The celebration of Richard Korf’s career in his 91st year provides an occasion to reflect on things I learned from this master teacher and reflect, as well, on the part he played in fomenting change and in accepting the change that comes with the application of new and varied techniques. There is much that could be written about Dick — his presence in class, his acting career, his strong political views, his purple-inked editorial scribbles and his enduring interest in cup-fungi. The operculate discomycetes, Pezizomycetes, held a special place in his studies. From the start, he intensely collected and worked on these fungi. He published a brief outline of the order Pezizales early in his career (Korf, 1953) and had plans for a major overview that was realized, in part, in his chapter in The Fungi: An Advanced Treatise (Korf, 1973a) and in his Mycological Society of America Presidential address (Korf, 1972). Well documented and innovative, these works direct us in our studies. He was particularly keen on using Boudier’s Icones Mycologicae as a way to ground the user of his keys; in The Fungi 4A, he listed Boudier’s illustration as a guide. He also provided the updated nomenclature for most of the Pezizales for the reprint version of the Icones (Korf in BrummeLEN et al., 1985). In this short paper, I make some general comments on Boudier’s work both from the standpoint of its importance in thinking about classification and as a resource for students and professionals. The classifications employed by Boudier and Le Gal and as reformulated by Korf ultimately have informed the phylogenetic classification we undertake today. My primary focus in this paper is on the Pezizaceae, that is, those larger taxa with asci that generally become blue in iodine solutions, complex often fragile excipular tissues frequently composed of globose cells and hyaline or light brown ascospores. Boudier’s work across the Pezizomycetes presents a classification scheme that has been one of the most successful and enduring. In many cases, the classification points to relationships that have now been confirmed in phylogenetic studies. It presents a unified view of these fungi as known from temperate regions.

Although quite different in character, the illustrated work of M. C. Cooke, the Mycographia, also relates to classification of the order, particularly in term of making names for groups that have been taken up at various times. As an illustrated work, the Mycographia leads us to further investigations but rarely does one have the confidence in Cooke that one can place in Boudier. But, Cooke too had a major influence on the classification of the operculate discomycetes. Within the first few months of my settling down to study mycology at Cornell University, Dick introduced me to Émile Boudier’s Icones Mycologicae. This was not the reprint of 1986, but rather one of the original copies. These volumes, borrowed from the library, were under lock and key in his office/lab and had belonged to Elias J. Durand, another discomycetes researcher. Boudier’s Icones is perhaps unique in the mycological literature in the quality of the lithographed illustrations, the broad scope of the work in it coverage of temperate fungi and the detail of the illustrations. The dazzling renderings of cup-fungi in these volumes guided me in my investigations. KRIeger (1922) said of the Icones that, “it is a positive delight to use them; indeed, were all published plates like these, there would be little question as to the identity of species.” In retrospect, I think it is fair to say that having the Icones encouraged me to study these fungi; Korf himself writes in much the same vein regarding his own experience (Korf in BrummeLEN et al., 1985). It was not just that the apothecia were so well rendered but with these illustrations one could see the fungus in situ, look at a magnified view and see the microscopic details of asci, spores, paraphyses and tissue structure. The descriptive text filled in where the illustrations left off. These were measured drawings done from living specimens; but, as BRUMMELEN (1969) pointed out, the measurements were not accurate because of a miscalibration of the magnification of Boudier’s microscope. They are 10% larger than in fact because of this mistake. Still, one learned from the plates which characters were important for making identifications. The plates took one from the field to the microscope and then to a name. Boudier’s fungus names have been catalogued and commented on by VAN VOOREN (2011, 2012).

My experience in graduate school would have been much different today. Boudier’s Icones is now readily accessible to the beginner.

Summary: Richard Korf is an important figure in the study of discomycetes. His contribution as teacher and scholar in relationship to Boudier’s masterwork, the Icones Mycologicae, is commented upon particularly in regard to the classifications used for the Pezizaceae. Although it has been common practice to recognize a single genus Peziza for most of the species in the Pezizaceae, molecular phylogenetic studies have shown that the genus Peziza is diverse and is not monophyletic. Boudier’s classification shows a more accurate picture of the diversity within the family than later classifications. Comments on the Icones and Cooke’s Mycographia are included as they relate to graduate training and opportunities offered by Richard Korf in his long career as a teacher.

Keywords: classification, discomycetes, Galactinia, generic concepts, Pezizaceae.
because of the bibliographic publications by Korf and Van Vooren, access through the reprinted volumes, and on-line through the Bio-
diversity Heritage Library (http://dx.doi.org/10.5962/bhl.title.49695) and, the Hathi Trust (http://catalog.hathitrust.org/record/100699252?type=all%20lookfor=%3Bseq=1it). Whether my experience would have been as exciting or as special using these internet resources I do not know, but access to these along with sup-
plementary guides to the names surely informs and enlightens. Still, to be sequestered with the books themselves was inspiring and to have the master teacher, Dick Korf, to interpret the work was an ex-
ceptional experience for a young mycologist.

For the beginner in those days, the classification scheme and par-
ricularly the nomenclature of the Pezizales as presented by Boudier was not completely transparent. For starters, one needed to know that rules for naming were not solidified in Boudier’s time and that the French perhaps had a special view of nomenclature. As a neo-
phyte, I needed an explanation of why it was that the species of Aleuria in Boudier had asci that were blue in iodine solutions and had little to do with the species that I was taught belonged to Aleu-
ria, that is, the orange peel fungus, Aleuria aurantia (Pers.) Fuckel. That fungus was Peziza aurantia Pers. in Boudier’s classification. To fur-
ther complicate this picture, Peziza species, that I was then just learning, were also to be found in the genus Galactinia in Boudier’s sys-
tem. Korf made it simple. In one of his many nomenclatural works (Korf, 1960) he explained, in a discussion of the name Plicaria, that essen-
tially all larger species with iodine positive asci, whether with spherical or ellipsoid spores and whether guttulate or not, were to his Peziza. Aleuria was the genus for the orange fungus because of the technicalities of typification. In Korf’s judgment, the form of the ascospores, their guttulation, or their ornamentation were not alone suf-
cient characters to recognize multiple genera. I examined Bou-
dier’s Icônes, I tussled with the nomenclature, and I learned from both Korf and Boudier. As will be seen later in this article, the tangle of nomenclature plays out in quite a different way in the present era where phylogeny often gives us a refined way to look at the class-
ification.

I have made the case that Boudier’s Icônes was and still is impor-
tant for identification and classification. To the researcher, it holds a wealth of information; but, to the bibliophile, it is also an object of interest. The illustrations were published along with preliminary text in fascicles, 30 in all, from 1904 to 1910. All fungi were included but the discomycetes took center stage, particularly the in fascicles, 30 in all, from 1904 to 1910. All fungi were included but groups among the operculate series. In the subsection Cupulés in this paper two groups of discomycetes were characterized: those with ope-
culate asci, Operculae, and those with a pore or irregular opening, the Inoperculae. This classification was presented in his Nouvelle classification naturelle des Discomycètes chams (BOUDIER, 1885) and elaborated in Histoire et classification des Discomycètes of Europe (BOUDIER, 1907). The Histoire laid out a classification that was followed by subsequent French workers and has been the frame-
work for much of the modern systematic work on these fungi. Not all of Boudier’s contemporaries followed him and several systems came into use — most notably those of Saccardo, Rehm, Fuckel and later Seaver. Boudier considered his system to be a “natural” one; those of his contemporaries were perhaps more utilitarian. He used ascomatal shape and color as primary characters, but importantly he used ascus reaction in iodine as a critical character. Features of spores such as guttulation, ornamentation and anatomical details of tissue construction were used to support his groupings. Because he knew these fungi well from field studies of fresh samples, he was influenced as well by ecological factors — where they grew and when they occurred.

By 1907 and the publication of the Histoire he recognized several groups among the operculate series. In the subsection Cupulés in family Pezizacées he recognized the tribe Aleuriées. The Aleuriées represent the core taxa of the Pezizaceae as currently recognized. The following genera were included: Lepidotia Boule, Aleuria (Fr.)

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1 The Farlow – Boudier connection is a strong one. They corresponded from 24 April 1892 until 24 December 1918. Farlow visited Boudier in Montmorency and they forayed together far. Farlow sent Boudier specimens for identification and Boudier sent Farlow specimens from France; these are in the Farlow Herbarium. Boudier also helped with the identification of the illustrations that Farlow had made for his illustrated Icônes Farlowianae. Boudier wrote with distress and sadness about his move to Blois during the war. According to University records Bou-
dier’s portrait hung in Farlow’s office.
Fig. 1 — Helvella lacunosa

Fig. 2 — *Aleuria sp.* illustrated by L. C. C. Krieger from a specimen collected June, 1904
Gillet, Galactinia (Cooke) Boud., Sarcosphaera Auer., Plicaria Fückel and Pachyella Boud. Following Körbl (1960, 1973a) and many modern treatments Lepidotia, Aleuria in his sense, Galactinia and Plicaria are referred to Peziza. In phylomeric treatments, each of these genera represents a distinct clade. Hansen et al. (2001) recognized eight primary groups within the Pezizaceae and of these all six of Boudier’s genera can be recognized and all but Galactinia represent monophyletic clades. Aleuria sensu Boudier is considered to be Peziza sensu stricto. Fig. 2 is one of Farlow’s plates by Krieger showing a Peziza of the sensu stricto group. Farlow dutifully followed Boudier and labeled it Aleuria but without a species epithet.

Boudier (1885) first recognized Galactinia at the generic level. Cooke (1879) had proposed this name for a subgenus of Peziza. Boudier distinguished Aleuria and Galactinia by the presences or absence of spor guttules. In Aleuria, in his sense, the spores are generally without prominent oil droplets and, if ornamented at all, the ornamentation is generally composed of low warts. These are generally without prominent oil droplets and, if ornamented at all, the ornamentation is generally composed of low warts. These are fragile fungi, their flesh being composed of mostly globose cells. In iodine solutions the asci generally show an intensely staining ring at the apex. Hansen et al. (2002) discuss this group as the core group of Peziza. It includes the type species of Peziza, P. vesiculosa Pers. Thus, these phylogenetic studies provide some good evidence that one could restrict the use of the name Peziza to members of this group. So far as is known, no member of the genus Peziza in the restricted sense are ectomycorrhizal; they are considered to be saprobic. The broad species concepts within the Peziza sensu stricto group, as presented by Hansen et al. (2002), needs critical review.

The Galactinia species of Boudier have been treated almost universally as Peziza species following Körbl (1960, 1973a). These have asci that are blue in iodine but do not have the characteristic ring of the Peziza sensu stricto species, rather the reaction is intense at the tip and extends over the upper half of the ascus wall. Differences in the blueing reaction among members of the Pezizaceae were highlighted in Hansen et al. (2001). In Galactinia the spores are ellipsoid and generally biguttulate and are often ornamented with warts and ridges. At least some of the species included by Boudier produce a colored juice when the flesh is damaged. The flesh is composed of globose cells and interwoven hyphal elements. The accepted type species of Galactinia is Peziza succosa Berk. Phylogenetic studies show variation within P. succosa complex (Smith, 2014).

The species that no doubt belong in this lineage are: Galactinia succosa (Berk.) Sacc., G. succossella Le Gal & Romagn., and G. michelii Boud. There are at least two hypogeous members of the genus that should be moved to Galactinia: P. erini M. E. Smith and P. infossa Fogel & Stutes. Members of the genus are ectomycorrhizal (Jaberg et al., 2015; Jang et al., 2011; Smith, 2014; Tedereso et al., 2007, 2009). Other species treated as Galactinia by Boudier fall primarily into another group, group VI of Hansen et al. (2001), for which there are several competing names.

A cautionary note is in order regarding the names combined in Galactinia. Like Peziza and Aleuria concepts have been broad, thus not all species named Galactinia belong in this genus in this restricted sense. The sorting of the species at this time is fragmentary, at best.

As mentioned above, the name Galactinia had its origins with M.C. Cooke, whose illustrated work introduced to me to another resource in pezizalean studies. This is Cooke’s (1879) Mycographia, seu icones fungorum with its illustrations of discomycetes from around the world. In regard to classification, Cooke’s contribution is a series of subgenera proposed in Peziza. Some of these, like Galactinia, came into use at the generic level. As compared to Boudier’s Icones, Cooke’s illustrations in the Mycographia are not beautiful. Sold also by subscription, it appeared in six parts over a four-year span. This, the only volume published in what was to have been a series containing other fungi, includes the so-called “fleshy” discomycetes. The illustrations were produced by lithography, but they are primitive in comparison to Boudier’s Icones. The registration is not always accurate and the color ranges are limited. But, here one finds page after page of illustrations, generally four to a page with descriptions on facing pages. The illustrations are simple and colors are, in most cases, best estimates from a dried specimens and descriptions. Microscopic features of asci, ascospores, and paraphyses are shown. Unlike sitting down with Boudier to feast on the nuisances of a well-serve plate, Cooke always seemed half-baked. Where with Boudier one can say that you know something more for having studied the plate, with Cooke one leaves with an appetite for more information, for the need to return to type specimens. Thus, it was not uncommon that a researcher would borrow a specimen from Kew for study only to find that the image in the Mycographia was highly imperfect. Still, one can get a taste for the exotic that Boudier, with his illustrations of fungi mostly from France, could not offer. In Cooke’s book, one finds fungi from Ceylon, Australia, Cuba or the Himalayas in this post card-sized format. It is appropriately subtitled “Figures of fungi from all parts of the world.”

Boudier, Cooke and Korf intersect over considerations of Boudier’s genus Lepidotia. Boudier described the genus, Cooke illustrated and described the type species and Korf sorted out the nomenclature, the morphology, and added information on an anamorph (Körbl, 1973b). Following his consistent view that Peziza is a large genus in which, because of intergradations and ambiguous characters, segregates could not be recognized, he stated that its only indisputable species, Lachnea hispida Quél., should be included in Peziza as P. quelepidotia Korf & O’Donnell, a substitute epithet for one, hispida, that had already been used in Peziza. In this paper, Korf published plates taken from Boudier’s Icones and Cooke’s Mycographia. Phylogenetic studies now show that this species is distantly related to Peziza sensu stricto and Galactinia and should be recognized as an independent genus in the Pezizaceae with at least one other species. The name to be applied is Lepidotia hispida Quél.

When we look at the Pezizaceae as recognized today, the taxon is basically as circumscribed by Boudier with the exception of several hypogeous species that are now included. The number of genera has increased with additions such as Scabropeza, Iodowynnea and others, particularly from among the hypogeous representatives, and we do understand more about the relationships within the genera and families. That still more genera will be needed to accommodate the many species referred to Peziza is unquestionable. All genera of Boudier’s (1907) tribe Aleurini, Lepidotia, Aleuria (= Peziza sensu stricto), Galactinia, Sarcosphaera, Plicaria and Pachyella can be recognized based on phylogenetic studies (Hansen et al., 2001, 2002, 2005).

In conclusion, I suggest that several names that trace to Boudier and Cooke can be reinstated in the Pezizaceae. Although phylogenetic studies are still incomplete, it is evident that the broad definition of Peziza that has been applied for many years is untenable. As ecological, morphological and molecular data accumulate, we will surely see more lineages defined and we should name them. To name things clearly and unambiguously, according to the rules and with a feel for the organism, should be the goal. It is to Dick Korf who so clearly demonstrated the need for precision and the feel for the organism that I dedicate this paper. Thanks to Dick Korf and our illustrious mycological forebears, we are equipped to look deeply into questions of morphology, taxonomy, classification and history and in those investigations to find new insights.

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