

ICZN – an Increasing Concern for Zoological Nomenclature?

ARTICLE

R.I. Vane-Wright

Department of Entomology,
the Natural History Museum,
Cromwell Road,
London SW7 5BD, UK;

and Durrell Institute of Conservation
and Ecology (DICE),
University of Kent,
Canterbury CT2 7NR, UK



Biosketch

Dick Vane-Wright is an Honorary Fellow of the RES, Scientific Associate of the Natural History Museum, Honorary Professor of Taxonomy at the University of Kent, and a contributor to *Antenna* since its first appearance in 1977.

A world without nouns (1)

Try to imagine a world in which our languages have no nouns. How well could we communicate? This challenge was posed by Michael Dixon, Director of London's Natural History Museum, to an audience of nearly 700 people gathered at the Royal Geographical Society on 16th December last year.

Almost all human languages operate on the classic sentence formula subject – verb – object, or some variant. *Sylvester sat on the mat. A flea bit him. Fleas are parasites.* Without nouns, common, proper, pro-, collective, countable and uncountable, to symbolize persons, organisms, places, things and abstract ideas, communication would be difficult, perhaps even impossible. We depend on our vast and ever-growing lexicon of names for rapid and effective communication. "Noun" literally means a word or group of words used for naming. Naming is closely related to the philosophers' concept of *ostension*: we can simply point to an example of what is signified by a term to convey its meaning. And if we don't have a name or a noun for pointing out or referring to a thing or an abstract concept, we bestow one, an appropriate existing one, or simply make one up: *Jack* or *Jill* for the new baby, *Splendeuptychia mercedes* for a new butterfly from Peru, *Newtown* for a new town when your local council is devoid of inspiration, *Kindle* for a novel electronic book reader (derived from the verb meaning to inspire), *rheomode* (Bohm, 1980: 39) for an experimental mode of language (more of this later).

What was the occasion for Michael Dixon's challenge?

Despite cold and rainy London weather, the Ondaatje Theatre at the RGS was filled to capacity as Michael Dixon introduced a very special double bill: Sir David Attenborough and Professor Richard Fortey (Michel,

2011). There was a real sense of anticipation as the audience waited to hear these superstars of natural history. Were we expecting to learn about new insights into *Life on Earth* or the discovery, perhaps, of another mass extinction? No. Quite remarkably, all of us had come to hear why a particular class of nouns is important. We had come for a celebration of the work of the International Commission on Zoological Nomenclature, and its vital role in managing the names we apply to the millions of animals, alive and extinct, that occur or have occurred on our planet.

The presentations began with a lively exposition from Richard about why biological nomenclature is so critical and how the Commission works. He continued with examples from his work on trilobites to demonstrate the rich background and meaning that lies behind taxonomic names. The audience were greatly amused by examples of names that seem to say it all, about the organism or the taxonomist, and what was really being expressed by the choice of a particular name. Sir David followed by giving examples of scientific names each of which could tell a tale, bringing life to his stories about nouns for animals by the addition of adventure, farce, surprise, competition, irony and beauty (Michel, 2011). Both speakers evoked the somewhat disquieting feelings of honour coupled with uncertainty when taxa are named in your honour. In their personal experience, the revelation that a giant flat trilobite, an extinct beast covered in prickles, or the first vertebrate known to have copulated has been given your name tends to give rise to questions you don't really want to answer!

One conclusion of the evening was that, in the right hands, the topic of nomenclature can be made stimulating and entertaining, even for a general audience (Knapp & Wheeler, 2009, offers another example). The event was



Left: David Attenborough onstage at the Royal Geographical Society, 16.xii.2010, gets passionate about how it was Linnaeus came to name the first known bird of paradise *Paradisaea apoda*. Photograph: E. Michel/NHM Interactive Media Film Unit. Right: Professor Richard Fortey and Sir David Attenborough signing books after their joint performance at the RGS – appropriately for entomologists, Sir David was autographing copies of *Life in the Undergrowth* (Attenborough, 2005). Photograph: Sandy Knapp.

indeed intended as a step towards increasing public awareness of the importance of the work that ICZN carries out on behalf of everyone interested in life on earth, its history and diversity, ecology, utility, intrinsic value and conservation. The evening demonstrated the existence of public goodwill for the work of managing the scientific names of the myriad animals

on Earth (Michel, 2011). However, there was another, rather more urgent reason for such a grand occasion.

The pressing need to support ITZN

Robert May once said, “to a first approximation all animals are insects”. Entomologists have to manage more names than all other zoologists put together, so the efficient, effective and continuing work of ICZN is of special importance for those of us who study Hexapoda. So the thought that ICZN, founded 116 years ago (Melville, 1995), might suddenly disappear is a shocking idea for anyone concerned with animal names and their orderly management. But that is exactly what is at issue right now: ICZN could founder simply due to a lack of funds available to its ‘parent’ body, the International Trust for Zoological Nomenclature (ITZN).

So, in addition to the pure enjoyment of the moment, the RGS event yielded other, and hopefully lasting and effective successes. Sir David agreed to become a patron of the ITZN fundraising campaign, joining Ed Wilson in giving high profile support for the work of the Commission. Michael Dixon is the Trust’s Chairman. A modest profit was realised on the evening, subsequent donations were received, connections were made with further potential promoters – and one audience member was even moved to volunteer to run a marathon with charitable fundraising on behalf of the Trust! A professional film made of the lecture is being distributed to potential

benefactors and the wider taxonomic community. It is hoped that by following up and consolidating the valuable connections made by the event that ITZN will be able to identify and maintain sustainable funding sources for the future (Michel, 2011).

A world without nouns (2)

A potential problem with taxonomy is that taxa are clearly not “persons”, “things” or “places”. Nor do they seem to be “abstract ideas” or merely hypotheses: they appear to have concrete reality in the manifestation of individual organisms. We can be sure that the name *Splendeuptychia mercedes* will always apply, at the very least, to the holotype specimen from Peru.

One way of looking at this problem is to invoke the difference between what David Bohm (1980) called explicate and implicate order. Consider a smoke-ring. Is a smoke-ring a “thing”? It is an outward, explicate sign reflecting a dynamic process – an underlying “implicate order” created by millions of moving molecules and smoke particles obeying the laws of gaseous and fluid dynamics. Moreover, a smoke-ring has a beginning, a period of semi-stability, after which it begins to decay and finally ceases to exist as the underlying processes and particles move to new and different equilibria. Not unlike living beings perhaps, which could be seen as temporary, “explicate” forms in the unfolding whole that is the single totality of organic evolution. Species appear, survive for a while, and can be named – but the ultimate fate of



Richard Fortey is not only a renowned geologist as well as a world expert on trilobites (e.g. Fortey, 2000), in his “spare time” he is also a highly accomplished specialist on British fungi and their culinary uses. Richard is seen here holding a fine giant puffball, *Calvatia gigantea*. Photograph: R.I. Vane-Wright.



Splendeuptychia mercedes Huertas, 2011. This specimen is deposited in the Natural History Museum, London, and was designated as the holotype by the author (Huertas, 2011). If there is ever any uncertainty regarding which taxon the name *Splendeuptychia mercedes* applies to, by the rules of zoological nomenclature enshrined in the 'Code' (ICZN, 1999), it must at the very least include this particular specimen. This is in effect a special form of definition by ostension: if there is doubt, we point to the primary type as the ultimate arbiter. Because they have this special role, primary types are often referred to as "name bearers". Photograph: NHM Photo Studio.

all is to go extinct. Yet, despite millions of extinctions, life goes on and has gone on, continuously, for some 3.5 billion years.

Bohm was concerned that our understanding of the world is hampered by normal language which, because of the dominant role of nouns, arguably focuses too much on the seemingly fixed and immutable things around us, the explicate order, and fails to give sufficient attention to the underlying dynamic flux, the implicate order that is actually responsible for all that we experience. Paying too much attention to fixed or separate "things" may cause mental fragmentation, and so interfere with our understanding of the endless and always interconnected processes on which everything depends, and of which the explicate order is just a sequence of transient expressions.

In a radical attempt to overcome what he saw as this limitation of typical languages (Blackfoot is a striking exception: Peat, 2002: 87), Bohm tried to create an alternative or additional syntax in which new verb-forms could take the dominant role instead of nouns. He called this new mode of language the *rheomode* – literally the "flowing mode [of language]".

Bohm's thought experiments with this approach were very interesting, but quite difficult to apply. However, his desire to refashion language to make it more fit for describing fundamental

reality reminds us that we need to separate, as far as possible, the symbolic functions of words from whatever our current understanding of nature and reality happens to be. Our creation of taxonomic nouns arguably can influence us to think in terms of species as "things" (and thus definable in some way, which they are not), or "individuals" (like individual humans, to be "christened"), whereas they actually reflect a complex and endlessly ongoing process that we witness directly only through the transient manifestation of individual organisms. Only by sticking them on a pin, for example, and preserving them in a museum can they be transformed into "objects": unfoldings frozen in time.

Scientific understanding *versus* names as symbols

Now it so happens that ICZN, as manifest by its flagship publication, the 4th *International Code of Zoological Nomenclature* (ICZN, 1999), fully appreciates this gulf between scientific understanding and names as symbols. The *Code* is based on eight principles, of which only the first two need concern us here: "(1) The Code refrains from infringing upon taxonomic judgment, which must not be made subject to regulation or restraint; (2) Nomenclature does not determine the inclusiveness or exclusiveness of any taxon, nor the rank to be accorded to any assemblage of animals, but, rather, provides the name that is to be used for a taxon whatever taxonomic limits and rank are given to it."

Indeed, the main point of ICZN and its Code is to manage and regulate the formation and application of scientific names for animal species, genera and families so that they can be applied unambiguously to the conclusions produced by whatever taxonomic methods we care to apply – be we so-called typologists, barcoders, evolutionary systematists, pheneticists, cladists or what-have-you – even "rheomodologists" if there be such thinkers and they have a need to name explicate parts of the unfolding totality of life.

The Commission in action

Thus, with respect to the regulation of names, which has unavoidably become quite a complex issue, ICZN serves not just the taxonomic community but everyone who has a need to know and

use scientific animal names. Significantly, recent changes to the Code, as manifest in the 4th edition, have led to a situation where more of the rules of zoological nomenclature can, within limits, be interpreted flexibly to avoid potentially unnecessary name changes otherwise brought about by too rigid application of certain formal procedures.

"Perhaps the most significant operational change which the Commission has approved, is to introduce a number of automatic courses of action in cases which previously called for intervention by the Commission" (ICZN, 1999: xxvi). Several of these are summarised under the rubric "Measures empowering authors to act in the interests of preserving established usage" (p. xxviii). If so, is a permanent Commission, with all the costs entailed, still necessary? To this question we have to answer a resounding "yes" – the complexities of zoological nomenclature and the vagaries of 250 years of practice since Linnaeus published the 10th *Systema* ensure that, as systematics continues to advance in so many different ways, nomenclatural problems continue to arise for which specific actions by the Commission offer the only realistic resolution.

The recent furore concerning *Drosophila melanogaster* offers a good example. *Drosophila* includes about 1500 known species, with many more yet to be named. With increasing knowledge of their interrelationships based on biochemistry, morphology, development, physiology, ecology and behaviour, the time has more or less come when it is possible to divide this huge assemblage, currently one of the largest animal genera, into smaller generic units. Unfortunately the type species of *Drosophila* is not THE fruitfly, *D. melanogaster* Meigen, innumerable millions of which have been gainfully sacrificed in the cause of genetics. Far worse is the realisation that the actual type species is remote from *melanogaster* within the omnibus genus. If and when *Drosophila* is split, the species name *melanogaster* will be recombined with another generic name – most probably the existing subgeneric name *Sophophora*, of which *D. melanogaster* is the type species, to become *Sophophora melanogaster* (Meigen).

Alert to this possibility, in 2007 a group of seven *Drosophila* researchers

put forward a case to the Commission requesting that the current type species designation for *Drosophila* be set aside and replaced by *D. melanogaster*. The proposal gave rise to heated debate, for and against, with many good arguments on both sides. Finally, in autumn 2009, the 28 ICZN Commissioners were asked to cast their votes: 4 were in favour, 23 against, with one unavailable (Opinion 2245, 2010). So, if or when *Drosophila* is formally split, it will almost certainly be a case of RIP “*Drosophila melanogaster*” (Michel, 2010). But the point here, regardless of any personal opinion, is that the arguments were fully explored, and a decision was fairly and openly reached. Without the Commission to act and decide on such cases, nomenclatural anarchy is the only likely alternative.

More than just maintaining the Code and ‘policing’ names in cases of dispute, in recent years the Commission has become active in other ways. A significant direction signalled in the 1999 Code is towards adopted lists. One way to legislate against changes caused by the rediscovery of ancient and long-forgotten names is the adoption of new baseline lists (as introduced by the bacteriologists years ago), rather than insist that every name published since 1758, even if it has not been dealt with adequately throughout the intervening period, has the potential to displace well established

synonymous or homonymous names now in regular use.

A major step towards this longer term goal is represented by ICZN’s *ZooBank* (<http://www.zoobank.org/>), launched significantly at midnight GMT on January 1st 2008 (Pyle & Michel, 2010), and “intended as the official registry of Zoological Nomenclature”. Effective name registration is being achieved by harnessing what Johnson (2007) has termed biodiversity informatics, and this is being linked in turn with the Encyclopedia of Life initiative (<http://www.eol.org/>; Hanken, 2010; Polaszek & Michel, 2010). The future for zoological nomenclature and its integration into global online biodiversity databases that really work looks very bright indeed – until you recall that the very existence of ICZN is under threat.

How can you help?

Fancy running a marathon in aid of ITZN? After all, it is a Registered Charity, number 211944! More realistically, what is really most needed is ideas – ideas for fund-raising, yes, but more than that. In our international world where communication is so important, and the issues of biodiversity value and loss so pressing, it seems absurd that such a fundamental Commission is dependent

on continual fund raising and charitable giving. Right now fund-raising efforts are vital, as the coffers at ITZN have run perilously low. But longer term there must be a better solution, one that could and should be embraced by the international community of biologists.

As a quick look at any issue of *Antenna* will instantly reveal, entomologists have a need for and make use of literally millions of names. As the largest user-group for ICZN services, can we come up with some really good ideas to help get the Commission funded on a more secure basis? So, answers on a postcard please, to the Executive Secretary, ICZN, the Natural History Museum, Cromwell Road, London SW7 5BD, UK (or by email to <iczn-em@nhm.ac.uk>). Good thinking!

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