

Heritage lecture / Allocution du patrimoine

By David J. Larson

Prairies then and now: Personal reflections on prairie entomologists and entomology

2005 Heritage lecture

It is an honor to be invited to give this lecture. Generally, it would seem that an old, venerable person be chosen. Just by letting nature take its course, one qualifies reluctantly for the old, but I don't know about venerable.

Age has one of two effects on how we view the world: we have either seen it all and are experts on everything and can solve all problems if you pay attention (viz. the coffee row in any small prairie café); or, the less sure we are that we know anything. I tend to be in the latter camp and about the only thing I feel I have any expertise on is me. Therefore I am going to talk about myself. However, I qualify this by using my experiences to talk about some entomologists and entomological experiences I have found memorable. I hope by sharing them we can identify some common experiences and review some aspects of the entomological environment and history of the Prairies.

My route to entomology

I think I was preadapted to the field. My mother says my first word was spider. This is not to say I think there are grand designs and patterns in history. I subscribe to the idea that history is "just one damned thing after another" (various authors, Arnold Toynbee). But in my sequence of damned things, it was those with an entomological basis that most influenced me.

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Paul Fields

This isn't unusual given my home environment. My father especially enjoyed the outdoors. His youth was spent on a homestead in southeastern Saskatchewan, and he knew about the expanse and sweep of the Prairies and the prairie biota. He introduced me to and involved me in these experiences and interests. Whenever possible we fished and hunted together throughout the years. My father had a job that took him outside a lot and he would quite often come home from work with some treasure he had found placed under his hat for safekeeping - e.g. a butterfly, a flower, an interesting feather. My mother was not a naturalist in the same way, but she was tolerant. She didn't object to me using her pots to render down mouse skulls to flesh them or having the lettuce crisper of the refrigerator full of diapausing insects. In summary I had a good supportive family, who not just tolerated my peculiar behaviors, but also actively participated in and encouraged them.

Watson Lake

My early school years were spent at the small airbase of Watson Lake in the southeastern Yukon. To us the known world was the Alaska Highway which passed nearby, and the string of airports along the Highway built as the North West Staging route in the Second World War. All around us was essentially unknown country - a true frontier. Having a frontier, specifically a geographical area that is essentially unknown, can have a great effect on one. There is curiosity as to what is there, for the possibilities are unlimited if you have a good imagination. Just walking to the edge

of the community put me at the edge of the frontier. In a modest way this was a personalization of the relationship America has with its West or Canada with its North. It provides an environment that encourages curiosity, activates the imagination and induces myths that foster exploration, in many ways aspects contained in the scientific process.

My first encounters with entomologists and entomological literature occurred at Watson Lake. The north is renowned for its biting flies. Each summer the Air Force sent survey crews of students to monitor biting fly levels on the airbase and when they reached a certain level, a DC-3 aircraft was sent in to fog the base and its residents with DDT, and this was followed up by truck-drawn foggers. Some of these people learnt about a kid who was interested in bugs, and I was sent a copy of *Insect Collectors Guide* (McMullan 1955). This, along with a copy of *Golden Guide to Insects* (Zim and Cottam 1951) which my father bought on a trip to the outside, were my bibles.

When I had finished elementary school, my parents feared that the kids, me especially, were going to go "bushed" if we stayed in the north so my father got a transfer out to Lethbridge. This return to civilization was not as big a shock as one might imagine. In the later 1950's Lethbridge was a small, rurally focused city. Farms were

small, and around the city were many small market gardens and abandoned fields so that country-side and town interdigitated. We lived in a new house but right on the edge of town where there were farm shelter belts, alfalfa fields with summer butterflies, irrigation ditches with salamanders, and Rancho La Brea-like tar pits from an old burnt-down oil refinery, all within several hundred meters of the house. Urban expansion later homogenized the area into housing but not before I had a driver's license and could look farther afield.

Ruby Larson

One of the most important events in my life was meeting Ruby Larson (Fig. 1). An entire talk could be devoted to the life and ideas of Ruby Larson. I am only going to look at few of her activities but biographies have been published by Riegert (1989) and Wasiak (2005) (an excellent biography that shows her sense of humor and enthusiasms). When I met Ruby she was a geneticist with Agriculture Canada at the Lethbridge Research Station. Although professionally a geneticist, she has broad interests and has been honored by both the Alberta and Canadian Entomological Societies. She has two major interests: scientific knowledge, and the process of doing science and scientific discovery.

Between 1958 and 1973, Ruby gave up her



Figure 1. Ruby Larson (front in white) and some members of her Science Club (back row, left to right; Joe Shorthouse, Dave Larson, Ken Richards and Doug Salt).



Figure 2. Science Club members who became professional entomologists: Joe Shorthouse, Dave Larson and Ken Richards.

private life on Saturdays to run a Junior Science Club. This consisted of a group of about a dozen Junior High and High School kids who liked science. We would get together at Ruby's house and talk about science and do science projects. There was a preponderance of activities related to entomology, for this was a major interest of a number of the kids. Ruby had a strong background and interest in insects, and there were resources at the Science Service Laboratory of the Lethbridge Research Station.

But Ruby gave up more than just her Saturdays. She had a remarkable tolerance of insensitive youth. We practically lived at her place - we had to tell her about new discoveries or ask her opinion or advice on things we had seen or heard.

Although her knowledge was encyclopedic, she was quick to point out what she didn't know but helped to show us how to find out through both the literature and personal observation. She had an extensive library, many items of which were bought for the Science Club. And she had a Wild dissecting microscope in the basement which she freely gave us the use of. It's no wonder such a resource spawned entomologists - three of the initial club members (Joe Shorthouse, David Larson and Ken Richards) ended up as professional entomologists (Figs. 2, 3).

She introduced us to Borror & DeLong (1954), the first serious entomology book that I had encountered, and a book that half a century of entomologists have since cut their teeth on. The Ento-



Figure 3. Map of Lethbridge, Alberta, with location of the homes of Ruby Larson and young entomologists.

mological Society of Alberta ran an insect collection competition during the time of the Science Club. For those of us interested in entomology, this competition provided a focus and a stimulus to our collecting activities. Each year we re-entered the competition and the collections grew into great unwieldy assortments of boxes that had to be transported to the annual meeting for judging and display. Most of the entomological community in Lethbridge became involved, answering our questions about collecting techniques and identification, and the transportation of the insect boxes. I especially remember the efforts made by Charlie Lilly (Fig. 4A) and Phil Blakeley (Fig. 4B). It was through Ruby that we made acquaintance with the entomologists of the Science Service Lab that led to various of us working for them as summer students, accompanying them on field work and even having them mentoring our university research projects.

Ruby directly or indirectly set each of us on our career paths. Joe Shorthouse remembers the start of his interest in galls when Ruby showed him a willow gall and suggested he investigate how the insect controls the plant growth so that a complex gall is formed. Again, mediated by Ruby, Joe met and worked for Alex Harper who, as part of his studies on aphids, investigated aphid gall formation. Similarly, Ruby was instrumental in introducing Ken Richards to Gordon Hobbs and his work and through this Ken followed a career looking at bees and pollination.

Norman Church

My first job in entomology was as a summer

student for Norm Church (Fig. 4C). From this job I learnt about political interference in research: I started my first day of work at 9 am and by coffee break I was laid off. The Diefenbaker government introduced an austerity program, and then, like now, it was the lowest on the ladder who took the hit. I was rehired about a month later.

Norman Church, an insect physiologist, was interested in insect development and as blister beetles develop more than almost any other type of insect with their larval hypermetamorphosis, he choose to work on them. A focus was the Caragana blister beetle, *Lytta nuttali*, probably because it was large, abundant and mysterious. When I worked for him and his technician Bill Pelham, the life history wasn't known. I don't know if it is now as I am not current in the literature. However, based on other species of blister beetles and species of *Lytta* the larvae were probably parasitoid/predators on grasshopper eggs or solitary bee larvae. It was easy to get fertilized eggs, for in captivity all these gross beetles do is eat, copulate and lay eggs. Bill and I took newly hatched larvae and tried to raise them on every sort of insect food readily available, the most successful being overwintering larvae of wheat-stem sawflies. The lab seemed to run on sawflies so fall was busy with people collecting wheat stubble containing diapausing sawfly larvae which were stored in cold for use in the various projects the following winter and summer. We all have done unusual, repetitive jobs at one time or another in the course of research. Collecting sawfly larvae was my initiation. This involved slicing the stubble longitudinally with a scalpel without



E. Gushul

Figure 4. A - Charlie Lilly; B - Phil Blakeley; C - Norm Church.



Figure 5. Gordon Hobbs and associates at Scandia Field Station. Hobbs in black hat, counterclockwise, John Virostek, two student assistants, Evan Gushul, Bill Nummi, Oswald Peck.

injuring the larva and extracting it with forceps - and doing it hundreds of times per day, day after day as the finicky blister beetle larvae toyed with the food and died. Rearing was never very successful, but Norm did get enough material for some work, especially his careful studies on embryological development and its contribution to the understanding of the evolution of the insect head (Rempel and Church 1971).

Gordon Hobbs

I never worked for Gordon Hobbs and was only peripherally involved in some of his projects. Nevertheless, Gordon is to me a hero and a legend. He and his associates, technicians Bill Nummi and John Virostek and photographer Evan Gushul, (Fig. 5) have been recognized for their excellent research and role in developing an important industry - leaf-cutter bee pollination of alfalfa (subsequently expanded to canola). This group was known to work hard, but they also knew how to play. The field work was often grueling but always an adventure with tales of both hardship and exciting discoveries. They traveled in a great boat-like station wagon loaded to the gunnels with entomological equipment as well as fishing rods, spotting scopes, etc. They worked hard but there are times that are meant for fishing or for tracking down the habits of that big elk in preparation for hunting season, and these

were not wasted. What they did was pursue field work as a life style with a good complement of fun.

Gordon was the bane of administrators. He had his own agenda and priorities and not much patience for a bureaucracy that stood in the way. I can remember staff meetings which when the discussion turned to things that interest administrators, Gordon would get up and with a muttered "God damn it" stride out. You can imagine his response when he was queried by administration over his lavish field expenses when as Evan Gushul informed me he submitted a claim of \$1.90 for the dinner party of the previous picture.

George Ball

When I went to University of Alberta I searched out George Ball (Fig. 6A). I had heard of him as an expert on ground beetles and as I had a leaning towards collecting beetles and had a few boxes of black beetles, I took them to him hoping to get some identifications. Finding George and his students was a reaffirmation of many values such as looking under rocks being one of the more important things one can do in life. George didn't name my specimens for me. Rather he gave me a space in one of the teaching labs along with a microscope and some pertinent literature and said that I was to figure out, with his guidance, what I had. This was an epiphany for me for I had previ-

ously been unaware of what diversity in insects really meant. The many black beetles gradually rearranged into numerous tribes, genera and species. Things that once looked similar were refocused into things of very different shape and structure. With this recognition of diversity came remembrances that all were not taken from under rocks but different habitats and habits suggested themselves.

George did several important things for me. He gave me a home and a sense of identity in the big impersonal university. I think this is a really important thing for students that our mass-production universities do not adequately cater to. The nomadic student is terribly disadvantaged over one that has a place to work and assemble material and to develop an identity. He, like Ruby Larson, provided a guide to the tools of research then said find out for yourself and stood back giving advice, suggestions, and a great deal of enthusiasm for new discovery. Amongst the literature George introduced me to were two very recently published works: Arnett's *Beetles of North America* (1963) containing George's excellent chapter treating the genera and higher taxa of Carabidae (Ball 1963); and Lindroth's *Ground Beetles of Canada and Alaska* (1961-69). These works have become classics and their appearance made ground beetles accessible and began a renaissance of ground beetle research. Lindroth's work is a classic to which I like to draw the attention of all entomologists. It contains all the components of a comprehensive faunal study but presented with a lightness and sparseness of touch that gets the essentials across very clearly. Many groups within the fauna could be made accessible to study if treated in works like this. Unfortunately there is a recent trend for more taxonomic papers in *The Canadian Entomologist* dealing with foreign insects than with the Canadian fauna.

Don Whitehead was a graduate student of George's at this time. Don was an extremely knowledgeable carabidologist and taxonomist and he freely gave of his time and advice. I best remember Don though for introducing me to the wonders of beetle diversity in the field. Three of us took a spring trip through southern Alberta: he, myself and my friend Ron Getty, an archaeol-

ogist. Don showed us the amazing things one could find by splashing, treading, digging, night collecting and other specialized collecting techniques. Ron kept us from vandalizing archaeological sites, for teepee rings and Indian stone ceremonial sites just look like rocks spread out conveniently for collectors. (Collectors on unbroken grassland please take note, for these archaeological features are often not obvious, especially if your head is down and you are not visualizing the larger picture of how the stones lie in relation to one another. Some people are as interested in the top side of rocks as we are in what occurs under them).

Andy Nimmo (Fig. 6B), also a graduate student of George's at this time but studying caddisflies rather than beetles, also did me a great kindness. I got a summer job collecting fisheries data on Great Slave Lake. Andy wanted a caddisfly collection from the region and arranged for me to have a supply of alcohol, vials and a field dissecting microscope. Armed with this equipment, a copy of Arnett (1963), and new found techniques for collecting I had a great summer of discovery. Living in the bush for the summer my coiffure was primitive to put it politely, and it wasn't helped by doing microscope work with the light of a red-hot pressure kerosene lantern. Even to this day the smell of hot kerosene and burnt hair bring back happy memories. I don't think Andy was disappointed with the caddisflies.

While at university, there were various subdisciplines of natural history that interested me and I did some casting around. Talking about options with an old rancher prompted him to make this observation. He said he had two bulls, an old one and a young one. The young one spent his time running around the pasture looking for cows but despite the effort was not being particularly successful in breeding the cows. The old bull on the other hand lay down by a water hole and every time a cow came by, which was twice a day for each cow, he got up and inspected her and did what was necessary, thus most of the rancher's production was from the old bull. In conclusion the rancher said "Son, find yourself a water hole". Well, I took his advice - and ended up studying water beetles. On reflection maybe I took him too

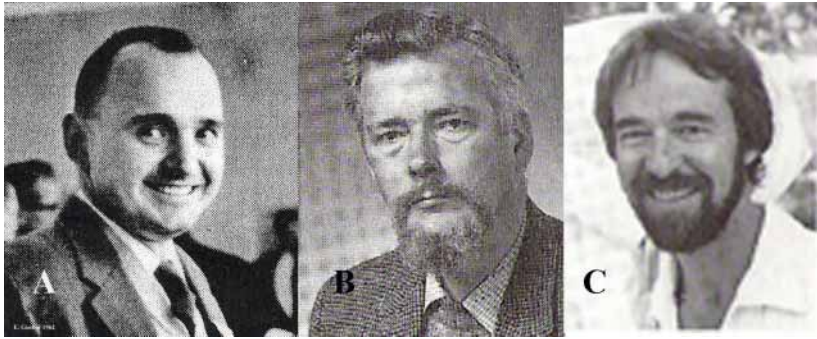


Figure 6. A - George Ball; B - Andy Nimmo; B - Gordon Pritchard.

literally - but I never regretted it and had fun in the water hole.

Gordon Pritchard

I ended up at the University of Calgary, working on water beetles under the supervision of Gordon Pritchard (Fig. 6C). A more supportive supervisor a student could not have. I hold that most graduate students graduate because of an irritation index (II) that reflects tension between student and supervisor. Over the course of the student's program this gets ratched up and when it approaches the homicidal level it drives the student to quit the sinecure of grad studies and graduate. This usually deflates the index precipitously. With Gordon I graduated in spite of the II not even registering. These were happy days of discovery and learning.

Bert and John Carr

When in Calgary I was informed by Hugh Leech, an eminent water beetle taxonomist then at the California Academy of Sciences, that John Carr also lived in Calgary. He knew John as a keen and knowledgeable water beetle collector, but who had been inactive for a while. I looked up Bert and John Carr (Fig. 7) and found them at a stage in their life when they were resuming their beetle collecting interests - and resume it they did with gusto. John and Bert had a superb knowledge of the beetles of Western Canada, and John especially knew the aquatics. He showed me water beetles in the same way Ruby Larson had shown

me insects and George Ball and Don Whitehead had shown me carabids. In spite of his vast knowledge and experience in beetles, John did not publish his work. He was a petroleum geologist by vocation and said his job had enough technical demands that he didn't want to carry these over into his avocation. However, he was happy to share his collection and observations with others and allow them to incorporate them into their work. When John and Bert's health failed and they were no longer able to work on beetles, in their characteristic generous way they donated their superb beetle collection, along with accompanying field notes, to the Canadian National Collection.

Following John's retirement, Bert and John traveled and collected extensively in western North America. Their knowledge and collection became well known to Coleopterists, both locally and internationally and their beetle bedroom became a Mecca for beetle people.

Bert and John became good friends and my wife and I spent many an evening at their place and in the field with them. The most memorable trip was a Larson family - Carr expedition to the Yukon to gather water beetle information for the Biological Survey project on Insects of the Yukon.

Do you ever wonder who your audience is when you write a paper? I always knew that I had an audience of at least one person - John. He read everything carefully and while always supportive and encouraging also had a good critical sense

and insightful comments.

The people I have discussed are only a small subset of entomologists who were active in Alberta during my period of entomological training. However, these are people who in my random walk through life I encountered and who through their kindness and interest in the discipline helped and encouraged me. Many other people helped in various ways, and I apologize for not having time to properly thank all to whom I owe gratitude. Riegert (1989) gives concise biographical sketches of many of these people.

A common denominator of the people I have mentioned is they all fostered doing entomology - that is getting out and making individual discoveries. This could be original research as in a graduate program or as a professional entomological researcher, or it could be discovery through the literature of entomology, not discovering new things at the boundaries of science but discovering things at the boundaries of one's individual experience. Geographical frontiers may no longer exist but knowledge frontiers in entomology abound and form a satisfactory substitute for the curious mind.

I have recently retired as a professional entomologist. Whereas in a professional life one has to focus on the boundaries of scientific knowledge and do original research, in my retired incarnation I can indulge in learning personally what other people already know. That is, I see myself changing from a producer of scientific knowledge to a consumer - to someone who can read and enjoy the accumulated wisdom and heritage

of the field. Too bad this is a luxury many will have to wait for retirement to do.

Reflections on life and entomology on the great plains

The preceding has been some reminiscences about my early experiences in entomology on the prairies. It also seems appropriate to reflect a little about prairie life and entomology. There are aspects of prairie life my wife and I like so we bought a ranch in southwestern Saskatchewan in the mid-nineteen nineties.

Since we have been on the ranch we have experienced a series of calamities. Just a partial list includes: flood, fire, drought, vermin plagues (maple bugs, blow flies, mosquitos, flea beetles, cutworms, voles, gophers and rabbits), late and early frosts, and a visiting friend came down in shingles so we say she had boils just to round out the biblical list of plagues. So far we have missed severe hail and grasshoppers, but they will come.

Aldo Leopold (1949) contended that "Every farm ... in addition to yielding crops and animals, should provide its owner with a liberal education. This crop of wisdom never fails, but it is not always harvested." Even if the farm does not produce agriculturally, there are things to be learnt and this is the motivation for our back to the land move.

The history of our place is typical of the prairie experience. Saskatchewan is often called "Next Year Country". Things didn't work out this year because of some unusual event which likely won't be present the following year. And often it isn't,



D. Larson

Figure 7. Bert and John Carr.

but there is still a crop failure due to some other factor. The prairie culture is full of quips on the harshness of the environment.

One of the early people to scientifically evaluate the economic potential of the Canadian prairies was Cpt. John Palliser in the late 1850's who concluded that the dry prairie south of the South Saskatchewan River (known as Palliser's Triangle), was unsuitable for settlement (Spry 1995). The regional wisdom is that we have spent the subsequent 150 years proving him right.

The plight of the prairie farmer is well summed up in a poem by the Sweet Songstress of Saskatchewan, Sarah Binks, who also recognizes the importance of insects in Saskatchewan culture. A portion of her poem *To My Father* (Hiebert 1995) illustrates this.

*I used to think the cut-worm and the weevil,
Were things that blindly come and go by chance,
And Hessian-fly an undiluted evil,
To make the farmer shudder in his pants;
But now I know they hold him to his acre,
For could he ever win and take his ease,
He'd up and leave his binder and his breaker,
And give the precious land back to the Crees.
The hopper should be cherished and be shielded,
And Hessian-fly is something we should trust -
If what we call the crop is ever yielded,
You'll never see the farmer for his dust.*

What are the implications of these environmental catastrophes for insects? Presumably they suffer the same fate as humans - some years things work and they prosper, other years the populations are devastated. Agricultural entomologists know this with the difficulties in forecasting pest outbreaks.

The northern Great Plains has a relatively rich fauna, but various entomologists have commented on the lack of endemism (Ross 1970). This is probably due to both the short-term vagaries as well as major long-term changes in climate, such as drought, temperature change and glaciation.

Several people have tried to recreate the pre-agricultural prairie environment through reviewing the records of the early European visitors to the plains (Nelson 1973, Potyondi 1995). A common denominator is sudden large-scale variability.

Many comment on the abundance of bison and the devastating impact their passage made on plant communities, water bodies and soil, yet in any given site this varied from year to year and there is also evidence of large variation in total bison numbers over time, perhaps due to periods of drought (Potyondi 1995). Fire catastrophically and irregularly burnt huge areas of the plains. And of course there is always the severe, unpredictable weather events whether it be unseasonable storms and frosts, drought of greater or lesser duration or extreme winter such as vividly described by Stegner (1962) which must keep the fauna in a state of disequilibrium. This may explain the lack of endemism, as regionally populations may not be able to persist in time.

On the other hand the ability to survive catastrophic variability probably explains why the fauna has held up so well in the face of the onslaught of modern agriculture. Some of the major recent impacts on the prairies are:

- Cultivation - there is enough tractor power to dig up every square meter of the prairie several times a year;
- Harvesting - a large proportion of the primary production essential to an ecosystem is swept up and exported;
- Grazing - What used to be grazed, probably sporadically and by an estimated 3 bison / km² (Potyondi 1995), is now relentlessly pursued by cows at higher densities and unrelenting intensity;
- Herbicides - there are enough herbicides to wipe out all vegetation;
- Adventive species - available space and resources now have to be shared by adventive species, many of which are better adapted to the current conditions than are the indigenous species.

And yet the diverse insect fauna persists. I submit that the insect fauna, like the human culture, is one adapted to adversity, most of the time taking its licks but, in the rare event of favorable conditions, rapidly able to take advantage and through wide dispersion somewhere in the vast grasslands things work out for someone each year, making survival and hope a possibility.

So far much of the biota has persisted. There are few documented cases of loss of insect species on the northern plains. But how far can it go?

Will climatic change reduce or increase the severity and frequency of devastating weather events? How far can humans push the system before it stops bending and breaks - can an industrialized prairie support its traditional biota and cultures?

There is some good news. Although the trend of loss of all types of natural prairie habitat continues, there are small attempts to slow or even reverse this. Governments have a poor record of prairie conservation: provincial governments generally do more damage than good when designating a park; and the federal government's efforts are little better than token. The bright spot is individuals and private groups of individuals who value what the prairie has been and are committed to keep it.

I would like to end my talk by bringing to your attention the major theme espoused by Aldo Leopold (1949) who stated:

"That land as a community is the basic concept of ecology, but that land is to be loved and respected is an extension of ethics. That land yields a cultural harvest is a fact long known, but of late often forgotten."

There are many reasons for loving and hating the Prairies, but for the sake of our natural and cultural heritage it's going to take a lot of love and respect for prairie to survive in its historical form.

Acknowledgements

I thank Evan Gushul and Joe Shorthouse for sharing photographs, information and memories of entomology in Lethbridge in the 1950s and 1960s.

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