REMINISCENCES OF ROTHAMSTED 1938-1941 by Dr Harold Gough

Photograph of Harold Gough (BSc PhD DIC FIBiol) taken from Annals of Applied Biology, Volume 85, 1-12. Dr Gough was President of the Association of Applied Biologists from 1975-76 and is an Honorary Member of the Association

I went to Rothamsted in May 1938 on a grant jointly provided by the (then) Agricultural Research Council and ICI to work on soil insecticides especially for the control of wireworms. My appointment was unexpected in that I had earlier attended an interview as an assistant to Tattersfield (then head of insecticides) to breed insects for testing insecticides. I knew they were hoping to recruit Charles Potter if sufficient money was available and that I, as a junior colleague of his at Imperial College (IC), was second choice.

I was keen to go just in order to see Rothamsted and was interviewed by Tattersfield and C B Williams quite informally as was usually so then. In the event Potter was appointed, I had an interesting day and forgot all about it. Much to my surprise a few months later I received the offer of the grant for the soil insecticide work at a lower salary than I was getting at IC for a Medical Research Council (MRC) grant to study the effect of sulphur dioxide on bedbugs. I considered the opportunity to work at Rothamsted and gain a different type of experience more on the agricultural side which had always been my aim more important than the money. Before the bedbug grant started I had been working on laboratory studies of fumigation of Tribolium for a PhD and had been able to complete this alongside the bedbug work which used the same apparatus. I had not finished the writing up and Rothamsted agreed I could do this in spare time, which I did.

I arrived at Rothamsted at an interesting time. It was still small enough (about 100 including students etc) for everyone to know everyone else and Sir John Russell encouraged this by insisting that we all came to tea in Red Gables at 4.00 o'clock (Indian in the urn and China in the pot). If possible he always came himself and often made a point of chatting to new and junior members. He had a remarkable memory for names and faces and some ten or more years later when he gave a talk to NAAS (National Agricultural Advisory Service) at Cambridge he recognized and remembered me by name. 1938 was a gloomy year with the Anschluss in March and Munich later; although there was some relief we all knew that the war was only postponed and felt humiliated. All institutions and university departments were finding places for Jewish and other refugees and Sir John took on many – not only scientists. I was in digs for a year with an Austrian family he had brought over as they were the parents of the Russell's maid. As they spoke no English I was able to practise my German. Even before the Nazis, Rothamsted was always a Mecca for agricultural scientists and there must have been a dozen or more nationalities represented at any one time, as well as the voluntary workers who were mostly, but not solely, from the UK during their long vacations. Most, if not all heads of departments, were internationally famous in their professions, Crowther in chemistry, Keen in physics, Thornton in bacteriology, Brenchley in botany, Yates in statistics as well as Tattersfield and C B Williams. Many of the lower grades became no less famous later with a notable example in Bawden soon to become head of plant pathology and ultimately Director before being knighted. While I was there, he and Pirie (still then at Cambridge) published their work demonstrating that the agent of one plant virus was a crystallised nucleic acid protein. How could this be? We know now, but it then made viruses even more of a mystery than before.

There were still a few indirect links with the past. Kathleen Warington's father had worked with Lawes and Gilbert and there were one or two old men often sitting by the allotment hut who could tell tales of the old days working on the farm. Kathleen, herself a delightful and gentle lady always helpful to juniors, officially retired in 1957 and lived on till 1992.

As a new boy I was soon roped in to be the secretary of the staff union – a purely social activity. I can't remember much about it except that I arranged talks by local notables – one I remember in particular being by Eric Shipton a friend of Thornton, who spoke about the Karakoram and his attempt on K2. In addition to laying in a barrel of beer when we had dances in Red Gables, I had to book the village hall for the famous Rothamsted Christmas parties always run by Marion Watson who wrote the script and produced the pantomime.

Sir John always stressed the importance of all permanent staff and long term temporaries knowing something about other departments and to this end the rota guide system meant that everyone was allotted one day a month when they had to be prepared to take casual visitors round the Station. Larger pre-booked parties were escorted by official guides who also had other duties.

The Munich crisis initiated an interest in air-rapid precautions - the main one being the digging of a trench beyond the Bee Department under the enthusiastic supervision of D M T Morland, the head of the Bee Department and separate from entomology; the main result was many blistered hands and the trench was never finished or used. Morland's other interest was gliding and I always regretted delaying taking up his offer to train me in the first year, and after that the war came. The outbreak of war brought many changes. Both J B S Haldane and R A Fisher (who had lived in Harpenden since his early pioneering work there) brought their departments from UC and room had to be found. I was ejected from my large room to share space with A C Evans the grade III entomologist. H F Barnes, the second in command of the department, who like many others, had become an air-

raid warden, made use of his enforced night watches by studying slugs and compared various household wastes e.g. tea leaves and coffee grounds as attractants. He produced the first simple key to the identification of most species.

The new arrivals, at least the junior ones, soon mingled with the staff. Fisher himself tended to be rather aloof but Haldane was always surrounded by a mixed group of mainly seniors. One person I remember in particular was A C Fabergé a grandson I believe of the famous jeweler. He was a superb maker of ingenious apparatus and instructed me in the art of making a Joly balance for weighing wireworms speedily at minimal cost. He was also a brilliant practical joker and his finest was played on a very studious and serious American colleague who for his PhD thesis had prepared and published a rather routine study of the basics of a 7 x 7 Latin square. Fabergé persuaded a number of colleagues including myself to write letters based on his suggestions to the American, most beginning with something like: "a friend of mine who is a mathematician has read your paper and mentioned it to me thinking it might help with a problem which has been puzzling me. I am taking the liberty of writing to you to ask for your advice . . . . . ." The letter I wrote was allegedly from a bridge player, Hubert M Scattergood, requesting help on the possible permutations of 13 cards. Another was from a stationmaster wondering how to best plan the complexities of the London expresses, the local and goods trains through his station. We sent envelopes containing the letters to friends in various parts of the country to forward to the victim who took them quite seriously, occasionally making a suggestion but usually admitting he could not help. The requests got more and more ridiculous and the replies more curt and finally he realized the requests were phoney and when Fabergé put copies of the originals and replies on the victim's desk he was furious. He almost went berserk and put a notice on the board in the pathology lab complaining among other things about the prostitution of science. Up to this time only those involved knew anything about it but the notice attracted everyone's attention and led to the Director insisting that no notices be put up without permission.

Rothamsted was not entirely unaffected by bombs and one afternoon in 1940 a stick of bombs straddled the Institute starting in the allotments and mostly dropping on the common but the last one hit a house on the opposite corner. Some time before I had at long last managed to have an underground cellar, to keep soil insects at an even temperature, built outside my hut which housed the Ladell soil insect extractor and where all the soil samples were examined. This was known as my funk hole and on that occasion I and my assistant shot down it as we heard the first bombs fall. On one occasion numerous incendiary bombs were dropped while we were having a party in Red Gables. All fell harmlessly outside and were easily dealt with and I extinguished one with re-cycled beer.

During the war Rothamsted Manor was taken over by the army but it was empty for a short interim period. Sir John arranged for anyone interested to visit it mainly to see the medieval pictures which had previously been recorded and are now I believe an established feature.

I was one of the few temporary members to own a car, a 1934 Austin 7, which I used to transport bulky soil samples between the farm and the lab. On such occasions I parked it on the grass verge opposite the main building and was castigated because the verge was part of Harpenden Common and I failed to see why this was such an offence. A few years ago I became Chairman of a conservation group concerned with Epsom Common and learnt something of the Law of Commons and what a heinous offence car parking was. Poacher turned gamekeeper!

Rothamsted Manor. Reproduced by kind permsision of the Visual Communications Unit, Rothamsted Research.

Many of my contemporaries, most of whom were undertaking a PhD, became well known in their own fields. One was George Cook, another Tom Walker who, after a period as a soil scientist in NAAS, went to New Zealand as a professor. Ian Blair who came from New Zealand to the Plant Pathology Department was in digs with me for a time and returned to New Zealand as head of microbiology in Canterbury and we kept in touch until his death a few years ago. In the Entomology Department I have pleasant memories of C B Williams who had one of the most fruitful and fertile imaginations I have ever come across. Although not a mathematician he had an instinctive feeling for numbers and statistical methods which the statisticians could develop.

His main interest was in the migration and fluctuation of insect populations. He developed automatically time-controlled light traps for moths, but found occasional unexpected massive catches of particular species tended to swamp gradual changes if he used an arithmetic mean. By converting catches to logarithms a more useful geometric mean could be established and to overcome the problem of nil catches he suggested adding 1 to all the figures a method approved by the statisticians. I remember once trying to solve an apparently simple problem in the New Statesman* which would not come out with the obvious quadratic equation. He took it home one night and the following morning said it could be solved by using 7 rather than 10 as the base unit. As the introduction to the puzzle was Humpty-Dumpty an egg shaped figure and hens had 3½ 'toes', 7 was an appropriate base, a point I am sure never occurred to the setter of the puzzle. (*Incidentally, the social club ran a magazine service and members were allowed to bid to be first on the list of any particular magazine or journal and also to retain it after completing its circulation list.)

Many heads of departments, and indeed most outstanding scientists then and since, were individualists and often pioneers more interested in their own research than managing their staff who were usually perfectly capable of choosing and developing their own research which was not necessarily an obvious priority. The idea of formal management was rarely thought of at that time and research often took on a momentum of its own sometimes going beyond what many people, including myself, thought appropriate though much 'basic' work at Rothamsted at that time demonstrated its value later. Indeed CB's work led to many traps for other insects especially aphids being developed for practical forecasting of likely pest prevalence. Unfortunately the pendulum over the last 20 or so years has swung to far in the other direction with management becoming an end in itself and creeping lower and lower down the chain of command.

But I digress. Williams was always known by his initials 'C B' was somewhat absent-minded and had difficulty in remembering names of people. He once popped his

head round my door and said "have you seen CB anywhere? I mean Evans". Though amusing at the time, having now suffered from poor memory for names for many years I sympathise with him. Although normally content to leave people to their own devices, he was always willing to help if asked. Usually before completing his advice he would say "Did I ever tell you about so and so . . . . ?" and launch into one of his amusing if irrelevant anecdotes about his life overseas. One typical tale which has always stuck in my mind concerned a very objectionable colleague in East Africa whose rudeness had moved a mutual colleague to reply in kind. The victim complained about this to CB who tactfully suggested it would be best to ignore the insult. The victim's face lighted up and said "that's a jolly good idea; I'll write to him and tell him I ignore it".

I have already referred to H F Barnes' pioneering work on slugs; he could collect hundreds from his own garden nearly every night and said they never seemed to get any less. His main interest was in gall midges (Cecidomyiidae) a little studied group but one of great economic importance and he was starting to prepare one or two volumes of his magnum opus which finally ran to eight. He was an enthusiastic supporter and treasurer of the Association of Applied Biologists and had many friends among the pre-war advisory entomologists, some of whom I knew through spending summer vacations at Harper Adams in 1932 and Long Ashton in 1933. Barnes was a very sociable character with whom I often enjoyed a glass of beer at the Station Hotel on the way home. We were sometimes joined there by Buckhurst (of Colorado Beetle fame and later notoriety) of the Ministry's Plant Pathology laboratory then in Milton Road.

Red Gables, ca 1929. Reproduced by kind permission of the Visual Communications Unit, Rothamsted Research.

As an air raid warden, Barnes was put in charge of ARP at Rothamsted. I happened to be with him on the way to Red Gables when we met C V Jacks, head of the Soil Bureau which occupied the upper floor of Red Gables. Barnes said "shall we let Red Gables burn?" to which Jacks replied "Yes I think so do you want to do it now?" Very silly but I can't help giggling when I recall it. The only other member of the Soil Bureau I remember was Miss Scherbatoff, an exiled Russian, a very matter of fact person with a very English manner and most helpful with obscure east European languages.

A C Evans, a Bristol graduate, was working on insect nutrition and studies of the energetics of food intake and excretory output of caterpillars. He became interested in my work on the life-history of wireworms when I noticed that they only fed for comparatively short periods two or three times a year, and after feeding their bulk and weight increased markedly prior to moulting. It was easy to show this was due to water uptake even when mouth and anus were blocked so that water must have been absorbed through the skin which was theoretically impermeable. This was later explained by Wigglesworth, the Cambridge insect physiologist, who showed that gritty particles in the soil scratched the cuticle so that it became permeable to water. Before I left Evans started working on earthworms almost the first serious study since Darwin. This was later developed by C A T Edwards at a time when there was some dispute about the importance of earthworms in the soil. After the war Evans joined the imaginative but ill-informed and ill-fated groundnut scheme as deputy to Bunting. I gathered from Bunting a few years ago that Evans was living in Battle. If still alive he would now be in his early nineties. During the war we shared an allotment on some land behind his house in Ox Lane.

I mentioned earlier that I was appointed to work on soil insecticides with wireworm control in mind. This was a grant for two, my partner being Philip Milne who had just completed an ARC Ministry scholarship spent partly at Hull working with A C Hardy on aerial insect fauna using kites. The other part was spent in Germany where he learned to speak German like a native and acquired a 35mm Leica camera. He was an excellent photographer and helped me choose a second hand Leica and taught me how to develop, print and enlarge. Fortunately, we were able to use a darkroom in our building in the evenings. Together with Gerald Cockbill, a voluntary worker in entomology, we formed a little German conversation class meeting in each others houses or digs once a week, knowledge which I found very useful when I lived with the Austro Hungarian family. Milne was a slight, dapper individual whose clothes for some of the extremely dirty field work we had to do, were rather better than my everyday wear. When ICI stopped supporting our work (which I realized later was when they discovered BHC [benzene hexachloride] as it was then) it was decided that I should continue the soil insecticide work and Milne went to Cambridge for a year to train as a microbiologist to work on bee diseases which he continued until his retirement and early death. By that time the Bee Department was headed by Colin Butler.

Mention of photography reminds me of Vic Stansfield, the Station official photographer whose other claim to fame was that throughout his life he carefully recorded all his liquid intake and output. I spent a great deal of time assembling a card index of soil insecticides and during the long cold spell of 1939-40 when field work was impossible, I elaborated and extended it. I suppose I must have mentioned it in a report to the ARC and when I was at Leeds I had an official request to compile a review of soil insecticides which I did in my spare time and it was published in 1945 by the Imperial Bureau of Entomology. It was the end of an era as the new synthetic pesticides had been discovered and were developed rapidly.

It would be pointless to attempt to discuss the scientific work done in that period as it appears in annual reports and is splendidly summarized by Russell in "A history of Agricultural Science in Great Britain" (Allen & Unwin 1966). After re-reading it a flood of memories returned about people I had almost forgotten. I shall therefore confine myself to a few non-scientific activities and reminiscences. Schofield, a colloid specialist in physics was a keen country dancer and during the war started an enjoyable series of classes in Red Gables which relieved the monotony of the cold war. Callan, one of less distinguished physicists but one I could understand, I remember, as he came into Red Gables when we were

listening to the radio on the fall of Dunkirk and was greatly amused at a comment he had overheard in the street "the Froggies have ratted". This was a dreadful moment and though in a reserved occupation I felt I ought to be doing something of more practical use to the war effort and it was a relief when the Home Guard (then the Local Defence Volunteers) was formed and I made many new friends.

Tattersfield was one of the real old characters; though often brusque in manner he was really a kindly soul who was the external examiner for my PhD. John Martin was his senior assistant working on the active principles of Pyrethrum and he happened to be the one of those allergic to it. In conjunction with his GP he studies his reactions to the different components and when he published or was about to publish the work Tatters (who had been kept in the dark) was very annoyed. Martin left shortly afterwards to work at Long Ashton on the composition and characteristics of plant cuticular waxes an important factor in the wetting ability of pesticide adjuvants. I was always in close touch with him as he lived a few doors from my parents then at Clevedon and in 1954; he was like me, one of the first members of the Inter-departmental Scientific Sub-Committee on Pesticides of which I later became chairman.

Fred Bawden, another sociable but outspoken character was always a joy to chat to in his Devonshire brogue. His favourite story was when he was leaning over a gate in Devon when a horseman came up and said, "Open the gate my man" which Fred characteristically ignored. The horseman then said "Do you know who I am I'm Lord Fortescue". To which Bawden retorted "I don't care if you are Lord Fiftybloodyscue you can open the gate yourself". The Plant Pathology Department was very active at that time with Marion Watson studying the transfer of viruses by aphids and noting how some species could transfer almost immediately but did not retain infectivity for long whereas others took time before becoming infective but the infectivity persisted. She could be difficult to work with as her South African assistance Maisie Roberts found, but she was a brilliant scientist and could also produce vast quantities of very witty rhymes for the Christmas pantomime or other occasions. Her husband Don was rather overshadowed by her but was also brilliant in his own way and was, I think, the first person to develop and apply plant physiology as a field study.

Mary Glynne had just discovered eyespot of wheat as a major cause of lodging straggly as opposed to that due to stem weakness and weather when most of the stems fell the same way. Garrett was developing his glass tumbler technique for investigation of take-all which was carried on plant remains in the soil and which could not like spores to be estimated directly so he produced the idea of infectivity units. Alan Walker was working with him for his PhD and like me he later joined NAAS and is still alive at Bristol.

I had many contacts with the Statistics Department when first Cochran and then Finney were my main advisors on the design and analysis of experiments. Boyd, a geography graduate with an interest in meteorology, was working for his PhD then and gradually metamorphosed into a statistician and became a permanent member of the department. I remember him particularly because I drew his attention to a long white cloud which neither of us had seen before but we soon realized it was the vapour trail of a plane later to become only too familiar. Many years later when NAAS HQ had an arrangement with Rothamsted to design and analyse all their field experiments, I had many contacts with Dyke, Church and others including Mike Westmacott a member of the 1953 Everest expedition. I had the pleasure of entertaining him when he gave a talk on it to the staff of Cambridge NAAS.

I left Rothamsted with regret in 1941 to take up a post in the Agriculture Department at Leeds University which brought me into closer touch with farming and advisory work which had always been my aim. I was also influenced by the fact that the future of my grant was getting uncertain. This is the point at which my recollections of Rothamsted in wartime finish, though I realize I have already anticipated much that happened later. However, as I remained in contact with the Station for the rest of my life I cannot resist summarizing some of these mutual activities. When the National Agricultural Advisory Service was established in 1946 I had a permanent job for the first time in my life and was appointed assistant advisory entomologist for the Yorkshire and Lancashire Province. Lancashire was a new area for us as it had operated independently in the old service based in Manchester. In 1948 I was promoted as head of the Entomology Department of Eastern Province based at Cambridge as Petherbridge the previous incumbent wished to remain at the University and I was fortunate in getting what had always been regarded as the "plum" job for an entomologist.

Whilst at Leeds I had started work on wheat bulb fly which I continued at Cambridge and I was able to anticipate the serious attacks of 1953 which led to a demand for further work. The ARC appointed two workers to help me with the field work and as the pest had several unusual aspects I sought help from Potter who put Michael Way on to it. Our field experiments had raised various problems which we were not in a position to follow up but could pass on to Rothamsted to study in laboratory or small plot experiments. Their results led to field experiments which we could undertake and by meeting at the beginning and end of each season as well as joint visits to experiments in progress. This continued for many years and the pest became a long term interest at Rothamsted where the fallow plots on Broadbalk provided an excellent opportunity for long term field observations.

Later on I became interested in pests of mustard seed at the request of Colman's and we again invited Potter's help. Although mustard was not in itself a major national crop, East Anglia was an important seed growing area for brassicas and other crops. The work came into its own when oil seed rape became a very important crop and we were in a position to provide advice right from the start.

Almost accidentally, I started some work on cereal cyst nematode on the long term oat plots. I used a simple conical flask flotation technique which had been developed at Leeds for estimating potato cyst eelworm density. At that time nematology was based at St Albans but after the war Tom Boodey moved to Rothamsted and was followed by his son Basil, and then B G Peters with whom I had already worked briefly in the moss lands of Lancashire on control of potato cyst eelworm with D-D, mixture, and finally Freddy Jones. We had close contacts with the department all the time I was in Cambridge and this continued until the virtual demise of the advisory service a few years ago.

The wheat bulb fly work was the first major collaboration between the Research Stations and the Advisory Service, but after I went to London as head of the Science Advisory Service, I was able to develop other contacts in other sciences. I like to think that this was in part due to the influence of my brief but significant period at Rothamsted.

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