LeBlanc has identified more than 250 species of mosses growing on the ground, rocks and tree trunks in an area of only 11 km^2 (4 square miles) at Mont Saint-Hilaire, 29 km (18 miles) north-east of Montreal, and he estimates there must be as many species of lichens in that limited area. Why then does there exist such a vast difference in the quality and quantity of epiphytic vegetation in our forests, where the trees are often host to dozens of lichenous species, and the vegetation which one observes in large cities and around industrial complexes, where these plants are rare and sickly, when they can be found at all?

Accompanied by a group of young researchers, Professor LeBlanc first explored the surroundings of the industrial complexes at Wawa and Sudbury in Ontario, where sulphur dioxide (SO_2) has greatly damaged the vegetation in general and mosses and lichens in particular. He then pursued his investigations around Arvida and Murdochville in Quebec to discover the impact which fluorine and heavy metals have had on the vegetative ecology in these regions. However, it is in Montreal that Professor LeBlanc demonstrated conclusively the major influence of air pollution on epiphytic vegetation. During three summers, his group carried out a detailed study of the ecology and phytosociology of epiphytes in 350 stations around Montreal in order to map the long-term effects of atmospheric pollution on the basis of lichen sensitivity.

His mapping method is based on the reaction or response of these obligate epiphytes to atmospheric pollutants. This long-term reaction is manifested by the disappearance of all or certain species in very polluted areas and by the abundance and great vitality of other species in areas with relatively little or no pollution. A simple mathematical formula takes into account relevant parameters, including the number of species, their covering on individual trees, their frequency, vitality, ease of reproduction and specific resistance to pollutants. It is possible, with the formula, to establish an Index of Atmospheric Pollution or I.A.P. for a given point; this index is actually a very accurate figure. As a result of this work a series of maps were published illustrating the distribution of several types of epiphytes around Montreal. The synthesis map, in six colors, gives an overall view of the long-range influence of air pollution in Montreal. By covering this map with an overlay especially printed to locate the industries and urbanized areas, the correlation between industrialization and the quality of vegetation becomes clear.

Following a series of conferences which Professor LeBlanc gave at Harvard University in 1968, he was invited to cooperate with Professor H.T. Fisher, Associate Director of the Laboratory for Computer Graphics and Spatial Analysis, of the Graduate School of Design of that university, in feeding all the information available as a result of the Montreal studies into a computer capable of producing rapidly and economically maps just as precise as those already drawn. This work was funded by the National Air Pollution Control Administration of the U.S. Department of Health, Education and Welfare. Dr. Jean-Maurice Granger, of the Institut d'Urbanisme, Université de Montréal, also cooperated in this project with the preparation of a paper on the subject: "Computer Mapping as an Aid in Air-Pollution Studies". This method of mapping, SYMAP, has enabled Professor LeBlanc to simplify his original methodology to arrive at a comparable result at nominal cost.

Has the epiphytic vegetation around Montreal always been so poor and in such bad health? Professor LeBlanc is not of that opinion. Fifty years ago, Father Hypolyte Dupret, sulpician, Professor of Philosophy at the Grand Séminaire de Montréal, collected dozens of species of epiphytic mosses on the maple and oak trees of Mount Royal in the very centre of Montreal, where these plants were then widespread and in good health. The notes and precise descriptions preserved

at the Botanical Institute of the Université de Montréal made it possible for Professor LeBlanc to locate the areas herborized by Father Dupret. Unfortunately, the many species of epiphytic mosses observed a half century ago have now completely disappeared from Mount Royal and the centre of Montreal has become an "epiphytic desert". The present generations of students must travel a great distance away from the centre of the city in order to study these plants.

Thanks to an ingenious method devised by Dr. E. Brodo of the National Museum, Ottawa, Professor LeBlanc has been able to transplant pieces of bark on which grew lichens and mosses from non-polluted areas onto trees in the polluted areas surrounding Wawa and Sudbury in Ontario and Arvida and Murdochville in Quebec.

The plants transplanted near the factories only lived a few months, whereas those transplanted at a further distance continued to grow normally. Moreover, results showed that these plants can accumulate in their tissues large quantities of sulphur, fluorine and several heavy metals. At 35 km (22 miles) south-east of Murdochville, for example, one finds 250 parts per million (ppm) of lead in a moss called *Hylocomium splendens*, while near the factories, 8 km (5 miles) from the city, there were 17,000 ppm.

In laboratory experiments, the University of Ottawa researchers have demonstrated that mosses and lichens exposed to large doses of SO_2 steadily lose their chlorophyl and that this change occurs more rapidly as the degree of humidity rises. Since the speed of disintegration is proportional to the amount of humidity in the air, it is important that industries better control their emissions during humid weather.

The work of Professor LeBlanc, while it has practical applications is also important from the point of view of fundamental research. In 1964, he was awarded second prize for scientific writing (Prix David) by the Department of Cultural Affairs of the Province of Quebec. In 1970, Professor LeBlanc received the medal of the Société botanique de France for the whole of his work on the ecology and phytosociology of obligate epiphytes, and for his more recent research on the influence of air pollution on epiphytic vegetation. □ **Diane Bisson**