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The Italian contribution to zoological taxonomy until the 19th century

ABSTRACT

In Roman times in the antiquity, and following a gap of some 1200 years again in the Renaissance, the Italian peninsula hosted significant contributions to scientific zoology, taxonomy representing an important part of this science. This study analyses the Italian contribution to Linnean zoological nomenclature until around 1800 in relation to general European trends. In contrast to other European regions such as Spain, France, the Netherlands or Scandinavia, Italy provided a relatively continuous contribution to zoological nomenclature without gaps. The role of various men and women who provided outstanding contributions to the advancement of taxonomic science is briefly discussed, with various Italian authors ranging in the top group. This study contains also a language analysis. Initially Italian taxonomic contributions appeared mostly in Latin, basically also a language that was developed in what is today Italy. The modern Italian language slowly gained increasing importance in the 18th and 19th centuries. The scientific significance of Latin declined continuously after 1700 when studies were increasingly published in modern European languages. In the mid-19th century taxonomic publications appeared almost exclusively in five languages: German, French, Italian, English with increasing trend, and Latin with declining trend. Special attention is given to the development of scientific collection management and preservation of original material which is important as type material for zoological nomenclature. It is known that in central Europe much pre-Linnean type material has been lost, but in Italy a relatively high proportion has been preserved and is still accessible for study today. This applies in particular to material that after the death of authors was handed over to scientific institutions. My contribution intends to draw attention to the importance of preserving this outstanding part of the Italian scientific heritage of taking all necessary measures to maintain these precious collections in good conditions for the future.

Keywords: Taxonomy, Italy, zoological nomenclature, scientific language, collection management.

When the Swedish naturalist and founder of modern scientific taxonomy Carl Linnaeus (1707-1778) established a new system of binominal names for animals and plants in the 1750s, he referred to hundreds of previously published works on zoology and botany, and extracted most information from there. In the zoological part of his 10th edition of "Systema Naturæ", Linnaeus (1758) presented more than 4,200 animal species with short diagnoses and 12,000 literature references citing some 350 previously published works. 11% of those works were published in Italy. Italy and the Italian language have always

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played an important role since the beginning of scientific zoological taxonomy in the Renaissance.

In a project of literature digitization executed between 2003 and 2011 at the University of Göttingen, aimed at providing copyright-free open access to early zoological literature (AnimalBase - Early Zoological Literature Online, www.animalbase.org), the published sources cited by Linnaeus (1758) in the form of cryptic abbreviations were deciphered and located in the Staats- und Universitätsbibliothek Göttingen or in remote libraries, digitized and made accessible online.

In a special project 274 books with an average number of 201 pages were digitized in 2010 in a collaborative project funded by the European Union from holdings of the University Library of Florence. In this cooperation many extremely rare and precious works were digitised, works that were rarely or in some cases nowhere present outside Italy. In many cases we did not find the titles in any German library. Since the access to pre-1900 original literature in Italian public libraries has become increasingly difficult for Italian researchers, this cooperative project was a great step to assist zoologists in facilitating bioscientific research on the Italian and southern European fauna.

Today digitized taxonomic literature is accessible at the Biodiversity Heritage Library (BHL, www.biodiversitylibrary.org) and the Internet Archive (archive.org), but their digital holdings reached considerable sizes only after 2007. AnimalBase was one of the first projects to digitize zoological literature. One side effect of the collaboration with Florence was a thorough view on the early Italian zoological literature. In the course of these efforts a relatively reliable list of the literature record relevant to zoological nomenclature was accumulated. It is possible to extract detailed information on the impact of Italian contributors to zoological taxonomy from these scanlist analyses.

Literature of the antiquity

The earliest zoological works cited by Linnaeus (1758) were those of Artistotle (around 350 BC, “History of Animals”) and Pliny the Elder (AD 77, “Natural History”). At one instance Linnaeus also referred to Caesar’s account “Commentarii de Bello Gallico”, published in eight volumes between 58 and 49 BC.

Pliny (AD 23-79) was born in Como and worked at the Roman naval base in Miseno near Naples. His “Natural History” was divided into 37 books, of which the first ten books were revised by himself and published in AD 77. Pliny died in AD 79 during the eruption of Vesuvius, so the other books were published posthumously by his nephew Pliny the Younger (61-c. 113). In his work Pliny established some fundamental principles of scholarly works, such as the referencing of some 500 previously published original sources and an index. Zoology was covered in books 8 to 11.

Another characteristic of Pliny’s work was that it was explicitly written for common people, including farmers, as he explained in his preface. This note in the preface is commonly taken to suggest that the literacy rate in the Roman world was relatively high, and that at least occasionally farmers were able to read, a view confirmed by modern research (Bergmeier. 2012). In this epoch such books were produced in large numbers in the form of papyrus scrolls, by copying and lecturing by hand, usually by slaves, widely distributed and sold by commercial editors and booksellers.

Loss of books in the late antiquity

In the following centuries a long gap followed, in which consulting published scientific knowledge was largely restricted to copied and translated works of relatively few Greek and Roman authors. In the course of some 250 years after AD 300 the largest part of the cultural heritage of classical antiquity got almost entirely lost. Of millions of books of probably more than 1 million published titles sold and distributed all over the Roman world in the antiquity, not a single original entire volume survived in a library. Most books before AD 100 were published in the form of papyrus scrolls. After AD 400 papryus scrolls were not used any more in Europe and only an extremely small part of the previously published literature was replaced by book-form codices made of parchment, a material based on animal skins (Albrecht, 1997). This was more easily available in Europe, but far more expensive. Papyrus is approximately as durable as parchment and can be conserved several centuries if appropriately stored and protected against humidity.

The transition from scrolls to codex format after 400 was rigorous. Information that was not copied and transcribed to codex format, was not preserved in libraries and got lost soon after its content was not regarded useful any more. This applied to libraries as well as to private literature collections.

The beginning of the loss of books in late antiquity was marked by a significant increase of illiteracy. After AD 400 literacy rates dropped dramatically to far below 1% in the European population. Due to the loss of demand, papyrus was hardly available in Europe any more from around AD 600 onwards. The result was an extremely reduced book production which decreased down to 10 books per year between 400 and 700, heavily contrasting the previous book production rates exceeding 10,000 books per year before 300.

The “Codices Latini Antiquiores” (CLA), a compilation project of preserved Latin manuscripts directed by E. A. Lowe from 1929 to 1969, recorded an average of one surviving book per year for the period 400-700 and estimated that the rate of loss for published works of this period ranged around 90% (so ten books per year might have been published).

Initially allmost all European works were published in Italy. Publishing in France began after 550, from 650 onwards books appeared also in Spain, Ireland and Great Britain. Publication activity in Germany and Switzerland began after 700.

The rate of loss of titles published before 350 was two orders of magnitude higher, only 0.1% of the books survived. This figure can be deduced from reliably recorded title numbers of preserved original accounts for the libraries of Constantinople (120,000 titles before AD 475) and Alexandria (700,000 scrolls in 240 BC, see also Parsons 1952), in relation to the low number of currently known 3,000 preserved antique texts, 1,000 of which were published in Latin.

The loss of books was directly associated with a loss of interest in books. In the following centuries literacy rates in Europe remained at extremely low levels. They increased slowly after 700 for several centuries. In 1300 they reached not much more than 1% in continental Europe and Britain (Cipolla, 1969; Cressy, 1977). The educational tradition in the Byzantine Empire and eastern Mediterranean, where access to Latin language and literature was lost around 600, suffered slightly less destructive breaks, there mainly caused by wars and invasions (Haldon, 1997), so that in this region at least a few more Greek works of the antiquity survived. The transition from papyrus scrolls to codices took also place in the Eastern Mediterranean, so that the ancient originals were also lost there.

All these developments may explain that Pliny's other numerous works were largely lost in this period. However his "Natural History" survived as it was copied and preserved over all the centuries until modern times. For centuries Pliny's "Natural History" served as one of the most important sources for consulting natural scientific knowledge. The previously published scientific works on which Pliny's compilation was based, in other words the primary literature of this epoch, did not survive.

Revival of natural sciences in the Renaissance

The advancement of scientific knowledge in the Renaissance is directly associated with the development of movable type printing in Mainz (Germany) by Johannes Gutenberg around 1452. Type printing press spread from Mainz to other towns, the first being Bamberg (1457), Strasbourg (1460), Cologne (c. 1465) and Augsburg (1468). The first printing press in Italy was established in 1465 by two German printers associated with Gutenberg who had emigrated to Subiaco near Rome, and who subsequently moved to Rome in 1467 where they established another printing press (Peckham 1940). Another printer Johann von Speyer emigrated in 1468 from Mainz to Venice and established the first printing press there. Within a few years Italy, and in particular Venice, became the most important centre of book printing in Europe. Until 1475 printing presses operated in 15 Italian cities and towns. In 1500 this number had increased to 77 (Borsa, 1977). One century later nearly 3,000 printing shops were located in Italy, 30% of them were concentrated in Venice. The business of book printing increased enormeously, but all this however cannot blur the fact that it took European libraries until the 19th century to reach again the volume number levels of libraries in the antiquity.

The restart of studying biodiversity in Europe began slowly. One of the first steps consisted in a wider distribution of the preserved ancient knowledge. In 1469 Johann von Speyer printed Pliny's "Natural History" in Venice, it was one of the first ancient European books to be printed (Plinius, 1469). Latin translations of Aristotle's "History of Animals" were printed in 1476. Its Greek original text was printed in Venice in 1497. It was only after 1500 that naturalists began to publish their own new studies and restarted contributing new knowledge to the advancement of zoological science.

Among the earliest books published in Italy on animal sciences were works by Niccolò Leoniceno (1518, Bologna, on snakes), Pietro Andrea Mattioli (1554, Venice, a botanical work), Hippolito Salviani (1558, Rome, on fishes), Baldo Angelo Abbati (1589, Urbino, on snakes), Giovanni Giovane (1589, Naples, on natural history) and Fabio Colonna (1592, Naples, mainly on botany).

The number of new titles increased rapidly. It is difficult to sort out which works were relevant for zoological taxonomy. One relatively easy approach is to sort the Linnean 12,000 literature references by language and country of publication (Fig. 1). Some Italian pre-1600 books ranged among the earliest works cited by Linnaeus (1758), who among others referred to Mattioli (1554, 10 citations) and Salviani (1558, 14 citations).

Some of the earliest contributions in this epoch came from France. Between 1551 and 1557 Pierre Belon (1517-1564) published several zoological works of considerable value. Linnaeus (1758) referred 88 times to Belon's books. Another French naturalist in this epoch was Guillaume Rondelet (1507-1566) who published on fishes and marine animals (Rondelet, 1554, 1555). Rondelet was cited 66 times by Linnaeus. It took more than one century until the next taxonomically relevant publications were published in French language.

In the entire period 1500-1600 Linnaeus referred to a total of 40 published works. Some 30% of those appeared in Italy, another 30% in France and Switzerland, respectively. The remaining 10% were published in Spain, Germany and Belgium. While most French works in this epoch were published in French language and those from Spain in Spanish, the books published in Italy and Switzerland were almost exclusively published in Latin. Printers in Italy and Switzerland had customers all over Europe, which explains why most books appeared in Latin.

Spanish impact of the 16th century

In Spain Spanish had replaced Latin as the language used for scientific purposes since the 13th century. In the 12th century skilled persons at Toledo began translating important Arabic and Hebrew works and Arabic translations of Greek scientific works which had not survived the preceding epochs in Europe. This was the restart of scientific studies in medieval Europe. Alfonso X of Castile (1221-1284) decided to abandon Latin as the target language and supported translations into a local form of Castilian, which later developed into the Spanish written standard language. Spain and in particular Toledo became the European center of scientific studies in these times, mainly because of religious tolerance and the meeting and cooperation of highly educated Muslims, Jews and Christians engaged in the translations.

In the 16th century of the Renaissance Spain's leading position in the scientific world had already passed away. Jews had been expelled from Spain in 1492, Muslims were outlawed in 1502. This was apparently associated with an unprecedented brain drain in this country from which Spain did not recover for centuries. Spain's contribution to zoological taxonomy after 1500 was minute when compared to the Italian record, with only very few publications until 1800. Taxonomically relevant Spanish publications cited by Linnaeus were largely restricted to reports of new discoveries in the Americas (Oviedo y Valdez, 1526, 1535, 1547).

Curiosity cabinets as predecessors of natural history collections

One of the first natural history works published in Italian language was "Dell'historia naturale, libri XVIII" by Ferrante Imperato (1599), an apothecary of Naples. His book of 791 pages contained 119 woodcut illustrations of his cabinet of curiosities. Due to continued high demand the work was reprinted in 1672 (in Venice) and 1695 (in Germany, in a Latin translation). Besides of being the first work on natural history published entirely in Italian, Imperato's work represented the first publication of displayed natural history collections, a new category of approach to natural history that appreared in the Renaissance. Such cabinets of curiosities were precursors to natural history museums and were compiled by members of leading classes, by prosperous citizens or merchants, either for more representational or more scientific functions. Linnaeus (1758) referred to many illustrated cabinet catalogues. The most significant contribution was certainly the published compilation of Albertus Seba's cabinet in Amsterdam (Seba, 1734, 1735), to which Linnaeus (1758) referred 320 times. Imperato's (1599) work was cited six times by Linnaeus.

The contribution of these cabinets to biodiversity was probably less reflected in the scientific value of their systematic arrangement and scope, but rather in their illustrated publications. The published illustrations helped taxonomists understanding how many different species were already known at the time. Taxonomists like Linnaeus were able to

base scientific animal names on reliably figured specimens without the need of having seen them in nature.

This has also implications for the established names today. The Principle of Typification in the International Code of Zoological Nomenclature establishes that the depicted material of those cited references forms part of the name bearing type material of the nominal species for which they were cited (ICZN, 1999, Art. 72.4.1). The problem with most cabinets accumulated by private persons such as Imperato (1525-1615) or Seba (1665-1736) is that the interest in preserving the collected material ceased often one or two generations later. Seba's precious collection was auctioned in 1752, small parts of it were purchased by the Academy of Sciences in Saint Petersburg, but for its largest part no records remained. Imperato's collection is estimated to have included up to 35,000 specimens. Most of it was lost in the mid-17th century when the collection material was dispersed by descendants.

Taxonomic advances after 1550

Artistotle's and Pliny's works continued to be the most important primary sources of knowledge until the mid-1500s. After 1550 modern naturalists began publishing their own monumental works, still heavily influenced by Aristotle and Pliny. The most significant impact in this epoch had certainly Conrad Gessner and Ulisse Aldrovandi. Both were later considered as the founders of modern zoology.

The Swiss naturalist Conrad Gessner (1516-1565) published a 4500 page multivolume encyclopedia "Historia Animalium" (Gessner, 1551 to 1558), which was rejected and set on the list of prohibited books by the Roman Catholic Church because Gessner had Protestant religion. The censorship remained without impact, Gessner's works gained outstanding importance in zoological taxonomy and were still reprinted decades after his death. Some works appeared posthumously, also in German language. Gessner's approach was primarily bibliographical. He attempted to describe all animals known and provided an extensive bibliography on natural history literature, mainly based on classical and medieval sources, but also containing information on animals of recently discovered regions in the north and the Americas. Linnaeus (1758) referred 276 times to Gessner's series, of which 156 citations referred to the third volume on birds (Gessner, 1555).

Ulisse Aldrovandi (1522-1605) from Bologna followed a slightly different approach. He was known for his detailed systematic studies which had great influence on the advancement of modern zoological science. With his students he organized excursions to explore and study fauna and flora of remote locations such as the island of Elba or Monte Baldo near Lago di Garda. In 1568 Aldrovandi founded the Botanical Garden of Bologna, one of the first botanical gardens associated with a research institution. The first university botanical garden had been established in 1544 in Pisa.

During his career Aldrovandi assembled a large cabinet of curiosities, comprising several thousand specimens, which after his dead was inherited by public university institutions. From 1742 onwards that collection was stored in the Palazzo Poggi in Bologna which kept the collection together until the 19th century, when specimens were distributed among various institutions.

Without the published record Aldrovandi would not have had the impact he had on zoological taxonomy. Aldrovandi wrote many hundred books and essays, however only a few were published during his lifetime, from 1599 onwards. All his taxonomically relevant zoological works were published in Latin.

In his work Aldrovandi was assisted by his wife and research partner Francesca Fontana who located literature resources, edited his books and wrote sections of their content. Aldrovandi himself would have preferred his wife to remain occupied with domestic affairs, but apparently he was not extraordinarily successful in this respect. She was a lady of high education herself, firm in Latin, wrote the preface to his posthumously published book on bloodless animals (Aldrovandi, 1606) and controlled access to his museum for ten years after his death (Le-May Sheffield, 2004). The contribution to zoological taxonomy under Ulisse Aldrovandi's name should rather be understood as a collaborative effort of two researchers. Linnaeus (1758) referred 351 times to eleven books written by Aldrovandi, of which 231 citations referred to his book on birds (Aldrovandi, 1599).

Trends after 1600

The total number of taxonomically relevant publications per year did not increase very much until the mid-18th century. By 1550 the rate had been at 0.4 publications per year, this increased slowly to 1.6 until 1725 and 4.0 until 1750. After 1750 this rate increased by the factor of 10 within a few decades.

The impact of Italian works on zoological taxonomy ranged at 60% of all taxonomic publications between 1600 and 1650, also because Aldrovandi's writings were subsequently published until 1649. In the same period various German and Dutch authors began to publish taxonomically relevant works, in this epoch still almost exclusively in Latin. After 1650 the number of British contributions increased suddenly with a series of taxonomically important illustrated works published by John Ray (1627-1705), Francis Willughby (1635-1672), Martin Lister (1639-1712) (assisted by his daughters Anne and Susanna Lister), and James Petiver (c. 1665-1718). Also those volumes were mostly published in Latin, Linnaeus (1758) referred more than 1700 times to them.

An important Italian work for zoological nomenclature in the second half of the 17th century was published by the Jesuit scholar Filippo Bonanni (1638-1723) as an illustrated guide for shell collectors, first in Italian, later in Latin (Bonanni, 1681, 1684). Linnaeus (1758) referred 170 times to these figures, from this point of view the third most important Italian reference for Linnaeus after Gualtieri (1742) and Aldrovandi's (1599) bird volume. Bonanni worked in Rome and became curator of the Museum Kircherianum in 1698, founded by the German Jesuit Athanasius Kircher (1602-1680) in Rome as one of the earliest museums arranged as such with scientific scope. Since 1651 Kircher had accumulated one of the largest and most well-known cabinets of curiosity.

The conceptual idea of a museum in the modern sense had previously been realized in Ambras Castle in Innsbruck, where buildings were erected in 1570 and 1598 to host art collections of Archduke Ferdinand II of Further Austria (1529–1595). Kircher's museum had a broader and more scientifically directed scope. When Bonanni was appointed to take care of the collection, much material had already disappeared, as can be seen when comparing Kircher's own (Sepibus, 1678) and Bonanni's (1709) catalogues. The museum expanded in the following decades and remained in a well preserved state until the 20th century. In 1870 the ecclesiastical properties, to which the museum belonged, were expropriated by the state. After 1913 the museum was dissolved by order of the state and its material was finally dispersed among many foreign institutions. Thanks to the catalogues some of its original material can still be traced in those collections.

Towards modern taxonomic science in the 18th century

When looking at the scientific production in the 18th century a remarkable language shift can be observed in the published record. After 1700 Latin began to decline as the leading international scientific language and was subsequently replaced by a variety of modern languages, mainly German, English, Dutch, Italian and French. The proportion of Latin publications dropped below 50% after 1725, below 40% after 1750, below 30% after 1775 and ended up near 15% in 1800, when 85% of the scientific contributions were published in modern languages, including Swedish and Danish. While modern Spanish had already been standardized since the 1300s, other modern European languages in the 18th century were still in the process of developing a standard written form. This applied particularly to German, slightly less to French, English and Italian.

Between 1750 and 1800 approximately 40% of the works were published in German, while English and French were used for 10% of the taxonomic works. 3% of the authors published in Italian and Dutch, respectively. Next to Swedish (9%) and Danish (7%) only three additional modern languages can be recorded to have been used in taxonomically relevant publications before 1800 (Spanish, Icelandic and Russian), they ranged all together at 0.7% of 2000 publications counted in these 300 years.

In this epoch only very few scientists published in foreign modern languages. They either published in Latin, or in the local language. Swedish was exclusively used in Sweden, Danish only in Denmark, Italian only in Italy, Dutch only in the Netherlands. French and German were exceptions. French was occasionally used outside France, German by some authors outside German-speaking regions. Authors in Russia published either in Latin or German. French was often used as a second language in English and Dutch publications.

One of the first effects of Linnaeus's proposal of binominal names for animals in 1758 ("Systema Naturæ") was the sudden increase of taxonomically relevant works published in Sweden and Denmark. With "Systema Naturæ" in the background, a steadily increasing number of zoologists reported continuously more species to the pool of scientific knowledge. The number of 4,200 species known in 1758 increased to more than 60,000 in 1800. Publishing scientific information shifted steadily from monographs to a form of relatively short articles in scientific journals edited by academic institutions.

Scandinavian scientists were the first to learn quickly how to apply the new system. 22% of the taxonomically relevant publications in the second half of the 18th century appeared in Scandinavia. 45% of the taxonomic output came from Germany, Austria and Switzerland, 9% from Britain and 4% from Russia. France (8%) and the Netherlands (5%) require a closer analysis because the percentages as such are misleading.

The proportion of works published in Italy between 1750 and 1800 was 4.5% (3% in Italian, the rest in Latin), and showed a continuous low-level presence of taxonomic output without breaks. This marked a difference when compared with the output published in other countries such as the Netherlands and France.

Publications in the Netherlands had their peak between 1650 and 1750 (the average proportion was 19% before 1760) and declined reaching a level near 1% in the 1790s. Many Dutch works had a commercial background and consisted of precious high-quality copperplate engravings. Among the most outstanding examples, besides Seba's already mentioned curiosity cabinet catalogue, were Rumphius's (1705) "D'Amboinsche Rariteitkamer" (320 citations in Linnaeus, 1758) and Merians's various works on insects

(160 citations). Seba, Rumphius and Merian were German-born naturalists working in the Netherlands.

Rumphius (Georg Eberhard Rumpf, 1627-1702) was employed by the Dutch East India Company to serve as a merchant in Ambon, an island under Dutch administration of what is today Indonesia. Primarily interested in botany, he also accumulated a collection of seashells and crabs and sent a manuscript to the Netherlands for publication. Maria Sibylla Merian (1647-1717) was an entomologist and scientific illustrator and was unprecedented in having studied insects directly, in Europe and in Suriname, in particular their metamorphosis and host plant relationships. Assisted by her daughters Johanna and Dorothea, her illustrations had an extraordinary scientific quality, in particular her masterpiece "Metamorphosis insectorum Surinamensium" (Merian, 1705), certainly one of the most precious works of natural history. She also contributed as an engraver to Rumphius's work.

In France a special situation was provoked by Georges-Louis Leclerc Comte de Buffon (1707-1788) who did not accept the taxonomic classification proposed by Linnaeus (1758) and had so much influence in Paris that hardly any French author published Latin names compatible with the Linnean system. This had the effect that the number of French publications relevant for taxonomy and name-bearing types was very low after 1758. The French impact until 1788 was largely confined to works that used French animal names and were subsequently cited by Linnean authors outside France as sources of reference. Relatively quickly after Buffon's death in 1788 authors in Paris adopted the Linnean system, the level of French contribution to taxonomy exploded and passed a proportion of 30% of all taxonomic publications around 1810.

Italian impact on taxonomy in the 18th century

With ongoing time Italy observed a slowly increasing trend towards using Italian as the preferred language for publication. Some 60% of Italian authors still used Latin until 1800. This applied also to one of the most outstanding contributions to taxonomy published in Florence by Niccolò Gualtieri (1688-1744), who illustrated hundreds of shells of his collection in a book containing 110 plates (Gualtieri, 1742). Gualtieri was a physician in Florence, doctor of Gian Gastone de'Medici, Grand Duke of Tuscany (1671-1737). He got interested in molluscs in 1731, and after 1737 he worked as a professor at the University of Pisa. Linnaeus (1758) referred more than 400 times to Gualtieri's figures, more than to any other bibliographic source besides the two Linnean in-house references "Fauna Svecica" (Linnaeus, 1746, with 1040 references) and his still unpublished essay on Queen Louisa Ulrika's collection in her palace near Stockholm (Linné, 1764, with 470 references). These three publications alone accumulated 16% of the 12,000 references provided by Linnaeus (1758).

Gualtieri's collection was purchased in 1747 for what later became the Natural History Museum of the University of Pisa, which until today has conserved 700 samples of molluscan shells, many of them name-bearing types of Linnean names. Like in Aldrovandi's case it turned out fortunate to leave the collection in a scientific institution.

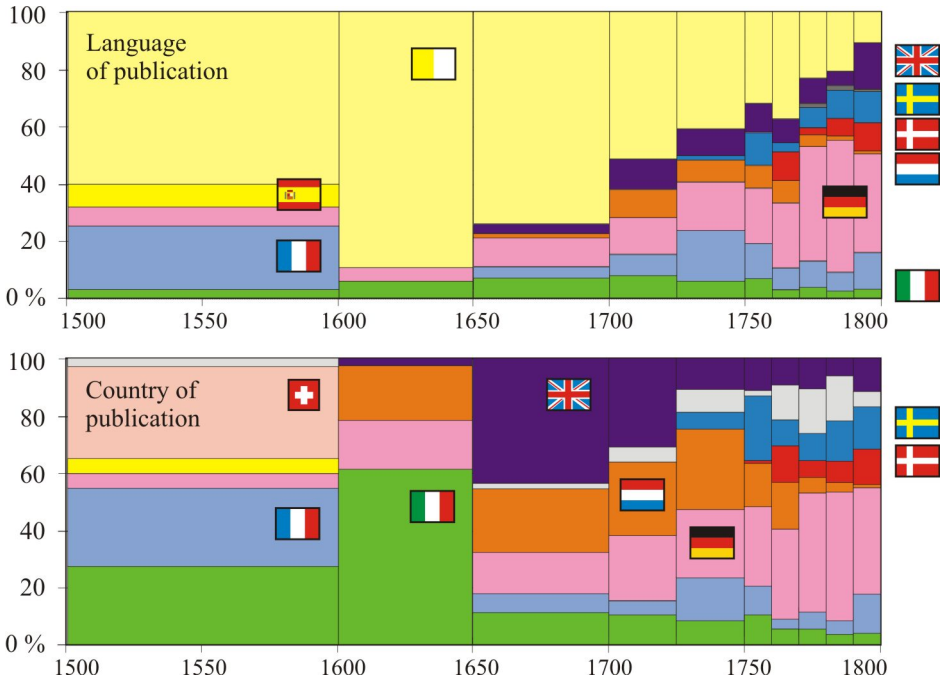

Fig. 1. Trends of contributions to zoological taxonomy until the end of 18th century. Languages and nations are indicated by flags.

After 1800 the proportion of contributions to taxonomy in Italian language increased not only in the relative language preference, which continued shifting away from Latin, but also in the number of works published in Italy. Italian taxonomic publications regained importance after 1820 and finally approached levels near 10% in the 1840s. Between 1800 and 1830 Italian had already become the 5th important language in taxonomy after German (maintaining a level of 30%), French (near 30% following a sharp increase after 1788), English (15% with increasing trend) and Latin (13% with declining trend). Swedish, Danish and Dutch dropped below 5% after 1810 and never regained significant importance.

So in the mid-19th century scientific taxonomy was almost exclusively published in five languages, Italian holding a stable proportion of near 10%. During the entire period between the late 1400s and 1850 we can observe a continuous presence of Italian authors in the published record. Italy has always been one of the most important European study centres since the beginning of biodiversity studies in the Renaissance of the 15th century. The country's heritage is worth to be preserved for the future.

RIASSUNTO

Il contributoitaliano alla tassonomia zoological fino al 19° secolo

In epoca romana, nell'antichità, e dopo un intervallo di circa 1200 anni nuovamente nel Rinascimento, la Penisola Italiana ha prodotto contributi significativi per la zoologia scientifica, in particolare con la tassonomia, che rappresenta una parte importante di questa scienza. Questo studio analizza il contributo italiano fornito alla nomenclatura zoologica linneana fino al 1800 circa, in relazione alle tendenze generali europee. A differenza di altre regioni europee come Spagna, Francia, Paesi Bassi o Scandinavia, l'Italia ha fornito un contributo relativamente continuo alla nomenclatura zoologica, senza evidenti lacune. Viene brevemente discusso il ruolo di vari uomini e donne che hanno fornito contributi eccezionali al progresso della scienza tassonomica, con diversi autori italiani che si collocano nel "gruppo di testa". Questo studio contiene anche un'analisi linguistica. Inizialmente i contributi tassonomici italiani apparivano per lo più in latino, di fatto la lingua che si è sviluppata in quella che è oggi l'Italia. La lingua italiana moderna acquisì lentamente una crescente importanza nei secoli XVIII e XIX. L'importanza scientifica del latino declinò progressivamente dopo il 1700, quando gli studi furono sempre più pubblicati nelle moderne lingue europee. A metà del XIX secolo le pubblicazioni tassonomiche erano quasi esclusivamente in cinque lingue: tedesco, francese, italiano, inglese con tendenza crescente e latino con tendenza decrescente. Particolare attenzione è anche data allo sviluppo della gestione delle collezioni scientifiche e alla conservazione del materiale originale che è importante come materiale tipico per la nomenclatura zoologica. È noto che nell'Europa centrale molto materiale di tipo prelinneo è andato perduto, ma in Italia si è conservata una proporzione relativamente elevata ed è ancora oggi accessibile allo studio. Ciò vale in particolare per il materiale che dopo la morte degli autori è stato consegnato a istituzioni scientifiche. Il presente contributo intende richiamare l'attenzione sull'importanza di preservare questa parte eccezionale del patrimonio scientifico italiano adottando tutte le misure necessarie per mantenere queste preziosi collezioni in buone condizioni per il futuro.

Parole chiave: tassonomia, Italia, nomenclatura zoologica, linguaggio scientifico, gestione delle collezioni.

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