

THE FATHER OF TREE IMPROVEMENT IN BC

BY

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FORWARD

The best indication of the merit of a professional is the esteem held by his fellow workers, family and friends, such as the following quotes about Dr. Alan Orr-Ewing:

Chris Heaman-“You are held in high esteem for your hard work, persistence, and dedication, as well as your high standards, careful record keeping, attention to detail and scientific integrity.”

Alec Orr-Ewing-“Dad was quiet and unassuming, yet, despite his war record, abhorred violence.”

Isabel Reid-Orr-Ewing-“Dad was a very loving husband, father and grandfather. He played the game of life fairly and honestly and with integrity.”

Ralph Schmidt-“Among the scores of researchers who worked in the BC Forest Service over the last seven decades, there were only a handful of individuals who made a major long-term impact upon their research program. Dr. Alan Orr-Ewing was one of these.”

Vladimir Korelus-“Alan was one of a rare breed-a person with a sound scientific mind who was able to communicate his work and inspire others by his direct approach, enthusiasm and personal touch.”

Dr. Harry Smith-“Alan was always a great encouragement to his associates and younger staff to develop their potential fully. He never compromised standards or stinted on effort, whatever the weather, the hour, or the day of the week; he expected no less of his fellow workers.”

Mike Finnis-“He was honest, kind hearted, and very quick witted.”

Gerry Burch-“Alan was a tall, quiet gentleman who painstakingly worked alone in his chosen field, but slowly began to influence his employer and the field foresters in BC that positive results could be obtained from tree improvement.”

Distinguished Forester Award Citation- “Dr. Orr-Ewing has shown a sincere dedication in his specialty within the field of professional forestry in BC and is highly esteemed by forest geneticists throughout the world. He is internationally known for his research on tree breeding, particularly of Douglas-fir. The results of his research experiments will be the basis for substantial increases in per acre production in this province long after he has retired.”

ALAN LINDSAY ORR-EWING, MC, BSF, MF, PhD, RPF
The Father of Tree Improvement in BC

What does it take to become a forester? Is it simply a love of the outdoors? Or is it by accident that an individual enrolls in forestry courses when other courses may not be available? This book is of an amazing individual who faced many difficult decisions and yet rose to become one of the top forest research scientists in the world. His story is told by his family and his compatriots in government and in industry.

Alan Lindsay Orr-Ewing was born in England in 1915, as the second son of three boys and a girl of Brigadier-General Sir Norman Orr-Ewing, C.B., D.S.O. His father was a permanent army officer, having served in South Africa, Egypt and in France, where in 1914 he was wounded seriously. He received many awards during his many campaigns- D.S.O., Cavalier of the Military Order of Savoy, Croix de Guerre and Officer de Legion d'Honneur. In 1931, Sir Orr-Ewing was appointed aide-de-camp to King George V and then King George VI.

Alan's early schooling was at Eton College, and for the first time, we can see his adventurous spirit, when it is reported that he was temporarily suspended from class for disconnecting a rail car. Yet he became a member of the Sigma Xi Honorary Society for top students. Alan decided that the better farmers were those that had taken further education, and that he, perhaps, should seek out an agricultural school. So, in 1933, after searching for the best one available, he enrolled in the Ontario Agricultural College at Guelph, Ontario. But one of the requirements for enrolling was a period of practical training, so Alan worked on a farm for five months for a wage of \$10 a month. The curriculum included a course in forestry, which appealed greatly to him. Attendance at the school enabled Alan to pursue his favourite sport boxing. It is on record that in 1934 in the 145lbs. weight class, he defeated a University of Toronto opponent by a technical knock out in the first round. At the school, Alan also made the acquaintance of his future wife, Helen, but it would be many years before marriage was possible. After receiving his diploma in agriculture in 1935, Alan bought a car (1928 Chevrolet coupe) and drove to British Columbia to find a job in forestry.

He made contact with the Forest Service and discovered that the best opportunities were with a program called the Young Men's Forestry Training Program. Then he was informed that only BC residents were eligible, but that the Forest Service would take him on in the Research Division at no pay, but would pay his room and board. Alan accepted and became a research assistant on May 14, 1935 for the summer. He was laid off in September, and worked in logging for the winter, first on a track laying crew at Campbell River at \$3 a day. His only comment was "And there was no coffee breaks in those days." Then, when that job ceased, he went with Alberni Pacific Co. at Port Alberni as a chokerman. Again a layoff occurred, and Alan went to work with Bloedel, Stewart and Welsh at Menzies Bay, again on the logging crew.

In May 1936, at last Alan was hired as a field assistant in the Research Division at \$90 per month, working on a regeneration survey of the Sayward Forest on Vancouver Island, and on Timber Berth W in the Alouette River drainage on the Mainland. Alan said it was a depressing job as there were many large areas with no natural regeneration of any kind and that planting was a must. Other areas, in the absence of fires, had regenerated, but on many of the best sites, deciduous growth had quickly taken over. He

traveled extensively throughout the coast this summer and made a decision at last to pursue forestry as a career.

Orr-Ewing then decided to return to Scotland and attend the University of Edinburgh to obtain his forestry degree. He graduated with a BSF in 1939, and was awarded the Harry Younger Medal for Practical Forestry and the Medal for Advanced Forestry as the top student. While at university, he again pursued his hobby of boxing, and in the Scottish University championships, "Orr-Ewing won the light heavy-weight division by winning both of his fights, although giving away nearly a stone of weight in both instances."

But World War II was declared a few months after graduation and Alan immediately joined the army—The Argyll & Sutherland Highlanders. He was sent to France in January 1940 as a second Lieutenant, and when his unit arrived in Normandy, it was in the grip of a severe winter. Even the men from the most northerly parts of Scotland had never experienced cold weather so biting. Throughout April and May, The Highlander's role was to give support to the French forces, with many disagreements on the military decisions made. On May 10, 1940, Alan was in command of a fighting patrol of his unit, and detected a greatly superior force of enemy formed up for an attack. Although by nature Alan hated violence, he unhesitatingly attacked and dispersed the enemy, inflicting severe losses on them. Although wounded, he subsequently withdrew his patrol and took it out again the next morning to search the area for enemy. On May 18, 1940, at Dunkirk in France, although still suffering a head wound from shrapnel, Orr-Ewing volunteered to lead a daylight patrol to a village where the enemy was known to be present. While searching a house he was fired on at short range and wounded in the arm. Despite this, he conducted a successful attack and captured a German officer and his men. For his fearless leadership of his patrol, Alan was awarded the Military Cross. However, in May, his younger brother was killed in action while fighting for the Black Watch.

In June 1940, Brigadier Orr-Ewing received word that his son, Alan, was a prisoner of war, having been captured on the Somme, France. Alan was to spend the next five years in prisoner-of-war camps. He kept his inventive mind active by planning repeated escapes—the first was in May, 1941 when he and another officer escaped from the infamous Oflag prison in a rubbish cart. They were captured by civilians almost immediately. Then he was transferred to Colditz, which was the German's escape-proof prison for captured officers and where they were treated as criminals. It was a very escape-minded camp with more guards than prisoners. The morale was very low but they received daily BBC bulletins from a hidden wireless set to keep their spirits up. However Alan made a second attempt to escape by hiding in a box and donning a German uniform, but he was arrested shortly thereafter. Later, he used his resemblance to a French orderly to affect his third attempt to escape; again he was unlucky and was recaptured the same day by the German Home Guard. Whilst he was a prisoner at Colditz, Lieutenant Orr-Ewing, MC, sent useful information to the War Office and to his father by code for which, after the war, he was awarded the Mention-in-Despatches Medal. The citation states "Behind the award to Lieut. Orr-Ewing lies a story of grim perseverance and total disregard for personal safety." Finally, on April 15, 1945 the prisoners at Colditz were rescued by the American army.

One of the most famous secrets of this prison came to light after the war, involving the construction of a glider in a false wall which was intended to fly from the roof of the

prison over the walls to freedom. It was constructed from floorboards, sheets and electric cable. Apparently the glider was completed a few months before the German surrender, but by then orders had come from London that prisoners should make no further attempts to escape. Alan was one of the officers involved in this desperate effort!

After demobilization, Alan and Helen were married in Toronto in October 1945, and settled in Stromferry, Scotland where he had accepted a position as District Forest Officer in the Forestry Commission. Soon Alan realized that job advancement was very limited, so he decided to return to BC. Arriving in February 1948, he applied to the Research Section of the Economics Division, BC Forest Service and was hired to work on natural regeneration of Douglas-fir after clearcutting, where he concentrated on seed mortality due to mice predation. This study resulted in the production of his first scientific paper, titled "The Life History of the Deer Mouse."

Finally, in 1950, Alan Orr-Ewing made a decision to specialize in forest genetics, and to this end, decided to enrol in the University of California to obtain a Masters Degree, which he accomplished in 1951, and was admitted to the Sigma Xi group for overall excellence. While in attendance at this school, a field trip was carried out to the US Forest Service's Institute of Forest Genetics at Placerville, California, which impressed Alan greatly, so much so that he decided to concentrate on a program of tree improvement with Douglas-fir. But he knew it would involve further education, and therefore in 1951 registered at the Faculty of Forestry at the University of British Columbia, under another noted research forester, Dr. George Allen. In March 1956, Alan became the first recipient of a PhD from the Forestry Department at UBC. His thesis involved research into the cytological effects of self-pollination in Douglas-fir. Then Alan returned to the Research Division of the BC Forest Branch for a lifetime of projects in forest genetics. However it should be mentioned that few scholarships existed at that time for forest research students, and government support for employees was not available, therefore these graduate studies involved considerable personal sacrifice for both Alan and Helen.

At last, the tall, quiet and reserved forester was about to embark on his chosen profession, but there were many obstacles ahead, which Alan undertook with the same determination he showed in the past. First, as a result of his drive, tree improvement research was formally recognized by the BC Forest Service. But, despite limited funds for the next two decades, Alan managed to expand his efforts in tree improvement. Initially, he worked with only one assistant in selecting individual Douglas-fir second-growth trees, both good and poorly formed specimens, and experimented with grafting, and pollinating cones with collected pollen.

But the slow pace of development in his genetic research, and the apathy of other foresters irked Alan greatly. Therefore, it was not surprising that in 1959, while meeting with Gerry Burch, RPF, Chief Forester of a large forest company, he suggested the formation of a committee, made up largely of industrial foresters, to help him locate superior-looking Douglas-fir trees. Gerry accepted the challenge and they organized the Plus Tree Board. The initial stands were selected by Alan, the company cruisers would select candidate trees, and Alan would inspect them as being suitable for his research or not. His standards were very high, and he would constantly remind other foresters: "One must realize that good selections are the very foundation of a successful tree improvement program." Once a tree was accepted as a candidate Plus Tree, Alan would then use a rifle to shoot a twig from the top of the tree and graft it in one of his "clone

banks.” No doubt he was one of the very few civil servants authorized to purchase and use a rifle in his work! Soon it became evident that Alan was not satisfied with the slow progress in selecting candidate trees, so a decision was made to organize “Plus Tree Weeks,” wherein government, industry and university foresters would be instructed in the selection by process in a fairly large 40 to 100 year old Douglas-fir stand selected by Alan. The first week was at Royston on Vancouver Island in 1960 in a beautiful 60 year old stand which was logged in the following decade. Six Plus Tree Weeks followed in successive years, and along with individual efforts by companies, over 1,000 good phenotypes were selected and formed the base for the establishment of clone banks and seed orchards on a large scale in BC. Alan’s work soon triggered similar research and testing on other species, including white spruce, lodgepole pine and western hemlock. The present coastal and interior Tree Improvement Councils were developed from this Board.

At the same time, Alan was disturbed at the lack of recognition given by foresters in not only the selection of better phenotypes when picking cones, but in the lack of thought as to locations where the seedlings were being planted in relation to the source of the seed. Therefore, he was the driving force behind the establishment of seed zonation maps, and a full registration of seedlots, citing examples of seed-source related failures revealed by his plantation surveys in the past. Similarly, Alan was concerned with the comment he heard in the early days in the Forest Service that Douglas-fir seedlings “go into check” the first year after planting, but this was not his experience. All research plots that he put in were planted personally by Alan, and no planting check was ever experienced, leading him to believe that the reforestation policy needed to be improved with careful handling of the stock from the nursery to the planting site and more attention given to proper planting technique.

During his working life, Alan’s research tackled formidable problems of tree selection and registration, pollen collection and storage, propagation, outcrossing techniques, and interspecific hybrids. The resulting collections and plantations, gained in the face of minimal budgetary support, and working alone in this very specific field, provided an inspiration to local field foresters and genetic scientists for many decades.

Two other fields of research deserve special emphasis and provide an insight into the determination of this remarkable scientist. The first project involves the investigation into the effects of self-pollination of the Douglas-fir species. The main objective of self-pollination is to eliminate undesirable characteristics, which being recessive, are carried on to the next generation. By continued selfing and selection, pure lines are eventually obtained. This method was extensively used in agriculture but ignored in forestry because of the long time periods between each generation. Tree inbreeding is a field requiring a considerable amount of patience. The inbred collection of Douglas-fir at Cowichan Lake Experimental Forest is unique in the world, as very few tree breeders have explored this field. Therefore, forest researchers from all over the world have visited Alan’s out plantings in this location. It is unfortunate that some of these plots were destroyed when Alan retired to make way for other research plots. His comment at that time was to recall the words of one of his mentors: “The greatest contribution that one generation of tree breeders can make is to provide sufficient breeding material for their successors,” (Dr. Klaus Stern).

Another pioneering venture carried out by this outstanding research forester was the very promising field of racial crossing. Alan determined that the Douglas-fir species is

found not only in the Pacific Northwest but has an extensive range from BC south to central Mexico, and one strain was even found in China. Alan contacted foresters in all of these locations and had them deliver seed to him for projects on wide crossings. Although there appears to be no incompatibility barrier to making wide crosses with this specie, and despite the fact that increased growth and excellent form were obtained from many crosses, much research is still required to assure these favourable patterns continue to rotation. At its peak, the Douglas-fir arboretum at Cowichan Lake contained seedlings from 320 locations from Mexico to central BC, as well as 216 provenances and 121 clones from the interior of BC, the USA and Mexico.

The dedication of Alan to his research culminated in 1971 when he received the first of many honours, as the first recipient of the Distinguished Forester Award from the Association of BC Professional Foresters. The award states that it is being granted to Dr. Orr-Ewing "for professional excellence, for fulfillment of established objectives, and for the ability to originate and innovate". This recognition from fellow foresters was a highlight in his career, as many times he felt that his efforts to sell genetics to his superiors, and industrial foresters, was falling "on deaf-ears/" However, during his working life, Alan constantly attempted to convert non-believers into believers, and generated support wherever possible--both financial and manpower-wise. He also documented his research in great detail, and took every opportunity to present speeches to national and international bodies. Over 25 scientific publications and numerous articles were printed during his working life. In 1962, Alan was invited by the Canadian-Scandinavian Foundation to a 3 month tour of tree-breeding establishments in Scandinavia and northern Europe. Also, he was requested to present his research results, particularly on selfing of Douglas-fir, to the Second World Consultation on Forest Tree Breeding in Washington, DC in 1969. This consultation was one of the largest gatherings of its type ever held with participants from more than 50 countries attending. Naturally, he was an active member of the Canadian Tree Improvement Association and The Western Forest Genetics Association in the Pacific Northwest, advancing to the presidency of the latter organization. Alan also served as an editor of *Silvae Genetica*, a noted research publication on advances in forest genetics. He was a regular speaker at forestry functions, universities, training schools and on public tours. In particular, he encouraged young foresters to set and attain high standards--a code Alan enforced on himself. His simple message on the field of forest genetics, particularly for young foresters and technicians, was "Good seed does not cost, it pays."

In 1980, Dr. Orr-Ewing was elected a Fellow of the national Canadian Institute of Forestry in the same year of his retirement. Also, in this year, Alan was elected to Honourary Membership in the Canadian Tree Improvement Association. And so, this relatively quiet and modest man, a pioneer in Canadian forestry, who really started out to be a farmer, left a legacy of knowledge in his network of plantations, out plantings, scientific articles, a seed certification system and his impressions on a generation of younger foresters. As a result of his efforts, there are now almost 100,000 trees of 13 species in 84 Forest Service and private seed orchards in British Columbia that are managed to produce improved seed for the reforestation of denuded lands in the province.

Together with the ongoing research into vegetative propagation, genetic gains can be transferred into the field quite quickly today and significantly increase the gains above what the Father of Forest Genetics--Dr. A.L. Orr-Ewing--ever envisioned. I think Alan would be justly proud of the ongoing progress of a field of forestry in which he pioneered

and fostered for nearly 50 years! He was a pioneer in Canadian forestry and Canada is indebted to him and fortunate that he chose Canada as his adopted land.

Dr. Alan Orr-Ewing enjoyed over ten years of retirement until his health began to fail, and he died on February 26, 1995 at the age of 80 years.

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10. Tape of a joint interview with co-workers John M. Finnis and John C. Heaman