

Bats from Lebanon at the Natural History Museum, Vienna: a cautionary tale on the reliability of museum specimen data (Chiroptera)

Netopýři z Libanonu v Přírodovědeckém museu ve Vídni: varovný příběh o nespolehlivosti údajů z musejních sbírek (Chiroptera)

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Abstract. Seven historical bat specimens of four species (*Rhinolophus ferrumequinum*, *R. mehelyi*, *Taiphozous nudiventris*, *Myotis myotis*), attributed to originate from the territory of the present-day Lebanon, are deposited and documented in the modern database of the mammal collection of the Natural History Museum, Vienna, Austria (Naturhistorisches Museum Wien). Two of these species (*R. mehelyi*, *T. nudiventris*) have never been reported for Lebanon in the existing literature and recent surveys have also failed to find them in this country. Since these bats were collected in the period 1824–1885, the history of the all respective specimens was evaluated in detail. The revision brought rather unexpected results. Only one specimen (*R. ferrumequinum*) was found to come (most probably) from Lebanon, being collected by W. HEMPRICH and Ch. EHRENBERG in 1824. In the remaining six specimens, the origin could not be defined, thus rendering the statement that they were collected in Lebanon insecure. This case demonstrates that careful checks of modern interpretations of historical records are necessary when examining past distributions of organisms.

Key words. Bat fauna, distribution, history of research, Mediterranean, Middle East.

INTRODUCTION

Museum specimens together with their associated data represent one of the most reliable sources of information on many aspects of natural history. However, to virtually all questions addressed by specimen based research, the quality of specimen data and the correct link between them and the actual specimen is of primary importance. To evaluate the reliability of the data associated with a particular specimen is oftentimes a non-trivial task, and the problem is seldom addressed in the literature. The increased use of museum specimens in non-traditional museum based research (SUAREZ & TSUTSUI 2004, HOLMES et al. 2016) thus results in the problem that “specimens are being increasingly used in many applications by persons distant from, and unfamiliar with, the historical framework that makes many specimen[-data]-related problems transparent, so these data are often uncritically assimilated in the literature” (RASMUSSEN & PRYS-JONES 2003: 66).

In their valuable review of specimen data reliability, RASMUSSEN & PRŶS-JONES (2003) gave a broad overview of different problems and error sources which are mainly caused by collectors and dealers of natural history, in particular ornithological, specimens. In addition to these data problems, which are in general already present before the specimens enter an institutional or private natural history collection, other errors accumulate over the period of time when specimens are already in the collection. On the one hand, these problems range from information loss due to incomplete transcription or transfer of the collector's field notes, data on labels and tags and other documentation to the museum record, the removal or substitution of collector's (field) tags, and exchange of tags between specimens (STRESEMANN 1962: 385, BAKER 1997: 175, RASMUSSEN & PRŶS-JONES 2003: 77) – processes which result in the loss or mis-allocation of originally present data. On the other hand, also the reverse may occur, i.e. the re-allocation of original data and specimen and even the refinement of data based on secondary evidence (e.g. restriction of collecting locality and/or date based on known itineraries of the collector). However, in general, both procedures tend to result in less reliable specimen data associations, not least because the underlying (re)-allocation process is error prone. Relying on such, potentially wrong, data can seriously flaw the outcome and significance of scientific studies (e.g. BOESSENKOOL et al. 2010).

As emphasized above, a detailed knowledge of specific collector and museum routines as well as collection and specimen history is often required to detect problematic specimen-data-associations. The aim of the present study is to demonstrate how post-accession processes in a museum collection can contribute to the generation of wrong or at least unreliable specimen data. We do not attempt to review this problem in general here, but rather raise awareness of the presence of this type of obstacle for specimen based research.

THE CASE

In the mammal collection of the Natural History Museum, Vienna, Austria (Naturhistorisches Museum Wien, NMW), seven bat specimens of four species are held, which are attributed – according to the modern museum evidence – to originate most probably from the territory of the present-day Republic of Lebanon (Table 1). These specimens remain the only NMW bat representatives from this Mediterranean country and all these bats come from rather old collections (1824–1885) and some of them were collected by famous explorers of the first half of the 19th century travelling in the Middle East and North Africa. On the other hand, although most of these specimens have not yet been published (only SPITZENBERGER 1996 listed two *Myotis myotis* specimens from “Beirut” among the comparative material), they might represent interesting and important contributions to the Lebanese fauna.

To our knowledge, the known bat fauna of Lebanon is currently composed of twenty-one species belonging to six families (BENDA et al. 2016). Two other species represented by the mentioned NMW bats, *Taphozous nudiventris* Cretzschmar, 1830 and *Rhinolophus mehelyi* Matschie, 1901, have not yet been reported from Lebanon (LEWIS & HARRISON 1962, ATALLAH 1977, THOMÉ & THOMÉ 1985, HARRISON & BATES 1991, BENDA et al. 2006). Nevertheless, *Rhinolophus ferrumequinum* (Schreber, 1774) and *Myotis myotis* (Borkhausen, 1797), the remaining two species from the list of the NMW Lebanese specimens (see Table 1), belong to regularly documented species according to the particular surveys (op. cit.).

In several recent years the bat fauna of Lebanon has been rather intensively studied (see HORÁČEK et al. 2008, 2009, HULVA et al. 2012, ABI-SAID 2014, LUČAN et al. 2014) but the two

Table 1. Bat specimens from the Natural History Museum Vienna (NMW) attributed to originate from the territory of the present-day Lebanon (according to the contemporary record). Legend: Acq. N^o = acquisition number; prep. = preparation/s: A = alcoholic specimen; B = dry skin (balg); S = skull; † = skull in situ (not extracted); * = attribution of the data to the respective specimen is not sure

Tab. 1. Sbírkoví jedinci netopýřů Přírodovědeckého musea ve Vídni (NMW) považovaní za pocházející z území současného Libanonu (podle současných musejních záznamů). Vysvětlivky: přír. č. = přírůstkové číslo; prep. = preparát/y: A = jedinec v lihu; B = suchá kožka (balg); S = lebka; † = lebka zůstává součástí preprátu; * = přiřazení údaje k jedinci není jisté; sex = pohlaví

Acq. N ^o přír. č.	collection N ^o sbírkové číslo	prep.	bat species druh netopýra	sex	age věk	collector sběratel
1826/I/7	NMW 19729	B†	<i>Rhinolophus ferrumequinum</i>	–	ad	C. [= W. F.] HEMPRICH & C. G. EHRENBERG
1826/I/8*	NMW 19112	S+B	<i>Taphozous nudiventris</i>	–	ad	C. [= W. F.] HEMPRICH & C. G. EHRENBERG*
1845/VI/2*	NMW 8522	A†	<i>Taphozous nudiventris</i>	♂	juv	Th. KOTSCHY*
1845/VI/2*	NMW 8523	S+A	<i>Taphozous nudiventris</i>	♀	ad	Th. KOTSCHY*
1886/IV	NMW 26357	S+A	<i>Myotis myotis</i>	♀	ad	F. J. LEUTHNER
1886/IV	NMW 26358	S+A	<i>Myotis myotis</i>	♀	ad	F. J. LEUTHNER
1886/IV	NMW 26359	S+A	<i>Rhinolophus mehelyi</i>	♀	ad	F. J. LEUTHNER

mentioned species (*T. nudiventris* and *R. mehelyi*) were not recorded in this country. Thus, the Lebanese NMW specimens deserve close attention – not only for their possible faunistic importance but also for the history of their origin. Both species are cave dwelling bats, which are relatively conspicuous and well noticeable when encountered in underground spaces. Their absence in the list of bat species of Lebanon (sensu HORÁČEK et al. 2008, ABI-SAID 2014) remains quite surprising, also in the light of their distribution pattern in Israel and Syria (MENDELSSOHN & YOM-TOV 1999, BENDA et al. 2006), and the interpretation of origin of the NMW specimens thus seems to be correct. On the other hand, the intensive recent bat survey in Lebanon suggests these bats do not occur in this country at all, at least in the present time. However, the faultless species identification of the respective NMW specimens and its correct documentation in the museum evidence (Table 1) was confirmed by us. Thus, the question arises, whether the geographical origin of these specimens is really in the territory of modern Lebanon and if so, whether their absence in the recent bat surveys in Lebanon is only a seeming and/or temporary state.

The Lebanese NMW specimens originate, according to the present museum documentation, from three separate arrivals recorded in long intervals of 19 and 41 years, respectively (comprising three separate entries under the acquisition numbers 1826/I, 1845/VI, and 1886/IV), representing three separate collections from the Middle East (Table 1). The entry 1826/I comes from the collection made by Wilhem Friedrich HEMPRICH (1796–1825) and Christian Gottfried EHRENBERG (1795–1876), who travelled mainly in the north-eastern part of Africa (Egypt, Sudan, Eritrea) and shortly also in the Middle East (present-day Lebanon, Sinai, Saudi Arabia) in 1820–1825; the entry 1845/VI comes from the collection by Theodor KOTSCHY (1813–1866), who travelled in similar regions of Africa as the previous explorers, but also broadly in the Middle East (incl. Turkey, Cyprus, Syria, Iraq and southern Iran), in 1836–1862; and the last entry 1886/IV comes from the collection by Franz Josef LEUTHNER (1854–1918), who visited

the Levant in 1885 (but also collected in Cyprus, Egypt, and southern Arabia). None of the collectors of the respective NMW bats visited solely the territory of the present-day Lebanon but travelled across broader regions of the Asian-African transition.

The present geographical affiliation of the respective specimens to Lebanon was established in the second half of the 20th century by the late Kurt BAUER (1926–2016), then a curator of mammals at NMW. BAUER began to re-curate the NMW mammal collection soon after his appointment as a curator of the mammal collection in 1961. Up to this date, the collection remained in a relatively chaotic post-war condition and over the years BAUER did exceedingly well in restoring its accessibility and usability (SPITZENBERGER 1986, SPITZENBERGER & GLUTZ VON BLOTZHEIM 2016). In most cases, BAUER tried to re-link, as far as possible, all specimens with the available museum documentation. In addition, whenever feasible, he also aimed at refining collecting data with the help of published primary and secondary literature. The sources of his findings were, almost invariably, meticulously documented by him on the specimen file cards and the results were also written on the labels attached to the skulls and skins. In the case of the allegedly Lebanese bat material, these thorough notes indicate that K. BAUER was not fully satisfied with the origin of the specimens in this country (cf. “ziemlich sicher” in the 1826/I entry).

Because the three collections, to which this material is allocated, represent three separate difficulties, all of them should be analysed in detail also separately, in search of the real collection circumstances of the respective bats and their possibility to enrich the fauna of Lebanon.

MATERIAL AND METHODS

The primary objective of the present study is to evaluate the reliability of specimen data of the entire ‘Lebanese’ bat material held by the NMW. We therefore analysed all the specimens and the available pertaining museum evidence available at the NMW mammal collection, as well as selected archival materials in other museums (ZMB). Details on the unpublished museum documentation may be found in Appendix 2. Spelling of toponyms and coordinates follows NGA (2016). Museum acronyms used throughout the text:

- NMW Naturhistorisches Museum Wien (formerly Hof-Naturalien-Cabinet and K. k. Naturhistorisches Hofmuseum), Vienna, Austria;
- RMNH Naturalis Biodiversity Center (formerly Rijksmuseum van Natuurlijke Historie), Leyden, the Netherlands;
- ZMB Museum für Naturkunde – Leibniz-Institut für Evolutions- und Biodiversitätsforschung (formerly Zoologisches Museum der Friedrich-Wilhelms-Universität zu Berlin and Museum für Naturkunde der Humboldt-Universität zu Berlin), Berlin, Germany.

RESULTS AND DISCUSSION

1826/I, leg. Hemprich & Ehrenberg

Bats of this entry represent two individuals of undetermined sex, a dry skin of *Taphozous nudiventris* (NMW 19112) with extracted skull and a slightly damaged dry skin of *Rhinolophus ferrumequinum* (NMW 19729) with the skull in situ (Table 1, Fig. 1h–j). Both are labelled as coming from “Arabia et Syria” – zieml[ich]. sicher Baalbek, Libanon, 1824” (Fig. 1a, b, d, h). The dry skins are accompanied with new museum tags bearing the NMW numbers, collection date or year and site (Fig. 1d, h), the *T. nudiventris* skin is also accompanied with an older tag bearing the following text: “*Taphozous nudiventris* Cretzsch. // Ohne Fundort // Rev. Dr. [Heinrich] Jansen. Febr. 1932.” (Fig. 1e). *T. nudiventris* skull (extracted in 1979, only a rostral part of the skull and separated mandibles are preserved) bears the NMW numbers written on the dorsal

side of the rostrum (Fig. 1c) and the lingual surfaces of the mandibles and is accompanied with a new museum label bearing identical data as the new tag at the skin (Fig. 1b). The original collector's tags are not available at the specimens or at other place. In the card index, there are preserved old (but not the original) labels once removed from these specimens, one bearing the following text: "*Taph. nudiv.* // 1832-H-3: // 1826 I 8"; and the other the following text: "1826. I.7. // Arabia. // *unihastatus*"* (Fig. 1f, g).

According to the labelling, these bats were collected by the zoologist W. F. HEMPRICH and the zoologist and botanist Ch. G. EHRENBERG during their joint expedition to north-eastern Africa and the Middle East in 1820–1825. This expedition was initiated and supported by the Prussian government and organised with the help of the Zoological Museum of the Royal University at Berlin (ZMB) (HUMBOLDT 1829, STRESEMANN 1954, KLAUSEWITZ 2002). The expedition collections were successively sent by HEMPRICH and EHRENBERG to the ZMB, in eight shipments (numbered III–X) composed of 110 boxes and barrels in total (STRESEMANN 1954). Hinrich LICHTENSTEIN (1780–1857), then a director of the ZMB, evaluated the collected specimens and immediately offered selections of them for sale or exchange to other museums to gather funds for and/or enrich the collections of the ZMB (see e.g. LICHTENSTEIN 1823, 1835). This was also the way how the ZMB bat specimens reached the NMW; the acquisition of the ZMB materials in the NMW in the period 1823–1866 was reported by VON PELZELN (1890: 515) as follows (underlined is the arrival containing also the respective bats; see Fig. 2): "1823 (Tausch) 9 Säugethiere, darunter typische Exemplare von den 1823 in dem Doublettenverzeichnisse [= LICHTENSTEIN 1823] aufgestellten Arten, 1826 (Kauf) Arten mit Typen Lichtenstein'scher Species, besonders aus Arabien und Syrien, dann *Semnopithecus nemaesus* u. s. w., dann weitere 5 Stücke, worunter Typen Lichtenstein's aus Mexico [sic], Syrien und dem Kaffernlande, 1827 *Bassaris astuta*, 1830 5 Exemplare mit Typen Lichtenstein's, 1866 16 Chiropteren (Tausch), worunter eine Type von Peters aus Mozambique, dann 2 von Peters und Gundlach aus Cuba." In the Acquisition Catalogue of the NMW mammal collection, the 1826 entry is specified by the NMW curator of the zoological collections in 1806–1844, Josef NATTERER (1786–1852), by the following headline: "1826. Nov. 1825. Vom königl. zoologischen Museum in Berlin durch Kauf. Um 139 RTh[= Reichsthaler]". This purchase (arriving at the NMW already in November 1825) comprises twelve items, seven of them originating from "Arabia et Syria", two of these are bats (Fig. 2): 1826/I/7 *Rhinolophus rufescens* and 1826/I/8 *Taphozous syriacus*. Both these names represent unavailable manuscript names (most probably first used by HEMPRICH and/or EHRENBERG in their labelling and later by LICHTENSTEIN in the list; cf. PETERS 1871); the former name represents an unavailable synonym of the valid name *Rhinolophus ferrumequinum* (FITZINGER 1870, PETERS 1871, ANDERSEN 1905, TURNI & KOCK 2008).

W. F. HEMPRICH and Ch. G. EHRENBERG travelled and collected in "Syria et Arabia" in the last period of their expedition, in 1824 and 1825 (STRESEMANN 1954, KLAUSEWITZ 2002): between May and August 1824 they travelled in "Syria" (but only in the area of the present-day Lebanon†) and

*The name *Rhinolophus unihastatus* Geoffroy, 1813 is a junior synonym of *Vespertilio ferrumequinum* Schreber, 1774 [= *Rhinolophus ferrumequinum* (Schreber, 1774)], see e.g. MILLER (1912), ELLERMAN & MORRISON-SCOTT (1951) or SIMMONS (2005).

†Ch. G. EHRENBERG described the trip through Lebanon briefly in a letter from Beirut to his father dated on 5 August 1824 (STRESEMANN 1954: 122): "Lieber Vater, // So eben komme ich von einer Bärenhetze auf den Eisspitzen des Libanon nach Bairut zurück. Wir haben den ganzen Libanon bis oberhalb Tripolis durchlaufen, Cölesyrien durchschritten, die alte Sonnenstadt, Balbeck, mit ihren riesenhaften Überbleibseln besehen und die Cedern besucht welche leicht Salomo kannte. Ein Bär steckt in unsern Kisten. Wir sind gesund und munter manchen Gefahren entgangen."

Taphozous nudiventris		Sammlungs-Nr. 19112
Rev. 43: Taphozous (liponycteris) nudiventris nudiventris Oretzschmar 1830		
Fundort: "Arabia et Syria" - zieml. sicher Bealbek 34°00' N / 36°12' E, Libanon (- die arabische Sendung von H. & E. traf erst 1826 in Berlin ein! Stressemann 1924)		
Datum	1824	Sammler/Erwerb: C. Hemprich & C.G. Ehrenberg leg.; im Nov. 1825 vom kgl. zool. Mus. Berlin gekauft unter dem MS-Namen "T. syriacus"
Biotope		
Geschl.	♂	Schädel
Publikation:		
Alter:		
		Feld-Nr.



Table 2. Bat specimens present in the shipment IX, sent by W. F. HEMPRICH and Ch. G. EHRENBERG from their expedition to north-eastern Africa and the Middle East (departured from Alexandria in October 1824) to the Zoological Museum Berlin (arrived in April 1825), see Fig. 3. Legend: H&E = name used by HEMPRICH and/or EHRENBERG (perhaps in specimen tags or other labels); M = number of specimens kept for the Museum collections; D = number of “doublettes” intended for sale or exchange

Tab. 2. Jedinci netopýrů přítomní v zásilce IX zasláné W. F. HEMPRICHEM a Ch. G. EHRENBERGEM z jejich expedice do severovýchodní Afriky a na Blízký východ (odeslané z Alexandrie v říjnu 1824) do Zoologického musea v Berlíně (došlé v dubnu 1825), viz obr. 3. Vysvětlivky: H&E = jméno použité HEMPRICHEM a/nebo EHRENBERGEM (patrně na lokalitních listcích jedinců); M = počet jedinců ponechaných pro sbírky musea; D = počet “dubletů” určených na prodej či výměnu

N ^o . číslo	name by LICHTENSTEIN jméno užitě LICHTENSTEINEM	H&E	origin původ	M	D
114	<i>Pteropus aegyptius</i>	<i>Pt. syriacus</i>	Syria	1	[-]
115–120	<i>Rhinolophus rufescens</i> Hempr.		Syria	3	3
121–[1]25	— <i>lebanoticus</i> & <i>minor</i> Hempr.		Syria	3	2
126–[1]36	<i>Taphozous syriacus</i>		Syria	4	7
137–[1]43	<i>Vespertilio</i>	— ?	ibid.	3	4
144–[1]45	<i>Nycteris thebaica</i>	— ?	ibid.	2	[-]

between December 1824 and April 1825 in “Arabia” (i.e. western part of the present-day Saudi Arabia). The two bats from “Syria et Arabia” arrived at the NMW in November 1825; however, at that time only the shipment IX from “Syria” (sent from Alexandria in October 1824, arrived at Berlin in April 1825) was available in the ZMB, while the (last) shipment X from “Arabia” arrived at ZMB on 3 April 1826 (STRESEMANN 1954: 171). So, if the NMW specimens recorded by the entry 1826/I really originate from the part of the expedition focused on “Syria et Arabia”, they may come solely from “Syria” and not from “Arabia”. The collection of bats in “Syria” is mentioned also by HEMPRICH in his letter from Beirut to LICHTENSTEIN dated on 3 August 1824 (published by STRESEMANN 1954: 122–123): “Wir sind gestern von einer Exkursion nach Balbek u. zu Zedern glücklich zurückgekommen. Die Beute, die wir gemacht, ist nicht so bedeutend als wir hofften. Von Säugethieren: [...] *Pteropus* 1 Exemplar. 3 andre Fledermäusearten; [...]”.

LICHTENSTEIN made a hand-written list of specimens of the shipment IX, which remains still available in the ZMB archive (Fig. 3); it contains 149 specimens of mammals (STRESEMANN 1954: 171, 1962: 385, reported only 145 pieces according to the numbering, but under some numbers additional specimens were added as letters) including 32 bats (Table 2). Among these

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Fig. 1. Collection items and a selection of evidence attributed to the entry 1826/I. a–f, i, j – *Taphozous nudiventris* (NMW 19112); g, h – *Rhinolophus ferrumequinum* (NMW 19729). a – card of the modern card index; b – skull label; c – skull fragment (rostrum), dorsal aspect; d – modern tag of the skin; e – old tag of the skin (1932); f – old label (19th cent.); g – old label (19th cent.); h – dry skin (skull in situ) with tag; i – dry skin, dorsal aspect; j – dry skin, ventral aspect.

Obr. 1. Sbírkové položky a výběr sbírkové dokumentace přiřazené k přírůstkovému číslu 1826/I. a–f, i, j – *Taphozous nudiventris* (NMW 19112); g, h – *Rhinolophus ferrumequinum* (NMW 19729). a – lístek současného lístkového katalogu; b – sbírkový lístek lebky; c – fragment lebky (obličejová část), hřbetní pohled; d – nový sbírkový lístek balgu; e – starý sbírkový lístek balgu (z r. 1932); f – starý sbírkový lístek (z 19. století); g – starý sbírkový lístek (z 19. století); h – balg (s ponechanou lebkou) se sbírkovým lístkem; i – balg, hřbetní pohled; j – balg, břišní pohled.

Säugethier-Sammlung.

Königl. zoologisches Museum in Berlin
J. Müller

I.

139 Btl. - 208/000 C. M.

Species	Individa
1. Cercopithecus Nemausus mas. (Pekinensis).	5088 1
2. Capra caucasicata mas. jun.	20 - 1
3. Nyctax syriacus	10 - 1
4. Sorex persicus.	4 - 1
5. Mus flaviventris	Arabia 1 - 1
6. — picturatus	Syria 1 - 1
7. Rhinolophus rufescens	2 - 1
8. Taphozous syriacus	2 - 1
9. Hydromys Copei adult.	Paraguay 15 - 1
10. Herpestes Caffer	Terra Caffrorum. 8 - 1
11. Lagomys alpinus	Siberia 8 - 1
12. Viverra Zorilla	Terra Caffrorum. 8 - 1
	139 Btl. 12

J. Natterer
Curator

Fig. 2. Record of the entry 1826/I made by the then curator of the NMW mammal collection, Josef NATTERER.

Obr. 2. Záznam přírůstku č. 1826/I zapsaný tehdejším kurátorem sbírky savců Dvorního kabinetu přírodní, pozdějšího c. k. Dvorního přírodovědeckého musea ve Vídni (NMW), Josefem NATTEREREM.

bats, there are also specimens of *Rhinolophus rufescens* and *Taphozous syriacus* (i.e. names used also by Jos. NATTERER in the NMW entry 1826/I, see above and Fig. 2) both coming from “Syria” (i.e. from Lebanon), and some specimens of both species are “doublettes” intended for sale/exchange. Moreover, the only specimen of *Pteropus* [= *Rousettus aegyptiacus* (Geoffroy, 1810)] reported by HEMPRICH to LICHTENSTEIN from “Syria” (see above) is also remembered by LICHTENSTEIN. So, the agreement in the bat names, specimen numbering and declared origin as well as the time sequence of the shipments suggest that the two NMW bat specimens of the 1826/I entry really represent the HEMPRICH and EHRENBERG specimens collected in Lebanon.

The “Syrian” part of HEMPRICH and EHRENBERG’s expedition through Lebanon is described and mapped in detail by STRESEMANN (1962) and MLÍKOVSKÝ & FRAHNERT (2011). Both men arrived at Beirut on 18 May 1824 from where HEMPRICH undertook a short excursion (28–31 May) to Zouq M Kayel, Aïntouâra, and Harïssa. On 9 June they left Beirut for Harïssa (9–26 June; visited Al Manṭarah and Aïn Jraïn) and proceeded east via Jisr El Hajar (26 June), Jabal Ṣannīn (26–28 June), across the Lebanon Mts. to Zahlé (28–30 June), Ablaj, Nahrou and finally to Baalbek (easternmost point of the route; 1–3 July). From there they headed north-west via Dahr El Hoûoui (3 July), and Aïnâta (3–5 July) to Bcharré (6–24 July) where HEMPRICH made an excursion (13–16 July) to Ihdin and Trâblous. Finally, they travelled via Hadet Ej Jobb (24–27 July) to Batrouïn (27–28 July) at the sea shore, further along the coast line to Amchît (28–30 July, excursion by EHRENBERG to Hâqel on 29 July), Tabarja, Zouq M Kayel (31 July – 2 August, excursion by HEMPRICH to Harïssa on 31 July), and back to Beirut (2–6 August). Hence, the bats could be collected only in the Lebanese territory bordered by Beirut [33° 53’ E, 35° 29’ E], Zahlé [33° 51’ N, 35° 54’ E], Baalbek [34° 00’ N, 36° 12’ E], Bcharré [34° 15’ N, 36° 01’ E], Trâblous [34° 26’ N, 35° 50’ E] and the Mediterranean Sea shore, between 18 May and 6 August 1824.

There seem to be no doubts concerning the geographical origin of the *Rhinolophus rufescens* (= *R. ferrumequinum*) specimen collected by HEMPRICH and EHRENBERG in “Syria”. Among the regions visited by these two explorers during their whole expedition, *R. ferrumequinum* occurs solely in Lebanon (QUMSIYEH 1985, HARRISON & BATES 1991).

Moreover, bats bought/exchanged from this Lebanese collection to the Royal Museum of Natural History of the Netherlands, Leyden (RMNH) were reported also by TEMMINCK (1835–1841) and later by JENTINK (1887, 1888). TEMMINCK (1835: 30) mentioned two specimens of *R. ferrumequinum* (under its synonym *R. unihastatus* – see also the old labelling of the NMW specimen above) as follows: “Mr. Lichtenstein m’a envoyé sous le nom de *Rhinolophus libanoticus* [see Table 2] deux sujets, mâle et femelle, que d’après tous les caractères extérieurs et ostéologiques, je dois des individus absolument semblables d’Italie, d’Égypte et du Cap de B[onne]. E[spérance].”. Later, FITZINGER (1855: 139) and KOLENATI (1860: 71) reported the occurrence of *R. ferrumequinum* as “aus Asien nur aus der Gegend des Libanon” and “am Libanon”, respectively. At that time, these specified records could be based only on the specimen/s collected by HEMPRICH and EHRENBERG (in KOLENATI’s publications certainly via the reports by TEMMINCK and FITZINGER, but maybe also from the correspondence with LICHTENSTEIN, EHRENBERG, NATTERER, and/or FITZINGER). Most probably, the respective NMW specimen gives also a basis for FITZINGER’s (1870: 135) opinion on the synonymy of the names “*R. rufescens* Lichtenstein” and *R. clivosus* Cretzschmar, 1828, although at another place FITZINGER (1870: 147) mentioned *R. ferrumequinum* (as *R. unihastatus*) to occur “in Syrien in der Umgegend des Libanon”, perhaps based on his own observation or TEMMINCK’s and/or KOLENATI’S reports. Finally, at least three specimens of *R. ferrumequinum* collected by HEMPRICH and EHRENBERG

The image shows two pages of a handwritten list of mammal specimens. The left page is numbered 1-30 and the right page is numbered 31-40. The list includes species names, their counts, and other details. The handwriting is in cursive and the paper is aged and yellowed.

Fig. 3. List of mammal specimens in the shipment IX sent by W. HEMPRICH and Ch. EHRENBERG from Alexandria to ZMB, written by the then ZMB director, Hinrich LICHTENSTEIN. For bat specimens, see Table 2.

Obr. 3. Soupis jedinců savců obsažených v zásilce IX zasláné W. HEMPRICHEM a Ch. EHRENBERGEM z Alexandrie do Zoologického musea v Berlíně, vytvořený jeho tehdejším ředitelem, Hinrichem LICHTENSTEINEM. Jedinci netopýřů jsou čitelně vypsáni v tab. 2.

in “Syria” (and labelled *R. libanoticus*, *R. conchifer* and *R. rufescens*) remain still deposited in the ZMB (TURNI & KOCK 2008, own observation).

More complex is the situation in the specimen of *Taphozous nudiventris*, although the name *syriacus** used by LICHTENSTEIN (and maybe by HEMPRICH and/or EHRENBERG before him) indicates the “Syrian” (= Lebanese) origin. On the other hand, there are some points which could indicate

*The name *syriacus* was created before the creation and publication of the name *Taphozous nudiventris* by CRETSCHMAR (1830: 70) – based on specimens collected in Egypt in the same period by Eduard RÜPPELL (1794–1884) – and thus HEMPRICH / EHRENBERG / LICHTENSTEIN could have created the name *syriacus* for any reason but not for differentiation of their specimens from *nudiventris*.

other than the Lebanese origin of the respective specimen of *T. nudiventris*. This species still remains unknown from Lebanon (see above), unlike the previous species, *R. ferrumequinum*, which is common in this country. However, *T. nudiventris* is a common bat in the Nile valley of the present-day Egypt and Sudan (HAPPOLD 2013), where HEMPRICH and EHRENBERG spent the period of 1821–1823 (STRESEMANN 1954, BAKER 1997). LICHTENSTEIN's list (Table 2) includes another species unknown from Lebanon, *Nycteris thebaica* Geoffroy, 1818, which is also known to be a relatively common bat in north-eastern Africa (BERNARD & HAPPOLD 2013). This could indicate a mix of specimens of various origin under the final labelling “Syria”. Moreover, according to STRESEMANN (1962), LICHTENSTEIN sometimes labelled the material collected in the Nile delta of Egypt and in the Sinai and adjacent parts of Arabia as originating in Syria. Sinai and its surroundings were visited by HEMPRICH and EHRENBERG between July 1823 and January 1824 and the collections from this part of the expedition were sent to Berlin in the same shipment IX as the “Syrian” collections (STRESEMANN 1954).

TEMMINCK (1840: 179) reported on the misidentification made by LICHTENSTEIN or already by HEMPRICH and/or EHRENBERG, concerning the RMNH specimens named *Taphozous syriacus*. Under *Vespertilio murinus* (= *Myotis myotis* or *M. blythii* (Tomes, 1857) = *M. myotis* s.l.), TEMMINCK wrote: “Le musée des Pays-Bas a reçu de celui de Berlin un *Myotis* de Syrie sous le nom de *Taphozous syriacus*, qui ne diffère en rien par le couleurs, par les formes et par les dents de nos individus d'Europe. Plusieurs autres individus on tété trouvés en Syrie, en Egypte et sur les côtes Barbarie.” (Most probably, according to this report, *M. myotis* s.l. was mentioned to occur in Syria by BLASIUS (1857: 84), KOLENATI (1860: 121), FITZINGER (1871: 279), DOBSON (1876: 138), and perhaps others.) However, under the name *Taphozous nudiventer**, TEMMINCK (1838: 9, 1841: 281) did not report any specimen from Syria or Arabia, but only the distribution of this bat in Egypt and Nubia based on RÜPPELL's specimens. Later on, JENTINK (1887, 1888) reported the same information concerning the specimens and names of *Vespertilio murinus* and *Taphozous syriacus*. This could indicate that the series or certainly a part of the series of 11 specimens of *T. syriacus* collected in Lebanon by HEMPRICH and EHRENBERG (Table 2) in fact represents *Myotis myotis* and/or *M. blythii* (both these species are known from the areas visited by HEMPRICH and EHRENBERG in 1824; cf. BENDA et al. 2016). Thus, the entry 1826/I/8 could contain a specimen of *M. myotis* s.l. under the name *T. syriacus* (similarly as in the RMNH), which was later changed for *Taphozous nudiventris* from another collection. This latter variant is further supported by the second, crossed out, acquisition number (“1832/II/3”) on the old label (Fig. 1f), now attached to the specimen file in the card index. Clearly, this number also refers to an entry in the Acquisition Catalogue, in this case termed “*Vespertilio*” (= a bat) under the heading “Von Herrn Frank aus Leipzig durch Kauf”. No further details regarding the collector and collecting locality and/or date are included, which is also in line with the note “Ohne Fundort” on the tag from 1932 attached to the specimen. Therefore, an exchange of specimens (or labels) seems to be likely, but see also the comments on the next entry. Unfortunately, the correctness of the species identification in the specimens labelled as *T. syriacus* that remained in the ZMB cannot be checked, since the majority of the collection by HEMPRICH and EHRENBERG was destroyed by a WWII event in February 1945 (STRESEMANN 1954).

*The name *Taphozous nudiventer* Temminck is a junior synonym of *T. nudiventris* Cretzschmar, 1830. ALLEN (1939), ELLERMAN & MORRISON-SCOTT (1951), HARRISON (1964), KOCK (1969), BORISENKO & PAVLINOV (1995) and SIMMONS (2005) quoted the year of publication of the former name as 1841. However, the prior paper in which this name appears as an available name is by TEMMINCK (1838: 7). Thus, the year of publication of the name *Taphozous nudiventer* Temminck should be treated 1838.

To summarise, while the specimen of *Rhinolophus ferrumequinum* (NMW 19729) with most probability originates from the present-day Lebanon, the specimen of *Taphozous nudiventris* (NMW 19112) may originate from Lebanon, but its origin from a different (and unknown) region cannot be excluded either. Since the latter specimen represents the first and only reference of *T. nudiventris* from Lebanon (see below), the certainty of its geographical origin should be considered with caution, although there are no available direct and unambiguous indications of its false interpretation.

1845/VI, leg. Kotschy

The supposed Lebanese bats of this entry are represented by two bodies of *Taphozous nudiventris* in alcohol (Table 1), an adult female with extracted skull (NMW 8523) and a juvenile male with skull in situ (NMW 8522), both labelled as coming from “Beirut, oder Baalbek, beide Libanon, Okt.–Dez. 1836” (Fig. 4a–c). The alcohol specimens are directly accompanied only with new museum tags bearing the NMW numbers (Fig. 4d) and indirectly (in jar) with a new museum label bearing the NMW numbers, collection site and date (Fig. 4c); skull (preserved in good condition, right tympanic bulla and both premaxillae are missing, mandibles are separated) bears the NMW numbers written on the braincase (Fig. 4e) and lateral surfaces of mandibles and a new small label in jar bearing the same data as the museum label in the jar with the alcoholic specimens (Fig. 4b). The original collector’s tags or any older NMW labels are not available at the specimens or at other place.

The size of the adult specimen (dimensions in mm: forearm length 73.4; condylobasal length 24.02; upper tooth-row length 11.08) clearly indicates it to belong to one of the small-sized subspecies of *T. nudiventris* living in Africa, southern Levant, southern and eastern Arabia and Indian subcontinent (*T. n. nudiventris*, *T. n. kachhensis* Dobson, 1872, *T. n. zayidi* Harrison, 1955), but not to the large-sized subspecies *T. nudiventris magnus* Wettstein, 1913 that occurs in Mesopotamia, i.e. from south-eastern Turkey to Iraq and western Iran (e.g. HARRISON & BATES 1991, BENDA et al. 2006, 2012).

According to the labelling, these bats were collected by the botanist Theodor KOTSCHY during his travel to the Middle East in the autumn 1836. KOTSCHY’s collections arrived to the NMW several times, VON PELZELN (1890: 509) briefly reported on the particular arrivals as follows: “[1839:] Eine gleichzeitige wichtige Bereicherung der Sammlung bestand in der Ausbeute von Th. Kotschy’s Reisen in Nordostafrika, 60 Säugethiere, welche einen werthvollen Beitrag zur Fauna dieses Gebietes bilden. [...] In den Jahren 1841, 1842 und 1845 wurden von Kotschy wieder verschiedene Thiere aus Nordostafrika und Vorderasien erworben.” Among these four arrivals, the entry 1845/VI contains six bat specimens in four items (Fig. 5); Jos. NATTERER, a curator of the NMW collections, specified the headline of this entry in the NMW Acquisition Catalogue of mammals as follows (Fig. 5): “1845. Dec[ember 1]844. Von Herrn Theodor Kotschy durch Ankauf um 110 fl [= Gulden] ernst [= eurer Majestät] // Extraordinarium”. The bats are mentioned under the name *Vespertilio* (= a bat) only, all coming from “Syria”, while the other mammal specimens represent a mix of origins from Egypt, Sudan and the Middle East (Fig. 5). Two items (1845/VI/1, 4) and three bat specimens are entered as originating from Babylon (= Babil, Iraq), one item (1845/VI/3) and one bat from Bagdad (Baghdad, Iraq) and one item (1845/VI/2) and two bats remain without close specification. To the latter item K. BAUER allocated the respective two specimens of *T. nudiventris*. However, the record at the item 2 can be also recognised as a repeated content of the preceding line, i.e. “*Vespertilio* von



Fig. 4. A selection of items and evidence attributed to the entry 1845/VI/2, *Taphozous nudiventris* (NMW 8522, 8523). a – card of the modern card index (NMW 8522); b – skull label (NMW 8523); c – label of the alcohol specimens; d – alcohol specimen (NMW 8522); e – complete skull, dorsal aspect (NMW 8523); f – complete skull, ventral aspect (NMW 8523).

Obr. 4. Výběr sbírkových položek a dokumentace přiřazené k přírůstkovému číslu 1845/VI/2, *Taphozous nudiventris* (NMW 8522, 8523). a – lístek současného lístkového katalogu (NMW 8522); b – sbírkový lístek lebky (NMW 8523); c – sbírkový lístek lihových jedinců; d – lihový jedinec (NMW 8522); e – úplná lebka, hřbetní pohled (NMW 8523); f – úplná lebka, břišní pohled (NMW 8523).

Babylon, Syria". The four remaining bat specimens of the entry (items 1, 3, 4) were allocated by K. BAUER to *Eptesicus bottae* (Peters, 1869) (1845/VI/1 = NMW 21938), *Taphozous nudiventris* (1845/VI/3 = NMW 8521), and *Pipistrellus kuhlii* (Kuhl, 1817) (1845/VI/4 = NMW 21941, 21942), all according to NATTERER's record labelled to come from Iraq. Apparently, according to the size of the specimens, *T. nudiventris* (1845/VI/2 = NMW 8522, 8523) cannot be affiliated to the Iraqi origin (see above).

Concerning the available original evidence (i.e. NATTERER's entry only), there is no obvious reason why BAUER labelled the respective two specimens of *T. nudiventris* to come from Lebanon. BAUER gave a certain explanation on the card of the juvenile specimen (NMW 8522; present in the NMW card catalogue of the mammal collection, Fig. 4a) that reads: "(waren unbeschriftet, Aufklärung durch Acqu. und ZK, vgl. NMW 8521; Beirut und Baalbek sind die beiden südlichsten Stationen Kotschy's in Vorderasien)". However, it is clearly stated there that the specimens

Säugetier-Sammlung.

134

1845
Nr 544.

Herr Hofrath Theodor Ketschy
sine Ankauf

VI.

100/100
Extraordinarium

Species	Individua	Individua
11 <i>Vulpes</i>	von Babylon Syria	2 / 1
12 —	—	4 / 2
13 —	von Bagdad	3 / 1
14 —	Babylon	4 / 2
15 <i>Canis aeg. niloticus</i>	Nubien	10/18
16 <i>Sciurus rufatus</i> Wagl.	mas et fem. à 31. Mesopotamien	6 / 2
17 <i>Meriones taurinus</i> Kolb	mas et fem. à 31. Syrien	6 / 2
18 <i>Lepus aegyptius</i>	Nubien	4 / 1
19 <i>Antelope Addax</i> 2 <i>Hyonax</i>	Nubien	10
20 <i>Antelope Dorcas</i>	Nubien	15 / 1
21 <i>Capra Hircus</i> var. <i>sennariensis</i>	Nubien	8 / 1
22 <i>Equus Asinus ferus</i>	aus Affrica	20 / 1
23 <i>Bubalus Capra</i> 2 <i>Hyonax</i>	Sennar	10
24 <i>Oryctolagus sennariensis</i> ausg. Fitzinger	Sennar	30 / 1
25 <i>Hyaena crocata</i> Gmelin	Sennar	4
26 <i>Rattus raperis</i> Gmelin	Sennar.	2
		100 / 110. 16

12 Stück für die Sammlung
4 — Nubien
4 — Porten
8 Stück für die Sammlung

J. Natterer
Curator

Fig. 5. Record of the entry 1845/VI made by Josef NATTERER, and signed by Jos. NATTERER and Leopold Joseph FITZINGER (1802–1884; curator of mammals at the NMW 1844–1861).

Obr. 5. Záznam přírůstku č. 1845/VI zapsaný Josefem NATTEREREM a podepsaný Josefem NATTEREREM a Leopoldem Josephem FITZINGEREM (1802–1884; kurátorem sbírky savců Dvorního kabinetu přírodnin v letech 1844–1861).

were found in the collection without any data. On the other hand, according to STAFLEU & COWAN (1979: 655), KOTSCHY's travel diaries from the period 1835–1843 are lost (although more or less detailed descriptions of KOTSCHY's routes in the Orient are available in several sources, see e.g. RUSSEGER 1841–1843, REDTENBACHER 1843, KOTSCHY 1864, SCHWEINFURTH 1868) and the collection of the specimens could not be confirmed by KOTSCHY's personal record. So, an apparent link between the specimens and KOTSCHY's collections is missing.

Kurt BAUER revised old materials of bats in the NMW and tried to allocate all the specimens to entries in the Acquisition Catalogue and a handwritten card catalogue of all the fluid preserved specimens (ZK 2) prepared by August VON PELZELN (1825–1891), then a curator of mammals and birds at NMW, around 1885 (VON HAUER 1886: 7). However, in this particular case BAUER's allocation is not supported by any other archival material or other evidence. Anyway, even if BAUER established a correct link between the specimens and the acquisition entry from 1845, the presumed donation time should make us cautious. From the other specimens donated in 1845, it seems very likely that they stem from a later trip (in 1841–1843) of KOTSCHY to the present-day northern Syria, Iraq and south-western Iran and back via Turkey but not to Lebanon (e.g. RECHINGER 1960, EDMONDSON & LACK 2006). For some reason, however, BAUER linked only those particular two specimens from the 1845 donation to the earlier trip of KOTSCHY (then accompanied by the geologist Joseph RUSSEGER, 1802–1863) during which they travelled also to Lebanon; obviously because he identified the bats as not belonging to the Mesopotamian population according to the body and skull size of the adult specimen. Moreover, the NMW also received two additional *T. nudiventris* specimens from KOTSCHY and RUSSEGER's trip in 1839. But even in VON PELZELN's card catalogue (which can be considered a fairly complete record since it was prepared when the whole NMW collections were moved from the old museum building in the Hofburg to the new museum building at the Maria-Theresien-Platz), those specimens are already missing.

So, it is unclear whether the respective specimens of *T. nudiventris* even belong to any of KOTSCHY's collections. The card catalogue prepared by A. VON PELZELN mentions only three specimens of *T. nudiventris*: one specimen from Syria "1 Ex. 1845/VI/3 Syria" and two specimens from Egypt "2 Ex. 1852/VI/8 [&] 8a. Aegypten". The "Syrian" specimen was certainly collected by KOTSCHY during his 1841–1844 trip and corresponds with the specimen NMW 8521 now labelled to come from Baghdad. The other two specimens were collected by Theodor VON HEUGLIN (1824–1876) during one of his early trips to Egypt in the 1850s. VON HEUGLIN's specimens of *T. nudiventris* (like two of KOTSCHY's specimens) could not be found in the last revision of the collection and therefore it seems likely that in fact the two specimens now allocated to the KOTSCHY's collection could be the specimens collected by VON HEUGLIN. The Acquisition Catalogue further lists an adult and a juvenile animal in VON HEUGLIN's donation which would also match the present material.

To summarise, the available data are too poor to confirm a possible or even undoubted Lebanese origin of the two respective specimens of *Taphozous nudiventris*. Hence, building a new species record for the country based on them is evidently inappropriate.

1886/IV, leg. Leuthner

Bats of this entry represent three bodies in alcohol with extracted skulls (NMW 26357–26359), two females of *Myotis myotis* and a female of *Rhinolophus mehelyi* (Table 1), labelled as coming from "Beirut, Libanon, 1886" (Fig. 6). The alcohol specimens are directly accompanied only



Fig. 6. A selection of items and evidence of the entry 1886/IV. a, b, d, f – *Myotis myotis* (NMW 26357, 26358); c, e – *Rhinolophus mehelyi* (NMW 26359). a – card of the modern card index (NMW 26357); b – skull label (NMW 26357); c – complete skull, dorsal aspect; d – label of the alcohol specimens; e – alcohol specimen; f – alcohol specimen (NMW 26358).

Obr. 6. Výběr sbírkových položek a dokumentace přírůstkového čísla 1886/IV. a, b, d, f – *Myotis myotis* (NMW 26357, 26358); c, e – *Rhinolophus mehelyi* (NMW 26359). a – lístek současného lístkového katalogu (NMW 26357); b – sbírkový lístek lebky (NMW 26357); c – úplná lebka, hřbetní pohled; d – sbírkový lístek lihových jedinců; e – lihový jedinec; f – lihový jedinec (NMW 26358).

with new museum tags bearing the NMW numbers (Fig. 6e, f) and indirectly (in jars) with new museum labels bearing the NMW numbers, collection year and site (Fig. 6d); skulls (preserved in good condition, left tympanic bulla and lambda are missing in NMW 26358, mandibles are separated in NMW 26357) bear the NMW numbers written on the braincase (Fig. 6c) and lateral surfaces of mandibles and new small labels in jars bear the same data as the museum labels in the jars with the alcoholic specimens (Fig. 6b). The original collector's tags are not available at the specimens or at other place.

The skull size in the *M. myotis* specimens (dimensions in mm: condylobasal length 23.68, 24.41; upper tooth-row length 10.51, 10.58) clearly indicates them to belong to the large-sized subspecies *M. myotis macrocephalicus* Harrison et Lewis, 1961 that occurs solely in the easternmost part of the Mediterranean basin between central Palestine in the south and eastern Cilicia

in the north (e.g. HARRISON & LEWIS 1961, SPITZENBERGER 1996, BENDA et al. 2006). These bats were collected and donated to NMW by the Austrian entomologist Franz Josef LEUTHNER (who collected insects in Palestine and Syria jointly with Karl Maria HELLER in 1885, see HORN et al. 1990), the entry is specified by the NMW curator of mammals and birds at 1886, A. VON PELZELN, as follows (in the NMW Acquisition Catalogue of mammals, Fig. 7): “1886.IV. Von Herrn Dr. Leuthner aus Syrien von dessen Reise nach Syrien 3 Arten in 5 Exemplaren in Spiritus (1 *Mus*?, 1 *Hypudaeus*?, *Vespertilio* 3 St.[ücke]) // 5 St.[ücke]”. A very similar text is present in the Annual Report of the NMW for 1886 (VON HAUER 1887: 30), in the part concerning arrivals of mammals to the NMW collection: “von Herrn Dr. Leuthner drei von demselben in Syrien gesammelte Arten kleiner Säugethiere (eine Maus, eine Wasserratte und drei Fledermäuse)”. No accurate information on the site of origin of the specimens nor an itinerary of the LEUTHNER’s trip giving an information on the collection of mammals are available. The geographical term Syria of the 1880s represents a large part of the Ottoman Empire and is very broad concerning the current political divisions of the Middle East (i.e. covering at least five states), see e.g. the discussion by BENDA et al. (2006).

However, at another page of the Annual Report for 1886, VON HAUER (1887: 28) mentioned LEUTHNER’s donation of a large collection of spiders, apparently coming from the same trip: “Arachnoiden 68 Arten in 596 Exemplaren von Beyrut (gesammelt von Dr. Fr. Leuthner)”. Perhaps in this part of the Report, Kurt BAUER found an indication of a possible origin of the bats: if such a huge amount and diversity of spiders came from one site, it could represent a long stay when also a small collection of mammals could be made; most probably therefore BAUER recorded Beirut as the site of origin of the bats in the museum secondary evidence in the 1960s and later on, SPITZENBERGER (1996: 12) published Beirut as a collection site of two females of *Myotis myotis* collected by LEUTHNER. Actually, there is no available evidence on the origin of the specimens in Beirut or its close surroundings.

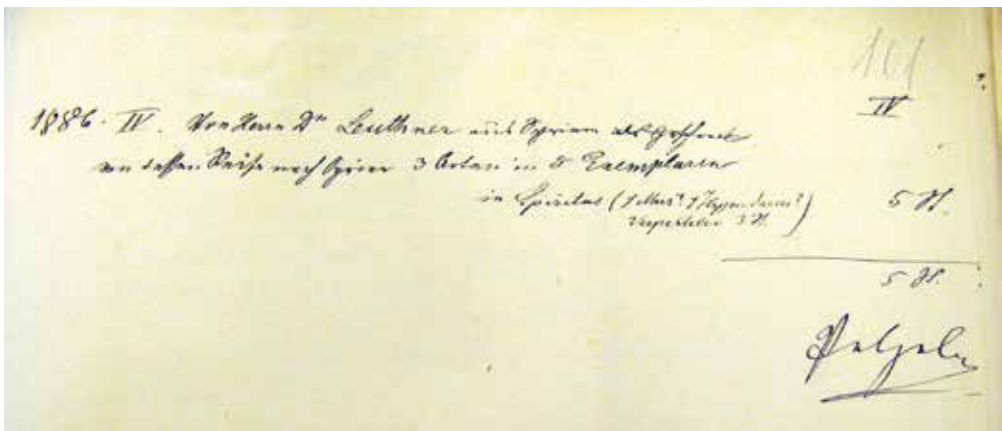


Fig. 7. Record of the entry 1886/IV made by the then curator of the NMW mammal collection, August VON PELZELN.

Obr. 7. Záznam přírůstku č. 1886/IV zapsaný tehdejším kurátorem sbírky savců c. k. Dvorního přírodovědeckého musea ve Vídni, Augustem VON PELZELN.

From several published and unpublished sources, we were able to reconstruct a fairly accurate itinerary of LEUTHNER's and HELLER's Levantine trip in 1885 (Appendix 1). According to this simple itinerary outline, the localities visited by F. LEUTHNER in the Levant belong to the territory considered under the term Syria (or Syropalestine) from ancient times until the 1920s and cover four present states (Israel, Lebanon, Syria, Turkey). Since there is no available evidence enabling to closely identify the localities of the collection of the three bat specimens among the nine sites listed above, it is, concerning the geographical origin of them, possible to say only "the area of the Levant between Jerusalem, Israel, in the south and Akbez, Turkey, in the north" and concerning the collection date, the interval "March–June 1885".

The specimen of *Rhinolophus mehelyi* collected by F. LEUTHNER in this area in 1885 thus certainly cannot be considered as the first record of this species from Lebanon (although it may originate from this country), until additional evidence is available, which could give a relevant basis for the above BAUER's statement, now clearly inappropriate. Anyway, both *Rhinolophus mehelyi* and *Myotis myotis* are known from this broader area of "Syria", both species from a series of records (HARRISON & BATES 1991, MENDELSSOHN & YOM-TOV 1999, BENDA et al. 2006, SHEHAB et al. 2007), *M. myotis* also from Lebanon (at least from seven sites, see HARRISON & LEWIS 1961, LEWIS & HARRISON 1962, ATALLAH 1970, BENDA et al. 2016). However, for the time being, the identification of the collection locality of the respective three NMW bats as Beirut is unjustified, and the collection data published by SPITZENBERGER (1996) should be considered erroneous.

CONCLUSIONS

The revision of the available museum evidence on the seven specimens of bats attributed to originate from Lebanon brought rather unexpected results. Only one specimen, *Rhinolophus ferrumequinum* (NMW 19729), was found to come with a certain probability from the present-day territory of Lebanon, being collected by Wilhelm HEMPRICH and Christian EHRENBERG during their expedition to "Syria" in 1824. In the remaining six specimens, the Lebanese origin cannot be confirmed. Three specimens donated to the NMW by Franz LEUTHNER, one *Rhinolophus mehelyi* and two *Myotis myotis* (NMW 26357–26359), were collected by F. LEUTHNER and Karl HELLER in the Levant in 1885 – the specimens originate from the broad area stretching "between Jerusalem, Israel, in the south and Akbez, Turkey, in the north". Hence, their origin in Lebanon is possible, but not sure. On the other hand, the remaining three specimens, *Taphozous nudiventris* (NMW 8522, 8523, 19112), almost with certainty originate neither from the territory of Lebanon nor the Levant as well. The evaluation of the available evidence did not support the collectors nor the origin to be correctly recorded in the modern documentation; however, it did not give a sufficiently robust support of other possibilities. Two specimens (NMW 8522, 8523) attributed to be collected by Theodor KOTSCHY seem to originate from Egypt rather than from the Levant and to be collected by Theodor VON HEUGLIN rather than by KOTSCHY. Similarly, in the last specimen (NMW 19112) yet attributed to be collected by HEMPRICH and EHRENBERG in Lebanon, the real collector and origin remain uncertain.

To be concluded, the interpretations of the origin of the respective specimens, contained in the modern museum documentation, were found in their large part inaccurate or erroneous. As a consequence, the purported records of *Rhinolophus mehelyi* and *Taphozous nudiventris* cannot be taken for a (former) occurrence in Lebanon. This case demonstrates that careful checks of modern interpretations of historical records are necessary when examining past distributions

of organisms. It also shows how complicated it is to disprove, but also to confirm the data on historic museum specimens.

SOUHRN

V mammalogické sbírce Přírodovědeckého musea ve Vídni se nachází sedm jedinců netopýrů čtyř druhů (*Rhinolophus ferrumequinum*, *R. mehelyi*, *Taphozous nudiventris*, *Myotis myotis*), které podle v současnosti používaných museumních záznamů pocházejí z území Libanonu (tab. 1, obr. 1, 4, 6). V případě dvou druhů (*R. mehelyi*, *T. nudiventris*) by se tak jednalo o první nálezy z území tohoto státu, přičemž současnými výzkumy nebyly ony druhy z Libanonu dokumentovány. Jelikož se jedná o historické jedince, jež měly být sebrány v rozmezí let 1824 a 1885, byly velmi zevrubně zkoumány dostupné materiály o jejich historii, a to jak v dokumentaci vídeňského musea (včetně dalších sbírek mimo mammalogickou), tak v literatuře či v dokumentaci dalších muzeí.

Zhodnocení historických pramenů přineslo dosti překvapivý výsledek, totiž že jen jediný kus ze všech, vrápenec velký (*Rhinolophus ferrumequinum*), s největší pravděpodobností opravdu pochází ze severní části současného území Libanonu, kde byl kolektován roku 1824 cestovateli a přírodovědci Wilhemem HEMPRICHEM a Christianem EHRENBERGEM během jejich cesty do tehdejší “Syrie”. Další tři jedinci, jeden vrápenec Mehelyův (*Rhinolophus mehelyi*) a dva netopýří velci (*Myotis myotis*), byli kolektováni entomology Franzem LEUTHNEREM a Karlem HELLEREM v Levantě v roce 1885 – jejich původ v Libanonu se však nepodařilo ověřit, je jej tedy třeba vztáhnout na celou oblast Levanty navštívenou oběma sběrateli a vymezenou (současnou geografickou nomenklaturou) jako celkem široké území mezi Jerusalemem v Izraeli na jihu a Akbezem v Turecku na severu. Původ oněch tří jedinců v Libanonu je tedy možný, nikoliv však jistý. Na druhou stranu, tři zbývající jedince, všechny náležející hrobkovci lysobřichému (*Taphozous nudiventris*), se nepodařilo s určitostí přiřadit k určitému přírůstku v museumní sbírce a jejich sběratel a tedy i geografický původ zůstává nejasný. Dva kusy byly původně přiřazeny k jednomu z přírůstků sestávajících z jedinců zakoupených od cestovatele a botanika Theodora KOTSCHYHO a jeden kus ke stejnému přírůstku jako výše uvedený *R. ferrumequinum*, tedy ke sběrům HEMPRICHA a EHRENBERGA z Libanonu. Jedinci zařazení do KOTSCHYHO přírůstku byly však spíše kolektovány Theodorem VON HEUGLIN v Egyptě, totéž možná platí i pro “jedince HEMPRICHA a EHRENBERGA”, jenž však mohl být kolektován i těmito cestovateli či KOTSCHYH v Egyptě či Nubii, anebo náleží docela jinému přírůstku.

Z podrobné revize sbírkové dokumentace dotyčných několika jedinců netopýrů z vídeňského Přírodovědeckého musea tak vyplývá, že současné výklady původu těchto kusů jsou z velké části nepřesné anebo chybné. U několika kusů naznačovaly jistý zoogeografický význam pro poznání fauny Libanonu – ten je však s ohledem na dostupné informace třeba zavrhnout, dotyčné jedince rozhodně nelze považovat za nepochybné prvné nálezy v této zemi. Celý případ jasně ukazuje ošemetnost bezvýhradného spoléhání se na interpretace uváděné na nových kartách, štítcích a dalších prvcích databází historických museumních sbírek, které díky někdy i celkem dramatickému vývoji sbírkových institucí či sbírek samotných mohly být rozličně zaměřovány a popleteny. Takové případy ostatně byly, včetně způsobů a důvodů záměn a reinterpretací, již dokumentovány vícekrát (viz RASMUSSEN & PRYS-JONES 2003), a to včetně netopýrů a včetně fauny Blízkého východu (viz např. BENDA et al. 2006, 2012). Tento případ také ukazuje, jak obtížné je vyracet, ale i potvrdovat sbírkové údaje o historických museálních jedincích.

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APPENDIX 1

Biographical notes on F. J. Leuthner

Only sparse biographical data on the collector Franz Josef LEUTHNER are available in the literature. From these pieces, only a brief biography can be compiled, which, however, may still be valuable for future students working on his, mainly entomological, collections.

Franz Josef LEUTHNER was born in or near Vienna in 1854 (STEINMANN 1919: 65). Around 1873 he moved to Basel where he worked as an assistant at the zoological institute of the university until 1879 and between 1880 and 1883 as a science teacher (cf. *Verhandlungen der Kaiserlich-königlichen Zoologisch-botanischen Gesellschaft in Wien*, 23–33, “Mitgliederverzeichnis”). During his time at the zoological institute, he published a small booklet on the fish fauna of the Rhine (LEUTHNER 1877). In Basel he also seems to have made plans to travel to the Orinoco, almost certainly to collect natural history specimens (ANONYMOUS 1884), but apparently this expedition never materialized. During about the same period he prepared his widely recognized publication “A monograph of the Odontolabini, a subdivision of the coleopterous family Lucanidae” which was translated into English by W. F. KIRBY and published in vol. 11 of the renown *Transactions of the Zoological Society of London* (LEUTHNER 1885).

In 1885, LEUTHNER, together with Karl Maria HELLER (1864–1945), undertook an expedition to the Levant, Egypt and Cyprus (see Table 3 for the itinerary) to collect mainly insect specimens (DRAESEKE 1957, HORN et al. 1990: 235). Two years later, in 1887, he embarked on a second collecting trip to Yemen (incl. the island of Socotra; Table 3) where he apparently met with the German explorer Friedrich BOHNDORFF (1848–1894) (cf. VON HAUER 1888: 30). Except for the two aforementioned trips, no other expedition outside Europe undertaken by LEUTHNER is recorded in the literature. Sometime before 1890, he became one of two curators of Paul RICHTER’s (1841–1891) Coleoptera collection in Berlin, an appointment he held probably until this year (HORN & KAHLE 1937: 402). In the same year, LEUTHNER moved to St. Gallen and started to work there as a dentist (WARTMANN 1891: 43). Beside his main occupation, he also became an active member of the St. Gallen Natural History Society. According to the only somewhat longer obituary he died on 25 June 1918 in destitution in St. Gallen (STEINMANN 1919: 65).

APPENDIX 2

Unpublished sources

The following list gives an overview of the unpublished archival sources we evaluated for this contribution. The modern specimen catalogues, file cards and labels are not included. AV = Acquisitions-Verzeichnis; ZK = Zettel-Katalog

NMW (1. Zoologische Abteilung, Mammal collection)

[AV] Säugetiere. Akquisitionen 1806–1830 “Consignationes specificae officiales collectionis mammalium ab anno 1806 ad acquisitionum singularum ab 1806 usque ad 1824” [Official specific records of the mammal collection in the year 1806 and the individual accessions from 1806 till 1824]

Leaf 94: 1826/I “Vom königl[ich]. zoologischen Museum in Berlin durch Kauf” [Bought from the Royal Zoological Museum in Berlin] (Fig. 2)

[AV] Säugetiere. Akquisitionen 1831–1849

Leaf 14: 1832/II “Von Herrn Frank aus Leipzig durch Kauf” [Bought from Mr. [J. H.] FRANK in Leipzig]

Leaf 12: 1832/VI “Von der kais[erlichen]. Akademie der Wissenschaften zum Geschenk erhalten. Gesammelt von Dr. Heuglin” [Donated by the Royal Academy of Sciences [in Vienna]. Collected by Dr. [Theodor] HEUGLIN]

Leaf 30: 1839/VI “Von Herrn Kotschy aus Egypten durch Ankauf” [Bought from Mr. Theodor KOTSCHY from Egypt]

Leaf 134: 1845/VI “Von Herrn Theodor Kotschy durch Ankauf” [Bought from Mr. Theodor KOTSCHY] (Fig. 5)

[AV] Säugetiere. Akquisitionen 1880–1890

Leaf 101: 1886/IV “Von Herrn Dr. Leuthner aus Syrien von dessen Reise nach Syrien” [From Dr. [Franz Josef] LEUTHNER from Syria from his journey to Syria] (Fig. 7)

ZK 2 Chiroptera, Insectivora

Unnumbered loose leaf: “*Taphozous nudiventris* Rüpp.” (Entries of specimens on verso)

[ZK] “Säugethiere in Weingeist”

Unnumbered loose leaf: “*Taphozous nudiventris* Cretschm. [sic]” (At present filed in ZK 2 together with the unnumbered leaf: “*Taphozous nudiventris* Rüpp.”; entries of specimens on recto)

NMW (2. Zoologische Abteilung, Neuropterida-Orthopteroidea-Insecta varia collection)

[BRUNNER VON WATTENWYL] “Verzeichniss meiner Sammlung [nos.] 12625–15694”

(Catalogue of Carl BRUNNER VON WATTENWYL’s Orthoptera collection for the years 1879–1885; unpaginated; specimens from F. J. LEUTHNER listed as numbers 15656–15694)

[BRUNNER VON WATTENWYL] “Verzeichniss meiner Sammlung [nos.] 15695–21987”

(Catalogue of Carl BRUNNER VON WATTENWYL’s Orthoptera collection for the years 1885–1898; unpaginated; specimens from F. J. LEUTHNER listed as numbers 15695–15799 [Cyprus, Egypt, Levant] and 16623–16633 [“Aden”; “im Febr[uar]. gesammelt”])

“Fundorte der Sammlung von Dr. Leuthner”

(Loose leaf laid in “Verzeichniss meiner Sammlung [no.] 12625–15694”; information on LEUTHNER’s field labels)

ZMB (Historische Bild- u. Schriftgutsammlungen, Bestand: Zool. Mus.)

S I, HEMPRICH & EHRENBERG III

Leaves 181–185 “Verzeichniss der Gegenstände, welche die Doctoren Ehrenberg und Hemprich im Jahr 1824, in Arabien und Syrien gesammelt und in ihrer neunten (8ten) [sic!] Sendung überschickt haben”
Entries of bats (listed as numbers 114–[1]45) are on leaf 182v (Table 2, Fig. 3).

Table 3. Known collecting localities of Franz Josef LEUTHNER during his expeditions to the Levant (1885, with K. M. HELLER) and to southern Arabia (1887, probably with F. BOHNDORFF). Legend: FL = field label (i.e. a piece of differently coloured and/or textured paper) of pinned insect specimens used by LEUTHNER according to BRUNNER VON WATTENWYL's list for the material from the 1885 collecting expedition (6, footnote 4) Tab. 3. Známé lokality sběrů Franze Josefa LEUTHNERA na jeho expedici do Levantu (1885, společně s K. M. HELLEREM) a do jižní Arabie (1887, pravděpodobně s F. BOHNDORFFEM). Vysvětlivky: FL = lokální lístek (tj. kousek odlišně zbarveného či silného papíru) příspěvlených jedinců hmyzu použitá LEUTHNEREM podle seznamu materiálu BRUNNERA VON WATTENWYL z expedice roku 1885

date	LEUTHNER's locality ^a lokalita LEUTHNERA	NGA locality ^b lokalita podle NGA (2016)	coordinates ^b souřadnice	FL ^c	source(s) ^d
Levant 1885					
March	“Cypern” ^e	Cyprus	–	–	4, 5
[March?]	Cairo	Cairo / Al Qāhirah, Egypt	31° 46' N, 35° 14' E	–	5, 6
March	“Yafa, Palaestina” ^f	Yafa, Israel	32° 02' N, 34° 45' E	flesh coloured	4-6
March	“Jerusal[em].” ^g	Yerushalayim / Al Quds, Israel	31° 47' N, 35° 14' E	–	4-6
[March/April]	Saida	Saida, Lebanon	33° 33' N, 35° 22' E	dark blue	4-6
April	“Beirut / Beirut, Syrien” ^h	Beirut / Beyrouth, Lebanon	33° 53' N, 35° 29' E	light blue	4-6
[April/May]	Tripolis	Trāblous, Lebanon	34° 26' N, 35° 50' E	–	5
May, June	“Lādikiye, N[ord]. Syrien” ⁱ	Al Ladhīqiyah, Syria	35° 31' N, 35° 47' E	white or no FL	4-6
[May/June]	Gebellie	Rab' ah / Kibīfīyah, Syria	35° 47' N, 36° 02' E	grey kraft paper	4-6
June	“Djebel Akra, N[ord]. Syrien” ^j	Jabal al Aqra' / Kel Dağ, Turkey	35° 57' N, 35° 58' E	–	6
June	“Akbez, N[ord]. Syrien” ^k	Akbez, Turkey	36° 51' N, 36° 31' E	red blotting paper	5, 6
[June]	Alexandrette	İskenderun, Turkey	36° 35' N, 36° 10' E	–	1, 6
Arabia 1887					
February	Aden	Aden / 'Adan, Yemen	12° 50' N, 44° 55' E	–	2, 5
	Sokotra	Socotra / Suqūṭrā, Yemen	–	–	3

^a The spelling of place names, as applied by Leuthner on his original insect specimen labels, is indicated by double quotes. Footnotes identify the respective specimens from the NMW entomology collections (under the current taxonomic identification, number of multiple specimens in brackets). No attempt was made to systematically record all of Leuthner's insect specimens currently held by the NMW, instead we tried to include representative samples from as many localities as possible. However, for several of the localities (i.e. Al Qāhīrah, Saīda, Trāblous, Rabī'ah/Kibīfīyah, Iskenderun, 'Adan, Suqītrā) reportedly visited by LEUTHNER, no respective specimens were found in the NMW collections. Spellings other than the ones listed in double quotes are taken from the cited sources.

^b Spelling of toponyms and coordinates follow NGA (2016).

^c Material from some localities seems to have been stored in paper tubes rather than pinned upon Leuthners return. From Brunner von Wattenwyl's list (6, footnote ^a) it seems likely that Leuthner stored specimens from different localities in tubes made from different materials and/or with additional marks on them. According to the aforementioned list, the specimens from the following localities were stored in different kinds of paper tubes: Al Qāhīrah (yellow straw paper (consistently?) labelled "Nil" [= Nile] or "p" [= pyramids]), Yafo (grey blotting paper labelled "j"), Yerushalayim / Al Quds (unlabelled grey blotting paper), Jabal al Aqra' / Kel Dağ (grey blotting paper labelled "AO" [for the whole mountain] or Armenian newspaper [for the peak]).

^d Sources other than collector's labels of insect specimens in the NMW collected by LEUTHNER. Published sources: 1, HELLER (1885); 2, HORN (1892); 3, HORN (1926); – Unpublished sources: 4, BRUNNER VON WATTENWYL C. [1879–1885]: *Verzeichniss meiner Sammlung* [no.] 12625–15694; 5, BRUNNER VON WATTENWYL C. [1885–1898]: *Verzeichniss meiner Sammlung* [no.] 15695–21987; 6, BRUNNER VON WATTENWYL C. [c. 1885]: *Fundorte der Sammlung von Dr. Leuthner*.

^e Diptera: *Eristalis* sp.

^f Diptera: *Eristalis* sp. (3), *Nemestrinus ater*.

^g Diptera: *Bibio* sp. (4), *Eristalis* sp.

^h Diptera: *Cryptolucilia* sp. (3), *Eristalis* sp. (2). Hymenoptera: *Polistes gallicus*

ⁱ Diptera: *Eristalis* sp. (3), *Tabanus decorus* (5), *T. erberi*. Hymenoptera: *Agathis albanica* (3), *Podalirius turcomanicus* (2), *Proxyclopa olivieri*, *Xylocopa violacea*

^j Diptera: *Eristalis* sp., *Hermoneura obscura* (2), *Merodon hirsutus* (7). Hymenoptera: *Megascolia maculata* (2), *Podalirius robustus* (2), *Scolia fuciformis*

^k Lepidoptera: *Ematheudes varicella*.