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Classifying nature: Constantin W. L. Gloger's (1803–1863) tapestry of a "*Natural System of the Animal Kingdom*"

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Abstract

There has been no shortage of attempts to develop classification systems in order to capture the diversity of living forms in nature. One unpublished proposal (thus, largely unknown alternative method) was devised by Constantin Wilhelm Lambert Gloger (1803–1863), an ornithologist and zoologist from Upper Silesia who worked in Berlin for many years. Gloger described important phenomena of the geographical colour variation of birds and mammals (Gloger's Rule, 1833) and he combined as "climatic varieties" of polytypic species many representatives that had been described previously as independent species. During the early 1830s, Gloger started several large ornithological book projects which he abruptly discontinued when, in January 1834, an "enlightening inspiration" deviated his scientific endeavours towards work on a natural system of animals based on natural philosophical principles. He failed entirely in this attempt but continued work on it until the end of his life as a poor and lonely private scholar in Berlin. Gloger planned to publish this zoological classification system, which resembles a modern dichotomous identification key, under the title "*Gloger's Natural System of the Animal Kingdom*". However, his systematic tables, albeit printed and distributed "as manuscripts" by the author, were never published in coherent fashion. Five of these tables from 1834–1836, comprising his system of mammalian genera as interconnected folios of a 2.4 meter long tapestry, have recently been re-discovered in the Berlin Natural History Museum. They are here described in detail and illustrated for the first time, together with another folio depicting his system of mammalian families and one folio of Gloger's universal table of the world system. It remains unclear, though, how exactly Gloger intended to apply his "numbering system according to natural philosophy", as he called it. Nevertheless, Gloger's approach illustrates alternative classification schemes representing the systematists' continuous endeavour to bring order into the seemingly chaotic nature, while highlighting the danger of fatal error and complete failure.

Key Words

classification
natural system
mammalia
Gloger's Rule
history of ornithology
natural philosophy
Martin Hinrich Lichtenstein
quinarianism

Introduction

"*There was a protracted period during which individual naturalists felt free to exercise a great deal of systematic discretion. . . . And since their elusive object remained stubbornly unrealized, there was always room for another attempt*".

Harriet Ritvo (1997: 27–28)

Ever since the Swedisch botanist and systematist Carolus Linnaeus (1707–1778), systematists have been convinced that there must be a natural system underlying their classifications. However, it took more than two hundred years before clear objective criteria for preferring one classification over another were established

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and generally accepted. Willi Hennig's (1950, 1966) seminal works on phylogenetic systematics provided one of the most important milestones initiating a silent but lasting revolution in systematics (see e.g. Williams & Forey 2007; Glaubrecht 2007).

Undoubtedly, following Linnaeus' early attempts at classifying nature in the first edition of his "*Systema Naturae*" (Linnaeus 1735) his binominal system of nomenclature with a generic name and a specific epithet in Latin applied to plants in "*Species plantarum*" (1753) and to animals in the tenth edition of "*Systema Naturae*" (1758) was a major breakthrough as it became soon applied universally and has been in use now for two and a half centuries (e.g. Schuh 2003). This nomenclature has been developed and is being maintained by rules of international commissions for botany and zoology today.

However, despite its undisputed importance, unfortunately, nomenclature is often confused with classification of species and taxa. For example, a recently compiled catalogue of available and valid family names for gastropods (Bouchet & Rocroi 2005) added elements of classification to this nomenclator, however again without more than tentative and intuitive assumptions on phylogenetic relationships within and among these molluscan families. Given our current ability of rigorous evaluation of phylogenetic hypotheses this procedure is reminiscent of earlier approaches to classification when intuition and imagination were the most important and only available instruments for classification, as is exemplified here by Constantin Gloger's ill-fated attempt to systematize nature.

Mayr (1982) and Jahn (1990: 227–264; 1998: 219–248) have outlined the history of systematic classification, starting with Aristotle's distinction between "blooded" and "bloodless" animals in his "*Historia Animalium*" which roughly correspond to vertebrates and invertebrates (see also Nielsen 1995, 1997; Westheide & Rieger 1996, 2004). Several accounts have in particular reviewed the long search for a natural system (see e.g. Winsor 1976; Knight 1981; Gregorio 1982; Panchen 1992). How strange and hazardous some of these earlier classification schemes were has been told, for example, by Ritvo (1997), albeit her unsystematic approach to systematics has been critisized (Cartmill 1997). An account on pre-Linnaean botany is given by Jarvis (2007). Based on the firm belief that species are constant, these early classifications were long meant, in Linnaeus' tradition, to reflect God's creative plan, thus demonstrating the wonderful work of the Creator (e.g. Nielsen 1997: 243). It took another century before systematists were able to base classification systems on evolutionary relationships leading not only to order out of the taxonomic chaos but also to a truly natural system reflecting genealogical relationships.

Lamarck's (1809) proposal that species change through time and that fossils represent ancestors of living species can be seen, therefore, as a first consistent theory of genuine evolutionary change (Mayr 1982: 358–359; Corsi 1989). However, although Lamarck's ideas were widely known and discussed, they were largely dismissed and, as many biographers have pointed out (Desmond & Moore 1991; Browne 2002), even Charles Darwin later in his life denied any influence of Lamarck on his own thinking about variational evolution. Darwin's (1859) epochal "*Origin on Species*", where he depicts one diagramatic sketch of a hypothetical phylogenetic tree to illustrate and explain biological diversity as the result of descent with modification and a continuous process leading to a branching pattern, provided the foundation of a natural classification of plants and animals. With morphological similarity being seen as a tool for discovering evolutionary relationships, Darwin advocated first of all genealogy as the basis of classification (Padian 1999). In Germany, Darwin's hypothetical tree idea found a prolific follower, first, albeit less known, in the linguist August Schleicher (1863) and in the zoologist Ernst Haeckel (1866), who in his "*Generelle Morphologie*" drew the first phylogenetic tree of the animal kingdom (see e.g. Alter, 1999; Hoßfeld 2005). Today, evolutionary trees have become the lingua franca of biology.

Throughout the history of the discipline there has been no shortage of attempts to find a classification system that captures the diversity of living forms in nature. While these alternative classifications in particular in Victorian Britain have repeatedly interested historians of science (e.g. Winsor 1976; Knight 1981; Gregorio 1982, 1984, 2002; Rupke 1983, 1994; Panchen 1992), one entirely unknown systematic approach was devised in Germany by Constantin Wilhelm Lambert Gloger (1803–1863), an ornithologist, who explored the fauna of his native Silesia, then southeastern Germany, and who was active in Berlin for a long time (Figure 1). During the 'Golden Age' of German ornithology in the mid 19th century, Gloger was among several ornithologists, besides the famous Johann Friedrich Naumann and Christian Ludwig Brehm, who contributed effectively toward an increase of ornithological knowledge (Gebhardt 1964, Möller 1972; Haffer 2006; Haffer & Hudde 2007). However, Gloger not only published an excellent handbook of European landbirds but attempted to develop a natural system of all animals based on natural philosophical principles. Gloger planned to publish this zoological classification system under the title "*Gloger's Natürliches System der Thierwelt*", or Gloger's Natural System of the Animal Kingdom. He failed entirely in this attempt but continued work on it until the end of his life as a poor and lonely private scholar in Berlin.

Some of Gloger's diagrams, or "Special-Tabellen", prepared for his system were given, in 1834 and 1836, to the Prussian Ministry of Education and to the zoology professor and director of the Berlin Natural History Museum, Martin Hinrich Lichtenstein (1780–1857), respectively. For long they remained unnoticed in this museum, until five of these tables and one of Gloger's world system, were recently re-discovered in the museum's Ornithological Collection, during research carried out there by one of us (J. H.), as described in Haffer & Hudde

Figure 1. Constantin W. L. Gloger, in the year 1862, one year before his death, when honored with the Russian St. Stanislaus Medal 3th Class for his studies on pest control. Museum für Naturkunde Berlin, Historische Bild- und Schriftgutsammlungen, Bestand Zool. Museum, Signatur Orn. 20,7.

(2007). The latter authors used also hitherto unpublished archival records held in the Museum für Naturkunde Berlin, *Historische Bild- und Schriftgutsammlungen*, in particular the correspondence of Gloger and Lichtenstein between 1825 and 1839 comprising a total of 58 letters with 150 pages in Gloger's handwriting (while Lichtenstein's answers are missing), as well as official documents of the Royal Prussian ministries held in the *Geheimes Staatsarchiv Berlin*.

A small section from Gloger's "*Natural System*" was used as cover illustration for a book by the Berlin Natural History Museum on the occasion of its new exhibition "*Evolution in action*" (Glaubrecht et al. 2007), together with a Komodo Dragon (*Varanus komodoensis*). Here we use the opportunity to describe and illustrate Gloger's tables for the first time in detail, following a brief account on Gloger's life and main scientific contributions. A reproduction of the "tapestry" of Gloger's system in original size and as leporello is published in Zischler & Kratky (2010). In addition, we note a slightly earlier alternative approach by Martin Hinrich Lichtenstein and discuss possible connections to quinarianism in Britain.

Constantin Wilhelm Lambert Gloger: an unhappy life

Gloger's mostly tragic life has been reviewed by Gebhardt (1964) and Möller (1972). It will here only briefly be outlined, following Haffer & Hudde (2007), who used unpublished archival records, provided a complete bibliography and chronological compilation of evaluation of Gloger's work by others. Gloger's career contrasts with the exceptionally successful life of Karl August Möbius (1825–1908), who a few decades later also started as school teacher in Hamburg, founded ecology in Kiel and became one of the leading zoologists in Berlin (see e.g. Glaubrecht 2008; Nyhart 2009). However, while Möbius became a model for a civic zoologist and emerging professional scientist, Gloger pursued a phantom deeply rooted more in German "Romantik" than in biology.

Constantin Gloger was born in Kasischka, county of Grottkau, on 17 September 1803 and grew up in the countryside of Upper Silesia (at that time in southeastern Germany). He was educated at the gymnasium in the city of Neiße and, since autumn 1821, studied zoology in Breslau (today Wroclav, Poland). As the most significant event during that time, he enrolled in the winter semester 1824/25 at the university in Berlin, where he became a student of the zoology professor Martin Hinrich Lichtenstein, who was also director of the Berlin Natural History Museum. As is evident from archival records including compilations of lectures and students inscribed (see Jahn 1985: 266–268), Lichtenstein at that time read general zoology, natural history of mammals and birds as well as on other animal groups (see below). In the summer of 1825 Gloger returned to Breslau. From this time on until 1839 there is an extensive correspondence written by Gloger to Lichtenstein extant in the archive at the Museum für Naturkunde in Berlin (see Haffer & Hudde 2007: 28–29, Anhang 4).

After having received his PhD in July 1830, Constantin Gloger became a teacher for natural history studies at the Matthias-Gymnasium in Breslau during the same year. During the following period he hoped that an offer from a university would permit him to become a lecturer and professor of zoology. This, however, never came to pass, although Gloger wrote several ambitious applications and apparently neglected his duties as high school teacher (Haffer & Hudde 2007: 14). During the early 1830s, Gloger started several ornithological book projects which he, however, abruptly discontinued without ever completing them:

- A "*Complete Handbook of the Natural History of the Birds of Europe*" ("*Vollständiges Handbuch der Naturgeschichte der Vögel Europa's, mit besonderer Rücksicht auf Deutschland*"), of which only volume 1 covering the "land birds" was published in 1834. Several contemporary reviewers praised the rich contents of this first volume and expressed their hope that the projected second volume on the "water birds" would follow with no delay; however, it never appeared.
- A book on "*Zoological Geography with Special Reference to the Distribution of Birds*" was announced in late 1833 by the publisher of Gloger's handbook

and was scheduled to be published soon. Only a brief abstract appeared (Gloger 1834b), but Gloger never finished the manuscript of this zoological geography and the book was never printed.

- A "*Handbook of Natural History*" (with reference mainly to mammals and birds) of which only volume 1 appeared after a long delay in 1841–1842.

Although Gloger's health was weak during the 1830s, this does not explain why he never completed even one of the above projects in later years. Some other reason seems to have been responsible for this rather strange neglect of his former plans. As Haffer & Hudde (2007) discovered when reviewing Gloger's files at the former Ministry of Culture (now kept at the *Geheimes Staatsarchiv Berlin*), this neglect was related to an "enlightening inspiration" regarding the natural system of the animal world which Gloger said he experienced in January 1834 (see below).

Eventually, in September 1842, Gloger obtained a 3-year scholarship of 600 Reichsthaler from the Prussian government (Dr. Eichhorn at the *Königliches Ministerium der Geistlichen, Unterrichts- und Medicinal-Angelegenheiten* in Berlin), explicitly to allow him to continue his studies. He gave up immediately his secure, but unloved position in Breslau and moved early in 1843 to Berlin as an independent scholar "in order to devote his full attention to the service of science", as he wrote in a letter; i.e. to the continuation of his work on the natural system of animals. The latter, however, was never forthcoming. Not a single publication documents the results of his natural philosophical work over the 30-year-period from 1834 to 1863. Only a few preliminary tables illustrating his system of mammals have been preserved (see below) but cannot be representative of his final results.

When the funds of his 3-year scholarship had been exhausted in 1845 and the Prussian government refused to support him and his plans any further, Gloger came up with the idea of writing articles and booklets on pest control and the protection of economically important groups of animals (like birds of prey, insect eating as well as hole nesting birds) and to sell these booklets to the Ministry of Agriculture. This provided him with a meagre and irregular income over several years. Gloger's proposal consisted of an intentional increase of the natural enemies of pest species like field mice, certain caterpillars, etc. In this way he became one of the founders of the movement on animal protection and pest control during the mid 19th century (Barthelmeß 1981; Haffer & Hudde 2007: 18–19).

When professor Jean Cabanis, ornithologist at the Museum of Natural History in Berlin, founded the *Journal für Ornithologie* in 1852 (volume 1 appeared in 1853), he invited Gloger as a collaborator, undoubtedly paying him small fees for his help and for his numerous contributions (after all a total of 128!) to this new journal during the last ten years of Gloger's life. He wrote on some of his observations in Silesia decades earlier and reported on diverse general biological aspects of birdlife based on his study of the ornithological literature. For example, he reported on hybridization among species of ducks and gouse, on the brood parasitism of the European Cuckoo, on the acoustic communication between parents and young of the Great Curlew prior to hatching from the egg, on the relatively longer tail and wing feathers in immature birds of prey, and on many other topics; see Haffer & Hudde (2007) for details and complete bibliography.

During those years, Gloger obviously lacked the funds for excursions into the surroundings of Berlin to conduct original observations in the field, though. He attended at least two of the ornithological meetings, 1851 in Berlin and 1856 in Köthen, but otherwise lived a very secluded life as a poor and lonely private scholar and bachelor (Möller 1972), having failed in his three decade long attempt to classify nature. Constantin Gloger died in miserable poverty and illness on 30 December 1863 in Berlin.

Gloger's scientific merits and his "rule"

Undoubtedly, Gloger was one of the German pioneers of ornithology during the first half of the 19th century, with important contributions and observations on the systematics, morphology, ecology and behaviour of birds. For example, in the first volume of his *Vollständiges Handbuch der Naturgeschichte der Vögel Europa's,* Gloger (1834) was the first to differentiate singing passeres ("singende Sperlingsvögel", or "*Aves passerinae melodusae*") from passeres without larynx ("Sperlingsvögel ohne Singmuskelapparat", or "*Aves passerinae anomalae*"). Thus, for the first time in a general handbook he pointed out the essential distinction, for example, between swallows and swifts (see Haffer & Hudde 2007: 13, 20).

Gloger belonged to the small group of early ornithologists who not only described many observed facts but also interpreted some of them biologically and drew theoretical conclusions, thus stimulating further research. Examples are (i) his discussion of the protective coloration of bird eggs and of the females of ground nesting birds (1829), (ii) his studies of the geographical colour variation in animals and his views of species as reproductive communities (1833), and (iii) his interest in a natural system of the animal world. In his history of systematic ornithology, Newton (1896: 57) stated that in a general handbook of birds Gloger (1834a) "had the courage to recognize, for instance, such a fact as the essential difference between Swallows and Swifts, [which] lifts him considerably above the crowd of other ornithological writers of his time".

Most significant, though, was Gloger's early work on the adaptive geographical variation in birds and mammals. Many zoologists with an interest in the phenomena of geographical variation of animals are familiar with "Gloger's Rule", that found its ways into many

textbooks on zoogeography and evolution thanks to the Berlin curator and zoologist Bernhard Rensch (1929, 1934) who formulated and named it in Gloger's honor. "Gloger's Rule" is since then discussed in most works on the variation and evolution of animals (e.g. Huxley 1942: 213; Mayr 1942: 90, 1963: 256, 1982: 287, 560; Rensch 1954: 43, 47; Zink & Remsen 1986). This rule states that, within a species of endotherms, more heavily pigmented forms tend to be found in warm-humid environments and paler forms occur in cooler and drier environments. The adaptive basis of this ecological rule is a protective or concealing coloration of animals with respect to predators, prey and competitors. Also, more heavily pigmented feathers and hairs are better protected than light coloured ones against feather – and hair-degrading bacteria which thrive in warm and humid climates (Burtt & Ichida 2004).

Gloger (1833) had first discussed the above phenomena in his book on "*The Variation of Birds under Influence of the Climate*", a classical text that was only recently re-published in German. As is evident from the preface that he contributed to Gloger's 1833 book, it was his zoology professor in Berlin, Martin Hinrich Lichtenstein, who originally made some of the relevant

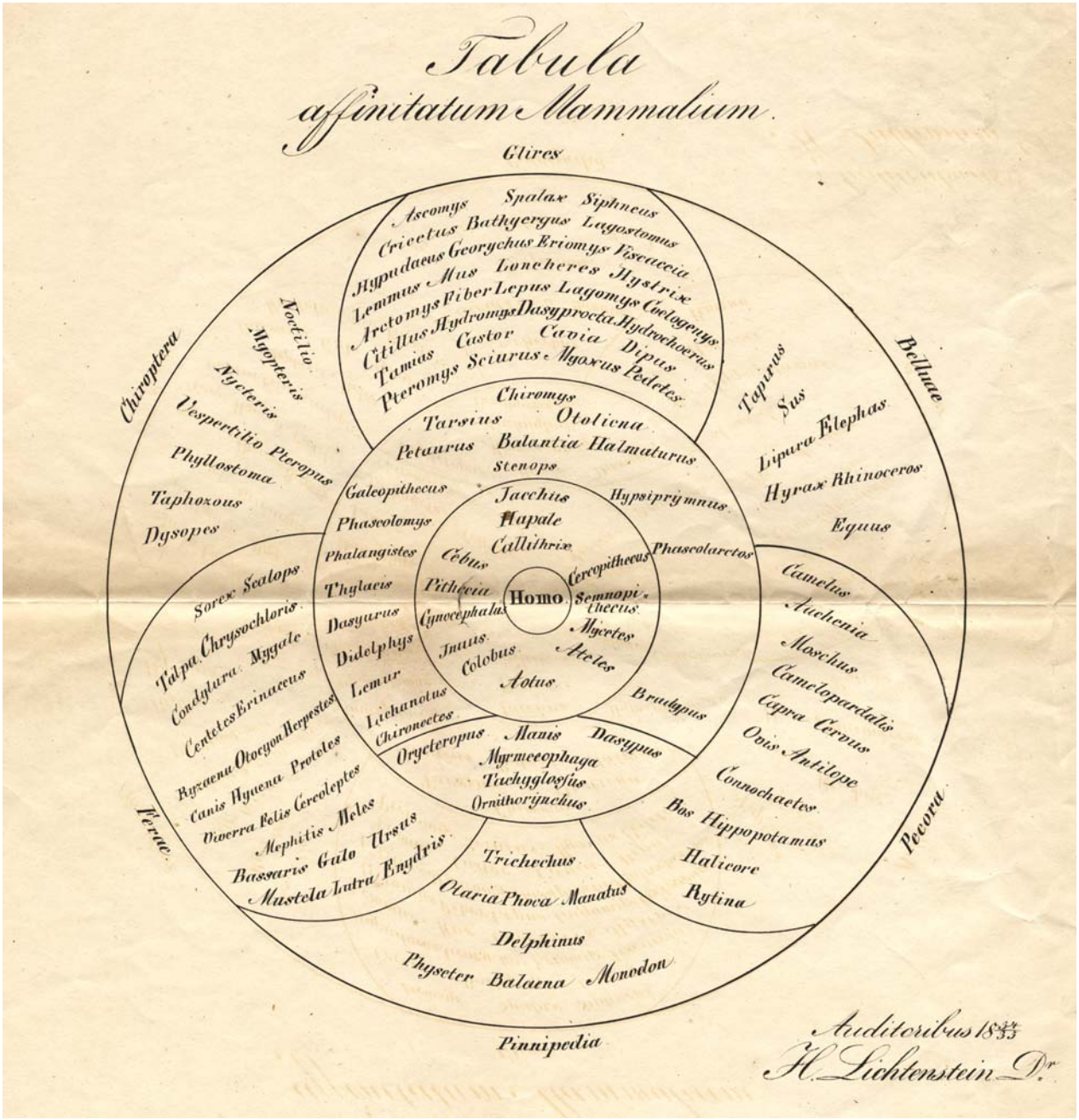

Figure 2. Schematic relationships of the Mammalia, "*Tabula Affinitatum Mammalium*", drawn as a circular diagram by Martin Hinrich Lichtenstein (1780–1857), zoology professor and director of the Berlin Natural History Museum, used for his university lecture in the winter semester 1832/33. Museum für Naturkunde Berlin, Historische Bild- und Schriftgutsammlungen, Bestand Zool. Museum, Abt. I.

observations on the geographical variation of mammals and birds, and on which Lichtenstein had reported in lectures, talks and letters. Nevertheless, Lichtenstein not only made it possible for Gloger to study this phenomenon in the then already rich collection of bird and mammal specimens from various regions of Eurasia in the Berlin Natural History Museum; he also allowed Gloger to publish these findings under his name. Gloger, however, doubted any fixed genetic (as we would call it today) basis of these geographical differences, as he believed that representatives of one form of a species, if transferred to the area of another form, would change their coloration to the appearance of that other form within a relatively short period of months or years. Therefore climatic varieties, in his opinion, could never develop into new species (see Haffer & Hudde 2007: 12).

Gloger was a convinced typologist (essentialist) and certainly not an evolutionist, as he was a firm believer in the stability of species, as was the case for most other naturalists until Darwin's (1859) publication. For example, Gloger's approach to species, albeit he regarded them as reproductive communities, was essentially typological and he deliniated many bird species in polytypic fashion, which was quite in contrast to other ornithologists of his times, e.g. C. L. Brehm (see Haffer 2003, 2006: 39–41; Haffer & Hudde 2007: 12–13). In what we would call today "lumping" fashion Gloger subsumed many of the geographically variable climatic varieties (subspecies) of birds within one species. Thus widely delineated, he argued against taxonomic names for subspecies.

This caused later, for example, Stresemann (1951: 72) to judge Gloger's view as having led systematic ornithology into a cul de sac, whereas we propose here with Haffer (2006) and Haffer & Hudde (2007) that Gloger's approach stimulated fruitful and eventually helpful discussions on species taxa and concepts and the practical question on how to delineate species. Although Stresemann (1951) mentioned Gloger's ornithological work favourably, he criticized the fact that Gloger did not apply taxonomic names to the "climatic varieties" of a species taxon but only wanted to describe the geographical variation in words. However, both the synthesis of similarities as well as the analysis of geographical differences of populations are necessary and lead to new knowledge in ornithology. The historical significance of Gloger's early ornithological work is being generally acknowledged (Haffer 1992, 1997, 2001, 2006).

Gloger's phantom: A classification based on natural philosophical principles

During the first decades of the 19th century, many biologists in Germany were influenced in their thinking by the *Romantic Zeitgeist* and the idealistic natural philosophy (see e.g. Richards 2002). This thinking had been introduced by Friedrich Wilhelm Schelling and Lorenz Oken who propagated the unity of nature and the human mind. They believed that deductive knowledge of nature is possible and that the genesis of the animal world may be understood through theoretical thinking without laboriously assembling an inductive basis of observed facts. Two of Gloger's professors at the University of Breslau were well known natural philosophers, Henrich Steffens (1773–1845), teaching there from 1811 until 1832, and Christian Gottfried Nees von Esenbeck (1776–1857), teaching there from 1830 to 1851 (see e.g. Schweizer 2009). Gloger was a close associate of both of them and they were very familiar with his scientific work before and after his PhD examination in July 1830. In the years following that date, Gloger became interested in the topic of natural philosophy, as is evident, for example, from letters to Martin Hinrich Lichtenstein in Berlin (see Haffer & Hudde 2007: 14–15).

As Gloger reported in an unpublished document (see Haffer & Hudde 2007: 15), on 7 January 1834 he experienced an "enlightening inspiration" with respect to a system of the animal world on a natural philosophical basis. Unfortunately, he never discussed in any detail the exact nature of this inspiration. It was apparently related to a rather elusive "number principle" according to which each taxonomic group of organisms should be subdivided. This principle supposedly permitted Gloger even to "predict" the existence of certain species or genera so far unknown. Several other natural philosophers of those times also emphasized the biological significance of the numbers 3, 4 or 5. The effect of Gloger's "inspiration" was that, as of early 1834, he discontinued abruptly all of his work on the three major projects mentioned above and, instead, turned his entire attention during his spare time to the establishment of "Gloger's Natural System of the Animal World", as he labeled it.

Gloger believed since January 1834 that "*in respect to systematics of natural objects he was lucky to have been able to make a more influential discovery than any other naturalist before*" ("*in Bezug auf die Systematik der Naturkörper eines glücklichen Fundes und einer viel einflußreicheren Entdeckung gewürdiget, als je einem anderen Naturforscher bisher*" (see Haffer & Hudde 2007: 17). Confessing that he was about to do what was until then held to be virtually impossible (i.e. to find order in the chaos of nature), Gloger's conviction appears to us today like a religious mission or vocation (*Berufung*), or at least one can assume that he might have regarded himself as chosen to find some kind of *Weltformel* for zoological systematics. As Linnaeus and other contemporaries have done earlier, also Gloger viewed the natural system as evidence for the necessity of the existence of God. In any case, Gloger regarded his natural system of the animal kingdom as alleged highlight of his life and career, for which he sacrified at the age of 30 his other ornithological and zoological works started promisingly in previous years. At least until 1850 Gloger followed this idea, as he informed in a letter of that year an influential ornitholo-

gist that due to the preoccupation with his natural system he would not finish his natural history of European birds (Möller 1972). Finally, only in the 1850s under the general criticism of natural philosophy in Germany Gloger put an end to his life dream.

It should be noted, though, that in other parts of Europe, for example, in Britain during the first half of the 19th century many strange approaches to classify nature have been proposed, often along quite similar lines of reasoning, as is evident from the account given by Ritvo (1997: 31–38 and the references cited in notes; see also e.g. O'Hara 1991, 1992; Panchen 1992). Particularly interesting here is the influential Quinarian system of classification invented by the British zoologist William Sharp MacLeay (1819, 1821) who arranged animals in groups of five, as an "*elaborate and eccentric attempt to represent the complex, overlapping sets of resemblances among animals*" (Ritvo 1997: 31). MacLeay (1821) in his essay on insects has first drawn the distinction between homology and analogy (see Panchen 1994: 39–42), thus, before Hugh Strickland in 1846 or Richard Owen in 1848, to whom this is mostly attributed. In 1819 MacLeay suggested to group animals in a system of embedded circles, each of which consisted of five subsidary circles, each of which was subdivided into five smaller ones, and so on. For example, in 1821 he separated the ten then recognized groups of insects in two groups of five (Mandibulata and Haustellata), based on their mouth parts. As is evident from an unpublished manuscript of 1829 (today in the Linnean Society Library; see Ritvo 1997: 217, note 26), MacLeay was also convinced of the existence of five primary divisions in mammals. His idea was found "suggestive, if not convincing" by many contemporaries and had quite some influence until the 1840s (Stresemann 1951; Ritvo 1997: 34; see e.g. Panchen 1994: 23–25). However, the idea of a circular classification system continued into the period after Darwin's "*Origin*" (1859) in the work of the Toronto professor William Hincks (Coggon 2002).

As for Gloger, for MacLeay linearity was unsatisfactory also, as it constrained the number of formal connections between animals; a view shared by most other contemporaries, as is evident, for example, from Hugh Strickland's (1841: 192) note that "no linear arrangement … ever can express the true succession of affinities". Given MacLeay's approach to use circular arrangement in particular for mammals, it would be interesting in a future study to look in more detail into the possible influence (whatever the direction was) or parallel development of these ideas in Britain and in Germany by Constantin Gloger and Martin Hinrich Lichtenberg (see below, Fig. 2).

Gloger's "*Natürliches System der Thierwelt*"

Obviously, Gloger's attempt to order nature in a comprehensive and adequate system was not the only one, not even in Germany at that time. Immediately before him, the zoology professor at the Berlin university Martin Hinrich Lichtenstein had tried to depict the relationships of the Mammalia. Drawn as a circular diagram centered around man and titled "*Tabula Affinitatum Mammalium*", with the note "*auditoribus 1833*" and his name (Fig. 2), he used it for his university lecture in the winter semester 1832/33 (Jahn 1985: 267–268). In addition to *Homo* at the center of the figure, Lichtenstein used three more circles to differentiate (i) monkeys and apes, as well as, among others, (ii) lemurs, marsupials and monotremes. In the outermost circle (iii) he arranged six major groupings, named Glires, Belluae, Pecora, Pinnipedia, Ferae and Chiroptera. Interestingly, Lichtenstein called this diagramatic scheme of relationships of mammals a table (tabula), as was later also done by Gloger.

Evidently, it was an exciting time for systematists. Pointing out the regular geometry of Lichtenstein's arrangement, Jahn (1985: 267) assumed that he might have been influenced by natural philosophers among contemporary zoologists (mentioning "A. Maclean, C. G. Carus, L. Reichenbach"). It would be worthwhile to look into this in more detail, as well as to know more about the struggle for system among the leading zoologists at this time in Germany and at the museum in Berlin. Any influence or connection to those arrangements proposed by William MacLeay or his main follower William Swainson (O'Hara 1991, 1992; Ritvo 1997) also remains to be studied. However, we note here that it is certainly possible that Lichtenstein, who apparently had an interest in the classification of mammals, might have been aware of John E. Gray's (1825) attempt to arrange these vertebrates according to MacLeay's quinarian approach and along the lines indicated in the manuscript draft by the latter (see above). Gray was keeper of natural history at the British Museum in London, thus most likely known to Lichtenstein. In contrast, Swainson's (1835) account on the classification of mammals, albeit more popular, was published too late given the origin of Lichtenstein's table in 1833. Interestingly, in contrast to the quinarian arrangement of five circles, Lichtenstein used only four circles, but had six groups in the outer circumference (Fig. 2). However, we note that William MacLeay, who had originally divided the circle of the class Mammalia into five orders, was later also forced to add a sixth order (see Ritvo 1997: 31–32).

After its peak in Britain in the 1830s quinarianism propagated by MacLeay, Swainson and Gray soon began to fade (Ritvo 1997: 33–35), certainly facilitated by the criticism of influential men such as, for example, Strickland (1841: 186, 192) who argued against numerical properties and regular geometrical pattern, as a system based on these were "*not of nature but of art*" (: 187) and doubted that the world is "*laid out with the regularity of a Chinese garden*" (: 188). However, it took decades before this or similar ideas on circular systems with its mystical numbers were completely overthrown, reminding us that the road to consensus

had been neither straight nor smooth, as the persuasiveness and authority of zoological classification had been less clear during the earlier stages (Ritvo 1997: 10), when systematics was polyphonous and at times even cacophonous.

The rather tragic efforts of Constantin Gloger in regard to classification have been documented by Haffer & Hudde (2007) in some detail and will in the following only briefly be summarized. After his "enlightening inspiration" in January 1834 Gloger's scientific endeavours were deviated towards work on the natural system of animals. All we know for sure is that he tried to base it on natural philosophical principles. As Gloger did not leave any account or manuscript where he explained his principles, we are left with documents in the *Geheimes Staatsarchiv Berlin* where in applications for financial support to the Prussian Academy of Science in Berlin late in 1835 and early 1838 he vagely declared that his systematics is concordant with both mere empiricism as well as refined natural philosophy and follows a principle of numbers (see Haffer & Hudde 2007: 16–17). As essential elements of Gloger's systematics we here extract from these sketches:

(i) Applying the principle of number (apparently sought after by Gloger, but unknown to us) determines the position of individual animals or forms (taxa) in the system, either "lower" or "higher";
(ii) Using in particular problematic ("*unbequeme*") taxa is essential, as from their position that of neighboring taxa becomes evident;
(iii) The systematic arrangement never follows a simple line, but is built instead of ever smaller parts of largely parallel and analogous lines of forms of equal number. This is true not only for genera, but also for species and varieties;
(iv) A tabular arrangement in form of a table is best suited for depicting the natural system.

In addition, from a stepwise arranged natural system, Gloger was hoping to find the underlying formative rules ("*ursprünglichen Bildungsgesetze*"). Natural system and natural history would then fall together as being one. His approach to zoological systematics, thus, was something like "*Rechnen mit Formen*", or accounting with organic beings, as he once in December 1838 called it in a letter; like in mathematics a majority of forms (or factors) needs to be known to allow calculation of unknown numbers and entities (Haffer & Hudde 2007: 16).

As is evident from some of the tables being printed in Breslau and distributed as manuscripts (see below) Gloger certainly planned to publish his zoological classification system, which resemble a modern dichotomous identification key, under the title "*Gloger's Natural System of the Animal Kingdom*". However, his applications for financial support of this work were treated very reservedly at the Royal Prussian Ministry of Education and at the Prussian Academy of Sciences in Berlin.

According to the reconstruction in Haffer & Hudde (2007) Gloger sent some first versions of his tables on vertebrates and of the entire animal kingdom, drawn according to his new method, to the following institutions and/or persons in Berlin in the mid 1830s:

(a) On 29 March 1834 to the Ministerium der Geistlichen, Unterrichts- und Medicinalen Angelegenheiten;
(b) With a letter dated 18 June 1836 to Professor Martin Hinrich Lichtenstein at the museum he sent tables of the Mammalia, listing essential genera;
(c) On 6 July 1836 he sent to the Prussian minister Von Altenstein five interconnected tables of Mammalia as well as a universal table of the entire world system.

His plans to elaborate his idea for the entire animal kingdom, however, were not supported until he received a 3-year scholarship in 1842 (see above). Professors at the Prussian Academy of Sciences were doubtful that, despite Gloger's initial progress in developing a partial system of the Mammalia, his approach was worthwhile when applied to all animals. It was recommended that Gloger should return to more solid studies and in particular finish his natural history of European birds. As Haffer & Hudde (2007: 17) so elegantly concluded, in particular Christian Gottlieb Ehrenberg and other zoologists of the Berlin academy soon realized "*die naturphilosophische Leere*", the natural philosophical emptiness, of Gloger's approach.

Rediscovering Gloger's "Special tables" of mammalian classification

The materials listed above under (b–c) are today extant in the Berlin Museum für Naturkunde, where they only recently have been re-discovered in the museum's Ornithological Collection during research carried out by one of us (J. H.); see Haffer & Hudde (2007). In Sommer 2003, while meeting with the ornithologist Dr. Frank Steinheimer who was at that time working in the respective collection of the Berlin Natural History Museum, J. H. mentioned his interest in Gloger's correspondence with Lichtenstein in the museum's archives. When searching for additional sources, Steinheimer found Gloger's "Tabellen", deposited at that time unter "G" (for Gloger, with the signatur number "S. 260., G. 57") in the Ornithological Collection, and sent photocopies of them to J. H. in October 2003. Gloger's tables are now housed in the Historische Bild- und Schriftgutsammlungen, Museum für Naturkunde Berlin, Germany (Bestand: Zool. Mus.; Signatur: S I, Gloger, C., Mappe: Gloger – System der Tierwelt); see below, Figs 3–6).

Some questions remain open as to this finding. Undoubtedly, Lichtenstein as liberal and ever-supportive director (Nyhart 2009: 47), was the first address for naturalists at this time in Berlin to turn to, in particular in case of Gloger who had been his student in

1824/25 (see above). Undoubtedly also, the museum (then in its original place, todays university main building at Unter den Linden), was at that time the chief natural history museum of the Prussian state, thus "a state institution par excellence" (Nyhart 2009: 46) and its main repository for natural items, and also the museum of the university in Berlin. Nevertheless, it is not known how and when exactly Gloger's universal system as well as his tapestry of mammals, comprising one folio with a system of mammalian families (Part I) and the five interconnected folios with his system of mammalian genera (the "tapestry" of Part II) (see below), came to the museum archives and why these tables found their way to the Ornithology Collection. It is not clear whether those tables sent directly to Lichtenstein (see above, listed under (b)) are lost, unless we assume that the two manuscript folios (see below, under C) are identical with the latter. Thus, we are left with speculations only, of which none could be substantiated to date.

Gloger's tables extant in the Berlin Museum für Naturkunde comprise the following items, as illustrated here for the first time:

A – Gloger's "*Universal-Tabelle des Weltsystems*". One folio, folded out as shown in Figure 3.
B – Gloger's "*Natürliches System der Thierwelt*", Part I (for mammalian families) (Fig. 4) and Part II (for genera), the latter comprising Special tables 1–5; folded out as shown in Figure 5a and Figures 5b–f.
C – Two manuscript folios, as Part of Gloger's Mammalia system; as shown in Figures 6 and 7.

A – Gloger's "*Universal-Tabelle des Weltsystems*"

One folio, folded out as shown in Figure 3 titled "*Gloger's universal table of the world system*", of the following size: length 53.5 cm, height 37.4 cm.

Notes in the upper right hand corner, apparently in (his?) handwriting, says: "*(Als Manuscript!)*"; below there is printed "*No. I*". Lines numbered vertically from 1 to 15 at the left margin, also numbers 1–15 along the lower left hand side.

Folio printed, albeit without note (as compared to the following folios; see below, under B).

Gloger's folio is titled "*Seyn*" (being), deviding it into "*Schöpfer (Ursache)*", i.e. Creator and cause, on the upper left hand side, and "*Welt (Wirkung)*", i.e. the world and effect, on the upper right hand side. The latter Gloger divided into (a) systems of fixed stars and galaxies ("*Lichtnebel*"), as well as (b) planets with non-living and living spheres, as e.g. the Earth.

This and his subsequent lower divisions clearly indicate his thinking being heavily influenced by the then influential natural philosophy of his times that was later in 1840s and 1850s dismissed by most scientists in Germany.

B – Gloger's "*Natürliches System der Thierwelt*"

Gloger's "*Natürliches System der Thierwelt*", or Natural System of the Animal Kingdom, comprises two parts, here refered to as follows:

– **Part I:** One folio of the following size: length 55.0 cm, height 21.2 cm; folded out as shown in Figure 4, titled "*Natürliches System der Thierwelt*". In the following line: "*Tab. A: Generelle Tabelle des Systems der Säugetiere, bis herab auf die Hauptfamilien*".

Notes in the upper left hand corner, in his handwriting, says: "*(Als Manuscript!)*"; below at the left margin there is a numbering, printed vertically from 1 to 10. In the upper right hand corner these numbers are repeated, added by a note saying: "*No. 2*".

At the bottom there is a note in brackets added indicating that this table will later be printed anew: "(*Anmerk. Gegenwärtige Tabelle wird später ganz neu lithographiert.)*".

Folio printed, with note in lower right corner: "*Lith.[ographisches] Inst.[itut] von S. Lilienfeld in Breslau.*"

This folio, apparently meant as a kind of summary given of the tapestry itself in Part II (see below), shows Gloger's system of "*Lebendig-Gebärende Warmblütige Wirbeltiere*", distinguishing "*Gehende (Land-)Säugethiere*", on the left hand side, from "*Nicht-Gehende Säuger*", on the right hand side. Note that this folio depicts all the major families of mammals, while the following lists all mammalian genera.

– **Part II:** The tapestry or Haupttabelle itself, titled "*Natürliches System der Thierwelt*" (Natural System of the Animal Kingdom), refers to all genera of Mammalia and consists of five interconnected (glued together) folios, numbered as Special tables 1–5.

Folded out as depicted in overview in Figure 5a (with details given in Figs 5b–f), the tapestry has a total length of 240.5 centimeter and is 21.2 centimeter in height. Note that the sizes of the individual folios as given below separately add to a slightly larger length, but that the margins are overlapping where folios have been glued together.

Each of the five folios (Figs 5b–f) is headed as "*Specialtabelle*" (Special table), with the names of the group of mammals given in German, as detailed below. The individual constituent taxa on each table are listed with their German names, often supplemented by a morphological characterisation such as e.g. with hoof or with complete rows of teeth.

Special table 1: "*Specialtabellen der Säugethiere bis herab auf sämtliche Gattungen. – Spec. = Tab. 1: Mensch und Affen.*" (torn apart with two sections of 28.0 and 16.5 cm = 44.5 × 21.2 cm).

Note says: "*(Einstweilen nur privatim als Manuscript vertheihlt unmittelbar von dem Verfaßser!)*".

Lines numbered vertically from 1 to 15; folio printed with note in lower right corner: "*Lith.[ographisches] Inst.[itut] von S. Lilienfeld in Breslau.*" (Fig. 5b)

Special table 2: "*Säugethiere, Spec. = Tab 2: Raubthiere.*" (size: 39.0 × 21.2 cm).

Note says: "*(Als Manuscript!)*"

Lines numbered vertically from 1 to 15; folio printed with note in lower right corner: "*Lith.[ographisches] Inst.[itut] von S. Lilienfeld in Breslau.*" (Fig. 5c)

Special table 3: "*Säugethiere, Spec. = Tab. 3: Nager.*" (size: 47.8 × 21.2 cm).

Note says: "*(Als Manuscript!)*".

Lines numbered vertically from 1 to 14; folio printed with note in lower right corner: "*Lith.[ographisches] Inst.[itut] von S. Lilienfeld in Breslau.*" (Fig. 5d)

Special table 4: "*Säugethiere Spec. = Tab. 4: Beutel-, Krallen- und Schnabelthiere; Dickhäuter, Wiederkäuer und Einhufer.*" (size: 56.3 × 21.2 cm).

Note says: "*(Als Manuscript!)*".

Lines numbered vertically from 1 to 14; folio printed with note in lower right corner: "*Lith. [?] von S. Lilienfeld in Breslau.*" (Fig. 5e)

Special table 5: "*Säugethiere Spec. = Tab. 5: Fliegmaki und Flederthiere; Robben Seekühe und Wale.*" (size: 56.0 × 21.2 cm).

Note, here on right hand side, says*:* "*(Als Manuscript!)*"; note that numbers 1–12 are repeated on right hand side; folio printed with note in lower right corner: "*Lith.[ographisches] Inst.[itut] von S. Lilienfeld in Breslau.*" (Fig. 5f)

Gloger's natural system of mammals starts from the top of the folios with subsuming all live-bearing (i.e. viviparous), warm-blooded Mammalia as "*Leb.[end] Geb.[ärende]Warmblüt.[ige]Wirbelthiere*", which he separated into "*Gehende(Land-)Säugethiere*" (walking terrestrial mammals) to the left, comprising Special tables (folios) 1–4 (Figs 5b–e), and "*Nicht-Gehende(Fliegende und schwimmende) Säugethiere*" (non-walking, flying and swimming mammals) to the right, on Special table (folio) 5 (Fig. 5f). The latter comprise those "*Mit Flughäuten*", i.e. bats, and "*Mit Flossenfüßen*", i.e. seals and wales. Within the former Gloger included those "*Mit vollständiger Zahnreihe*", such as carnivores, apes and man as "higher" land mammals, distinct from the "lower" land mammals "*Mit unvollständiger Zahnreihe*", i.e. rodents. He placed *Homo* to the immediate left hand side of folio 1, under those "*Mit Händen*" and therein those "*Mit Plattfüssen*", constituing the first order, as opposed to the second order, which are those "*Ohne Plattfüsse*", i.e. monkeys and apes.

In this arrangement, at the same time subdivided and interconnected by widely overarching brackets, Gloger followed his expressed conviction that the natural system should not be depicted as a simple line, but instead be built of ever smaller parts of largely parallel and analogeous lines of equal number (see documents analysed in Haffer & Hudde 2007: 16). He arranged the forms or taxa consistently in a dichotomous way, using some of the most distinct and conspicuous morphological characters of the animals, as is done today also in dichotomous identification keys; these, however, do not represent and are not meant (albeit often misunderstood!) as a classification of the taxa in question.

C – Two manuscript folios, as part of Gloger's Mammalia system

While the first three (A–B) are printed, two additional folios (Figs 6, 7) extant in the Berlin Museum für Naturkunde are handwritten sketches of a part of Gloger's "*Natürliches System der Thierwelt*". Both are in ink on watermark paper (watermarked "JWhatman" in capital letters). One is with some corrections. As is evident from our comparison with letters written by Gloger (today in the archives of the Museum für Naturkunde in Berlin) these sketches are of Gloger's hand.

The first folio (size: 26 × 19 cm) is a manuscript sketch with classification of marsupials (Fig. 6) which correspond to a part of Gloger' system depicted on Special table 4 (compare Fig. 5e). As this manuscript version of the table of marsupials shows corrections that are missing when compared to a second manuscript version of the same folio (size: 21.9 × 13.3 cm) (Fig. 7), it can be assumed that this second manuscript version was done some time later than that in Fig. 6. It reveals Gloger's repeated revision and work on his system, apparently in the initial years 1834 to 1836 when he developed his classification.

However, we can only speculate that it were these two manuscript versions of the tables that Gloger sent in June 1836 to Lichtenstein at the museum; accordingly, the five interconnected tables of the mammalian system and the universal system sent originally to Von Altenstein at the Prussian ministry in July 1836 must have found their way later to the museum.

From all we know, the folios listed here under A and B were printed in Breslau by S. Lilienfeld, most likely during March 1834 and July 1836, when Gloger was living there and before he sent them to the Prussian ministry and to Lichtenstein at the Berlin museum (see above). The repeated notes in handwriting on the printed folios clearly stated that these tables of Gloger's system were meant as preliminary manuscript versions only, distributed directly by the author, apparently in the course of his applications for financial support.

As Gloger tended to group forms on the basis of very few, or even single, characteristics (such as dentition, foot, digits etc.), his system was as artificial as Linnaeus's classification. With the mammals being part of Gloger's natural system of the entire animal kingdom, to this day it remained unclear, unfortunately, how exactly he intended to apply his mysterious "numbering system according to natural philosophy", as he called it. His approach is neither deduciable alone from the existing "Special-Tabellen" depicted here (Figs 3–5), nor in combination with or from his (quite extensive) letters and other manuscript documents ex-

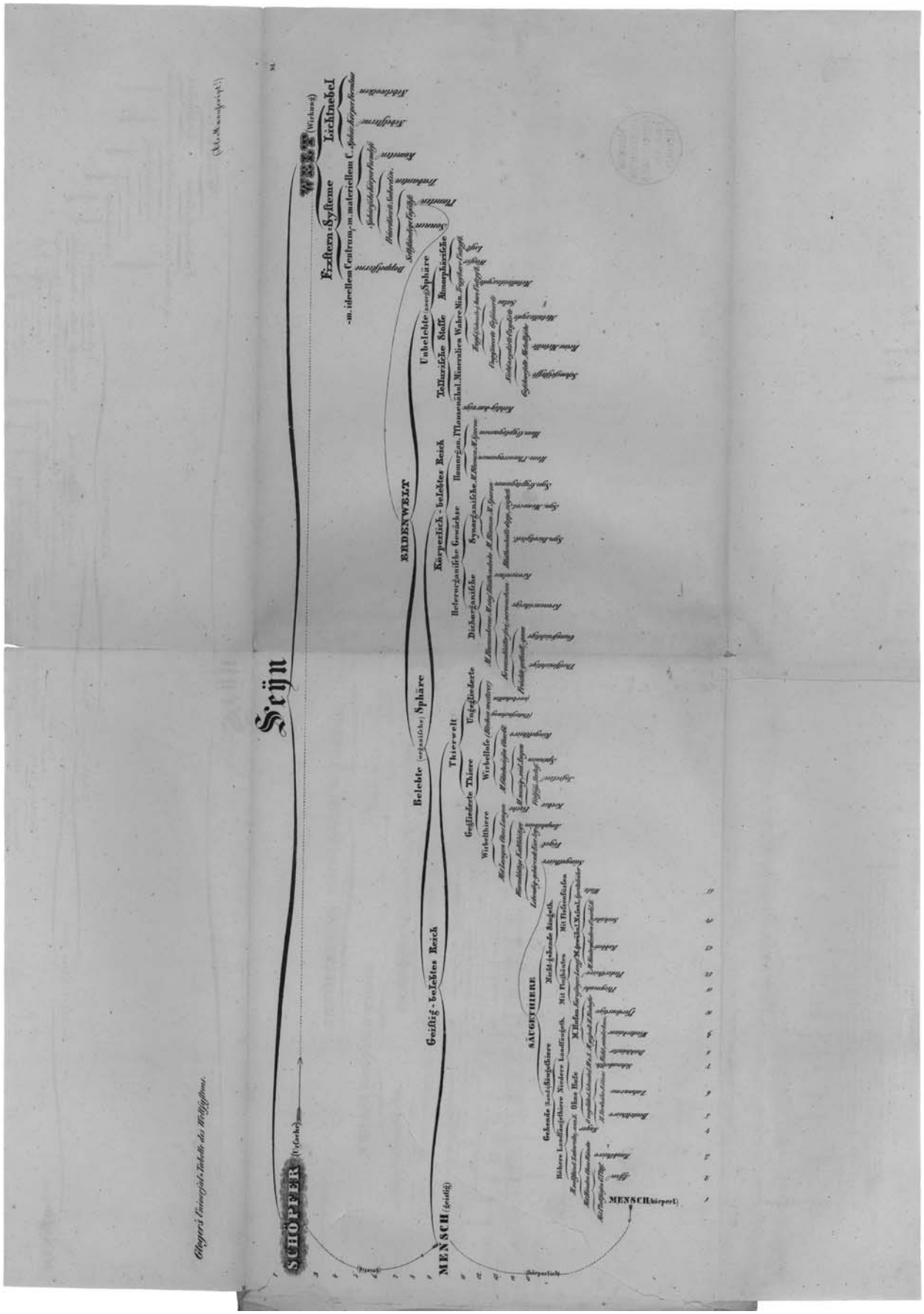

Figure 3. Gloger's *"Universal-Tabelle des Weltsystems"*, or Universal Table of the World System; **a.** one folio, overview (this page); **b.** folded out and nonscaled (shown on the following three pages). It is housed in the Museum für Naturkunde Berlin, Historische Bild- und Schriftgutsammlungen (Bestand: Zool. Museum; Signatur: S I, Gloger, C., Mappe: Gloger – System der Tierwelt).

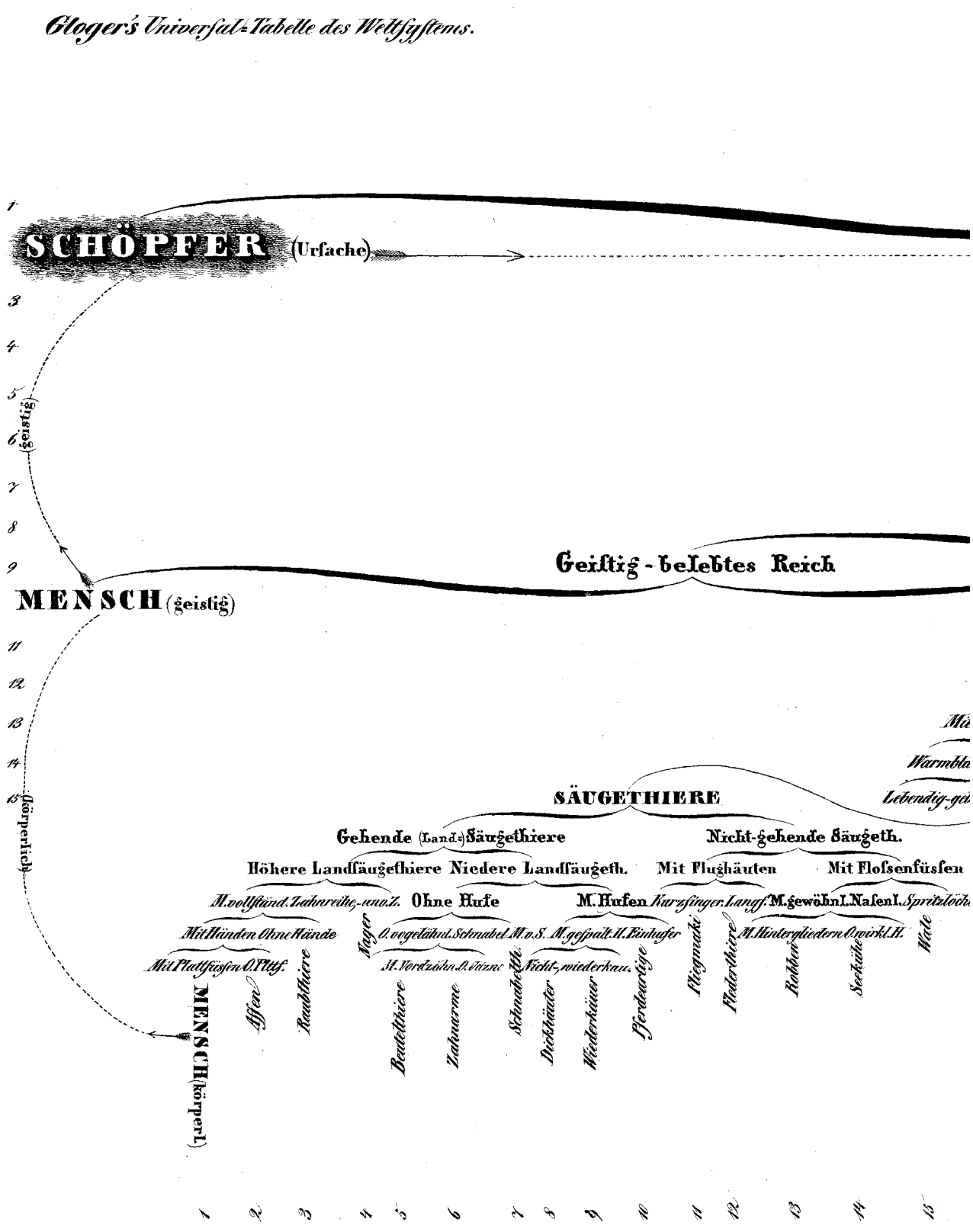

Figure 3b. Gloger's *"Universal-Tabelle des Weltsystems"*

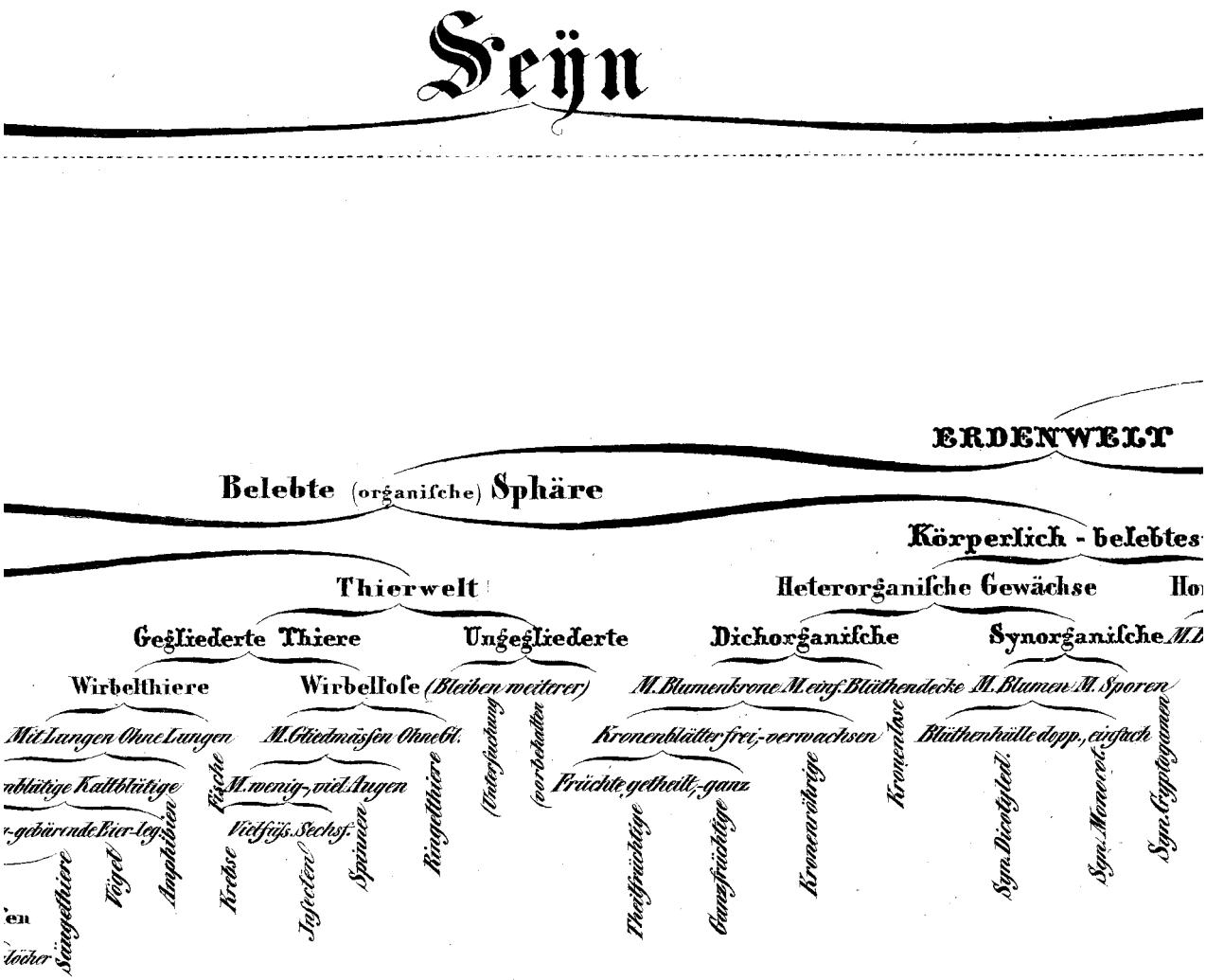

Figure 3b. (continued) Gloger's *"Universal-Tabelle des Weltsystems"*

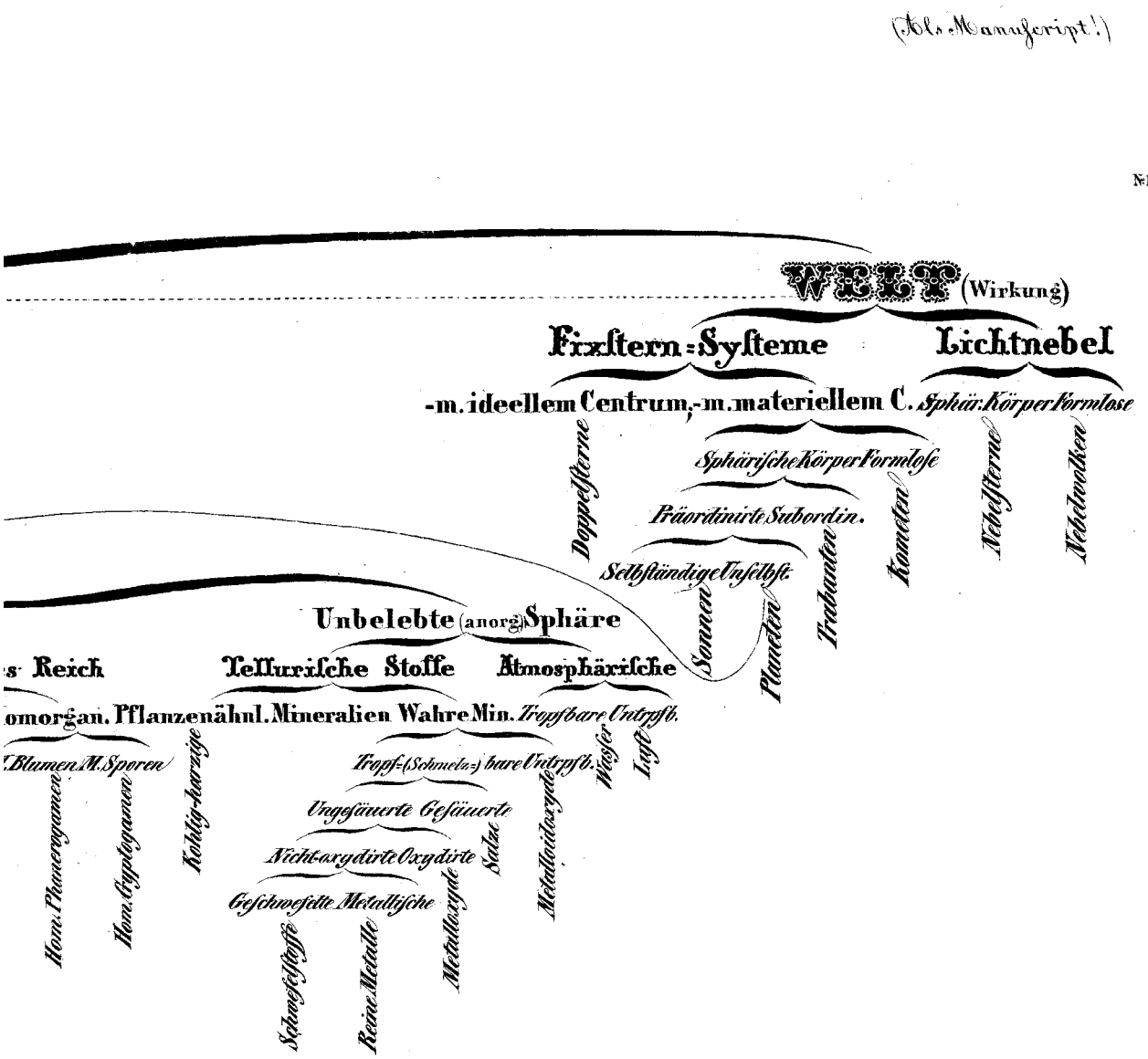

Figure 3b. (continued) Gloger's *"Universal-Tabelle des Weltsystems"*

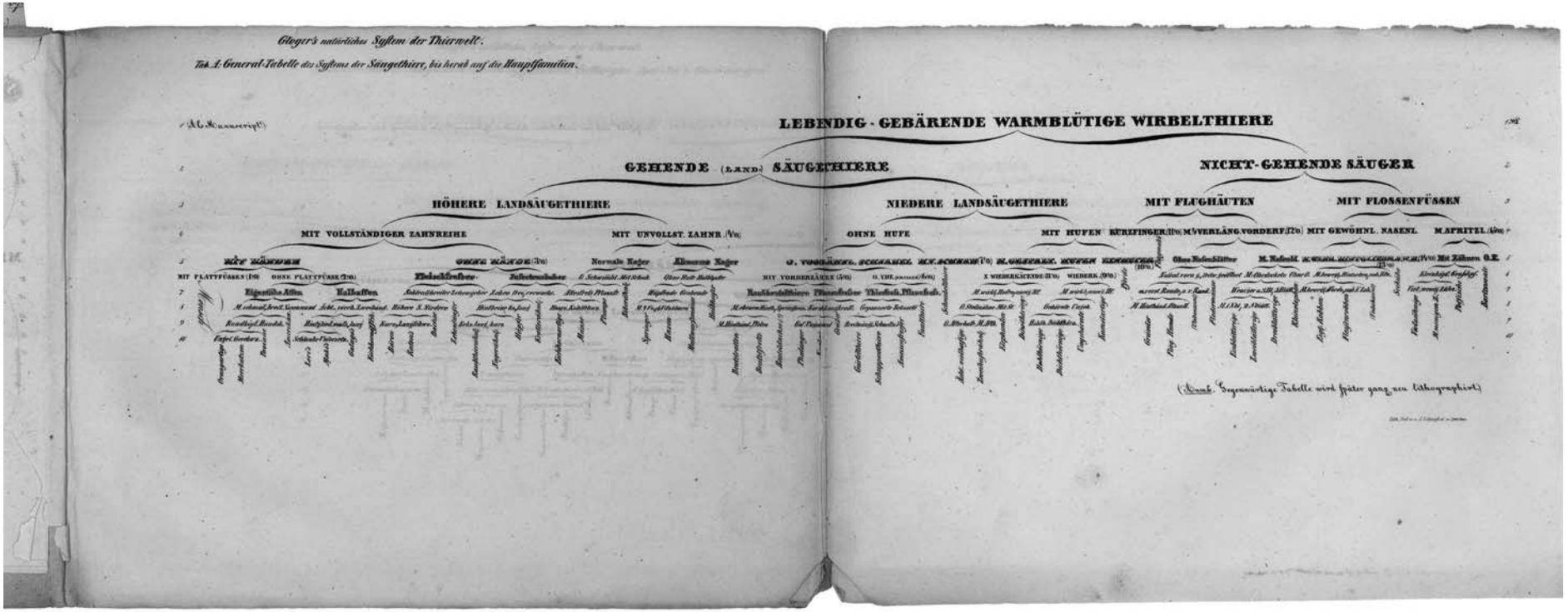

Figure 4. Gloger's *"Natürliches System der Thierwelt"*, or Natural System of the Animal Kingdom, depicting his system of mammalian families, here described as Part I; **a.** one folio (this page); **b.** folded out and nonscaled (shown on the following three pages), with the names of the mammalian subgroups; for details see text. It is housed in the Museum für Naturkunde Berlin, Historische Bild- und Schriftgutsammlungen (Bestand: Zool. Museum; Signatur: S I, Gloger, C., Mappe: Gloger – System der Tierwelt).

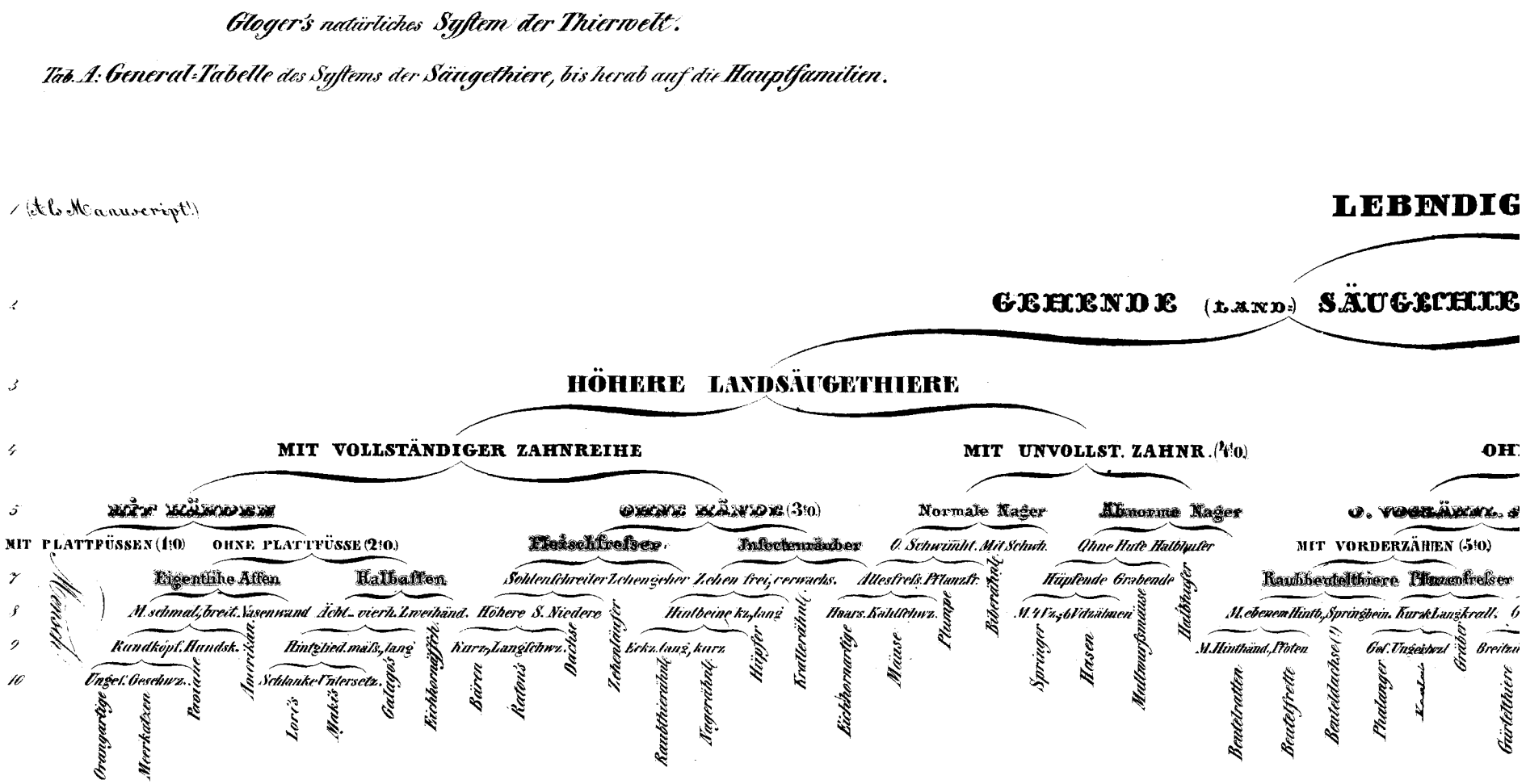

Figure 4b. Gloger's *"Natürliches System der Thierwelt"*, nonscaled sections.

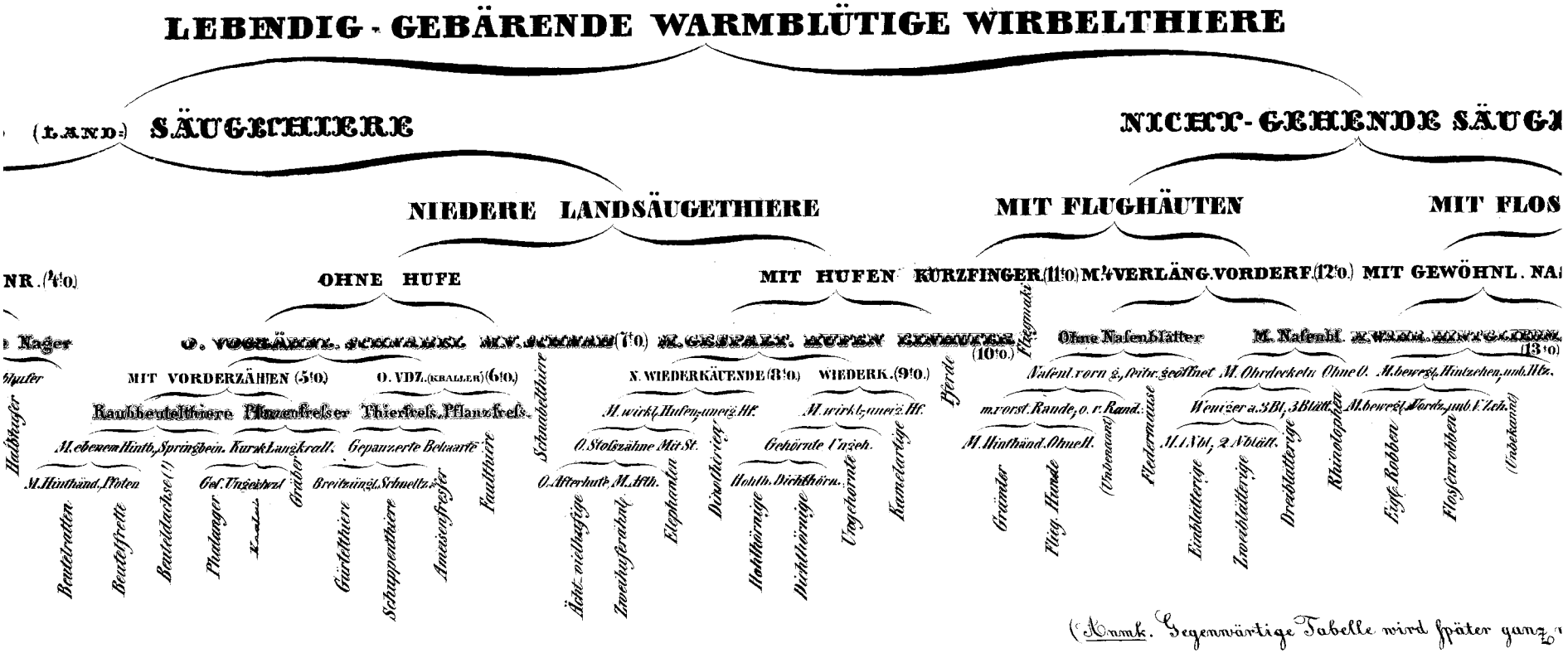

Figure 4b. (continued) Gloger's *"Natürliches System der Thierwelt"*, nonscaled sections.

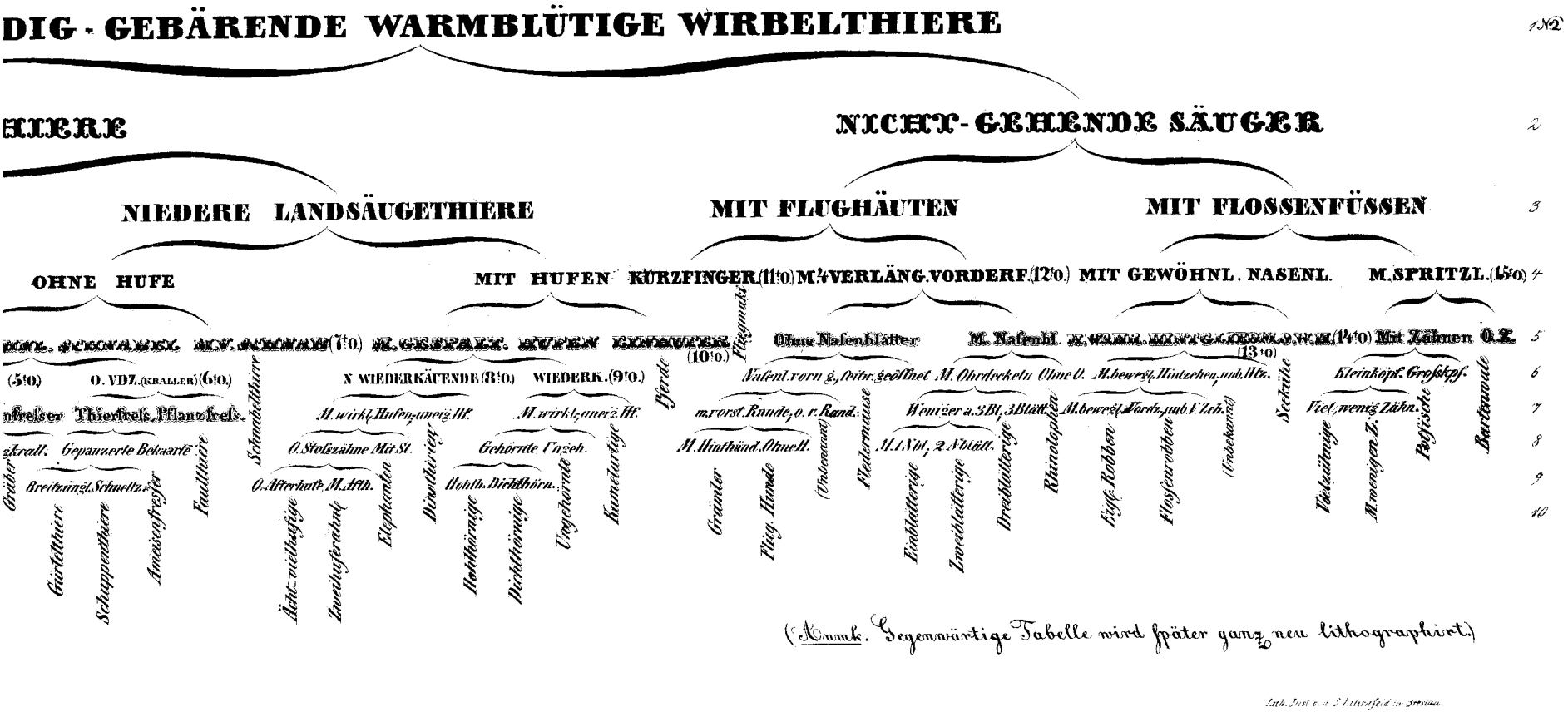

Figure 4b. (continued) Gloger's *"Natürliches System der Thierwelt"*, nonscaled sections.

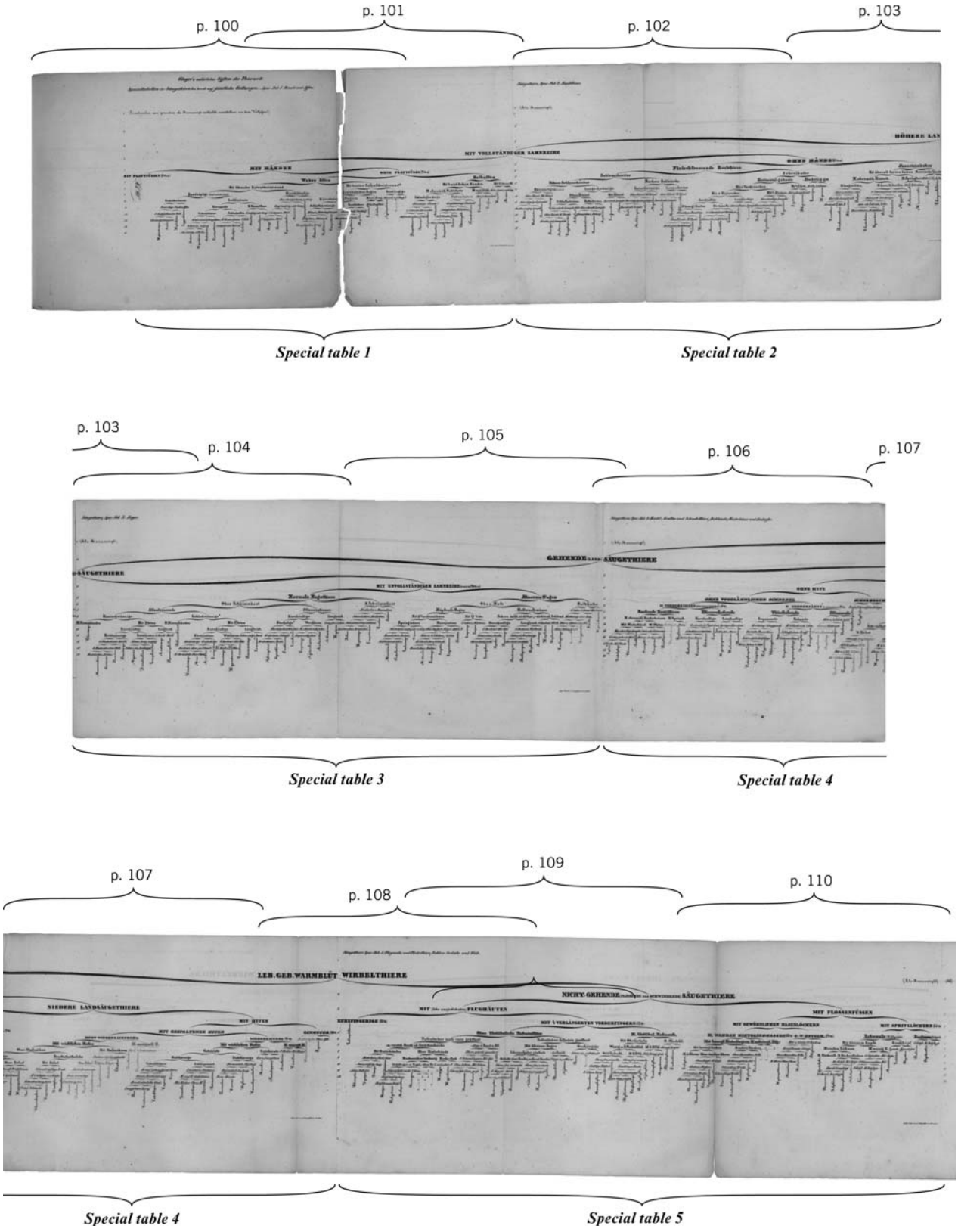

Figure 5. Gloger's *"Natürliches System der Thierwelt"*, or Natural System of the Animal Kingdom. Entire tapestry folded out to a total length of 240 cm comprising five folios or tables, entitled each as "Special tables" with the names of the mammalian subgroups given on each folio accordingly. **a.** Shown here (this page) is an overview with indication of the sequence of those individual tables shown in more detail in b–f. **b–f.** Gloger's *"Natürliches System der Thierwelt"*, or Natural System of the Animal Kingdom (nonscaled, shown on the following eleven pages). The figures show details of the respective folios, entitled each as "Special table" with the names of the mammalian subgroups given on each folio accordingly; for details see text. The original is housed in the Museum für Naturkunde Berlin, Historische Bild- und Schriftgutsammlungen (Bestand: Zool. Museum; Signatur: S I, Gloger, C., Mappe: Gloger – System der Tierwelt).

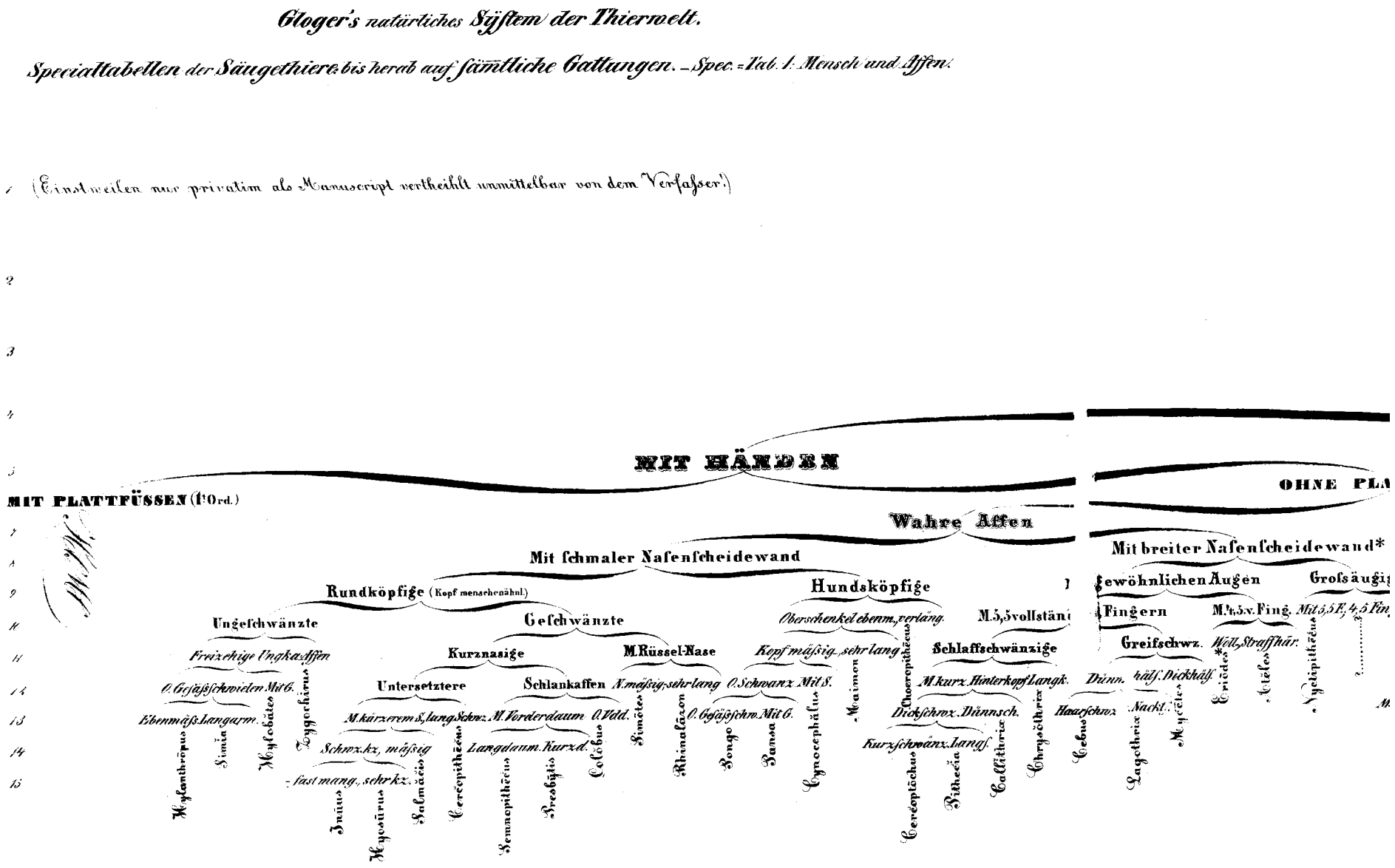

Figure 5b. Gloger's *"Natürliches System der Thierwelt"*. Special table 1.

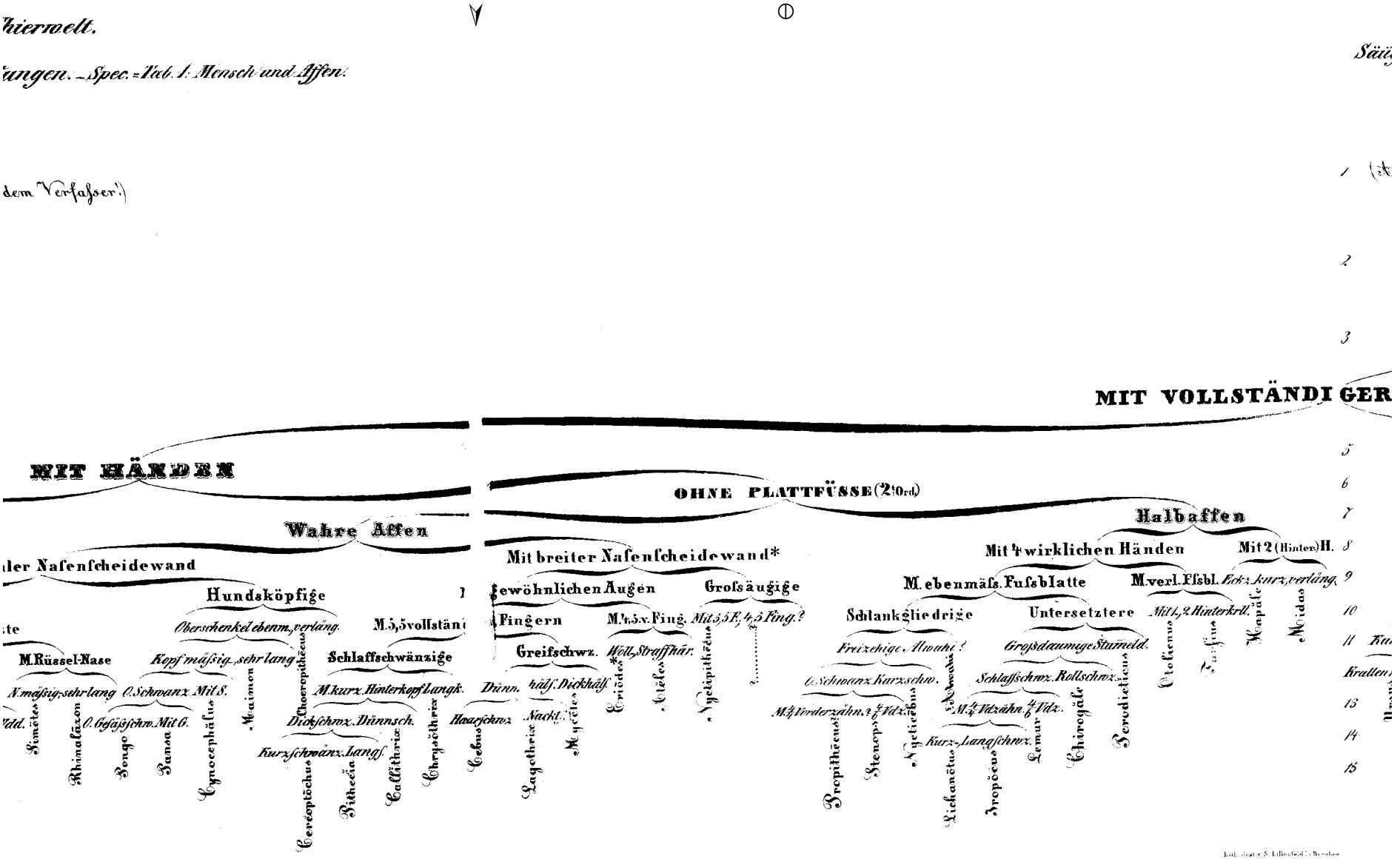

Figure 5b. (continued) Gloger's *"Natürliches System der Thierwelt"*. Special table 1.

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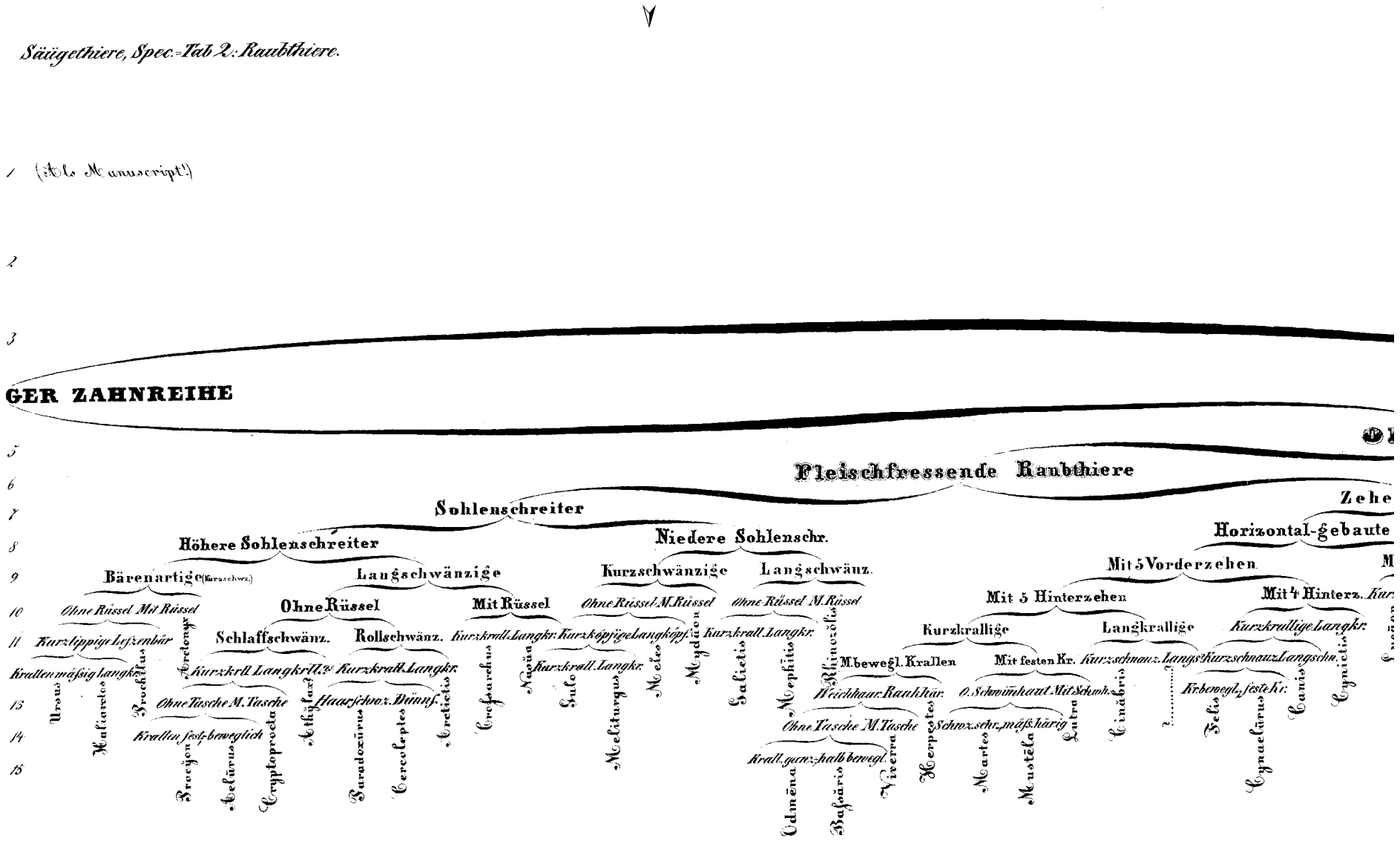

Figure 5c. Gloger's *"Natürliches System der Thierwelt"*. Special table 2.

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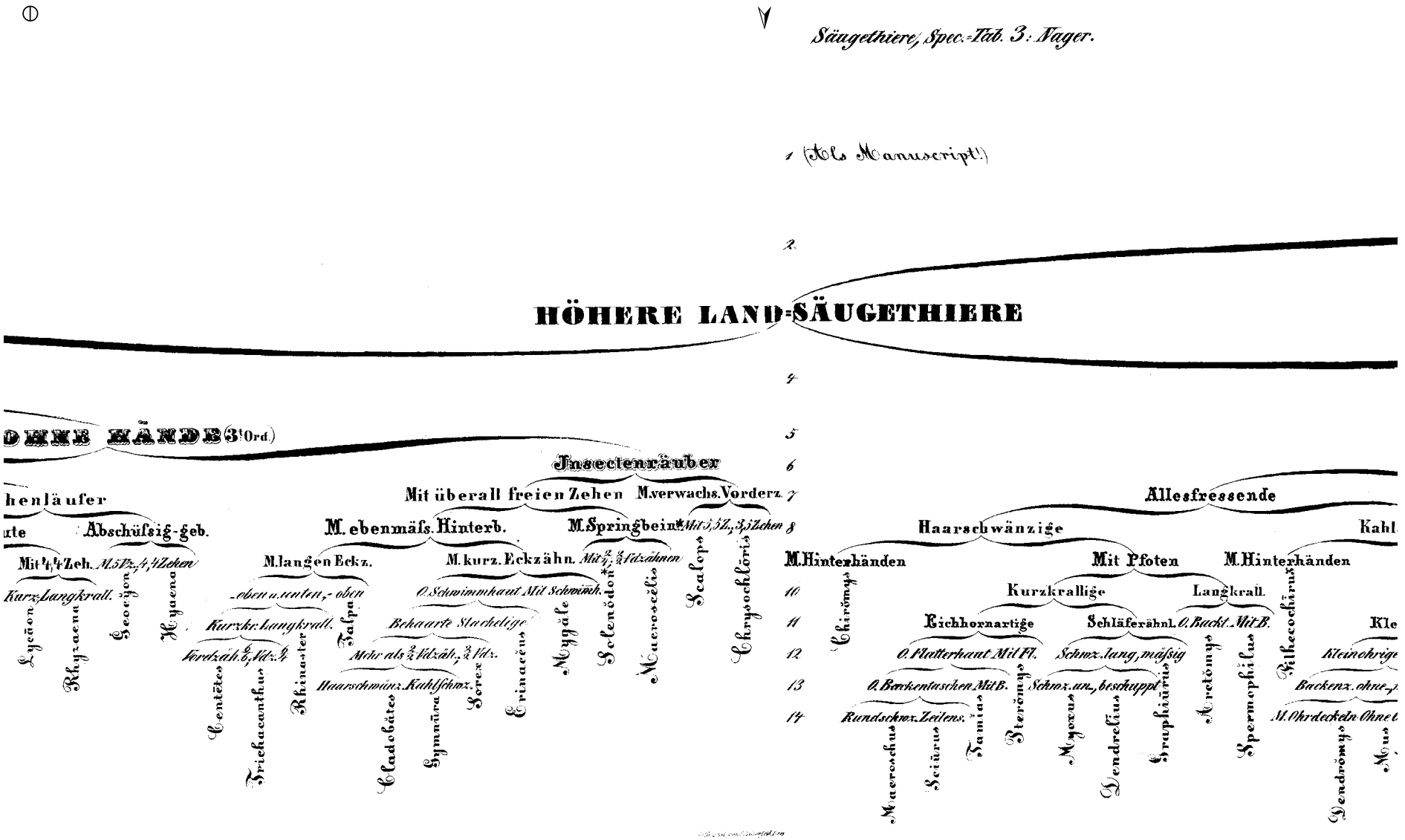

Figure 5c. (continued); **d.** Gloger's *"Natürliches System der Thierwelt"*. Special tables 2, 3.

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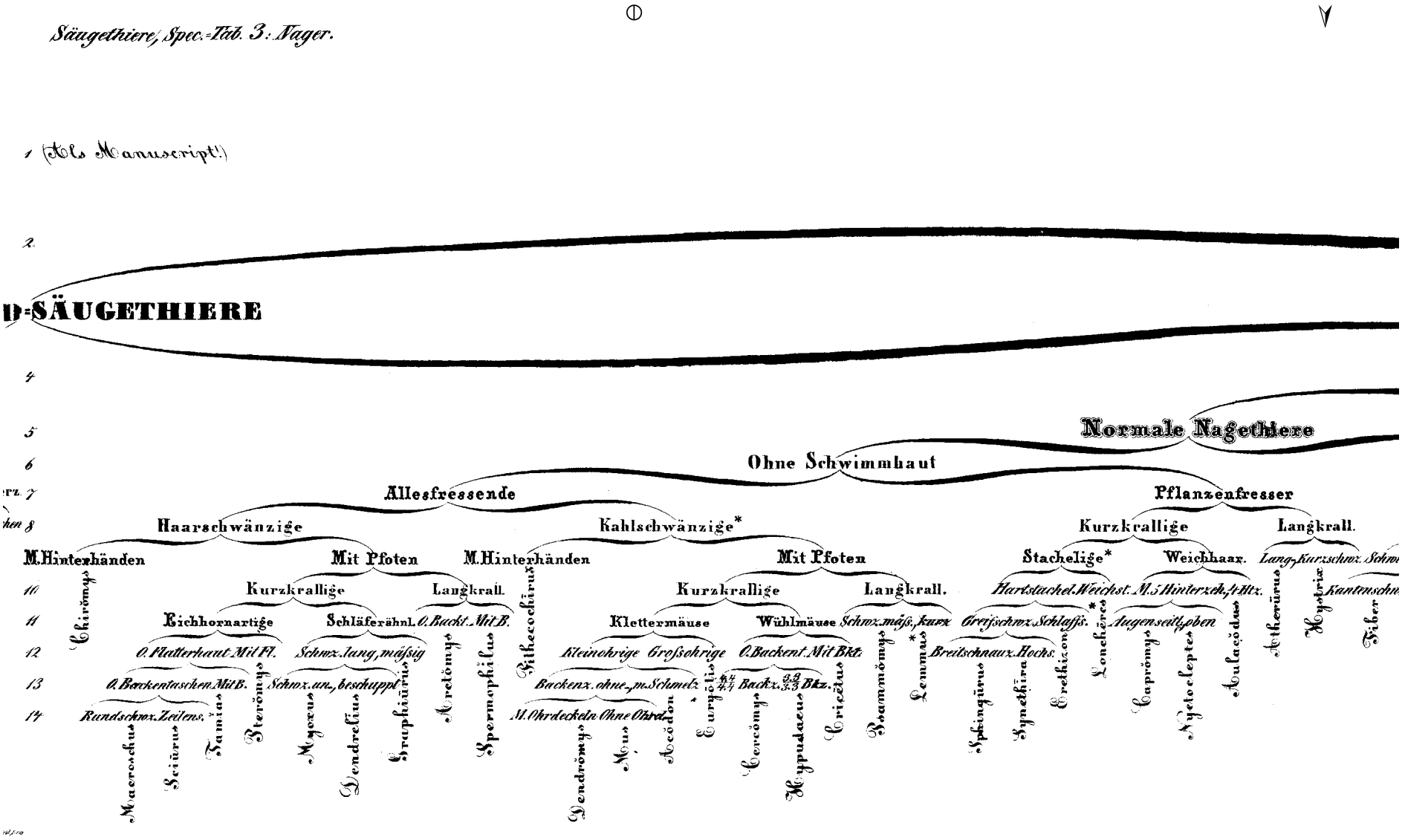

Figure 5d. (continued) Gloger's *"Natürliches System der Thierwelt"*. Special table 3.

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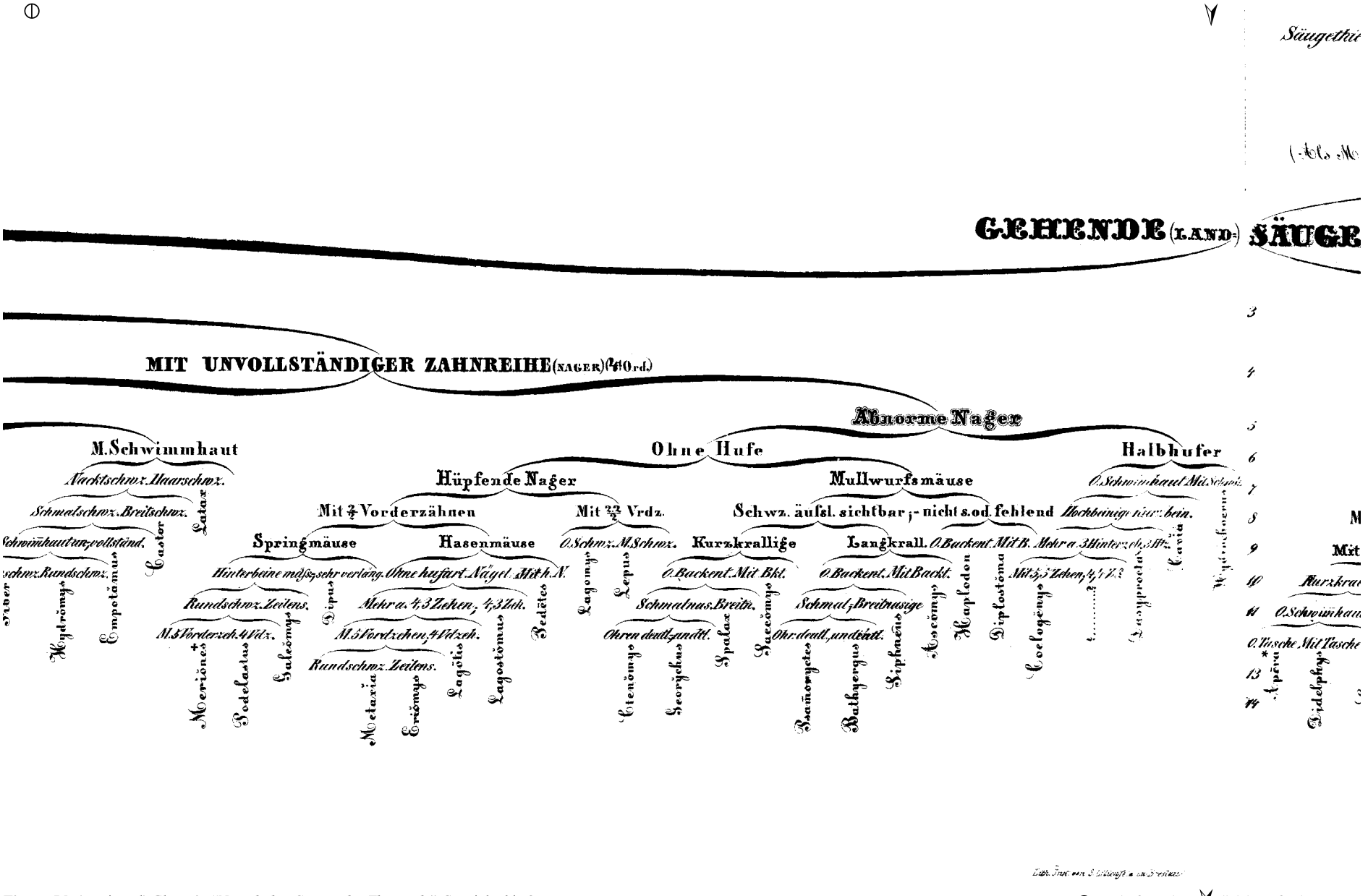

Figure 5d. (continued) Gloger's *"Natürliches System der Thierwelt"*. Special table 3.

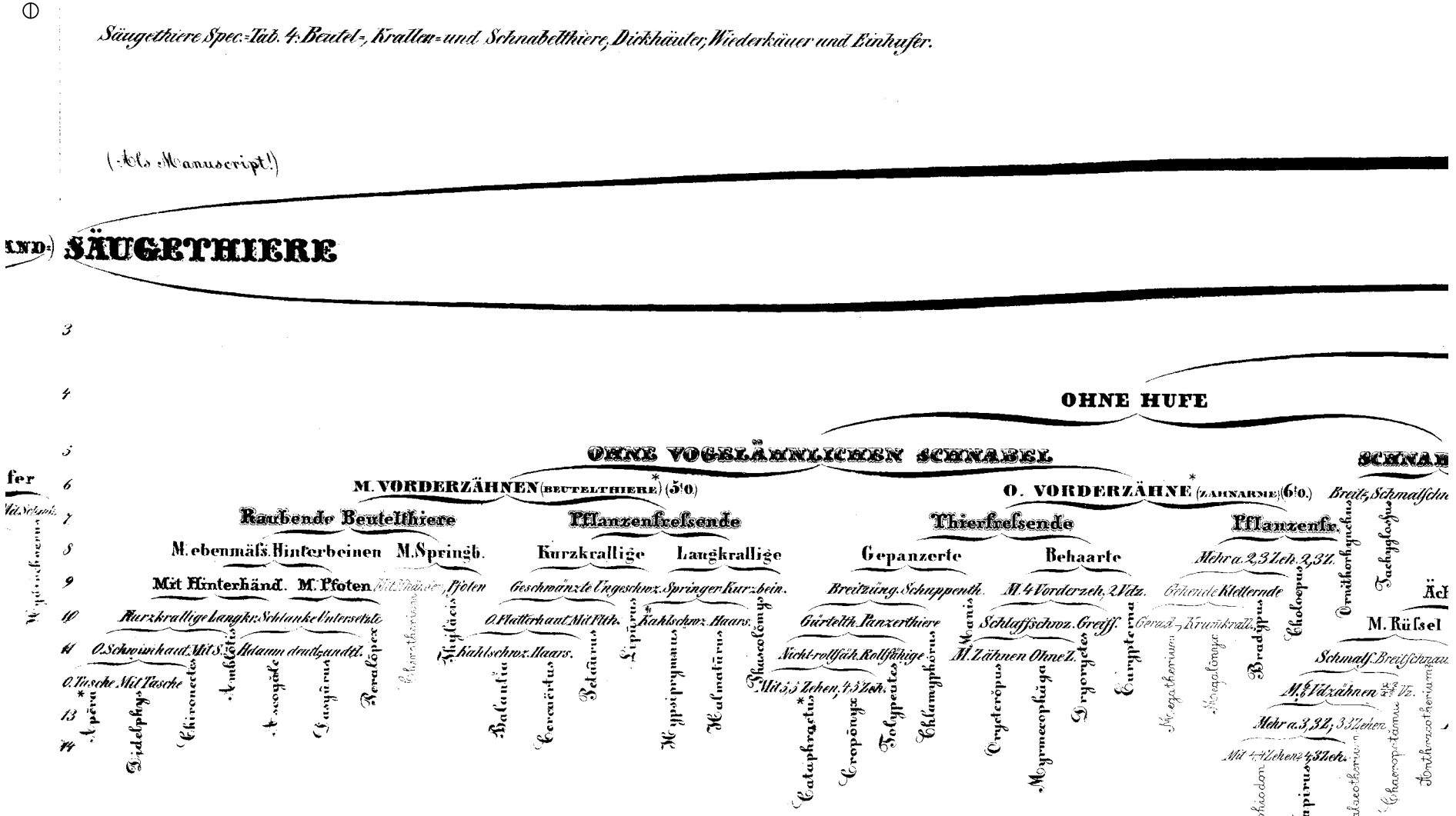

Figure 5e. Gloger's *"Natürliches System der Thierwelt"*. Special table 4.

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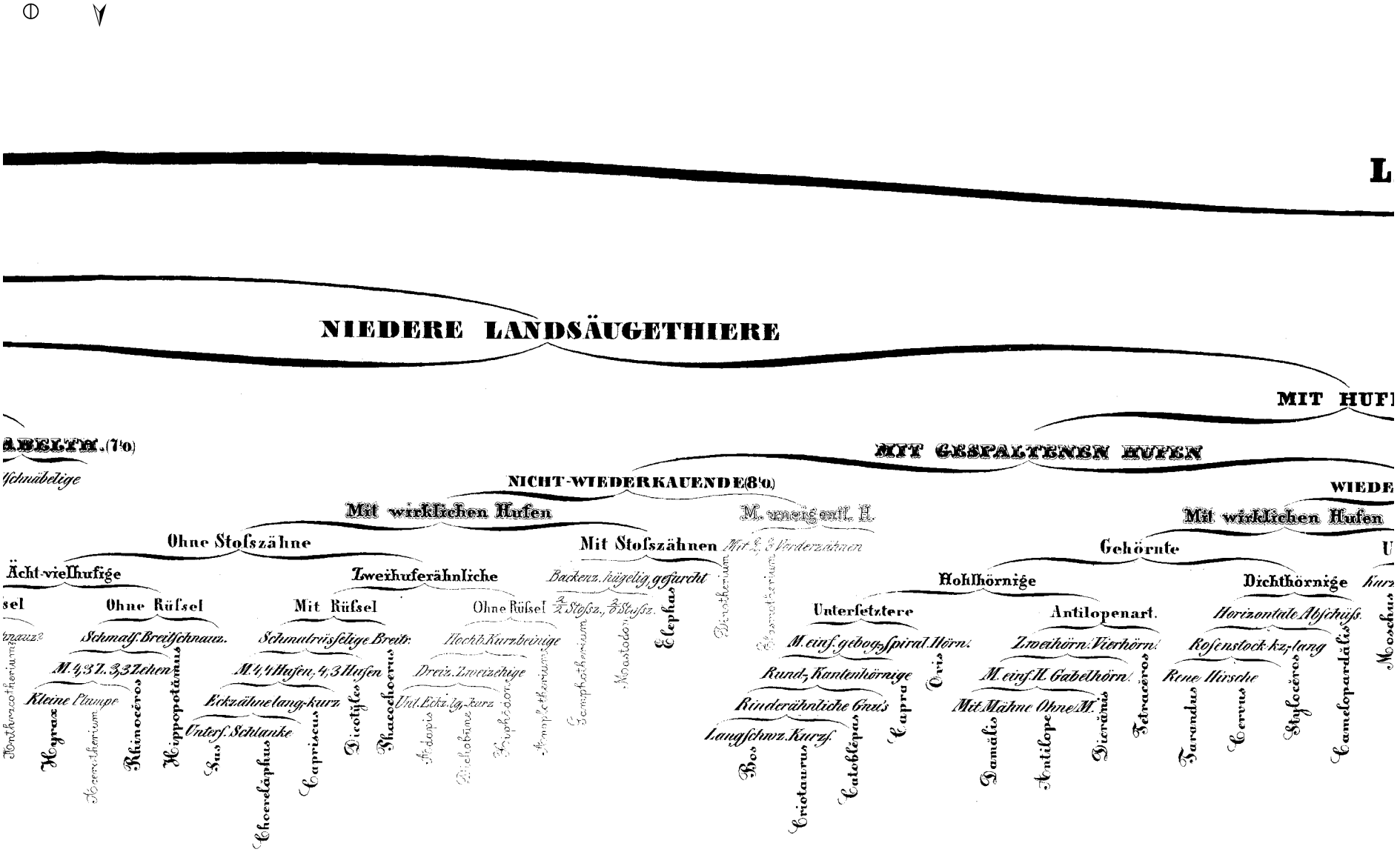

Figure 5e. (continued) Gloger's *"Natürliches System der Thierwelt"*. Special table 4.

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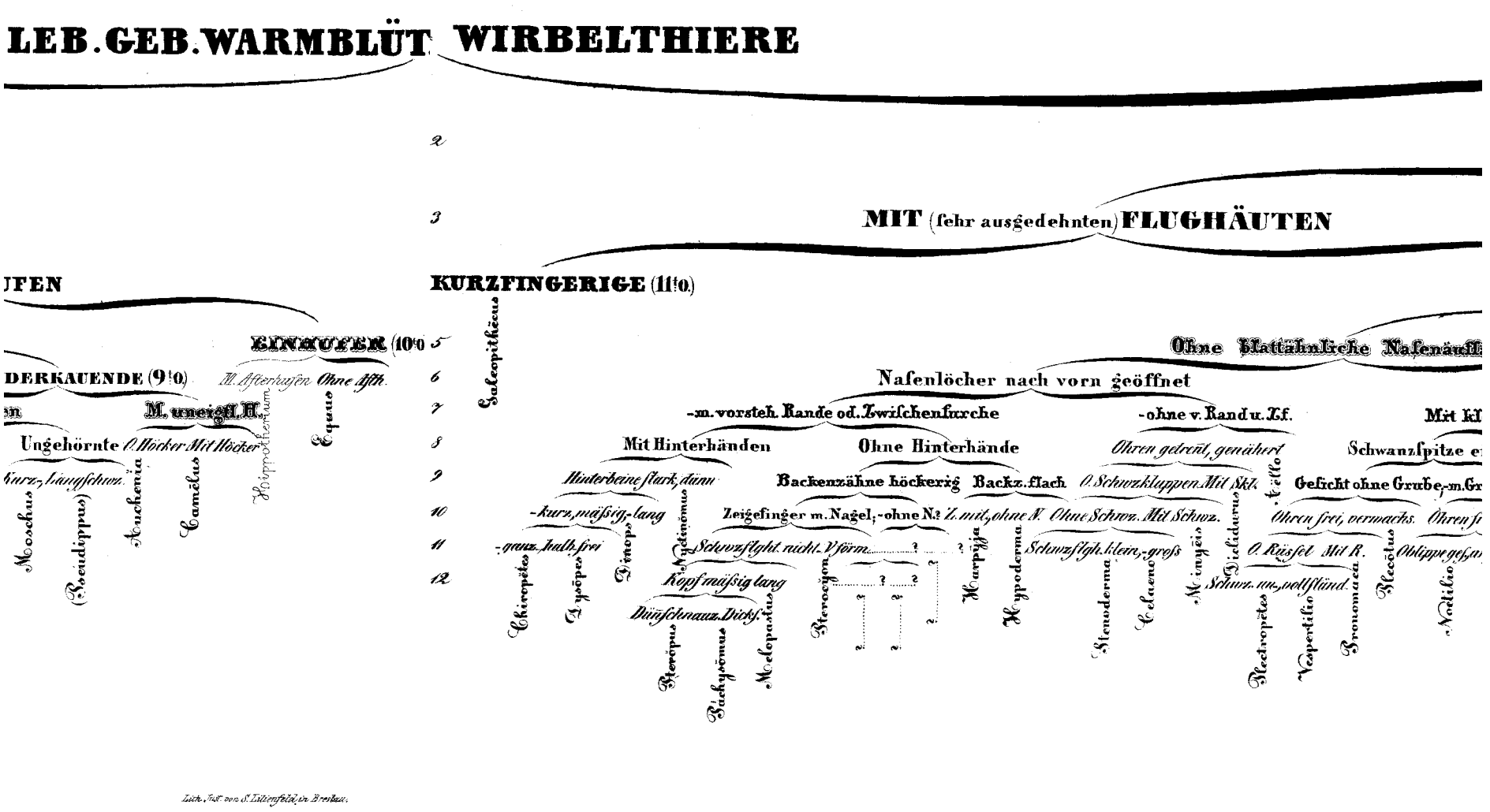

Figure 5e. (continued); **f.** Gloger's *"Natürliches System der Thierwelt"*. Special tables 4, 5.

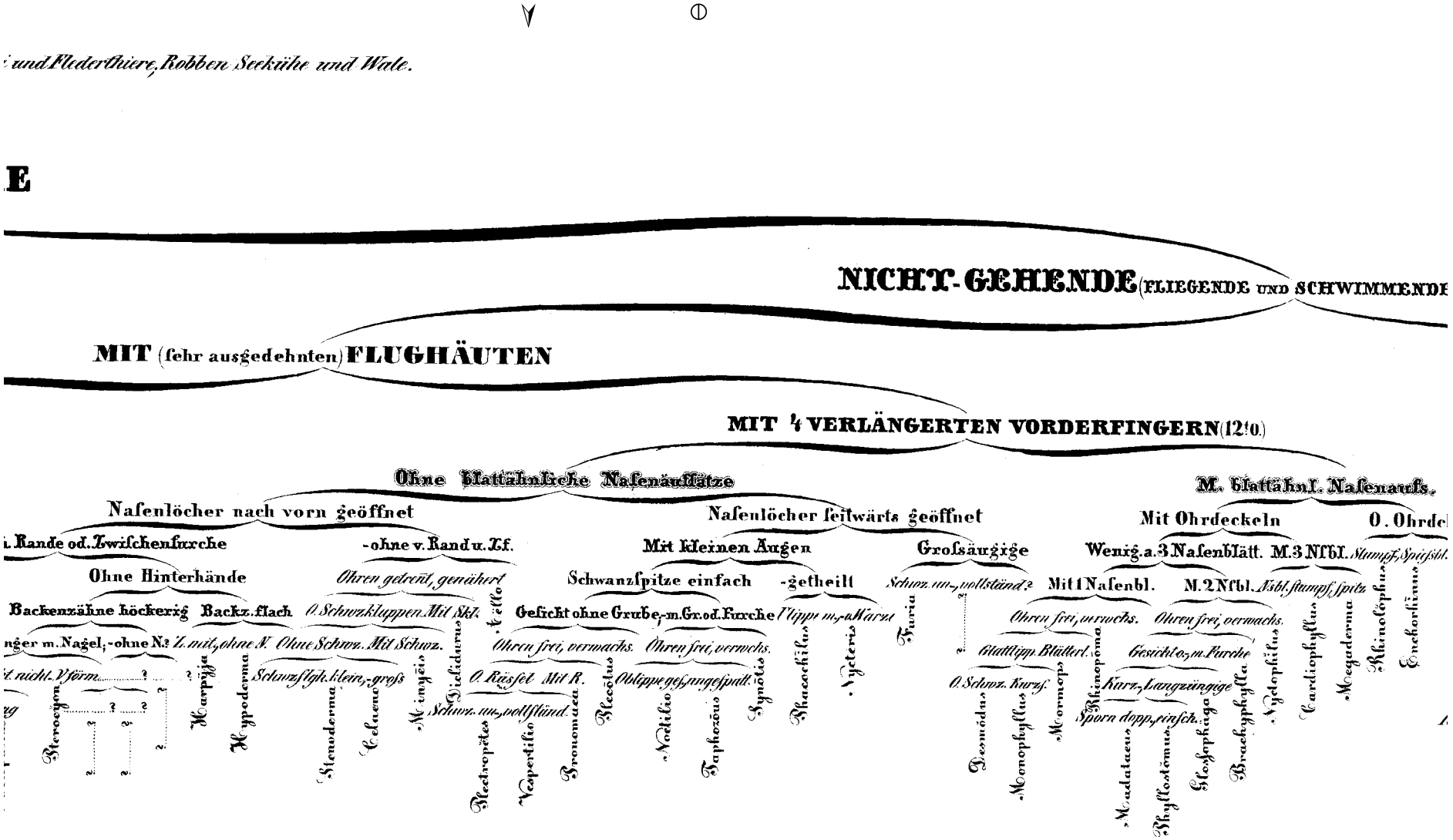

Figure 5f. (continued) Gloger's *"Natürliches System der Thierwelt"*. Special table 5.

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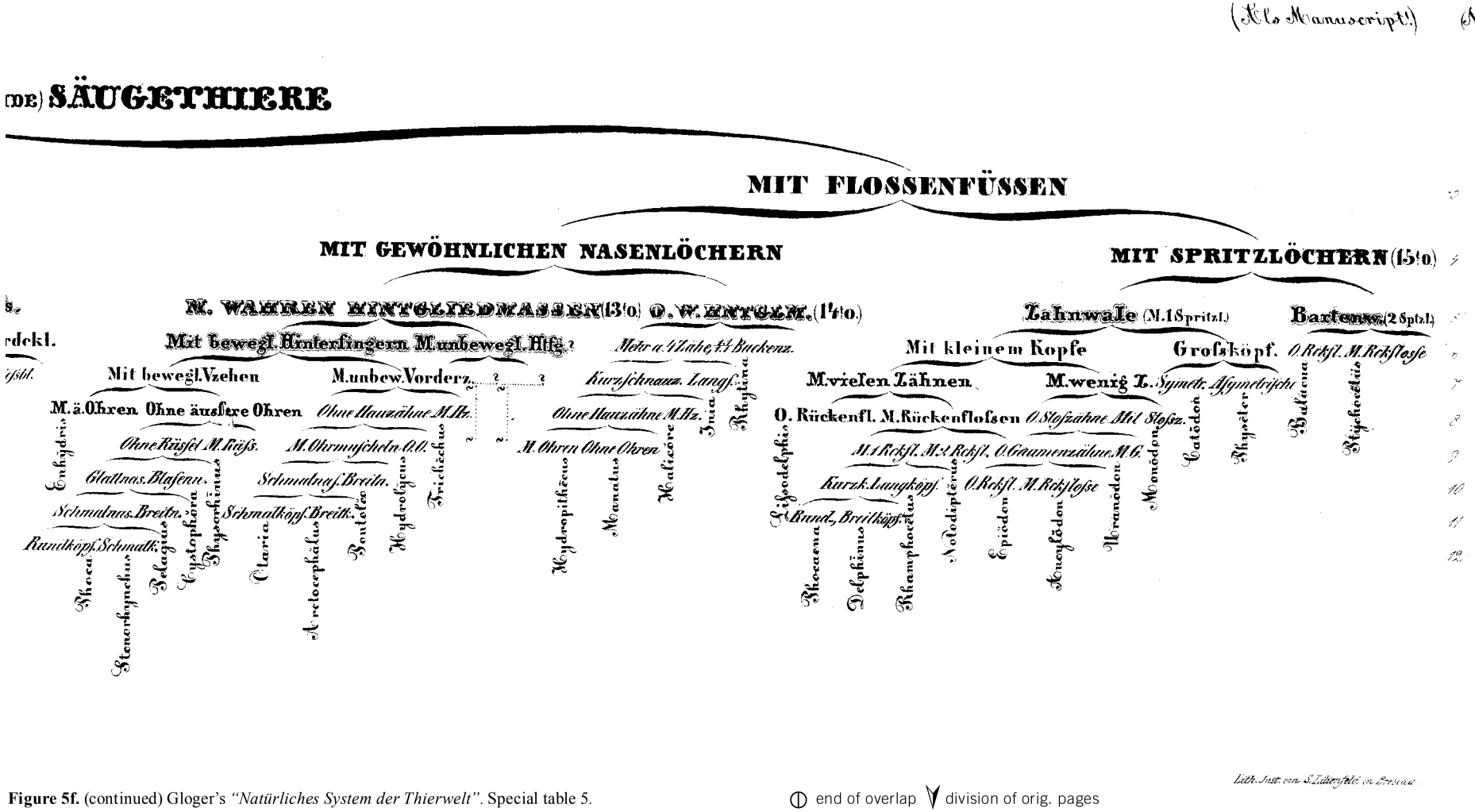

Figure 5f. (continued) Gloger's *"Natürliches System der Thierwelt"*. Special table 5.

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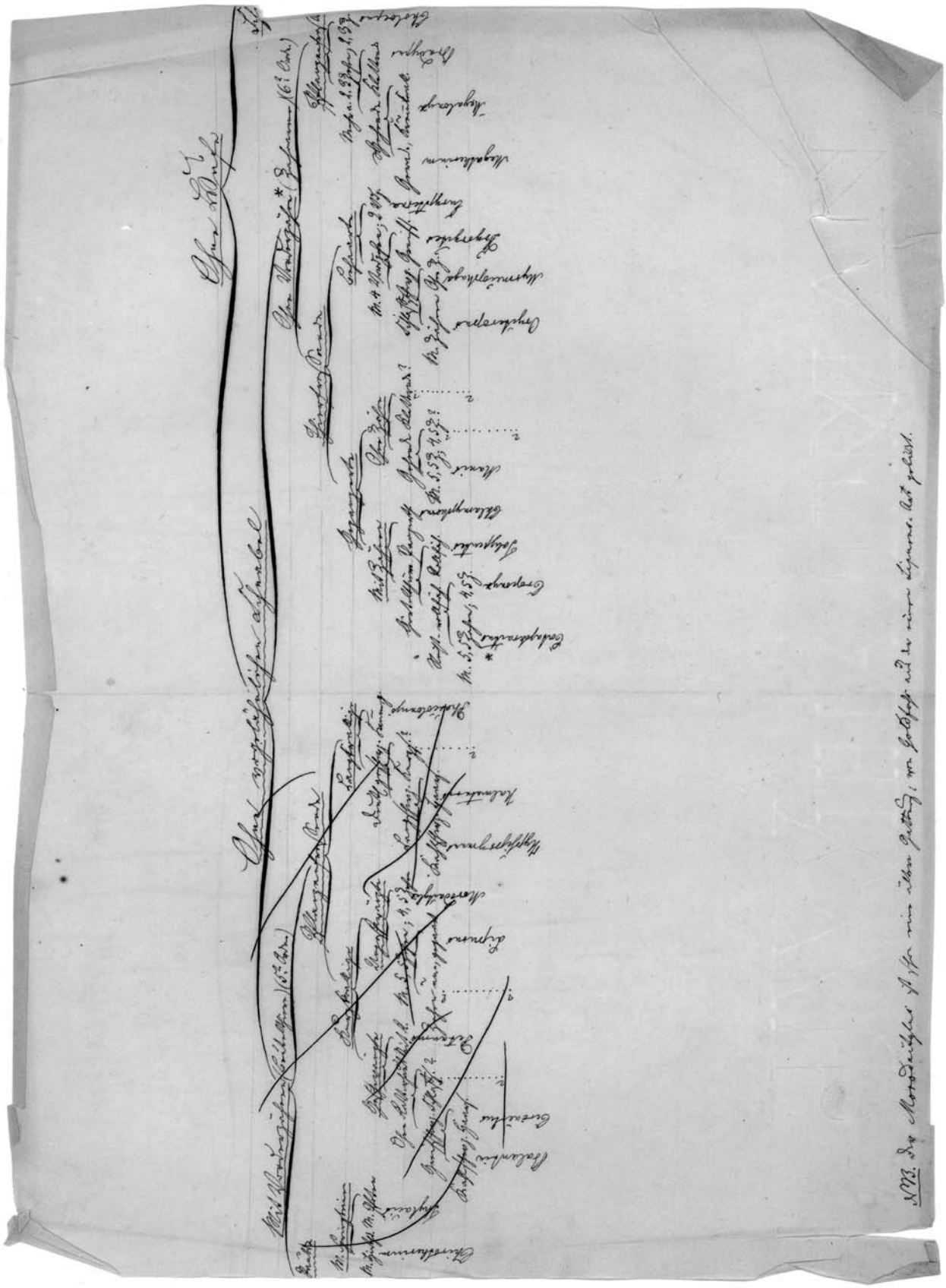

Figure 6. Corrected, earlier version of manuscript sketch of a part of Gloger's "*Natürliches System der Thierwelt*" (scaled to 85 % of the original size), depicting his classification of some marsupials; compare to Special table 4 in Figure 5e; note the corrections added; The original is housed in the Museum für Naturkunde Berlin, Historische Bild- und Schriftgutsammlungen (Bestand: Zool. Museum; Signatur: S I, Gloger, C., Mappe: Gloger – System der Tierwelt).

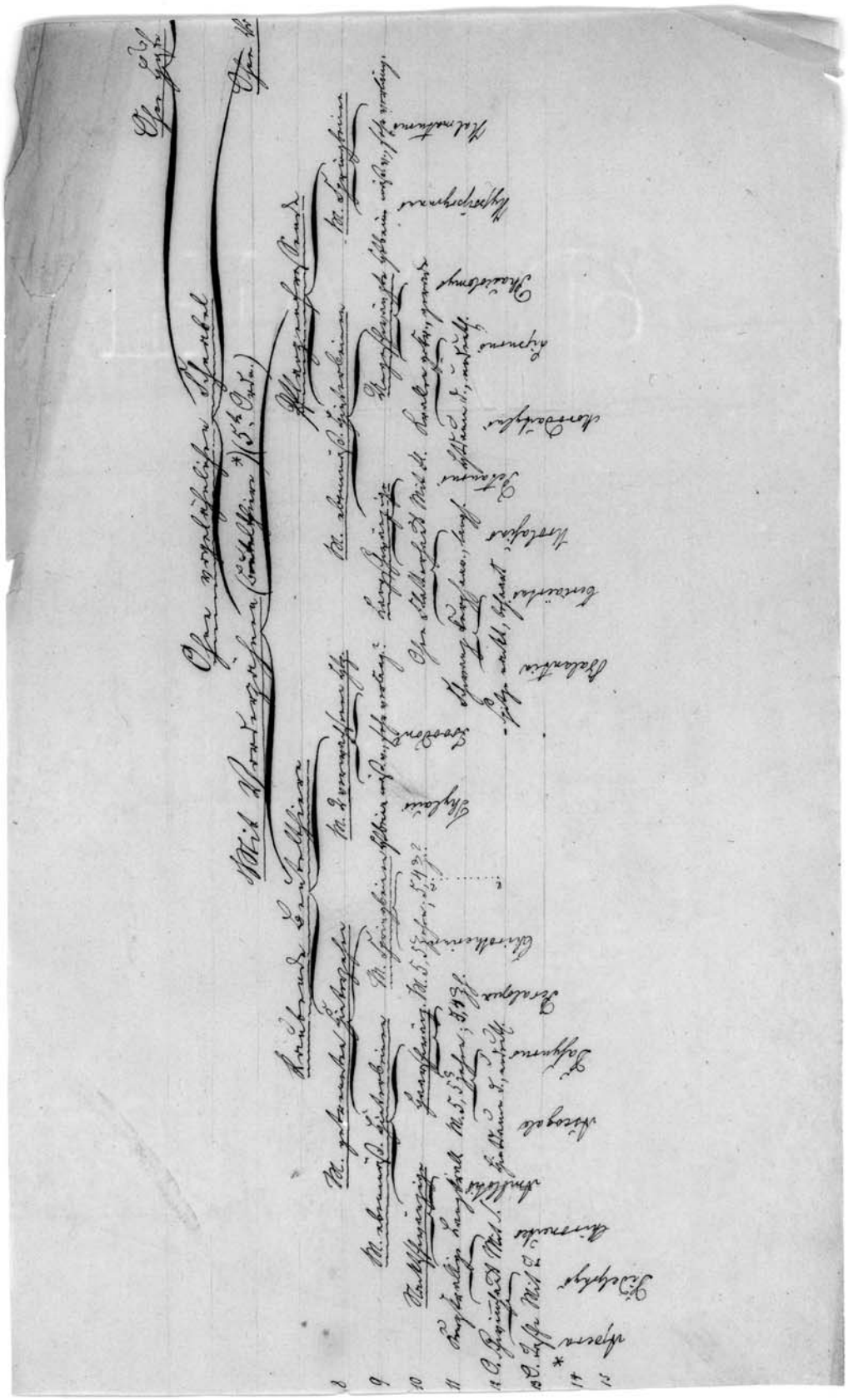

Figure 7. Manuscript sketch of Gloger's "*Natürliches System der Thierwelt*" (nonscaled), depicting the same part of his classification of marsupials as in Figure 6; compare to Special table 4 in Figure 5e. The original is housed in the Museum für Naturkunde Berlin, Historische Bild- und Schriftgutsammlungen (Bestand: Zool. Museum; Signatur: S I, Gloger, C., Mappe: Gloger – System der Tierwelt).

tant in the archives in Berlin (Haffer & Hudde 2007: 16–17).

Nevertheless, however, Gloger's eccentric method (as well as Lichtenstein's; see Fig. 2) adds to the graphic metaphors or abstractions that were invented in the first half of the 19th century by many naturalists in their struggle to overcome the hitherto dominant visualization of nature's system being constructed as a great chain of being, or *scala naturae*. It was this long-lasting "ubiquitous feature of the language of zoological classification" (Ritvo 1997: 28) that was only decades later replaced by the tree metaphor of Darwinian classification (after it had first been proposed by Pallas in 1766 and Lamarck in 1809 and 1815; Mayr 1982: 209; see also Haffer 2007: S132). Later propagated by Darwin (1859) himself as well as, for example, Strickland (1841) and then Haeckel (1866) the tree became the canonical convention.

Conclusion

Constantin W. L. Gloger decided to give up his secure position as teacher in Breslau in order to follow an "inspiring enlightenment" to create a figurative representation of the natural system of the animal kingdom based on natural philosophy. He believed that a classification of animals will be found by applying the principle of numbers to the natural system. He failed miserably, died ignored, lonesome and in poverty, and was falling soon into nearly complete oblivion. But his failure becomes meaningful nearly two centuries later now, as we still struggle for "the tree of life" as the only true representation of nature's system. Evidently, the classification of any group of organisms is still apt to tell as much about the classifiers as about the classified.

The fact that similar groupings tend to show up in different classifications is often greeted with surprise, although it can be assumed that it tells us something about the order of nature, or at least the way our minds are organized. Today we understand Darwin's point that the classification scheme of Linnaeus worked so well because it does indeed reflect the underlying structure of the natural world, not as a reflection of any creative plan but rather as a simple consequence of the evolutionary process. In a time when phylogenetic trees, in particular those based on small and fragmented genetic sequences or on the genome of (so far) very few species, have become the lingua franca of biology, Gloger's tables and his attempt to find "the natural system" might be regarded as mere idiosyncrasy and an anachronism. As he was dealing indeed with a natural system, using in a dichotomous way several of the morphological characters that not only help us to distinguish certain groupings from others but that are a result of evolution and adaptive change, his approach must have appeared fruitful at least to him (and in part to a few others).

However, it is perhaps less surprising that Gloger was as often on the right track as he erroneously combined and subsumed certain taxa in his classification. As systematists we once in a while need to be reminded that to date all these approaches to a natural system of the animal kingdom are merely interim results rather than closing reports. In this respect Gloger's tragic struggle with systematization bears both a message and a warning. Highlighting the danger of fatal error and complete failure, his "*Natürliches System der Thierwelt*" stands as one of the many alternative classification schemes and attempts of the early 19th century representing systematists' continuous endeavour to bring order into the seemingly chaotic nature.

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