~~HWF~~, Bob Keller 12/29/66

INSTITUTE OF ANALYTICAL CHEMISTRY
UNIVERSITY OF STOCKHOLM
Roslagsvägen 90, Stockholm 50, Sweden

Stockholm, December 29, 1966

Copy sent to:
J. R. Barley
R. M. Parks
J. A. Speziale

Mr. Ford
Monsanto Chemical Co
800 Lindbergh Road
S:t Louis, Missouri 63177
USA

Dear Mr. Ford.

Last year I had the great pleasure of visiting you at the Monsanto Co in St.Louis to discuss analytical problems of the phenolic composition of TCP. We were later kindly supported with samples by Mr. J.S. Thomas and Mr. A.F. Uelner. Our analytical investigations are almost finished and we will send you a reprint of the report when they will be available.

This letter is to inform you that we recently have identified most of the unknown GC-peaks at residue analysis of pesticides in biological samples. By the aid of combined GC and mass spectrometry Mr. Jensen of this institute has found the unknowns to be polychlorinated biphenyls which among other companies are manufactured by Monsanto, trade name Aroclor.

Added to this letter you will find a preprint of the synopsis of our publication which will appear in Acta Chem. Scand. (Summer 1967). Two gas chromatograms are also added to show that the chlorinated biphenyls are enriched in ecological series. - In the sample of the sea eagle were found: Polychlorinated biphenyls 80 ppm; ordinary chlorinated pesticides 80 ppm and mercury (!) 40 ppm.

At present we have no knowledge of the biological significance of the presence of these compounds in living organisms. We have started a collaboration with the Dept. of Toxicology at the Carolin Institute but we should very much appreciate to work with your toxicologists over this problem.

We will be glad to give you any further informations of the results obtained in this laboratory.

Sincerely Yours

Gunnar Widmark

Gunnar Widmark

EXHIBIT
WBP M-7

MONS 089196

TOWOLDMON0003185

September 1966

Institute of Analytical Chemistry
University of Stockholm
Roslagsvägen 90
STOCKHOLM 50

Head: Gunnar Widmark, Ph.D.

Secretary: Mrs. Ingrid Broms

Research fellows: 15

Education: 24 students a year
12 graduates

Technical assistants: 4

Workshop: 2

Laboratory area: about 400 m^2

Instrumentation (examples): Gas Chromatographs (40 of different manufacture), IR (Perkin-Elmer 421), UV (Hitachi 139), atomic absorption (Jarrell-Ash), differential scanning calorimeter (Perkin-Elmer DSC-1) ion chamber (Cary), electrophores, zone-melting, mass spectrometer LKB-9000

Research specialities: Analytical chemistry in the fields of organic chemistry, biochemistry and medicine ("life sciences")

Basic Research:

Gas chromatography, general (Allan Linnarson)
Analysis of expired air (Bo Jansson)
Head space analysis (Bengt Larsson)
Quantitative gas chromatography (Kerstin Widmark)

Applied Research:

x Analysis of chlorinated pesticides (Sören Jensen)
x Analysis of 3,4-Benzopyrene (Lars-Erik Strömberg)
x Lipid analysis (Kerstin Widmark)
Mercury analysis, atomic absorption (Jan Scullman)
Organic mercury, gas chromatography (Sören Jensen)
Isotopic synthesis (Olof Borgå)

x = research combined with stations for routine analysis

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PESTICIDE ANALYSIS

PRESENCE OF POLYCHLORINATED BIPHENYLS AT RESIDUE ANALYSIS OF BIOLOGICAL SAMPLES.

Sören Jensen and Gunnar Widmark

Institute of Analytical Chemistry, University of Stockholm,
Stockholm 50, Sweden

(Synopsis)

At analysis of samples from the Swedish wild-life fauna by means of gas chromatography, using both electron capture detector and micro coulometric detector, a large number of unknown but chlorine containing compounds have been detected together with the ordinary pesticides. Masspectra of some of these compounds obtained at a combined gas chromatograph mass spectrometer (LKB-9000) indicate that most of the unknown compounds are polychlorinated biphenyls, potentiated somewhat in nature towards those of higher degree of chlorination.

A large number of samples have been examined, and polychlorinated biphenyls are found especially in fish and in sea birds but also in needles of conifers and in some samples of human depot fat. Two hundred samples of soil and water did not contain detectable amounts of chlorinated biphenyls nor did twenty samples of terrestrial mammals.

By the use of a nitration method most of the ordinary pesticides can be removed from extracts, leaving the polychlorinated biphenyl unaffected. Using this method, it has been shown that two of the major peaks of the chlorinated biphenyls overlap the two peaks of ppDDT and opDDT respectively. This is found true for SF-96 columns, most frequently used for the quantitative residue analyses reported in literature; not in case of QF-1 columns.

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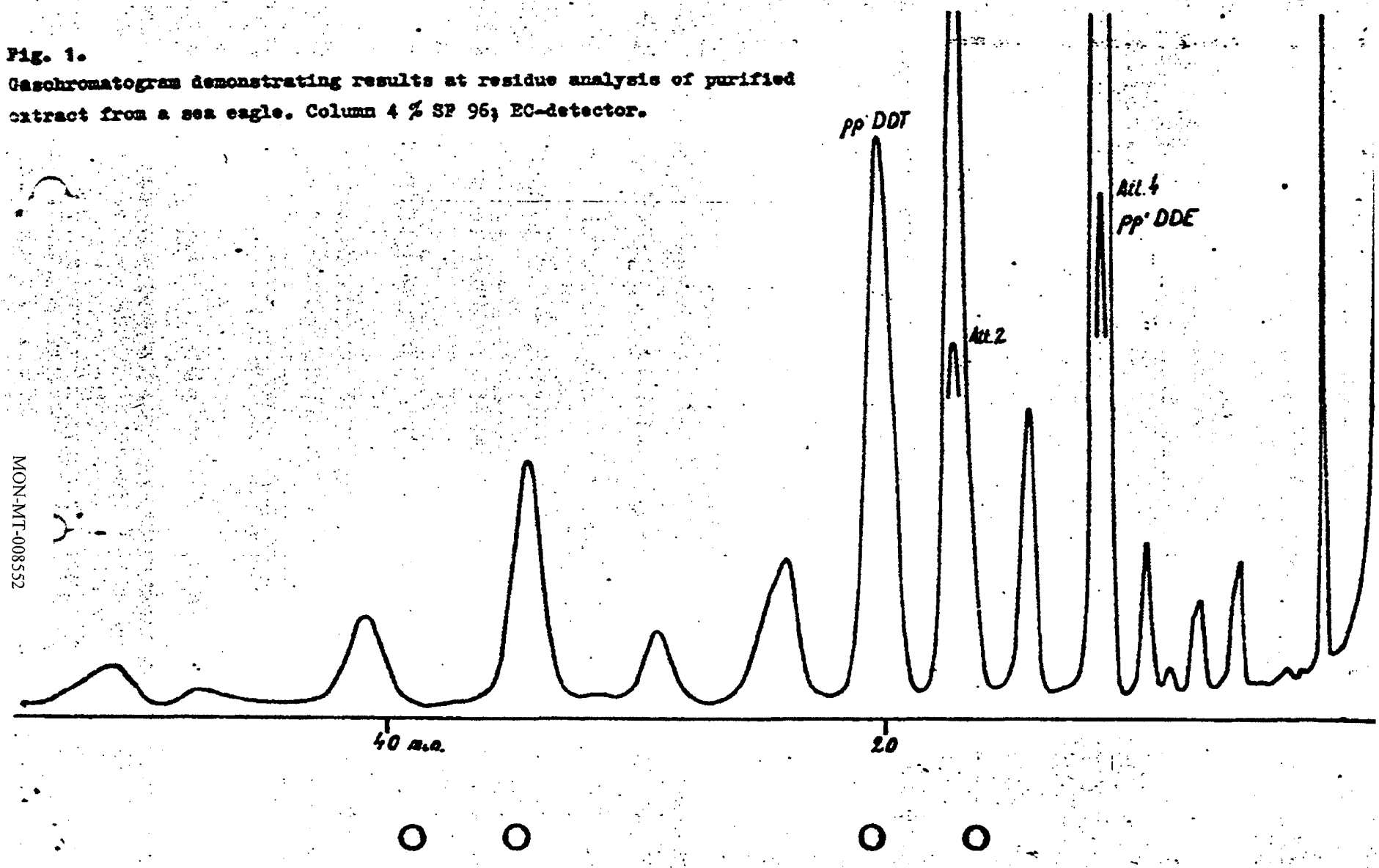
Fig. 1.
Gaschromatogram demonstrating results at residue analysis of purified extract from a sea eagle. Column 4 % SP 96; EC-detector.



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