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AUTHENTICITY IN NATURAL HISTORY COLLECTIONS: REFLECTIONS FROM A ZOOLOGICAL RESEARCH PERSPECTIVE

A MATTER OF PERCEPTION

A major attraction of museums obviously lies in providing visitors with the opportunity to get in touch with original objects. Museums seek to touch visitors' emotions by emphasizing the experience of »authenticity« in their exhibitions, despite the broad and quite subjective connotations of the term[1]. While such promotion is a recurring element of public relations for most museums, natural history museums do not usually use the authenticity of their scientific collections to draw in visitors. For most natural history museums, the total number of specimens in their collections significantly outnumbers those on display at any given time, making them more valuable as behind-the-scenes research resources for scientific scholars instead. However, it may be a misinterpretation to assume that the numerous objects not on display in scientific collections are less »authentic« than their few selected counterparts filling exhibition halls. Instead, we should ask if maybe a different comprehension of authenticity exists among biologists. Therefore, I would like to explain the perception of authenticity in natural history collections from a researcher's perspective.

SPECIMEN AUTHENTICITY IN NATURAL HISTORY MUSEUMS

Research in natural history museum collections comprises many diverse intellectual approaches, practical techniques and analytical methods. Specimen-based research, i. e. all scientific work revolving around preserved biological specimens, usually assesses variants of individual characteristics ranging from external features to molecular constitution.

In any case, scientific work with a preserved object usually requires verification of its identity first. Such identification guarantees the correct temporal and spatial association of an object in its biological and historical context. Depending on the focus of your work, you might be interested either in its individual identity, its taxonomic identity or its identity within a subset of a specific collection – or in all of this at the same time. So what are these three kinds of identity?

First, individual identity means, to put it simply, to ensure that the object in your hand is the one you are looking for. Since there are no entirely identical organisms in nature, each preserved object in a natural history collection likewise represents a unique individual. This is in contrast to non-natural collections, where different objects could, at least potentially, be completely identical: man-made artefacts could have been produced serially, whereas biological individuals are irreplaceable.

Second, taxonomic identity refers to the biological classification based on an individual object's relatedness to other members of the same group (e. g. a species or a family). Proper taxonomic identification is the prerequisite for biologically meaningful comparisons within and between such groups. It is therefore no surprise that a precise classification of a preserved specimen should not only reflect its evolutionary background, but that it also forms the basic organizing principle of biological scientific collections.

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Fig. 1 A glimpse at the ornithological collection of the Zoologisches Forschungsmuseum Alexander Koenig in Bonn. – Scientific collections like these often store numerous individuals of the same kind (taxon) to account for the character variation in space and time that makes each individual unique. – (Photo T. Töpfer).

Third, the association of an object within a subset of a certain collection or collection event is particularly important in historical studies because it is the temporal overlap that ensures its correct assignment with other specimens. Here, the information necessary to correctly identify an object goes beyond that of the two aforementioned methods and requires meta-data that cannot be gathered from studying external appearance alone.

In any case, the identification process relies on the data associated with a preserved specimen. The more extensive such information is, the easier its identification. Once the identification of an object has been proven, researchers might well consider a specimen »authentic« in one respect or another. As a consequence of different research foci, however, the determination of a specimen's authenticity might vary: for example, a specimen might be authentic in the light of its whereabouts but does not have to be authentic in terms of its taxonomic identity at the same time and so on.

THE SPECIMEN AS A BIOLOGICAL VOUCHER

As mentioned above, biological individuals are never identical. Instead, they represent a unique snapshot within a range of character variations in a population at a given time and place[2]. Therefore, preserved voucher specimens act as evidence of natural variation in time and space (**fig. 1**). This non-interchangeability of natural history collection items explains their scientific value and makes nonsense of the historically practised habit of relinquishing biological »duplicates«.

In a previous classification of museum objects, Th. Thiemeyer assigned no value of authenticity to biological specimens[3], claiming that they act merely as placeholders for abstract categories. Although this may hold true for the very specific purpose of a biosystematics display in an exhibition, where single specimens represent an entirety as a necessary means of simplification, this is definitely not the case in a scientific collection. Moreover, the idea of the dispensability of a specimen once all information has been derived from it[4] is inapplicable in biological research because the individuality of each specimen makes it an ongoing source of information.

In a broader context, as suggested by Th. Thiemeyer himself[5], specimens may be assigned to several different categories of museum objects depending on the research focus in question. Thus, a specimen could be regarded as authentic based solely on the way it was preserved – an appealing interface between »specimen« and »artefact«[6]. Taking this suggestion into consideration, an individual biological specimen would be no less authentic than any other well-dated museum object, man-made or not.

THE »HYBRID AUTHENTICITY« OF BIOLOGICAL TYPE SPECIMENS

An important aspect of biological specimens in scientific collections is that they serve a twofold function: a concrete one as individual voucher specimens and an ideographic one as representatives of abstract biological conceptions. In consequence, some specimens may be characterised by a particular »hybrid authenticity«. This is most pronounced among so-called type specimens, individuals chosen to represent a whole taxon as bearers of scientific names (fig. 2).

Fig. 2 The type specimen of the Green-headed Oriole *Oriolus chlorocephalus speculifer* in the ornithological collection of the Zoologisches Forschungsmuseum Alexander Koenig in Bonn. – Type specimens represent physical evidence for scientific naming and as such are subject to a hybrid authenticity: a concrete one as individual voucher specimens and an ideographic one as representatives of abstract biological conceptions. – (Photo T. Töpfer).

Scientific naming and zoological nomenclature is highly regulated and subject to many conventions laid down in an internationally agreed Code of Zoological Nomenclature[7]. One of its key aspects is to preserve a type specimen for every scientific name in a zoological collection. Since a scientific name designates a certain zoological entity with a defined delimitation (a »taxon«), it is obvious that such a type specimen likewise represents only an individual sample of the whole taxon's character variability. However, its documented membership in a particular population at a given time is crucial for separating taxa and assessing its taxonomic identity (i. e. a particular name), allowing for a later revision of its status, if necessary[8]. Type specimens remain permanently linked to a particular scientific name, even if the name is no longer in use by the contemporary scientific community. Since the type status is imperishable as long as the type specimen exists, even massively damaged specimens[9] will retain their integrity and thus their authenticity as types.

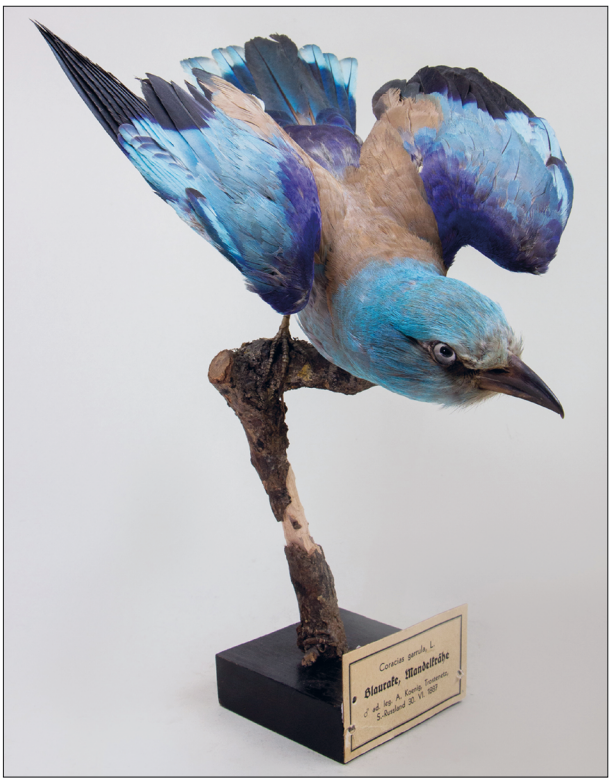

Fig. 3 A European Roller *Coracias garrulus* in the ornithological collection of the Zoologisches Forschungsmuseum Alexander Koenig (ZFMK) in Bonn. – The bird was obtained personally by the museum's founder Alexander Koenig during a hunting trip to Russia in 1887 (Böhme 2015). Therefore, its historical context makes it interesting beyond its function as a biological voucher specimen and conveys an authentic insight into the museum's early days. – (Photo M. Wittenhorst, ZFMK).

THE FUTURE OF SCIENTIFIC SPECIMEN AUTHENTICITY

As stated above, the amount and quality of data associated with a specimen is crucial for its identification. In its traditional manifestation, specimen data are often confined to a limited set of information (e. g. locality and collection dates). Such information is usually more or less directly attached to the specimen itself through labels or notes on pedestals and may be repeated or partly complemented by additional data provided in inventory books, field notebooks or even letters. As there are characteristic handwritings and

label styles, such additional meta-data is of particular importance when reconstructing a specimen's historical background or subset identity[10]. Taken together, the direct combination of specimen and data enhances the perception of a specimen's authenticity (**fig. 3**).

Nonetheless, the ability to store data digitally offers many options to extend the amount of information belonging to specimens and as such allows easier identification of individual objects. It is thus to be expected that routine digitisation of natural history collection items and a broadened portfolio of associated digital data (photographs, CT scans, DNA sequences etc.) will make a single object even more valuable from a scientific perspective[11]. On the other hand, the effect on specimen authenticity is unlikely to be dramatic. As long as specimen authenticity is mainly perceived as directly linked to an object, natural history items will, first and foremost, remain physical vouchers of biological reality. Their digital representation will enhance their importance but not replace the objects as such – unless derivatives of digital data (e. g. 3D prints of scanned specimens as models) attain the status of discrete objects. In this case, they would be subject to the same considerations of authenticity as any other man-made duplication[12].

A PRAGMATIC VIEW ON AUTHENTICITY IN ZOOLOGICAL RESEARCH

In practical specimen-based zoological research, the indistinct concept of authenticity arguably plays a secondary role to the importance of individuals, populations and species. In the majority of cases, researchers studying collections tend to apply a view that is focused on the individual specimen and its identity within a given group of organisms. This makes the aforementioned precision in specimen identification generally more important than the less clearly defined considerations of authenticity as a »container term[13].

However, the authenticity and identity of a biological specimen are often largely congruent and only partly exclusive. Biological specimens are collected to serve as representatives of biological reality, but they also function as ideograms of abstract conceptions, such as species concepts. As a result, the sometimes devotional treatment of a particular specimen's authenticity (e. g. specimens collected by renowned personalities) may more commonly be replaced by a rather pragmatic acknowledgement of its identity. Such consideration does not belittle the scientific or societal importance of specimens, particularly historical ones. To the contrary, it adds additional value to an object by broadening the perception of its relevance, since rare is the researcher who is not susceptible to some emotional commitment to his or her study objects – and thus to their authenticity.

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Notes

1) Sabrow/Saupe 2016b. – Rehling/Paulmann 2016. – Ohl 2017.
2) Ohl 2017. – Töpfer 2018.
3) Thiemeyer 2016.
4) Thiemeyer 2016.
5) Thiemeyer 2016.
6) Ohl 2017.
7) International Commission on Zoological Nomenclature 1999.
8) Ohl 2017.
9) E.g. the type specimen of the Long-tailed Rosefinch *Uragus sibiricus* pictured in Frahnert 2015.
10) Cf. Ebert/Saalmann 2016.
11) Webster 2017. – Töpfer 2019.
12) Sabrow/Saupe 2016b. – Rehling/Paulmann 2016.
13) Rehling/Paulmann 2016.

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Zusammenfassung / Summary

Authentizität in naturkundlichen Sammlungen: Betrachtungen aus zoologischer Forschungsperspektive

In den meisten Naturkundemuseen übertrifft die Zahl der in den Sammlungen aufbewahrten Exemplare jene in den Ausstellungen um ein Vielfaches, was sie zu einer wertvollen Forschungsressource für Wissenschaftler macht. Im Gegensatz zu den Ausstellungen, wo Authentizität ein wesentliches Element darstellt, um Besucher anzuziehen, wird Authentizität in Sammlungen anders wahrgenommen: In erster Linie dienen die Präparate hier als Belege natürlicher Variation in Raum und Zeit. Ihre Nicht-Austauschbarkeit als biologische Individuen (Identität) erklärt, warum sie zudem oftmals eine Doppelfunktion erfüllen, nämlich eine konkrete als individuelle Belege für die Variabilität von Populationen und eine ideografische als Stellvertreter abstrakter biologischer Konzeptionen (z.B. Typus-Exemplare). Dennoch sind Identität und Authentizität biologischer Präparate oftmals weitestgehend kongruent und schließen sich nur teilweise aus.

Authenticity in Natural History Collections: Reflections from a Zoological Research Perspective

In most natural history museums, the total number of specimens in the collections significantly outnumbers those on display, making them valuable as behind-the-scenes research resources for scientific scholars. In contrast to museum exhibitions, where authenticity is a major element of visitor attraction, authenticity in collections is perceived differently: first and foremost, preserved specimens act as evidence of natural variation in time and space. Their non-interchangeability as biological individuals (identity) explains why they may serve a twofold function, a concrete one as individual voucher specimens and an ideographic one as representatives of abstract biological conceptions (e.g. type specimens). However, the authenticity and identity of a biological specimen are often largely congruent and only partly exclusive.