Traces of industrial chemical are sou

By THOMAS CLARIDGE

A Canadian scientist who has emerged as an authority on PCBs—polychlorinated biphenyls—has just returned from Ungava Bay with evidence that may shed some light on one of the most worrisome industrial pollutants.

Robert Risebrough's mission for the Canadian Wildlife Service was to collect samples from the remote northern Quebec region for analysis which may yield clues on how PCBs have reached areas virtually untouched by man.

The theory is that PCB travels through the atmosphere, possibly through evaporation or co-distillation with water.

PCBs are chlorinated aromatic hydrocarbons, compounds of hydrogen, carbon and chlorine noted for their stability when heated and their resistance to chemical change. They are used in electrical condensers, capacitators and transformers. As fire-resistant compounds PCBs are used to impregnate and coat electrical cables and to seal terminals in electrical appliances. They are used as plasticizers and resins for chlorinated-rubber based lacquers, varnishes and paints and as carriers for some insecticides.

The discovery of PCB in wildlife far from industrial areas was in its own way as great a shock to scientists as the recent finding of high levels of mercury in fish caught in the lower Great Lakes.

But governments that managed to identify quickly the major sources of the mercury pollution will have no similar ease in tracing the source if PCBs are found to be a threat to wildlife or even man.

The scientific community is sharply divided on the likelihood of PCBs becoming as great an ecological problem as those posed by DDT and mercury, but there is unanimity on one point: much, much more research must be done and quickly.

Anthony Keith, head of the Canadian Wildlife Services pesticides section, says government and industry must increase spending on PCB research, particularly to find how the fat of polar bears from the Hudson Bay area could have come to contain higher levels of PCBs than DDT.

"We must know the distribution of the residues of these things," he said. "And we want to see, for example, whether you can show a gradient of PCBs away from the centres of industrial activity."

Asked where he would put PCBs in a list of research priorities, he replied: "Pretty high. Our first priority is to clean up the work we started in Canada on mercury and the environment .... In terms of new work it's mercury and then PCBs."

He said that in the event PCBs are confirmed to be a serious environmental problem, the cleanup would be much more of a problem than that posed by either DDT or mercury.

Mr. Risebrough, a 35-year-old native of Richmond Hill, who has spent five years at the University of California at Berkeley, said that his next project after reporting on the Ungava trip will be to determine how fast PCBs are contaminating the oceans.

"Our aim will be partly to find the distribution of PCBs off the west coast and partly to find whether they are accumulating and, if so, how fast," he said. "We already know certain things are happening to oceanic birds and that if the accumulation proceeds at the suspected rates we'll be in trouble."

Interviews with other scientists of federal Government agencies established that until now both Washington and Ottawa have chosen to let most of the research into PCBs be conducted by industry.

Industry, in this case, is mainly the giant Monsanto Co. of St. Louis. And the results of its research are hardly reassuring.

The manufacturer announced last month that because of mounting evidence that PCBs induce birth defects in some animals it would restrict sales wherever there is danger of leakage to

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the environment. The announcement said that in view of the possible threat to the environment Monsanto would restrict sales of PCBs "to those applications where their unique fire-resistant properties are important and where it is possible to control collection and regeneration or incineration of spent material."

Sales of PCBs for use in plasticizers are to be halted by the end of this month and the chemical will be phased out of uncontrollable uses in industrial and hydraulic fluids over the next six months. Additionally, Monsanto promised to "continue research efforts to develop alternatives to the PCBs and modify PCBs to make them biodegradable in conventional secondary waste treatment facilities."

Mr. Risebrough, whose papers were cited in the Monsanto release, doubted the company's action goes far enough.

"Any manufactured product eventually is thrown away," he said. "There is still a great chance that PCBs will continue leaching into the environment."

The scientist said another major problem is to find out what products contain PCBs. "Monsanto just makes the raw stuff and most of its customers use it in manufacturing processes."

He said a peculiarity in U.S. law has prevented scientists from learning annual production levels of PCBs. "The law says that there is no need to release production figures if there are only one or two producers of any commodity."

Mr. Risebrough said one reason production figures are important to scientists is that PCBs are much more persistent in the environment than DDT, whose chemical half-life has been estimated at about 40 years.

"That's why PCBs are so useful," he said. "We know those with fewer chlorine atoms can be metabolized and this probably means they will get out of the body more quickly. But the molecule may stay around forever and our present methods of analysis just don't detect the derivatives."

Mr. Risebrough said he and other scientists became interested in PCBs through studies of DDT.

It was only about five years ago that a Swedish scientist, Soren Jensen, identified as PCBs unknown peaks on gas chromatograph readings designed to show DDT metabolites. Mr. Keith is another scientist who was in on the ground floor of PCB research.

"It was about six or seven years ago in Wisconsin when I was doing analyses on the Great Lakes gull population that my chemist reported getting a spectacular peak that wouldn't key out as a legitimate DDT metabolite," he said.

Mr. Keith said all analysts in the field as late as about three years ago were reporting similar unknowns.

"Some thought they were yet-undescribed DDT metabolites and others just wouldn't guess," he said. "Jensen gave pretty conclusive evidence that the peaks were the same things as these industrial materials, the PCBs, which are in fact chemically very close but have different molecular weights and can be identified this way."

The best means of identification is through use of a mass spectrometer, which can obtain levels of the 24 polychlorinated biphenyls known to be manufactured. A total of 114 PCB molecular arrangements are theoretically possible. However, the process is slow and the equipment extremely expensive.

Monsanto and most of North America's large water quality agencies, including the Ontario Water Resources Commission, are concentrating research efforts on devising better tests for PCBs.

Frederick Voege, assistant manager of the OWRC in charge of the research work, said the commission has come up with a tentative method. "But there are still a large number of problems in making certain that it's PCBs we're getting and not something else."

Next: The threat to wildlife.

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