none of these proved effective, one had to concentrate on cultural operations, a procedure too often neglected these days. With the evolution of spraying and dusting machinery, and the introduction of dozens of new organic and other chemicals, each more devastating than the last, and with names even more fearful, the humble practitioner finds that he is required to be an engineer and a chemist as well as an entomologist; and in the past few years with the increase in personnel he has to be an accountant, mathematician and administrator in addition. It is all so new and untried with so many different angles to watch.

I have mentioned many workers who have gone to the happy collecting grounds, and should mention one or two of the acquisitions that entomology has made during this period. In 1924 a whirlwind appeared in the province in the person of our president, G. L. Spencer.

His energy and enthusiasm have done much to advance our Society and entomology in general here. From various sources and by devious means he has amassed a vast collection of insects of the province at the University of British Columbia, and his effective tutelage has provided fieldmen with well trained assistants, where before there were none. Finally, mention must be made of the invasion of prairie and eastern entomologists which occurred a few years ago. The outbreak caused no little concern at the time as no control was known, but I am glad to say none has been found necessary. They all turned out to be, not commensals or inquilines, but excellent examples of mutualism, and a perfect symbiosis with the older workers has developed that I am sure will be of benefit to entomology in the province in the coming fifty years.

FIFTY YEARS OF ENTOMOLOGY IN THE INTERIOR OF BRITISH COLUMBIA

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When I was selected to present a paper dealing with the above subject I felt somewhat at a loss; but, when told that I should be working with Mr. E. R. Buckell, the problem was simplified to a great extent because Buckell and I had already worked together on many occasions. One might approach this subject from various angles, but as I was told that dry statistics were not required I have done my best to avoid them, and to give what may be a somewhat personal narrative dealing with certain characters whom I met and who were, at that time, the sole representatives of our science in the Okanagan Valley. I might deal with my own early struggles in the field of entomology and recount the difficulties which I had to overcome in order to gain a foothold on the ladder, which eventually landed me among the "elite" or, so I should have thought, in 1897.

It was my good fortune to meet the late Dr. James Fletcher quite early in my entomological career, and it was due to his personal interest that I was able to have my material named. Dr Fletcher was an inspiring personality, a naturalist of the old school, who when addressing the public, always stressed the interesting points of insect behaviour, rather than their control, for, as he said, "if one is interested in the subject the artificial control measures are much more easily understood." Fletcher filled the dual roll of Dominion Entomologist and Botanist. I wonder how one of us would feel if landed in that position today. He had one assistant, Mr. Arthur Gibson, who later became Dominion Entomologist and had much

to do with the organization of the Division of Entomology as it exists today.

I remember so well that after sending a number of beetles to Dr. Fletcher for naming, I got a long letter in which he stated that several of the species were of particular interest, and that he would be glad if I could secure more of them because he wished to send them to Professor Wickham in the United States. The receipt of this letter filled me with new enthusiasm and I could understand Darwin's feelings when he got a letter from Lyall, the geologist, dealing with some material Darwin had sent from the Galapagos Islands. Lyall told him that not only were his specimens of great interest, but that his notes were of particular value to science. Darwin, in his reminiscences, says that, on receipt of this letter he sprang over the rocks and made them ring again with the blows of his geological hammer. I wonder if any of the professional workers here today, have, on the receipt of a letter from Ottawa, been inspired to leap on the spray tank and brandish the spray gun with renewed vigour?

It was about 1900 that I was asked by Fletcher to inspect several hundred peach seedlings which had been sent from Ontario to a nurseryman in Vernon. These were suspected of harbouring San Jose scale and I was directed to spray the whole block with kerosene emulsion in case the trees were infested. I believe that this may have been the first time an oil spray had been used commercially in the Okanagan Valley. Of course, in those days, fruit growing was in its infancy and people were very interested in the subject of pests and were rather pleased if they could find something new. They would proudly take their friends to view the work of, perhaps, the red humped caterpillar, or bud worm on their young trees. This would usually be on Sunday afternoon.

The Farmers' Institutes were organized, I think, about 1900 and it was at one of the meetings that I met Dr. Fletcher. The subjects dealt with on some of the programmes were very general, such as, *The Bacon Hog, The Dairy Cow* or *The Blue Jay.* Some of the speakers, however, were never at a loss, and would deal with almost any agricultural subject which the meeting might decide upon on the spur of the moment. For instance, on one occasion a gentleman was on the programme to talk on *The Blue Jay,* but when called upon for his address he said "There are no blue jays in the Vernon district, so I will talk to you on Cheese Factories, which he proceeded to do at some length. In another case, the subject was, Birds in Relation to Agriculture. When he rose to his feet, the speaker, however, changed this to The Construction of Silos.

With regard to the respect due to those who deal with agricultural subjects at farmers' meetings, it may teach some of us proper humility to hear the remarks of a Vernon farmer, who, when my father, who was Institute secretary, asked him to come to one of the meetings, delivered himself as follows: "No, sir. I ain't no use for them lads what talks all night and sleeps all day. Clever know-nothins, what don't know beans when the bag is opened."

One might continue at some length with reminiscences of the very early days, but I must refrain, and deal with the early development of economic entomology. With the arrival of Mr. R. C. Treherne our science took on a more serious, but perhaps, less human tone. Spraying was becoming a somewhat general practice although, even in 1919 and for several years following, hand pumps were the order of the day. Many of us made our own lime-sulphur sprays and this material was applied assiduously in the dormant period, usually before the snow had left the ground, and there was satisfaction in the brilliant yellow colouring of the snow coupled with the penetrating and healthful odour which, one felt, must be toxic to all pests. Of course, around 1900, there were no professional workers, so that

our Society's efforts were quite unaided from that quarter. We circulated manuscript notes with lists of captures and remarks on the season, with occasional mention of injurious insects.

The late Mr. R. V. Harvey was the first secretary of the Entomological Society of British Columbia, a man of tremendous zeal and enthusiasm; he made the trip from Vancouver to Vernon via the Hope-Princeton trail on foot and camped on Long Lake for a fortnight.

Another member, Mr. W. Bush, was an ardent lepidopterist who usually carried a net with a handle about ten feet long with which he would sweep the shade trees in the city park. This, and the white suit which he used to wear, topped off by a large straw hat, attracted much attention, and served to advertise the science of entomology.

Then there was the Rev. G. W. Taylor who specialized in the Geometridae, of which group he had built up a large collection He was in charge of the Anglican Church in Nanaimo, and it was in that church that I witnessed to what heights an entomologist might rise, or perhaps descend. During his sermon a desirable specimen was hovering round the pulpit light, and Taylor, with a few deft passes of a cyanide bottle captured the insect with no interruption of his discourse.

After Treherne's arrival a new era commenced. "Tre" as he was always called, was a splendid man, full of new ideas, and it was not long before he became secretary of our Society. He added a considerable number of members by insisting that any one he met who was connected with fruit growing, should join the society "for the good of the industry." Mr. Buckell was already engaged in entomological work when I was taken on in 1919. I remember that Tre and I were in Keremeos, and hearing that Buckell was camped up the river, went to look him up only to find that he was away up in the Lillooet country, I believe. His tent was pitched close to the river and a note attached to the flap warned visitors to "look out for the rattlesnake." Buckell's work, dealing as it did with locusts, necessitated quite long trips, which he made on horseback, and in this way covered an area from the Okanagan up into the Cariboo. Later he was provided with a Model T Ford complete with Ruxstel axle, but it would take a volume to recount his adventures with this contraption.

I think that the control of injurious insects has, today, lost the human interest which it had in the early days. Remedies were far more heroic in those days, and could be applied, in most cases, without referring to the chemist, who, today hovers in the foreground and almost excludes the entomologist. Take for instance the recommendations for tarnished plant bug. "Shake them from the trees before sunrise, and destroy them." In the case of the New York weevil remedy — "There seems to be none other than to catch and kill this mischief maker." The red-humped apple caterpillar "should be shaken from the tree and trampled under-foot." The apple-leaf sewer—"The most obvious remedy is, to carefully gather all the fallen leaves with the enclosed larvae and burn them." What has become of those hosts of injurious forms which were present in the late 'eighties? Who among us would recognize the *silky pyrophila,* the *American procris,* the *light-loving anomala,* or the *currant angeroa,* to mention a few. Are they all extinct? We don't see them mentioned on the spray calendar.

The period between 1900 and 1925 was an era in which mechanical barriers and traps were much to the fore. It was not uncommon to see lines of Chinamen, each with a blanket, chasing off swarms of grasshoppers. The strawberry weevil was turned aside with barriers. Crickets were prevented from entering the fields by the erection of wood, tin, or, in some cases, glass fences.

The control of insects now seems to be in the hands of the chemical engineer, and universal destruction is the order of the day. What the

upshot will be remains to be seen and it might be of interest to maintain blocks of orchard trees under the spray programme used in, we will say, 1940 or thereabouts. Some valuable information might be forthcoming affording as it would, a direct comparison on insect populations.

A remark made by the president of the British Horticultural Society a few months ago gives one food for thought. He drew attention to the fact that, most of our leading types of livestock, cattle, horses, sheep, poultry, etc., were produced by the efforts of ordinary farmers, with little, or no assistance from Science as we know it today. He also put forward the idea that Science may, at times, actually delay discoveries by splitting too many hairs.

There is a good deal of truth in these statements, but it will be for the younger men to ponder them.

THE HISTORY OF THE STUDY OF EXTERNAL ARTHROPODS AFFECTING ANIMALS AND MAN IN BRITISH COLUMBIA

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The earliest observations of insects affecting man and animals date back to records made by early explorers on the voracity of some of these pests. In Dr. Cheadle's diary of his trip across British Columbia in 1863 are such comments as "Fearful amount of gadflies. Horses half mad . . . tormented to death by flies. Sandflies and musquitos terribly annoying . . . musquitoes murderous." Remarking on the terrible "musquitoes" at the plains of Sumas, he states that "Indeed men from all countries agree that the musquitoes of B.C. are unmatched for numbers and ferocity."

In the early nineties the mosquito still occurred in millions in the Fraser Valley, rendering work a "purgatory" from early July until September. Relief was obtained when the area was dyked. The first economic studies of animal insect pests were undertaken by Dr. Seymour Hadwen, Animal Pathologist at Agassiz in 1912. From his pen arose publications covering ticks, warble flies and other livestock pests, and under joint authorship with Dr. E. A. Bruce, he published his observations of the migration of warble lavae through the tissues of cattle. In a later bulletin he treated comprehensively the control of insects affecting livestock. In 1919, under the direction of the Dominion Entomologist, Dr. Hewitt, Mr. Eric Hearle commenced his studies of mosquitoes in the Fraser Valley. This was followed by his 1927 publication of the "Mosquitoes of British Columbia."

The study of insect and ticks affecting animals and man was placed on a firm footing with the official establishment of a Dominion Insect Unit at Kamloops in 1928. Eric Hearle was transferred from Indian Head, Saskatchewan, to act as Officer in Charge —and staff. His wire to the Dominion Entomologist, Mr. Arthur Gibson, that he had "located a place that is admirably suited to our needs" referred to an old shack that was located in the centre of town and which had served in its time various purposes from a funeral parlour to a bootlegging joint.

Once established, he set himself, singlehandedly, to the terrific task which lay before him. Not only was he treading on virgin territory as far as his work was concerned, but he was working in a province that contains a richer supply of biological material than all the rest of Canada. This is readily evidenced in later taxonomic studies of various insects.

During the first summer he studied and collected all data and specimens he could lay his hands on. This included mosquitoes, blackflies, sandflies, horseflies, ticks, mites and lice. His