Chapter 14
A Tale of Two…Glasses?

John Brown

It was the best of wines, it was the worst of wines … port wine, that is. But I'm getting way, way ahead of myself. So let me start again….

I consider myself a microlepidopterist—not a tiny person who studies moths, but a normal-sized person who studies tiny moths. Although we may boast a long legacy of champions—Linnaeus was actually the first person to describe a microlepidopteran—I really do not think of us as having many of your standard time-honored traditions … but of course, I could be wrong (duh!). Like most scientists, we enjoy bashing, or at least augmenting, modifying, or fine-tuning the hypotheses, concepts, and methods of those who came before us—nothing is sacred. Our science, like all science, moves forward by questioning the findings of our predecessors, mentors, and peers. Furthermore, in the constant barrage of technological advances, there are fewer and fewer systematic and traditional methods that we have in common with those who laid the foundations of our science. For example, Edward Meyrick (1854–1938), the "godfather" of microlepidoptera who described over 14,000 species of little moths, relied exclusively on superficial characters of the wings and body. His descriptions of new species were concise and accurate, but woefully incomplete by today's standards. Nonetheless, as a teacher of "the classics," each and every one of the Latin names (all species must have a scientific or Latin name) proposed by Meyrick is exceptional in its Latin derivation and grammatical structure. The closest some of us cretins come to Latin today is pig-Latin. The study of Latin? Now, there's a long lost tradition.

In the 1920s, the British pair of F. Pierce and J. Metcalfe began exploring the concealed anatomy of the male and female genitalia through careful dissection of the abdomen of adult moths. It was not long before these structures became the primary character for differentiating species, and their use in descriptions of new species became standard and essential. We still rely on these characters but perhaps

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not with the same zeal. Later came scanning electron microscopy (SEM)—probably most skillfully embraced by Don Davis (National Museum of Natural History)—which dug deeper and deeper into morphological features barely discernible using dissecting and compound microscopes. Although SEMs were not employed by the masses, owing to the inaccessibility of electron microscopes to many workers, Davis and others discovered many morphological features of considerable value in deciphering the relationships among families and other groups of mostly primitive moths. As for SEMs, well, I do not see them much in the Lepidoptera papers anymore (although I recently included a pair in a paper).

By the mid-1980s, the use of computer-assisted methods for crunching data to build the much sought phylogeny of groups (trees or diagrams which portray genealogical relationships) were in full swing, with highly contentious arguments regarding which algorithms or mathematical models best revealed the "true" (HA!) phylogeny of any given group. During this period, those who organized groups by phenetic methods (based on overall similarity) were replaced by the cladists (Hennigian phylogeneticists) who organized groups based on shared advanced characters. Computers have not gone away … yet.

By about 2010, even the most traditional systematists (i.e., oldest, or more diplomatically, most senior) had seen the molecular light and were embracing the use of at least one gene (the mitochondrial gene cytochrome oxidase I—a.k.a. the "barcode of life") to differentiate taxa and/or identify relationships. There is nothing like a big ol' neighbor-joining tree ("neighbor-joining" referring to the mathematical algorithm that links or clusters the DNA sequences by similarity) to keep a systematist entertained for hours! That's not to say that the previous, traditional methods were abandoned with each advancement—many merely took a backseat as the new methods were incorporated into a growing toolbox of systematic techniques.

To be perfectly honest, there are many things that I do today the very same way I learned to do them in graduate school back in the 1980s. But that's not to say I do them for traditional reasons. I suspect I do them mostly because I am just too lazy to change. For example, I learned to make microscope slides of the genitalia using Canada balsam as the mounting medium. Today, a material called euparol is the medium of choice—it makes clearer slides that potentially last longer without yellowing—but I just cannot seem to change … too old and set in my ways, I guess. I also do other things in a rather old-fashioned manner; I frequently use blocks (something you might find in an old curiosity shop) rather than spreading boards to set specimens. Hmmm. But some of this can be explained by personal preference, simple resistance to change, or plain laziness in my case, rather than "tradition." However, in contrast to my turn-of-the-century predecessors, I use a battery-powered ultraviolet light (blacklight) and a plastic bucket trap with a light-weight aluminum funnel and plexiglass baffles rather than a Coleman lantern and a bed sheet to attract moths at night; I use plastic Nalgene vials and 100 % alcohol in a freezer kept at − 80 °C to preserve specimens for molecular analyses; and I set (= pin and spread) my microlepidoptera in small plastic boxes with dense plastozote foam. Hence, in regard to methods and techniques, even though I may

be old fashioned, there are exceedingly few things I do that can be considered "traditional."

So how about Lepidoptera traditions from a social perspective? Although I consider myself a rather gregarious sort, I am at loss to come up with many traditional social aspects of lepidopterists … although I can think of a stupid one. At the annual meeting of the Lepidopterists' Society, the incoming president receives, from the outgoing president, a headband that bears a pair of styrofoam antennae at the end of pipe cleaners; and he is obliged to wear these antennae for the remainder of the business meeting. Now there is a fine tradition.

So now that I have convinced you, or at least myself, that there are a few traditions in the Lepidoptera world, let me tell you about a tradition known only to a handful of microlepidopterists, a tradition of which I became aware just a few years ago….

My story begins with Thomas de Grey, sixth Baron Walsingham (1843–1919; known simply as "Walsingham" to most microlepidopterists), who was born in London and educated at Eton and Trinity College in Cambridge. Lord de Grey sat as a Conservative member of the British Parliament from 1865 until 1870 when he succeeded his father and entered the House of Lords. In stark contrast to his political obligations, Walsingham was an avid lepidopterist and collector, primarily of microlepidoptera, an avocational interest that developed at an early age. His collection (estimated at over 260,000 specimens), which was eventually sold to the British Museum (now The Natural History Museum, London), was among the most important ever assembled. For many of us, Walsingham is to microlepidoptera systematics what Darwin is to evolutionary theory. His impressive published works and massive collection represent an invaluable cornerstone of the foundation upon which the modern systematics of many microlepidopteran families is based.

When Godman and Salvin embarked on their grandiose project near the turn of the nineteenth century, a series of volumes titled *Biologia Centrali-Americana,* Walsingham was drafted to write the volume on microlepidoptera (Volume IV, Lepidoptera-Heterocera, published 1909–1915). Early in the process, Walsingham enlisted the assistance of August Busck (1870–1944), a Danish-born American entomologist who worked for the U.S. Department of Agriculture (USDA) at the National Museum of Natural History (USNM), Smithsonian Institution in Washington, D. C. Busck's expertise included many microlepidoptera groups, especially those in the New World tropics; he had spent a considerable amount of time collecting in Panama, prior to the construction of the canal, investigating mosquitoes as vectors of diseases. Busck was a careful worker with an exceptional publication record, and he was revered and respected by colleagues and students, alike. He was largely responsible for the tremendous growth of the microlepidoptera collection at the USNM through fieldwork and acquisitions of major collections. In 1908, Busck was invited to England to help his friend and colleague, Lord Walsingham, with the *Biologia* volume treating the microlepidoptera of Central America. Among the things that Busck brought back with him upon his return to America was a pair of small, handsome port wine glasses etched with the Walsingham crest, which Lord de Grey had given him as a symbol of friendship and gratitude (Fig. 14.1).

Fig. 14.1 The Walsingham glasses given to August Busck

In the late 1930s, as Busck's career was winding down, the torch was passed to young John Frederick Gates Clarke (1906–1990) ("Jack" to his friends and colleagues) who came onboard the USDA at the USNM. Originally working on macrolepidoptera (the larger moths), upon the retirement of August Busck in 1940, Jack switched to microlepidoptera, following in Busck's footsteps, making his greatest contributions to the study of these small moths, and like Busck, primarily the superfamilies Gelechioidea and Tortricoidea. Jack's highly productive career at the USNM (1936–1975) spanned that great transition from the early American, turn-of-the-century lepidopterists (e.g., Schaus, Dyar, Busck, Heinrich, et al.) to the modern, or at least current, lepidopterists that occupy offices at that institution today; that is, Don Davis, John Burns, Robert Robbins, Alma Solis, Mike Pogue, and I, all overlapped with Clarke to some extent (the youngest of us as postdocs after Clarke's retirement). As a driving force behind the creation of an Entomology Department separate from the Department of Zoology at the Smithsonian, and as its first chairman (Jack jumped ship from the USDA to the Smithsonian in 1953), Jack had a significant and lasting impact on the collections, the staff, and the overall success, notoriety, and productivity of the department.

Immediately before coming to the museum, Jack had begun work on his PhD at Cornell University, which he left in 1936 to take a position with the USDA, enticed by the highly lucrative salary—$3200/year! Jack was stationed at the museum most of his career, but served in the Army in Europe during World War II. After the War he was detailed to the British Museum (Natural History) to compile a series of catalogs on the types of microlepidoptera in that museum described by Edward Meyrick. The result was an impressive eight-volume set that provided for the first-time images of adults and genitalia of these types (the unique specimen upon which the concept of a species is based) to the world community of lepidopterists. For that work, he received a PhD from the University of London in 1949. Before the War, Jack worked closely with Busck, and near the end of Busck's career, he passed to

Fig. 14.2 Tortricidae in the USNM collection *(Left)*. Lepidoptera on spreading blocks *(Right)*

Jack the handsome pair of port glasses that Busck had received from Walsingham. The glasses were among Jack's prized possessions.

Jack was a skilled field biologist and an active member of a local group called the Washington Biologists' Field Club, serving as its vice president in 1984–1985. He also was known for his culinary skills, and particularly for his potatoes with a "small dash" of whiskey that were served at the club's events on Plummers Island. The club was organized around the turn of the century (ca. 1901), and August Busck, an avid field biologist and collector himself, was one of its early members, elected to membership in 1903. Hundreds of specimens of microlepidoptera collected by Busck on Plummers Island (ca. 1901–1910), the club's "research station," are deposited in the collection of the USNM (Fig. 14.2). One of the long-term goals of the club was to compile an inventory of the biota of the island, and both Busck and Clarke contributed to this end. In Jack Clarke's oral history, he recalled that Busck left the club early on (ca. 1910) when the club unjustifiably raised its annual dues from $2 to a whopping $3, obviously too steep for Busck.

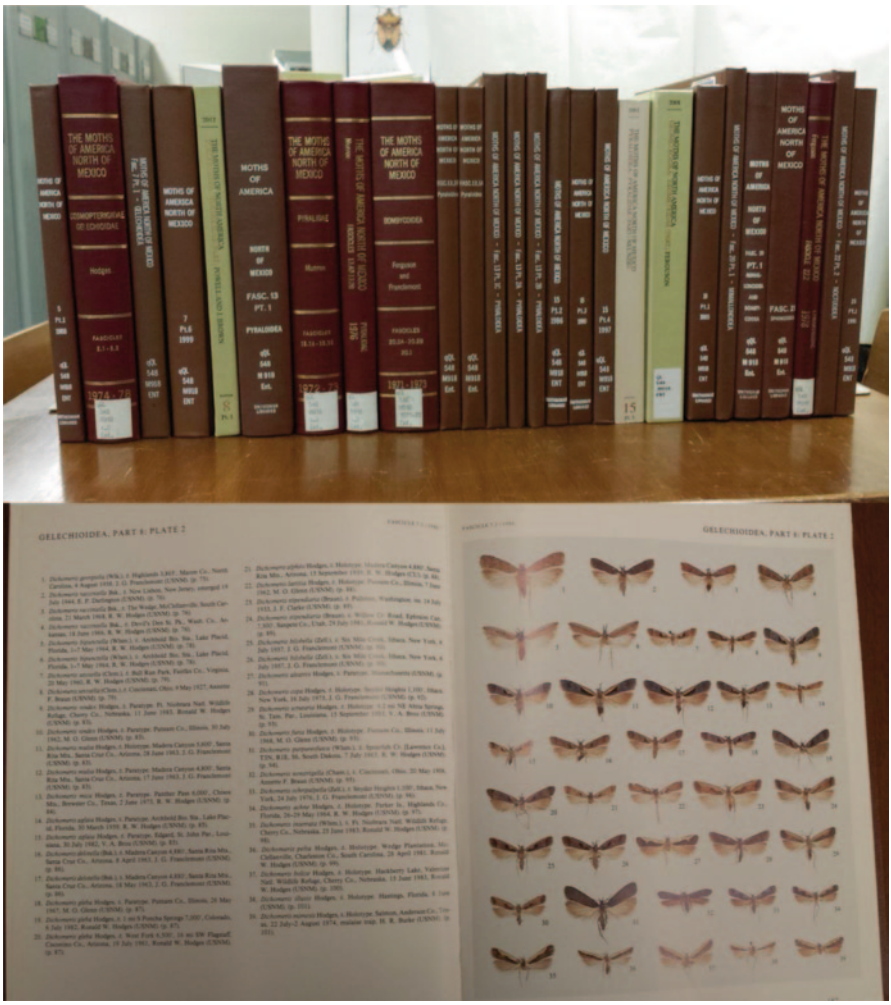

Fig. 14.3 Fascicles published by the Wedge Entomological Research Foundation *(top)*, with a page of illustrations from a Gelechiidae fascicle *(bottom)*

In the early 1960s, the long legacy of Cornell students in the USDA's Lepidoptera unit who had been trained by Jack Franclemont began at the USNM with the hiring of Ron Hodges. For many decades thereafter, virtually all of the moth taxonomists/curators at the National Museum (i.e., Donald Davis, Ronald Hodges, Douglas Ferguson, Robert Poole, and postdocs such as Richard Brown) were students who earned their PhDs at Cornell under the guidance of Franclemont. Ron's forte was the microlepidopteran superfamily Gelechioidea, a group whose systematics was pioneered by Busck and subsequently studied extensively by Clarke. Like Busck and Clarke before him, Hodges was also an enthusiastic field biologist. He also was an excellent curator, a prolific publisher of scientific papers, and a superb preparator of microlepidoptera specimens (reflecting his training from Franclemont).

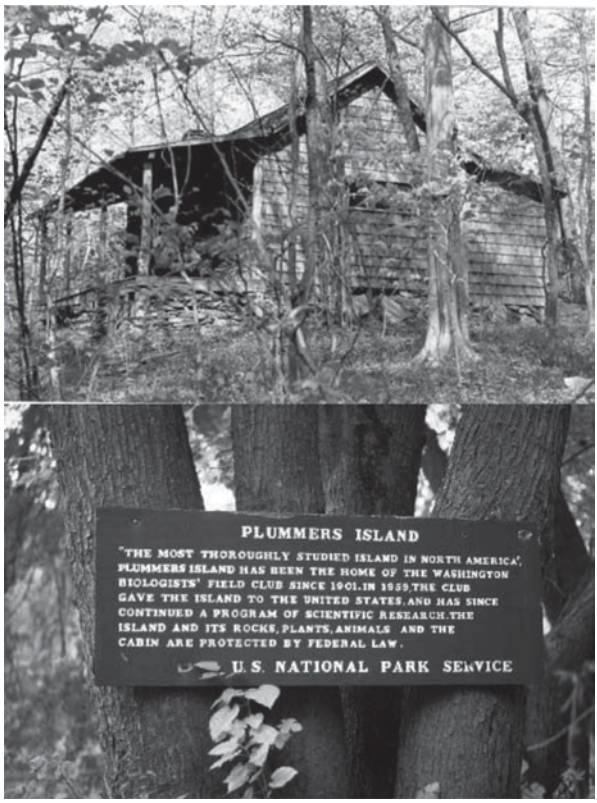

Fig. 14.4 Historic cabin at the high point on Plummers Island *(top)*, and sign at entry point to the island *(bottom)*

Specimens collected and prepared by Franclemont and Hodges are immaculate, easily recognized in the USNM collection, and hence, frequently used for illustrations in scientific publications. Ron was an active member of the Washington Biologists' Field Club, serving as president (1976–1979) and as "cook" during the biannual outings on Plummers Island (Fig. 14.4), inheriting this chore from Clarke. Ron and his wife Elaine (a noted scientific illustrator at the National Museum) were participants in many museum activities and were fixtures at all Entomology Department functions. With Clarke's retirement, the microlepidoptera torch passed to Hodges, and so did the Walsingham glasses.

Ron was extraordinarily farsighted in regard to the future of Lepidoptera research on the North American fauna, and in collaboration with several colleagues, founded the Wedge Entomological Research Foundation (in the late 1960s) with a substantial endowment from the Dominick family. The flagship publication of the foundation, a series of fascicles called *The Moths of North America* (a.k.a. *MONA*) (Fig. 14.3), became the premiere vehicle for the publication of systematic monographs on the fauna of North America (north of Mexico). Ron contributed fascicles on Sphingidae, Cosmopterigidae, Oecophoridae, and Gelechiidae (one on Dichomerinae and one on the genus *Chionodes*), and for these contributions he received the

Lepidopterists' Society's prestigious Karl Jordan Medal in 1997. After a remarkably productive career of over 35 years with the USDA's Systematic Entomology Laboratory (SEL) at the Smithsonian, Ron retired in 1997.

In January of that year, I joined the staff of SEL as Ron's replacement—truly a dream come true for me. I was a late bloomer and had been unable to find a position in systematics after earning my PhD at the University of California, Berkeley (1988), followed by a postdoctoral position at the Smithsonian Institution, and a technician position at the Los Angeles County Museum of Natural History. I was working as an environmental consultant in San Diego, California when I received the call from Ron asking me if I would be interested in applying for the position. I was 45 years old when I started with SEL, but despite my age I was the proverbial kid in a candy store. To come to work every day to the Smithsonian, to play in the enormous moth collection at the National Museum, and to share my scientific findings via published papers was absolutely unbelievable. I suspect I appreciated the position more than most because I had spent a considerable amount of time in private industry in a job that was not particularly fulfilling, and I had always dreamed of a position in research, but had abandoned that dream.

The focus of my research was and still is the family Tortricidae (known as leafrollers); I concentrated on those groups of interest to American agriculture—pests, invasive species, biological control agents, etc. Unaware of the "traditions" of my predecessors, I accepted an invitation to join the Washington Biologists' Field Club in 2000, serving as its president in 2008–2011. I spearheaded the publication of an inventory of the invertebrates of Plummers Island (2008), and I remain active in the club's activities. Like my predecessors, I have a passion for fieldwork, participating in faunal inventories in Costa Rica, Miramar Air Station in San Diego, the Great Smoky Mountains National Park, and elsewhere. I also have indulged in many "bioblitzes," and I am an enthusiastic backyard collector of all families of Lepidoptera, but of course, mostly microlepidoptera.

In 1998, I was invited to become a board member of the Wedge Entomological Research Foundation, a position I graciously accepted. In recent years (since about 2007), my wife Poody and I have hosted an informal dinner following the annual meeting of the board. And in 2009, I became a part of a little-known prestigious (to me) microlepidoptera tradition. Ron secretly brought the Walsingham glasses to the dinner (with the assistance of John Burns), along with a bottle of very fine, old port wine. And as the evening wound down, Ron introduced me to those handsome little glasses, told me about their long tradition, and gave them to me. We toasted Walsingham, Busck, and Clarke with the fine port wine, which was aged and thick; it had to be strained with cheesecloth before drinking. And although I certainly did not recognize its quality (I am no wine aficionado), I savored each sip. It was undoubtedly the most memorable occasion of my entomological career, and it was highlighted by the fact that it was shared with several of my closest colleagues and best friends. Although it is unlikely that I will ever be in the same league as my predecessors, I am hoping that I have at least one more decade to continue to add to my lepidopterological accomplishments.

Few things in my life have given me the feeling of being a part of something big, something special, a sense of continuity with the past, and the feeling of passion, camaraderie, and discovery that I have experienced working on the systematics of microlepidoptera for the USDA at the National Museum of Natural History, belonging to the Washington Biologists' Field Club, serving on the Board of the Wedge Entomological Research Foundation, and possessing, even if only temporarily, the Walsingham glasses.

With my retirement this year, I grow eager to see to whom the Walsingham glasses may pass in the future. I anticipate that the USDA will hire a young microlepidopterist to replace me, and I have great expectations that he or she will have a passion for collections, descriptive taxonomy, and fieldwork shared by the former microlepidopterists who have occupied the USDA position at the Smithsonian Institution.

John Brown is a retired research entomologist. He received his bachelor's degree from San Diego State University and his PhD from the University of California, Berkeley. He has spent the past 17 years of his career with the U.S. Department of Agriculture's (USDA) Systematic Entomology Laboratory (SEL) at the National Museum of Natural History, Smithsonian Institution in Washington, DC. He has a passion for the systematics and diversity of Tortricidae, and he continues to work on the Smithsonian collection and conduct research on these ugly little brown moths. He has published over 170 research papers, notes, book chapters, and monographic treatments on Lepidoptera, and has served as the president of the Lepidopterists' Society, the Entomological Society of Washington, the American Association for Zoological Nomenclature, and the Washington Biologists' Field Club. He enjoys collecting moths, participating in Lepidoptera courses, and vacationing with his wife, kids, and grandkids.