

Recollections of Hawaiian Natural History and Conservation, with Steven L Montgomery, Pillar of Hawaiian Entomology

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I first became aware of Dr. Steven L Montgomery about twenty years ago when I was a graduate student; I emailed Steve asking for, and receiving, some assistance with my research. Little did I know at the time that Steve was a giant of Hawaiian entomology, and in hindsight, his kindness was a gift to a student like me. Over the years I have come to know more of Steve through learning about his achievements in Hawaiian entomology, especially his role in collecting and describing some of Hawai'i's most iconic arthropods: The happy-face spider (*Theridion grallator*), the predacious *Eupithecia* caterpillars, and the picture-wing *Drosophila*. However, Steve has also been active in Hawaiian conservation from pointing out the dangers of noise pollution to helping prevent eels from being aquacultured in Hawai'i to playing a role in enacting legislation aimed at protecting Hawai'i's native flora and fauna. Steve even has collected the first specimens of more than one endemic plant species. I sat down with Steve on 18 February 2024 in Gilmore Hall, at the University of Hawai'i Mānoa campus, and conducted the following interview, which has been lightly edited for clarity and length, though I have preserved Steve's wording as faithfully as possible except in cases of potential ambiguity. Following the interview are additional comments about Steve made by Frank Howarth and Kim and Forest Starr.

When I first sat down with Steve, he had a box of specimens to deliver to the UH Insect Museum. He also brought a

couple of old photos of colleagues, and he was much more eager to discuss them than himself. I listened with interest as Steve reminisced about the Gagnés, Frank Howarth, and others, and then began to ask him questions.

MJM: Steve, where were you raised, and what was your early childhood like, and how did you get interested in entomology in the first place?

SLM: Northern Indiana, and the 4H program—I did an entomology project where at age 10 I could enter a collection in the county fair and my brother Michael did that too. He was a year older, and in fact, I remember when I was 9, him telling me, “When you get to be 10, you can get into this program,” and the bigger kids, who were like 13 and 15, would teach you stuff. I can remember when I was going to one of these meetings the kids saw that I had a royal walnut moth (*Citheronia regalis*), the caterpillar was called the hickory horned devil, that I'd gotten with the help of my grandfather, and they said, “we'll give you five of (these) if you can trade (that) one” (laughs) but I decided I'd keep it, and I've never seen one since.

It ended up that Michael did go on into biology at Earlham College and after that went to Cornell for a doctorate in Insect Nutrition with people like (entomologist) Ring Cardé. Michael is retired now from the US Forest Service, working on (spongy) moth (*Lymantria dispar*) and then on hemlock wooly adelgid. It was

a pest of conifers in China, and he went three times to find beetles that could be used for biocontrol and that was a successful project. I went to Grinnell College, Iowa, after a year at Purdue, looking for a liberal arts college, something like Earlham, but I didn't want to be at my brother's college. There's where I met somebody from Hawai'i, who, after a couple years, said, well, "you need to come to Hawai'i. I mean, I went to spend the Christmas holidays at your family's place and it's your turn to take your first airplane ride." I told her that I couldn't afford to travel and that this was completely out of the question, but she used her persuasion and raised some funds, and we managed to come on a standby basis—it was pretty cheap on United in '67—so we did spend Christmas. And after a week, she said, well, "my parents have aged a couple years and I wanna stick around and get to know them; why don't we transfer to UH?" (laughs) And she used her persuasion to convince me to do that, so I actually spent my last semester taking classes here and decided to stick around when she decided it was time to go to Wisconsin and finish her bachelor's in psychology there, and that she needed to be independent of me and her parents. So, I felt like I was kind of (tricked into getting to) Hawai'i but it's worked out pretty well. There's so much to do and so many interesting people and a week turned into 50-some years.

MJM: Did you know from your 4H days that you wanted to be an entomologist?

SLM: Yeah, I was aware that you could go to college and specialize in insects. When I was 12 or 13, I was thinking I might be a farmer like my uncle and my grandfather, but I realized after shoveling corn for days and hauling tomatoes and cleaning out dairy cow stables that you'd be doing an awful lot of this and there wouldn't be

much time for insects so I made a goal to get a biology degree and go to graduate school and learn about plants and bird life. In fact, my first passion was collecting ectoparasites from wild birds and mammals; I still have a collection that I need to find a home for, of midwestern ectoparasitic insects. I think that being in Hawai'i and seeing that there was such an open field with so much within, say, 40 minutes, you could be on top of Tantalus, you could be in a native forest, and you could be finding (new) things or trying to find things like (British entomologist R.C.L.) Perkins' flightless fly, the long-legged fly (*Dolichopodidae*) that no one has seen since his type collections. I eventually did find some on the summit of Mt. Ka'ala, that (entomologist Neal) Evenhuis described, and I began to specialize in flies because (entomologist) Elmo Hardy had some money from IBP (International Biological Program) and wanted to hire a student to work on the ecology of non-*Drosophila* Diptera, and I certainly was into that because I was taking plant taxonomy and trying to learn the flora as best I could and going out with people like (teacher and botanist) John Obata and (botanist) Darryl Herbst whenever I could get into the field and see them firsthand.

So (entomologist Wayne) Gagné and I started going out every Sunday with Obata who's an intermediate science teacher and one of his students was Sam O. Gon—I don't know how much hiking he did, that's another story I guess, with Obata, but for about a year and a half we went out like 40 weekends a year on Sunday and came back with a lot of interesting things. That's when we supplied (photographer William) Mull, I mean when the first happy-face spider photograph was made it was soon after we brought it down from the Pu'u Pane area of Mt. Ka'ala, thinking it might be photogenic, not really knowing just what it was and that it would lead later to Gon



Steve Montgomery and the author, 18 February 2024, UH Mānoa

getting his doctorate on that and getting a grant—they had to find somebody when he got his Nature Conservancy job to take over the grant and that’s when (professor and evolutionary biologist) Rosemary (Gillespie) came from Tennessee I believe to finish out that work and then applied for the position that was opening up.

The position that (Gillespie) took was in the evolutionary biology program that was established by the legislature—that’s another project where people like Wayne and I put together testimony that said we had this tremendous biological resource in Hawai’i and it ought to be used. And we found a champion in Senator James Aki who lived in Wai’anae and one of his staff persons knew I was a biologist and, Michael Meriwether was his name, asked me, “what does the university need? You’re a grad student there.” And I said, “it needs a program in evolutionary biology. It’s a missing opportunity that we don’t really

play up this huge asset we have and build up some scholarship.” So, they put a bill in, and people like Wayne and I showed up, and (entomologist and UH professor Ken) Kaneshiro and his student Lorna Arita, to testify in favor of it, and the university showed up and testified saying that “it’s not in the administration’s budget, and we do not support this.” In fact, (chair of the UH Mānoa faculty senate executive committee) Barbara Z. Siegel said, “well you know, we ought to have something in tropical biology, but I don’t think evolutionary biology would be a great idea.” So Aki went ahead and his bill passed over to the house side and then it came to the finance committee, there was a representative from Kaua’i who was so upset with the university, it was kind of embarrassing to sit there and be in favor of this bill for an evolutionary biology program and then hear the university oppose it—and the witness for the university was instructed

by the chairman of the committee not to use the word “university” because he (the chairman) was so upset by the university, (and he instructed the witness) to refer to (the university) as “it.”

And it was passed, and you can go ask Kaneshiro about this because he already had his doctorate, and he was trying to build up things as he was one of the big advocates for it but was getting resistance from Dr. Siegel and others who were relics of another era, hanging on and blocking progress, in our opinion. So that’s a story that I think needs to be known, that it was a struggle just to start really focusing on our own assets. We’ve shown, I think, how much grants can be brought in and how much interest there is and we’re able to collaborate with people from all over the country and I think it’s great that Berkeley has a strong interest in Hawai’i and the Pacific, all the work they’re doing in French Polynesia.

MJM: I read some of your *Eupithecia* research and I noticed in the acknowledgements you mentioned (British Museum of Natural History lepidopterist) Klaus Sattler, and I was curious, did you spend time with him at the British Museum?

SLM: He arrived in Hawai’i because of (Elwood) Zimmerman’s encouragement. He met the Hawaiian *Hyposmocoma* while Zimmerman was struggling through preparing his microlep volumes (of *Insects of Hawaii*). So he was persuaded to take up the project and spent three months in ’73 and came back in ’77 I think, or was it ’76, for another three months, and it was good timing from the point of view of the environment because there was a huge debate going on whether Japanese eels, unagi, *Anguilla japonica*, should be imported and used for aquaculture and people like Ken Kato and other people with the state DLNR felt that this would be a huge export

industry but scientists like John Maciolek who was with the Cooperative Fisheries Unit, based in Edmondson Hall, believed this would become an aquatic mongoose, essentially preying heavily, if it escaped, and they’re the “Houdinis” of the fish world, that are so competent at escaping capture. In fact we went to a hearing in Lā’ie, which is where this aquaculture was supposed to take place, and in advance we’d sent around some information, some articles, that showed eels coming up in toilets in Massachusetts, the North American eel, and there was enough testimony and concern and there were people like Dr. Ishmael Stagner who was on the faculty at BYU (of Hawai’i), local residents just did not warm up to the idea at all of eels coming to their neighborhood. So (laughs) the proposal was disapproved. In fact, Klaus Sattler had something to do with it because he’d worked with eels as a student while he was in Germany and his testimony was quite convincing with his German accent, that these fish cannot be contained in the way that you propose, that it’s too risky, they’re going to naturalize, and you’re going to have yourselves a serious predator, just like Dr. Maciolek said.

So Alan Ziegler, who was a veteran from helping to block the axis deer importation—I don’t know if you’re at all familiar with what a huge battle (that was), I mean the proposal had been fought by the ranchers on the Big Island for a long time, they went all the way to the supreme court and lost, so the state was going to use its executive powers to ship these in. The deer project was decryed by the zoo director Jack Throp—at the time he pointed out the only reason the state’s doing it is because the politicians are forcing him to do it but it doesn’t make any sense scientifically or zoologically, so at about that time, UH students put together a petition and took it to the governor and said that, this is 1970, there’s a new approach called

doing an environmental impact statement that hasn't even been considered for the deer, (and) it should be done, so when (Mayor) Frank Fasi and his zoo director were criticizing the governor for this, he said "I'm not responding just to the political pressure of the hunters and politicians on the Big Island, I'm responding to the pressure from the university students who asked for an environmental statement to be done and I'm gonna ask the department not to do anything on the axis deer until they've completed the EIS." And that was giving us time to go to the legislature and support something called an Animal Species Advisory Commission, or ASAC, and it was the solution that Senator Nadao Yoshinaga proposed after conferring with a legislative reference bureau, so I've written up a little (currently unpublished) story about that and essentially said that any species that was imported to Hawai'i or proposed by the state for transfer between the islands, whether it be the white-winged pheasant or axis deer, (must be considered by the ASAC). (For example, in) the past, pronghorn antelope were released on Lāna'i with the state cooperating with Castle & Cooke and mostly they promptly ran down into the ocean and started swimming and drowned, but there were a few that hung around for about 20 years and they died off slowly.

Anyway, the whole mentality of turning Hawai'i into a zoological adjunct to the continent, with continental dominant herbivores and game birds, that was winding down with the application of more science. Alan Ziegler, Andrew Berger, Ruth Gay, and Frank Radovsky of the Bishop Museum were all appointed by the governor to this commission when it was set up and all these proposals were brought before it and the eel was subject of more discussion too. In fact, there was a law passed adding it to the "completely prohibited" category that included Gila monsters and fruit bats

and hummingbirds because they would pollinate pineapples and might cause seeds to grow in the pineapples. So, we got (the eels) into the most restricted category, like snakes (laughs). Anyway, that's one of the reasons it took Wayne and I a little longer than average to get our degrees, because there were so many important biological issues that had to be worked out in the public arena. A lot of people had no idea that Wayne was a Canadian citizen because he knew so much about Hawai'i and was so involved in its future that it's quite surprising to them to learn that he'd spent his childhood and got his degree at McGill before he came to Berkeley in order to do his graduate work in Hawai'i at (entomologist Robert) Usinger's suggestion. And Usinger himself is a model because in the '30s he did the seed bugs of Hawai'i for his own doctoral work.

MJM: I'm curious if you have a favorite group of Hawaiian insects that you've worked on, or a most memorable discovery, or both?

SLM: Well, when Hardy assigned me to work on the ecology of Diptera, he meant non-drosophilids, because there was so much attention already being given by so many people, but when you go out into the forest and start collecting flies and looking for fly larvae and trying to identify the larvae that you've found in plants, there are some interesting non-*Drosophila*. (For example,) asteiids, and I've reared one from *Erythrina*, the wiliwili tree from dry forests near Kona, a brown colored thing just like the bark of the wiliwili tree, and (Hardy) happened to be working on that volume of *Insects of Hawaii* and was sending (specimens) off to people like (entomologist) Curtis Sabrosky when he needed help on certain families. But he described several new species, and one of them was from the wiliwili called *Asteia*

montgomeryi, and (this tied into) the work I did with Obata, since we were going to all these hot-spots of hala pepe (*Chrysodracon*) plants and pāpala kēpau (*Pisonia*), and ōpuhe (*Urera*), olonā (*Touchardia*), every one of these turned out to be having quite a few drosophilids, a number of asteiids, and a few other sorts of insects, even though I focused on (the insects found on) *Cyrtandra*, trying to get an idea of what these little midges were that were living under *Cyrtandra* leaves.

There was also *Scaptomyza cyrtandrae* and it was present on every island, and then there were craneflies that were leaf-miners in *Cyrtandra* leaves and had quite unusual behavior for the (Limoniidae). But all the flies that were brought back that were *Drosophila* were so interesting that Hardy and Kaneshiro described a lot of new species, naming one for John Obata because of his assistance to the project, and with these new host plants being found, I mean, when I would go to Moloka'i to ask Noel Pekelo, who was the forestry and wildlife enforcement officer there, where can I find olonā, he said "if you go to Mapulehu, I've seen some up there in the ravine, so go ask Mrs. Pearl Friel if you can have permission—it's private land." And she granted that permission and I went up there and the plant was there and the flies were there and I brought the larvae back and I reared them and Elmo Hardy described it as *Drosophila toxochaeta*, the sister species to the one from O'ahu found from the Castle Trail in Punalu'u, which he called *Drosophila touchardiae* after we first reared it. And then on Maui there's another species that's in that lineage and I found a few larvae and (members of that lineage) on the Big Island that have not been described because we didn't get enough specimens that survived when we went into the Kohala Mountains in a trail that's now collapsed due to the earthquakes. So that's unfinished business.

In the drosophilids, there's still many more to come. In fact, I took (entomologist) Karl Magnacca up by the Nu'uuanu Pali and in 20 minutes of hiking from where the tourist spot is, you can come across a population of *Charpentiera*, at least you could ten years ago, and that *Charpentiera* had a long, pointed-winged *Drosophila*, which looked like *virgulata* from Maui, and he said no, that's different, we're going to call it *Drosophila moli*, so he gave it a name and he sorted out that *lanaiensis* was a name that had priority over *virgulata* so now the Maui and Lana'i one are called *Drosophila lanaiensis*.

So, it was kind of a disappointment in a way that I didn't do my master's degree on non-*Drosophila*. I ended up publishing on the ecology of the Hawaiian *Drosophila*, the picture-wings in particular, putting all this data together. And that was okay with Hardy. We helped a lot of programs and in fact when we went to the Kohalas to do some general collecting and *Drosophila* (collecting), we stayed—it's a very difficult thing to get into the central Kohalas—we used the Ditch Trail that goes in and out of Honokane Valley and Pololū Valley, that's the one that's broken by landslides now. And the sugar plantation closed, of course the mule operation closed, and Dale Sproat who was our guide—he was the ditchman, his job was to go in there, and they had a cabin they maintained, so we could stay in the ditchman's house, built in 1920 or so. It was quite luxurious work in a very wet, remote place, and we found lots of *Touchardia*, lots of 'ohe'ohe (*Polyscias*), and many other hostplants like *Pisonia* and hala pepe (*Chrysodracon*). So, (evolutionary biologist and professor) Hampton Carson was very disappointed that no one had found *Idiomyia* (an earlier genus name for many Hawaiian drosophilids [ed.]), which were the giant drosophilids, in the Kohala volcano, the oldest part of the Big Island, when they're all over Maui, (and

they're down in the rest of the Big Island, (so Carson said,) "WHY NOT?!" So, I had never seen or collected one of these, because I was pretty new on the project, but I knew that they were associated with *Clermontia* elsewhere.

So, I started looking for all the *Clermontia* plants and on the third day I came in with a fly I collected on *Clermontia* that looked like it might be an *Idiomyia* and they were all packed up and ready to head out and I showed them the fly and (Carson) said, "YES! It's in the *silvestris* group." (After) the first one, in fact, he said "let's try to get another one." So, he and I stayed over for a final day to go back to the same plant and there was a natural bait, a rotting stem, it wasn't just the banana baits that we brought in, so we got a second one. And he ended up saying it's the "fly of the year" because it had so much genetic information that helped him work out his *Idiomyia* phylogeny. In fact, it was the day before he established the *Idiomyia* prize—he said he's going to give \$25 to anybody who got one of these. (laughs) So he paid up, which was kind of nice for a graduate student, from a member of the National Academy of Sciences.

MJM: What did you do with the money?

SLM: I bought food! Tunafish! (laughs)

MJM: I have a special request question from a worker over in the Pacific Biosciences Research Center, which is, what would you say is the most interesting species of Hawaiian *Drosophila*?

SLM: Of *Drosophila*! Interesting! (grins) Probably the ones that have the biggest mysteries. And I would say, right now, to me, it's (*Scaptomyza*) *crassifemur*, and its sister species, like (*S.*) *reducta*, because no one has documented what the larvae do for a living. It's funny—it's on every

island and has a very unusual reproductive system, and (biologist Michael) Kamby-sellis and I have talked about it when he was around, and they've got—they're one of these things that keep eggs till they get very large, and when they lay the eggs, the larva is ready to go and probably doesn't take too long to develop. So, to me, that's so fascinating, because they've made some kind of adaptive shift. They're doing something that most *Drosophila* don't do, and I've gotten hints from my study of caterpillars, and I can't say anything more about it because Ken (Kaneshiro) and I were just talking about it recently. We've got that one specimen that I've reared that was associated with a caterpillar and we don't know what it was doing because we didn't witness the whole life cycle, but it's doing something very un-*Drosophila*-like. So, we'll just leave it at that. The ones that have mystery behind them are very important, I think, to follow up and document the breadth of this adaptive radiation. I mean, we have drosophilids like the ones that feed on the surface of green, living *Cyrtandra* leaves, (like) *Scaptomyza cyrtandrae*. We have *Scaptomyza* that crawl around on the sticky fruits of the pāpala kēpau (*Pisonia*), eating that glue, and maybe the dead insects that get stuck in there and that can't get off. It actually pupates right there, and emerges, and somehow the fly doesn't get stuck in the glue, and goes off to find another *Pisonia* fruit to lay its eggs on. So, there's lots of candidates for the most interesting fly, but I would say the (*S.*) *crassifemur* fly has got my fascination piqued right now.

MJM: Do you have a favorite place to do field work, and if so, what do you love about it the most?

SLM: Hmm... (Long pause.) That's like asking a person with eight children who is their favorite! I'd say that if I had to pick

one on each island, I think Kalua‘ā Gulch on O‘ahu would be my favorite because it was so productive and it has such a rich flora, visiting it with Obata in the ‘70s, I don’t know if it still has the (*Cryptocarya*) tree in the Lauraceae family, but that’s the only known (host) of a psyllid that makes a gall on the leaf of the tree. But there were *Drosophila* reared from *Strongylodon* fruits and there are plants like *Joinvillea*. We haven’t found *Drosophila* on it or many other insects, but it’s just such a magical place to see all these plants. There’s the usual pāpala (*Charpentiera*), ōpuhe (*Oreora*), and ‘ohē‘ohē (*Polyscias*). (It’s) mesic—it’s got elements of dry and wetness, especially you climb up and get some ‘ōlapa (*Cheirodendron*) on the ridge tops, so that would be one on O‘ahu.

On Lāna‘i, it would be Kaiholena because it’s got a regular cloud that comes in at night, it’s 2500’ or so, and it’s got things like *Cyanea grimesiana*, that was still hanging on among the dense ginger patches and strawberry guava. Sometimes it’s really sad to go back to these places and see how the canopy of strawberry guava has thickened and shaded them out and really essentially evicted the native flora. So, this is why I’m really a strong supporter of the proposal for a \$50 million biological control lab for the USDA on the Big Island to replace the one here on O‘ahu and hopefully our senators get that money in the budget so that we can be a regional biocontrol testing facility for tropical (areas)—Hawai‘i, Samoa, Guam, lots of places would benefit. Florida has a lot of the same weeds that we have so we can do work that would benefit them as well.

On Maui, I think maybe it would be Waikapū because Waikapū doesn’t have any deer or goats. It’s extremely rich flora, and three times I’ve been in there, every time we get great loads of things. I was able to take Karl Magnacca in there,

and (biologist) Durrell Kapan, along with (native guide) Keahi Bustamente, who was the guide who helped introduce me to that place. I was telling Keahi we should be on the lookout for *Hibiscadelphus* because there’s none known from West Maui at the time, and sure enough, a couple years later, they found a gulch, with not only a new species, but the biggest population of hau kuahiwi (*Hibiscadelphus*) of any of the known ones. Usually when they’re found they’re just a couple of plants. In the case of North Kona, there might have been 20 or so when Rock described *Hibiscadelphus hualalaiensis* and now it’s down to zero in the wild but it’s being replanted and is in gardens.

I was able to help (botanists) Ken Wood and David Lorence on Kaua‘i to locate the type habitat for *Hibiscadelphus woodii*, which brings me to why I think the back of Kalalau Valley is probably my favorite collecting site, specifically not just Kōke‘e in general, but specifically the back wall, as you drop down from the plateau, into Kalalau Valley, because it’s mesic, and there’s a transition there, it’s the type locality of *Hibiscadelphus woodii*. Also, I brought back specimens of (a) mint, (and a) euphorb, and an aster, now described in endemic genus as *Remya montgomeryi*, known only from cliffs near the rim of the valley, plus *Stenogyne campanulata* and ‘akoko (*Euphorbia eleanoriae*). One day (laughs) I was reaching up at just about the goat browse level and I brought back a *Remya* which I assumed was *kauaiensis* and (botanists) Derral Herbst and Warren Wagner, when I took them in the museum the next week, they said, “that’s not *kauaiensis*, it’s new, and we’re going to describe it as *Remya montgomeryi*.” And the mint I brought back that day was a *Stenogyne* and it was fuzzy and a different color and somebody else described that one as a new one. So, that’s pretty good when an entomologist can come up with

two new species of plants in a day. We find *Wikstroemia* and there were real rare *Drosophila* called *craddockae*, (which were) split off from (*D.*) *grimshawi*, I believe (*D.*) *craddockae* is just O‘ahu and Kaua‘i, that is a place where you can find (them)—we had a trap, and Kapan and I had a trap with some banana baits and we caught a member of the *hawaiiensis* group which kinda shows that it looks like it’s new. A single specimen and it’s sitting in a collection somewhere. We’ve gotta get more. (Kalalau Valley is) still a hot spot, both for plants and for insects, because there’s been enough goat hunting, they’re not so thick as they were elsewhere, and because it’s that transition between the wet zone and the dry zone where you have a great diversity.

Moloka‘i, it would be Transect 7, above the Kolekole cabin—have you been into that locality?

MJM: Yes, several times.

SLM: So, if you go up from there, there’s complicated geology—it goes across a stream and a little bit through a lava tube. I had to spend an extra day up there because I got off the flagged trail, I couldn’t find it, it was getting dark. And during that single night, the extra night that I spent, I found the first *Aumakua omaomao* sister species, probably a new noctuid compared to what we have on Kaua‘i, that Klaus Sattler described. I got the first specimen of *Eupithecia phaeocausta* that came to light and then something that’s undescribed, which laid a few eggs, and the larvae, I reared it out and it’s a new species. I call it the “liverwort look alike” caterpillar, because it’s very segmented, bristly. When it sits on tree trunks, it disappears among the liverworts and the mosses. So that’s its ambush site. It’s one of the magnificent 18 species of carnivorous caterpillars so far we’ve found just on Moloka‘i, and then

later I found it on Maui, in the cloud forest zone. They can’t really survive on bare tree bark unless it gets regular moistening by the clouds, I guess. You don’t see them below 3000’, they like it on ridge tops, they get drenched by clouds quite a bit.

So, that leaves Ni‘ihau, and my favorite place there is the place I haven’t been to yet: The summit. I’ve been on the coast and collected a few things there, but I (hope to get permission). I think the last biologist who did work over there was Harold St. John in the ‘40s.

MJM: Do you think you’ll be able to make it out?

SLM: Well, who knows. I’ll just have to make a proposal. I first wrote to him in 1970 about going into some of their Kaua‘i land, they said, “well, we’ll let you walk up Hanapepe Valley,” which wasn’t too productive because it’s mostly weeds in that area. But I’ve gotten to know Keith (Robinson, one of the owners of Ni‘ihau) pretty well and he’s deeply interested in Hawaiian flora, so he might warm up to the idea of doing more field work. Since we know a lot about the flora and fauna about Kaho‘olawe, we know there are still things hanging on. I saw your paper describing the lowland things (Medeiros et al. 2017, Zool J Linn Soc). Yes indeed, we may not have too much longer. I mean the ‘Ewa lowlands, it’s harder to get *Plutella capparidis* over there on the caper plants (*Capparis sandwichiana*) due to ants and the reduction in the number of capers, but maybe it’s still there, we’ll have to find out. I think I found some of the lowland *Thyrocopa*—I can remember finding the larvae at Pacific Missile Range Facility—have you been to the west part of Kaua‘i, where they have a *Dodonaea* shrubland on that land the military controls?

MJM: I have not collected out there, no.

SLM: So, I think I got a few adults, but I can't recall. I do know I remember finding the larvae that were behaving just like they do in Haleakalā crater, feeding in clumps of debris that catches under and behind stones or someplace. It's just amazing they can eat this cellulose—that you can make a living off of it. But caterpillars are—you know the wax moth caterpillar will actually eat plastic bags? (laughs) So maybe they can help us deal with the plastic pollution.

(Ed. note: Somehow, we forgot to discuss the Big Island.)

MJM: Do you have any advice for the younger generation of Hawaiian entomologists, or topics you hope future workers will focus on?

SLM: Pay attention to the flora. It's so important for understanding what's going on because they've co-evolved. In some cases, the plants benefit directly from pollination, but especially the insects, they play a big role in recycling those nutrients. I mean, *Drosophila*, they are basically saprophages and they help prepare the way for new plants and we've had some debates of whether the Araliaceae or the Lobeliaceae (now Lobelioideae [ed.]) were the more important plants to the drosophilids, and I think the persuasive arguments that Magnacca and (biologist Patrick) O'Grady have made convinced me that it's the Lobeliaceae and since we're losing so many of the lobeliads, we may not have so much time. *Neogramshawi* is a *Drosophila* that hadn't been collected for many years until Karl (Magnacca) found a few on the summit range of Ko'olau and it's only been reared from *Cyanea* rotting bark, so as the *Cyanea* decline, that fly is going to be disappearing and become even more difficult to find. So, I'm really encouraged that we have the Plant Extinction Preven-

tion Program that's doing a great job of outplanting things.

There were stories that Hardy heard and read where (malacologist F.W.) Terry would bring in snails that had flies and I think that (Otto) Swezey reared some of these flies and I don't know who pinned them up—I haven't seen the actual specimens—but the mystery is *Dyscritomyia* blowflies were reared by Terry from living land snails, not dead rotten ones, but living ones! So, there may have been something going on there that's going to be hard since *Achatinella* is virtually extinct in the wild. But who knows, maybe somebody will get lucky and bring in a snail and a fly will come out of it, and the fly won't kill the snail. There are of course *Sciomyza* flies that live on nothing but snails, and in fact they were brought to deal with the liver fluke situation on the Big Island there and they've naturalized. So that might be another example of an adaptive shift in the blowflies, to take advantage of all these mollusks, in the same way that *Hyposmocoma molluscivora* has shifted over into using this abundant resource.

MJM: Steve, what are your plans for the future? What are you excited about working on next?

SLM: I'm pleased that there have been a couple *Eupithecia* brought in by others. One of them from the Ko'olau Mountains appears to be intermediate between the *monticolens* type and the carnivorous type in the structure of its legs. And now that we have some material, I think with (lepidopterist) Camiel (Doorenweerd)'s help and (lepidopterist and professor) Dan (Rubinoff)'s help we might be able to do some DNA work on these geometrids which will help solve some of these mysteries of how this radiation came about and where some of the species' limits are. For my doctorate, I described the caterpil-

lars of about 18 species, and half of them don't have names yet, partly because of the absence of lepidopterists from the island. I was kind of (pulled away from studying) *Drosophila* by having people with so many questions, and it's so interesting to try and find out what's going on in this unusual adaptive shift. There are a few aborted starts of other people, but maybe now that we have resident lepidopterists — I mean one of Sattler's projects was going to be to help with that and he taught me a lot on how to prepare microleps and how to identify some of them. So, you'll notice in the collections I've sorted out, some of them were determined by Sattler and he made another trip here some years ago and I had him look through my collection and help me name some things so I could produce these environmental reports where I was doing insect surveys as lands are being developed. Especially in Kona, we had a lot of projects there, and that's when we found a new species of *Plutella* that bores in the fruits (of *Caparis sandwichiana*). It has nothing to do with the leaves but is a fruit feeding one, so (Sattler) described some of those but Camiel's very interested and we're going to see if we can get some more material to describe those microleps properly and expand on what the British Museum guys did, based on what we shipped them.

Other loose ends, beside *Eupithecia* and *Plutella*, are the (*Drosophila*) *crassifemur* mystery, what that fly is doing. And there are still some big picture-wings where we don't know what the adults do. Quite puzzling, in fact, so it'd be nice to solve those and when I have a chance to get into the field, I try to bring back larvae and rear them. We have some predictions but one of them is, or what used to be called *Grimshawomyia*, it's a tiny fly, it looks like a picture-wing but it's not, it's a smaller thing, more close to the *Scaptomyza* or something, it's never been reared. We find

it in places like Mokule'ia, Mākua Valley, and there's a species from another island, but we only have maybe only 20 or 30 in collections. It'd be nice to know what they're doing for a living.

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Appendix 1

Reminisces by Francis G Howarth

Steve and I first met in 1969 when we shared an office at the start of our graduate studies at UH-Mānoa with Dr. D. Elmo Hardy, and we soon became good friends discussing topics of mutual interest. In 1970, I joined B.P. Bishop Museum to curate the Hawaiian arthropod collection, where I shared an office with Wayne Gagné. With funding from the International Biological Program, the 1970s began a period of renaissance in Hawaiian biology. The three of us soon began collaborating, and off and on for over two decades, conducted insect surveys in Hawai'i. Those were heady times with each field trip resulting in the discovery of many new and remarkable species. Steve, Wayne, and I joined in a friendly rivalry over who could find the strangest new animal or phenomenon. Wayne coined the descriptor for these as "new naturals and non-pollutants." We teamed up with nature photographer, William P Mull, who produced exquisite photographs of

many of our discoveries. Bill considered us as his mentors and called us “the three cricketeers.” Bill was enthralled with the excitement and significance of our novelities and became a leading voice promoting conservation biology in Hawai‘i.

Steve was indefatigable in the field, and rarely stopped collecting at the agreed upon time. His idiosyncratic tardiness was well-known and inspired many “timely” jokes by those who joined him in field-work. However, his skills in observing and collecting were exceptional and often resulted in us forgiving his unpunctuality. His most notable discoveries included the predatory caterpillars and their radiation, the happy-face spiders, and new species and biology of Hawaiian *Drosophila*. Each of these breakthroughs has led to new fields of research.

Appendix 2 **Forest and Kim Starr’s spin on** **this quirky entomologist** **(Montgumball)**

Whatever the market will bear

When we were first getting going in consulting work, we asked Steve how much we should charge. His answer was “*Whatever the market will bear.*” At the time, we thought he was being shifty, since we just needed a number we could use. Over time, however, we realized that was the best answer, as our rate does indeed change over time and by client.

Become the insect

While collecting insects at Kanaha Pond with Steve, we spent some time looking for *Manduca blackburni* on tree tobacco. In order to determine where to look for eggs and small larvae, Steve imagined being a female *Manduca* moth, flitting about, looking for sites to lay eggs. That mental exercise has greatly helped us when searching for *Manduca* and other species.

Go for it

We had a project once helping figure out the native tephritid flies on Maui. When we asked Steve how best to collect *Trupanea artemisiae*, the host plant of which is mostly found hanging off cliffs, his suggestion was “*spiked tabs and net extensions.*” We were thankfully able to find some *Artemisia* plants we could reach without imperiling ourselves. But it shows the lengths to which Steve would consider going, and inspired us to go for it.

Eat/sleep/breathe it (homeless guy)

During that same Kanaha Pond collecting era, we light-trapped with Steve until we were too tired and had to go home. He just spent the night by the sheet at the pond. The next morning, our friend who was helping us with coastal restoration at Kanaha Beach saw Steve sacked out by his disheveled sheet and thought he was a homeless guy that busted into the pond. No, we said, that’s the great Hawaiian entomologist Steve Montgomery.