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In This Issue —

Some Observations on the Dry, Dehiscent-fruited Yuccas in New Mexico

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The relatively wet winter and spring months of 2007 produced a magnificent early summer display of *Yucca* flowers that inspired me to look more closely at this genus than I have ever done before during my travels throughout the State of New Mexico. After reviewing the literature and viewing many New Mexico *Yucca* populations and herbarium specimens, I find the taxonomic circumscriptions and geographic distributions of dry, dehiscent-fruited species in the section *Chaenocarpa* are still poorly understood and often misapplied in New Mexico[1]. Unfortunately, most herbarium specimens are inadequate for the study of the dry, dehiscent-fruited yuccas. What are needed are regional population surveys and very broad circumscriptions of taxa that tolerate variability within regions and populations. The following observations and opinions may be helpful as New Mexican botanists grope towards consensus on this difficult and variable group of plants that represent (in part) our official state flower.

All of our dry, dehiscent-fruited yuccas have narrow leaves with smooth, filiferous margins separating into thread-like fibers. Leaf width and shape are consistently useful characteristics for distinguishing only two taxa from the larger group of New Mexican taxa. The leaves of both *Yucca neomexicana* Wooton & Standley and *Yucca harrimaniae* Trelease are narrowly lanceolate, relatively wide (1-2 cm), and are obviously concave on the upper surface and correspondingly convex on the lower surface (concavo-convex). The remaining New Mexican species of dehiscent-fruited yuccas have narrower leaves that are linear or linear-lanceolate, and are not, or less obviously, concave on upper surface though still markedly convex on the lower surface (plano-convex) especially near the middle of the leaf.

Yucca neomexicana is a distinctive endemic to rocky hills and escarpments in Union, Harding, eastern Colfax, eastern Mora, and northern San Miguel counties. It is an acaulescent, relatively broad-leaved yucca with a tall, racemose inflorescence that begins just above, or well beyond, the leaf tips. Occasional plants have short branches at the proximal nodes of the inflorescence and these are more frequent in the southern part of its range. Likewise, the purple color suffusing the outer surface of the outer tepals is darker and more obvious in the south than in the north of its range. *Yucca neomexicana* is sympatric with *Yucca glauca* Nuttall, but I have not seen any apparent hybrids between these species.

Yucca harrimaniae is very rare in New Mexico and I am not personally familiar with it in the field. I have seen only two UNM herbarium specimens of *Y. harrimaniae* from New Mexico with very wide (1.5 cm), leaf material and lacking flowers or inflorescence. A few collections have been made on sandstone bluffs to the north and northwest of Farmington in San Juan County (Ken Heil, personal communication) and southern McKinley County near Dalton Pass (*Wagner 2054* UNM). Reveal (Cronquist et al. 1977) reduced *neomexicana* to a variety of the more variable *Y. harrimaniae*. Other recent authors (Clary 1997, Hess and Robbins 2002) maintain them as distinct, allopatric species that are geographically separated by the southern Rocky Mountains. *Yucca neomexicana* is apparently distinguished from *Y. harrimaniae* only by its longer scapes, but I have not seen the range of variation in *Y. harrimaniae* populations north and west of New Mexico, so have no opinion on this ranking. Jennings (San Juan Basin Flora, in press) believes that all San Juan River basin collections of *Y. harrimaniae* are actually *Yucca baileyi* Wooton & Standley, which may not be accurate for the New Mexico part of the basin since the McKinley County leaf specimen at UNM is broad (15 mm), lanceolate, and especially suggestive of *Y. harrimaniae*.

The type of *Yucca baileyi* is from the Chuska Mountains near the Arizona border in northwestern New Mexico. McKelvey's subsequent type for *Yucca standleyi* McKelvey is also from the same Chuska Mountains locality and this taxon is generally considered a synonym of *Y. baileyi*. McKelvey (1947) had included *Y. baileyi* in her circumscription of *Y. standleyi* "except for the type collection", which she considered to be a hybrid with *Yucca baccata* Torrey because the pistils on the specimen are so large. She failed to account for the fact that the type of *Y. baileyi* was collected very late in the season when the pistils would be enlarging into fruits. Neither Webber (1953) nor Reveal (Cronquist et al. 1977) could support

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Botanice est Scientia Naturalis quae Vegetabilium cognitiorem tradit.

— Linnaeus

(Yucca, continued from page 1)

her conclusion and felt the type of *Y. baileyi* was typical of the plants in that region. Only Clary (1997) has continued to use the name *Y. standleyi*. The name *Y. baileyi* is now most commonly attached to the Colorado Plateau plants that are acaulescent (rarely caulescent with short, decumbent stems) with narrow, often falcate, linear-lanceolate, plano-convex leaves; short scapes with relatively short, racemose inflorescences beginning within the leaves or near the leaf tips; relatively short, densely-flowered racemes; terete, white or pale green styles; and capsules that are not constricted near the middle, or only slightly so[2]. Some populations in the Chuska and Zuni mountains with dense clumps of rosettes on subcaulescent branches have been named *Yucca baileyi* var. *navajoa* (J.M. Webber) J.M. Webber (1953). This is a distinctive, but sporadic variation that is considered synonymous with variety *baileyi* by Cronquist et al. (1977) and Hess and Robbins (2002).

Yucca baileyi is sympatric with *Yucca angustissima* Engelmann ex Trelease, which is distinguished from the former by its longer scapes that elevate the lowest flowers of the racemose inflorescence above the tips of its long, linear leaves and somewhat smaller capsules that are markedly constricted near the middle. *Yucca angustissima* also usually has longer, less densely-flowered racemes than *Y. baileyi* var. *baileyi*. I have not recently studied the yuccas of northwestern New Mexico, but recall seeing a population with these characteristics only on the plains of western McKinley County. Hess and Robbins (2002) also confine the New Mexico distribution of *Y. angustissima* to near the Arizona border in McKinley and San Juan counties. However, Clary (1997) and Jennings (San Juan Basin Flora, in press) extend its range east to Sandoval and Rio Arriba counties where the dehiscent-fruited yucca populations combine characteristics of both *Y. angustissima* and *Y. baileyi* and often cannot be placed within either species with any satisfaction. These more eastern populations begin to resemble *Yucca baileyi* var. *intermedia* (McKelvey) Reveal, which is a taxon confined to the plains and foothills of north-central New Mexico (McKelvey 1947).

I have recently observed numerous *Y. baileyi* var. *intermedia* populations in north-central New Mexico. It consistently appears to combine the short scape (flowers begin within the leaves or near the leaf tips) and densely-flowered inflorescence of *Y. baileyi* with the relatively long raceme of *Y. angustissima*. These plants are acaulescent and usually racemose although individuals with branches at the lower nodes of the inflorescence are not uncommon. The leaves are narrow, linear or linear-lanceolate, and plano-convex. Flower tepals are usually lanceolate-acute, rarely ovate-acute or obtuse, and the outer tepals are usually darkly suffused with purple on the outer surface - like variety *baileyi* and *Y. angustissima*. The styles are always ochroleucous and usually terete or narrowly oblong. The capsules of *intermedia* are often constricted near the middle and vary between almost no constriction and deep constrictions similar to *Y. angustissima*[3].

Yucca baileyi var. *intermedia* occurs mostly on plains and foothills ranging from northern Socorro County to the eastern bajada of the Manzano/Sandia range of mountains, then along the lower slopes of the Sangre de Cristo Mountains to Mora County and west to Sandoval, eastern Rio Arriba, and eastern Cibola counties. Its type locality is in western San Miguel County at the eastern limit of its range, but it is most abundant and best developed in the middle and upper Rio Grande basin counties of Valencia, Bernalillo, Sandoval and Santa Fe. Webber (1953) dismissed *Yucca intermedia* McKelvey as a hybrid between *Y. glauca* and *Y. angustissima* or *Y. baileyi*, but this taxon covers too large an area to be considered a hybrid swarm and I can find no population with styles that even begin to suggest the distinctive style characteristics of *Y. glauca*.

Reveal (Cronquist et al. 1977) resurrected McKelvey's *intermedia* as *Y. baileyi* var. *intermedia*, which is a reasonable combination since *baileyi* and *intermedia* share the salient characteristics of short scapes and densely-flowered racemes, and are not easily distinguished from one another in northwestern New Mexico. It could have as easily been made a variety of *Y. angustissima* with which it shares long racemes and a tendency towards constricted capsules. Hess and Robbins (2002) maintained *Yucca intermedia* McKelvey as a species, but were apparently unfamiliar with it since they misrepresented its distribution as being from central New Mexico northeast to the Texas and Oklahoma border. This inaccurate range is probably the result of their making *Y. intermedia* var. *ramosa* McKelvey a synonym of *Y. intermedia*. McKelvey's var. *ramosa* is misplaced in *Y. intermedia*, which I will discuss later.

Although it has been a common practice by local authors to place *Y. baileyi* var. *intermedia* of north-central New Mexico into *Y. glauca* (Martin and Hutchins 1980, Carter 1997, Ivey 2003, Sivinski 2007, and many more), it is not the *Y. glauca* of the eastern plains and is more likely related to the dehiscent-fruited yuccas of the Colorado Plateau. Pellmyr et al. (2007) sampled the nuclear DNA of most dehiscent-fruited taxa for phylogenetic study with an analysis based on 4322 FLP markers. They found that the two *intermedia* samples from Valencia and Santa Fe counties grouped more closely with the western *Y. harrimaniae*, *Y. baileyi* and *Y angustissima* samples from adjacent Arizona and Utah than with the *Y. glauca* samples taken east of New Mexico. Unfortunately, the statistical support for this genetic distinction is too low to resolve any phylogenetic patterns at regional or species levels, but does help to place this dehiscent-fruited yucca of north-central New Mexico (*intermedia*) within a group of western yuccas and not as closely related to the *Y. glauca* complex on our northeastern plains. Whether *intermedia* should be called a species or a variety of *Y. baileyi* is up to the individual taxonomist, but I am more inclined to use the varietal combination with *Y. baileyi*.

The shortgrass prairies of eastern New Mexico from the Colorado border south to Lea County are densely covered with a variable array of acaulescent yuccas with plano-convex, linear leaves that are frustratingly difficult to place in a particular taxon. The exception is the high plains of northeastern New Mexico, which is only region in the state where I have been able to find uniform populations of typical *Y. glauca*. These plants have short scapes that hold the lowest flowers of the inflorescence within the leaves of the rosette, or near the leaf tips. The inflorescence is usually a loosely-flowered raceme, but occasional plants will have short panicle branches at the proximal nodes of the inflorescence. Flower tepals are usually ovate-acute or obtuse and the styles are dark green, short and tumid.

Traveling south and east from the high plains the proportion of paniculate inflorescences increases until nearly the entire population of acaulescent yuccas of east-central and southeastern New Mexico is paniculate to some degree. The populations in southern San Miguel County and Guadalupe and Quay counties are exceedingly variable. Yuccas in this region can be densely paniculate at the proximal inflorescence nodes and racemose in the distal portion, while plants with entirely paniculate inflorescences are becoming frequent, and entirely racemose plants are rare. From De Baca County south to Lea County almost all of the plants are paniculate. My limited observations of flowers on the paniculate plants of east-central New Mexico found that the styles are also variable, being dark green, pale green, or ochroleucous and ranging from 4-10 mm long, usually less tumid than *Y. glauca*, but generally thicker than the dry, dehiscent-fruited yuccas of north-central and northwestern New Mexico. The tepals are more ovate-obtuse or acute and less darkly suffused with reddish purple in the outer whorl - like *Y. glauca*, instead of generally lanceolate-acute and more reddish purple in the outer whorl - like the varieties of *Y. baileyi*.

McKelvey's type of *Y. intermedia* var. *ramosa* was proposed

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(Yucca, continued from page 2)

for the more paniculate yucca populations of east-central New Mexico. The *ramosa* type specimen was taken from Torrance County at the western edge of this variable eastern plains population of paniculate yuccas and very near the eastern range extreme of the central New Mexico population of *Y. bailey* var. *intermedia*. She also included paniculate plants from De Baca County in her concept of variety *ramosa*, which firmly places this taxon on our eastern plains. I have not seen the variety *ramosa* type specimen, but the more revealing photo in her publication is of a relatively short-scaped, paniculate plant clearly similar to the acaulescent yuccas on the plains of east-central and southeastern New Mexico. These eastern paniculate plants are apparently more closely related to *Y. glauca* or other species further east and south than they are to *Y. baileyi* var. *intermedia*. Therefore, I believe *ramosa* is misplaced with *intermedia* as a variety and synonym.

Another taxonomic possibility for the acaulescent, paniculate yuccas of east-central and southeastern New Mexico is *Yucca campestris* McKelvey, which is also acaulescent, short-scaped, paniculate and has green, thick styles. Most authors confine the range of this species to a few counties in west-central Texas, but Martin and Hutchins (1980) and Clary (1998) extend its range to Lea County, New Mexico. I have not made a field visit to the Texas populations of *Y. campestris*, but the written descriptions and photos I have seen of this species are not significantly different in gross morphology from most of our eastern New Mexico yuccas. If our Lea County yuccas are if fact *Y. campestris*, then this name might reasonably be applied to the millions of acaulescent, paniculate yuccas across thousands of square miles of our eastern plains as far north as southern San Miguel County and eastern Union County.

Webber (1954) dismissed *Y. campestris* (and the acaulescent, paniculate yuccas of eastern New Mexico) as hybrids between *Yucca elata* Engelmann and *Yucca constricta* Buckley (of central and south Texas) with their green styles suggesting the possible entrance of *Y. glauca* into the hybrid complex. I can confirm that *Y. elata* is an influence within our generally acaulescent, paniculate yuccas in eastern New Mexico. This is evident in some occasional plants that have either short caulescent stems or relatively long scapes that lift the inflorescence well above the leaf tips, but these are regionally unusual. I cannot support Webber's belief that all the yuccas on the plains of eastern New Mexico and a large area of adjacent western Texas comprise an unstable hybrid swarm that cannot be taxonomically circumscribed. These yuccas are variable to be sure, but are huge in number and cover a vast area. They are unified by a common gross morphology of almost always being acaulescent, paniculate, and with relatively short scapes that hold the lower panicle branches within the leaves or not far above the leaf tips. With broad interpretation, the name *Y. campestris* is available for the plants of this eastern region.

West of the Pecos River in the southern portion of New Mexico most of the dehiscent-fruited yuccas fit comfortably into *Y. elata*. This species is also variable in several characteristics, but easily distinguished by its gross morphology of caulescent stems and relatively long scapes that lift the paniculate inflorescence well above the leaf tips. The stems of *Y. elata* can (rarely) reach up to five meters tall in some areas but tend to decrease in height toward the northern and eastern limits of its range until it becomes nearly acaulescent. Northern populations coming into contact with *Y. baileyi* var. *intermedia* in central New Mexico will often have some individuals with short, or no, stems and racemose inflorescence, but their longer scapes, loosely-flowered inflorescence and shorter styles keep these within the realm of the larger *Y. elata* population.

Summary

Phylogenetic studies of the genus *Yucca* have resolved relatively monophyletic groups at the taxonomic levels of section (fleshy, indehiscent-fruited *Sarcocarpa*; dry, dehiscent-fruited *Chaenocarpa*; spongy-fruited *Clistocarpa*) and the *Chaenocarpa* series *Rupicolae* in Texas and adjacent northern Mexico (Clary 1997, Pellmyr et al. 2007). Many of the remaining species within *Chaenocarpa* are not monophyletic and probably reflect incomplete lineage sorting due to rapid diversification. Therefore, there may be fewer phylogenetic species of dry, dehiscent-fruited yuccas than there are taxonomically delineated species. Pellmyr et al. (2007) did find some genetic evidence of western and eastern lineages that would separate the dehiscent-fruited yuccas in western two-thirds of New Mexico from those on our eastern plains, but even these groups were indistinct and not well supported in that study.

Introgression between regionally distinguishable species of dehiscent-fruited yuccas is common and evident where populations meet, but the variations caused by hybridization and introgression are more the exceptions than the rule. Too much can be made of these obvious hybrids, which leads to taxonomic uncertainty and frustration. Webber (1953) went down this path and determined that all yuccas in nearly one-third of New Mexico (north-central, east-central and southeastern parts) could not be identified as anything but unstable hybrid swarms. However, if one ignores most of the variable details and odd individuals, there are some unifying characteristics that can be taxonomically useful for these regional populations. To be useful, the taxonomist must look for the morphological tendencies or averages in populations instead of the often variable details of particular plants[4].

Many of the dehiscent-fruited yucca populations in New Mexico are in an evolutionary period of rapid diversification and are unlikely to be sorted as distinct species for perhaps another hundred thousand years. In the mean time, I am proposing the following key that might be useful to taxonomists who would like put names to these populations. I reserve the option to change my mind as I learn more about these fascinating plants.

Proposed Key to *Yucca* Section *Chaenocarpa* in New Mexico

1 Inflorescences of population predominantly paniculate, sometimes upper one-third of inflorescence racemose and lower two-thirds branched; acaulescent or caulescent with erect stems up to 5 m tall

2 Population caulescent with short or tall stems; scapes long, lifting lowest panicle branches at least 3 dm above the leaf tips; southern part mostly west of the Pecos River ..... ***Y. elata***

2 Population mostly acaulescent; scapes generally short, holding lowest panicle branches within the leaves or just above the leaf tips; plains of east-central and southeastern parts .... ***Y. campestris***

1 Inflorescences of population predominantly racemose, sometimes with a few branches in the lowest nodes of the racemes; most plants in population acaulescent, some may have short stems usually less than 5 dm tall

3 Leaves concavo-convex, narrowly lanceolate, usually 1-2 cm wide

4 Scapes lifting lowest flowers of racemes at a population average of 1 dm or more above the leaf tips of the rosette; styles

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(Yucca, continued from page 3)

pale green or ochroleucous; rocky ridges and hillsides within the high plains of northeastern part..... ***Y. neomexicana***

4 Scapes short in most of the population, holding the lowest flowers of the racemes within the leaves or near the leaf tips; styles green; very rare in northwestern part in mountains and on sandstone slick rock..... ***Y. harrimaniae***

3 Leaves plano-convex, linear or linear-lanceolate, usually less than 1 cm wide

5 Scapes lifting lowest flowers of the raceme 1 dm or more (population average) above the leaf tips of the rosette; racemes (lowest flower to top flower) long on most plants, often more than 1.5 times longer than the length of the leaves; capsules usually deeply constricted near the middle, plains of McKinley and San Juan counties..... ***Y. angustissima***

5 Scapes short in most of the population, holding the lowest flowers of the racemes within the leaves or near the leaf tips; racemes long or short; capsules constricted or not

6 Racemes usually loosely-flowered; styles short, tumid, dark or medium green; high plains of northeastern part . ***Y. glauca***

6 Racemes densely-flowered; styles on most plants terete or oblong-cylindric, usually ochroleucous, rarely pale green

7 Racemes (lowest flower to top flower) of population usually short and less than 1.5 times the length of the leaves; capsules not constricted or only slightly so; northwestern quadrant, usually in the mountains ... ***Y. baileyi*** var***. baileyi***

7 Racemes longer, most plants in population with racemes near 1.5 times and sometimes up to 2.5 times the length of the leaves; capsules often deeply constricted near the middle; north-central part, usually on plains and foothills..... ..... ***Y. bailey*** var***. intermedia***

Notes

1 I am guilty of this by misidentifying *Yucca baileyi* var. *intermedia* as *Yucca glauca* in the Checklist of Vascular Plants in the Sandia and Manzano Mountains (Sivinski 2007).

2 The descriptions of *Y. baileyi* by Welsh et al. (1987) and Carter (1997) are unique in attributing pendulous fruits to this species. I have not studied *Y. baileyi* in Utah, but all the dry, dehiscent-fruited species I have ever seen (including *Y. baileyi*) have erect or spreading fruits. If pendulous-fruited populations exist in New Mexico or elsewhere, they would be very unusual and worthy of further study.

3 Capsule constrictions appear to be the result of yucca moth larvae feeding within the capsule or the oviposition location on the pistil by the female moths. A single yucca inflorescence can have capsules that are not constricted, constricted on all three valves, and constricted on only one or two valves. Therefore, capsule constrictions are apparently induced. Yet the propensity for a particular species' capsules to constrict under the influence of yucca moths may have some taxonomic value.

4 Herbarium specimens of dehiscent-fruited yuccas taken from many parts of New Mexico can be essentially useless unless the style shape and color, gross morphology of the entire plant, and morphological tendencies of the population are included on the specimen label.

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Darwin's Journals and Yours

Brian Drayton

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What do educators stand to gain from keeping a journal? A journal has long been seen as a key tool for teachers (or anyone else) seeking to reflect upon their practice and direct and deepen their own learning. Because reflective writing in science is something that we increasingly value for students, it's important for educators to understand it from the inside out, by practicing it ourselves.

There are several reasons a journal is helpful: When you revisit something, or even when you copy it from a reference into your notebook, you are focusing attention on it, and each time you do so, you may notice different aspects than you did before. Second, when you paraphrase or reword something, you have to transform it, and therefore reexamine your understanding in light of other associations or thoughts triggered by the change from, and contrast between, the "original" and your new version. Third, keeping a journal may push you to try to better distill or outline a thought, or put it into pictorial, numerical, or graphical form. This is also a powerful way to test and strengthen your understanding of the point at hand. Finally, if you are working actively with some question, your cross-references to other entries, intermediate statements, and tentative formulations ("What I think is going on here is...") are a way to stimulate increasing depth and precision of your thinking, and also are opportunities to ask, "Do I really believe this? What's my evidence? What would really clinch it—or send me back to the drawing board?"

For some people, keeping such a notebook comes naturally, but others are put off by the idea. My own up-and-down experience with journal keeping suggests that sometimes the problem is that, like any new good habit, it's hard to fit journal keeping into your already full schedule. Perhaps you, like me, have found it difficult to figure out what to put in such a journal, and how it really helps deepen and broaden thinking. How can I move beyond pure introspection, or pure stenography, and really use this text as a thinking workshop? For starters, perhaps a good comparison to have in mind is not the kind of journal that is used for personal or spiritual growth, but rather a scientist's lab or sketch book.

While pondering this some years ago, I found myself reading a lot about Charles Darwin and his creative process. In the midst of this Darwin hobby, my wife gave me an edition of Darwin's notebooks covering the years 1836-1844 (Barrett et al. 1989). From his notebooks I began to learn some lessons that helped me think more freely about how to use a journal as a tool for dialogue—not just with myself, but with my colleagues, my reading, and the subjects I was trying to understand—both in my work with science teachers, and in my scientific research in conservation biology. Between 1836 and 1844, Darwin was reading, experimenting, and imagining ways to make sense of his field experiences; he was working from the very detailed notes of his investigations toward a theory that would encompass the development of all life, including Homo sapiens (Gruber 1981). In this grand endeavor, Darwin's notebooks played an essential role. In them, he entered his reading notes; observations of curious phenomena he saw in his walks or visits to the zoo; interesting comments from friends or correspondents; and reflections, daydreams, hypotheses, and many questions.

Three qualities of Darwin's notebooks have helped me imagine how to make my own notebooks more creative and supportive of reflection and learning. I have labeled these three qualities diversity, freedom, and cultivation.

Diversity

Darwin took in and wrote down things from many different sources—learned treatises, scientific journals, word-of-mouth from cronies and colleagues, personal observations, his father's opinions, folk wisdom, etc. In this sense, his notebook serves as a kind of thematic memory, keeping the manifold strands of his scientific imagining and reasoning alive and available. A key feature of this memory is that it's a jumble, with lots of different kinds of facts, ideas, gossip, notes, reflections, jostling each other in no clear order, but just as they came over the course of the days. Here are a few examples [page numbers in brackets]:

> [468] Saw Humble [bumblebee] go from great Scarlet Poppy to Rhododendron—[...]. Humble alighted on base of filaments & reached nectar =again= between them, hence quite below stigma. & so avoided it. On certain days Humble seem to frequent certain flowers, to day early, the great scarlet Poppy—

> [551] Sept. 4th. Lyell in his Principles talks of it as wonderful that Elephants understand contracts.—but W. Fox's dog that shut the door evidently did, for it did with far more alacrity when something good was shown him, than when merely ordered to do it.—

> [463] Waterhouse showed me the component vertebrae of the head of Snake wonderful!! distinct!!—He would not allow such series showed passages—yet in talking, constantly said as the spinal marrow expands, so do the bones expand—instead of saying as the brain is created &c &c

Freedom

Don't think about what "ought" to be in a journal or notebook. Make it legible to yourself for future reference, but then include anything that helps you work on the ideas you have in mind. Darwin's notebooks contain solid facts, wild speculations, large and small questions, lists, dates, and crude drawings that convey little to any other reader, but were good enough for him. This is a reasonably good reflection of any person's mind at work, and is just right for the working journal. Here we find his ideas jammed together, feeding on each other, and coexisting for reasons that may or may not be apparent.

Very often, journal writers imagine someone reading over their shoulder and discovering just how confused and trite their thoughts really are. Darwin seems to have overcome that constraint pretty thoroughly! Your journal is yours, it is an extension of your own thinking in the same way a hammer extends the power of your hand. Write for yourself only.

> [466] My view of character being inherited at corresponding age & sex, opposed by cantering horses having colts which can canter—& DOGS trained to pursuit having PUPPIES with the same powers instinctive & doubtless not confined to sex.—Is not cantering a congenital peculiarity improved. Probably every such new quality becomes associated with some other, as pointing with smell.= These qualities have been given to foetus from before sex developed—Double

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(Journals, continued from page 5)

flowers & colours breaking only hereditary characters wh. come on in after life of Plants—also goodness of flavour in fruit—all affected by cultivation during life of individual.

[551] Plato (Erasmus) says in Phaedo that our " necessary ideas " arise from the preexistence of the soul, are not derivable from experience.—read monkeys for preexistence—

[234] Thomas Carlyle, saw with his own eyes. new gate. Opening towards pig.—latch on other side.— Pigs put legs over, & then snout lift up latch & back.—

Cultivation

A journal requires cultivation, as with a garden—visit, weed, move, plant, churn, fuss. A notebook really only becomes a tool for thinking if you revisit it in many ways—if you write for yourself, you also need to be a reader of your writing. Here is where the diversity and freedom of the collection become most valuable—when you revisit it with questions or concerns in mind.

Furthermore, it is important not to treat entries as sacrosanct. Argue with yourself, add better wording, raise questions, put in cross-references to later pages. In an area where you're actively thinking, it helps to keep track somehow of the layers of thinking—dating later comments, or using different ink, anything to help keep track of the twists and turns of the inner conversation. Darwin reread his notes, added to them, corrected his own mistakes, added references and wisecracks, and later ripped out pages to use in other notebooks. In the examples below (and above), text in boldface was added at a later date, usually in a different pen or pencil.

[466] Rhododendrum--nectary marked by orange freckles on a upper petal; bees & flies seen directed to it--The Humbles in crawling out brush over anther & pistil & one I SAW IMPREGNATE by pollen with which a bee was dusted over. [rude sketch of this] Stamens & pistils curve upwards, so that anthers & stigma lie in fairway to nectary—Is not this so in Kidney Bean. How is it generally. —In Azalea it is so.—In yellow day lily, the Bees visit base of upper petal, though not differently coloured—& stamens bend up a little.

[463] Bats are a great difficulty not only are no animals known with an intermediate structure, but it is not possible to imagine what habits an animal could have had with such structure. Could anyone. have foreseen, sailing, climbing, & mud-walking fish?

[578] one carries on, by association, the question, "one [or what] will anyone, especially a women think of my face,"? to one [or one's] moral conduct.—either good or bad. either giving a beggar, & expecting admiration or an act of cowardice, or cheating.—one does not blush before utter stranger,—or habitual friends.—but half & half. Miss F.A. said to Mrs. B.A. how nice it would be if your son would marry Miss. O.B.—Mrs, B.A. blushed. analyse this:—

Darwin used his journal not just for recording, but also for interior dialogue—as a way of coming to understand his own thoughts and learning patterns. Darwin's notebooks are especially powerful, not only because of the quality of the mind displayed before us, but also because we know that for much of the time that Darwin struggled with his ideas, he could not confide in anyone else. Darwin's journals are a great source of insight about how to manage one's learning—as friends' or colleagues' journals may be, too. Ask around about how people keep their journals. For a wider perspective about how people use journals in many fields, see Fulwiler (1987). For a fascinating story by a teacher-researcher, which gives some idea of how she uses her notes and journals to reflect on her students' learning, see Ballenger (1999).

I encourage you to return with your own current burning questions to your neglected journal with diversity, freedom, and cultivation in mind, and find your own way to make this ancient, simple, and reliable cognitive tool work for you.

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Excerpts from Darwin's journals from Charles Darwin's notebooks 1836-1844. Reprinted courtesy of Cornell University Press.

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Plant Distribution Reports

New records and significant distribution reports for New Mexico plants should be documented by complete collection information and disposition of a specimen (herbarium). Exotic taxa are indicated by an asterisk (*), endemic taxa by a cross (+).

— Kelly Allred [PO Box 30003, New Mexico State University, Las Cruces, NM 88003]

****Pennisetum setaceum*** (Forsskål) Chiovenda (Poaceae, fountaingrass): Doña Ana County: Las Cruces, edge of cement drainage ditch along Buena Vida Circle, N32º 17.618' W106º 43.888', 4096 ft, 15 April 2008, Jessica Dominguez 8 (NMCR). [Although this is a commonly cultivated species throughout southern New Mexico, this is the first documented report of its escape to the wild.]

— Robert Dorn [Box 1471, Cheyenne, WY 82003]

Salix nigra Marshall (Salicaceae, black willow): Quay County: Ute Lake at Logan, north side ca. 1/2 mile above dame, 3800 ft, 13 July 2007, R. Dorn 10302 (UNM). [This substantiates one previous report for this species (Great Plains Flora Association-atlas).]

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Kelly Allred

What's In A Name?

[Ever notice those two little dots above the letter e in some names of plants? Just what are they and what do they mean, you ask? A recent proposal to amend the International Code of Botanical Nomenclature (ICBN) explains matters — ed.]:

(002–003) Proposals to recommend usage of the diaeresis mark on the letter e (ë) in Latin names

[Taxon 57(1):314-315. 2008]

Jacek Drobnik & Barbara Bacler

Article 60.6 of the ICBN (McNeill & al. in Regnum Veg. 146. 2006) states that the diaeresis (e.g., on the letter e), indicating that a vowel is to be pronounced separately from the preceding vowel (as in *Cephaëlis*), is *permissible*. In fact, *ë* exists in botanical Latin on purpose. The diaeresis mark plays an important role in botanical Latin: *(1)* It detaches some prefixes and suffixes from roots which begin or end with the vowels *a* or *e*, e.g., *neo-*, *pseudo-* in *Ficus neoëbudarum* Summerh., *Pseudoërnestia* (Cogn.) Krasser.; *-ensis* in *Limonium tarcoënse* Arrigoni & Diana. *(2)* The use of *ë* indicates Greek origin of roots of which names are built, e.g., Greek *aër-* ("air") is not Latin *aer-* ("bronze"), Greek *phaë-* ("glittering") is not Greek *phae-* ("brown, sombre"). *(3)* The letter *ë* could also differentiate the pronunciation, and it really does so, when a Latin name is read by users of a language in which it is possible to imitate the classic pronunciation. Simplified spelling is discordant with the original authors' intentions. The first taxonomists did use the diaeresis in their validly published names (see for example some Linnaean names: *Aloë* L. 1753, Sp. Pl.: 319–323, *Hippophaë* L., l.c.: 1023–1024, and *Isoëtes* L. l.c.: 1100). Omitting the diaeresis mark makes impossible the proper understanding of the scientific names etymology, because it deforms their Greek, Latin or Latinised roots. According to Rec. 60H.1, the etymology of names should be clear. Moreover, Rec. 60A.1 states that names derived from Greek should be transliterated in conformity with classical usage. Given this, the ICBN should at least recommend usage of *ë* (it is merely *permitted* under Art. 60.6).

(002) Add a new Recommendation 60H.2 and associated Example:

"*60H.2.* For better understanding of names, use of *ë* is recommended in order to: *(1)* detach groups of letters *ae* and *oe* which belong to different roots; *(2)* distinguish some roots derived from Greek; and *(3)* facilitate appropriate pronunciation."

"*Ex. 1. Pseudoërnestia*, *Ficus neoëbudarum*, *Limonium tarcoënse*, *Aëranthes*, *Aloë*, *Isoëtes* is a better spelling than *Pseudoernestia*, *Ficus neoebudarum*, *Limonium tarcoense*, *Aeranthes*, *Aloe*, *Isoetes*, respectively."

(003) In order to make clearer that the diaeresis is permissible, amend Articles 60.4, 60.5, and 60.6:

Add at the end of Art. 60.4: "The diaeresis on *e* is permissible too."

Add "*e* or *ë* " to the first sentence of Art. 60.5 so that it reads: "… where the letters *u*, *v*, or *i*, *j*, or *e*, *ë* are used interchangeably …".

Add at the end of the second sentence of Art. 60.6 (transcription rules) the clause: "French and Dutch (but not Latin) *ë* becomes *e*." 🕮

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