

A short history of the early years of plant pathology in Queensland

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The technical achievements of scientists are often well-documented through their publications in scientific journals. However, information about the backgrounds and personalities of these people and the social environment in which they worked are rarely recorded and disappear into history once careers end. This essay on the history of plant pathology in Queensland by the late John (Jack) H. Simmonds, written in c. 1986, was 'rediscovered' in a clean-up of a storage room at the Queensland Department of Primary Industries and Fisheries' research facility at Indooroopilly. Extracts of this essay relating to the life and times of J. H. Simmonds have been published previously (Alcorn and Purss 1992) but this is the first time that this essay has been published in its entirety. Editorial comments are noted in italics.

Andrew D. W. Geering, (6 February 2008)

My purpose in writing these notes is two-fold. Firstly, to call attention to the contribution made by the workers in the plant disease field before a specific Plant Pathology Branch was created in the Department of Agriculture and Stock (*now the Department of Primary Industries and Fisheries, Queensland*). These early workers might be described as belonging to the era of the great naturalists since they usually had a wide range of interests and knowledge. Their work was limited by the paucity of scientific background information and the absence of all but relatively simple apparatus. There were advantages in that so much was new and time had not to be spent becoming familiar with all the relevant literature as more often than not there was little or none. This section will cover the period up to 1926.

Secondly, I propose to describe the early years of the graduate era from 1926 to the end of the Second World War. In addition to giving a summary of the more important historical events, it was thought appropriate to record a few anecdotes to illustrate the working conditions in the 20s and 30s and hopefully enable present day pathologists to contrast these with the present. Not that I envy anyone the modern facilities as without doubt this early period was the most interesting and enjoyable of my whole working life.

The narrative is based on notes prepared many years ago but then shelved. Urged on by some of my former colleagues I have taken the subject up again. Now at 85, I find it not possible to elaborate much beyond the original notes and happily brevity is thus maintained.

In the first period three names are outstanding, namely, Joseph Bancroft, Frederick Bailey and Henry Tryon. As well as briefly describing their more important contributions to the plant disease situation of their time, I have given a resume of their lives to show the varied backgrounds and lack of specialised training characteristic of many of the scientific investigators of that time.

Joseph Bancroft



Dr Joseph Bancroft was born in England in 1836, came to Brisbane in 1864 and died in 1894. He was a qualified Doctor of Medicine but appears to have had more interest in scientific work than a medical practice. He was an active member of the Philosophical Society and its successor the Royal Society of Queensland. Joseph Bancroft combined the qualities of an observant field naturalist and a critical experimental biologist. He did outstanding work on the medicinal properties of *Alstonia constricta* and *Duboisia*. He also investigated tick poisoning in dogs and the poisonous properties of Noogoora Burr.

As far as I can ascertain, he was also responsible for the first work of a plant pathological nature in Queensland. A reference to this is contained in the first "Report of a Board appointed to inquire into the causes of diseases affecting livestock and plants" prepared in 1876. Here Dr Bancroft described a visit made to Eagle Farm in

February 1874 to investigate a disease in bananas. This was found in *Musa maculata* and sugar bananas but not in Cavendish. He went on to give what is the first known description of Panama disease of bananas and records the discolouration of the vascular strands and the fungus associated with them. He advised growers to select planting material from sources free from the disease, a recommendation still in use.

Some years later, we find Dr Bancroft advocating the importation of overseas wheats, especially Indian varieties grown under conditions resembling our own, in the hope that they would be more resistant to rust. When seed became available he grew some himself in Brisbane and recorded that many of the Indian wheats, especially the bearded forms, were more resistant to rust than the European varieties.

Frederick Mason Bailey



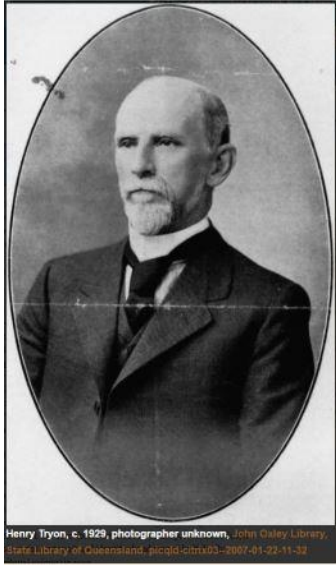
F. M. Bailey was born in England in 1827 and died in Brisbane in 1915 at the age of 88. His father, John Bailey, worked with a well-known nursery firm in England and in 1839 came to South Australia as Government Botanist and Curator of the Botanic Gardens but was later retrenched. F. M. Bailey was then only 12 and received no further formal schooling after leaving England. He read widely and was essentially a self taught man. His early career was varied. He first helped his father in a private nursery, then had a short venture into gold mining and a short time farming in New Zealand. He returned to Australia in 1861, taking up residence in Brisbane where he opened a seed store and collected botanical specimens for sale to British and foreign botanical nurseries. Bailey was later appointed as botanist to the same Board as recorded Bancroft's work with Panama disease of bananas. In the 4th annual report made in 1879, a number of plant diseases are recorded. The names had been checked by C. E. Broome in England. Among the diseases recorded were powdery mildew of grape vine and cucurbits, grass smuts and *Helminthosporium ravenelii*.

In 1880, Bailey was appointed acting curator of the Museum and in 1881 Colonial Botanist. He was located at the museum until 1889 then in the new Department of Agriculture and Stock building in William Street until 1912 and then at the Botanic Gardens. In 1902, when he was 75 years old, he refused to accept retirement and worked for some time without pay. After public protest his services were retained on half pay (£150 pa) until his death.

In the late 1880s and early 1890s Bailey was an active member of the Field Naturalist Section of the Royal Society and attended all their outings. A favourite location for these was following the construction of the Brisbane-Gympie railway which was then being cut through the heavy rainforests of Eumundi and Cooroy. (During this period Bailey and my father formed a close and lasting friendship). He also made a number of official collecting trips to various locations throughout Queensland, including an expedition to Bellenden Ker.

Bailey was a remarkable collector and recorder of all forms of plant life. He is better known for his work with the Phanerograms in producing the six volumes of the "Queensland Flora" but he was also very interested in the Cryptograms, including the fungi as reference to his "Comprehensive Catalogue of Queensland Plants" published in 1913 will show. Specimens of fungi were usually forwarded to M. J. Berkeley, M. C. Cooke or George Massee for determination. As the "Comprehensive Catalogue" contained records of many parasitic fungi and their hosts, Bailey described the preparation of Bordeaux mixture in the preface to that volume. Reference to the Author Index in "Host Index of Plant Diseases in Queensland" (Simmonds 1966) will give some idea of the extent of Bailey's work in this field.

Henry Tryon



While F. M. Bailey concentrated more on the taxonomic side of his investigations, Henry Tryon, in his capacity as Government Entomologist and Vegetable Pathologist, progressed further towards the plant pathology of more modern times. He endeavoured to study, as far as was possible in those days, the interaction of parasite and host and to formulate control measures.

Tryon was born in England in 1856. He was related to Admiral Tryon and Lord Tryon. After leaving school he became a medical student at London hospital but instead of completing his medical course devoted himself to natural science. For a time he collected plants in Sweden. Then he went to New Zealand and managed a grazing property for his father. Later he came to Australia where he became interested in entomological research.

In 1883 he obtained a position at the Queensland Museum. In 1894 he was appointed Government Entomologist. In 1901 the designation was changed to Government Entomologist and Vegetable Pathologist. In 1929 he retired (73 years). He died in 1943 (87 years). Tryon had a range of interests including botany, entomology, geology, conchology and ethnology. A list of 136 publications is given in his retirement notice in the Queensland Agricultural Journal. Of his publications, the most valuable so far as plant pathology is concerned are his Annual Reports and individual papers on diseases of various hosts. Many early descriptions of diseases of economic plants in Queensland will be found in these. For more detail see the Author Index in "Host Index of Plant Diseases in Queensland" (Simmonds 1966).

Some of Tryon's notable contributions will be referred to briefly here. He was probably the first in the world to describe bacterial wilt of the potato and the associated bacillus. On 27 April 1894 he submitted a "Preliminary Report on a new Potato Disease prevalent at Ravensbourne, at Corinda and in other parts of Southern Queensland". This included a description of the associated bacillus, mode of occurrence and development on artificial media. Obviously he was describing bacterial wilt. Unfortunately for Tryon, his report was not published in full. A summary appeared in the Departmental Annual Report 1983-94 and in *Zeitschrift für Pflanzenkrankheiten*. Tryon always thought that E. F. Smith's later work was prompted by his own earlier finding and that he should have had the credit for discovering the disease.

In 1895 Tryon commanded an expedition to New Guinea to collect sugar canes. After four months he returned with 65 named varieties, including Badila, which for many years was used for about 90% of the crop grown.

In May 1909 Tryon recorded Irish blight for the first time in Australia. The disease occurred on seven farms near Brisbane and Tryon deduced it must have originated in the seed for the June-August 1908 crop which was obtained from Tasmania. A serious disease locally known as "brown rust" had been recorded in Tasmania, subsequent to some importations from Ireland and Scotland. This was thought by southern pathologists to be due to *Fusarium* but, when Tryon in June 1909 obtained *Phytophthora infestans* from potatoes imported from Tasmania, they admitted his diagnosis was correct.

In 1912 Tryon spent eighteen months abroad with Dr T. Harvey Johnson in connection with prickly pear control. They brought back the cochineal insect from Ceylon which eventually destroyed the tree pear *Opuntia monacantha*. What is not so well known is that Tryon also brought back *Cactoblastis cactorum* larvae from Argentina but was unable to rear them.

Tryon took an active part in the Philosophical Society and its successor the Royal Society. Dr Marks, in her history of these societies, says he was probably the stormiest member in the society's history. He had a brilliant brain, a

sarcastic tongue and a cantankerous nature. He was the terror of inexperienced or ill-prepared speakers. He resigned and rejoined the Society several times owing to rows with its officers. I have seen Henry Tryon in action and must say Royal Society meetings were enlivened by his presence. However, this side of his nature was not in evidence during working hours.

The early graduate era

By 1922 Tryon had several assistants. Two brothers, Edmond and Hubert Jarvis, were systematic entomologists and illustrators. Hubert had a good reputation as a landscape painter. J. L. Froggett was a busy little man employed for the specific job of finding a control for the banana weevil borer. A. A. Girault was a Frenchman and a world authority on Chalcids. He gave the impression of being slightly eccentric (which he was) by poring over window panes with a hand lens searching for his little wasps.

At this time the Government took the unprecedented step of appointing four young men to Henry Tryon's staff. Two of these, Alan Summerville and John Weddell, joined with Senior Public Examination certificates. Fred Holdaway and J. H. Simmonds were raw graduates from Queensland University with B.Sc. degrees majoring in Biology (Zoology and Botany). At that time such subjects as entomology, plant pathology and agriculture were unheard of. As far as I can recollect, these two were the first graduate to be appointed to the scientific staff of the Department of Agriculture and Stock. Commencing salaries were £250 (\$500) a year for non-graduates and £300 (\$600) for graduates.

A few notes on the careers of these four recruits may be of interest. Alan Summerville took his degree on a part-time basis while working in the Department. After some years as an entomologist he transferred to other branches, climbing up the ladder until he became Under Secretary for Agriculture and later Agent General in London for which he received a knighthood.

John Weddell was less ambitious and concentrated on family life and on the less technical side of the Entomological Branch. One of his major contributions towards the end of his career was the work he put into establishing the scientific laboratories at Indooroopilly.

Fred Holdaway was interested in the pink boll worm of cotton but it was not long before he accepted a position with the Council for Scientific and Industrial Research. He then went to the University of Hawaii and finally was Professor of Entomology at a university in the United States.

J. H. Simmonds was fortunate in being the first in charge of the embryonic Plant Pathology Branch and in being satisfied to remain there for most of his working life. Hopefully he did something towards developing the Branch to its present status.

The four new recruits were allotted one fairly large room containing one normal office table and a narrow bench along one side under the windows. We all sat at this one table. Chalk lines were drawn to clearly set out each person's domain and woe betide trespassers. Apparatus consisted largely of hand lenses and glass jars used for working out the life history of a variety of economic insects for which this information was then unknown. Mr Tryon had a somewhat ancient microscope.

There was no telephone in the Branch and we had to run up a steep and narrow flight of stairs when called to the phone from above. In the early days Mr Tryon was still sending out his letters in longhand. He retained a copy of these by using an old copying press, a practice still in use at that time. Later he sent his letters to be typed in the typing pool.

Of course we always addressed Mr Tryon deferentially as "sir" and he would refer to us as "my lad". I am glad to have had the privilege of serving under Henry Tryon. He showed us the importance of good observation. He himself could pick out an amazing amount of detail with nothing more than a hand lens. One feature of those early days was the complete absence of any academic atmosphere. Perhaps this was to have an unconscious influence later.

I was fortunate in being given a fair amount of field work, mostly entomological in the early days. This arose from the need to obtain further information on the habits and control of various pests or in response to queries from growers. I was assigned to help Mr Girault in some of his field investigations and found him an interesting companion. I remember working with him on banana thrips out of Gympie. Mr Girault hired a horse and sulky in

town and we trotted in style along the dirt road to Chatsworth. I have yet to find a pleasanter way of starting the day's work. Chatsworth was then a well-known banana district, especially for sugar bananas, a variety now almost unknown because of the ravages of Panama disease.

Girault was also working on the control of the bronze orange bug of citrus. This was long before the days of DDT and amongst other things, we tried cyaniding under a calico tent erected over the trees. The Blackall Range in those days was almost completely devoted to citrus employing a greater diversity of varieties than could be seen at the present day. A current subject for discussion was whether seedling or grafted trees were better. There were certainly some very good seedling trees to be seen and they had the advantage of being less subject to scale infestation. Mapleton was reached by the tram-train from Nambour. To get to Montville one travelled on a dilapidated mail truck from Palmwoods which had to negotiate an ungraded dirt road going almost straight up the mountain. After that it was on foot though once I was more adventurous and hired a horse in Mapleton. Carrying a collecting bag was an added hazard on the few occasions I attempted to maintain command of the situation on horseback. Because of the time taken in travelling, we often stayed overnight in places like Montville or Buderim.

One trip made in this period is worth recording to give an idea of some of the experiences one could have at this time. I was instructed to visit Mr Swadling, a dairyman, to ascertain what was troubling his cotton crop. Travelling by train to Rockhampton and then on the western line I arrived at Yamala, a small railway workman's settlement east of Emerald. Here I was able to hire a horse and rode the 17 miles south to the farm, staying overnight and inspecting the cotton which was suffering from jassid injury. I returned by the same method to Yamala without incident, to the credit of my horse. Arriving at Rockhampton it was necessary to await further instructions from Head Office. My first night in a Rocky hotel was made so unpleasant by bedbugs that I shifted next day to the Salvation Army hostel where amenities were basic but scrupulously clean. The absence of car transport in those days made overnight stays at small country pubs sometimes necessary and the problem of bedbugs could be acute leading to such strategies as sleeping on the middle of the floor. In due course a knapsack spray was forwarded from Head Office and I returned to Mr Swadling who this time provided the transport. The trials were probably of doubtful value in those pre-DDT days. By the way, travelling expenses at this time were fifteen shillings (\$1.50) a day. A few years later this was raised to seventeen shillings and sixpence and we felt we were made.

During these first few years I had seen a little of what was involved in plant pathology by association with Henry Tryon and decided it would be more interesting to concentrate on this side of the Branch's activities. Consequently during 1925 I was granted leave of absence to attend the University for one year with this end in view. Fortunately, Dr D. A. Herbert had just taken up his appointment as Lecturer in Botany and his lectures in mycology and plant pathology formed the basis of my instruction. Text books and reference books on these subjects were very few at this time.

In 1926 J. H. Simmonds and R. B. Morwood (a new graduate) took up duty as Plant Pathologist and Assistant to Plant Pathologist in the Department of Agriculture and Stock. For the first time plant pathology operated within its own Section so that this represents the initial steps in the formation of a Plant Pathology Branch within the Department.

This unit was located in a large room on the top floor of the original William Street building. Additions to the furniture and the plumbing allowed it to serve as office, laboratory and preparation room. An autoclave, steam sterilizer and incubator were installed. One second-hand Reichert microscope was acquired for 33 pounds and gave good service for many years.

In 1929 the Pathology Section moved to more spacious, specially designed accommodation alongside Entomology in a new extension of the Agriculture and Stock building. For the first time we were provided adequate laboratory facilities, a separate preparation room, transfer chamber and incubator room. At this time also the multiple temperature incubator was installed. This was designed by Pathology, based on a simpler model used some years previously by the Cotton Entomologist and was built by the Public Works Department. This apparatus proved a very useful tool and was much in demand for many years.

The year 1925 was noteworthy for the appointment of Mr Robert Veitch as officer in charge of plant pest and disease work in place of Henry Tryon who left to work on his own in accommodation at the Botany Branch in the Botanic Gardens. Tryon was then nearing seventy. A few years later the Entomology and Plant Pathology sections were formed into a Division of Entomology and Plant Pathology with the Chief Entomologist, Robert Veitch, in charge. This was essentially the arrangement which prevailed until the end of the period covered by this narrative.

Mr Veitch was a Scotsman who had spent time working on cane pests in Fiji. He was responsible for two important things. Firstly, for his emphasis on the desirability of appointing only University graduates to the staff. The creation of an Agricultural Faculty in the University of Queensland assisted in this. In later years we find entomologists filling senior posts in other branches of Plant Industry which had been slower to make use of this source of manpower.

Secondly, Veitch was a strong advocate for the establishment of field stations. The only permanent one started for Pathology before the war was opened by Morwood in Stanthorpe in 1936. He established his office and laboratory in a small wooden dwelling rented for the purpose. Morwood carried out much valuable work in connection with the control of diseases in cereals and deciduous fruit during his lengthy stay in this area.

Veitch also believed in the value of advisory articles and many of these on a range of subjects were written for the Agricultural Journal and reprinted as leaflets. A handbook "Pests and Diseases of Fruit and Vegetables" by Veitch and Simmonds was published in 1929. This was brought up to date and reprinted with the addition of field crops in 1938 to form volume III of the Agricultural and Pastoral Handbook series. The Agricultural Journal was also used for the publication of scientific articles in those days.

There were several additions to the pathology staff in the pre-war years. Only brief reference will be made here to their activities. For more details reference should be made to their published articles listed in the Author Index of the "Host Index of Plant Diseases in Queensland" (Simmonds 1966)

L. F. Mandelson (1931) was a Sydney University graduate. He concentrated on tobacco diseases, particularly blue mould control. He eventually returned to NSW for family reasons and became Officer in Charge of the Gosford Fruit Research Station.

H. K. Lewcock (1932) was from South Australia and came to Pathology from the disbanding prickly pear control organisation. He specialised in pineapple diseases, eventually becoming the general cultural expert in this crop. Later he joined a South African pineapple company.

H. E. Young was a Queensland Agricultural Science graduate who specialised in forest pathology. He was employed by the Forestry Department but used the facilities of the Pathology section. Most of his investigations have been recorded by publication, the most important being fused needle of Pinus. He later left to work for the Rubber Research Institute in Ceylon.

F. W. Blackford and J. E. C. Aberdeen, both Agricultural Science graduates, joined in 1936. Blackford concentrated mainly on citrus. He developed the homemade cuprous oxide spray which was used extensively on citrus, tomatoes and tobacco before the advent of copper oxychloride. The latter was probably less efficient but easier to

use. After the war Blackford joined A.C.F. and Shirley Fertilizers as scientific adviser to their clients. Aberdeen preceded J. C. Johnson as vegetable pathologist. He spent some time attempting to find a satisfactory fungicide for tomatoes which was not phytotoxic. He eventually joined the staff of the University of Queensland, Botany Department.

One interesting arrangement in the pre-war period was the seconding by the Council for Scientific and Industrial Research of one of its officers, R. S. Mitchell, to investigate banana diseases, using the facilities of the Queensland Plant Pathology section. This arrangement worked well and it is a pity that it has not been repeated.

It was in this period also that T. McNight and W. Pont joined the Department of Agriculture as clerk-typists and were stationed in the Entomology and Pathology sections. They later completed University courses on a part-time basis, receiving leave to attend day lectures not available in the evening. This was easier then since the University was still located in George Street.

In the "twenties" and "thirties" plant pathology work was less complicated and the field less worked over than today. There were few text books and literature was scanty by present day standards. Consequently, one was left more to one's own resources. Pathology workers were relatively few the world over and it was possible to keep in touch with what was going on, even outside one's own particular field. Papers were written in a more narrative style and not obliged to conform to a recognised format. All this made more interesting and easier reading.

In the laboratory modern techniques and equipment were unknown as was the impact of modern biochemistry. Virus disease investigation was in its infancy and the electron microscope not yet available.

In the field fungicides were limited to modifications of Bordeaux mixture, lime sulphur and sulphur. Field experiments were not complicated by the requirement of a statistical layout and subsequent analysis. A little scientific intuition could be used to advantage.

For the person working in the field, conditions were very different from those now taken for granted. The motor car was only beginning to come into general use and of course air travel was unheard of. Normally one would take the train to the nearest station and then, if it involved only a few miles or so, one would walk carrying the field bag. (Some younger pathologists may have wondered why the early field bags were fitted with shoulder straps). The rich farming lands of Sunnybank, Manly and Cleveland (*now suburbs of the Greater Brisbane*) were serviced in this way. To reach the south coast banana areas one took the train to Southport and relied on the local bunchy top inspector for further transport. An overnight stop was usually necessary (*it now only takes 60 min to drive to Southport*). At that time the first Southport bridge was fairly new and there were only a few houses on the coastal strip between Southport and Little Burleigh. The disastrous development which was to follow had not yet commenced.

A day trip, which I did on a number of occasions when working on bananas at Mt Mellum, was to catch the morning mail train to Landsborough; take the Maleny bus half way up the mountain; walk the mile or so across to Mt Mellum; do the day's work and then walk (or run if time was short) the five miles down to Landsborough to catch the afternoon train back to Brisbane.

Another trip remains in my memory. Returning to El Arish after working at Clump Point it was found that there was a railway strike of unknown duration. This part of the north was not closely settled as it is today and I decided to make for Innisfail. The first part of the journey was made on horseback with an accompanying rider to take my horse home. The next was on foot a good few miles along the railway track carrying a travelling bag. Arriving at Innisfail I was able to take a passenger launch through the Hinchinbrook passage to Townsville, only to find the strike over and no chance of a steamer trip to Brisbane.

In spite of the fewer facilities and less specialised knowledge then available, this was an interesting and productive period for the few pathologists on the staff. Many new records were made and much field and laboratory information was accumulated regarding diseases not previously investigated or recorded. In many cases this was important for the development of control measures such as in the field of cereal smuts, forestry diseases and some of the diseases of tobacco and tropical fruits.

The association with the farming community was very enjoyable and it is to be hoped sometimes to their advantage. I should like to pay tribute to the help and information obtained from farmers who were able to supply the basic practical information on crop needs and management so important in pathological investigations.

Farming practices were not as complex and technical then as now so that the life of the man on the land was simpler and he still had a chance of enjoying the life of a farmer in the old sense of the word.

Another event may be of interest in showing the difference between the period under discussion and the present day. In 1931 I obtained twelve months leave of absence without pay and no expenses paid in order to get further experience abroad. The more important agricultural experiment stations and plant pathology centres were visited in Hawaii, USA, Canada, the British Isles, Holland, Egypt, Palestine, India, Ceylon, Malaya and Java. A great deal of valuable information and experience was obtained as well as the opportunity of meeting some of the great personalities in the plant pathology scene of the day. There was of course no air travel at that time and twelve different ships had to be used as well as a considerable mileage by train and coach. As I recollect, time away was a little over a year and the total cost of the trip about one thousand pounds. Even in those days this was achieved only by very frugal living and transport. I suspect that travelling was easier and safer in 1931 than it is now in spite of the so called progress that has taken place.

The Second World War marked the end of this early period in the history of the Plant Pathology Branch. As the war progressed, most of the pathology staff joined the forces as positions became available which enabled them to overcome manpower restrictions. H. E. Young was connected with troop nutrition; J Aberdeen worked on the entomological aspects of malaria; L. F. Mandelson and J. H. Simmonds were in charge of malaria control units. All four served in New Guinea. T. McKnight and W. Pont joined the armed forces, the latter seeing service in the Middle East. Aberdeen and Simmonds received military honours.

I found malaria control work interesting but very strenuous. We were fortunate in being one of the first units given the task of evaluating the new pesticide DDT for the field control of the malaria mosquito.

Returning to William Street after a few years active service, it was not easy to settle into the old routine. In fact, it is doubtful whether it was ever quite the same. What seemed to be a new development was the emphasis Departmental officers in general were placing on remuneration and status, something they had not given so much attention to earlier. This was probably part of a general community trend where the old work ethos of working for work's sake was becoming less evident.

The years following the war were marked by a general exodus of pathology staff. Whether this was due to a feeling of unrest or to the number of attractive jobs becoming available is a matter for conjecture. Finally, only Morwood, Pont, McKnight and myself were left. This meant that it became necessary to rebuild the Pathology Branch almost from scratch. With the new recruits, mostly young graduates of the University of Queensland, was ushered in the modern era. This has been characterised by a continued growth in personnel, equipment and field stations with of course the major move to the Indooroopilly laboratory. To one associated with the Pathology Branch in its early years, the result of this growth has been amazing. I trust the present staff will be interested in learning something of their Branch's humble origin.

References

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