my experience they are not usually very successful at producing believable alignments. Otherwise structure-based rRNA or intron sequences are produced by hand, which is one of the most tedious procedures known to mankind.

In perusing this section, it is obvious that much of the discussion is about protein sequences rather than DNA/RNA. Moreover, several missing topics occurred to me, which I will just briefly mention here. Indeed, Chaisson and Tesler (2012) provide a neat figure summarizing alignment methods grouped into: short pairwise alignment/detailed edit model: database search/divergent homology detection; whole genome alignment; and short read mapping—none of the programs they list is included in this book except BLAST and FASTA. To me, the obvious multiple-alignment program missing is Muscle, which is more frequently used than most of the selected programs (except Clustal), at least in phylogenetics. There is nothing in the book about statistical alignment (e.g., BALI-Phy, StatAlign) or direct optimization (e.g., POY, MSAM, BeeTLe). There is not much about RNA/intron/ITS alignment, although these constitute some of the most commonly used data in phylogenetics. There is nothing about motif finding or structure-prediction alignment or short-read alignment. There is very little about genomic alignment (except perhaps Chapter 15), which seems to be the biggest current challenge for automated alignment procedures. The modern emphasis is on Big Data and the associated high-throughput pipelines (Daugelaite et al. 2013); and this will be a problem for phylogenetics, since at the moment there is no suitable algorithm that could be used as the basis. So, all in all, there seem to be some good bets missed in this book, which are needed to make it complete.

I suspect that the phenomenal success of the MEGA program (45th in van Noorden et al.’s list, having got there in only 7 years) means that, in practice, alignment is being done using Clustal or Muscle (the only options), and tree-building is mostly being done by neighbor-joining (the paper for which is 20th in van Noorden et al’s list). This is a very limited approach to the subject of phylogenetics. Practitioners would therefore be well advised to peruse books such as Multiple Sequence Alignment Methods. It is not perfect, but it clearly contains much information that would help phylogeneticists improve the quality of their work.

REFERENCES


As the head of a museum (in my case, a herbarium), it may or may not be regarded as a terrible thing that, before reading Foundations of Museum Studies: Evolving Systems of Knowledge, I had no idea that there was such a thing as Museum Studies. I can imagine several ways in which this condition could arise. In one, I could be regarded as lax and defective in not becoming acquainted with a theoretical frame through which I could interpret my own institution and experience. In another, I could be forgiven on the grounds that, to paraphrase Monty Python: “What has Museum Studies ever done for me?”
Despite this inauspicious beginning, I must say that reading Latham and Simmons' book was enjoyable, and I got a lot out of it, despite the fact that I am a long way from the target audience. It is well written, concise, well structured, and a good introduction to the topic. These are obviously good things, especially considering that the target, clearly stated, audience is graduate students attending a foundational course in Museum Studies. In effect, this is Museum Studies 101, the book having grown directly out of an eponymous course at Kent State University.

After a foreword (by Ford W. Bell, President of the American Alliance of Museums), preface and introduction, the book is laid out in five sections each of 1–2 short chapters, these sections bearing the extremely simple titles How, What, Who, Where, and Why. Within this structure are chapters examining: Definitions of “museum” and “museum studies”; the history of, and a survey of types of, museums; the context of, and role of, museums in their wider societies; the internal structure of museums, and its implications for their work; an introduction to roles within museums and to visitors to museums; and, of course, the future of museums. All these topics are appropriately, and usually fairly briefly, covered.

Having said that, does the book have much relevance for the average reader of Systematic Biology (which I take to be mostly systematic biologists)? Probably not. While one of the authors (Simmons) has a background in biodiversity research, the book is heavily weighted toward museums as cultural institutions. As someone embedded in the scientific research side of the museum spectrum, I came away feeling that my own interests were skirted around, acknowledged here and there, but not the focus. This is fine, and should not be taken as a criticism of the book given its intent; nevertheless, it did mean that a couple of issues that could be of direct relevance and importance to our community were not covered.

First, though, a miscellany of some neat things I discovered while reading the book. I was delighted to find a kindred spirit in Ulisse Aldrovandi (1522–1605), regarded by some as the founder of modern natural history, who went so far in cataloguing his museum as to catalog the visitors as well as the objects—I expect we can all recognize our own love for classification in that. While on the topic of classification, I was pleased also to learn that while Linnaeus introduced an effective, universal, and (in parts) long-standing classification system for human-made objects was not introduced until 1978. One up for biology! The book also introduces some wonderful terminology (we all enjoy terminology), including “museality,” “musealization,” and “musealia.” An important aspect of museality is the musealization of objects, which thus become musealia.

On a more serious note, an important and useful short discussion relates to the concept of all museum objects, including the biological specimens we are familiar with, being “documents,” these defined in an abstract sense as “any signifying thing” and “any organised physical evidence.” To quote (p. 90):

In the document-centered museum, the relationship between a person (either a worker or a visitor) and an object is essential. There is something special about the encounter between a person and a physical thing that is not the same as when the object sits alone or the person hasn’t encountered it yet. When the two meet, an experience between them can occur, a moment when the two merge, unite. This experience is called a transaction, or more specifically, a person-document transaction.

This accords well with my own experience when working with specimens, and the sometimes almost meditative state that I find often bodes well for the resolution of some particularly knotty taxonomic problem. The idea is reprinted later in the book in a short discussion of virtualization, which concludes (as I am sure we would all applaud) that virtual, digital representations of museum objects, while very useful for some purposes, can never replace the actual objects themselves.

Now to a couple of issues that I believe the book could have touched on, even if just in passing in anticipation of Museum Studies 202. The first is relevant to all museums but particularly to cultural ones—there is no real mention of the thorny issue of repatriation. From the Elgin Marbles to the return for cultural reasons of human remains or stolen artifacts, repatriation is not discussed except in a brief mention of the relatively trivial (and trivializing) case of digital records being seen as providing a possible “win-win” opportunity for repatriation. My understanding is that this is (or should be) a hot topic in museum circles, and I would have liked to have seen it discussed. And note that, while repatriation is a hotter topic for cultural than for biodiversity collections, I can envisage the day when there may be a call for repatriation of biological specimens for cultural reasons, especially of species with totemic or other significance. This may seem inconceivable for us now, but so did the campaigns to return the Elgin Marbles and Kennewick Man a few decades ago.

The second topic, that of deterioration, is an indication of the book’s stronger alignment with cultural than with biodiversity collections. Deterioration is properly discussed in the context of conservation, the important need for museums to minimize damage or deterioration of physical objects through inappropriate storage or use. However, there is another side of deterioration, particularly for biodiversity collections, that is not mentioned—the deterioration or dissociation of a collection of specimens from the broader context of growing scientific understanding of relationships. An enormous amount of curatorial effort in any
well-maintained biodiversity collection is spent in updating names, annotating specimens and, sometimes, rearranging parts of the collection to keep it current with changing taxonomic and systematic understandings. This is a key issue for our class of collections because it is time-consuming, labour-intensive, and frequently undervalued, an unhappy combination in a fiscally constrained world.

Finally, and related to this, is a topic that I personally find interesting and important (and which has been the subject of debate recently within Australian biodiversity collections), but which is not mentioned in the book. This is the seemingly simple question: What is the “point of truth” in your collection—is it the physical specimens, or the database of metadata associated with the physical specimens? Despite the point made by Latham and Simmons (and touched on above) that the virtual cannot replace the physical, we are all digitizing our collections, and our collection of digital records is becoming just as important as our collection of physical specimens. In my own collection, we never ever update a name in the digital collection before also affixing an annotation slip to the physical specimen. The reason for this practice (we have realized) is that we see the physical collection as the point of truth. Nevertheless, it is time consuming to maintain this practice (simply physically finding the specimen takes time) and tempting to just do a global search-and-replace in the database. Other collections, we have discovered, have allowed their digital and physical collections to diverge, and they regard the former as the point of truth. The problem is that point-of-truth practices are rarely made explicit. Even worse, some collections have no point of truth, with some curatorial actions applied to specimens and others to records. This is tricky, and I feel it needs more debate, an area where Museum Studies could perhaps help museums.

In summary, if you have time and you, like me, have never heard of Museum Studies, read this book. You will come away with a slightly deeper understanding of what you do every day, and probably take for granted. If, however, you are time-poor and run a biodiversity collection, your time is probably better spent writing the next funding proposal.

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