This ability of chemotaxonomy to detect hidden chemical fingerprints of related trees may prove of great value to forestry. Dr. von Rudloff has analyzed terpene oils from spruce and pine in western Canada and has detected significant variations among certain species.

Again he emphasizes, "I have heeded Prof. Erdtman's early warning and was fortunate in obtaining the help of botanists with an extensive knowledge of conifer taxonomy. Thus all our work on the Engelmann spruce and its intragression with white spruce in the mountains of Alberta and British Columbia was carried out in close cooperation with Prof. R. T. Ogilvie of the University of Calgary, who ensured that we worked with morphologically well-defined plant material."

"As a result of this work," he continues, "I feel that chemotaxonomy may help the lumber industry spot trees with desirable properties in areas where commercially unimportant trees also are growing." Additionally, it could reduce some of the uncertainty in reforestation programs by helping to select tree varieties most suited to grow well in specific locations.

Applied to tree breeding it could detect desired crosses in young seedlings, saving 10 to 20 years presently required before it is known whether breeding programs have promise of success.

Dr. von Rudloff and Gordon Sinclair of PRL's Fibrous Products Laboratory are now taking a look at jack pine in northern Saskatchewan where a large pulp mill is already in operation. The jack pine is considered undesirable for large use in pulping but Dr. von Rudloff and Mr. Sinclair suspect on the basis of chemotaxonomy that as yet undetected variations may exist in local jack pine. A closer look may reveal varieties that could be better used commercially.

Chemotaxonomy has the great advantage of leaving growing trees intact while determining what properties they may possess by comparison of their fingerprints with those of known varieties. At most, only a few small branches are needed for individual assays and in some cases only one needle or piece of leaf. Dr. von Rudloff has developed a technique which can determine the oil composition of a single conifer needle. Although not yet widely applicable due to inherent variations within individual branchlets of coniferous trees, the technique is valuable in certain instances. He also has devised a system for recovery of volatile oils on the site of growing trees in dense forests, thus eliminating any danger of changes in plant material during transport to the laboratory.

The work at the Prairie Regional Laboratory on the development of chemotaxonomy as an additional and independently quantitative tool for identification of plants has brought together organic chemists, botanists, taxonomists and electrical engineers through collaboration with groups working on related projects. Post-doctorate fellows trained in the new approach at Saskatoon are pursuing further studies in Formosa and Japan. Industry also is beginning to show more than passing interest in chemotaxonomy. This expanding field has added new impetus to plant taxonomy and is stimulating further research in related areas.

Dr. B. M. Craig, Associate Director of the Prairie Regional Laboratory, says: "The gas chromatographic research on analysis of the complex mixtures in essential oils has laid a basis for chemotaxonomy to augment morphological classification, for population studies, and for the solution of some of the practical problems encountered in the industries associated with forestry." □

Dr. Ernst von Rudloff and Michael Granat collect conifer samples during the winter dormant period when leaf oil composition is constant.

Le Dr Ernst von Rudloff et Michael Granat prélèvent des échantillons de conifères en hiver, saison durant laquelle la composition des essences est constante.