17 May 2019 Ken Walker (kwalker@museum.vic.gov.au) Museums Victoria. Edition 60.

Hi All –

It is with a tinge of sadness that this will be the final BowerBird Bugle – and issue 60 seems to be a nice round number on which to conclude. I have certainly enjoying writing each issue and highlighting the wonderful uploads from people like you.

This week I was contacted by an "entomological entrepreneur" who wanted to collaborate with the museum by running a series of workshops at the museum. Interestingly, he termed these workshops "business events" and he provided a link to his website. In a nutshell, his workshops centred on taxidermy and artistic expression. At each workshop, participants could select either a dead specimen of a Ulysses Blue butterfly or a Death's Head Hawk moth. Participants were shown how to relax specimens and then how to correctly stage them on setting boards and how to position the antennae, wings and abdomen. People were then provided with a glass fronted, wooden box in which to mount their set specimens once rigor mortis had set in and the wings were not going to move. At bottom of the webpages was the cost of $400 per person per workshop. He asked to come in to see me and to discuss ideas of collaboration.

My reply compared his approach to entomology from a taxidermy and artistic direction to my direction of biodiversity discovery mainly through the capture of images. I emphasised my well-worn phrase of "show me what's in your backyard". I then gave several examples of discovery from BowerBird posts and talked about empowering people to do science in nature and how the public can make significant contributions to our biodiversity knowledge. I offered to meet with this person but suggested we targeted difference audiences. Privately, it seems that he wanted to use the museum as a backdrop attraction for this private business and that's not what museum's do.

I have not yet received a reply and with fingers crossed, I secretly hope that my lengthy reply showed we had little in common with our entomological directions.

BowerBird began as a germ of an idea about 2007 or 2008. I had developed an online website for Australian Biosecurity called PaDIL – Pest and Diseases Image library. As the name suggested, it was a virtual, diagnostic collection of exotic pests that quarantine wanted to keep out of Australia. It had begun when the Commonwealth has failed to secure through overseas museum purchases about 25 specimens per species for a wide range of pest species. These pest specimens were to become reference material to be deposited in AQIS quarantine centres around all of the major airports and other Australian quarantine centres.

In the late 1990s, I had developed a website with the horrible name of "Bioinformatics". It was the first attempt to provide public access to museum specimen data records for Victorian species of butterflies, snakes, frogs, lizards and mammals.

People thought I was mad to do such a thing – Why would the public want access to museum data? I was asked many times. In the early 1990s, I had written a small book titled "Spiders commonly found in Melbourne". The museum decided not to publish my text and images but the Royal Society of Victoria offered to be the publisher and I accepted. This Melbourne only spider book proved to be a roaring success. I spoke to a friend who had attended pre-natal classes at a Melbourne hospital and part of the information pack supplied by the hospital contained a copy of my Melbourne spider book to each participant. I was amazed but it taught me the value of concentrating on local issues rather than State or Australia wide issues. Alternative spider books available at the time provided Australia wide treatments. So, if someone in Melbourne wanted to identify a spider found in their backyard, they would have to page through the entire Australia wide book to initially find Victorian spiders and then if distribution maps were provided per species then see which of the Victorian species occurred in Melbourne. My little red spider book made it easy for Melbournians to discover their own spider fauna.

So, when I developed the museum dataset website Bioinformatics, I remembered the lessons of the little red spider book. Instead of providing a full data dump for every record we had per species and letting people wade through reams of information searching for some information relevant to their specific question, I allowed the online users to select their own data. This was done in two ways and both involved maps. I divided a map of Victoria and of Melbourne into a grid system and you could ask for data from any individual or from several grids for each species. People loved it.

I will give two examples. Frogs are notoriously difficult to find in the wild but it is easy to hear and record their calls. The museum has over 25,000 pickled frog specimens all named and with location data. So, someone could listen to and record a frog call from their local frog bog. Then they could open up Bioinformatics (I still hate that name!) and using the Melbourne map grid, they could find out what species of frogs have been recorded from their local area. Each species of frog returned to the query had an image of the species but importantly, I had gained access to Murray Littlejohn's frog call tapes which I had digitised. The user would have perhaps six frog species returned for their area and then they could listen to each of the six frog calls and identify their frog. So, 25,000 dead Victorian frog specimens allowed Victorians and Melbournians to ask their own local fauna questions and get answers.

The second example amazed me. A group of people associated with a nature reserve somewhere on the Mornington Peninsula, decided they wanted to replant the park with plants species about in the 1950s. So, they went to the Bioinformatics Butterfly dataset. They used the map grip query system, which also allowed users to select either a month or decade to query. This allowed them to ask: "What species of butterflies occurred in the Mornington Peninsula in the 1950s". From the species returned, they went to the food plant data I had added per species and began to compile a planting species list guide for their nature reserve based on the plant species eaten by butterfly caterpillars recorded in the 1950s from their area. I was stunned when they thanked me for provided such a dataset and they told me what they had used the data for.

I learnt that day that Fact Sheets, which provide voluminous amounts of information but on the basis of you get it all or

nothing, was not the best way to allow the public to get answers to their own questions.

Both Bioinformatics and PaDIL were one way traffic websites – the user could ask questions of the dataset but could not input or add data to our databases.

In 2007, the Atlas of Living Australia was launched which heralded a new way of accessing biological data. Much of the ALA came from museum and herbaria datasets. Now these institutions have a wealth of legacy data but little current data on the distributions of plants and animals today. Museums are no longer funded to conduct large and non-specific surveys to collect and record species. Citizen science was beginning to make a name in biological data capture and I saw an opening to create such a website for the general public to inform science of these current day distributions. At the time, NatureShare was running a citizen science website but was restricted to Victorian records only. I spent many hours speaking to Russell Best on what worked and what didn't work with NatureShare. Finally and probably to keep me quiet, ALA funded the development of BowerBird which went live in May 2013. What I loved about BowerBird was that anyone could create a Project and when other people joined that Project and contributed image records, then a critical mass of data was built. My own Project was Australian Native bees which started out with just me in the Project but now has 524 people who have contributed over 4,000 image records from around Australia.

BowerBird was always offered for free and I have since learnt that it costs money to offer something for free. The main yearly cost of BowerBird is hosting it in the Amazon cloud. The

BowerBird programmers argued that it needed two virtual servers – one for the software and one to store the images. We initially tried using just one server for both software and images but the website ran very slowly. So, hiring two virtual servers is more expensive than hiring one. I have been able to manage to secure sufficient funds to support delivering BowerBird. However, the situation changed when software problems occurred about 12 months ago. The first was the decision by Google Maps to charge for the use of their maps – previously Google Maps had been a free service. The second software problem occurred with data uploads to ALA. Every night, BowerBird creates a complete data dump for all of its records. Then weekly on a Sunday afternoon, ALA would hoover up these records and display the BowerBird dataset on ALA. By uploading the complete BowerBird dataset meant that any identification that had changed or been updated took only one week to be corrected on ALA. The software programmers created a data dump program that had an expiry time of five hours. At the time of releasing BowerBird, that seemed like a reasonable if not excessive time limit. As we have now discovered, the five hour time limit times out at about 70,000 records but there are now over 120,000 records on BowerBird and so not all data can be downloaded from BowerBird nightly to be uploaded to ALA. This has been the case now for over 6 months.

I raised over $50,000 to fix these and other BowerBird software issues – that was the amount the programmers told me was needed to fix these issues. I paid the programmers these funds but when they began working on the problems, they realised the issues were much bigger than they had initially considered and would cost at least double what I had paid. I was not able

to raise double these funds and so none of the BowerBird problems have been resolved.

It took quite some time for me to be told there was insufficient fund to resolve the BowerBird issues. So, I waited for problems to be fixed but nothing happened despite assurances from the programmers. Finally, the time has come to say enough.

I believe that the Google Maps and ALA data upload issues will not be resolved. To me, a core component of BowerBird is the data uploads to ALA where the data is permanently stored, added to millions of other data records and displayed for all to use.

I am now recommending that if you want your citizen data to reach ALA, you should stop using BowerBird and start using the iNaturalist citizen science website (https://www.inaturalist.org/). Many BowerBird users have told me that they have already made this change.

Finally, I have no idea how much longer the BowerBird website will continue to be delivered. I believe it will stop sometime in the next six months but I cannot get an answer from the programmers on when BowerBird supporting funds with run out.

This is all somewhat disappointing news for everyone involved in some way with BowerBird. The website really has made some amazing discoveries. On ALA for many species, BowerBird records provide the only distribution points and species images. Several fascinating magazine stories have been published about BowerBird records.

We should all be very proud of the legacy that BowerBird contributors have built and the many lessons that citizen science has learnt from BowerBird.

Thanks from me to everyone involved with BowerBird. It has now run its course but there are other websites where new discoveries can be made and shared with the world. I do hope that BowerBird users will now engage with other citizen science websites and continue making valuable contributions about our natural world.

Thank you all and happy photographing nature. Citizen science is now a well-accepted and valued part of natural sciences. BowerBird and your contributions have helped to secure this status. Best wishes – Ken Walker

And finally, what's the last Bugle without Mark Berkery's

Nature Place

A Blue Banded Bee. I found him on the ground below the flowers. He was far from home but behaved as if new from the nest, struggling to take flight as if just born with some unseen impediment. But perhaps it was acquired in flight on a windy day.

He seemed energetic enough, and whole except for the hanging tongue and the apparently missing mandible, had come from some ways to the flowers. But here couldn't get into the air for more than a few seconds before falling back to earth.

The yellow on his back reminded me of how orchids will leave a sack of pollen on the backs of visiting insects, bees and wasp and such small flying creatures. What this was I think.

However, I gave him a hand, literally and by an available leaf to climb on. Often a bee having trouble at ground level will be successful from a higher vantage.

But no, was not to be, he just kept falling. So I brought him to the veranda table upstairs and set him up for a few shots before feeding him some sugar water.

He took lengthening breaks but he never gave up, always at the ready. And while I was momentarily distracted he disappeared. Into the wild …

He had done his job for the orchid, though he wasn't done yet.

Just beyond the shade of knowing.

Down on the pebbled concrete at the foot of the stairs, where the recent Curlew stood.

After watching him fall again and again I lent a hand. The one he's standing on above.

A leaf afforded more opportunity for a few shots, within reach and firm enough for his weight.

From the other side and above it is clear the pollen sacks stuck to his back have been torn.

And all the while his tongue is hanging down and unsheathed, not its usual position or condition.

The one mandible visible here and above is clearly ok and in place. But in other images its opposite is clearly out of place, maybe tucked behind the tongue sheath causing it to hang – can't really tell.

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Moving and stopping, to and fro, made for an exercise in capturing available backgrounds from varying angles.

And variations thereof ... uncluttered imagery. No emotion or thinking to distract from the simple being, or form.

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