (GPIT-PV-30788) are estimated to have been enlarged by 25–30% as a result of pedogenesis (Moser 2003: 70). Nevertheless, further studies into the variation of *Plateosaurus* suggested that the different morphotypes could be explained by developmental plasticity (Klein 2004; Sander & Klein 2005; Hofmann & Sander 2014). By 2004,

when the second edition of *The Dinosauria* (Galton & Upchurch 2004) was published, three species were considered valid: *Pl. engelhardti* (species 1 in Fig. 3), now *Pl. trossingensis*, *Pl. longiceps* (species 7 in Fig. 3) and *Pl. gracilis* (species 20 in Fig. 3) (Galton & Upchurch 2004). These names, however, did not include most of the species that were considered as valid during most of the 20<sup>th</sup> century, as most of the specific names were reinterpreted as *nomina dubia* (Galton 2001a) (Fig. 3). In the past decades (2005–today), no new taxonomic revision of *Plateosaurus* has been made, with most of the changes concerning the assignment of specimens to each species (Regalado Fernández & Werneburg 2022).

### Taxonomy 1

The alpha taxonomy developed by von Huene and used for most of the 20<sup>th</sup> century delineated species based on their stratigraphic placement and their morphology (Taxonomy 1 in Fig. 4). According to this alpha taxonomy, the fauna from the Stubensandstein (middle Late Triassic) consisted of small to medium-sized gracile dinosaurs, which was then replaced by the fauna of medium-sized to large robust animals in the Knollenmergel (upper Late Triassic). The Stubensandstein genera were ‘*Sellosaurus*’, ‘*Teratosaurus*’ and ‘*Zanclodon*’; the Knollenmergel genera included *Plateosaurus* (most gracile), and *Gresslyosaurus*



**Fig. 4.** The history of taxonomy of *Plateosaurus* Meyer, 1837 can be interpreted as having three phases. **Taxonomy 1** took place during most of the 20<sup>th</sup> century and was based on stratigraphy and morphology alone. **Taxonomy 2** was the subsequent revision towards the end of the 20<sup>th</sup> century and turning of the 21<sup>st</sup> century, focusing mainly on considering the limits of intraspecific variability, assuming plasticity and explaining the morphological differences as taphonomic artefacts. **Taxonomy 3** is a proposed new taxonomy that requires each specimen to be compared with the holotype of the type species *Pl. trossingensis* Fraas, 1913, taking into account stratigraphy, intraspecific variability, and autapomorphies. Large blue circles refer to a genus-level determination. Dashed large blue circle refers to a *sensu lato* definition of *Plateosaurus* that includes several *nomina dubia* as synonyms. Small geometric shapes represent different species within the genera. Edges represent comparisons.

and ‘*Pachysaurus*’ (most robust). Differences between specimens were later used to delineate species within the genera, with the disadvantage that ontogenetic differences were likely obscured by being in separate genera.

### Taxonomy 2

The second alpha taxonomy (Taxonomy 2 in Fig. 4) attempted to delineate species within a new framework, assuming that specimens were representatives of a synchronic deposit of animals. Thus, most of the differences between specimens were explained as intraspecific variability. Within this framework, the syntypes of *Pl. ‘engelhardti’*, likely an assemblage of different individuals, were considered uninformative. However, the stability of *Plateosaurus* was kept long enough so that more complete individuals were available for comparison. Thus, the alpha taxonomy relied on the more complete skeletal remains to describe *Plateosaurus*. In Taxonomy 2, two opinions were held: 1) that only the more complete specimens represented valid species, with some of the less complete specimens considered either junior synonyms or nomina dubia, 2) that most of the European sauropodomorph remains belonged to the same species and the differences were explained by either diagenetic processes (Moser 2003) or phenotypic plasticity. This second opinion was employed through most of the recent literature, mostly because of the discovery of several skeletal remains of *Plateosaurus* in 1932 that were interpreted as a population (Weishampel 1984; Schoch 2011); nevertheless, this opinion was also extended to the specimens that were considered nomina dubia and shelved, including those referring to large morphotypes in von Huene’s taxonomy. It is worth noting that, before this second opinion was widespread, several specimens were removed from the *Plateosaurus* pool into new genera: *Efraasia*, from the Stubensandstein, and *Ruehleia*, from the Arnstadt Formation (Fig. 2).

### Taxonomy 3

Recent developments in our understanding of the Late Triassic of Europe necessitate the development of a new alpha taxonomy that delineates species in a way in which variability is consistent with the information on development, palaeoecology, and physiology derived from Taxonomy 2. In the case of *Issi* Beccari *et al.*, 2021, the specimens were originally assigned to the genus *Plateosaurus* without erecting new species; in the case of *Schleithemia* Rauhut *et al.*, 2020, *Gresslyosaurus* and *Tuebingosaurus* Regalado Fernández & Werneburg, 2022, the new species were recognized after they were compared against the new type species of *Plateosaurus* that was designated in 2019 (ICZN 2019). In accordance with the taxonomy of von Huene (1905, 1907, 1914, 1915, 1932), all specimens referred to as *Gresslyosaurus* and ‘*Pachysaurus*’ are robust animals when compared to *Plateosaurus ‘erlenbergiensis’* (species 2 in Fig. 3) and *Pl. ‘quenstedti’* (species 3 in Fig. 3). Following this approach, the specimen referred to as *Gresslyosaurus ‘plieningeri’* (GPIT-PV-30787) (species 17 in Fig. 3) has been designated the holotype of *Tuebingosaurus maierfritzorum* Regalado Fernández & Werneburg, 2022, because its anatomy more closely resembles a massopodan than *Plateosaurus* (Regalado Fernández & Werneburg 2022). Similarly, some of the Klettgau Formation material formerly considered to be *Gresslyosaurus* (Galton 1986) has been reassessed as a distinctive species of robust sauropodiform sauropodomorph, named *Schleithemia schutzi* Rauhut *et al.*, 2020. In contrast, the material from Jameson Land, Greenland, more gracile and previously referred to as *Plateosaurus* (Clemmensen *et al.* 2016; Marzola *et al.* 2018), has been recognized as a new species of plateosaurid, named *Issi saaneq* Beccari *et al.*, 2021.

## Material and methods

The specimens cited are housed in the following collections:

- AMNH = American Museum of Natural History, New York, USA
- BSP = Bavarian State Collection for Paleontology and Geology, Munich, Germany
- GPIT = Palaeontological Collection of Tübingen, Tübingen, Germany
- MB = Natural History Museum, Berlin, Germany
- NHMUK = Natural History Museum, London, United Kingdom
- SMNS = State Museum of Natural History Stuttgart, Stuttgart, Germany

### Collection catalogue

In the literature on the taxonomy of *Plateosaurus*, it is common to find catalogue numbers with the acronym GPIT, referring to the old name of the collection's institute, *Geologisches und Paläontologisches Institut Tübingen*, followed by either a letter or a number (in either Arabic or Roman numerals) (e.g., Galton 2001a). While we use these historical numbers to facilitate reading and to itemize various specimens alongside their new catalogue numbers, we strongly encourage both readers and future researchers to adopt and employ these new GPIT numbers.

Galton (2001a, 2001b) listed the specimens referred to as *Plateosaurus* in the collection using the alphanumeric system. The numbers ranged from “GPIT A” to “GPIT E” for specimens stored in the basement of the collection (known as the Neuer Compactus), and from “GPIT I” to “GPIT VII” for the skeletons on display in the Plateosaurus Hall in the museum exhibition in the Palaeontological Collection of the University of Tübingen. Likewise, Hungerbühler (1998) used a similar system to describe the taxonomy of *Plateosaurus* (= ‘*Sellosaurus*’), with the annotations “Aixheim” (treated as a specimen number), “GPIT 18064”, “GPIT 18392”, and “GPIT 18318a”. Table 1 summarises the corresponding historical numbers, taxonomic treatment, and taxonomic status of the specimens proposed in this paper. For this review, we are using von Huene's (1907, 1915) system to catalogue the collection, as the documentary evidence of the Palaeontological Collection from the 19<sup>th</sup> century was still available when von Huene erected new sauropodomorph species. The plates with reconstructions of sauropodomorphs in von Huene (1907) also include information not detailed in the rest of the publication, such as shaded bones representing elements in the collection. These reconstruction plates were redrawn and used in some of the following figures. Photographs of the specimens were taken by the authors. The human skeleton was drawn by Mariana Ruiz Villarreal (public domain), depicting a height of 1.75 m, in the same scale as given by von Huene (1907).

As Galton (2001a) reported, several specimens and most documentary evidence from the collection have been lost. Currently, we are only left with the old catalogue of the Palaeontological Collection of Tübingen (PV, short for Tübinger Petrefactenverzeichnis, meaning ‘inventory of the fossils’; these inventory books are stored in the University Archive Tübingen, inventory number: UAT 678/75), with entries matching some numbers written directly on the bones, and the illustrated old monographs written by Quenstedt. The additional evidence that is now lost was available to von Huene, and some of it was incorporated into von Huene's (1907, 1932) catalogues. In this work, we use von Huene's system to organise the text and correlate it with what was reported by Galton (2001a, 2001b).

The complex history of the Palaeontological Collection has generated several overlapping numbering systems. Skeletal numbers refer to material documented or assumed to belong to one individual. Bone specimen numbers refer to individual elements, either complete bones, fragmentary remains, or bone assemblages; sometimes, these numbers refer either to publications that did not use the whole individual or were given because the elements were removed from their original context.

### Preservation

To describe the preservation of the material, we use the same scale that Moser (2003: fig. 18) employed to describe the bones from Ellingen (Table 2). Moser (2003) suggested that some of the bones collected from the Knollenmergel, such as historical specimen “GPIT V”, look blown up, a phenomenon that did not happen in Ellingen. The interpretation that the bones in the collection have expanded due to diagenetic processes has been applied to several specimens in the GPIT Collection. In the following sections, we discuss the preservation and re-evaluate the possibility that the large sizes are caused by diagenetic processes.

**Table 2.** Summary of the different types of preservations influenced by carbonate paedogenesis as outlined in Moser (2003).

Type	Structure of the bone	Diagenesis	Deformation
1	Cortical bone: flaked and crumbly, loosened and rounded. Medullary cavity: broken, intruded by fragments of cortical bone.	Damage due to compression by load, biotic damage, and/or chemical dissolution. Carbonate encrustations are common on the cortical bone and dissolved cavities.	None or widespread compression deformation.
2	Cortical bone: well preserved, with minor cracks.	Pores and cavities are infilled with carbonates – small carbonate incrustations in the cortical bone.	Unevenly deformed by compression (compressive and paedogenic).
3	Cortical bone: single and irregular cracks formed by concretions growing in the medullary cavity. Medullary cavity: deformed by concretions.	Bones are structurally broken down into a small mosaic of fragments surrounded by carbonate nodules.	In some places, the concretions grow outwards, deforming the bones. Some deformation is due to compression.
4	Bone looks like dark spots that are widely scattered and out of place.	Chemically dissolved, partially or entirely, bone fragments surrounded by carbonate matrix.	Protuberances and large cracks usually deform the cortical surface. Adjacent bones fused inside the same concretion and cannot be separated. Most of the deformation is paedogenic.

## Results

### *Tübingen sauropodomorph collection*

This section contains a detailed examination and cataloguing of the Tübingen sauropodomorph collection. The material is presented in chronological order based on the year it was discovered.

The dates provided in this chronology were obtained by cross-referencing various sources. While the specimens collected during the 19<sup>th</sup> century have entry numbers in the Tübinger Petrefactenverzeichnis (PV), these numbers are not consistently accompanied by dates. Several well-studied specimens in the collection were used to reconstruct a timeline of the collection prior to von Huene’s (1907) account. The old catalogue number PV 8511 (*Cycnorhamphus suevicus* Quenstedt, 1855) was described in Quenstedt (1855); the old catalogue number PV 9855 (*Teleosaurus* Geoffroy, 1825), a 55 foot long specimen currently lost, is reported to be mounted in 1860. The publications on the material tend not to have details on where and when the specimens were collected, and the publications do not match the chronological entry numbers. For instance, PV 8339 (“*Ichthyosaurus*” *posthumus* Wagner, 1852) was published in Quenstedt (1852), and PV 98775 (*Ichthyosaurus* De la Beche & Conybeare, 1821 with embryos, currently on display) was published in Quenstedt (1867). However, we are confident that the sauropodomorph material with old numbers PV 8157–8163 (GPIT-PV-60160, 60272, 60255, 60341) was already in the collection by 1855.

Regarding the material on display in the Plateosaurus Hall, there is documentation that the specimens were collected between 1921 and 1923 (Reinacher 2021). However, Prieto-Márquez & Norell (2011) write that the specimen in the AMNH was collected on July 1925 by von Huene. We do not have evidence of an expedition carried out during 1925 that produced sauropodomorph material. Prieto-Márquez & Norell (2011: 8) state that “The specimen [AMNH FARB 6810] is still on display in the David H. Koch Hall of Saurischian Dinosaurs at the American Museum of Natural History, with a cast skull based on the now disarticulated remains. The other specimen collected by von Huene is one of two specimens on display

at the Institute for Geosciences of the Eberhard-Karls-University Tübingen, Germany.” To the best of our knowledge, the specimens on display were excavated between 1921 and 1923.

### Middle of the 19<sup>th</sup> century: Aixheim complex

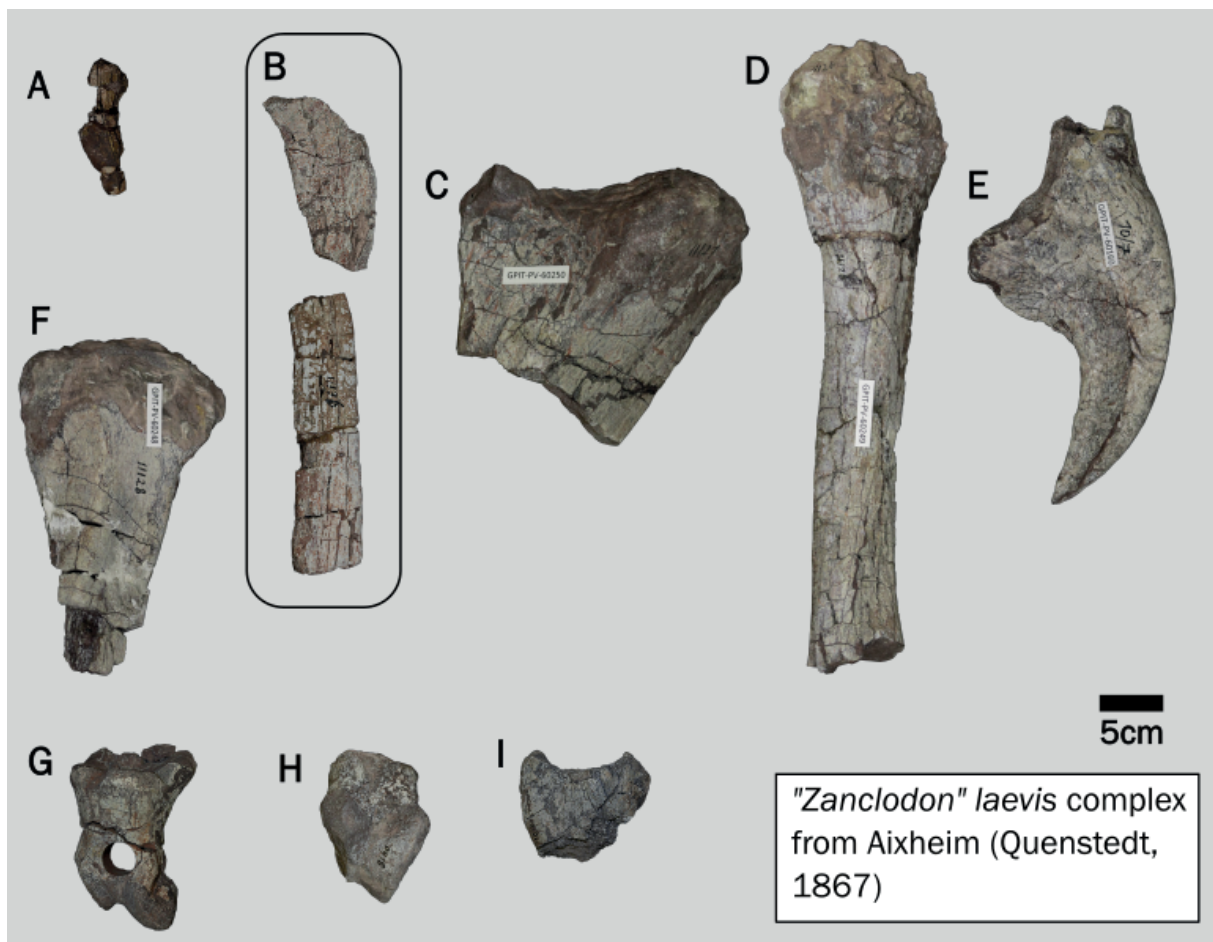
label a in Fig. 1, number 6 in Fig. 2, Fig. 5

#### Bone specimens

GPIT-PV-60160 (Fig. 5E), GPIT-PV-60248 to GPIT-PV-60250 (Fig. 5C–D, F), GPIT-PV-60255 (Fig. 5H), GPIT-PV-60259 (Fig. 5B), GPIT-PV-60272 (Fig. 5G), GPIT-PV-60340 (Fig. 5A), GPIT-PV-60341 (Fig. 5I).

#### Palaeohistological sample

GPIT-PV-111901, obtained from GPIT-PV-60272 by Nicole Klein in 2003 (Klein 2004: fig. 14i).



**Fig. 5.** Material from Aixheim collected in the mid-19<sup>th</sup> century. **A.** GPIT-PV-60340, tooth. **B.** GPIT-PV-60259, fragments of thoracic ribs. **C.** GPIT-PV-60250, proximal end of ulna. **D.** GPIT-PV-60249, incomplete right radius. **E.** GPIT-PV-60160, putative manual ungual I.2. **F.** GPIT-PV-60248, distal end of a fibula. **G.** GPIT-PV-60272, putative pedal phalanx (sample GPIT-PV-111901 comes from this specimen). **H.** GPIT-PV-60255, fragment of potentially a pedal phalanx. **I.** GPIT-PV-60341, proximal portion of putative pedal ungual. Photos taken by the authors on the views that have either been illustrated or that show catalogue numbers.

### Taxonomic history

The old catalogue of the Palaeontological Collection of Tübingen (PV) indicates that the older entries were collected from Aixheim, 60 km southwest of Tübingen, and were already available for study in the 1850s. The material collected from Aixheim was identified by Quenstedt (1856: 38–39) as “*Zanclodon*” *laevis* (label a in Fig. 1, number 6 in Fig. 2). A fragmentary tooth (GPIT-PV-60340, Fig. 5H) is also part of this collection, as the reference to “*Zanclodon*” was done based on comparing the tooth morphology with the descriptions in Plieninger (1846a) (Anonymous 1847). A claw (GPIT-PV-60160, Fig. 5E) was illustrated as part of the material referred to as ‘*Pachysaurus*’ sp. (von Huene 1907), suggesting that there was documentary evidence at the time that it belonged to the “Aixheim specimen”. Von Huene (1907) compared the morphology of the ulna (GPIT-PV-60250) to the material from Jäcklinge, namely *Pl. ‘quenstedti’* (species 3 in Fig. 3), and the material from Wüstenroth, namely ‘*Pa. ajax*’ (species 12 in Fig. 3), but he defined the material as indeterminate remains of *Pachysaurus*.

### Description

According to von Huene (1907: 154–155, pl. 10 fig. 6), the assemblage included a cervical rib (currently lost), part of a thoracic rib, the distal end of a radius, the proximal end of a right ulna, two manual phalanges and two claws. The specimens that form part of the Aixheim complex are associated to low old PV catalogue numbers, namely: PV 11126 (GPIT-PV-60249, Fig. 5D), PV 11127 (GPIT-PV-60255, Fig. 5H) and PV 11136 (GPIT-PV-60259, Fig. 5B). Von Huene did not illustrate specimen PV 11128 (GPIT-PV-60248, Fig. 5F), putatively the distal end of a left fibula, but based on the other numbers in the catalogue, this specimen belonged to the material from Aixheim that Quenstedt (1867) referred to as the “*Zanclodon*” *laevis* complex.

The radius (GPIT-PV-60249) is very deformed towards the distal end, and the bone is damaged. The proximal end of the ulna (GPIT-PV-60250) is quite robust, and the overall proximal shape has a transversely expanded lateral outline with a marked radial fossa; the cortical bone is flaked, and the medial border was broken before diagenetic mineralisation, but there are no signs of deformation. The claw (GPIT-PV-60160) is also quite large, and due to its curvature, it is interpreted as the largest manual ungual in a sauropodomorph manus (ungual I).

### Preservation

All of the material we have associated with this Aixheim complex has a similar preservation, type 1 or 2, with few cracks on the pale grey-purplish cortical bone. The interior portion of the bone has a reddish-brownish colour and, based on the sample taken from the putative pedal phalanx (GPIT-PV-60272), the microstructure is well preserved in the material.

### Stratigraphic level

The only information available regarding the stratigraphy of the material is given in von Huene (1907: 154), and it is only mentioned that the material was found in the Knollenmergel (number 6 in Fig. 2).

### Status

The specimens cannot be unequivocally defined as part of one individual. Von Huene (1907) did not include all the elements from this complex as part of ‘*Pachysaurus*’. The association of this material with the genera *Pachysaurus* is hereby rejected, and this material is removed from *Zanclodon*, that should be restricted to early-diverging archosauromorph material.





**Fig. 6.** “GPIT A” and “GPIT D” mounted by von Huene in 1901, in right anterolateral view. The mount, which for reference has the number GPIT-PV-60296, was disassembled in the second half of the 20<sup>th</sup> century. Photo from University Archive Tübingen, catalogue number of the photo: UAT 678/73; background changed by the authors.

**Years 1864–1865: Pfrondorf complex (historical numbers “GPIT A” and “GPIT D”)**  
label c in Fig. 1, number 13 in Fig. 2, Figs 6–8

**Historical numbers**

GPIT A (Fig. 7), GPIT D (Fig. 8).

**Bone specimens**

GPIT-PV-60150, GPIT-PV-60151, GPIT-PV-60152, GPIT-PV-60155, GPIT-PV-60162, GPIT-PV-60164, GPIT-PV-60168 (type material of *Plateosaurus ‘quenstedti’*, illustrated by Quenstedt (1867, 1885)); GPIT-PV-60153, GPIT-PV-60154, GPIT-PV-60156 to GPIT-PV-60159, GPIT-PV-60161, GPIT-PV-60163, GPIT-PV-60165, GPIT-PV-60170 to GPIT-PV-60172 (material referred to as *Pl. ‘quenstedti’* by von Huene (1907) collected from Jäcklinge, Pfrondorf); GPIT-PV-60329 (unpublished material collected from Jäcklinge) [historical number “GPIT A”, Fig. 7]. GPIT-PV-60169, GPIT-PV-60173 to GPIT-PV-60176, GPIT-PV-60310 (type material of *‘Pachysaurus magnus’* collected from Brandklinge, Pfrondorf); GPIT-PV-60166, GPIT-PV-60167, GPIT-PV-60182, GPIT-PV-60291, GPIT-PV-60294, GPIT-PV-60295, GPIT-PV-60298 (material referred to as *‘Pa. magnus’* by von Huene (1907) collected from Brandklinge, Pfrondorf); GPIT-PV-60321 (unpublished material collected from Brandklinge, Pfrondorf) [historical number “GPIT D”, Fig. 8]. Material associated to the locality of Brandklinge but indeterminate: GPIT-PV-60308 (Fig. 8O), half of a centrum and tentatively a fragmentary centrum; GPIT-PV-60273, a caudal centrum.

**Palaeohistological sample**

GPIT-PV-111902 (from a drilling taken by Nicole Klein in 2003 from a phalanx that is currently lost).

**Taxonomic history**

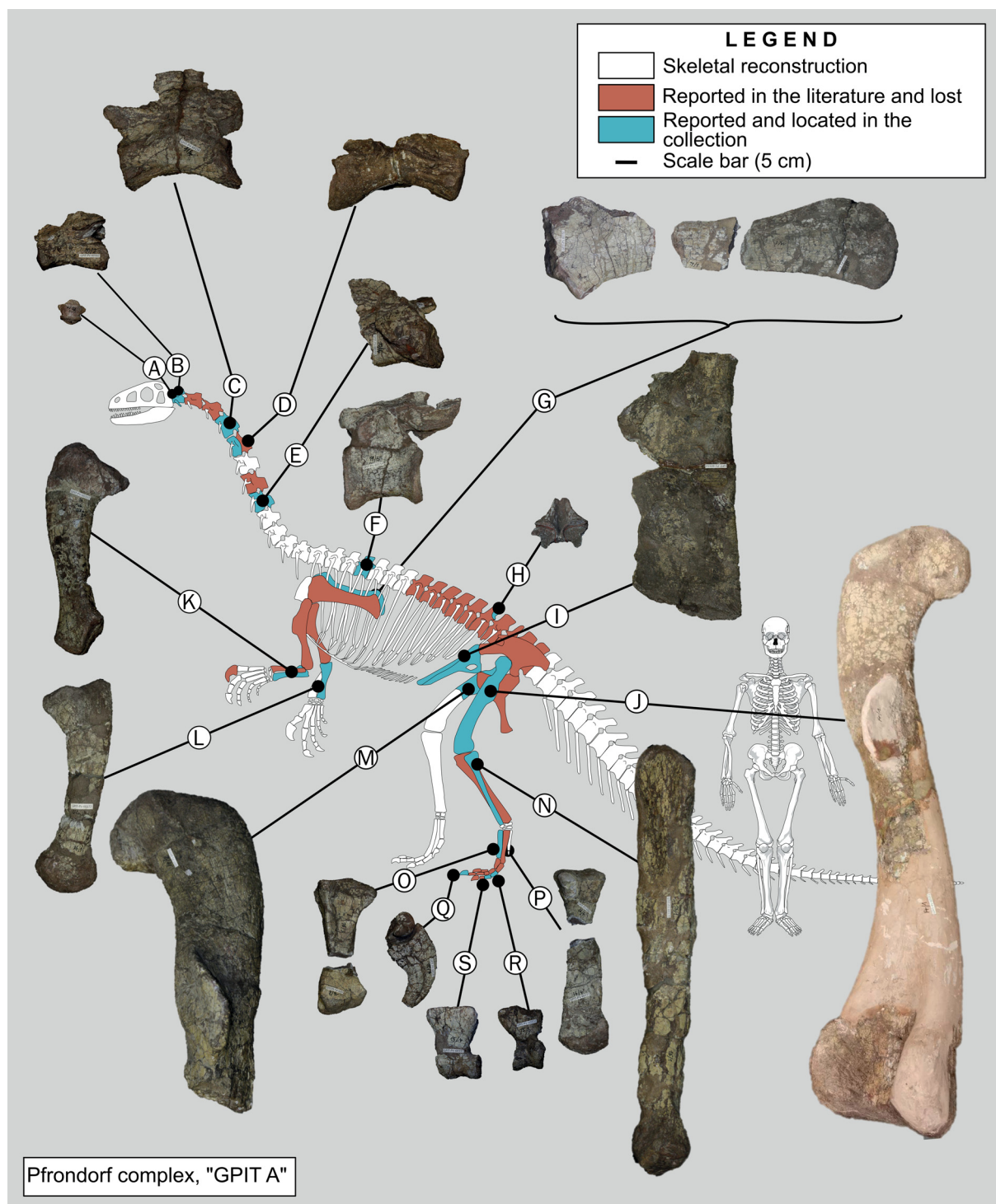
In 1864, Quenstedt’s servant Johann collected material from Brandklinge, a stream near the town of Pfrondorf (label c in Fig. 1) and the material entered the catalogue as “*Zanclodon*” material from Pfrondorf – the old PV catalogue shows the entry for unidentified specimens: “PV 11297 Knochen Brandklinge, Grabung von Johann [im] Herbst 1864”. The specimens from Pfrondorf were collected by two different servants (Johann and Wilhelm), and although they first reported the locality simply as Pfrondorf, they further make a distinction between Jäcklinge and Brandklinge.

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**Fig. 7** (see next page). Holotype of *Plateosaurus ‘quenstedti’* described by von Huene (1907) and illustrated on the reconstruction of *Plateosaurus ‘quenstedti’* redrawn from von Huene (1907: pl. 102). **A.** GPIT-PV-60168, atlas in ventral view. **B.** GPIT-PV-60162, axis in left lateral view. **C.** GPIT-PV-60164, cervical 5 in left lateral view. **D.** GPIT-PV-60156, centrum of putative cervical 6 in right lateral view. **E.** GPIT-PV-60155, partial cervical 8 in left lateral view. **F.** GPIT-PV-60154, anterior dorsal (presumed dorsal 4) in left lateral view. **G.** GPIT-PV-60152, left scapula in medial view. **H.** GPIT-PV-60159, postzygapophyses attached to the prezygapophyses of dorsal vertebra (presumed dorsal 14) in posterior view. **I.** GPIT-PV-60153, right pubis in anterior view. **J.** GPIT-PV-60151, left femur, reconstructed shaft, in posterior view. **K.** GPIT-PV-60172, right ulna in anterolateral view. **L.** GPIT-PV-60163, left ulna in anterolateral view. **M.** GPIT-PV-60150, proximal half of the right femur in posterior view. **N.** GPIT-PV-60170, left fibula in lateral view. **O.** GPIT-PV-60165, proximal and distal ends of metatarsal II in posterior view. **P.** GPIT-PV-60171, proximal and distal ends of metatarsal III in posterior view. **Q.** GPIT-PV-60161, pedal ungual III with distal end of phalanx III.3 in lateral view. **R.** GPIT-PV-60157, phalanx, presumed pedal phalanx IV.2 in dorsal view. **S.** GPIT-PV-60158, phalanx, possibly pedal phalanx IV.3 in dorsal view. The human skeleton represents a height of 1.75 m, as originally drawn by von Huene (1907: pl. 102), the relative size of the reconstructed sauropodomorph is 2 m. Reconstruction and photographs made by the authors, with photos taken on the labelled side or on the side that was illustrated in the past.

The specimens from the “*Zanclodon*” *laevis* complex in Quenstedt (1867, 1885) that were collected from Brandklinge were described and illustrated in von Huene (1907: 59–63, pl. 105) and designated as the type material of ‘*Pa. magnus*’ (Fig. 8), whereas the material from Jächklinge was described as *Pl. ‘quenstedti’* (Fig. 7) (von Huene 1907: 29–42).

The specimen from Jächklinge was then given the number “GPIT A” (‘*Pl. quenstedti*’) and the material collected from Brandklinge was given the number “GPIT D” (‘*Pa. magnus*’) (Galton 2001a, 2001b). Both



names were considered as nomina dubia by Galton (2001a, 2001b), but '*Pa. magnus*' was considered as a subjective synonym of *Pl. trossingensis* (= *Pl. 'engelhardti'*) by Moser (2003) (species 3 and 15 in Fig. 3).

According to von Huene (1907: 29), the two localities are separated by a 20 m distance, which suggests that the type locality is at the confluence of the two streams, Jäcklinge and Brandklinge, and not two separate localities (contra von Huene 1907; Galton 2001a).

### Description

The numbers from PV 10975 to PV 11316 in the old PV catalogue were assigned in 1865, and although the first entries registered the locality as 'Pfrondorf', subsequent numbers differentiate between two localities within Pfrondorf: Jäcklinge, another stream near Pfrondorf (PV 11129 to PV 11140) and Brandklinge (PV 11210 to PV 11316). The distinction may have occurred to distinguish the side of the locality where the specimens were collected. A photograph retrieved from the archives (UAT 678/73, Fig. 6) shows that by 1901 there was a mounted skeleton that included the material outlined above to show the overall size of the dinosaurs that lived in Swabia. However, this reconstruction was intended as a composite. The pelvis and the proximal part of the right femur are illustrated in Quenstedt (1867: pl. 9, 1885: pl. 13), and are part of the Jäcklinge specimen that was considered "the best preserved".

The specimens illustrated as '*Pl. quenstedti*' in von Huene (1907) are a cervical vertebra (GPIT-PV-60156; von Huene 1907: pl. 11 fig. 4; Fig. 7D), a dorsal vertebra (GPIT-PV-60154; von Huene 1907: 32, fig. 18, pl. 11 fig. 5; Fig. 7F), postzygapophyses attached to the prezygapophyses of dorsal vertebra (GPIT-PV-60159; von Huene 1907: 34, fig. 21; Fig. 7H), a right pubis (GPIT-PV-60153; von Huene 1907: pl. 12 fig. 2; Fig. 7I), a left ulna (GPIT-PV-60163; von Huene 1907: 36, figs 23–24; Fig. 7L); a left femur (GPIT-PV-60151; von Huene 1907: pl. 14 fig. 1; Fig. 7J), a right ulna (GPIT-PV-60172; von Huene 1907: 32, fig. 18, pl. 16 fig. 1; Fig. 7K), the left fibula (GPIT-PV-60170; von Huene 1907: pl. 15 fig. 1; Fig. 7N), the proximal and distal parts of metatarsal II (GPIT-PV-60165; von Huene 1907: 41, fig. 28, pl. 16 fig. 3; Fig. 7O), the proximal and distal parts of metatarsal III (GPIT-PV-60171; von Huene 1907: 32, fig. 18, pl. 16 fig. 4; Fig. 7P), pedal ungual III with distal end of phalanx III.3 (GPIT-PV-60161; von Huene 1907: pl. 10 fig. 6a–b; Fig. 7Q), and two left pedal phalanges (GPIT-PV-60158; von Huene 1907: pl. 15 fig. 3; Fig. 7S and GPIT-PV-60157; von Huene 1907: pl. 15 fig. 4; Fig. 7R).

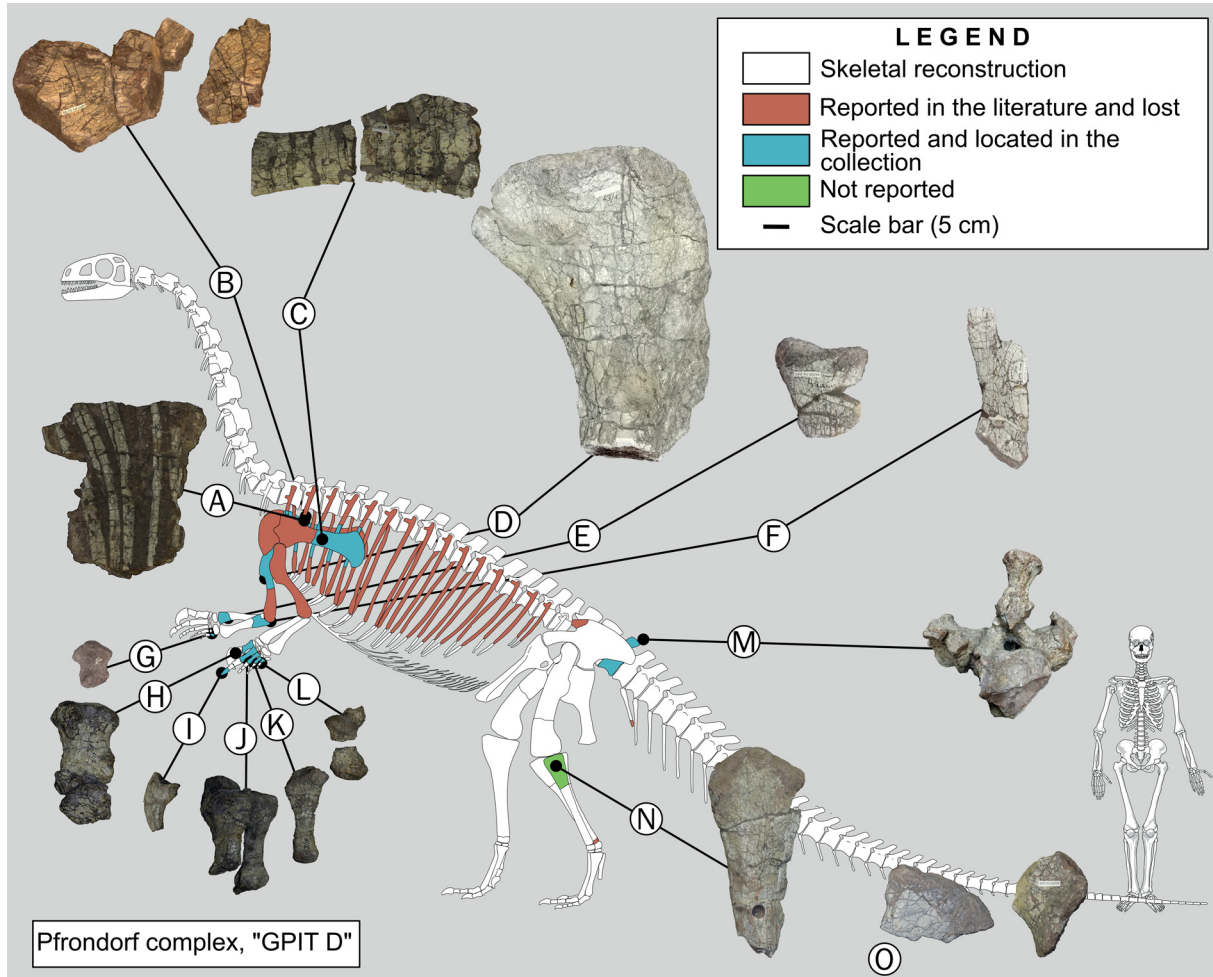
The specimens illustrated as '*Pa. magnus*' include the proximal half of a humerus (GPIT-PV-60182; von Huene 1907: pl. 63 fig. 1; Fig. 8D), a third sacral vertebra (GPIT-PV-60298; von Huene 1907: pl. 60 fig. 1, pl. 61 fig. 1; Fig. 8M), the shaft of the right ulna (GPIT-PV-60295; von Huene 1907: pl. 59 fig. 8; Fig. 8F), and the proximal end of the radius (GPIT-PV-60294; von Huene 1907: pl. 59 fig. 7; Fig. 8E). Specimen GPIT-PV-60169 corresponds to fragments of scapulae: the fragments are illustrated in von Huene (1907: pl. 14) as one scapula, and von Huene (1907: pl. 62) shows additional fragments described in von Huene (1907: 148); the missing fragments complement the located ones.

This composite (Fig. 6) included the following elements: the pubes (left, GPIT-PV-60153, right currently lost; von Huene 1907: pl. 12 figs 2–3), the pelvis (lost; von Huene 1907: pl. 12 fig. 1), five dorsals (lost; von Huene 1907: pl. 12 fig. 1), the proximal part of the left femur (GPIT-PV-60150; von Huene 1907: pl. 14 fig. 2), the partial left femur (GPIT-PV-60151; von Huene 1907: pl. 14 fig. 1), the tibia (lost), the fibula (GPIT-PV-60170; von Huene 1907: pl. 15 fig. 1), the metatarsal II (GPIT-PV-60165; von Huene 1907: pl. 16 fig. 3), the metatarsal III (GPIT-PV-60171; von Huene 1907: pl. 16 fig. 4), phalanx I.1 (GPIT-PV-60158; von Huene 1907: pl. 15 fig. 3), phalanx III.1 (GPIT-PV-60157; von Huene 1907: pl. 15 fig. 4), and abdominal ribs (GPIT-PV-60166, GPIT-PV-60167; von Huene 1907: pl. 10 fig. 5).

### Preservation

The material of "GPIT A" that corresponds to *Pl. 'quenstedti*' has mostly a type 1 preservation, with no evidence of compression or deformation. The bones have been lacquered and have a darker colour, but several elements conserve the original colours expected from the Knollenmergel. The material of

“GPIT D” is mostly type 1 preservation with more prominent cracks. Similarly, some elements have been lacquered, having a darker colour than other elements.



**Fig. 8.** Holotype of ‘*Pachysaurus magnus*’ described by von Huene (1907) and illustrated on the reconstruction of ‘*Pachysaurus ajax*’ redrawn from von Huene (1907: pl. 103). **A.** GPIT-PV-60166, fragments of five putatively thoracic in lateral view. **B.** GPIT-PV-60169, fragments corresponding to the proximal end of the right scapula in medial view. **C.** GPIT-PV-60169, fragments corresponding to the distal end of the left scapula in lateral view. **D.** GPIT-PV-60182, proximal portion of the right humerus in medial view. **E.** GPIT-PV-60294, proximal end of the left radius in medial view. **F.** GPIT-PV-60295, shaft of the left ulna in lateral view. **G.** GPIT-PV-60291, left metacarpal V in ventral view. **H.** GPIT-PV-60176, right metacarpal I with the proximal end of phalanx I.1 in anterior view. **I.** GPIT-PV-60310, left ungual phalanx, possibly from digit II in lateral view. **J.** GPIT-PV-60174, left metacarpal II and metacarpal III fused together in anterior view. **K.** GPIT-PV-60175, left metacarpal IV in anterior view. **L.** GPIT-PV-60173, left metacarpal V with a fragment of phalanx V.1 in anterior view. **M.** GPIT-PV-60298, third sacral vertebra in anterior view. **N.** GPIT-PV-60321, possibly a proximal end of the left fibula, not described by von Huene, in lateral view with a hole drilled for the collection of the palaeohistological sample GPIT-PV-111902. **O.** GPIT-PV-60308, fragments of centra. The human skeleton represents a height of 1.75 m, as originally drawn by von Huene (1907: pl. 103), suggesting the reconstruction represents a 4 metre tall sauropodomorph. Reconstruction and photographs made by the authors, with photos taken on the labelled side or on the side that was illustrated in the past.

### Stratigraphic level

*Plateosaurus* ‘*quenstedti*’ was found in Jäcklinge, whereas ‘*Pa. magnus*’ (number 13 in Fig. 2, species 15 in Fig. 3) was excavated near Brandklinge (label c in Fig. 1). The locality of Jäcklinge/Brandklinge was described as part of the Knollenmergel Member of the Trossingen Formation (upper Norian) (von Huene 1905) (number 13 in Fig. 2).

### Status

The holotype of *Pl.* ‘*quenstedti*’ is likely part of one individual, but most of the skeleton is currently lost (Fig. 7). Some lost material has been cast and stored in the NHMUK (see the Systematic palaeontology section below). The holotype of ‘*Pa. magnus*’ could also be one individual based on the reconstruction by von Huene (1907: pl. 103), which would mean that most of the rib cage is lost (Fig. 6).

### Year 1879: Bebenhausen complex

label d in Fig. 1, number 12 in Fig. 2, Figs 9–10

### Historical number

GPIT B (Fig. 9–10).

### Bone specimens

Historical number “GPIT B” (Fig. 9–10): GPIT-PV-60177 to GPIT-PV-60181, GPIT-PV-60183, GPIT-PV-60184, GPIT-PV-60186 to GPIT-PV-60192, GPIT-PV-60194, GPIT-PV-60195, GPIT-PV-60206 to GPIT-PV-60208, GPIT-PV-60292, GPIT-PV-60309, GPIT-PV-6312 [holotype of *Gresslyosaurus robustus* von Huene (1907), probably belonging to one individual, Fig. 10A–S]; GPIT-PV-60193, GPIT-PV-60258, GPIT-PV-60302 to GPIT-PV-60307, GPIT-PV-60311, GPIT-PV-60313 to GPIT-PV-60318, GPIT-PV-60345 [material with similar preservation to *G. robustus*, but partially undescribed, and probably belonging to another individual, Fig. 10T–AF]. GPIT-PV-60301 [material with similar preservation to *G. robustus* but currently identified as remains of Dinosauria indet. or Sauropodomorpha indet.].

### Taxonomic history

According to von Huene (1907: 127), this material was collected in 1879 in Bebenhausen, 6 km away from the centre of Tübingen (label d in Fig. 1), during the construction of a new road. The forest manager, Tscherning, found several bones and alerted Quenstedt of the find. However, the site was destroyed and the bones were used as track ballast before they were eventually collected. Quenstedt tried to recover as much of the material as possible. Von Huene (1907) referred to the material as *Gresslyosaurus* ‘*robustus*’ (species 11 in Fig. 3), and there are photographs showing that at least the hindlimb was mounted (Fig. 9).

The type species of the genus *Gresslyosaurus* is a set of fragmentary material from Niederschönthal, Switzerland, *Gresslyosaurus ingens* Rüttimeyer, 1856 (species 10 in Fig. 3). Unfortunately, a diagnosis for *Gresslyosaurus* is not given in the literature. However, von Huene (1932: 113) assigned some material collected from Halberstadt to *Gresslyosaurus ingens* based on the following features: 1) the height of the centra of the dorsal series is larger than the length of the centra – a character that varies widely within the dorsal series in the same individual, as in *Ruehleia* (ORRF pers. obs.), 2) the dorsal vertebrae lack a ventral keel – also a widespread character in early-diverging sauropodomorphs, e.g., *Lufengosaurus* Young, 1940 (ORRF pers. obs.), *Jingshanosaurus* Zhang & Yang, 1995 (Wang *et al.* 2019) or *Adeopapposaurus* Martínez, 2009 (Martínez 2009), 3) the vertebra is wedge-shaped, as it is in specimen GPIT-PV-30784, referred to as *Plateosaurus trossingensis* (species 23 in Fig. 3).



**Fig. 9.** The mounted hindlimb of *Gresslyosaurus* Rüttimeyer, 1856 (this mounted specimen has the catalogue number GPIT-PV-60293 for reference). The mount was disassembled in the second half of the 20<sup>th</sup> century. Photo from University Archive Tübingen, catalogue number of the photo: UAT 678/73; background changed by the authors.

In a revised taxonomy, von Huene (1932) considered that *Gresslyosaurus* was a species of theropod (a ‘carnosaur’ belonging to the family Teratosauridae Cope, 1871), thus the type material of *Gresslyosaurus* ‘*robustus*’ was reclassified as *Plateosaurus* ‘*robustus*’, after comparing the type material to specimen GPIT-PV-30786, classified as a sauropodomorph (species 11 in Fig. 3), also see the section on specimen “GPIT III”).

### Description

The type material of *Gresslyosaurus* ‘*robustus*’ has similar proportions to *Pa. magnus* and represents a very robust animal (Fig. 10). Likely, there was evidence at the time that the specimen illustrated as *Gresslyosaurus* ‘*robustus*’ in von Huene (1907: 127–137, pls 54–56) was part of a single individual since in von Huene (1907: 137) he mentioned that some elements belonged to a smaller individual (Fig. 10S–AF), namely fragments of metatarsal II (GPIT-PV-60303, Fig. 10X), and metatarsal IV (GPIT-PV-60305, Fig. 10AA).

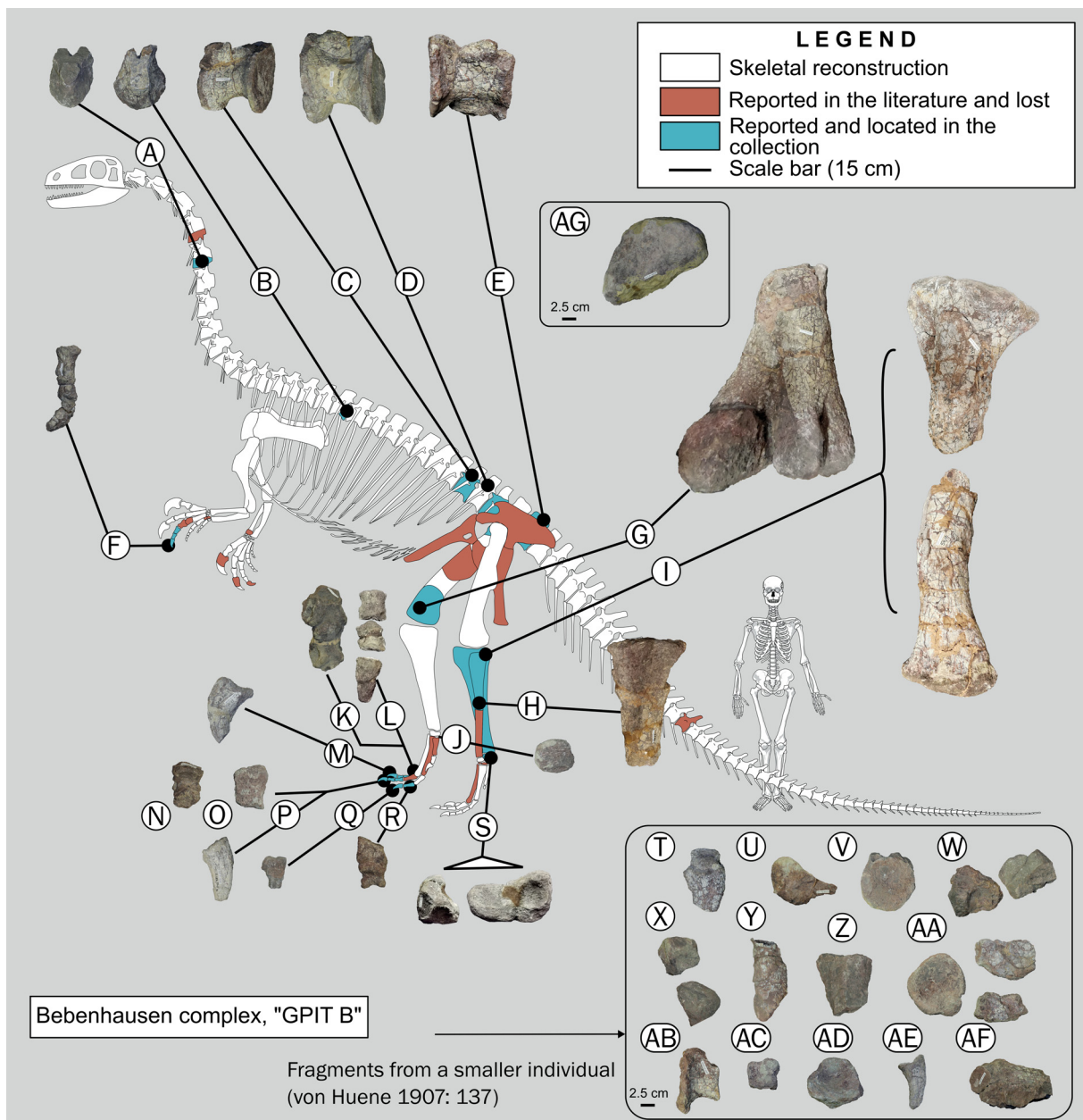
Not everything that von Huene (1907) illustrated has been located in the collection (Fig. 10, in red), with the identified bones being: three dorsal vertebrae (GPIT-PV-60183, labelled as dorsal 13 illustrated by von Huene 1907: 128, fig. 124; Fig. 10C; GPIT-PV-60184, labelled as dorsal 15 illustrated by von Huene 1907: 128, fig. 123; Fig. 10D; and GPIT-PV-60188, illustrated by von Huene 1907: 127, fig. 122; Fig. 10B),

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**Fig. 10** (see next page). **A–S.** Holotype of *Gresslyosaurus robustus* described by von Huene (1907) and illustrated on the reconstruction of *Gresslyosaurus plieningeri* redrawn from von Huene (1907: pl. 104). **A.** GPIT-PV-60195, posterior half of a cervical vertebra in anterior view. **B.** GPIT-PV-60188, posterior half of a dorsal vertebra in anterior view. **C.** GPIT-PV-60183, posterior dorsal vertebra in lateral view. **D.** GPIT-PV-60184, posterior dorsal vertebra in lateral view. **E.** GPIT-PV-60180, second sacral vertebra in ventrolateral view. **F.** GPIT-PV-60192, articulated manual digit (three non-terminal phalanges and one ungual) in medial view. **G.** GPIT-PV-60292, distal part of the right femur in posterolateral view. **H.** GPIT-PV-60181, proximal half of the left fibula in lateral view. **I.** GPIT-PV-60206 and GPIT-PV-60207, proximal and distal portions of a tibia in medial view. **J.** GPIT-PV-60191, distal tarsal in distal view. **K.** GPIT-PV-60194, two pedal phalanges fused together in anteromedial view. **L.** GPIT-PV-60177, two non-terminal phalanges and one ungual in anterior view. **M.** GPIT-PV-60186, pedal ungual phalanx in lateral view. **N.** GPIT-PV-60190, two pedal phalanges fused together in dorsal view. **O.** GPIT-PV-60312, pedal phalanx in dorsal view. **P.** GPIT-PV-60187, pedal ungual phalanx in medial view. **Q.** GPIT-PV-60309, partial pedal ungual phalanx in medial view. **R.** GPIT-PV-60189, two pedal phalanges fused together in dorsal view. **S.** GPIT-PV-60208, astragalus in medial and dorsal views. **T–AF.** Fragments belonging to a smaller individual (von Huene 1907: 137). **T.** GPIT-PV-60193, large ungual phalanx with distal portion of the phalanx. **Q.** GPIT-PV-60258, indeterminate bone fragment. **V.** GPIT-PV-60301, partial centrum. **W.** GPIT-PV-60302, two fragmentary pieces of what has been identified as the proximal ends of metatarsal II and I in lateral views. **X.** GPIT-PV-60303, two fragmentary pieces of what has been identified as the distal ends of metatarsal II and IV in lateral views. **Y.** GPIT-PV-60304, shaft of a long bone, possibly a fibula. **Z.** GPIT-PV-60305, proximal portion of the metatarsal IV. **AA.** GPIT-PV-60306, three pieces of vertebra, although not from the same element: an articular surface, a neural arch and a fragment of a non-articular margin of the centrum. **AB.** GPIT-PV-60307, two pieces of vertebra, not from the same element. **AC.** GPIT-PV-60311, pedal phalanx. **AD.** GPIT-PV-60314, pedal phalanx. **AE.** GPIT-PV-60315, pedal ungual III.5. **AF.** GPIT-PV-60345, metatarsal III. **AG.** GPIT-PV-60218, right femoral head in anteromedial view, catalogued as part of the Trossingen material by Weishampel in 1983, but with the same preservation than Bebenhausen. The human skeleton represents a height of 1.75 m, as originally drawn by von Huene (1907: pl. 103), the relative size of the reconstructed sauropodomorph is 4.5 m. Reconstruction and photographs made by the authors, with photos taken on the labelled side or on the side that was illustrated in the past.



a second sacral vertebra (GPIT-PV-60180, illustrated by von Huene 1907: pl. 56 fig. 1; Fig. 10E), the distal portion of the femur (GPIT-PV-60292, illustrated by von Huene 1907: 133, fig. 131, pl. 53 fig. 2; Fig. 10G), the proximal portion of the tibia (GPIT-PV-60206, illustrated by von Huene 1907: pl. 53 fig. 1) and its distal portion (GPIT-PV-60207, illustrated by von Huene 1907: 134, figs 132–134, pl. 54 fig. 1; Fig. 10I), a partial left fibula (GPIT-PV-60181, proximal half, illustrated by von Huene 1907: pl. 54 fig. 2; Fig. 10H; and GPIT-PV-60179, distal half, illustrated by von Huene 1907: 135, fig. 135, pl. 54 fig. 3), the left astragalus (GPIT-PV-60208, illustrated by von Huene 1907: 134, fig. 134, pl. 55 fig. 2; Fig. 10S), possibly a distal tarsal (GPIT-PV-60191, illustrated by von Huene 1907: 136, fig. 136; Fig. 10J), two non-terminal phalanges fused and attached to an unguis (GPIT-PV-60177, illustrated by von Huene 1907: pl. 54 fig. 3; Fig. 10L), an isolated phalanx (GPIT-PV-60178, illustrated by von Huene 1907: pl. 54 fig. 3), a large unguis phalanx with the distal portion of a non-terminal phalanx (GPIT-PV-60193, illustrated by von Huene 1907: 131, fig. 130a; Fig. 10T), and two isolated unguis phalanges (GPIT-PV-60186, Fig. 10M, and GPIT-PV-60187, Fig. 10P, illustrated by von Huene 1907: 137, fig. 140a, c).



### Preservation

All the remains from Bebenhausen share a similar preservation, but not all of them were illustrated by von Huene (1907). Most of the fragments are chemically dissolved. Von Huene (1907) reported that the previous preparator in the collection reconstructed the bones by combining and mismatching various pieces, and some of these reconstructed elements were on display (Fig. 9). However, as the material was dismantled, the pieces were likely restored, and it is not possible to identify these reported mismatches.

### Stratigraphic level

It is impossible to establish where the material was collected in 1879. Based on geological maps from the Landesamt für Geologie, Rohstoffe und Bergabbau (LGRB) in Bebenhausen (label d in Fig. 1), there are outcrops of the Knollenmergel, Trossingen Formation, and the Löwenstein Formation. The main road L1208 in Bebenhausen cuts through the Löwenstein Formation, but near Bebenhausen, there have been reports of Rhaetian outcrops (Tübingen Sandstone) (Clemens & Martin 2014), and thus it is possible the material could have come from a now removed outcrop of the Tübingen Sandstone (number 12 in Fig. 2).

### Status

The large individual is considered the holotype of *Gresslyosaurus* ‘*robustus*’ but the fragments that belonged to a smaller individual are identified as indeterminate sauropodomorph remains.

### Year 1881: Wüstenroth complex (historical numbers “GPIT C” and “GPIT VII”)

label e in Fig. 1, number 14 in Fig. 2, Figs 11–12, 13C, 14–15

### Historical numbers

GPIT C, GPIT VII.

### Skeleton number

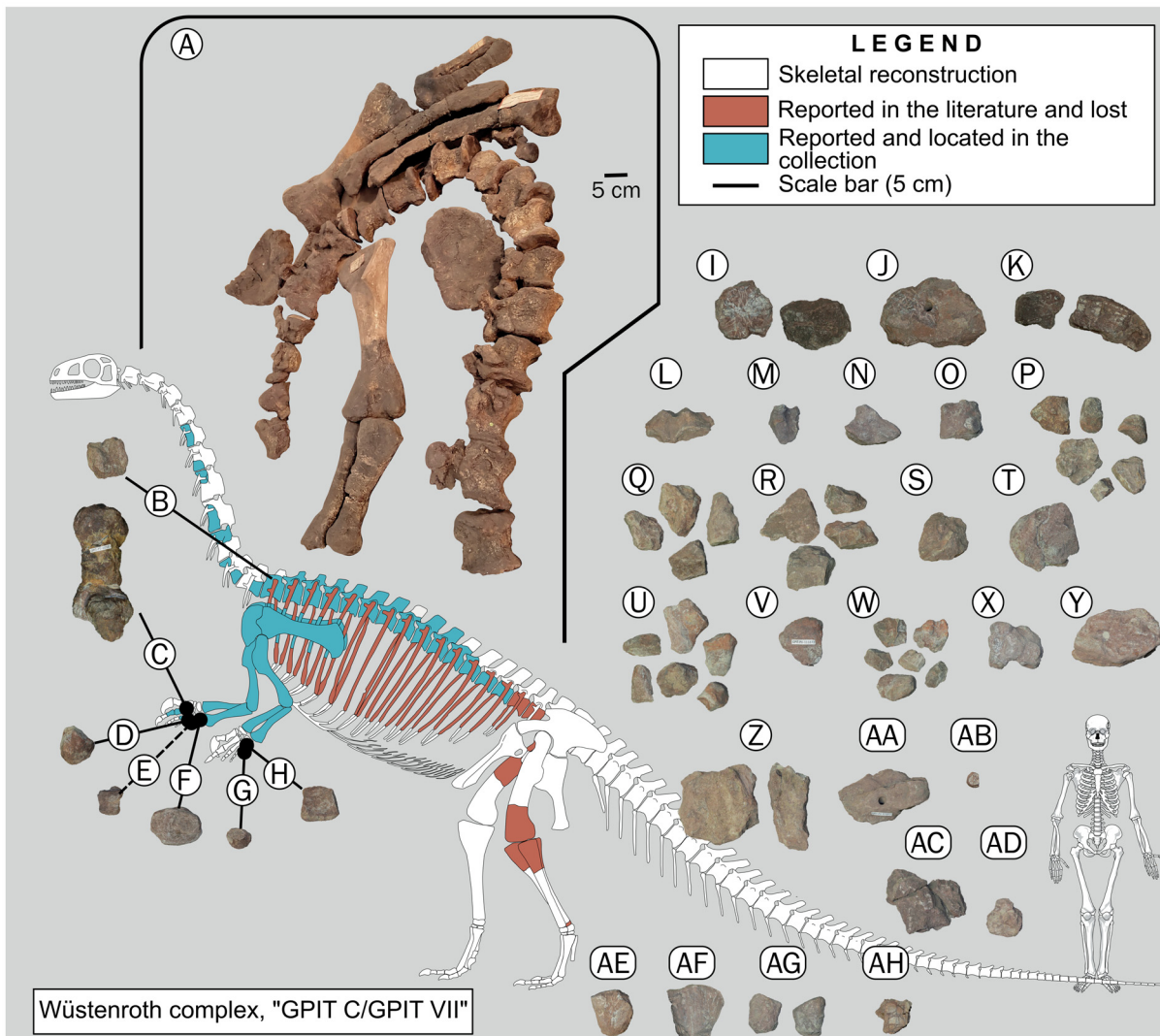
Both forelimbs, incomplete (comprising humeri, radii, ulnae), both scapulae, both ilia, and tentatively part of the cervical and dorsal series (GPIT-PV-30790, which was given the number “GPIT C” by Galton (2001a) and “GPIT VII” by von Huene (unpublished); part of the holotype of ‘*Pachysaurus ajax*’ (Fig. 11)).

### Bone specimens

GPIT-PV-60185, GPIT-PV-60196 to GPIT-PV-60200, GPIT-PV-60204, GPIT-PV-60205, GPIT-PV-60268, GPIT-PV-60291, GPIT-PV-60300 [elements that were associated to GPIT-PV-30790, and also part of the holotype of ‘*Pachysaurus ajax*’], GPIT-PV-111862 to GPIT-PV-111895 [fragments of elements from GPIT-PV-30790 that were removed during preparation; the material was stored in individual boxes with a map indicating their position within the skeleton, but this information is no longer accurate or reliable; this material is thus considered a hypodigm of ‘*Pachysaurus ajax*’ (Fig. 11I–AG)], GPIT-PV-6201 to GPIT-PV-60203, GPIT-PV-60266, GPIT-PV-60267 [elements associated to Wüstenroth that are indeterminate, removed from *Pachysaurus ajax*].

### Taxonomic history

Quenstedt acquired the specimen after it was discovered in 1881 by Jakob Hildenbrand from Ohmenhausen during a topographic survey in Wüstenroth, southeast of Löwenstein (label e in Fig. 1) (von Huene 1907). Von Huene prepared, mounted, and illustrated the material in 1901, comprising several cervical vertebrae, a nearly complete series of dorsal vertebrae, scapulae, and forearms (von Huene 1907) (Fig. 12). The material was designated as the holotype of ‘*Pachysaurus ajax*’ (von Huene 1907) (species 12 in Fig. 3).

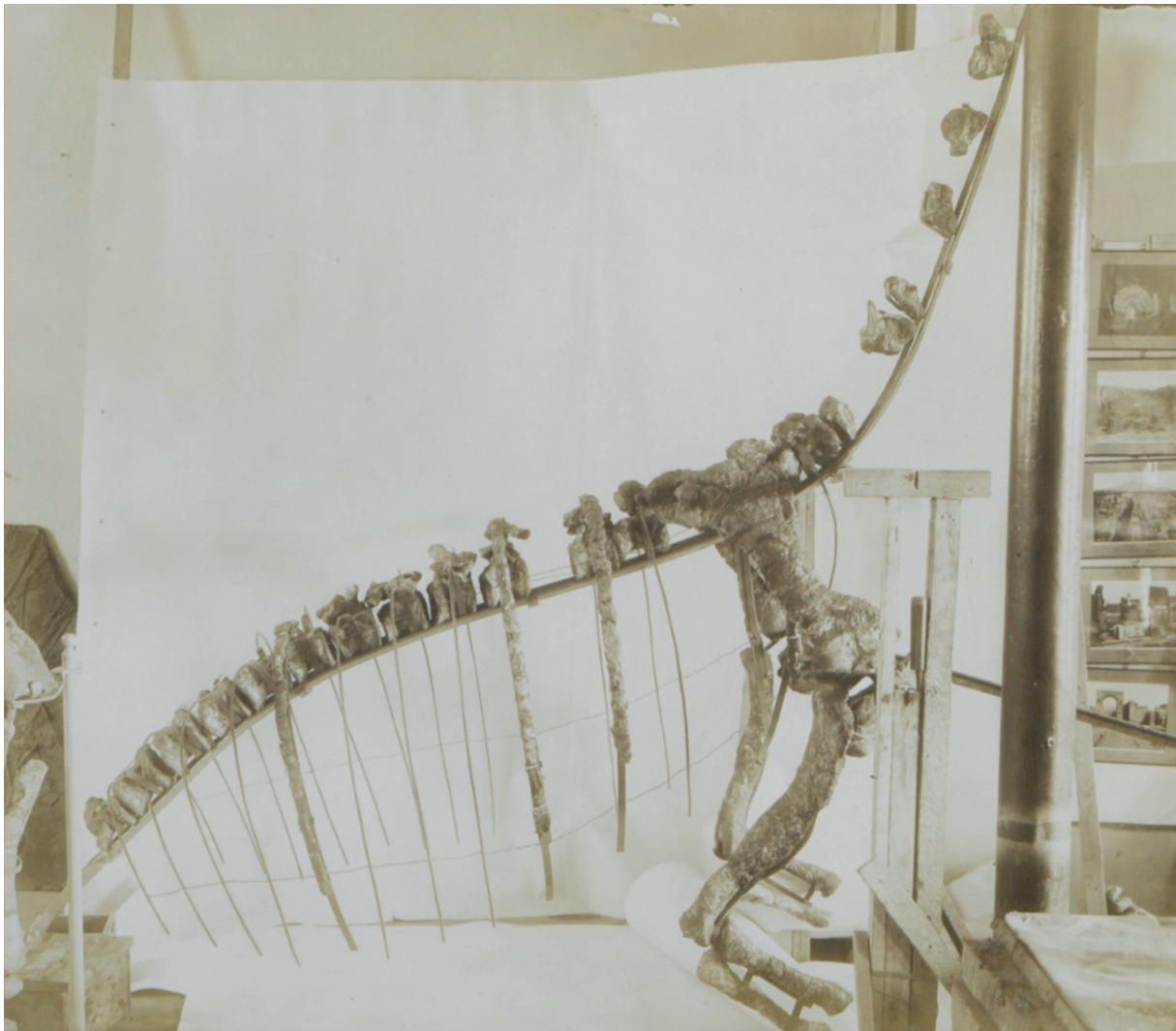


**Fig. 11.** Holotype of '*Pachysaurus ajax*' described by von Huene (1907) on a reconstruction, redrawn from von Huene (1907: pl. 103). **A.** GPIT-PV-30790, both forelimbs, with complete humeri, ulnae and radii, both scapulae, both coracoids, and part of the cervical and dorsal series. **B.** GPIT-PV-60197, centrum of a presumed dorsal vertebra 2. **C.** GPIT-PV-60185, right metacarpal II. **D.** GPIT-PV-60196, fragment of presumed left metacarpal II. **E.** GPIT-PV-60201, fragment of a presumed right manual phalanx III.1 in dorsal view. **F.** GPIT-PV-60200, a presumed right carpal. **G.** GPIT-PV-60199, fragment of a presumed left manual phalanx in distal view. **H.** GPIT-PV-60198, fragment of a presumed left metacarpal. **I–AG.** Elements that cannot be anatomically identified. **I.** GPIT-PV-60266. **J.** GPIT-PV-60267. **K.** GPIT-PV-60268. **L.** GPIT-PV-111863. **M.** GPIT-PV-111864. **N.** GPIT-PV-111865. **O.** GPIT-PV-111866. **P.** GPIT-PV-111867. **Q.** GPIT-PV-111868. **R.** GPIT-PV-111868. **S.** GPIT-PV-111869. **T.** GPIT-PV-111870. **U.** GPIT-PV-111871. **V.** GPIT-PV-111872. **W.** GPIT-PV-111873. **X.** GPIT-PV-111874. **Y.** GPIT-PV-111875. **Z.** GPIT-PV-111876. **AA.** GPIT-PV-111877. **AB.** GPIT-PV-111878. **AC.** GPIT-PV-1881. **AD.** GPIT-PV-111880. **AE.** GPIT-PV-60203. **AF.** GPIT-PV-111882. **AG.** GPIT-PV-111879. The human skeleton represents a height of 1.75 m, as originally drawn by von Huene (1907: pl. 103), the relative size of the reconstructed sauropodomorph is 4.5 m. Reconstruction and photographs made by the authors, with photos taken on the labelled side or on the side that was illustrated in the past.

However, it was later considered a junior synonym of *Pl. 'engelhardti'* (Galton 1985a, 1986, 2001b; Galton & Upchurch 2004) before being classified as a nomen dubium (Galton 2001a).

The name '*Pachysaurus*' von Huene, 1907 was considered preoccupied by Kuhn (1959) because the name was listed in Fitzinger (1843). This led him to establish the replacement name *Pachysauriscus* (Kuhn 1959). Accordingly, von Huene (1959) introduced another replacement name, *Pachysaurops*. However, we have found that the name in Fitzinger (1843: 20) is part of a nomenclature, where the vernacular name *Pachysaurus* is attached to the white-throated monitor lizard *Varanus (Polydaedalus) albigularis* Daudin, 1802. Given that *Pachysaurus*, as published in the nomenclature by Fitzinger (1843), was not meant to be part of a binomial name, the name '*Pachysaurus*' von Huene, 1907 should be treated as the correct one.

The University Archive of Tübingen has documentation of the 1911–1912 Trossingen expedition led by Eberhard Fraas, which includes a photograph of the holotype of '*Pachysaurus ajax*' in its mounted state

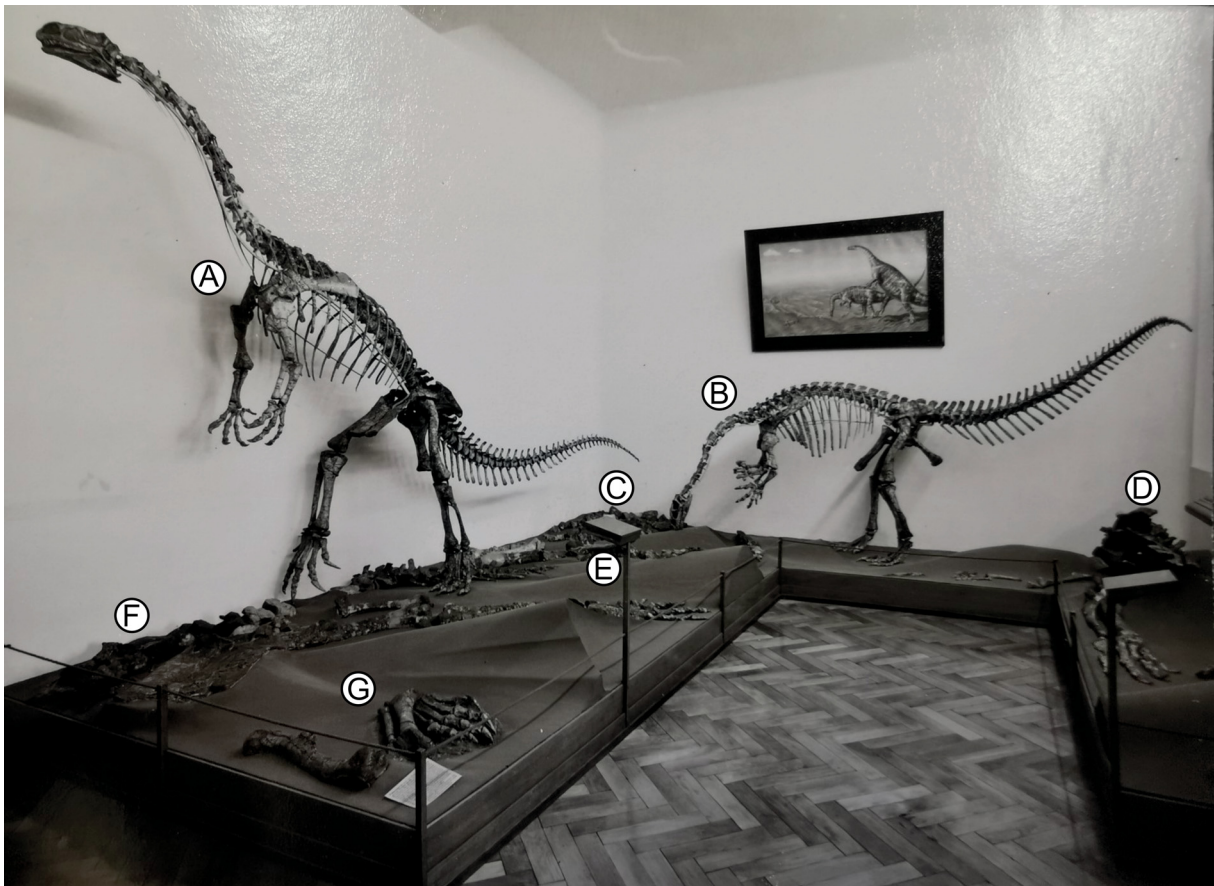


**Fig. 12.** Archive photograph (UAT 678/73) of the mounted specimen. The skeleton mount was given the collection number GPIT-PV-30790 (ca 1901). Some elements from this mount have recently been rediscovered as items stored in individual boxes, along with an old sheet of paper (undated) indicating where each element belonged. However, we are not certain that the elements in these boxes have not been misplaced given these elements were uncatalogued until March 2022.

(Rieß-Stumm 2021) (Fig. 12). The metallic framework held the bones, allowing the individual elements to be removed for research (Reinacher 2021). The mount was not intended to represent a specific individual but rather aimed to show a general size and posture of the animals. According to von Koken (1904), the mount included elements of ‘*Pachysaurus ajax*’ (GPIT-PV-30790) and elements from “*Teratosaurus*” (GPIT-PV-60297) (Fig. 15).

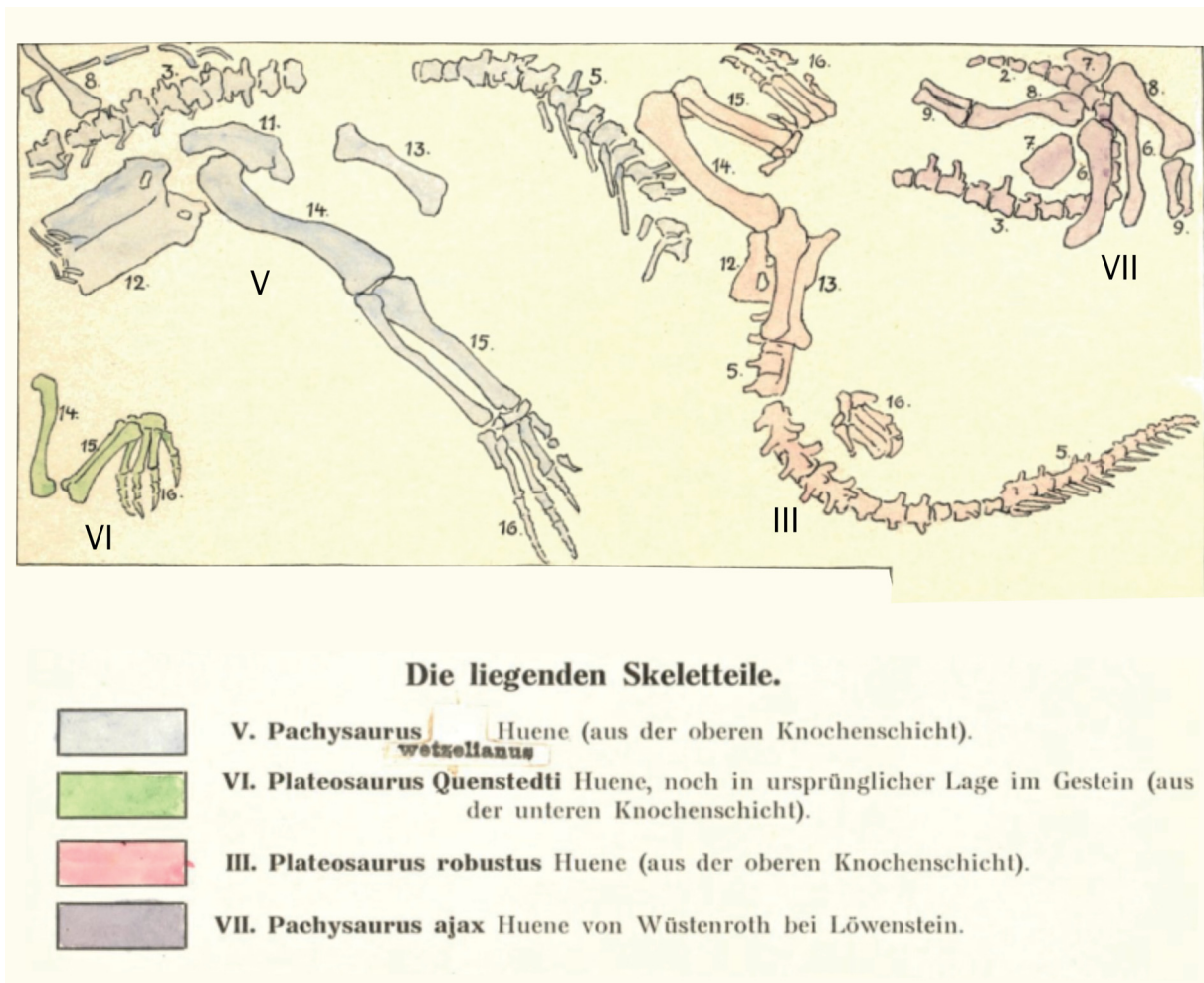
### Description

The specimen on display in the Plateosaurus Hall (Figs. 13C, 14) includes five cervical vertebrae, 13 dorsal vertebrae, both coracoids, both scapulae, and both forelimbs, without the manus (GPIT-PV-30790, the cervical vertebrae were illustrated in von Huene 1907: 139, fig. 141, pl. 58 figs 1–2, the dorsal series



**Fig. 13.** Archive photograph of the Plateosaurus Hall taken in the early 1960s showing the original diorama as designated by von Huene (see Figs 14, 22, 25–26). **A.** “Skeleton 2” (“GPIT II”), a composite of at least two individuals, without a skull – the skull in the photograph is a cast from specimen SMNS 13200, the holotype of *Pl. trossingensis* Fraas, 1913. **B.** “Skeleton 1” (“GPIT I”), an almost complete skeleton – the skull is also a cast of SMNS 13200; the original skull of this specimen was disassembled and catalogued as GPIT-PV-111840. **C.** “Skeleton VI” (“GPIT VI/C”), the holotype of ‘*Pachysaurus ajax*’ von Huene, 1907. **D.** “Skeleton IV” (“GPIT IV”), originally referred to as *Plateosaurus ‘plieningeri*’, and currently the holotype of *Tuebingosaurus maierfritzorum* Regalado Fernández & Werneburg, 2022. **E.** “Skeleton III” (“GPIT III”), a complete left hindlimb, right foot and complete tail, referred to as *Plateosaurus ‘robustus*’. **F.** “Skeleton V” (“GPIT V”), partial dorsal and caudal series, pelvic girdle and left hindlimb, holotype of *Plateosaurus ‘wetzeli*’ von Huene, 1932. **G.** “Skeleton VI” (“GPIT VI”), a complete right hindlimb referred to as *Plateosaurus ‘quenstedti*’ von Huene, 1905.

was illustrated in von Huene 1907: 143, fig. 145, pl. 59 figs 1–2, the scapulae were illustrated in von Huene 1907: 143, fig. 145, pl. 59 figs 1–2, the coracoids were illustrated in von Huene 1907: pl. 56 fig. 3, the humeri were illustrated in von Huene 1907: pl. 57 fig. 1, and the distal end of the left humerus in von Huene 1907: pl. 59 fig. 4, the ulnae were illustrated in von Huene 1907: 143 fig. 143–244, pl. 59 fig. 3, the radii were illustrated in von Huene 1907: 143, fig. 145, pl. 59 figs 1–2). Separated from this specimen are elements stored in the New Compactus (Fig. 11B–AI), which match the preservation illustrated in von Huene (1907: pl. 103) with a reconstruction of specimen “GPIT C”/“GPIT VII”.



**Fig. 14.** Plate showing the arrangement of the sauropodomorph skeletons on display in the diorama drawn by von Huene (GPIT-PV-117991, on display in the Stratigraphic Hall) as shown in Fig. 13. “GPIT V” corresponds to ‘*Pachysaurus wetzeli*’ von Huene, 1932, collected from the upper bone bed from the Obere Mühle, Trossingen. “GPIT VI” corresponds to *Plateosaurus ‘quenstedti*’ von Huene, 1908, a hindlimb still in the original matrix collected from the upper bone bed from the Obere Mühle, Trossingen. “GPIT III” refers to *Plateosaurus robustus* (von Huene, 1905), collected from the upper bone bed from the Obere Mühle, Trossingen. Finally, “GPIT VII” refers to ‘*Pachysaurus ajax*’ von Huene, 1905, a skeleton collected from Wüstenroth, near Löwenstein. Explanation of the numbers: 2. = cervical vertebrae; 3. = dorsal vertebrae; 5. = caudal vertebrae; 6. = scapula (shoulder blade); 7. = coracoid, attached to which are rudiments of the clavicles (collar bones); 8. = humerus (upper arm); 9. = radius and ulna (forearm); 11. = ilium; 12. = pubis; 13. = ischium; 14. = femur (thigh); 15. = tibia and fibula (lower leg); 16. = pes; 17. = abdominal ribs [see rest of the figure in Fig. 22].

The mount was disassembled, and some of the bones were placed in a corner of the new diorama in the Plateosaurus Hall in 1928 (Fig. 13C). The rest of the bones were then stored in the collection in the basement. In March 2022, a piece of paper was found in one of the drawers of the collection, outlining the arrangement of bones that belonged to Hildenbrand's specimen. Galton (2001a) reported that several elements of "GPIT C" were lost, but according to the notes we found, they correspond to what von Huene identified as "GPIT VII". The elements listed as lost in Galton (2001a) match the elements currently located upstairs in the collection. GPIT-PV-30790, which is on display, is the only specimen in the diorama that does not come from the Obere Mühle expedition from 1922–23 (Figs 13C, 14).

### Preservation

The specimens in the diorama still have a type 2 preservation, but most of the other material has a type 4.

### Stratigraphic level

The complex of bones from Wüstenroth, which was previously mounted, is given the catalogue number GPIT-PV-30790 (Fig. 12), equivalent to the historical numbers "GPIT C" and "GPIT VII". The material is potentially the stratigraphically youngest sauropodomorph specimen in the collection, coming from the uppermost part of the Knollenmergel (upper Norian?/lower Rhaetian?) (Galton 2001a) (number 14 in Fig. 2).

### Status

The material is more robust than the specimens referred to as *Plateosaurus trossingensis*, and further study into the significance of this variability needs to be done before identifying this material as *Plateosaurus*. Since there is most of the pectoral girdle, an almost complete cervical and dorsal series, and part of the forelimbs, comparisons with *Pl. trossingensis* is possible. The indetermined bone fragments represent pieces belonging to the bones from "GPIT C"/"GPIT VII", but due to them being isolated, it is impossible to identify their anatomical provenance.

### Year 1889: historical denotation "GPIT Aixheim"

label f in Fig. 1, Figs 15–16

### Bone numbers

GPIT-PV-60365, GPIT-PV-60366, GPIT-PV-60368 to GPIT-PV-60374, GPIT-PV-60376 to GPIT-PV-60378, GPIT-PV-60381 to GPIT-PV-60389, GPIT-PV-60391 to GPIT-PV-60399 (Figs 15–16). As the material was mounted, these specimen numbers are given reference number GPIT-PV-60297. The following specimens are associated to the complex "GPIT Aixheim", but they cannot be unequivocally identified as part of any of the previous individuals: GPIT-PV-60390, GPIT-PV-60400 to GPIT-PV-60416.

### Taxonomic history

The material was acquired by Quenstedt before 1889 (Hungerbühler 1998), reportedly collected in Neuhaus, a Stubensandstein outcrop near Aixheim (von Huene 1932: 95) (label f in Fig. 1), and was first described by von Huene (1907: 157–167). This material has been referred to as "GPIT Aixheim" (Hungerbühler 1998), but it is different from older material collected by Quenstedt around the 1850s (see Middle 19<sup>th</sup> century: Aixheim complex). In von Huene (1907), it is tentatively referred to as "*Teratosaurus*" *suevicus*, and following the taxonomy in von Huene (1914), it was interpreted as the remains of a carnivore dinosaur. Specimen GPIT-PV-60364 is associated to *Teratosaurus suevicus*; however, this claw was equivocally referred to *Teratosaurus suevicus* by Huene von (1907; pl. 169 fig. 17), with the old PV number "GPIT 15615". This claw was recovered from Schwenningen, in a Stubensandstein outcrop 5 km east of Trossingen.

The holotype of "*Teratosaurus*" *suevicus* is a left maxilla collected from Heslach, near Stuttgart, in 1865 (species 28 in Fig. 3). It was sold to the British Museum and is presently housed in the Natural

History Museum of London as specimen NHMUK PV OR 38646 (a cast of this maxilla is also present in the GPIT Collection as GPIT-PV-60363). The maxilla was reinterpreted as a rauisuchian (Brusatte *et al.* 2009). According to von Huene (1907: 157) the postcranial skeleton was found near several tooth remains similar to those attributed to “*Teratosaurus*” *suevicus*. Consequently, he tentatively associated the postcranial material with “*T.*” *suevicus*. A second finding in 1912, also in a similar arrangement of postcranial elements next to carnivore teeth, further supported the attribution of the postcranial elements to “*Teratosaurus*” *suevicus* (von Huene 1915, 1932; Hungerbühler 1998) [see 1912: historical number “GPIT 18392” below]. Charig *et al.* (1965) noted that the attribution of some of the Aixheim material mentioned above to “*Teratosaurus*” was uncertain and restricted *Teratosaurus* to the holotype, while considering the rest as a ‘prosauropod’. Whereas *Teratosaurus* was reidentified as a rauisuchian (Galton 1985c; Benton 1986), the ‘prosauropod’ material was referred to as *Pl. gracilis* (Hungerbühler 1998; Yates 2003).

### Description

The original material of “GPIT Aixheim” included more elements than those currently stored in the collection (Figs 15–16). The specimen originally included a complete pelvic girdle and an almost complete left hindlimb (Fig. 15), but currently only the following elements have been identified in the collection



**Fig. 15.** A combination of archival photographs (UAT 678/73) showing a mounted ‘*Pachysaurus ajax*’ von Huene, 1905 from Wüstenroth (GPIT-PV-30790) and “*Teratosaurus*” *suevicus* Mayer, 1861 from Aixheim, Löwenstein Formation (GPIT-PV-60297); these specimens were as one skeleton mounted in 1905 by Ernst von Koken (1860–1912), von Huene’s teacher, to show the overall size of the dinosaurs from the region.



(Fig. 16): a fragment of a diapophysis of the atlas (GPIT-PV-60374, Fig. 16B), presumably the centrum of a dorsal vertebra (GPIT-PV-60373, Fig. 16C), a first sacral vertebra (GPIT-PV-60377, Fig. 16E), a second sacral vertebra (GPIT-PV-60378, Fig. 16F), presumably a caudosacral (GPIT-PV-60382, Fig. 16G), anterior caudal vertebrae (GPIT-PV-60383, GPIT-PV-60381, Fig. 16H–I), fragments of chevrons, possibly from the anterior caudals (GPIT-PV-60391, Fig. 16AA), caudal vertebrae (GPIT-PV-60385 to GPIT-PV-60389, GPIT-PV-60397, Fig. 16J–O), left metacarpal I (GPIT-PV-60376, Fig. 16P), presumably fragments of the left fibula (GPIT-PV-60395, Fig. 16Q), fragment, possibly of the proximal right tibia (GPIT-PV-60393, Fig. 16Z), fragment, possibly of the distal left tibia (GPIT-PV-60396, Fig. 16R), distal tarsal (GPIT-PV-60372, Fig. 16S), an astragalus (GPIT-PV-60369, Fig. 16T), distal tarsal (GPIT-PV-60371, Fig. 16U), pedal phalanx III.1 (GPIT-PV-60370, Fig. 16V), right metatarsal I (GPIT-PV-60366, Fig. 16W), metatarsal II (GPIT-PV-60365, Fig. 16X), and right metatarsal III (GPIT-PV-60368, Fig. 16Y). This specimen has largely been interpreted as a large individual with two sacral vertebrae and a caudosacral partially attached to the second sacral (Galton 1985c, 1986, 1999; Moser 2003).

### Preservation

The overall preservation of the material is type 1, with no evidence of chemical dissolution, and only what seems to be the distal-most centra of the tail lacks portions of the cortical bone. An anterior caudal and the astragalus show some deformation by compression, and the distal portion of the left tibia also appears to have undergone compression. The green-greyish colours are consistent with the type of fossilisation from the Stubensandstein. Several elements have a similar preservation and are labelled as collected from Aixheim, but we have removed them from this complex and placed them in a category of ‘Material from Aixheim collected from Stubensandstein’ for which we have no documentary evidence that it belongs to

**Fig. 16** (see next page). Material from Aixheim referred to as *Teratosaurus ‘suevicus’*. The holotype of *T. suevicus* Mayer, 1861 is a right maxilla currently stored in the Natural History Museum of London (NHMUK PV OR 38646). Dashed lines refer to elements that cannot be unequivocally linked to the anatomical position suggested in von Huene’s (1907) plates. **A.** GPIT-PV-60394, fragment of a presumed postzygapophyses from a cervical vertebra in left lateral view. **B.** GPIT-PV-60374, fragment of a diapophysis of the atlas in left lateral view. **C.** GPIT-PV-60373, centrum of the anterior dorsal vertebra in left lateral view. **D.** GPIT-PV-60384, centrum of a presumed posterior dorsal vertebra in left lateral view. **E.** GPIT-PV-60377, sacral vertebra in posterior view. **F.** GPIT-PV-60378, sacral vertebra in ventral view. **G.** GPIT-PV-60382, caudosacral vertebra in left lateral view. **H.** GPIT-PV-60383, anterior caudal vertebra in left lateral view. **I.** GPIT-PV-60381, deformed anterior caudal vertebra. **J.** GPIT-PV-60385, caudal vertebra in left lateral view. **K.** GPIT-PV-60388, centrum of caudal vertebra in right lateral view. **L.** GPIT-PV-60389, centrum of caudal vertebra in left lateral view. **M.** GPIT-PV-60387, centrum of caudal vertebra in left lateral view. **N.** GPIT-PV-60386, centrum of caudal vertebra in left lateral view. **O.** GPIT-PV-60397, centrum of caudal vertebra in left lateral view. **P.** GPIT-PV-60376, left metacarpal I in anterior view. **Q.** GPIT-PV-60395, fragments, possibly of the left fibula in lateral view. **R.** GPIT-PV-60396, presumed fragment of the distal left tibia in distal view. **S.** GPIT-PV-60372, distal tarsal in proximal view. **T.** GPIT-PV-60369, deformed astragalus in anterior view. **U.** GPIT-PV-60371, distal tarsal in proximal view. **V.** GPIT-PV-60370, pedal phalanx III.1 in anterior view. **W.** GPIT-PV-60366, right metatarsal I in anterior view. **X.** GPIT-PV-60365, right metatarsal II in anterior view. **Y.** GPIT-PV-60368, right metatarsal III in anterior view. **Z.** GPIT-PV-60393, presumed fragment of the proximal right tibia in left lateral view. **AA.** GPIT-PV-60391, fragments of chevrons, possibly from the anterior caudal vertebrae, in lateral view. **AB.** GPIT-PV-60364, presumed right ungual I.1, stored in the same compartment, unequivocally identified as such by von Huene (1907). The human skeleton represents a height of 1.75 m, as originally drawn by von Huene (1907: pl. 106), the relative size of the reconstructed sauropodomorph is 4.5 m. Reconstruction and photographs made by the authors, with photos taken on the labelled side or on the side that was illustrated in the past.

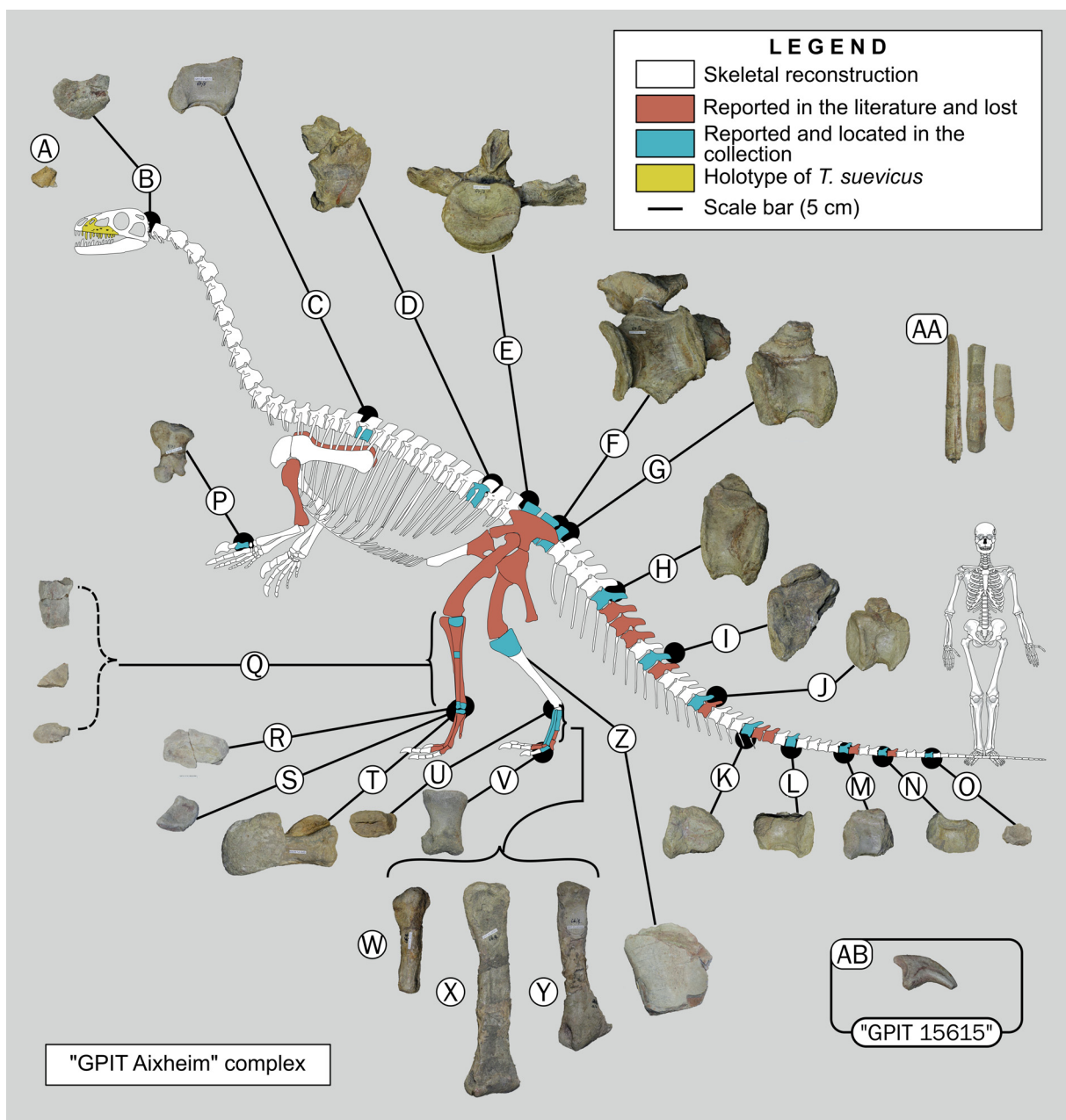
the individual identified as “*T.* *suevicus* and for which we cannot confirm nor cross reference that their labels are accurate (Appendix 1; Fig. 17)

### Stratigraphic level

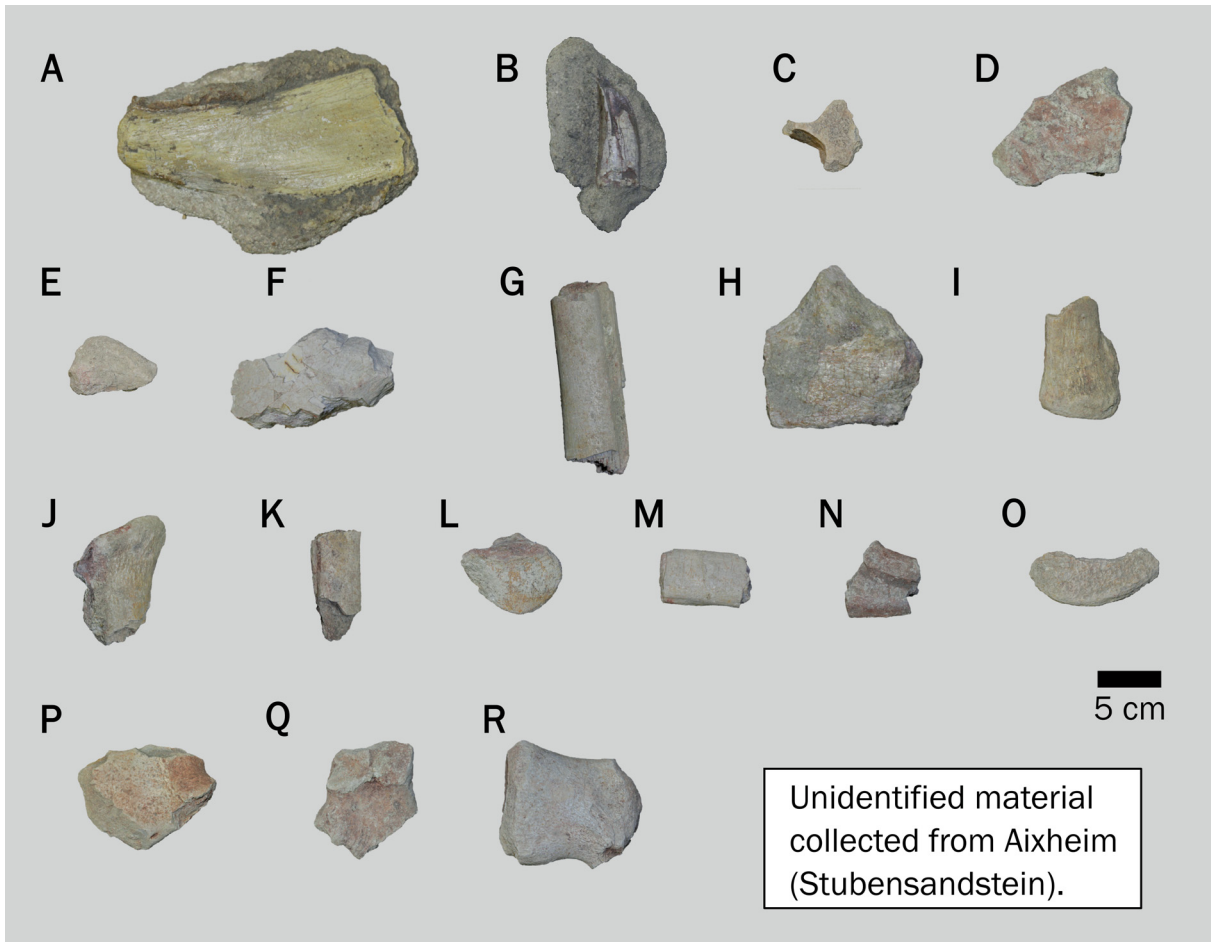
The only information available regarding this finding is that it comes from Stubensandstein (number 6 in Fig. 2).

### Status

This specimen has largely been considered part of the metataxon *Pl. gracilis*; however, as pointed out by Yates (2003), the available material does not overlap enough to allow comparisons, and there is a variance of gracile and large specimens. In this paper, we follow the same taxonomy; however, a species-level phylogenetic analysis is needed that includes the different specimens of *Pl. gracilis* as separate



operational taxonomic units (OTUs) and compares the material to other Late Triassic and Early Jurassic sauropodomorphs – as an expansion of the analysis Yates (2003). There are several fragments that were collected in the Stubensandstein near Aixheim, whose collection date and provenance are not documented (Fig. 17).



**Fig. 17.** Unidentified material from Aixheim, collected from the Stubensandstein. **A.** GPIT-PV-60390, fragment of a scapular blade in lateral view. **B.** GPIT-PV-60400, serrated conical tooth. **C.** GPIT-PV-60401, fragment of a vertebra. **D.** GPIT-PV-60402, indeterminate bone fragment. **E.** GPIT-PV-60403, rib fragment. **F.** GPIT-PV-60404, indeterminate bone fragment. **G.** GPIT-PV-60405, rib fragment. **H.** GPIT-PV-60406, bone fragment. **I.** GPIT-PV-60407, rib fragment. **J.** GPIT-PV-60408, zygapophysis. **K.** GPIT-PV-60409, rib shaft fragment. **L.** GPIT-PV-60410, zygapophysis. **M.** GPIT-PV-60411, rib fragment. **N.** GPIT-PV-60412, zygapophysis. **O.** GPIT-PV-60413, ventral margin of centrum. **P.** GPIT-PV-60414, fragment of a phalanx. **Q.** GPIT-PV-60415, fragment of a phalanx. **R.** GPIT-PV-60416, partial phalanx.

**Year 1906: historical number “GPIT 18064”**  
label g in Fig. 1, number 8 in Fig. 2, Fig. 18

**Bone specimens**

GPIT-PV-60447 and GPIT-PV-60448 (Fig. 18).

**Taxonomic history**

Von Huene (1907) erected the new species “*Teratosaurus*” ‘*trossingensis*’ (species 23 in Fig. 3), whose holotype was specimen “GPIT 18064”, to differentiate the pedal anatomy of this specimen from that of “*Teratosaurus*” *suevicus*. Galton (1992) considered “*Teratosaurus*” *trossingensis* as a synonym of ‘*Sellosaurus*’ *gracilis*. “*Teratosaurus*” *trossingensis* was considered as a nomen dubium by Yates (2003) since it was impossible to differentiate the pedal elements of GPIT-PV-60447 and GPIT-PV-60448 from those of other sauropodomorphs found in Germany, namely *Plateosaurus* and *Efraasia*. The specimens were collected in 1906 during an expedition led by Koken to Trossingen, in the Obere Mühle (Benton 1993; Maisch 2020) (label g in Fig. 1).

**Description**

The specimen included a partial fibula, an astragalus, distal tarsals I–III, and a partial foot, although currently, only the astragalus (Fig. 18A) and the partial foot are in the collection (Fig. 18B–Q).

**Preservation**

The material is large and has a type 1 preservation. According to von Huene (1915), the specimen was found with the appendicular skeleton oriented vertically. Sander (1992) and Hungerbühler (1998) explained this position suggesting that the animal sank into a viscous deposit while still alive.

**Stratigraphic level**

The bone specimens were found between a sandstone and a mudstone facies in the portion of the Upper Stubensandstein, which is either the uppermost part of the Löwenstein Formation or the base of the Trossingen Formation (Hungerbühler 1998) (number 8 in Fig. 2).

**Status**

The bone specimens are well preserved, and comparisons with the type material of *Pl. trossingensis* and the specimens of the metataxon *Pl. gracilis* would be needed to establish whether the material is diagnostic. For now, we tentatively classify this specimen as *Plateosaurus* cf. *gracilis*.

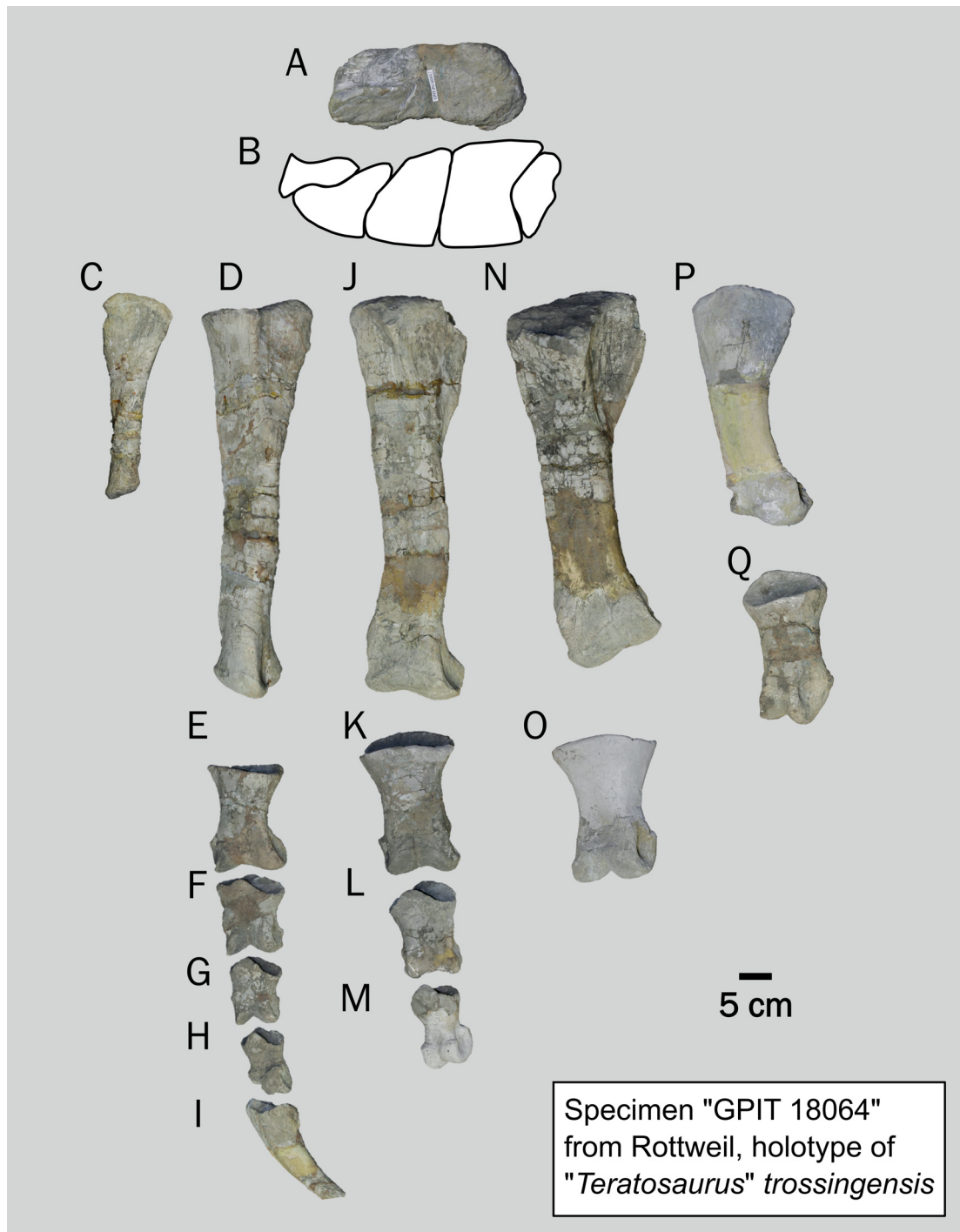
**Year 1910: historical number “GPIT 18318a”**  
label h in Fig. 1, number 8 in Fig. 2, Fig. 19

**Bone specimens**

GPIT-PV-60380, GPIT-PV-60417 to GPIT-PV-60424, GPIT-PV-60426 to GPIT-PV-60446, GPIT-PV-60501 to GPIT-PV-60504, GPIT-PV-60512, GPIT-PV-60514 to GPIT-PV-60515, GPIT-PV-60520 to GPIT-PV-60538, GPIT-PV-111900.

**Taxonomic history**

The holotype of ‘*Sellosaurus hermannianus*’ is a maxilla (SMNS 4388) recovered from the Heschl quarries, Löwenstein Formation (species 24 in Fig. 3). This specimen was initially described as *Belodon* by von Meyer (1861: 292–293, pl. 37 figs 28–31) and tentatively later referred to as “*Thecodontosaurus*” *hermannianus* by von Huene (1905). Von Huene (1915) reported that a complete skeleton (“GPIT 18318a”)



**Fig. 18.** Holotype of “*Teratosaurus*” *trossingensis* von Huene, 1907 (historical number “GPIT 18064”) from Rottweil. **A.** GPIT-PV-60447, astragalus, in ventral view. **B.** Outline of the metatarsals in proximal view. **C–Q.** GPIT-PV-60448, partial right pes. **C.** Metatarsal V in anterior view. **D.** Metatarsal IV in anterior view. **E.** Pedal phalanx IV.1 in anterior view. **F.** Pedal phalanx IV.2 in anterior view. **G.** Pedal phalanx IV.3 in anterior view. **H.** Pedal phalanx IV.4 in anterior view. **I.** pedal ungual IV.5. **J.** Metatarsal III in anterior view. **K.** Pedal phalanx III.1 in anterior view. **L.** Pedal phalanx III.2 in anterior view. **M.** Pedal phalanx III.3 in anterior view (most of the element is reconstructed). **N.** Metatarsal II (shaft is probably a negative cast). **O.** Pedal phalanx II.1 (half of the element is probably a negative cast). **P.** Metatarsal I in anterior view (shaft is probably a negative cast). **Q.** Pedal phalanx I.1 in anterior view.

was found near Trossingen in 1910 from the middle Stubensandstein (label h in Fig. 1), and determined that the dentition of the maxilla of “*Thecodontosaurus(?) hermannianus*” was similar to that of “GPIT 18318a”. Furthermore, von Huene (1915) compared the skeleton “GPIT 18318a” with the anatomy of the vertebrae and the pubis of ‘*Sellosaurus gracilis*’ (species 20 in Fig. 3) and ‘*Sellosaurus fraasi*’ (species 21 in Fig. 3) and concluded that the maxilla SMNS 4388 should be referred to as *Sellosaurus hermannianus*. ‘*Sellosaurus fraasi*’ was later reclassified as a junior synonym of ‘*Sellosaurus gracilis*’ (von Huene 1932).

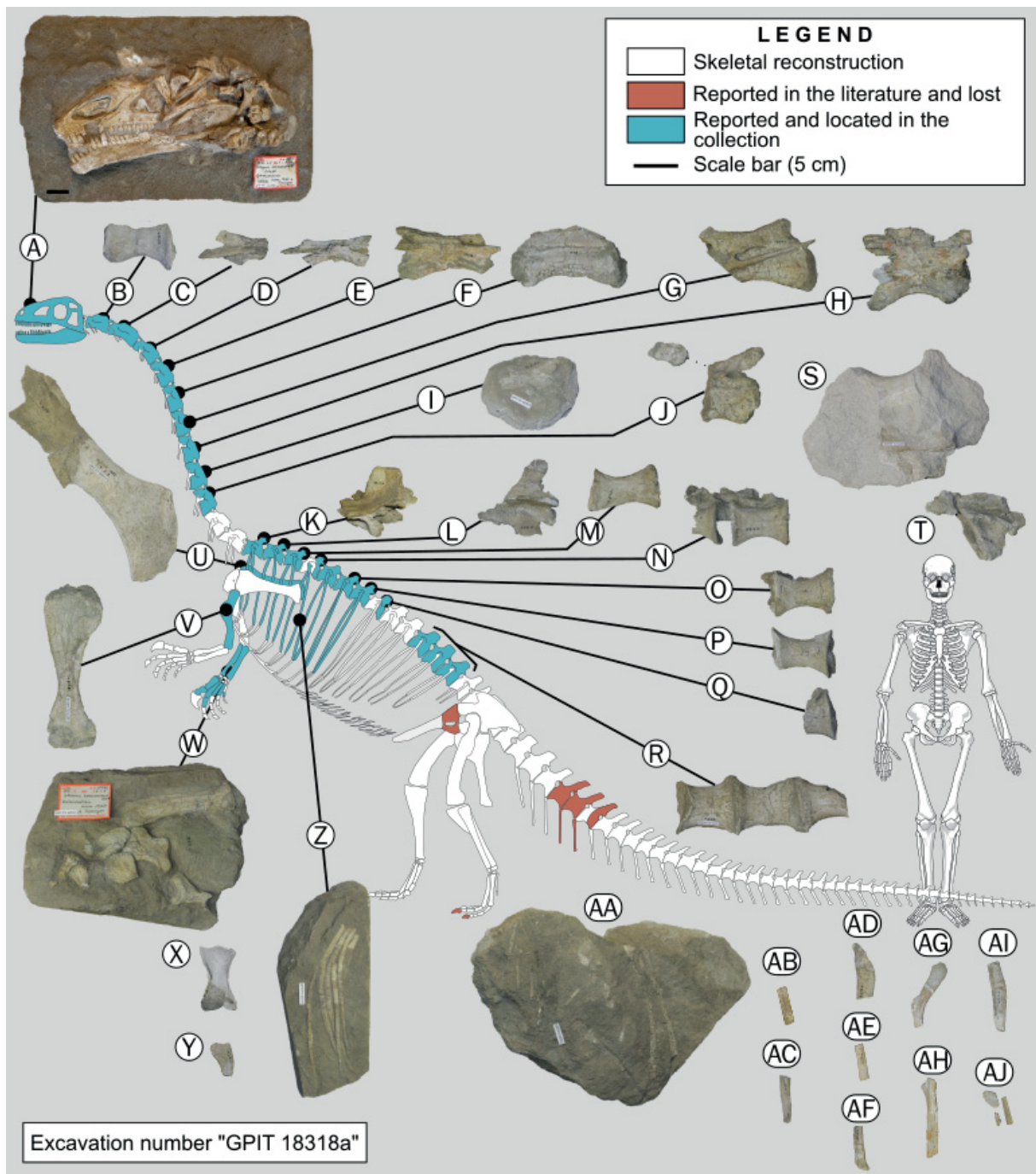
Galton (1985b: fig. 1) proposed that “GPIT 18318a” should be referred to as ‘*Sellosaurus gracilis*’ (species 20 in Fig. 3). According to Yates (2003), there were several differences between the cranial anatomy of *Pl. trossingensis* (species 8 in Fig. 3) and the skull of the specimen “GPIT 18318a”. In the phylogenetic analysis by Yates (2003), “GPIT 18318a” was found to cluster with the specimen SMNS 5715 (holotype of *Pl. gracilis*), and both specimens were defined as *Pl. gracilis* (species 20 in Fig. 3). SMNS 5175 comprises several dorsal vertebrae, proximal and middle caudal vertebrae, a right ilium, left pubis, conjoined ischia, and a fragment of the left fibula. In the Palaeontological Collection of Tübingen, several specimens have been referred to as *Pl. gracilis*, namely “GPIT Aixheim” complex, “GPIT 18392” (see Appendix 1), and “GPIT 18318a”. Yates (2003) also removed most of the material that Galton (1999) included under ‘*Sellosaurus gracilis*’ to a new species *Efraasia minor* (holotype SMNS 11838, referred specimens: SMNS 12188–92, 12354, 12667, 12684, 17928, 12216, 12668, and 14881). Thus, ‘*Thecodontosaurus hermannianus*’ was restricted to the maxilla SMNS 4388 and considered a nomen dubium (Yates 2003) (species 24 in Fig. 3).

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**Fig. 19** (see next page). Material of specimen “GPIT 18318a” on a reconstruction of ‘*Sellosaurus gracilis*’ as drawn by von Huene (1907: pl. 107); specimen “GPIT 18318a” is referred to as ‘*Sellosaurus hermannianus*’, and the elements reported as missing are based on what was reported by von Huene (1915). **A.** GPIT-PV-111900, skull, still embedded in the matrix. **B.** GPIT-PV-60523, cervical 2 in ventral view. **C.** GPIT-PV-60535, postzygapophyses of cervical 3 in right lateral view. **D.** GPIT-PV-60537, cervical 4 in left lateral view. **E.** GPIT-PV-60525, cervical 5 in right lateral view. **F.** GPIT-PV-60521, cervical 6 in left lateral view. **G.** GPIT-PV-60531, cervical 7 in left lateral view. **H.** GPIT-PV-60522, cervical 8 in right lateral view. **I.** GPIT-PV-60503, cervical 9 in dorsal view, still in matrix. **J.** GPIT-PV-60536, cervical 10 in right lateral view. **K.** GPIT-PV-60530, dorsal 1 in lateral view. **L.** GPIT-PV-60534, dorsal 1 in dorsal view. **M.** GPIT-PV-60257, dorsal 3 in ventral view. **N.** GPIT-PV-60532, partial dorsal 4 and dorsal 5 in ventral view. **O.** GPIT-PV-60526, dorsal 6 in ventral view. **P.** GPIT-PV-60533, dorsal 7 in ventral view. **Q.** GPIT-PV-60528, posterior half of the dorsal 8 in ventral view. **R.** GPIT-PV-60520, dorsals 11, 12 and 13 in ventral view. **S.** GPIT-PV-60446, possibly a sacral vertebra in ventral view, but it was not reported as part of the same specimen. **T.** GPIT-PV-60524, neural arch of a dorsal vertebra in dorsal view. **U.** GPIT-PV-60512, right scapula, with a cast taken from the negative mould of the original matrix in medial view. **V.** GPIT-PV-60514, left humerus in anterior view. **W.** GPIT-PV-60515, right radius in lateral view, metacarpals I to V in anterior view, and phalanx I.1 in anterior view. **X.** GPIT-PV-60529, partial phalanx, the cast was a mould produced from the original negative mould where the specimen was found. **Y.** GPIT-PV-60434, ungual (possibly pedal ungual). **Z.** GPIT-PV-60504, block with ribs. **AA.** GPIT-PV-60502, block with gastralia. **AB.** GPIT-PV-60442, rib fragment. **AC.** GPIT-PV-60443, rib fragment. **AD.** GPIT-PV-60444, rib fragment. **AE.** GPIT-PV-60439, rib fragment. **AF.** GPIT-PV-60441, rib fragment. **AG.** GPIT-PV-60438, rib fragment. **AH.** GPIT-PV-60437, rib fragment. **AI.** GPIT-PV-60436, rib fragment. **AJ.** GPIT-PV-60440, rib fragments. The human skeleton represents a height of 1.75 m, as originally drawn by von Huene (1907: pl. 107), the relative size of the reconstructed sauropodomorph is 3.5 m. Reconstruction and photographs made by the authors, with photos taken on the labelled side or on the side that was illustrated in the past.

### Description

According to von Huene (1915) and Hungerbühler (1998), the skeleton included a complete skull (Fig. 19A), cervical vertebrae 2 to 10 (Fig. 19B–J), dorsal vertebrae 1 to 8 (Fig. 19K–Q), and the last dorsal vertebrae (Fig. 19R), as well as several cervical ribs (only those attached to cervicals are preserved), part of the thoracic rib cage (Fig. 19Z), the left humerus (Fig. 19V), the right forearm with parts of the manus (Fig. 19W–Y), isolated remains of phalanges (lost), claws (lost), and part of the pubis (lost). The skull of “GPIT 18318a” (Fig. 19A) was not in the Palaeontological Collection of Tübingen from 2004 until 2022 when it was recovered.



### Preservation

The specimen was embedded in a sandstone matrix, which is still present in the skull (Fig. 19A), in the forearm (Fig. 19W) and ribs (Fig. 19Z, AA). Several elements were removed from the sandstone and in one scapula (Fig. 19U) and one phalanx (Fig. 19X), the plaster is a cast of the negative mould. The elements show uneven compression along the mediolateral axis in the cervicals and the skull, and along the dorsoventral axis on the dorsals.

### Stratigraphic level

According to Hungerbühler (1998), “GPIT 18318a” was found in 1910 in the same layers as specimen “GPIT 18064” (see section Year 1906: historical number “GPIT 18064”) (number 8 in Fig. 2).

### Status

The most recent examination of this material was conducted by Yates (2003), who scored characters for the skull (GPIT-PV-111900) as part of the Operational Taxonomic Unit (OTU) *Pl. gracilis* (species 20 in Fig. 3). The scores from his character-by-taxon matrix have been used as part of *Pl. gracilis* in subsequent phylogenetic analyses (see Regalado Fernández & Werneburg 2022 for more details). Therefore, it is sounder for taxonomic stability to consider “GPIT 18318a” as part of *Pl. gracilis*.

### Year 1911: historical number “GPIT 18375”

label i in Fig. 1, Fig. 20

### Bone specimens

GPIT-PV-60346 to GPIT-PV-60362.

### Taxonomic history

According to von Huene (1915), these remains were collected in the summer of 1911 near a factory in Friedrichstraße, Hechingen, south of Tübingen, 5 m below the Pylonbank (label i in Fig. 1). Von Huene (1915) compared the morphology of the lost ulna to that of *Pl. ‘quenstedti’* (species 3 in Fig. 3). This comparison was made with what would correspond to the forearm elements of the “GPIT A” complex at the time. Nevertheless, the morphology of the tooth of “GPIT 18375” was similar to the teeth of *Pl. ‘poligniensis’* (species 9 in Fig. 3), *Pl. ‘ornatus’* (species 25 in Fig. 1), and *Pl. ‘elizae’* (species 27 in Fig. 3), but there was no dental material associated with the holotype of *Pl. ‘quenstedti’*. Thus, von Huene (1915) considered this specimen as *Plateosaurus* sp., and the specimen has apparently never been used again in the literature. Originally, the material included a complete right forelimb, i.e., humerus, ulna, three complete fingers – I–III – and most of fingers IV and V (von Huene 1915), a tooth, seven caudal vertebrae with eight chevrons, fragments of slender ribs, the distal portion of a scapula, half of the tibia, the right foot, and isolated claws.

### Description

Currently, few elements are preserved in the collection (Fig. 20). The seven caudal vertebrae mentioned in von Huene (1915: 13) are still in the collection, and their morphology is similar to middle caudals of GPIT-PV-30784 where the diapophysis is still in the centrum, and the slim neural spine is projected posteriorly. The scapular blade is not mentioned in von Huene (1915). The right forearm illustrated in von Huene (1915: fig. 6) is lost. In von Huene (1915: figs 11–12) the small ungual was interpreted as part of the manual digit II of the left hand (Fig. 20Q), but the larger ungual (Fig. 20P) was speculated to belong to another animal.

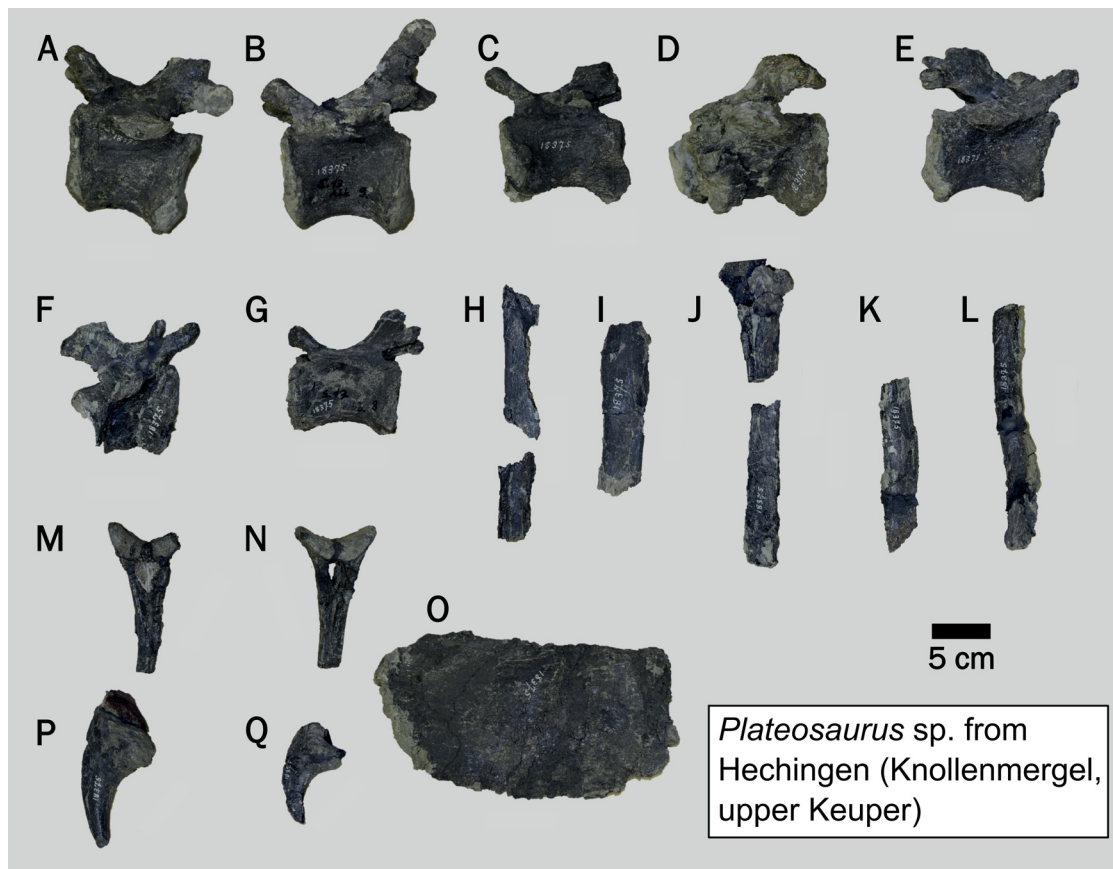


### Preservation

The preservation is type 1, but unlike the rest of the material in the collection, its colouration is black. This was a feature from the original finding, according to von Huene (1915: ‘On the slope of the Starzelufer [...] black bones were seen in the summer of 1911’ [translated from German]). Currently, the tooth (von Huene 1915: fig. 7), the forearm (von Huene 1915: fig. 6), the tibia and the foot (von Huene 1915: fig. 10) are missing from the collection.

### Stratigraphic level

Based on von Huene’s (1915) account, the material comes from the upper Knollenmergel. As mentioned in the Geological outline, it is not possible to know if Knollenmergel means Trossingen Formation or if this was referred to as a time unit. The Pylonotenbank is an outcrop of the Pylonotenton Formation in Tübingen, which corresponds to the Black Jura (Schwarzer Jura), the lowest level of the Jurassic in the South Germany basin (Bloos *et al.* 2006).



**Fig. 20.** Material collected in Hechingen, an outcrop of the Knollenmergel, known as the historical collection number “GPIT 18375”. **A.** GPIT-PV-60357, middle caudal in left lateral view. **B.** GPIT-PV-60360, middle caudal in left lateral view. **C.** GPIT-PV-60359, middle caudal in left lateral view. **D.** GPIT-PV-60358, middle caudal in left ventrolateral view. **E.** GPIT-PV-60356, middle caudal in right lateral view. **F.** GPIT-PV-60361, anterior caudal in right lateral view. **G.** GPIT-PV-60362, anterior caudal in left lateral view. **H.** GPIT-PV-60355, chevron in left lateral view. **I.** GPIT-PV-60353, chevron in left lateral view. **J.** GPIT-PV-60352, chevron in left lateral view. **K.** GPIT-PV-60354, chevron in left lateral view. **L.** GPIT-PV-60351, chevron in left lateral view. **M.** GPIT-PV-60348, chevron in left lateral view. **N.** GPIT-PV-60347, chevron in left lateral view. **O.** GPIT-PV-60350, distal part of the scapular blade. **P.** GPIT-PV-60349, manual ungual. **Q.** GPIT-PV-60346, presumed manual ungual.

## Status

The tooth, the forelimb, the ribs and the tail were interpreted by von Huene (1915) as being part of the same individual that he referred to as *Plateosaurus* sp., with the exceptions of one of the claws (GPIT-PV-60349), which he suggested belonged to a different dinosaur. Further work is needed to determine if this specimen is indeed a juvenile of *Plateosaurus*, but we keep this determination for the time being.

## Year 1912: historical number “GPIT 18392”

label j in Fig. 1, number 7 in Fig. 2, Fig. 21

## Bone specimens

GPIT-PV-43792, GPIT-PV-60488 to GPIT-PV-60500, GPIT-PV-60505 to GPIT-PV-60511, GPIT-PV-60516 to GPIT-PV-60519, GPIT-PV-60539 to GPIT-PV-60541, GPIT-PV-60543 to GPIT-PV-60558, GPIT-PV-60561, GPIT-PV-60563 to GPIT-PV-60566, GPIT-PV-72541, GPIT-PV-111896, GPIT-PV-111897, GPIT-PV-111899 (Fig. 21).

## Taxonomic history

The material was discovered in March 1912 by von Huene in Rottweil, a locality situated near Aixheim (label g in Fig. 1) (Hungerbühler 1998). Von Huene (1915: pl. 6 fig. 3a–b) referred to this material as “*Teratosaurus*” *suevicus* (species 28 in Fig. 3). Galton (1999) referred to it as ‘*Sellosaurus*’ *gracilis* (species 20 in Fig. 3). Galton’s (1999) “UT (University of Tübingen), large individual, Aixheim, near Rottweil” refers to the ‘*Sellosaurus*’ complex found in the late 19<sup>th</sup> century (label j in Fig. 1); “UT 18392” corresponds to “GPIT 18392”, and it is also referred to as “Aixheim” material in the literature (e.g., Hungerbühler 1998). Galton (1999) considered the ‘*Sellosaurus*’ complex as having three sacral vertebrae, whereas “GPIT 18392” was interpreted as having only two (Galton 1999); however, only one sacral

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**Fig. 21** (see next page). Specimen “GPIT 18392”, the number which represents not a catalogue number but a number given to the finding during the excavation in 1912. **A.** GPIT-PV-60507, dorsal vertebra 5. **B.** GPIT-PV-60509, dorsal vertebra 11. **C.** GPIT-PV-60508, dorsal vertebrae 12 and 13. **D.** GPIT-PV-60517, dorsal vertebra 10. **E.** GPIT-PV-60519, dorsal vertebra. **F.** GPIT-PV-60518, dorsal vertebra. **G.** GPIT-PV-60510, sacral vertebra. **H.** GPIT-PV-60511, dorsal vertebra. **I.** GPIT-PV-60516, caudal vertebra. **J.** GPIT-PV-60506, anterior caudal vertebra. **K.** GPIT-PV-60493, chevron from anterior caudal. **L.** GPIT-PV-60561, chevron from anterior caudal. **M.** GPIT-PV-60493, chevron from anterior caudal. **N.** GPIT-PV-60493, chevron from anterior caudal. **O.** GPIT-PV-60488, one phalanx, possibly pedal phalanx. **P.** GPIT-PV-60488, pedal ungual. **Q.** GPIT-PV-60489, indeterminate remains. **R.** ribs: a = GPIT-PV-60539, left dorsal rib 7; b = GPIT-PV-60541, right dorsal rib 8; c = GPIT-PV-60540, left cervical 10; d = GPIT-PV-60552, right dorsal rib 4, e = GPIT-PV-60553, right dorsal rib 1; f = GPIT-PV-60554, right dorsal rib 2; g = GPIT-PV-60556, right cervical rib 9; h = GPIT-PV-60558, left dorsal rib 9; i = GPIT-PV-60555, left dorsal rib 12; j = GPIT-PV-60557, left dorsal rib 11; k = GPIT-PV-60543, left dorsal rib 6; l = GPIT-PV-60544, left dorsal rib 10; m = GPIT-PV-60545, left dorsal rib 5; n = GPIT-PV-60546, right dorsal rib 10; o = GPIT-PV-60547, right dorsal rib 9; p = GPIT-PV-60551, right dorsal rib 8; q = GPIT-PV-60550, right dorsal rib 5; r = GPIT-PV-60548, right dorsal rib 7; s = GPIT-PV-60549, right dorsal rib 7. **S.** GPIT-PV-60566, left fibula. **T.** GPIT-PV-60490, pedal phalanx. **U.** GPIT-PV-60488, pedal phalanx. **V.** GPIT-PV-60500, fragmentary bones: t = bone fragment identified as ‘g’ in Hungerbühler (1998: fig. 4), u = bone fragment identified as ‘f’ in Hungerbühler (1998: fig. 4), v = bone fragment identified as ‘e’ in Hungerbühler (1998: fig. 4), w = bone fragment identified as ‘n’ in Hungerbühler (1998: fig. 4). **W.** GPIT-PV-60494, pedal phalanx. **X.** GPIT-PV-60565, right pubis. **Y.** left femur in two parts, GPIT-PV-60496 (proximal) and GPIT-PV-60495 (distal). **Z.** GPIT-PV-60563, right ischium. **AA.** carnivorous teeth that do not belong to sauropodomorphs, GPIT-PV-60491, GPIT-PV-60497, GPIT-PV-60498, GPIT-PV-60499.



was part of the original material, and the ilium where the sacral scars were probably visible is lost (see Preservation). Yates (2003) tentatively referred to “GPIT 18392” as *Pl. gracilis* (species 20 in Fig. 3).

### **Description**

According to Hungerbühler (1998), the original material, as described by von Huene (1915: 15–24, pls 4–7), included a fragmentary surangular, six dorsal vertebrae, one sacral vertebra, five caudal vertebrae, part of the rib cage, a complete set of gastralia, five chevrons, both ischia, left ilium and pubis, right tibia, fibula, and foot. In addition, Hungerbühler (1998) reported that the gastral complex, the sacral, the first caudal vertebrae, the left ilium, the right tibia and foot, and several fragments were lost.

### **Preservation**

The skeletal material mostly has a type 1 preservation. The femur (Fig. 21Y) and some vertebral elements (Fig. 19A–C) are mediolaterally compressed. The individual ribs were broken in several pieces and their specimen numbers did not match the original elements (Fig. 19R), but we were able to reconstruct them following von Huene (1915: 15–24, pls 4–7) and updated their collection numbers.

### **Stratigraphic level**

Although the original finding site is no longer available and the layers have been overgrown since the excavation of “GPIT 18392” (Hungerbühler 1998), von Huene (1915) described some sedimentological information. “GPIT 18392” was found in the Untere Mühle on the southern slope of the Trosselbach Valley (Hungerbühler 1998) (label j in Fig. 1). Just like “GPIT 18064”, “GPIT 18392” was found in the erosional contact of two facies, a basal sandstone overlain by mudstone but corresponding to the top unit of the middle Stubensandstein (Hungerbühler 1998) (number 7 in Fig. 2).

### **Status**

Further revision needs to be done regarding a comparison between the holotype of *Pl. trossingensis* and the holotype of *Pl. gracilis*. However, given that this specimen has already been described in detail in Hungerbühler (1998) as part of *Pl. gracilis*, we refer to this specimen as *Pl. gracilis*.

**Years 1921–1923: historical number “GPIT E”**  
label l in Fig. 1, number 10 in Fig. 2, Figs 22–23

### **Bone specimens**

GPIT-PV-60234 to GPIT-PV-60236.

### **Taxonomic history**

Von Huene (1932) erected the species ‘*Pachysaurus giganteus*’ (species 13 in Fig. 3), referring to the three large metatarsals. Subsequently, it was reclassified as *Gresslyosaurus ‘giganteus*’ by Steel (1970). The paedogenic deformation of these specimens does not allow determining any affinities with known sauropodomorphs, and Galton (2001a) considered this species to be a nomen dubium. Galton figured these specimens (2001a: 4f, 10f), tentatively identified them as three fibulae and referred to them as *Plateosaurus ‘longiceps*’ (species 7 in Fig. 3).

### **Description**

The three metatarsals were catalogued as “Block 98” (field number referring to one unique block found in the excavation). A large amount of plaster keeps the material together, and the surface is crumbly (Fig. 23). The interpretation by von Huene (1932) that the block contained elements from the same individual is

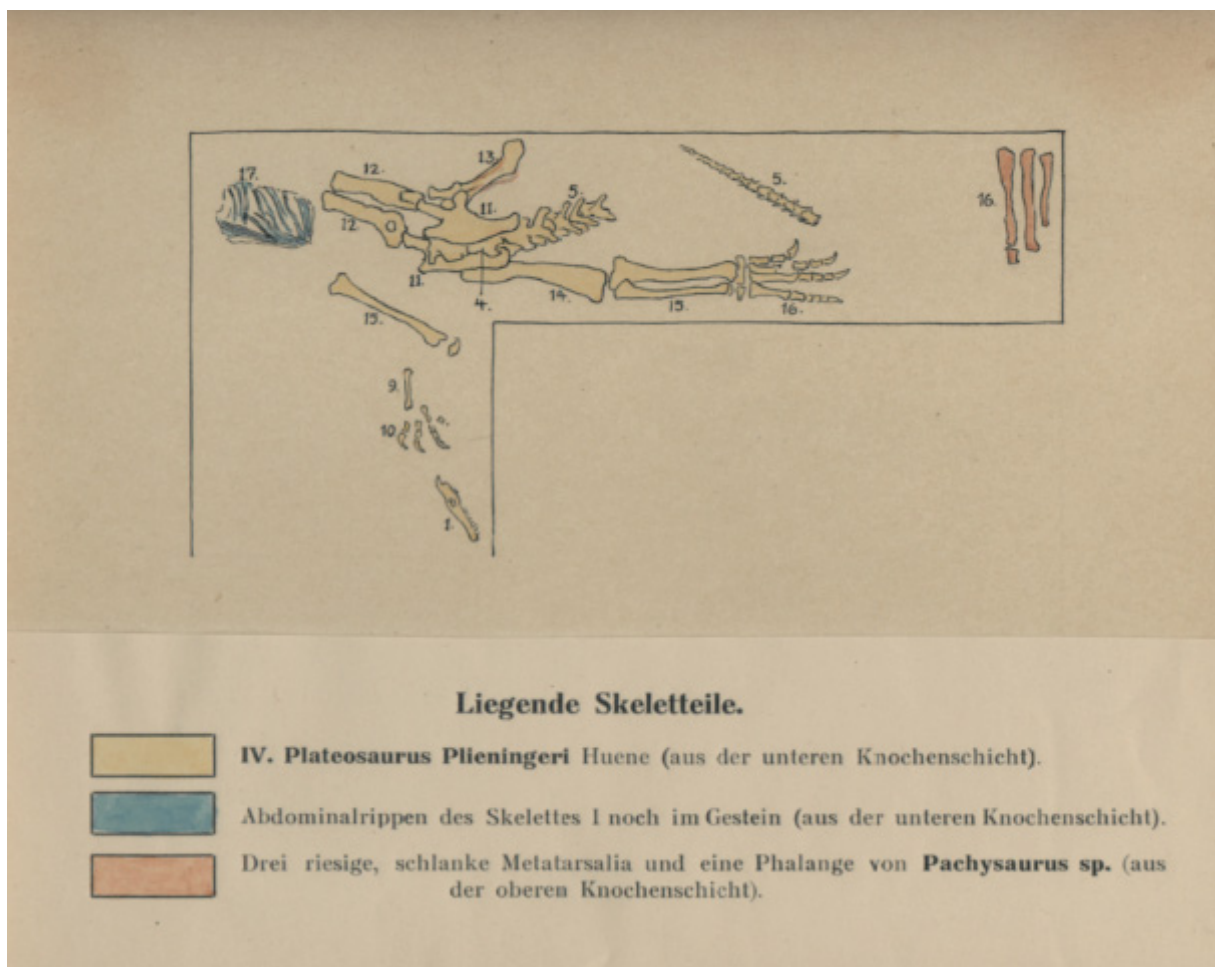
probably accurate, but each metatarsal has been given a new catalogue number: GPIT-PV-60234, GPIT-PV-60235, and GPIT-PV-60236.

### Preservation

The material is poorly preserved, and a considerable portion has been reconstructed with plaster. Currently, its preservation resembles type 4, although this likely includes post-preparation damage.

### Stratigraphic level

The specimen comprises three large metatarsals collected from the upper bone bed from the Obere Mühle, an outcrop of the Trossingen Formation (label k in Fig. 1). These metatarsals were collected during an expedition organised by von Huene between 1921 and 1923 (von Huene 1932) (number 10 in Fig. 2).



**Fig. 22.** Most of this “Lying Skeleton Parts” corner was removed in the 60s and comprised three historical specimens: “skeleton IV”, referred to as *Plateosaurus ‘plieningeri’*, most of it now the holotype of *Tuebingosaurus maierfritzorom* Regalado Fernández & Werneburg, 2022, the gastralia blocks of specimen GPIT-PV-30784 (“GPIT I”), and three metatarsals that make up the holotype of ‘*Pachysaurus giganteus*’ von Huene, 1932 (Fig. 23), or historical number “GPIT E”. Explanation of the numbers: 1. = cranial material; 4. = sacral vertebrae; 5. = caudal vertebrae; 9. = radius and ulna (forearm); 10. = manus; 11. = ilium; 12. = pubis; 13. = ischium; 14. = femur (thigh); 15. = tibia and fibula (lower leg); 16. = pes; 17. = abdominal ribs (gastralia).

### Status

*Pachysaurus giganteus* is a nomen dubium since the preservation does not allow us to identify diagnostic features or compare them to other similarly sized sauropodomorphs.



**Fig. 23.** The holotype of *Pachysaurus giganteus* von Huene, 1932 (comprises three metatarsal bones, poorly preserved and heavily reconstructed as it was mounted in a now dismantled display). **A.** Drawing of the dismantled corner, details in Fig. 22. **B.** Drawing of specimen “GPIT E”. **C.** GPIT-PV-60234, metatarsal II. **D.** GPIT-PV-60235, metatarsal III. **E.** GPIT-PV-60236, metatarsal IV.

**Years 1921–1923: historical number “GPIT I”**  
label k in Fig. 1, number 9 in Fig. 2, Figs 13B, 24–25

**Skeleton specimen**

GPIT-PV-30784.

**Bone specimens**

GPIT-PV-60223, GPIT-PV-60251, GPIT-PV-60253 to GPIT-PV-60254, GPIT-PV-60256 to GPIT-PV-60257, GPIT-PV-60260, GPIT-PV-60274 to GPIT-PV-60278, GPIT-PV-60336 to GPIT-PV-60339, GPIT-PV-111840, GPIT-PV-111842, GPIT-PV-111845 to GPIT-PV-111854.

**Taxonomic history**

The skeleton was described and illustrated by von Huene (1926, 1928, 1932) and was initially referred to as *Pl. ‘quenstedti’* (species 3 in Fig. 3). Galton (2001a) reclassified the specimen GPIT-PV-30784 as *Pl. longiceps* (species 7 in Fig. 3), along with the specimen AMNH FARB 6810 (label k in Fig. 1, number 9 in Fig. 2), which was also collected during the same expedition.

Based on von Huene’s (1932) account, this skeleton represents a single individual, and we have assigned it the catalogue number GPIT-PV-30784. The anatomy of this individual has been compared to that of specimen SMNS 13200, the holotype for *Pl. trossingensis*, and it is tentatively referred to as *Pl. trossingensis*, but a redescription of SMNS 13200 is needed before a definitive classification can be made.

To facilitate future taxonomic work, we document each time GPIT-PV-30784 has been illustrated, under which catalogue numbers, and species names:

1. Mentioned as “GPIT I” by von Huene (1926: pl. 5 fig. 9), also identified as “Block 208”.
2. The braincase was illustrated by Galton (1985a: fig. 3m–o), and the dorsal view of the retroarticular process of the mandible by Galton (1985a: fig. 9f). Galton (1985a: table 2) also provided cranial measurements of several skull elements.
3. A skull reconstruction can be found in Galton (2001a: fig. 3d; 2001b: fig. 13d), referred to as *Pl. ‘quenstedti’*.
4. The premaxilla and maxilla were illustrated in Yates (2003: fig 1c) as “GPIT Skelett 1”.
5. The left manus was illustrated as “UT1” – University of Tübingen – in Galton (1971: text-fig. 12), referred to as *Plateosaurus*, and as “GPIT I” in Galton (1999: fig. 18), referred to as *Pl. longiceps*.
6. The sacrum was illustrated as “GPIT I” in Galton (1999: figs f–j) as *Pl. longiceps*, and as “UT1” referred to as *Plateosaurus* sp. in Galton (2000: fig. 5). Photographs and outlines of the sacrum (as “GPIT I”) were published in Galton (2001a: figs 5, 6f–j), also referred to as *Pl. longiceps*.
7. Yates (2003: fig. 3c) illustrated the sacrum in lateral view as “GPIT Skelett 1” and referred to it as *Pl. ‘engelhardti’*.
8. The left ilium in medial view was illustrated as “GPIT I” in Galton (2001b: fig. 10h).
9. Specimen illustrated in von Huene (1928: pl. 10) as “Plateosaurus-Skelettes Nr. 1 von Trossingen (*Pl. Quenstedti* H.)” and reprinted as “find 1” in Sander (1992: fig. 12A) and Galton (1999: fig. 7e).
10. The digitalized material was published in Mallison *et al.* (2009) and Mallison (2010) as “GPIT1” and referred to as *Pl. ‘engelhardti’*.
11. The cervical vertebrae of “GPIT I” were measured and illustrated in Böhmer *et al.* (2015) using the old catalogue number GPIT/RE/7288 and referred to as *Pl. ‘engelhardti’*.
12. Selected elements of the skull were illustrated in Lallensack *et al.* (2021: figs 4b, 6b and supplementary material).

### Description

GPIT-PV-30784 corresponds to an almost complete skeleton including a skull (Fig. 24A–B), a complete vertebral column, both forelimbs with few elements missing from the right forearm and manus, and both hindlimbs, with few elements missing from the right pes.

### Preservation

The skeleton is almost complete with type 1 and 2 preservation. The cortical bone is flaky, and there are no signs of compression deformation. The skull is disarticulated on the left side and is currently stored in the vault, whereas the rest of the skeleton is mounted on display in the Plateosaurus Hall.

### Stratigraphic level

This skeleton was collected from the lower dinosaur bone bed at the Obere Mühle quarry during the expedition of 1922–23 (label k in Fig. 1), currently considered part of the upper portion of the Trossingen Formation (number 9 in Fig. 2).

### Status

This specimen has been combined with other specimens to form the OTU *Pl. 'engelhardti'* in the Regalado Fernandez & Werneburg 2022. This specimen can be considered *Plateosaurus* cf. *trossingensis*, which is more complete than the holotype SMNS 13200.

### Years 1921–1923: historical number “GPIT II”

label k in Fig. 1, number 9 in Fig. 2, Figs 13A, 26

### Skeleton specimen

GPIT-PV-30785.

### Taxonomic history

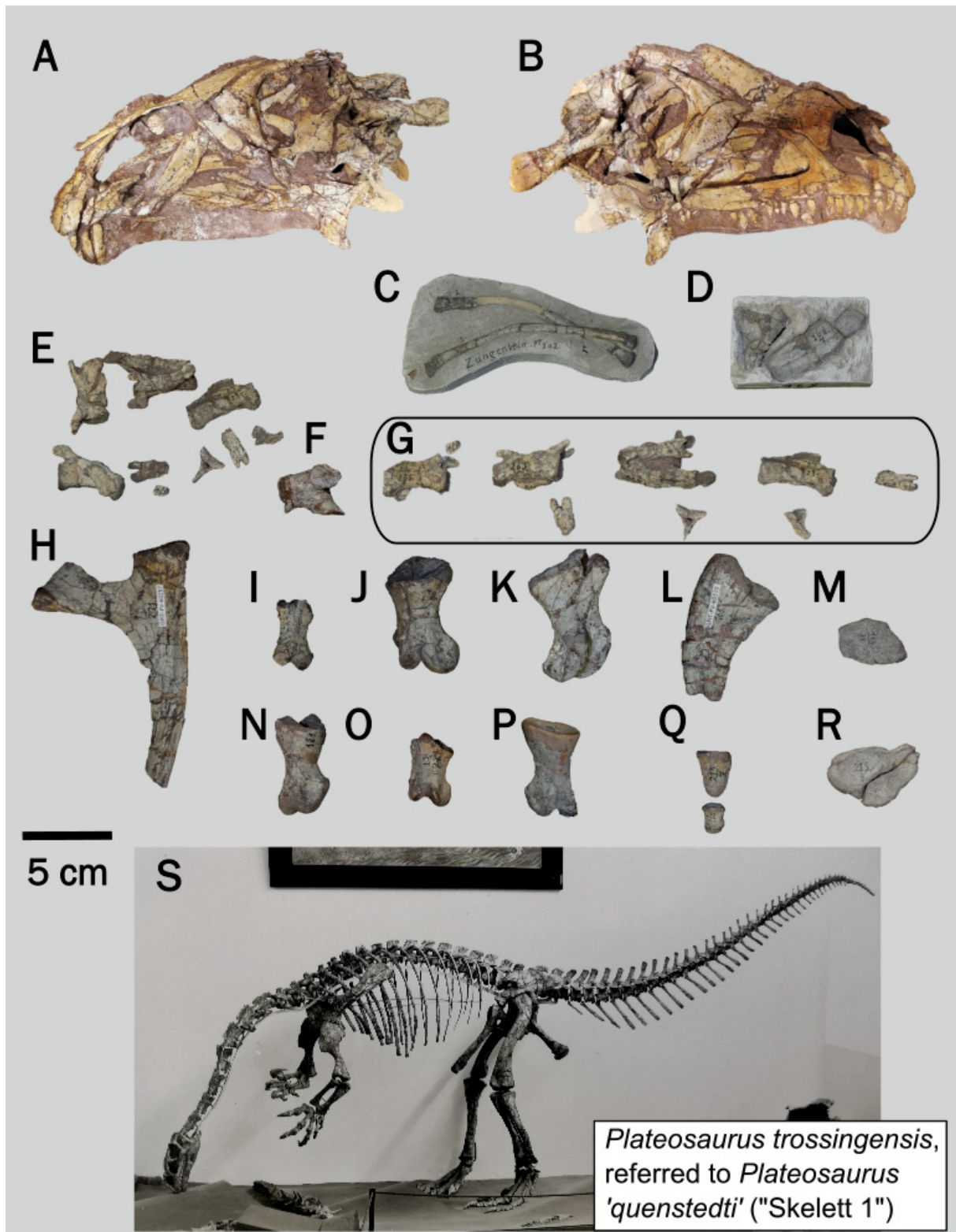
This specimen, like the preceding one, is also displayed in the Tübingen Plateosaurus Hall next to the specimen GPIT-PV-30784. Unlike specimen GPIT-PV-30784, GPIT-PV-30785 is a composite, and von Huene illustrated the composition of the specimen in unpublished diagrams. Von Huene (unpublished, Fig. 26) described that the composite comprises elements from two species: *Pl. 'quenstedti'* (species 3 in Fig. 3) and *Pl. 'erlenbergensis'* (species 2 in Fig. 3).

GPIT-PV-30785 has been used to illustrate the anatomy of *Pl. trossingensis*, but given the composite nature of this specimen, we recommend restricting *Pl. trossingensis* to GPIT-PV-30784 in the GPIT Collection. To help future taxonomic work, we document the times that GPIT-PV-30785 has been illustrated and under

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**Fig. 24** (see next page). Skeletal elements of specimen GPIT-PV-30784 historically known as “GPIT I”. **A–B.** GPIT-PV-111840, skull. **A.** In left lateral view. **B.** In right lateral view. **C.** GPIT-PV-60260, hyoid bones. **D.** GPIT-PV-60336, sternal plates. **E.** GPIT-PV-60223, six distal caudals with chevrons. **F.** GPIT-PV-60256, half of a distal caudal. **G.** GPIT-PV-60223, four distal caudals with chevrons. **H.** GPIT-PV-60257, capitulum and tuberculum of left dorsal 15. **I.** GPIT-PV-60274, manual phalanx. **J.** GPIT-PV-60275, manual phalanx. **K.** GPIT-PV-60276, manual phalanx. **L.** GPIT-PV-60339, ungual I.1. **M.** GPIT-PV-60254, distal tarsal. **N.** GPIT-PV-60253, manual phalanx. **O.** GPIT-PV-60277, manual phalanx. **P.** GPIT-PV-60278, manual phalanx. **Q.** GPIT-PV-60337, manual phalanges V.1 and V.2. **R.** GPIT-PV-60338, distal carpal. **S.** Mounted skeleton, photograph taken in the ca 1960 (archive photo UAT 678/73); the skull on display is a cast from the skull of specimen SMNS 13200.

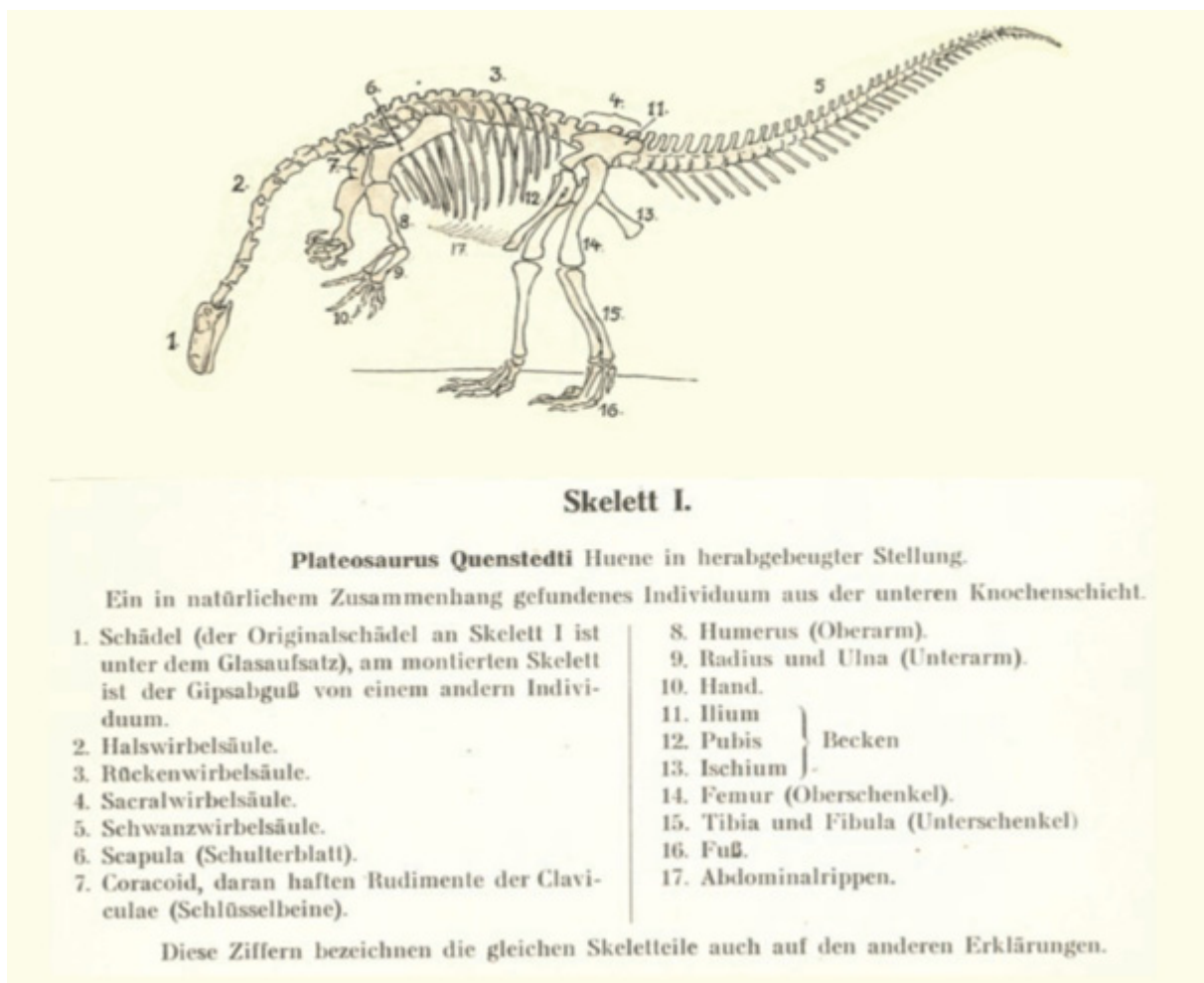




which catalogue numbers and species names. The left pubis is illustrated as “GPIT Skelett 2” in Yates (2003: text-fig. 6e–f) referred to as *Pl. ‘engelhardti’*, which would correspond to the “GPIT IIe.i” that has been identified as *Pl. ‘erlenbergiensis’*. The conjoined ischia are illustrated as GPIT Skelett 2” in Yates (2003: text-fig. 7c–d) and referred to as *Pl. ‘engelhardti’*. These elements also belong to “GPIT IIe.i”.

## Description

The unpublished diagram (Fig. 26) suggests that the composite specimen includes two species. However, it is unclear whether each species includes several individuals or if each species corresponds to a single individual. *Plateosaurus ‘quenstedti’* is represented by the dorsal vertebrae 13–15, 3 sacral vertebrae, 42 caudal vertebrae, a partial shoulder girdle, elements of the forelimb, a pelvis with a closed obturator

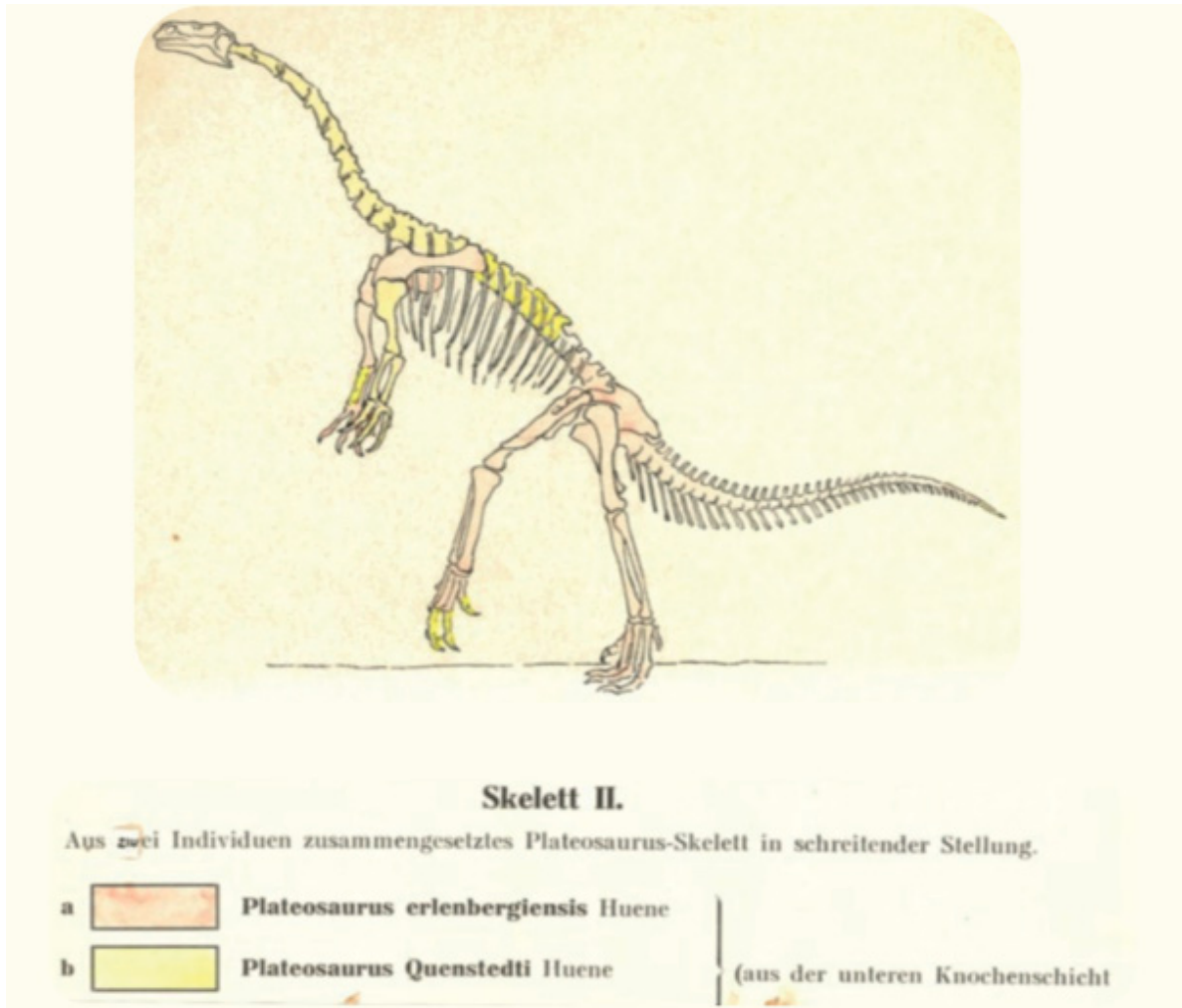


**Fig. 25.** Illustration of specimen “GPIT Skelett I” by von Huene (new catalogue number: GPIT-PV-117990). The translation of the text is as follows: “Skeleton 1. *Plateosaurus Quenstedti* Huene in a bent down position. An in natural context found individual from the lower bone layer. 1. Skull (the original skull on skeleton I is under the glass top), on the mounted skeleton is the plaster cast of another individual. 2. Cervical vertebrae. 3. Dorsal vertebrae. 4. Sacral Vertebrae. 5. Caudal vertebrae. 6. Scapula (shoulder blade). 7. Coracoid, attached to which are rudiments of the clavicles (collar bones). 8. Humerus (upper arm). 9. Radius and ulna (forearm). 10. Hand. 11. Ilium. 12. Pubis. 13. Ischium. 14. Femur (thigh). 15. Tibia and fibula (lower leg). 16. Foot. 17. Abdominal ribs. These numbers denote the same skeletal parts on the other explanations.” [Fig. 13].

foramen, and hindlimbs (“GPIT IIq” sensu Galton 2001a). *Plateosaurus erlenbergiensis*’ is represented by the cervical vertebrae, most of the dorsal series, forelimb elements, and the left foot (“GPIT IIe.i” sensu Galton 2001a).

### Stratigraphic level

The skeletal remains were collected from the lower dinosaur bone bed at the Obere Mühle quarry during the expedition of 1922–23 (label k in Fig. 1), currently considered part of the upper portion of the Trossingen Formation (number 9 in Fig. 2).



**Fig. 26.** Illustration of specimen “GPIT Skelett II” by von Huene (new catalogue number: GPIT-PV-117990). The drawing shows that the mounted skeleton is composed of at least two individuals that von Huene identified as two different species both found in the lower dinosaur bone bed from Obere Mühle. In orange (a) are elements that were referred to as *Plateosaurus erlenbergiensis* von Huene, 1905, which includes both scapulae, the right humerus, some elements of the right hand, the posterior-most part of the dorsal series, the pelvis, most of the left hindlimb, a complete right hindlimb, and the caudal series – this assemblage is what Galton (2001a) identified as “GPIT IIe”. In yellow (b) are elements that were referred to as *Plateosaurus quenstedti* von Huene, 1905, and this includes the cervical series, most of the dorsal series, the right humerus, right and left forelimbs, and some elements of the right and left hands, as well as elements of the pes. The skull is not coloured as it was a cast of the specimen in Stuttgart, SMNS 13200.

### Status

Further studies are needed to assess the identity of the two specimens combined to form the mount. Therefore, we remove this specimen from *Plateosaurus trossingensis* and consider the assemblage as cf. *Plateosaurus*.

**Years 1921–1923: historical number “GPIT III”**  
label k in Fig. 1, number 10 in Fig. 2, Figs 13E, 14, 27

### Skeletal specimen

GPIT-PV-30786.

### Taxonomic history

The specimen was initially referred to as *Plateosaurus robustus* (von Huene 1932) (species 11 in Fig. 3) and corresponded to the posterior half of one individual. Galton (2001a) also referred these skeletal remains to *Pl. ‘robustus’*, and included to his referral specimens SMNS 13200a+e, a partial hind limb and posterior part of the dorsal series, and SMNS 13200d, a complete hind limb, all from the lower bone bed.



**Fig. 27.** Specimen GPIT-PV-30786 on display nowadays in the diorama (as it was originally mounted, Fig. 13E), comprising a complete right hindlimb, the left pes, partial pubes and conjoined ischia, and a series of around 50 caudal vertebrae. The specimen is embedded in a cast matrix.

### Description

The pelvic elements include a complete pair of ischia and the proximal fragments of the pubes, a complete left hindlimb comprising a complete femur, 1.5 times as large as the one in GPIT-PV-30784, a tibia, a fibula, distal tarsal IV, astragalus, calcaneum, and the complete left and right feet (Figs 14, 27). According to von Huene (1932), the first vertebra preserved in the series corresponds to the third sacral, but due to its embedment inside the diorama (Figs 14E, 27), this is impossible to assess.

### Preservation

The material shows preservation of type 3 through most of the skeleton, and, whereas most elements show a dark grey-greenish colouration, the distal-most part of the tail shows a purple colouration like most Knollenmergel material. In addition, the feet are greenish, and the left foot is better preserved than the right one.

### Stratigraphic level

The historical specimen “GPIT III” was collected in 1922 from the upper dinosaur bone bed of Obere Mühle (label k in Fig. 1, number 10 in Fig. 2). According to von Huene (1932), this material corresponded to four blocks (blocks 120–124), and, presumably, they were close to each other on the site. The sizes and articulation of the elements are congruent with our opinion that they belong to the same individual, despite the differential preservation, which can be an artefact caused by the exposure in the diorama.

### Status

The specimen is referred to as cf. *Plateosaurus* and comparisons need to be carried out to establish affinity.

### Years 1921–1923: historical number “GPIT IV”

label k in Fig. 1, number 9 in Fig. 2, Fig. 28

### Skeletal specimen

GPIT-PV-30787.

### Bone specimens

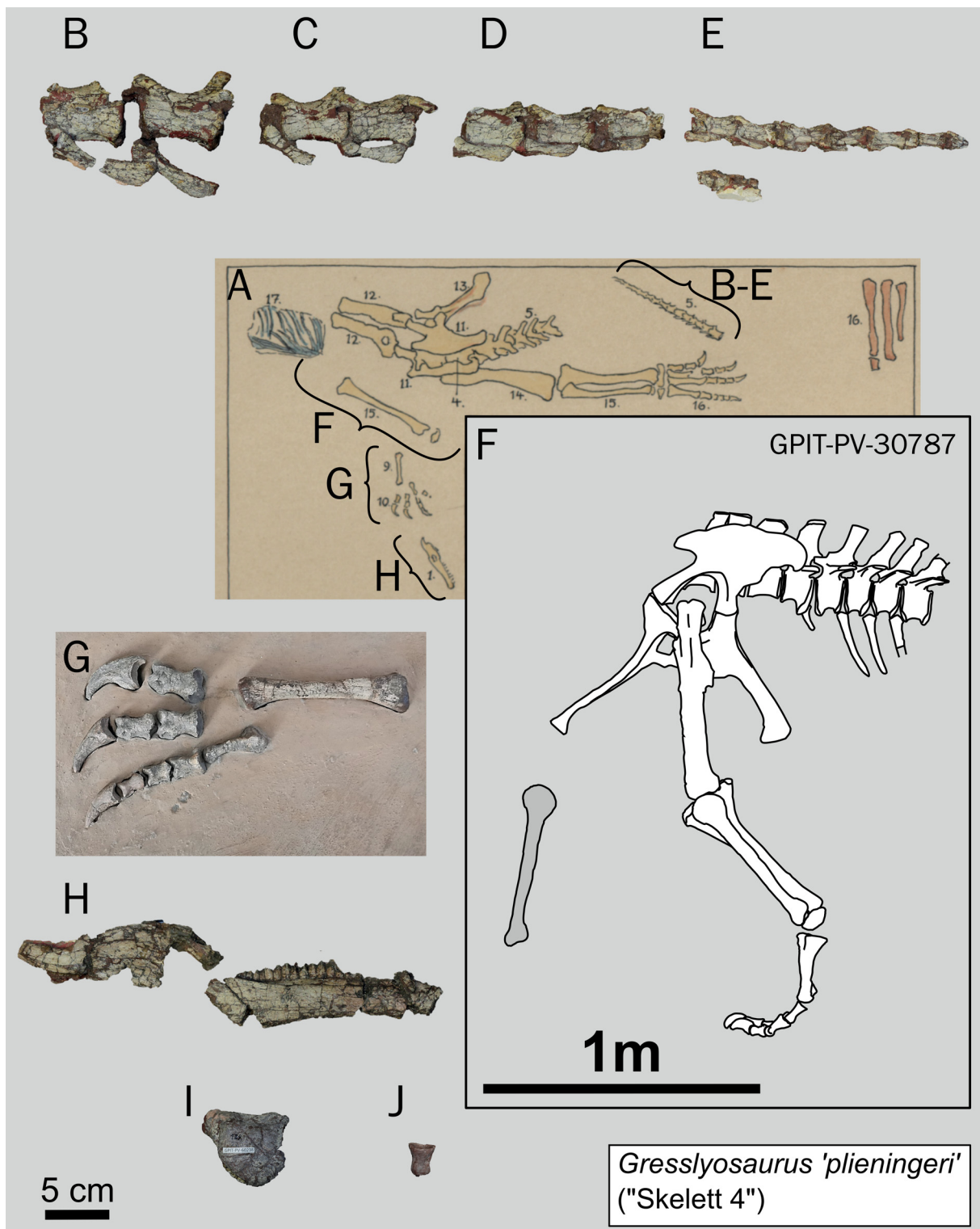
GPIT-PV-60237 to GPIT-PV-60239, GPIT-PV-60287.

### Taxonomic history

Most elements of the historical specimen “GPIT IV” have been designated as the holotype of a new species, *Tuebingosaurus maierfritzorum*, described in Regalado Fernández & Werneburg (2022). The first two caudal vertebrae of “GPIT IV” were illustrated as *Pl. ‘wetzeli’* by Galton (1999: fig. 7d) (species 16 in Fig. 3). However, note that *Pl. ‘wetzeli’* corresponds to another specimen, “GPIT V” (see “GPIT V” in this paper). Galton (2001a: fig. 4a) identified the same drawing as *Pl. longiceps* (species 7 in Fig. 3). Galton (2001b) considered specimen “GPIT IV” to be *Pl. ‘plieningeri’* (species 17 in Fig. 3).

### Status

GPIT-PV-30787 is the holotype of *Tuebingosaurus maierfritzorum* (Fig. 28F). The following elements are not part of the holotype and are considered indeterminate sauropodomorph remains: GPIT-PV-60237, the cast of phalanx V.2 (Fig. 28J, original is lost); GPIT-PV-60238, indeterminate bone fragment (Fig. 28I); GPIT-PV-60239, seven articulated caudal vertebrae with chevrons (Fig. 28B–E); GPIT-PV-60287 [partim], right mandible (Fig. 28H, damaged during its removal from the diorama); GPIT-PV-30787 [partim], radius, ulna, metacarpal V, five non-terminal phalanges, and ungual phalanges (Fig. 28G, it has not been removed as it is embedded in the diorama).



**Fig. 28.** Finding “GPIT IV” or “Skelett 4” described as *Plateosaurus plieningeri*. **A.** GPIT-PV-30784, gastralia block, not part of “GPIT IV”. **B–E.** GPIT-PV-60239, distal caudal vertebrae. **F.** GPIT-PV-30787 [partim], holotype of *Tuebingosaurus maierfritzorum* Regalado Fernández & Werneburg, 2022. **G.** GPIT-PV-30787 [partim], right radius, manual digit I, manual digit II, and manual digit III. **H.** GPIT-PV-60287, right mandible in right lateral view. **I.** GPIT-PV-60238, unidentified fragment. **J.** GPIT-PV-60237 cast of negative mould of the manual phalanx V.1.

**Year 1921–1923: historical number “GPIT V”**  
label k in Fig. 1, number 10 in Fig. 2, Figs 13F, 14, 29

**Skeletal specimen**

GPIT-PV-30788.

**Taxonomic history**

The specimen was designated as the holotype of ‘*Pa. wetzeli*’ (von Huene 1932) (species 16 in Fig. 3), which was later considered a junior synonym of *Pl. engelhardti* by Galton (1985a, 1990) (species 1 in Fig. 3), but made a nomen dubium by Galton (2001a) due to the apparent poor preservation (Fig. 3). The humerus is currently missing. “GPIT V” is the largest specimen in the collection, with the hindlimb about 3 metres long, and it can be found on display in the collection (Fig. 13F). The specimen “GPIT V” is also depicted in the unpublished diagram of the Plateosaurus Hall (Fig. 14).

**Description**

This specimen included eight dorsals (Fig. 29B), an incomplete third sacral vertebra (Fig. 29C), 13 caudal vertebrae (Fig. 29C), most of the left humerus (lost), the ventral half of the left ilium (Fig. 29D), both ischia (Fig. 29D) and pubes (Fig. 29A), and the almost complete left hindlimb (Fig. 29D–G) (von Huene 1932: 105–111, pl. 2; Galton 2001a: figs 4e, 10e). The foot (Fig. 29G) has been illustrated in Galton (2001a: fig. 4e) referred to as *Pl. longiceps*. The third sacral vertebra is illustrated in Galton (2001a: fig. 10a–e).

**Preservation**

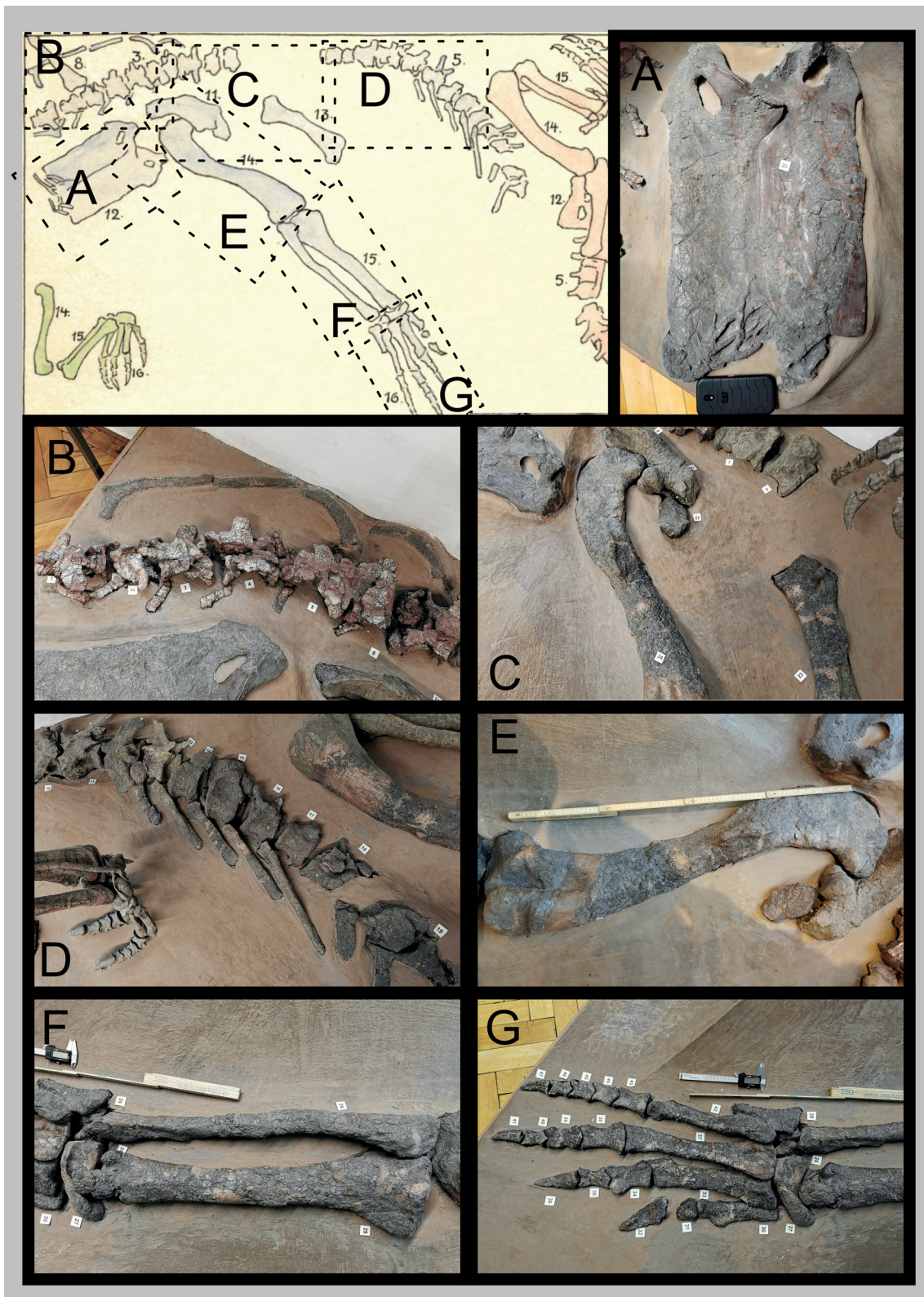
The large size of this material has been attributed to a paedogenic artefact (Moser 2003), where the sediment infilled the bones and made them grow. However, the epiphyses of the long bones do not show exaggerated transversal deformation due to calcite infilling (e.g., Holz & Schultz 1998: fig. 4). The femur is 991 mm long, being one of the longest femora reported so far in the literature (Moser 2003; Hofmann & Sander 2014). However, the shape of the bones is still clearly discernible, and although the cortical bone is flaked, the paedogenic expansion seems to be limited. The vertebrae show chemical dissolution, and several portions of the bones have been deformed. Nevertheless, several anatomical features like a spinopostzygapophyseal fossa in some of the dorsal vertebrae, or the anterior centrodiapophyseal laminae in what is thought to be the anterior part of the dorsal series, are well delimited and identifiable, which suggests that the size of the bones is not just a consequence of paedogenic deformation. The proportions of the femur to the tibia and the pedal phalanges are similar to those of other sauropodomorphs, indicating a uniform paedogenic deformation through the hindlimb. The total length of the hindlimb is almost 3 m and suggests this is evidence of the largest sauropodomorph from Late Triassic from Europe known to date. Unfortunately, the humerus, that was reported in von Huene (1932) and in his unpublished drawing, is currently lost.

**Stratigraphic level**

“GPIT V” was collected in 1922 from the upper dinosaur bone bed of Obere Mühle, Trossingen Formation (label k in Fig. 1; number 10 in Fig. 2).

**Status**

Further work can be done on this material to determine its identity, but we remove it from *Plateosaurus* (see the Systematic palaeontology section below).



**Fig. 29.** Skeletal elements of specimen GPIT-PV-30788 on display in the diorama. **A.** Both pubes with some gastric ribs. **B.** Probably nine dorsal vertebrae, two sacral vertebrae. **C.** Twelve caudal vertebrae. **D.** A partial left ilium, conjoined ischia. **E.** Left femur. **F.** Left tibia, left fibula, left astragalus. **G.** Two distal tarsals, five metatarsals, partial digits.



**Years 1921–1923: historical number “GPIT VI”**  
label k in Fig. 1, number 9 in Fig. 2, Figs 13G, 14, 30

**Skeletal specimen**

GPIT-PV-30789.

**Taxonomic history**

This specimen was referred to as *Pl. ‘quenstedti’* in an unpublished drawing by von Huene (Fig. 14).

**Description**

A left hindlimb with the femur, tibia, fibula, distal tarsals, metatarsals, and pedal phalanges (Fig. 30).



**Fig. 30.** Skeletal elements of specimen GPIT-PV-30789 on display in the diorama, referred to as *Plateosaurus ‘quenstedti’* by von Huene (see Fig. 14) comprising a right hindlimb, with a femur, a tibia, a fibula, and a complete pes.

### Preservation

The specimen has a combination of preservation types 1 and 2.

### Stratigraphic level

The specimen, still partially unprepared inside the original matrix and embedded in plaster on display in the Plateosaurus Hall, was collected from the lower dinosaur bone bed of the Obere Mühle (label k in Fig. 1, number 9 in Fig. 2).

### Status

The specimen can be considered part of *Pl. trossingensis* (species 8 in Fig. 3) as the overall morphology of the femur and tibia is similar to that of GPIT-PV-30784, consistent with von Huene's (1932) reasoning that this limb could be referred to *Pl. 'quenstedti'* (species 3 in Fig. 3), which is considered here to be a subjective synonym of *Plateosaurus trossingensis*.

### Years 1921–1923: material from Trossingen catalogued by Weishampel (1983)

label k in Fig. 1, numbers 9–10 in Fig. 2, Fig. 31

### Bone specimens

GPIT-PV-60210 to GPIT-PV-60222, GPIT-PV-60224 to GPIT-PV-60233, GPIT-PV-60261 to GPIT-PV-60265.

### Taxonomic history

This material has not been described or identified.

### Description

According to Weishampel (1984), all the material in the Palaeontological Collection of the University of Tübingen had already been collected by the time he was a guest and by the time Frank Westphal (1930–2022) was a curator. A piece of paper attached to one of the drawers shows an attempt to tally the specimens.

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**Fig. 31** (see next page). Uncatalogued material separated as “Weishampel 1983” in the collection, presumably from the expedition led by von Huene between 1922–1923 to Obere Mühle. **A.** GPIT-PV-60210, fragment of a right mandible in medial view. **B.** GPIT-PV-60225, left maxilla in lateral view. **C.** GPIT-PV-60224, right maxilla in lateral view. **D.** GPIT-PV-60214, dorsal vertebra in right lateral view. **E.** GPIT-PV-60215, dorsal vertebra in right lateral view. **F–G.** GPIT-PV-60220, anterior caudal vertebra in right lateral view (F) and in dorsal view (G). **H.** GPIT-PV-60221, anterior caudal vertebra in anterior view and associated fragment. **I.** GPIT-PV-60222, anterior caudal vertebra in left lateral view and associated fragments. **J.** GPIT-PV-60219, middle caudal vertebra in right lateral view. **K.** GPIT-PV-60228, middle caudal vertebra in right ventrolateral view. **L.** GPIT-PV-60229, middle caudal vertebra in right lateral view. **M.** GPIT-PV-60233, posterior caudal vertebra in right lateral view. **N.** GPIT-PV-60232, posterior caudal vertebra in right lateral view. **O.** GPIT-PV-60231, distal caudal vertebra in left lateral view. **P.** GPIT-PV-60226, left metacarpals I to IV in anterior view. **Q.** GPIT-PV-60227, right metacarpal II. **R.** GPIT-PV-60212, left metatarsal IV. **S.** GPIT-PV-60213, left metatarsal IV. **T.** GPIT-PV-60217, left metatarsal I. **U.** GPIT-PV-60265, chevron in lateral view. **V.** GPIT-PV-60264, chevron in lateral view. **W.** GPIT-PV-60261, chevron in anterior view. **X.** GPIT-PV-60262, chevron in anterior view. **Y.** GPIT-PV-60261, chevron in lateral view. **Z.** GPIT-PV-60211, right pubis in anterior view. **AA.** GPIT-PV-60216, right ilium in lateral view.



On the paper sheet found in the collection, the specimens in the Plateosaurus Hall are relabelled as follows: “GPIT I” = 1603/1, “GPIT II (anterior half)” = 1603/2, “GPIT II (posterior half)” = 1603/3, “GPIT III” = 1603/4, “GPIT IV” = 1603/5, “GPIT V” = 1603/6, “GPIT VI” = 1603/7, “GPIT VII” = 1603/33 (unknown specimen), “GPIT E” = 1603/32. The specimens of this complex have two numbers written down on the surface of the bones: one with small numbers in black ink that are similar to the excavation numbers written on other bones collected from the Obere Mühle, and a new number in blue ink that continues the succession 1603/n for the specimens on display. The material in this list includes a right maxilla (1603/8, Fig. 31A), a left maxilla (1603/9, Fig. 31B), a right mandible (1603/10, Fig. 31C), a right ilium (1603/11, Fig. 31AA), a right pubis (1603/12, Fig. 31Z), a left femur (1603/13), a partial left hand (metacarpal I, metacarpal III, metacarpal IV and metacarpal V, all 1603/14, Fig. 31P), two right metacarpals II (1603/15, Fig. 31Q, 1603/16), a right metatarsal I (1603/17, Fig. 31T), two left metatarsals IV (1603/18, Fig. 31R, 1603/19, Fig. 31S), two dorsal vertebrae (1603/20, Fig. 31F–H), and seemingly a caudal series (1603/20–31, Fig. 31I–O).

Based on the black ink numbers, which we interpret as probably being the excavation numbers, these findings were isolated and do not correspond to any of the individuals on the diorama. They also do not correspond to the same individual as there are duplicate elements (right metacarpal II and left metatarsal IV); thus, it is possible that the caudal series does not represent one individual either. The most likely provenance of this material is that they are individual isolated elements collected during the excavation and thus never published or illustrated. The Trossingen material is all accounted for in the collection, as most of the lost items reported in Galton (2001a) belong to the material collected between 1840–1900.

### Preservation

These specimens are of a similar size and preservation (type 2 and no deformation), but the presence of two right metacarpals II (GPIT-PV-60227 and GPIT-PV-60230) and two left metatarsals IV (GPIT-PV-60212 and GPIT-PV-60213, Fig. 31R–S) suggests several individuals.

### Stratigraphic level

These specimens were likely collected between 1922 and 1923 from the Obere Mühle outcrop, Trossingen Formation. There is no documentation regarding their stratigraphy, but the elements have a combination of the preservation seen in the material collected from the lower bone bed (types 1 and 2) and preservation from the upper bone bed (types 2 and 3).

### Status

Further work can be done on this material to determine the likely identity of every element, if at all possible, but we remove it from *Plateosaurus*.

### Systematic palaeontology

Class Reptilia Laurenti, 1768  
unranked Sauropsida Huxley, 1864  
unranked Archosauromorpha von Huene, 1946

Genus *Zanclodon* Plieninger, 1846 incertae sedis

*Smilodon* Plieninger, 1846a: 152 [replaced name].

*Zanclodon* Plieninger, 1846b: 247–248.

*Belodon* – Plieninger 1852: 389.

### Type species

*Zanclodon laevis* (Plieninger, 1846).

### *Zanclodon laevis* (Plieninger, 1846)

*Smilodon laevis* Plieninger, 1846a: 152.

*Zanclodon plieningeri* Fraas, 1896: 18 [objective synonym].

*Belodon plieningeri* – Plieninger 1849: 171; 1852: 389.

non *Zanclodon crenatus* Plieninger, 1846 – Fraas 1896: 18.

non *Zanclodon suevicus* (Meyer, 1861) – Fraas 1896: 18.

non *Zanclodon arenaceus* Fraas, 1896: 18.

### Type material

#### Lectotype

GERMANY • a fragmentary maxilla; Swäbisch Hall, Gaildorf, Erfurt Formation of Germany (Ladinian, Middle Triassic); SMNS 6045.

### Remarks

The material collected from the Knollenmergel near Aixheim before 1850 was first referred to as *Zanclodon laevis* by Plieninger (1847: 207) and then as *Belodon plieningeri* (Plieninger 1849: 171; 1852: 389). However, Quenstedt (1885) continued to refer to the material housed in the Palaeontological Collection as *Zanclodon laevis* (species 8 in Fig. 3). Fraas (1896: 18) argued that because in palaeontology and geology, the designation by Quenstedt was so commonplace, the term *Zanclodon laevis* should be transferred to the material in Tübingen to designate the dinosaur material from the Knollenmergel. Fraas (1896) then erected the name *Zanclodon plieningeri* to refer to the fragmentary maxilla SMNS 6045. This decision was challenged by von Huene (1907: 187–190), who suggested *Zanclodon laevis* should be restricted only to the fragmentary maxilla SMNS 6045. For taxonomic stability, *Zanclodon laevis* is restricted only to the maxilla SMNS 6045, and *Zanclodon plieningeri* is an objective synonym of *Zanclodon laevis*. The material in the GPIT collection is an assortment of presumed archosaur remains removed from *Zanclodon*.

The species *Zanclodon crenatus* refers to very fragmentary teeth (von Huene 1907: 239, figs 258–262) that Fraas (1896) identified as belonging to *Belodon* Meyer, 1844. The material comes from the type locality of *Zanclodon laevis* (Gaildorf). *Belodon* is currently considered a valid name of genus of phytosaur. Then this specific name should be removed from *Zanclodon*. *Belodon crenatus* is likely a nomen dubium.

*Teratosaurus suevicus* (species 28 in Fig. 3) was erected by von Meyer (1861) and recombined by Fraas (1896) as *Zanclodon laevis* to designate a large maxilla. This material is removed from *Zanclodon*.

*Zanclodon arenaceus* was erected by Fraas (1896) to identify a fragmentary lower jaw that was similar in morphology to *Z. laevis*. However, this identification is unsubstantiated, and the generic placement is left open, as suggested by Hungerbühler (2001).

unranked Archosauria Cope, 1869  
unranked Crurotarsi Sereno & Arcucci, 1990  
unranked Rausuchia von Huene, 1942

Genus *Teratosaurus* Meyer, 1861

### Type species

*Teratosaurus suevicus* Meyer, 1861.

*Teratosaurus suevicus* Meyer, 1861

*Zanclodon suevicus* – Fraas 1896: 18.

### Type material

#### Holotype

GERMANY • right maxilla; Mittlerer Stubensandstein, Mittelkeuper (middle Norian, Late Triassic); NHMUK PV OR 38646.

### Remarks

Fraas (1896) referred to this maxilla as *Zanclodon suevicus* (species 28 in Fig. 3). The morphology of the maxilla has been identified as an early-branching rausuchian, a group of carnivore archosaurs from the Triassic (Brusatte *et al.* 2009). The genus *Teratosaurus* is therefore excluded from Sauropodomorpha. The species of *Teratosaurus* have been traditionally considered as part of *Plateosaurus gracilis* (species 20 in Fig. 3).

unranked Dinosauria Owen, 1842  
Order Saurischia Seeley, 1888  
Suborder Sauropodomorpha Huene, 1932  
Family Plateosauridae Marsh, 1895

Genus *Plateosaurus* Meyer, 1837

*Platysaurus* Agassiz, 1846: 296.

### Type species

*Plateosaurus trossingensis* Fraas, 1913.

### Other species

*Plateosaurus gracilis* (von Huene, 1905).

*Plateosaurus longiceps* Jaekel, 1913.

*Plateosaurus trossingensis* Fraas, 1913  
Figs 6, 7, 24, 30

*Plateosaurus quenstedti* von Huene, 1905: 348.

### Type material

#### Holotype

GERMANY • almost complete skeleton; Obere Mühle, Trossingen Formation; SMNS 13200.

### Material examined

We treat the following specimens as comparable to *Plateosaurus trossingensis* but with distinctive morphotypes:

#### “GPIT I” (Fig. 24)

GERMANY – **Obere Mühle, Trossingen Formation** • mounted skeleton in the collection, comprises most of the skeleton, and several cast elements, including a cast of the skull of SMNS 13200; GPIT-PV-30784 • original skull of the skeleton embedded partially in matrix; GPIT-PV-111840 • left maxillary; GPIT-PV-111842 • left squamosal; GPIT-PV-111848 • left postorbital; GPIT-PV-111849 • left jugal; GPIT-PV-111845 • left quadratojugal; GPIT-PV-111846 • left quadrate; GPIT-PV-111847 • right quadrate; GPIT-PV-111852 • right squamosal; GPIT-PV-111853 • right postorbital; GPIT-PV-111854 • right jugal; GPIT-PV-111850 • right quadratojugal; GPIT-PV-111851 • hyoid and tongue bones still in the matrix; GPIT-PV-60260 • capitulum and tuberculum of a thoracic rib; GPIT-PV-60257 • fragment of the neural arch of a caudal vertebra; GPIT-PV-60256 • right distal carpal; GPIT-PV-60338 • right manual phalanx; GPIT-PV-60274 • right manual phalanx; GPIT-PV-60275 • right manual phalanx; GPIT-PV-60276 • right manual phalanx; GPIT-PV-60277 • right manual phalanx; GPIT-PV-60278 • right manual claw; GPIT-PV-60339 • left distal phalanx of manual digit V; GPIT-PV-60337 • left manual phalanx; GPIT-PV-60253 • right distal tarsal; GPIT-PV-60254 • six distal caudal vertebrae with three chevrons; GPIT-PV-60223.

**Note:** *Plateosaurus trossingensis*, gracile and medium-sized morphotype. This specimen was referred to as *Pl. ‘quenstedti’* (von Huene 1932).

#### “GPIT VI” (Fig. 30)

GERMANY – **Obere Mühle, Trossingen Formation** • a right femur, a right tibia, a right fibula, a right astragalus, a complete set of the right metatarsals and pedal phalanges, still embedded in the matrix; GPIT-PV-30789.

**Note:** *Plateosaurus cf. trossingensis*, gracile and medium-sized morphotype. Von Huene also referred to this specimen as *Pl. ‘quenstedti’*.

#### “GPIT A” (Figs 6–7)

GERMANY – **Pfrondorf, (?) Trossingen Formation** • atlas; GPIT-PV-60168 • axis; GPIT-PV-60162 • anterior cervical 5; GPIT-PV-60164 • posterior cervical 8; GPIT-PV-60155 • posterior cervical 9; GPIT-PV-60156 • anterior dorsal 4(?); GPIT-PV-60154 • fragment of the neural arch of posterior dorsal 14(?); GPIT-PV-60159 • left scapula; GPIT-PV-60152 • right ulna; GPIT-PV-60172 • left ulna; GPIT-PV-60163 • right pubis; GPIT-PV-60153 • left femur with a reconstructed shaft; GPIT-PV-60151 • proximal portion of right femur; GPIT-PV-60150 • left fibula; GPIT-PV-60170 • proximal and distal ends of metatarsal II; GPIT-PV-60165 • proximal and distal ends of metatarsal III; GPIT-PV-60171 • pedal ungual III with the distal end of phalanx III.3; GPIT-PV-60161 • possibly pedal phalanx IV.2; GPIT-PV-60157 • possibly pedal phalanx IV.3; GPIT-PV-60158 • casts of axis; NHMUK PV R 3062 • cervical vertebra 5; NHMUK PV R 3063 • cervical vertebra 7; NHMUK PV R 3064 • cervical vertebra 8; NHMUK PV R 3065 • left pubis; NHMUK PV R3067 • right pubis NHMUK PV R 5845 • both ischia; NHMUK PV R 3066 • left ulna; NHMUK PV R 3071 • left radius; NHMUK PV R 3074 • left femur; NHMUK PV R 3068 • proximal part of the left tibia; NHMUK PV R 5849 • left fibula; NHMUK PV R 3070 • two phalanges; NHMUK PV R 3075 • left metatarsal; NHMUK PV R 3073 • left metatarsal; NHMUK PV R 3073 • claw; NHMUK PV R 3076.

**Note:** *Plateosaurus cf. trossingensis*, a gracile and medium-sized morphotype, holotype of *Pl. ‘quenstedti’*. The GPIT Collection still houses some of the holotype material. However, four cervical vertebrae, a left scapula, two humeri, a radius, the posterior half of the dorsal series, the sacrum, the ilia, the ischia, the

right pubis, the left tibia, and the metatarsals are currently lost – the NHMUK in London houses casts of some of these elements.

### Remarks

“GPIT I” is referred to as *Pl. trossingensis* (species 8 in Fig. 3); it is worth noting that a considerable amount of intraspecific variability between the specimens that make *Pl. trossingensis* needs to be studied in detail. The rest of the material from the Obere Mühle is considered as *Pl. cf. trossingensis* based on the stratigraphic framework that has been currently proposed for the Trossingen outcrop. Von Huene (1929, 1932) formulated the taxonomy of sauropodomorphs from the Late Triassic more akin to the polytypic approach, where morphotypes are used as criteria to produce what in modern usage would be equivalent to a subspecies. The specimen “GPIT A” from Pfrondorf (label c in Fig. 1), the holotype of *Plateosaurus ‘quenstedti’* (species 3 in Fig. 3), shares several similarities in the ulna, the ilium and the femoral head morphology with GPIT-PV-30784. The holotype of *Pl. ‘quenstedti’*, however, is now incomplete, with several elements lost, although casts of most of these elements are now available in the Natural History Museum. Given these circumstances, it is reasonable to consider *Pl. ‘quenstedti’* as a senior subjective synonym of *Pl. trossingensis*. Furthermore, if future studies conclude that the disparity between the holotype of *Pl. trossingensis* and GPIT-PV-30784 is substantial enough to warrant the recognition of a new species, then GPIT-PV-30784 can bear the name *Pl. ‘quenstedti’* of which GPIT-A would be the holotype.

### *Plateosaurus gracilis* (von Huene, 1905) metataxon Figs 16, 18–19, 21

*Sellosaurus gracilis* von Huene, 1905: 348.

*Thecodontosaurus hermannianus* von Huene, 1905: 348.

*Teratosaurus trossingensis* von Huene, 1907: 260.

*Sellosaurus hermannianus* (von Huene, 1905) – von Huene 1915: 3 [partim].

*Plateosaurus hermannianus* (von Huene, 1905) – von Huene, 1907: 348.

### Type material

#### Holotype of *Plateosaurus gracilis*

GERMANY • a partial skeleton; Heslach quarries, Stuttgart, Löwenstein Formation; SMNS 5715.

#### Holotype of *Thecodontosaurus hermannianus*

GERMANY • a maxilla; Heslach quarries, Stuttgart, Löwenstein Formation; SMNS 4388.

### Material examined

#### “GPIT Aixheim” (Fig. 16)

GERMANY – Aixheim, Löwenstein Formation • fragment of a diapophysis of the atlas; GPIT-PV-60374 • centrum of the anterior dorsal vertebra; GPIT-PV-60373 • sacral vertebra; GPIT-PV-60377 • sacral vertebra; GPIT-PV-60378 • anterior caudal vertebra; GPIT-PV-60382 • anterior caudal vertebra; GPIT-PV-60384 • fragments of chevrons, possibly from the anterior caudals; GPIT-PV-60391 • anterior caudal vertebra; GPIT-PV-60383 • caudal vertebra; GPIT-PV-60385 • centrum of caudal vertebra; GPIT-PV-60388 • centrum of caudal vertebra; GPIT-PV-60389 • centrum of caudal vertebra; GPIT-PV-60387 • centrum of caudal vertebra; GPIT-PV-60386 • centrum of caudal vertebra; GPIT-PV-60397 • left metacarpal I; GPIT-PV-60376 • fragments, possibly of the left fibula; GPIT-PV-60395 • fragment, possibly of the proximal right tibia; GPIT-PV-60393 • fragment, possibly of the distal left tibia; GPIT-PV-60396 • distal tarsal; GPIT-PV-60372 • astragalus; GPIT-PV-60370 • distal tarsal; GPIT-PV-60371 • pedal phalanx



III.1; GPIT-PV-60370 • right metatarsal I; GPIT-PV-60366 • right metatarsal II; GPIT-PV-60365 • right metatarsal III; GPIT-PV-60368.

**“GPIT 18064” (Fig. 18)**

GERMANY – **Rottweil, Stuebsandstein (Löwenstein Formation)** • left astragalus; GPIT-PV-60447 • partial left foot; GPIT-PV-60448.

**“GPIT 18318a” (Fig. 19)**

GERMANY – **Untere Mühle, Stubensandstein (Löwenstein Formation)** • skull, still embedded in the matrix; GPIT-PV-111900 • cervical 2; GPIT-PV-60523 • cervical 3; GPIT-PV-60535 • cervical 4; GPIT-PV-60537 • cervical 5; GPIT-PV-60525 • cervical 6; GPIT-PV-60521 • cervical 7; GPIT-PV-60531 • cervical 8; GPIT-PV-60522 • cervical 9; still in matrix; GPIT-PV-60503 • cervical 10; GPIT-PV-60536 • dorsal 1; GPIT-PV-60530 • dorsal 1; GPIT-PV-60534 • dorsal 3; GPIT-PV-60257 • partial dorsal 4 and dorsal 5; GPIT-PV-60532 • dorsal 6; GPIT-PV-60526 • dorsal 7; GPIT-PV-60533 • posterior half of the dorsal 8; GPIT-PV-60528 • dorsals 11, 12 and 13; GPIT-PV-60520 • possibly a sacral vertebra, but it was not reported as part of the same specimen; GPIT-PV-60446 • neural arch of a dorsal vertebra; GPIT-PV-60524 • right scapula, with a cast taken from the negative mould of the original matrix; GPIT-PV-60512 • left humerus; GPIT-PV-60514 • right radius, metacarpals I to V, and phalanx I.1; GPIT-PV-60515 • ungual (possibly pedal ungual); GPIT-PV-60434 • partial phalanx, the cast was a mould produced from the original negative mould where the specimen was found; GPIT-PV-60529 • block with ribs; GPIT-PV-60504 • block with gastralia; GPIT-PV-60502 • rib fragments; GPIT-PV-60442, GPIT-PV-60443, GPIT-PV-60444, GPIT-PV-60439, GPIT-PV-60441, GPIT-PV-60438, GPIT-PV-60437, GPIT-PV-60436, GPIT-PV-60440.

**“GPIT 18392” (Fig. 21)**

GERMANY – **Untere Mühle, Stubensandstein (Löwenstein Formation)** • dorsal vertebra 5; GPIT-PV-60507 • dorsal vertebra 11; GPIT-PV-60509 • dorsal vertebrae 12 and 13; GPIT-PV-60508 • dorsal vertebra 10; GPIT-PV-60517 • dorsal vertebra; GPIT-PV-60519 • dorsal vertebra; GPIT-PV-60518 • sacral vertebra; GPIT-PV-60510 • dorsal vertebra; GPIT-PV-60511 • dorsal vertebra; GPIT-PV-60516 • anterior caudal vertebra; GPIT-PV-60506 • three chevron from anterior caudal; GPIT-PV-60493 • chevron from anterior caudal; GPIT-PV-60561 • pedal phalanx; GPIT-PV-60488 • pedal ungual and indeterminate remains; GPIT-PV-60488 • indeterminate remains; GPIT-PV-60489 • left dorsal rib 7; GPIT-PV-60539 • right dorsal rib 8; GPIT-PV-60541 • left cervical 10; GPIT-PV-60540 • right dorsal rib 4; GPIT-PV-60552 • right dorsal rib 1; GPIT-PV-60553 • right dorsal rib 2; GPIT-PV-60554 • right cervical rib 9; GPIT-PV-60556 • left dorsal rib 9; GPIT-PV-60558 • left dorsal rib 12; GPIT-PV-60555 • left dorsal rib 11; GPIT-PV-60557 • left dorsal rib 6; GPIT-PV-60543 • left dorsal rib 10; GPIT-PV-60544 • left dorsal rib 5; GPIT-PV-60545 • right dorsal rib 10; GPIT-PV-60546 • right dorsal rib 9; GPIT-PV-60547 • right dorsal rib 8; GPIT-PV-60551 • right dorsal rib 5; GPIT-PV-60550 • right dorsal rib 7; GPIT-PV-60548 • right dorsal rib 7; GPIT-PV-60549 • left fibula; GPIT-PV-60566 • pedal phalanx; GPIT-PV-60490 • pedal phalanx; GPIT-PV-60488 • fragmentary bones; GPIT-PV-60500 • pedal phalanx; GPIT-PV-60494 • right pubis; GPIT-PV-60565 • left femur proximal part; GPIT-PV-60496 • left femur distal part; GPIT-PV-60495 • right ischium; GPIT-PV-60563.

**Remarks**

The specimen known as “GPIT Aixheim” was tentatively classified as *Teratosaurus suevicus* by von Huene (von Huene 1905: 345–349; 1907: 158–168) (species 28 in Fig. 3). However, the maxilla NHMUK PV OR 38646, which is the holotype of *Teratosaurus suevicus*, has been identified as a rauisuchian (Brusatte *et al.* 2009). A similar situation occurred with “GPIT 18392”, also referred to as *Teratosaurus suevicus* (von Huene 1915). Subsequently, both “GPIT Aixheim” and “GPIT 18392” were reclassified as *Plateosaurus gracilis* (*Sellosaurus gracilis* in Hungerbühler 1998; *Plateosaurus gracilis* in Yates 2003) (species 20 in Fig. 3). “GPIT 18318a” is also referred to as cf. *Plateosaurus gracilis*, as it has been included as a part of *Pl. gracilis* following Yates (2003).

Suborder Sauropodomorpha Huene 1932

**Incertae sedis**

Further research is required to determine whether the following specimens can be referred to as *Plateosaurus*. Galton (2001a) considered several species nomina dubia due to their incompleteness and lack of sacral or femoral characters. Furthermore, their morphologies have been explained as taphonomic artefacts (Moser 2003). However, the material is not poorly preserved, and several features can be distinguished that could make the species valid. Further work is necessary to investigate if the following specimens bear any phylogenetic or morphogeometric signal, or diagnostic features, after comparing them with other sauropodomorphs in Europe and elsewhere.

However, these comparisons are beyond the scope of this paper. Therefore, to aid researchers in consistently identifying and delineating material for work on sauropodomorphs, we resurrect the names as they constitute the type material and place them as incertae sedis. This determination should help further studies by ensuring that the material is not included a priori as samples of *Plateosaurus* and instead tested to see if it makes sense to consider it as part of *Plateosaurus*.

Genus *Gresslyosaurus* Rüttimeyer, 1856

**Type species**

*Gresslyosaurus ingens* Rüttimeyer, 1856.

*Gresslyosaurus robustus* von Huene, 1905  
Figs 9–10

*Gresslyosaurus robustus* von Huene, 1905: 348.

*Plateosaurus robustus* – Steel 1970: 56.

**Type material**

**Holotype** GPIT-PV-60293 (Figs 9–10)

GERMANY – **Bebenhausen, Trossingen Formation (?)** • posterior half of a cervical vertebra; GPIT-PV-60195 • posterior half of a dorsal vertebra; GPIT-PV-60188 • posterior dorsal vertebra; GPIT-PV-60183 • posterior dorsal vertebra; GPIT-PV-60184 • second sacral vertebra; GPIT-PV-60180 • articulated manual digit (3 non-terminal phalanges and one ungual); GPIT-PV-60192 • distal part of the femur; GPIT-PV-60292 • distal half of the fibula; GPIT-PV-60179 • proximal and distal portions of a tibia; GPIT-PV-60206, GPIT-PV-60207 • two pedal phalanges fused; GPIT-PV-60194 • distal tarsal; GPIT-PV-60191 • two non-terminal phalanges and one ungual attached; GPIT-PV-60177 • pedal ungual phalanx; GPIT-PV-60186 • two pedal phalanges fused; GPIT-PV-60190 • pedal phalanx; GPIT-PV-60312 • pedal ungual phalanx; GPIT-PV-60187 • pedal ungual phalanx; GPIT-PV-60309 • two pedal phalanges fused; GPIT-PV-60189.

Genus *Pachysaurus* von Huene, 1905

*Pachysaurus* von Huene, 1905: 348.

*Pachysauriscus* Kuhn, 1959 (vide Steel 1970: 54).

*Pachysaurops* von Huene, 1959: 24.

**Type species**

*Pachysaurus ajax* von Huene, 1905.

*Pachysaurus ajax* von Huene, 1905

Figs 11–12

**Type material**

**Holotype** (examined)

GERMANY – **Wüstenroth, Trossingen Formation (?)** • both forelimbs, comprising humeri, radii, ulnae, both scapulae, both coracoids, and part of the cervical and dorsal series; GPIT-PV-30790 • partial manus; GPIT-PV-60185, GPIT-PV-60196, GPIT-PV-60198 to GPIT-PV-60201, GPIT-PV-60203, GPIT-PV-111862 • several remains that belonged to elements in GPIT-PV-30790. (see Fig. 11 and Appendix 1 for more details)

*Pachysaurus magnus* von Huene, 1907

Fig. 8

**Type material**

**Holotype** (examined)

GERMANY – **Pfrondorf, Trossingen Formation** • third sacral vertebra; GPIT-PV-60298 • five ribs in a block; GPIT-PV-60166, GPIT-PV-60167 • three fragments of the left scapula, and the proximal part of the right scapula; GPIT-PV-60169 • proximal part of a right humerus; GPIT-PV-60182 • proximal end of the radius; GPIT-PV-60294 • the shaft of the right ulna; GPIT-PV-60295 • metacarpal I with the proximal end of the phalanx I.1; GPIT-PV-60176 • metacarpals II and III; GPIT-PV-60174 • metacarpal V; GPIT-PV-60173 • ungual phalanx (manual?); GPIT-PV-60310 • proximal end of fibula; GPIT-PV-111909.

*Pachysaurus wetzeli* von Huene, 1932

Fig. 29

**Type material**

**Holotype** (examined)

GERMANY – **Obere Mühle, Trossingen Formation** • probably nine dorsal vertebrae, two sacral vertebrae, twelve caudal vertebrae, a partial ilium, both pubes, conjoined ischia, left femur, left tibia, left fibula, astragalus, two distal tarsals, five metatarsals, partial digits; GPIT-PV-30788.

**Nomina dubia**

*Pachysaurus giganteus* von Huene, 1932

Fig. 23

**Type material**

**Holotype** (examined)

GERMANY – **Obere Mühle, Trossingen Formation** • three metatarsals, GPIT-PV-60234 to GPIT-PV-60236.

**Remark**

The historical number “GPIT E” is poorly preserved and has been reconstructed several times; thus, this specimen is the only nomen dubium in our revision.

*Plateosaurus ornatus* von Huene, 1905

### Type material

The type material of this species is illustrated and described in von Huene (1907: 247–248) but the specimens are lost (species 25 in Fig. 3).

### Discussion

The Palaeontological Collection of Tübingen houses many of the specimens that von Huene (1907, 1932) used to establish the first taxonomy of Sauropodomorpha. Unfortunately, a large portion of the information is currently missing and probably lost to time. Although most of the species described by von Huene were considered nomina dubia, it became customary in the past decades to treat the type material as belonging to *Plateosaurus*. This problem became further complicated by the fact that the original type material of *Plateosaurus* lacked diagnostic features. New findings in France and Switzerland have been placed under *Plateosaurus* due to the lack of complete type material for comparison, resulting in a taxonomy with multiple reference points. Several specimens that von Huene considered robust morphotypes have been reinterpreted as new species, i.e., *Schleithemia* and *Gresslyosaurus* in Rauhut *et al.* (2020), and *Tuebingosaurus* in Regalado Fernández & Werneburg (2022), after they were compared against the new type species of *Plateosaurus* that was designated in 2019 (ICZN 2019). In contrast, gracile individuals referred to as *Plateosaurus* have been redescribed as a different type of plateosaurid, i.e., *Issi* (Beccari *et al.* 2021).

In this review, we reconstruct as much as possible the information on the provenance and documentation of around 20 skeletons of sauropodomorphs from the Late Triassic collected in Baden-Württemberg. The names *Zanclodon laevis* and *Teratosaurus suevicus* represent valid species and genera that do not belong to *Plateosaurus* taxonomy. Any dinosaur remain that has been given the names *Zanclodon* or *Teratosaurus* should be reassessed to determine their affinity to *Plateosaurus* in order to establish their taxonomic status. In the case of the genus *Plateosaurus*, we propose the recognition of only two valid species: *Plateosaurus trossingensis* and *Plateosaurus gracilis*. In the case of *Pl. trossingensis*, we restrict the name to three specimens: SMNS 13200, GPIT-PV-30784, and AMNH FARB 6810, which makes *Pl. quenstedti* a subjective synonym of *Pl. trossingensis*. *Plateosaurus gracilis* is considered valid as a metataxon, as none of the specimens overlap anatomically. We also consider as valid the genus *Pachysaurus*, containing three species (*Pa. ajax*, *Pa. magnus*, and *Pa. wetzeli*). And to the recently resurrected genus *Gresslyosaurus* we add the species *G. robustus*. We consider as nomen dubium the species *Pachysaurus giganteus*, whose specimen is too badly preserved and heavily reconstructed to make determinations. The type material of *Pl. ornatus* is currently lost, making it also a nomen dubium.

A new species delineation needs to compare all specimens referred to as *Plateosaurus* against the type of *Pl. trossingensis* (SMNS 13200). The specimens that are currently considered as nomina dubia should not be considered as *Plateosaurus* before comparisons against the type material are performed. The species referred to as *Plateosaurus* ‘*poligniensis*’ in France and *Plateosaurus* ‘*longiceps*’ in Germany should not be considered as representatives of *Plateosaurus trossingensis* either, as these designations require further work. Therefore, this third taxonomy should attempt to reduce the noise and quantify how much of the variability in *Plateosaurus* is due to intraspecific variability and how much is due to microevolutionary patterns while incorporating sedimentological and palaeogeographical data.

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*Pl. 'quenstedti'* currently stored in the NHM collection. We also thank Claire Peyre de Fabrègues and an anonymous reviewer whose comments helped improving this manuscript.

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## Appendix 1

Complete catalogue of the material of early sauropodomorphs from the Late Triassic currently in the GPIT collection, organized in chronological order.

New number	Old number	Material, preservation type	Taxonomic opinion
<b>Material from Aixheim collected during the 1850s</b>			
GPIT-PV-111901		Histological slides from a drilling obtained from phalanx GPIT-PV-60272 (referred to as <i>Plateosaurus 'engelhardti'</i> in Klein 2004)	Sauropodomorpha indet.
GPIT-PV-60160	8157	Ungual, type 1	Sauropodomorpha indet.
GPIT-PV-60248	11128	Distal end of the fibula, type 2	Sauropodomorpha indet.
GPIT-PV-60249	11126	Incomplete right radius, type 2	Sauropodomorpha indet.
GPIT-PV-60250	11127	Proximal end of the ulna, type 2	Sauropodomorpha indet.
GPIT-PV-60255	8160	Fragment of potentially a pedal phalanx, type 1	Sauropodomorpha indet.
GPIT-PV-60259	11136	Thoracic rib fragment, type 2	Indet.
GPIT-PV-60272	8159	Potentially a pedal phalanx, type 1 (histological cut illustrated in Klein 2004: fig. 14I)	Sauropodomorpha indet.
GPIT-PV-60340	44	Tooth, type 2	Archosauria
GPIT-PV-60341	8161	Proximal portion of an unguis, types 2 and 3	Sauropodomorpha indet.
<b>Type of <i>Plateosaurus 'quenstedti'</i></b>			
<b><i>Pl. quenstedti</i> illustrated by Quenstedt (1867–1885)</b>			
GPIT-PV-60150	10977 (1-2) [sic]	Proximal half of the right femur, type 3	<i>Plateosaurus quenstedti</i>
GPIT-PV-60152	11134, 11135, 11130,	Left scapula in 3 fragments type 1 and type 3	<i>Plateosaurus quenstedti</i>
GPIT-PV-60155		Posterior cervical (CE8), types 1 and 2	<i>Plateosaurus quenstedti</i>
GPIT-PV-60162		Axis, types 1 and 2	<i>Plateosaurus quenstedti</i>
GPIT-PV-60164	10975	Anterior cervical (CE5), types 1 and 2	<i>Plateosaurus quenstedti</i>
GPIT-PV-60168	10978	Atlas, type 1	<i>Plateosaurus quenstedti</i>
<b><i>Pl. quenstedti</i> illustrated by von Huene (1907)</b>			
GPIT-PV-60153	10976 (I-II) [sic]	Right pubis, type 3. Illustrated complete, currently, the proximal part is preserved	<i>Plateosaurus quenstedti</i>
GPIT-PV-60154		Anterior dorsal (D4?) with the prezygapophyses of the next vertebra (D5?), type 1	<i>Plateosaurus quenstedti</i>
GPIT-PV-60156		Posterior cervical (CE9), type 2	<i>Plateosaurus quenstedti</i>
GPIT-PV-60157		Phalanx of the left foot, type 2	<i>Plateosaurus quenstedti</i>
GPIT-PV-60158		Phalanx of the left foot, type 2	<i>Plateosaurus quenstedti</i>
GPIT-PV-60159		Fragment of posterior dorsal (D14?), types 1 and 2	<i>Plateosaurus quenstedti</i>
GPIT-PV-60163		Left ulna, type 1	<i>Plateosaurus quenstedti</i>
GPIT-PV-60165		Metatarsal II (2 fragments), type 1. Illustrated complete, currently the middle portion is missing	<i>Plateosaurus quenstedti</i>
GPIT-PV-60170	10977 (1-2)	Left fibula, type 3	<i>Plateosaurus quenstedti</i>
GPIT-PV-60171		Metatarsal III (2 fragments), type 1. Illustrated complete, currently the middle portion is missing	<i>Plateosaurus quenstedti</i>
GPIT-PV-60172		Right ulna, type 1 and type 3	<i>Plateosaurus quenstedti</i>
GPIT-PV-60151	11140	Left femur broken in two fragments reconstructed with plaster, type 2 and type 3	<i>Plateosaurus quenstedti</i>
GPIT-PV-60161	11137	Claw with distal end of phalanx, type 1	<i>Plateosaurus quenstedti</i>

New number	Old number	Material, preservation type	Taxonomic opinion
<b>Type of <i>Pachysaurus magnus</i> Huene, 1907 (pl. 14-3)</b>			
GPIT-PV-60169	11213?	Three fragments of a left scapula, missing the distal part, type 3	<i>Pachysaurus magnus</i>
GPIT-PV-60169	11213?	Proximal part of the right scapula, type 3	<i>Pachysaurus magnus</i>
GPIT-PV-60173	11300	Metacarpal V with a fragment of the phalanx V.1, type 2	<i>Pachysaurus magnus</i>
GPIT-PV-60174	11300	Metacarpal II and III, type 2	<i>Pachysaurus magnus</i>
GPIT-PV-60175	11300	Metacarpal IV, type 2	<i>Pachysaurus magnus</i>
GPIT-PV-60176	11300	Metacarpal I with proximal end of the phalanx I.1, type 2	<i>Pachysaurus magnus</i>
GPIT-PV-60310		Phalanx unguis, type 1	<i>Pachysaurus magnus</i>
<b>Material from Brandklinge, <i>Pachysaurus magnus</i> sensu von Huene (1907) (GPIT D [partim])</b>			
GPIT-PV-60166	11303	Five ribs, type 2	Sauropodomorpha
GPIT-PV-60167		Fragments that probably belonged to GPIT-PV-60166	Sauropodomorpha
GPIT-PV-60182	11212	Proximal part of a right humerus, type 3	Sauropodomorpha
GPIT-PV-60291		Metacarpal V, type 2	Sauropodomorpha
GPIT-PV-111909	11307	Proximal end of the fibula, type 3	Sauropodomorpha
GPIT-PV-60294	11308	Proximal end of the radius, type 2	Sauropodomorpha
GPIT-PV-60295		Shaft of the ulna, type 3. Only the midshaft is preserved, although it is illustrated with a distal end	Sauropodomorpha
GPIT-PV-60298	11210	Third sacral vertebra, type 2	Sauropodomorpha
<b>Other specimens collected from Brandklinge</b>			
GPIT-PV-60321	11311	Possibly a fibula, type 3	Sauropodomorpha
GPIT-PV-60329	10977 (3)	Cervical vertebra, flattened, type 4	Sauropodomorpha
GPIT-PV-111902		Histological slides from a drilling obtained from a phalanx (referred to as <i>Plateosaurus 'engelhardti'</i> in Klein 2004)	Sauropodomorpha
GPIT-PV-60308		Half of a centrum, type 3	Sauropodomorpha
GPIT-PV-60273	12, 11304	Vertebra, type 2	Sauropodomorpha
<b><i>Gresslyosaurus robustus</i>, from Bebenhausen</b>			
GPIT-PV-60177		Two non-terminal phalanges and one unguis attached, type 4	<i>Gresslyosaurus robustus</i>
GPIT-PV-60178		Phalanx, type 3	<i>Gresslyosaurus robustus</i>
GPIT-PV-60179		Distal half of the left fibula, type 3	<i>Gresslyosaurus robustus</i>
GPIT-PV-60180		Second sacral vertebra, types 2 and 3	<i>Gresslyosaurus robustus</i>
GPIT-PV-60181		Proximal half of the left fibula, type 3	<i>Gresslyosaurus robustus</i>
GPIT-PV-60183	RW13	Large posterior vertebra, type 2	<i>Gresslyosaurus robustus</i>
GPIT-PV-60184	RW15	Large posterior vertebra, type 2	<i>Gresslyosaurus robustus</i>
GPIT-PV-60186		Unguis phalanx, types 2 and 3	<i>Gresslyosaurus robustus</i>
GPIT-PV-60187		Unguis phalanx, types 2 and 3	<i>Gresslyosaurus robustus</i>
GPIT-PV-60188		Dorsal vertebra, type 2	<i>Gresslyosaurus robustus</i>
GPIT-PV-60189		Two phalanges, fused together, type 4	<i>Gresslyosaurus robustus</i>
GPIT-PV-60190		Two phalanges, fused together, type 4	<i>Gresslyosaurus robustus</i>
GPIT-PV-60191		Bone fragment identified as a distal tarsal, type 4	<i>Gresslyosaurus robustus</i>
GPIT-PV-60192		Articulated digit (3 phalanges, one unguis), type 4	<i>Gresslyosaurus robustus</i>
GPIT-PV-60194	II.2	Two phalanges, fused together, type 4	<i>Gresslyosaurus robustus</i>
GPIT-PV-60195		Cervical vertebrae, type 4	<i>Gresslyosaurus robustus</i>

New number	Old number	Material, preservation type	Taxonomic opinion
<b><i>Gresslyosaurus robustus</i>, from Bebenhausen</b>			
GPIT-PV-60206		Proximal portion of the tibia, types 2 and 3	<i>Gresslyosaurus robustus</i>
GPIT-PV-60207		Distal portion of the tibia, types 2 and 3	<i>Gresslyosaurus robustus</i>
GPIT-PV-60208		Astragalus, types 2 and 3	<i>Gresslyosaurus robustus</i>
GPIT-PV-60292		Distal femur, type 2	<i>Gresslyosaurus robustus</i>
GPIT-PV-60309		Phalanx, type 4	<i>Gresslyosaurus robustus</i>
GPIT-PV-60312		Phalanx, type 4	<i>Gresslyosaurus robustus</i>
GPIT-PV-60345		Metatarsal III, type 4	<i>Gresslyosaurus robustus</i>
<b>Indeterminate remains from Bebenhausen</b>			
GPIT-PV-60193		Large ungual phalanx with distal portion of the phalanx, type 4	Sauropodomorpha
GPIT-PV-60258		Bone fragment, type 4	Sauropodomorpha
GPIT-PV-60301		Partial centrum, type 4	Sauropodomorpha
GPIT-PV-60302		Two fragmentary pieces of what has been identified as the proximal ends metatarsal II and I, type 4	Sauropodomorpha
GPIT-PV-60303		Two fragmentary pieces of what has been identified as the distal ends of metatarsal II and IV, type 4	Sauropodomorpha
GPIT-PV-60304		Shaft of a long bone, possibly a fibula, type 3	Sauropodomorpha
GPIT-PV-60305		Proximal portion of the metatarsal IV, type 4	Sauropodomorpha
GPIT-PV-60306		Three pieces of vertebra, although not from the same element: an articular surface (type 3), a neural arch (type 4), a fragment of a non-articular margin of the centrum (type 4)	Sauropodomorpha
GPIT-PV-60307		Two pieces of vertebra, not from the same element, types 2 and 3	Sauropodomorpha
GPIT-PV-60311		Phalanx, type 4	Sauropodomorpha
GPIT-PV-60313		Fragmentary bone, type 2 inside, type 4 outside	Indet.
GPIT-PV-60314		Phalanx (I), type 4	Sauropodomorpha
GPIT-PV-60315		Claw, identified as of pedal digit III, type 3	Sauropodomorpha
GPIT-PV-60316		Phalanx, identified as left IV.5, type 3	Sauropodomorpha
GPIT-PV-60317		Phalanx, identified as left I.1, type 4	Sauropodomorpha
GPIT-PV-60318		Phalanx, identified as left IV.2, types 2 and 3	Sauropodomorpha
<b>“Wüstenroth complex” (GPIT VII and CPIT C)</b>			
GPIT-PV-30790	16718	Both forelimbs, incomplete (humeri, radii, ulnae), both scapulae, both coracoids, and tentatively part of the cervical and dorsal series, type 2	<i>cf. Plateosaurus</i>
GPIT-PV-60185		Right metacarpal II, type 2	Sauropodomorpha indet.
GPIT-PV-60196		Fragment of a metacarpal, type 2	Sauropodomorpha indet.
GPIT-PV-60197		Fragment of a vertebra, type 2	Sauropodomorpha indet.
GPIT-PV-60198		Fragment of a metacarpal (?), type 4	Sauropodomorpha indet.
GPIT-PV-60199		Fragment of a phalanx, type 4	Sauropodomorpha indet.
GPIT-PV-60200		A carpal (?), type 4	Sauropodomorpha inder.
GPIT-PV-60201		Fragment of a manual phalanx, type (?)	
GPIT-PV-60202		Indeterminate bone fragment, type 4	
GPIT-PV-60203		Indeterminate bone fragment, type 4	
GPIT-PV-60204		Fragmentary long bones, type 4	Indet.
GPIT-PV-60205		Fragmentary long bones, type 4	Indet.

New number	Old number	Material, preservation type	Taxonomic opinion
<b>“Wüstenroth complex” (GPIT VII and CPIT C)</b>			
GPIT-PV-60266	34	Fragmentary bones, type 4	Indet.
GPIT-PV-60267	35	Fragmentary bones, type 4	Indet.
GPIT-PV-60268	24	Fragmentary bones, type 4	Indet.
GPIT-PV-60291		Metacarpal V (?), from the Knollenmergel in Löwenstein, type 4	Sauropodomorpha indet.
GPIT-PV-60300		Distal portion of a large femur, type 4	cf. <i>Plateosaurus</i>
GPIT-PV-111862	38	Proximal fragment of a metacarpal (?)	cf. <i>Plateosaurus</i>
GPIT-PV-111863	38	Postzygapophysis of a vertebra, type 4	cf. <i>Plateosaurus</i>
GPIT-PV-111864	38	Fragment of a capitulum, type 4	cf. <i>Plateosaurus</i>
GPIT-PV-111865	38	Fragment of phalanx, type 4	cf. <i>Plateosaurus</i>
GPIT-PV-111866	38	Fragment of phalanx, type 4	cf. <i>Plateosaurus</i>
GPIT-PV-111867	40	Tentatively fragments of a dorsal or caudal vertebra, type 4	cf. <i>Plateosaurus</i>
GPIT-PV-111868	25	Tentatively fragments of a tibia, type 4	cf. <i>Plateosaurus</i>
GPIT-PV-111869	26	Fragment of a vertebra, type 4	cf. <i>Plateosaurus</i>
GPIT-PV-111870	26	Fragment of a vertebra, type 4	cf. <i>Plateosaurus</i>
GPIT-PV-111871	42	Vertebra (?) in six fragments, type 4	cf. <i>Plateosaurus</i>
GPIT-PV-111872		Fragment of a capitulum, type 4	cf. <i>Plateosaurus</i>
GPIT-PV-111873	43	Vertebra broken in six fragments, type 4	cf. <i>Plateosaurus</i>
GPIT-PV-111874	13	Fragment of a neural arch, type 4	cf. <i>Plateosaurus</i>
GPIT-PV-111875	29	Indeterminate bone fragment, type 4	cf. <i>Plateosaurus</i>
GPIT-PV-111876	28b	Two indeterminate bone fragments, type 4	cf. <i>Plateosaurus</i>
GPIT-PV-111877	1	Indeterminate bone fragment, type 4	cf. <i>Plateosaurus</i>
GPIT-PV-111878	3	Bone fragment, type 4	cf. <i>Plateosaurus</i>
GPIT-PV-111879	21	Bone fragment, type 4	cf. <i>Plateosaurus</i>
GPIT-PV-111880	8	Three joint fragments of a vertebra (?), type 4	cf. <i>Plateosaurus</i>
GPIT-PV-111881	7	Bone fragment, type 4	cf. <i>Plateosaurus</i>
GPIT-PV-111882	45	Cervical (?) centrum in two fragments, type 4	cf. <i>Plateosaurus</i>
GPIT-PV-111883	12	Bone fragment, type 4	cf. <i>Plateosaurus</i>
GPIT-PV-111884	10	Bone fragment, type 4	cf. <i>Plateosaurus</i>
GPIT-PV-111885		Neural arch, type 4	cf. <i>Plateosaurus</i>
GPIT-PV-111886		Anterior part of a centrum, type 4	cf. <i>Plateosaurus</i>
GPIT-PV-111887		Centrum and a rib, type 4	cf. <i>Plateosaurus</i>
GPIT-PV-111888		Neural arch, type 4	cf. <i>Plateosaurus</i>
GPIT-PV-111889		Fragment of a centrum, type 4	cf. <i>Plateosaurus</i>
GPIT-PV-111890		Assortment of fragmentary material, type 4	cf. <i>Plateosaurus</i>
GPIT-PV-111891		Fragment of an ilium, type 4	cf. <i>Plateosaurus</i>
GPIT-PV-111892		Postacetabular process of the right ilium, type 4	cf. <i>Plateosaurus</i>
GPIT-PV-111893		Preacetabular process of the right ilium, type 4	cf. <i>Plateosaurus</i>
GPIT-PV-111894		Fragment of an ilium, type 4	cf. <i>Plateosaurus</i>
GPIT-PV-111895		Block with ribs, type 4	cf. <i>Plateosaurus</i>
<b>Material from Aixheim referred to as <i>Teratosaurus suevicus</i></b>			
GPIT-PV-60365		Metatarsal II, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60366		Metatarsal I, type 2	<i>Plateosaurus gracilis</i>



New number	Old number	Material, preservation type	Taxonomic opinion
<b>Material from Aixheim referred to as <i>Teratosaurus suevicus</i></b>			
GPIT-PV-60368		Metatarsal III, reconstructed, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60369		Astragalus, deformed, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60370		Phalanx III.1, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60371		Distal tarsal, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60372		Distal tarsal, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60373	64/5	Anterior caudal vertebra, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60374		Fragment of a diapophysis, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60376	66/3	Left metacarpal I, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60377	64/3	Sacral vertebra, possibly a caudosacral, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60378		Second primordial sacral, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60381	F1	Deformed anterior caudal vertebra, type2	<i>Plateosaurus gracilis</i>
GPIT-PV-60382	F2	Anterior caudal vertebra, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60383	F3	Anterior caudal vertebra, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60384	F4	Anterior caudal vertebra, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60385	F5	Anterior caudal vertebra, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60386	F6	Centrum of caudal vertebra with no cortical bone, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60387	F7	Centrum of caudal vertebra with no cortical bone, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60388	F8	Centrum of caudal vertebra with no cortical bone, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60389	F9	Centrum of caudal vertebra with no cortical bone, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60391	F10	Fragments of chevrons, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60392	F3	Distal tarsal, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60393	F4	Fragment of a tibia, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60394	F1(?)	Zygapophysis from a vertebra, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60395	F1(?)	Bone fragment (fibula?), type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60396	F4	Bone fragment (tibia?), type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60397	F4	Centrum of caudal vertebra with no cortical bone, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60398	F4	Bone fragment (fibula?), type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60399	F4	Bone fragment (fibula?), type 2	<i>Plateosaurus gracilis</i>
<b>Material from Aixheim collected from Stubensandstein</b>			
GPIT-PV-60390		Fragment of a scapular blade with carbonate crystals, type 3	Sauropodomorpha indet.
GPIT-PV-60400		Serrated conical tooth, type 2	Theropoda indet.
GPIT-PV-60401		Fragment of a vertebra, type 2	Indet.
GPIT-PV-60402		Bone fragment, type 2	Indet.
GPIT-PV-60403		Rib tuberculum fragment, type 2	Indet.
GPIT-PV-60404		Bone fragment, type 2	Indet.
GPIT-PV-60405		Rib fragment, type 2	Indet.
GPIT-PV-60406		Bone fragment, type 2	Indet.
GPIT-PV-60407		Rib tuberculum, type 2	Indet.
GPIT-PV-60408		Zygapophysis from a vertebra, type 2	Indet.

New number	Old number	Material, preservation type	Taxonomic opinion
<b>Material from Aixheim collected from Stubensandstein</b>			
GPIT-PV-60409		Rib shaft fragment, type 2	Indet.
GPIT-PV-60410		Zygapophysis from a vertebra, type 2	Indet.
GPIT-PV-60411		Rib shaft fragment, type 2	Indet.
GPIT-PV-60412		Zygapophysis from a vertebra, type 2	Indet.
GPIT-PV-60413		Ventral margin of a centrum, type 2	Indet.
GPIT-PV-60414		Fragmentary phalanx, type 2	Indet.
GPIT-PV-60415		Phalanx, type 2	Indet.
GPIT-PV-60416		Phalanx, type 2	Indet.
<b>GPIT 18064 (<i>Teratosaurus trossingensis</i>)</b>			
GPIT-PV-60447		Right astragalus, type 2	cf. <i>Plateosaurus</i> sp.
GPIT-PV-60448		Right foot (includes metatarsal I to IV, phalanx I.1, ungual 1, phalanx II.2, phalanx III.1, III.2 phalanx IV.1, phalanx IV.2, phalanx IV.3, phalanx IV. 4 and ungual 4). The following elements are casts: phalanx II.2, ungual 2, phalanx III.3, ungual 3), type 2	<i>Plateosaurus</i> cf. <i>gracilis</i>
<b>GPIT 18318a (<i>Sellosaurus hermannianus</i>)</b>			
GPIT-PV-60380		Zygapophysis from a vertebra, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60417		Rib tuberculum fragment, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60418		Rib fragment, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60419		Two bone fragments, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60420		Bone fragment, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60421		Fragment of rib, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60422		Bone fragment, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60423		Bone fragment, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60424	18318a	Four fragments of different chevrons, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60426	18318a	Rib tuberculum fragment, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60427	18318a	Rib tuberculum fragment, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60428	18318a	Rib tuberculum fragment, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60429	18318a	Rib tuberculum fragment, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60430	18318a	Rib tuberculum fragment, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60431	18318a	Chevron, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60432	18318a	Cervical rib, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60433	18318a	Dorsal rib capitulum, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60434	18318a	Rib capitulum, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60435	18318a	Cervical rib capitulum, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60436	18318a	Rib fragment, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60437		Cervical rib capitulum, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60438		Cervical rib capitulum, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60439		Dorsal rib capitulum, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60440		3 fragments of tibs, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60441		Rib fragment, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60442		Rib fragment, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60443	18318a	Rib fragment, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60444	18318a	Cervical rib tuberculum, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60445	18318a	Cervical rib tuberculum, type 2	<i>Plateosaurus gracilis</i>

New number	Old number	Material, preservation type	Taxonomic opinion
<b>GPIT 18318a (<i>Sellosaurus hermannianus</i>)</b>			
GPIT-PV-60446		Dorsal vertebra fragment, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60501		Gastralia block, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60502		Gastralia block, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60503		Gastralia block, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60504		Gastralia block, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60512	18318a	Scapula, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60514		Scapula, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60515		Forearm, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60520	RW11-13	Dorsal vertebrae 11 to 13, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60521	C6	Cervical vertebra centrum, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60522	C8	Cervical vertebra 8, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60523		Cervical vertebra, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60524		Dorsal vertebra neural arch, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60525	C5	Cervical vertebra 5, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60526	6	Dorsal vertebra 6, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60527	RW2	Dorsal vertebra, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60528	8	Dorsal vertebra 8, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60529		Dorsal vertebra, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60530		Neural arch of dorsal vertebra, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60531	C7	Cervical vertebra, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60532		Dorsal vertebra 4 (partial) and 5, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60533		Dorsal vertebra 7, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60534		Neural arch of dorsal vertebra, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60535	C3	Neural arch of cervical vertebra 3, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60536	C10	Posterior half of cervical vertebra 10, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60537	C4	Neural arch of cervical vertebra 4, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60538	2C	Partial cervical vertebra 3, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-111900		Skull of skeleton 18318a, type 2	<i>Plateosaurus gracilis</i>
<b>GPIT 18375 (<i>Plateosaurus</i> sp. from Friedrichstraße)</b>			
GPIT-PV-60346		Claw, type 2	Carnivorous archosaur
GPIT-PV-60347		Chevron, type 2	Sauropodomorpha
GPIT-PV-60348		Chevron, type 2	Sauropodomorpha
GPIT-PV-60349		Claw, type 2	Carnivorous archosaur
GPIT-PV-60350		Scapula, type 2	Sauropodomorpha
GPIT-PV-60351		Chevron, type 2	Sauropodomorpha
GPIT-PV-60352		Chevron, type 2	Sauropodomorpha
GPIT-PV-60353		Chevron from anterior caudals, type 2	Sauropodomorpha
GPIT-PV-60354		Chevron from anterior caudals, type 2	Sauropodomorpha
GPIT-PV-60355		Chevron from anterior caudals, type 2	Sauropodomorpha
GPIT-PV-60356		Caudal vertebra, type 2	Sauropodomorpha
GPIT-PV-60357		Caudal vertebra, type 2	Sauropodomorpha
GPIT-PV-60358		Caudal vertebra, type 2	Sauropodomorpha
GPIT-PV-60359		Caudal vertebra, type 2	Sauropodomorpha
GPIT-PV-60360		Caudal vertebra, type 2	Sauropodomorpha

New number	Old number	Material, preservation type	Taxonomic opinion
<b>GPIT 18375 (<i>Plateosaurus</i> sp. from Friedrichstraße)</b>			
GPIT-PV-60361		Caudal vertebra, type 2	Sauropodomorpha
GPIT-PV-60362		Caudal vertebra, type 2	Sauropodomorpha
<b>GPIT 18392 (<i>Teratosaurus suevicus</i>)</b>			
GPIT-PV-43792	Hungerbühler (1998: fig. 4“d?9”)	Dorsal vertebra 9, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60488		Two non-terminal phalanges – one with preservation type 4 and the other with type 2 – and one ungual phalanx, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60489		Indeterminate bones, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60490		Phalanx, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60491		Tooth, type 2	Archosauria
GPIT-PV-60492		Fragmentary bone, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60493	Hungerbühler (1998: fig. 4p)	Three chevrons, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60494	Hungerbühler (1998: fig. 4l)	One ungual (?), type 2	Archosauria
GPIT-PV-60495		Distal part of the left femur, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60496		Proximal part of the left femur, type 2; a piece of the femur GPIT-PV-60495, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60497		Tooth, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60498		Tooth, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60499		Tooth, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60500	Hungerbühler (1998: fig. 4e)	Fragmentary bones, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60505		Vertebra fragment, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60506	Schw5	Anterior caudal vertebra (possibly Ca8), type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60507		Dorsal vertebra, type 2 (D5)	<i>Plateosaurus gracilis</i>
GPIT-PV-60508	RW12	Two posterior dorsal vertebrae fused, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60509	RW7	Dorsal vertebra (possibly D11), type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60510	SW3	Sacral vertebra, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60511	RW9	Dorsal vertebra, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60516	CW12, 18392	Dorsal vertebra, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60517	RW10	Dorsal vertebra, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60518	CW1	Dorsal vertebra, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60519	CW4, 18392	Dorsal vertebra, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60539		Left dorsal rib 7, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60540		Left cervical rib 10, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60541		Right dorsal rib 8, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60543		Left dorsal rib 6, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60544		Left dorsal rib 10, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60545		Left dorsal rib 5, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60546		Right dorsal rib 10, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60547		Right dorsal rib 9, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60548		Right dorsal rib 6, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60549		Right dorsal rib 7, type 2	<i>Plateosaurus gracilis</i>

New number	Old number	Material, preservation type	Taxonomic opinion
<b>GPIT 18392 ('<i>Teratosaurus suevicus</i>')</b>			
GPIT-PV-60550		Right dorsal rib 5, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60551		Right dorsal rib 8, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60552		Right dorsal rib 4, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60553		Right dorsal rib 1, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60554		Right dorsal rib 2, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60555		Left dorsal rib 12, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60556		Right cervical rib 9, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60557		Left dorsal rib 11, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60558		Left dorsal rib 9, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60561		One chevron, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60563		Right ischium, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60564		One chevron, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60565		Pubis, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-60566		Left fibula, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-72541		Tooth, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-111896	Hungerbühler (1998: fig. 4g)	Fragmentary bones, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-111897	Hungerbühler (1998: fig. 4n)	Fragmentary bones, type 2	<i>Plateosaurus gracilis</i>
GPIT-PV-111899	Hungerbühler (1998: fig. 4c)	One phalanx, type 2	<i>Plateosaurus gracilis</i>
<b>GPIT E</b>			
GPIT-PV-60234	98.1	Metatarsal III (?), type 4	Sauropodomorpha
GPIT-PV-60235	98.2	Metatarsal III (?), type 4	Sauropodomorpha
GPIT-PV-60236	98	Metatarsal IV, type 4	Sauropodomorpha
<b>GPIT I</b>			
GPIT-PV-30784		Skeleton GPIT I, types 1 and 2	<i>Pl. trossingensis</i>
GPIT-PV-60223	265, 265.18, 265.20, 265.24, 265.27	Assemblage of distal caudal vertebrae: distal caudal vertebra with chevron (265.20), three distal caudals with chevron (265), chevron (265.27), two distal caudal vertebrae (265.24, 265.27), chevron (265.18), type 2	<i>Pl. trossingensis</i>
GPIT-PV-60251	221.25	Unidentified bone, type 2	<i>Pl. trossingensis</i>
GPIT-PV-60253	183	Phalanx, type 2	<i>Pl. trossingensis</i>
GPIT-PV-60254	115.39	Distal tarsal (?), type 2	<i>Pl. trossingensis</i>
GPIT-PV-60256		Fragment of the neural arch of a caudal vertebra, type 2	<i>Pl. trossingensis</i>
GPIT-PV-60257		Capitulum and tuberculum of a dorsal 15, type 2	<i>Pl. trossingensis</i>
GPIT-PV-60260		Hyoid and tongue bones, type 1	<i>Pl. trossingensis</i>
GPIT-PV-60274	144 (?)	Manual phalanx, type 1	<i>Pl. trossingensis</i>
GPIT-PV-60275	11	Manual phalanx, type 1	<i>Pl. trossingensis</i>
GPIT-PV-60276	9	Manual phalanx, type 1	<i>Pl. trossingensis</i>
GPIT-PV-60277	13	Manual phalanx, type 1	<i>Pl. trossingensis</i>
GPIT-PV-60278	13	Manual phalanx, type 1	<i>Pl. trossingensis</i>
GPIT-PV-60336	168	Two bone fragments in a plaster, type 1	<i>Pl. trossingensis</i>
GPIT-PV-60337	215.7	Distal phalanx of manual digit V, type 1	<i>Pl. trossingensis</i>
GPIT-PV-60338	215.8	Distal carpal (?), type 2	<i>Pl. trossingensis</i>

New number	Old number	Material, preservation type	Taxonomic opinion
<b>GPIT I</b>			
GPIT-PV-60339	166	Manual claw, type 2	<i>Pl. trossingensis</i>
GPIT-PV-111840		Skull of skeleton GPIT I, type 1	<i>Pl. trossingensis</i>
GPIT-PV-111842		Left maxillary, type 1	<i>Pl. trossingensis</i>
GPIT-PV-111845		Left jugal, type 1	<i>Pl. trossingensis</i>
GPIT-PV-111846		Left quadratojugal, type 1	<i>Pl. trossingensis</i>
GPIT-PV-111847		Left quadrate, type 1	<i>Pl. trossingensis</i>
GPIT-PV-111848		Left squamosal, type 1	<i>Pl. trossingensis</i>
GPIT-PV-111849		Left postorbital, type 1	<i>Pl. trossingensis</i>
GPIT-PV-111850		Right jugal, type 1	<i>Pl. trossingensis</i>
GPIT-PV-111851		Right quadratojugal, type 1	<i>Pl. trossingensis</i>
GPIT-PV-111852		Right quadrate, type 1	<i>Pl. trossingensis</i>
GPIT-PV-111853		Right squamosal, type 1	<i>Pl. trossingensis</i>
GPIT-PV-111854		Right postorbital, type 1	<i>Pl. trossingensis</i>
<b>GPIT II</b>			
GPIT-PV-30785		Composite mounted skeleton of several individuals of different sizes, types 1 and 2	cf. <i>Plateosaurus</i>
<b>GPIT III</b>			
GPIT-PV-30786		Pair of ischia and the proximal fragments of the pubes, a complete left femur, a left tibia, a left fibula, a left distal tarsal IV, a left astragalus, a left calcaneum, and the complete left and right feet, all type 3	cf. <i>Plateosaurus</i>
<b>GPIT IV</b>			
GPIT-PV-30787		Pelvis with two pubes, two conjoined ischia, five caudal vertebrae, a left femur, a left tibia, two fibulae, three metatarsals, fingers III and IV, type 2	<i>Tuebingosaurus maierfritzorum</i>
GPIT-PV-60237		Cast of a distal phalanx V.2	
GPIT-PV-60238	189.22	Bone fragment, type 2	
GPIT-PV-60239	186 (1-7)	Seven articulated caudals with chevrons (186), and what seems the following eight caudals with chevrons (174), type 2	cf. <i>Tuebingosaurus maierfritzorum</i>
GPIT-PV-60287	165.2	Right mandible, type 2	cf. <i>Plateosaurus trossingensis</i>
		Forearm (radius, ulna, metacarpals and phalanges), embedded in the display of the <i>Plateosaurus</i> Hall, type 2	cf. <i>Plateosaurus trossingensis</i>
<b>GPIT V</b>			
GPIT-PV-30788		Both pubes with some gastric ribs (type 4). Probably nine dorsal vertebrae (type 3), two sacral vertebrae (type 3), twelve caudal vertebrae, a partial left ilium (type 3), conjoined ischia, a complete left hind limb (type 2 and 3).	<i>Pachysaurus wetzeli</i>
<b>GPIT VI</b>			
GPIT-PV-30789		Right hindlimb, with a femur, a tibia, a fibula, and a complete pes, type 2	cf. <i>Plateosaurus trossingensis</i>
<b>Material from Trossingen catalogued by Weishampel (1983)</b>			
GPIT-PV-60210	1603/10	Right mandible, type 2	Sauropodomorpha
GPIT-PV-60211	1603/12	Right pubis, type 2	Sauropodomorpha
GPIT-PV-60212	1603/18	Left metatarsal IV, type 2	Sauropodomorpha

New number	Old number	Material, preservation type	Taxonomic opinion
<b>Material from Trossingen catalogued by Weishampel (1983)</b>			
GPIT-PV-60213	1603/18	Left metatarsal IV, type 2	Sauropodomorpha
GPIT-PV-60214	253.1	Dorsal vertebra, type 2	Sauropodomorpha
GPIT-PV-60215	253.1	Dorsal vertebra, type 2	Sauropodomorpha
GPIT-PV-60216	1603/11	Right ilium, type 2	Sauropodomorpha
GPIT-PV-60217	1603/17	Left metatarsal I, type 2	Sauropodomorpha
GPIT-PV-60218	1603/13	Left femoral head covered in paper, type 4. Preservation similar to the one from the material collected from Bebenhausen.	Sauropodomorpha
GPIT-PV-60219	181	Caudal vertebra, type 2	Sauropodomorpha
GPIT-PV-60220	1603/28	Caudal vertebra, type 2	Sauropodomorpha
GPIT-PV-60221	1603/29	Caudal vertebra, type 2	Sauropodomorpha
GPIT-PV-60222	1603/27	Caudal vertebra, type 2	Sauropodomorpha
GPIT-PV-60224	1603/8	Right maxilla, type 2	Sauropodomorpha
GPIT-PV-60225	1603/9	Left maxilla, type 2	Sauropodomorpha
GPIT-PV-60226	1603/14	Left metacarpals I to IV, type 2	Sauropodomorpha
GPIT-PV-60227	1603/16	Right metacarpal II, type 2	Sauropodomorpha
GPIT-PV-60228	1603/24	Caudal vertebra, type 2	Sauropodomorpha
GPIT-PV-60229	1603/25	Caudal vertebra, type 2	Sauropodomorpha
GPIT-PV-60230	1603/15	Right metacarpal II, type 2	Sauropodomorpha
GPIT-PV-60231	1603/22	Caudal vertebra, type 2	Sauropodomorpha
GPIT-PV-60232	1603/26	Caudal vertebra, type 2	Sauropodomorpha
GPIT-PV-60233	197	Caudal vertebra, type 2	Sauropodomorpha
GPIT-PV-60261	115c.	Chevron from anterior caudal vertebra, type 2	Sauropodomorpha
GPIT-PV-60262	115a.	Chevron from anterior caudal vertebra, type 2	Sauropodomorpha
GPIT-PV-60263	71f.	Chevron blade from anterior caudal vertebra, type 2	Sauropodomorpha
GPIT-PV-60264	125b.	Chevron from anterior caudal vertebra, type 2	Sauropodomorpha
GPIT-PV-60265	71g.	Chevron blade from anterior caudal vertebra, type 2	Sauropodomorpha
<b>Material of unknown provenance</b>			
GPIT-PV-111903		Histological slides from a drilling obtained from a phalanx (referred to as <i>Plateosaurus 'engelhardti'</i> in Klein 2004)	
GPIT-PV-111904		Histological slides from a drilling obtained from a phalanx (referred to as <i>Plateosaurus 'engelhardti'</i> in Klein 2004)	
GPIT-PV-60252		Distal end of a phalanx, type 1	Dinosauria indet.
GPIT-PV-60269		Two large phalanges in articulation, type 4	Dinosauria indet.
GPIT-PV-60270	8182	Fragmentary bones of vertebrae, type 4	Indet.
GPIT-PV-60319	RW14	Large dorsal centrum without a neural arch, type 2	Sauropodomorpha
GPIT-PV-60320		Proximal third and distal third of fibula, types 2 and 3 (collected from Jäcklinge, Pfrondorf?)	Sauropodomorpha
GPIT-PV-60322	RW12	Large dorsal centrum, maybe D12 (histological sample taken from this specimen)	Sauropodomorpha
GPIT-PV-60323	SW1	Posterior part of a sacral vertebra, types 2 and 3	Sauropodomorpha
GPIT-PV-60324		Cervical vertebra (possibly anterior), type 1	Sauropodomorpha
GPIT-PV-60325	SW1	Anterior part of a sacral vertebra, types 2 and 3	Sauropodomorpha
GPIT-PV-60326		Scapular blade, type 2	Sauropodomorpha

New number	Old number	Material, preservation type	Taxonomic opinion
<b>Material of unknown provenance</b>			
GPIT-PV-60327		Bone fragment, type 2	Indet.
GPIT-PV-60328		Possibly a sternal plate with rib four rib fragments, type 2 surrounded by matrix	Sauropodomorpha
GPIT-PV-60330		Vertebra (deformed by compression), type 2	Indet.
GPIT-PV-60331		Bone fragment, type 3	Indet.
GPIT-PV-60332		Fragment of a dorsal vertebra (labelled as metatarsal III), type 4	Indet.
GPIT-PV-60333		Cervical vertebra (possibly anterior), type 2	Sauropodomorpha
GPIT-PV-60334		Two blocks with ribs, possibly gastralia, type 2	Sauropodomorpha
<b>Material of unknown provenance</b>			
GPIT-PV-60342		A carpal bone (?), type 1	Indet.
GPIT-PV-60343		A phalanx (?), type 2	Indet.
GPIT-PV-60344		A large distal end of a phalanx, type 2	Indet.
GPIT-PV-60364	15615	Right claw, type 2	Indet.