The eternal life of taxonomic monographs: the series on the Fauna and Flora of the Gulf of Naples

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Abstract

Taxonomic monographs, such as those of the Fauna and Flora of the Gulf of Naples, have almost eternal life, in terms of scientific relevance, and keep being cited even after centuries.

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Most papers, and even books, rapidly fall into oblivion: some pass through bursts of popularity, to lose their fame a few years after publication, or after the death of the author(s). Some scientific contributions, however, survive for centuries. Darwin's books are the paradigm of eternal success, whereas those of Alexander von Humboldt, for instance, rapidly lost their intellectual attractiveness and need to be revived from time to time, in spite of their modernity (Wulf, 2016).

Taxonomic monographs are exceptional under this respect: they are not "best sellers" but they are surely "long sellers", and their appeal never fades away.

Most of these books are old, and have a market through antiquarian booksellers; many monographs, however, can be downloaded for free from specialized sites such as the Biodiversity Heritage Library (https://www.biodiversitylibrary.org/).

The charm of old paper, the quality of both bindings and illustrations, the very smell of these ancient books makes them objects of cult for those who appreciate "real things" more than their projections on a computer screen. As a source of information, however, the digitalized monographs are even better than the real books: they are searchable, parts of their content can be copied, annotated and organized in other documents, along with the illustrations. In the past, these books were often photocopied for taxonomists who had not a solid library to support their studies, and the library copies were subjected to continuous handling stress. Now they have to support a single stress: the scanning from the machine. Then they can circulate for free throughout the world, as pdf files.

The names of taxa are subjected to continuous change, as soon as their phylogenetic or nomenclatural position becomes clearer, also in the light of molecular studies. The old monographs deal with phenotypes and are almost invariably rich in beautiful plates that show the morphology of the treated species. The names can change, but the organisms keep looking the same, whatever the name we give them.

The great oceanographic expeditions led to the production of impressive monographic series: biological oceanography started with the Challenger Expedition (1872-1876) whose results were published as 50 monographs that narrate the cruise and describe the sampled species, especially from the deep sea (Bailey, 1953). The results of many other expeditions were documented with monographic series (Wust, 1964), accounting for what today is labeled as "biodiversity exploration".

Vessels and marine stations are complementary for the study of marine life. On the one hand, oceanographic ships have a worldwide operational range, but their samplings last just a few hours at each station, with a narrow temporal range. Samples are usually preserved, and the collections are studied by appointed specialists in their institutions. On the other hand, marine stations allow for the study of living specimens, often in their natural environment, with no time-related constraints: the spatial range is limited to the vicinities of the station, but the temporal range is wide.

The Zoological Station of Naples, now Stazione Zoologica Anton Dohrn, was founded by Anton Dohrn in 1872, the starting year of the Challenger Expedition: both modern biological oceanography and marine biology have exactly the same age. The impressive monographic series of oceanographic expeditions, however, have no counterpart for marine stations. With the sole exception of Naples' Zoological Station.

Anton Dohrn, in fact, launched the *Fauna und Flora des Golfes von Neapel* , later known as the *Fauna e Flora del Golfo di Napoli* , a series of monographs dedicated to the biodiversity of the Gulf and, sometimes, of the whole Mediterranean (Fig. 1).

The first monograph treated the Ctenophora (Chun, 1880), the 40th and last one the Opistobranchia (Schmekel and Portmann, 1982). For a century, three generations of Dohrn (Anton, Reinhard and Peter) hired taxonomists that worked for years at the Zoological Station, sampling and rearing the local species of the assigned groups, and renewed artists were often appointed to lavishly illustrate the monographs. The books were sold as subscriptions, not only to institutions whose researchers used them as benchmark references for their studies, but also to lay people, who collected them as beautiful coffee-table books.

The monographs were printed and sold by the Zoological Station, with the exception of the very last one, that was published, in a different format from all previous monographs, by Springer Verlag (Schmekel and Portmann, 1982), twelve years after the 39th monograph on the Anthomedusae-Athecatae (Brinckmann-Voss, 1970). Each monograph required several years of work. To produce her monograph, Anita Brinckmann-Voss, for instance, worked at Naples from April 1958 to July 1963, and continued to work at it in Canada, until it was finally published. She had a technician (Sofia Giaquinto-Boag) to rear the studied species so as to reconstruct their life cycles and an artist (Ilona Richter) to produce the plates that illustrate the monograph. During Brinckmann-Voss permanence at the Zoological Station, many hydrozoan specialists spent periods of study at the Station, such as Eberhard Stechow, Kay Petersen, Marta Vannucci, Mayumi Yamada, Jean Bouillon, to complement Brinckmann-Voss' work.

Such investments in time and human effort are not profitable, with current publication trends. More than ten years of work for a single title, in a series that is not awarded an Impact Factor is simply suicidal for young researchers, and this calls for some meditation on how biodiversity research is supported.

The monograph series of the Zoological Station was terminated in 1970-1982, ten years before the beginning of the era of biodiversity with the Rio Convention on Biological Diversity, in 1992. It is paradoxical that Naples' Zoological Station, one of the world capitals of marine biodiversity, gave up its primacy just when the vision of its monographs was given crucial importance.

The first 34 monographs of the Zoological Station are freely downloadable from the site of the Biodiversity Heritage Library (https://www.biodiversitylibrary.org/bibliography/176366). Biodiversity knowledge, however, cannot be "frozen" in these old books. They must be updated, since new species are discovered, species that were present at those times are not found anymore, whereas other species arrive from the tropics, due to the impact of global warming on Mediterranean biota. The species of boreal affinity are in distress, being replaced by species of tropical affinity: the composition of biodiversity evolves, and its knowledge must

be continuously updated. It is time, then, to upgrade the available monographs, using the currently valid names, adding species that were not covered, completing the descriptions with molecular data and, if the whole life cycle was not described, providing information not only about adult stages. The 38th Monograph (Ahlstrom et al. 1962), for instance, is still a classic in the field of fish larval development, and the knowledge it contains is based on the careful work carried out at the Zoological Station by Salvatore Lo Bianco, whose monograph on the periods of sexual maturity of the animals of the gulf of Naples (Lo Bianco, 1909), published in the journal of the Zoological Station, is a masterpiece in marine phenology, covering the periods of sexual maturity of most of the animal species dealt with in the Monographs and with many other taxa that are not covered in the Monographs. Many taxa, in fact, simply do not have a monographic coverage: the knowledge on these taxa is fragmented into myriads of papers that are often published in "obscure" journals that are not accessible to most researchers.

The monographs on the Fauna and Flora of the Gulf of Naples represent a unique opportunity to compare the present biodiversity with the past one: the unparalleled knowledge of marine biodiversity at Naples is conducive to biodiversity changes evaluation that cannot be accomplished at other places, due to lack of detailed studies dating back to more than a century ago. These accounts on biodiversity remain important historical witnesses of the first steps of biodiversity exploration, their style, furthermore, is far from the dry and essential style of modern scientific literature and are often fun to read.

Maybe these monographs are not so useful to document the local biodiversity, since the species they deal with might not be present in the area anymore, having been replaced by others that are not covered in the monographs. They surely need updates, and this is easy with the currently available digital aids.

Online monographs might respond much better to the need of summarizing all available knowledge on species, and offer the opportunity of real-time updates, species by species, as soon as new data become available.

As a taxonomist, long time ago, I photocopied all papers that dealt with each species of the group I was studying, starting from the original description, and pasted the clips of monographs and articles in files that contained the whole available knowledge on each taxon. Nowadays, this monographic treatment, species by species, is even more feasible, taking advantage of the digitalization of taxonomic papers and books. Artificial intelligence elaborates what is available in the web but cannot examine documents that are buried in libraries. If meta-monographs will be realized for each species, the exploration of biodiversity will become more reliable and efficient. Once all the published knowledge on biodiversity will be digitized and properly organized, artificial intelligence will become a powerful tool that will foster biodiversity science in an unprecedented fashion. The decision of carrying out this project, though, depends on natural intelligence.

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Legend to Figures

Fig. 1. Library collection of the series *Fauna e Flora del Golfo di Napoli* . The 40th monograph on the Opistobranchia of the Mediterranean has a different format than all other monographs and is not published by the Zoological Station.