similar to Aroclor 1260, indicating a 60% chlorine concentration in the PCB residue. Extracts of the sludge from the various industrial plants consistently yielded concentrations of 50 to 160 ppm PCB (dry weight). On the basis of these results and the amount of sludge transported to the deep waters and dumped, it was calculated that about 1 ton of PCB was dumped each year. Similar analyses from Manchester and London revealed that these cities also dumped about 1 ton PCB each into the Northern Irish Sea and off the Thames estuary, respectively. The source of the PCB residues could be traced no further than the sewage treatment plants within the scope of this study. It is believed that the residues originate in industrial wastes. No PCB residues have so far been detected in freshwater fish in Scotland.

71-0674. Stewart, D. K. R.; Chisholm, D.; Ragab, M. T. H. (Res. Station, Canada Dept. of Agriculture, Kentville, Nova Scotia, Canada). Long term persistence of parathion in soil. *Nature 229(5279): 47; 1971.* (7 references)

Soil samples from plots which had been treated with 31.4 lb/acre parathion yearly from 1949 through 1953 were analyzed using a gas-liquid chromatograph (GLC) equipped with a flame photometric detector in order to identify the possible degradation products. Earlier studies (Chisholm) *et al.*, 1955) of soil from these plots found that the parathion residues had declined from the applied concentration of 15.7 ppm to 0.5 ppm in the fall of 1953. By 1964, the residue concentrations were further reduced to 0.2 ppm. This detection method (Averell and Norris, 1948) did not allow identification of degradation products. New samples were taken from depths of 0 to 4, 4 to 8, 8 to 12 and 12 to 16 in, air-dried, extracted with hexane/acetone (1:1) and prepared for analysis by GLC using the flame photometric detector. The samples were analyzed using three different columns: a 3% OV-17, 2% DEGS and a 10% DC-200 column. Small quantities of parathion were detected and identified, but no degradation products were found. These findings were confirmed by thin-layer chromatography (TLC) using an esterase inhibition technique (Mendoza *et al.*, 1968). Residue concentrations detected at the various depths were 0.060, 0.063, 0.008 ppm and only a trace at 0 to 4, 4 to 8, 8 to 12 and 12 to 16 in, respectively, which showed there was very little downward movement of parathion in this sandy loam soil. A total of about 0.1% of the parathion applied to the plots remained in the soil 16 years after the last application. That parathion may have been dissolved in lipids of the soil organic matter and thus protected from bacterial degradation and hydrolysis may explain its unusually long persistence in the soil.

71-0675. Lloyd-Jones, C. P. (Long Ashton Res. Station, U. of Bristol, Bristol, England). Evaporation of DDT. *Nature 229(5279): 63-6; 1971.* (8 references)

The evaporation rate of uniformly ring-labeled 14-C-DDT was investigated and compared to the calculated rates. Calculating the rate from the relation between the vapor pressure, the gaseous diffusion coefficient and the still air layer thickness, DDT should evaporate at the rate of 0.003 mcg/sq cm/hr at 20 C and at 0.0002 mcg/sq cm/hr at 5 C. Another method of calculating the rate using the relation between the rate of loss, the product of vapor pressure and the square root of the molecular weight results in a rate of 0.002 mcg/sq cm/hr. The labeled DDT (0.5 mcg/sq cm) was applied in ethanol to 3.8-sq cm aluminum planchets. During 53 days in a well-ventilated room away from direct sunlight, radioassays revealed that the counts steadily decreased from the initial value of about 180 to 10 cps. When maintained outdoors in a Stevenson's screen for 43 days when the average maximum and minimum temperatures were 7.0 and 1.3 C, the count declined from 200 to 80 cps. The mean rates of loss in these two experiments were 0.002 mcg/sq cm/hr and 0.0003 mcg sq cm/hr, respectively. The same amount of DDT was placed in enamelled metal dishes and exposed continuously to blowing air (about 10 mph) for 14 days. Recoveries were between 26 and 33% of the control, equivalent to 0.001 mcg/sq cm/hr. A fourth experiment designed to recover the volatilized radioactivity, revealed that inverted untreated planchets acquired radioactivity with a mean count of 20 cps after 14 days at 20 C. The experimentally determined evaporation rates, in good agreement with the calculated values, are equal to about 2 lb/acre/yr in the summer and about 0.3 lb/acre/yr in the winter. About ½ of the DDT applied to field crops may enter the atmosphere.

71-0676. Acker, L.; Schulte, E. (Institut fuer Lebensmittelchemie, Universitaet Muenster, Muenster, [illegible]). The occurrence of chlorinated biphenyls and hexachlorobenzene in addition to chlorinated insecticides in [illegible] milk and human fatty tissue. *Naturwissenschaften 57(10): 497; 1970.* (7 references) (German)

This is a report for the first time of the finding, by gas-chromatographic techniques, in human milk and fatty tissue extracts of significant amounts of polychlorinated biphenyls (PCB), hexachlorobenzene (HCB), DDT, DDE and *beta*-HCH (*beta*-hexachlorocyclohexane). In whole human milk, the content of PCB and HCB was, 0.103 and 0.153 ppm, respectively; in human milk fat 3.5 and 5.3 ppm, respectively; and in human fat tissue 5.7 and 6.3 ppm, respectively. The possible origin of these residues in the light of the uses of PCB in electrotechnology, lacquers, varnishes, plastics and synthetic products is discussed.

71-0677. Edwards, C. A.; Thompson, A. R.; Beynon, K. I.; Edwards, M. J. (Rothamsted Experimental Station, Harpenden, Hertfordshire, England). Movement of dieldrin through soils. I. From arable soils into ponds. *Pesticide Sci. 1(5): 169-73; 1970.* (11 references)

Dieldrin was applied at a rate of 22 to 45 kg/ha to strips above four ponds. Samples of soil from the strips, soil from the slopes leading to the ponds, pond water and pond-bottom mud were removed at intervals up to 81 weeks and extracted with hexane. The extracts were analyzed by gas-liquid chromatography (GLC) to trace the movement of dieldrin from the treated strips into the ponds. Recovery values ranged from 95 to 100%. At Kineton (England) sites A and B, the dieldrin was lightly raked into the soil surface; at the Solihull site it was thoroughly incorporated into the soil and at East Meon it was