PROPOSALS TO AMEND THE CODE

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(48-49) Two proposals to amend Art. 8 to provide for the typification of plant microfossil names by illustrations

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(48) In Art. 8.3, line two, delete the words “of non-fossil plants”.

(49) At the end of Art. 8.4 and 8.5, add a sentence: “Note, however, that for names of plant microfossils an illustration may serve as type.”

Background information

Recently (in Jansonius & McGregor, Palynol. Princ. & Appl. 1: 23-24. 1996) I informally suggested that for plant microfossils typification by illustration should be permitted by the Code. The purpose of this article is to present the arguments formally and to propose specific amendments to the Code to make the practice legitimate.

The facts are simple and compelling. There are c. 20,000 validly published species names of fossil spores and pollen, as well as c. 10,000 species names for organic-walled algal microfossils (including fossil dinoflagellate cysts, acritarchs and other algal microfossils; R. A. Fensome, pers. comm.), associated with c. 5,000 generic names. Such microfossils are normally prepared as “strew slides” – made from mixed residues of many microfossils, commonly as many as 5,000 per slide – enclosed in a mounting medium under a cover slip on a microscope slide, to be examined with biological microscopes by transmitted light. Less commonly, palynomorphs are attached with adhesives to scanning electron microscope (SEM) stubs.

An overwhelming preponderance of the types theoretically existing for the thousands of names under discussion are in fact not available for study. In addition to the hundreds of types that may exist on slides in a cupboard somewhere but would be very difficult to find on the slides, and may be in very poor condition, there are thousands that simply no longer exist. There are many reasons for this situation:

- Organic-walled plant microfossils (mostly spores, pollen, and dinoflagellate cysts) are inherently difficult to preserve permanently. Important types were mounted in glycerin, glycerin jelly, or even in syrup. Such preparations last only a few years, or up to several decades at best. More permanent mounting media such as Canada balsam darken or dry out progressively with age, or adversely react over time with the organic compounds of which most plant/fungal palynomorphs consist. No mounting medium in use has been proven to last unchanged for even as long as a century, and probably none does. Under the best of conditions, the fossils themselves tend to oxidise or otherwise degrade chemically and physically. Glass slides are themselves easily damaged or destroyed.

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Relocating a microfossil from specifications in the literature is difficult or impossible. In time palynomorphs can shift location and/or orientation because the mounting media are either thermoplastic or remain viscous for long periods after preparation. Furthermore, the marking of microfossils on slides for future finding is tricky. The literature is full of references to holotypes whose position on the slide is described by microscope mechanical stage co-ordinates that only apply to the microscope used by the describer. (Even when that microscope is available, the types cannot readily be found if the microscope has had its stage adjusted.) More sophisticated techniques, such as use of reference points on the slide, or a fixed grid such as provided by England Finder slides, are rarely used by those designating holotypes. Even when they are, finding the holotype ranges from very difficult to impossible. Techniques for marking locations on the cover slip are rarely permanent. The markers fade, fall off or become illegible, and often point to more than one microfossil.

It is possible to make single microfossil mounts for types, but this is seldom done. Instead, almost all holotypes designated in the literature for names of microfossils were selected from strew slides. Commonly single-grain preparations are made as an afterthought, for example, to provide a characteristic form to be sent to another palynologist for examination. Such preparations are seldom those on which the original study of the taxon was based. Once embedded in a preparation with hundreds of other microfossils under a cover slip, it is difficult or impossible to find, isolate and remove a type to make a single-grain mount.

The Code calls for deposition of type specimens in a herbarium or “institution” (Art. 9.14, 37.5), but holotypes for plant microfossils are generally on strew slides with hundreds, even thousands of other palynomorphs. These slides are often important research materials under continuing study. Hence, palynologists are reluctant to deposit such slides, even if they intend to do so eventually and have stated in print that such deposition is a fact. Furthermore, there are very few repositories even theoretically committed to the permanent curation of the small boxes and trays of microscope slides concerned. The palaeobotanists of yore, when shaping the rules that apply to fossil plants, were clearly thinking of megafossils and their deposition in museums, an arrangement similar to that of herbaria. Palaeopalynologists, in contrast, face a situation in which type-containing slides are usually difficult or impossible to find. Even if the slide is finally discovered, and the type itself eventually located for study, it may no longer be in good condition.

In practice, most palynologists work from pictures, those from the literature and their own photomicrographs and drawings. Types are seldom consulted. There are many papers in the literature describing in detail the adventures of an author in attempting to find a particular palynomorph type. Often the palynologist must conclude that although a similar microfossil was found, he/she is less than certain that it was the actual type.

Illustrations as types in the present Code

It is a curiosity of the Code that, although fossil plant names require an illustration for valid publication (Art. 38), they are the only ones specifically excluded from typification by an illustration (Art. 8.3). The Code accepts typification by illustration
for other categories of plants and for certain situations. In Art. 8.3 the Code states that typification by an illustration is intended for situations in which “it is impossible to preserve a specimen as the type” or “if such a name is without a type specimen.” If “preserve” is interpreted to mean “more or less permanently in a manner permitting accessibility,” it could be argued that the present wording already applies to plant microfossils, except for the specific exclusion of fossil material from the jurisdiction of the article.

Outside of Art. 8.3, the Code (Art. 7 Ex. 5, 8.1, 9.1, 9.2, 9.6, 9.7, 9.14, 10.4, 37.3, 37.5) simply states repeatedly, and without reservation, that holotypes and other types may be illustrations.

The point is to make clear that the Code does not regard the use of illustrations as types to be in any way strange. Instead, it is clear that the Code contemplates the use of illustrations in many instances where it is impossible or impractical to come up with eligible, available specimens.

What I propose is to legitimise the designation of illustrations as lectotypes (in rare cases as neotypes) for the names of perhaps 30,000 species of organic-walled plant microfossils that at present have, in effect, no available types. Authors may continue to designate specimens as types, and if they are single-grain preparations properly curated, they will be helpful for as long as they last in good condition. In time, most if not all would be replaced by lectotypic or neotypic illustrations, which will be generally available to the palaeopalynological community.

When I presented these ideas informally, it was objected that many of the illustrations from the literature that would be designated as types are very poor photomicrographs, or even line drawings with little detail. This is true, but the present Code, in Art. 9.7, has the perfect answer to this objection: “An epitype is a specimen or illustration selected to serve as an interpretative type when the holotype, lectotype or ... neotype ... is demonstrably ambiguous ...” Designation of supplementary epitypic illustrations – for example SEM pictures to augment the original photomicrographs – would be most helpful in many situations in palaeopalynology.

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