Carl C. Heimburger - Retires

"Explorant adversa viros: perque aspera duro Nititus ad laudem, virtus interrita clivo." — Adversity tries men, and virtue strives for glory through adverse circumstances, undeterred by hard obstacles.

SILINUS ITALICUS. 4, 605

During the course of his life CARL C. HEIMBURGER has encountered more than his share of adversity and has been confronted by many obstacles which have required considerable perseverance to overcome. He succeeded and made a significant contribution to tree breeding and forest genetics both nationally (Canada) and internationally.

CARL C. HEIMBURGER was born in St. Petersburg, Russia (Leningrad, U. S. S. R.) on January 19, 1899. While still in his early teens he was presented with a book on Mendelism and rapidly developed a consuming interest in plant breeding. Initially his attentions centered on developing gastronomically improved varieties of fruits to satisfy a young man's palate, but gradually he expanded into other fields. He has retained this interest in plant breeding throughout his extremely varied and often disrupted career.

Following matriculation in St. Petersburg, 1918, CARL moved to Denmark where he enrolled in the Forestry Department, Royal Veterinary and Agriculture College, Copenhagen.

It was during this period (1918—1924) that he first met C. SYRACH-LARSEN. These two men were destined to play important roles in the development of the field of forest genetics and tree improvement. It is interesting to speculate how two men of such different backgrounds and nurtured in such different environments could be pioneers in the same field of endeavor. It is not difficult to visualize how C. SYRACH-LARSEN became a tree breeder. He was born and raised in an environment very conducive to such development (SØEGAARD, B., Silvae Genetica 17: 157—158, 1968). CARL C. HEIMBURGER, on the other hand, exhibited a strong interest in plant breeding during his youth, but the environment to which he was subsequently subjected would have turned any but the most dedicated to other fields.

Following graduation in Copenhagen in 1924 CARL HEIMBURGER spent several years finding his proper niche. Employment by Tornator O—Y, a paper and lumber company in Finland, was followed by a short course in the technical school of Forestry and Sawmill Industry in Sweden in 1925. In the same year he emigrated to Canada where he was employed with Wayagamack Pulp and Paper Ltd. at Flamand and Three Rivers, P. Q. Throughout this rather difficult period he maintained a strong interest in plant breeding and spent a considerable portion of his spare time studying the North American flora and growing flowering plants.

Later CARL HEIMBURGER enrolled in the Faculty of Forestry, University of Toronto. Following graduation, 1928, he was employed by the Ontario Department of Lands and Forests, Forestry Branch, Toronto, Ontario. In 1930 he enrolled in the graduate school at Cornell University, Ithaca, N. Y., U. S. A. He received the PhD degree in 1933. His thesis, "Forest type studies in the Adirondack region" (1934, Cornell Agr. Exp. Sta., Memoir 165), is still widely cited. During his years at Cornell he maintained his interest in plant breeding and did some very interesting interspecific hybridization work with poppies *(Papaver)*.

In 1933 the depression was in full swing in North America and jobs of any type were difficult to obtain, but Dr. HEIMBURGER finally found a place with the Lamb Lumber Company in Menzies, B. C.

In 1934 Dr. HEIMBURGER jcined the staff of Dominion Forest Service, Petawawa Forest Expt. Station, Chalk River, Ontario to carry out site research. He maintained his interest in plant breeding and initiated his work on *Populus, Pinus,* and *Picea* breeding.

In 1946 when the Ontario Department of Lands and Forests initiated a research program in tree improvement at Maple, Ontario, Dr. HEIMBURGER undertook its direction. Much of his work on breeding white pines resistant to rust, *Cronartium ribicola* FISCHER, and weevil, *Pissodes strobi* (PECK), as well as the development of aspen hybrids with good growth characteristics and capable of rooting from stem cuttings was done after 1946. In later years his program included supervision of breeding projects with pines of the *Lariciones* group, *Picea* species and *Thuja.*

In 1953 Dr. HEIMBURGER was elected a Fellow of the Royal Society of Canada, the first and only professional forester to be so honored.

During the course of an extremely diverse educational and employment pattern, Dr. HEIMBURGER developed a wide appreciation of the interrelationship of genotype and environment which he utilized very effectively in his selection and breeding work. Indeed his breadth of experience, keen observation, and genuine enthusiasm compensated in large measure for the primitive conditions under which he often worked and the frequent lack of research support. Thus he was hampered but not prevented from leaving a legacy of well-planned experiments, collections of trees, and a wealth of ideas.

Dr. HEIMBURGER was instrumental in organizing the Committee on Forest Tree Breeding in Canada, serving in various executive positions for several years. It is difficult to conceive any forest genetics activity in Canada which has not benefitted from his contributions. He has what is almost a unique ability to visualize a problem in its entirety; to clear away the peripheral "garbage"; and get to the heart of the problem. He will be remembered for this ability and for his occasionally caustic, but just, comments. Not one to condone ignorance, incompetence, or indolence on the part of researchers or administrators, he did not hesitate in making his feelings known. These confrontations will not be forgotten.

Not only has Dr. HEIMBURGER been an important contributor to forest genetics research in Canada, he has played an important role at an international level. His varied background and linguistic ability ideally suited him for this work. He served as Canadian editor for *Silvae Genetica* (formerly Z. Forstgenetik u. Forstpflanzenzüchtung) since its inception in 1951. The title *"Silvae Genetica"* was first suggested by Dr. HEIMBURGER when the decision was made to stress the international scope of this journal.

Dr. CARL C. HEIMBURGER retired from the Ontario Department of Lands and Forests in 1968. He continues to be very active in the field of tree breeding and has finally found enough time to publish many of the results from a distinguished career in research. He continues to be an active plant breeder although with maturity he is now inclined to be more interested in the aesthetic value of flowering plants than in the gastronomic selections of his youth. Dr. HEIMBURGER's interests are shared by his wife who is a cytotaxonomist in the Department of Botany, University of Toronto.

Department of Fisheries and Forestry D. P. FOWLER
Fredericton, N. B., Canada

August, 1969

Precocious Flowering in Some Pines of the Lariciones Group[1])

By C. C. HEIMBURGER[2]) and D. P. FOWLER[3])

(Received for publication May 13, 1968)

One obstacle to genetic work with forest trees is the length of the period between generations (breeding cycle) of many tree species. Numerous experiments in the induction of flowering in young tree seedlings by various treatments of the plants and by modification of their environment have been carried out during the last 25 years, but thus far the results have not been promising. Another possible method of shortening the breeding cycle of at least some forest trees is to achieve this by genetic means. Precocious flowering has in many cases been found to be inherited. The following review of literature presents some of the better known cases of precocious flowering in Scots pine *(Pinus silvestris* L.) and some other species of the *Lariciones* group.

LÖFFLER (1923) in his outline for proposed breeding work with Scots pine and Norway spruce *Picea abies* [L.] KARST.) recommended the use of precocious trees, flowering at age 6—8. They were to be used for the purpose of rapidly obtaining information on the inheritance of silviculturally important characteristics. Within a span of 20—30 years it should have been possible to obtain information applicable to the breeding of materials with longer breeding cycles for direct use in forestry.

MÜLLER (1937) found Scots pine bearing cones at age 5—8 and staminate strobili at age 10 in plantations and natural stands in north Germany. The interval between first ovulate and staminate flowering usually exceeded five years. In three plantations of different ages in Saxony the proportion of trees with ovulate strobili was 2.7% at age six, 6.7% at age eight, and 20.4% at age 10. In all three plantations the average heights of the trees with ovulate strobili were greater than of the non-flowering trees. Several examples are given where abundant supply of light and nutrients were conducive to precocious female flowering while the opposite seems to hold true for the early production of male catkins. In a progeny test, after open pollination, with single tree plots, one progeny of an 8-year-old tree contained 47% trees with ovulate strobili at age six while another progeny of a 12-year-old tree had 12%. The same progenies had 78% and 50% trees respectively, with ovulate strobili at age nine. In another series an 8-year-old tree had a progeny containing 50% trees with ovulate strobili at age six while a progeny of a 27-year-old tree contained only 9%. Also in these tests trees with precocious flowering continued to show superior height growth as compared with non-flowering trees, at least during early life. A breeding plan is proposed, based on single plant selection and progeny testing. With 10-year breeding cycles, four generations of selected trees, including the original parents, should become available for final evaluation in about 22—25 years and the best lines could then be selected for use in forestry. Relatively wide spacing is recommended for individual evaluation. This is estimated to require a total of about 700,000 plants to be tested on an area of about 500 acres.

Based on observations for 55 species and varieties of pines growing at Placerville, Calif. RIGHTER (1939) reported an average minimum age of ovulate strobili production to be 5.2 years. The average minimum age of male catkin production of 39 species and varieties was 4.4 years. The minimum age for flowering of 14 species and varieties of the *Lariciones* group was reported to be 5.1 years for strobili of both sexes. Scots pine could flower, both male and female, at age five, its variety *rigensis* LOUD. at age four and *P. densiflora* SIEB. & ZUCC. at age two. The latter species produced good seeds after female flowering at three years of age. The climatic conditions at Placerville are considered to be quite favourable to reproductive precocity.

SCHRÖCK (1949) found precocious trees in progeny test plantations of Scots pine near Berlin, Germany. Several progenies of young trees contained greater proportions of precocious seedlings than progenies of older trees, indicating that the precocious flowering habit is inherited. Also in this case, precocious flowering could be found combined with good growth rate and growth form. The author believed that the tendency to precocious flowering was dominant and was introduced into native Scots pine materials through cross pollination from plantings of foreign origin. Some progenies of trees flowering at age 13 contained up to 89% precocious seedlings of which 7% were males, 55% females and 38% monoecious. It is pointed out that the dioecious flowering habit is valuable in seed orchards if it is persistent and under strong genetic control.

MORRISON-BELL (1950) reported a Scots pine transplant (2/2) planted in 1948 near Oxford, England and photographed with mature cones early in 1950. This plant must have produced functional ovulate strobili at age four and was seemingly normal in other respects.

HERRMANN (1951) and MERGEN and CUTTING (1957) reported a rare occurrence of male catkins on mugo pine *(Pinus mugo* TURRA) at an age of 16 and 12 months respectively. HERRMANN found male catkins on one seedling which he had micrografted on Norway spruce. MERGEN and CUTTING found three out of 330 seedlings to have male catkins. In

[1]) Contribution No. 68-3, Ontario Department of Lands and Forests, Research Branch, Maple, Ontario, Canada.

[2]) Research Branch, Ontario Department of Lands and Forests, Maple, Ontario.

[3]) Forestry Branch, Canada Department of Forestry and Rural Development, Fredericton, N. B.