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Are Species Constructs of the Human Mind?

In 1926, Reagan defined the species as a purely pragmatic principle of classification: “A species is what a good taxonomist says it is” (cited from Huxley, 1942). In 1996, Hawksworth did not see the biological species any differently: “Species are groups of individuals separated by heritable character discontinuities and which it is useful to give a name to” (cited from Heywood, 1998). Even today, more than twenty different species concepts are still practiced concurrently (Mayden, 1997). This observation shows either that *the* biological species does not exist or that the particular species concepts define something different from the one truly existing species.

Since Darwin and Wallace, it has not been possible to unite Linnaeus’s taxonomic principle of classification into rigid classes with the theory of evolution. Simply consider the implications of the title of a famous publication by Alfred Russel Wallace “On the tendency of varieties to depart indefinitely from the original type” (Wallace, 1858). Does this title in itself not mean “There are no species?”

With these considerations in mind, it would now be consistent and simple to accept the reality that species are fictitious human constructs made to sort genuine biodiversity into manageable but artificial units. However, a large majority of field biologists, insect collectors and “tickers” and “twitchers” among the hundreds of thousands of bird watchers believe in the real existence of species. All of the modern field guides to the birds of Europe and the adjoining regions contain approximately 800 bird species. None of these books identify the species concept that was used to obtain this number. They do not explain whether the term “species” means morphotypes, ecotypes, reproductive communities or descent communities. Instead, the impression is conveyed that these 800 species exist in reality and that each species simultaneously satisfies the classification principles furnished by each species concept.

Of course, the field guides do contain disputed borderline cases, for example, the recently undertaken separation of the Balearic Shearwater (*Puffinus mauretanicus*) from the Yelkouan Shearwater (*P. yelkouan*) or the separation of the eastern Mediterranean Black-eared Wheatear (*Oenanthe melanoleuca*) from the western Mediterranean Black-eared Wheatear (*O. hispanica*) to give two distinct species. However, these are isolated incidents. In the main, the books convey the general

consensus that species exist without posing the question of the nature of species. Otherwise, no consistent field guide could appear on the market. Nevertheless, these apparently unambiguous species are not defined anywhere in the field guides. Except for observations that certain species diverge from each other genetically or that there are diagnostic-typological differences, the reader does not learn why particular varieties are delimited from each other as species.

Adherence to any species concept is never fully consistent. If the reproductive community, the classification according to apomorphies or the classification of equal-ranking kinship were actually taken seriously, then many animal and plant groups would be split much more deeply into separate units than current practice supports (Chapter 2). An unspoken agreement appears to sanction “generously” combining mosaic-like fragmented reproductive communities or nested cladistic bifurcations to construct inclusive species boundaries because this approach yields readily manageable units. In critical cases, pragmatism proves to be a highly dominant principle in taxonomy. Pragmatism determines taxonomy’s direction, and consistent reasoning has only a marginal importance in taxonomy (Chapter 2).

The introduction to a remarkable review article by Martin L. Christoffersen titled “Cladistic taxonomy, phylogenetic systematics, and evolutionary ranking” in the journal *Systematic Biology* contains the following statement that could equally be an opening theme for the present book (Christoffersen, 1995):

“The ancient discipline of biological taxonomy has been very slow to incorporate major shifts in world views. . . . Impervious to the derision of scientists in the more glamorous fields of research, many taxonomists today simply take for granted secular traditions of describing and naming the diversity of nature. They may persist stoically for a lifetime in such a self-appointed descriptive role, avoiding theory, philosophy and explanation. Some of these taxonomists may venture intuitive classifications for their named groups but will often delegate to others the task of deriving evolutionary meanings from their proposals.”

Of course, one can use the traits employed for identification to recognize particular species and to distinguish them from other species. However, this procedure already implies that these particular species do exist, and that one needs only to learn how to identify them. If there were no species, it would be meaningless to identify them. Moreover, if two groups of organisms were not different species, but instead were one and the same species, it would be meaningless to identify and distinguish them. This observation demonstrates that the process of defining a species must precede the process of identifying that species (Chapter 2). Taxonomy cannot defend its reputation as a serious science if it relies exclusively on species identification. More scientific than the diagnosis of a species is the “why” of a species (Mayr, 2000). It is not sufficient to identify two organisms belonging to two different species by their diagnostic traits. It is more scientific to be able to explain the reasons that the organisms belong to two different species.

There is an important difference between that which something is and that by which something can be identified. Two human beings are not brothers because they have similar traits, but because they have the same parents. Half a century ago, George Gaylord Simpson stated this difference as follows: “The well-known example of monozygotic twins is explanatory. . . Two individuals are not twins because they are similar but, quite the contrary, are similar because they are twins” (Simpson, 1961). Stated precisely, individual organisms do not belong to the same taxon because they are similar, but they are similar because they belong to the same taxon.

The anthropologist and psychologist Scott Atran stated resignedly: “Perhaps the species concept should be allowed to survive in science more as a regulative principle that enables the mind to establish a regular communication with the ambient environment than as an epistemic principle that guides the search for nomological truth” (Atran, 1999).

It appears that species are simply pragmatic principles of classification. Furthermore, the principles of classification are not the same in higher animals, for example, antelopes in Africa, and in more primitive animals, for example, rotifers. However, under these conditions, the species of different animal and plant taxa are not mutually comparable. It would be meaningless to contrast the species richness of certain beetle families (*Coleoptera*) with the species poverty of certain families of frogs (*Anura*). Nevertheless, such comparisons are made.

Taxonomy pursues the intention of classifying organisms according to personal standards. In contrast, scientific correlations, as they nomologically exist in nature, are a different matter. To research such correlations serves a different objective and disagrees with taxonomy’s goal of forming a stable classification (see Section “The constant change in evolution and the quest of taxonomy for fixed classes: can these be compatible?” in Chapter 2). There is a distinct difference between a definition that serves pragmatic intentions and the reality of organismic diversity, which fits only imperfectly into all recent definitions.

George Gaylord Simpson had already expressed this dilemma half a century ago: “Taxonomy is a science, but its application to classification involves a great deal of human contrivance and ingenuity, in short, of art. In this art there is leeway for personal taste, even foibles, but there are also canons that help to make some classifications better, more meaningful, more useful than others. . . .” (Simpson, 1961).

