A sustainable genealogy of pines and pesticides

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Some acknowledgements:

http://evanheplersmith.com/acknowledgements

DRT SELL YOUR PINE STUMPS

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Sell Your Pine Stumps

Pine trees are among the nation's most resilient and renewable natural resources. Thick forests blanket the nation's southeastern coastal plain from North Carolina to Louisiana. Above ground, mature pine trees are cut and trucked away for paper, lumber and building products. Yet below ground, the pine stump remains. For over a century, Pinova has utilized these same stumps as the foundation of a global industry.

General Inquiry ›

https://www.pinovasolutions.com/sell-your-pine-stumps (accessed 5 Oct 2021)

SCALAWAG Southern Politics Race & Place Arts & Soul Newsletters Mission Become a Member!

RACE & PLACE

Knock on Wood: How Europe's wood pellet appetite fuels environmental racism in the South

Part one: An expanding market for renewable fuels has fallen short of climate and job goals—instead bringing air pollution, noise, and reduced biodiversity Black and low wealth communities

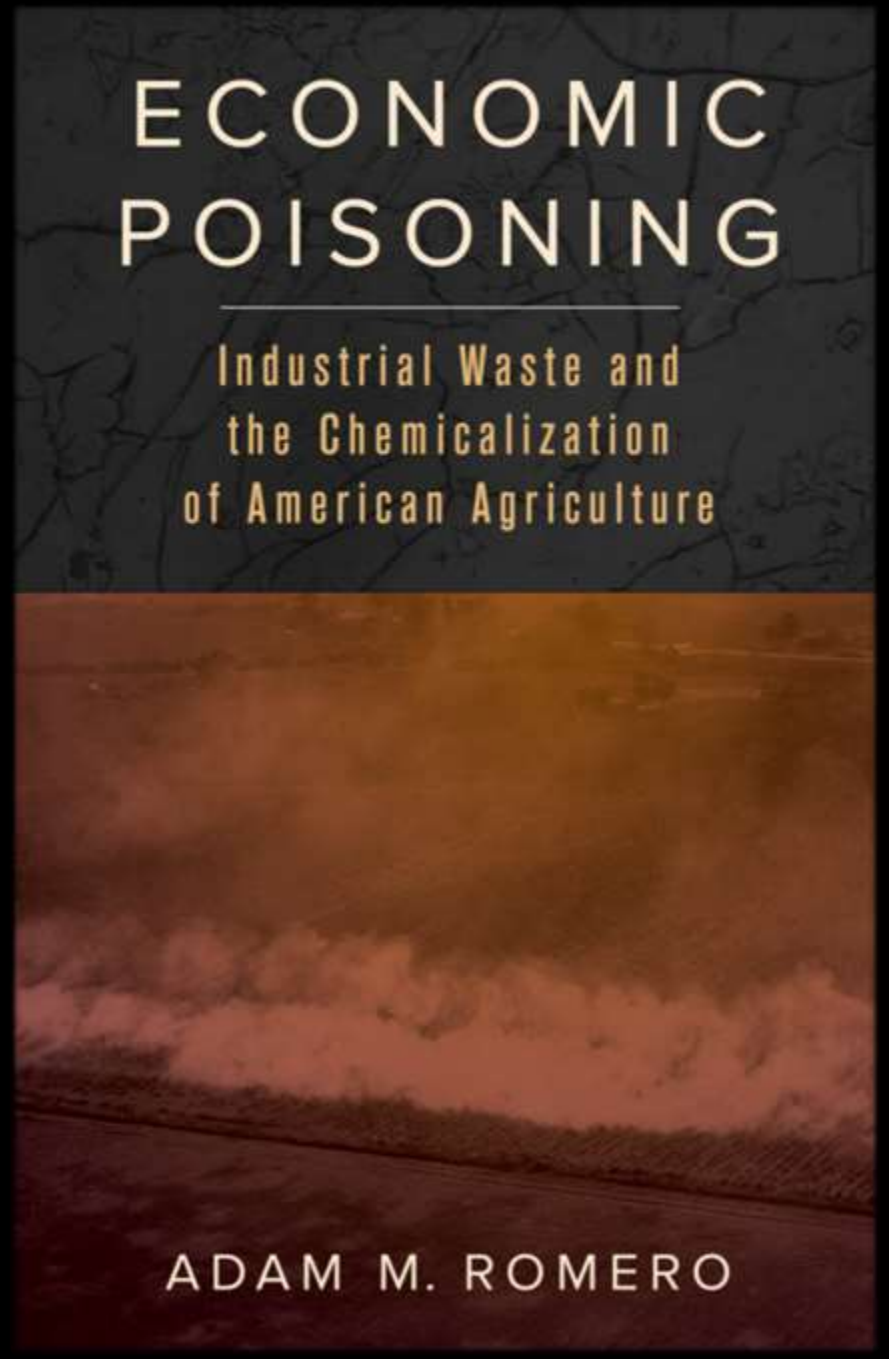
by DANIELLE PURIFOY October 5, 2020

https://scalawagmagazine.org/2020/10/wood-pellet-environmental-racism-part-one/ (Purifoy 2020)

https://www.theguardian.com/sustainable-business/2014/dec/10/toxic-chemicals-managed-forests-georgia-south (McCall 2014)

Can a hundred-year-old chemicals business shake a toxic past?

After a toxic century for the chemicals industry, bio-based chemicals are increasingly in demand. Can a company with a checkered past produce a greener future?



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OPEN ACCESS

A metabolic history of manufacturing waste: food commodities and their outsides

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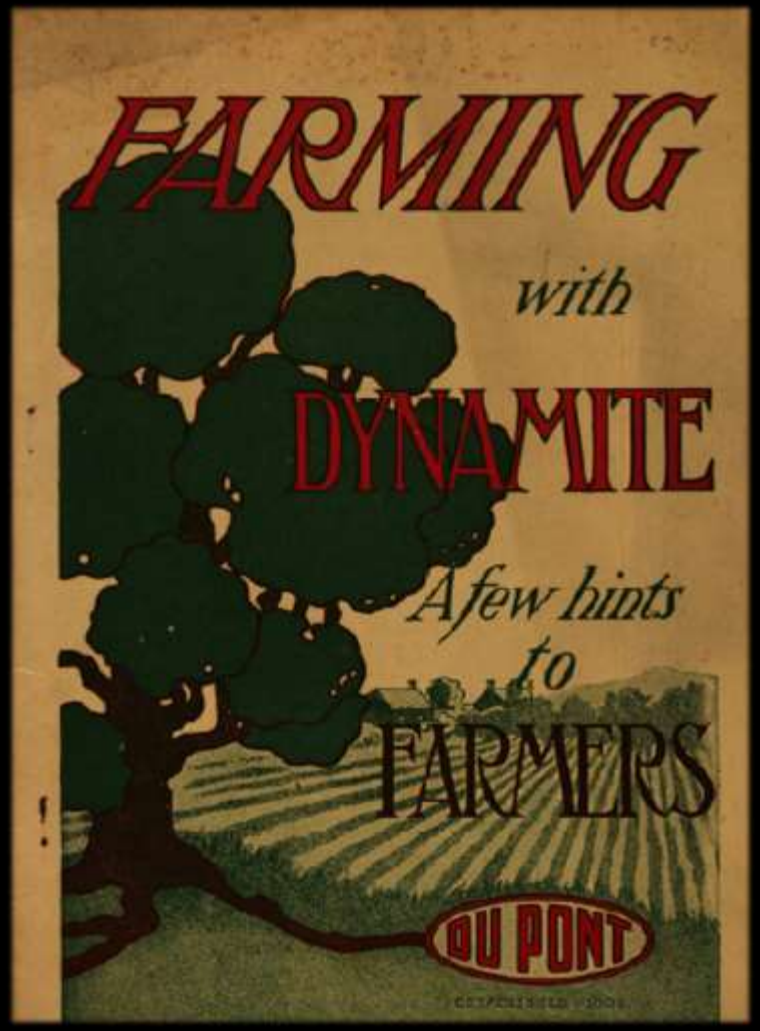
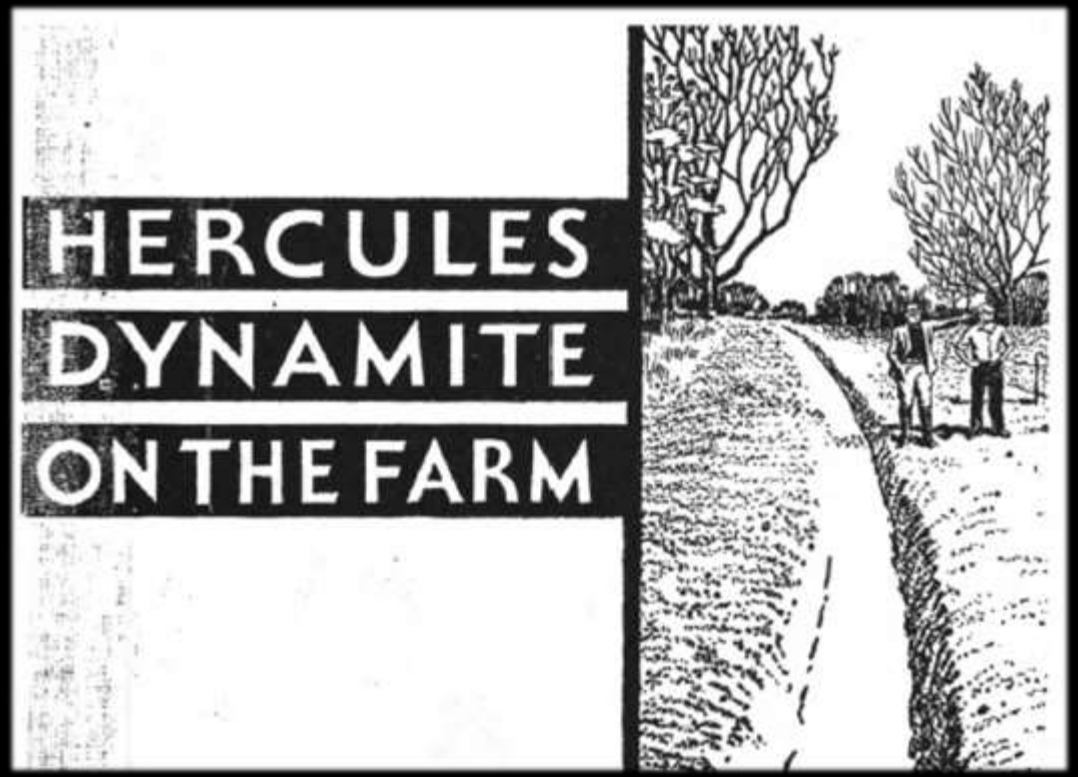
ABSTRACT

The early twentieth-century industrialization of food production and processing generated large volumes of processing waste. Following the fate of waste products cast off from the new food commodities, this article describes the logics and practices of large-scale waste reuse as animal feed and microbial nutrient medium in industrial chemical production in the United States. A "chemical gaze" on matter recast disparate burdensome byproducts such as beet pulp, cottonseed meal, or arsenic trioxide in terms of resources to be fed forward through microbial and animal metabolism. Focused on feed efficiency and growth promotion, this chemical gaze was selectively attuned to growth yet blind to the emerging infrastructure of waste-as-feed as a massive circula-

KEYWOR
Waste; m
health; g
animal nu
endocrine
molasses;





Hercules Powder Company: pine stumps, "Naval Stores," & insecticides

Hercules Mixer, 1941

Among the aims of the Naval Stores Research Group is the desire to produce improved insecticides; to produce

Naval Stores—

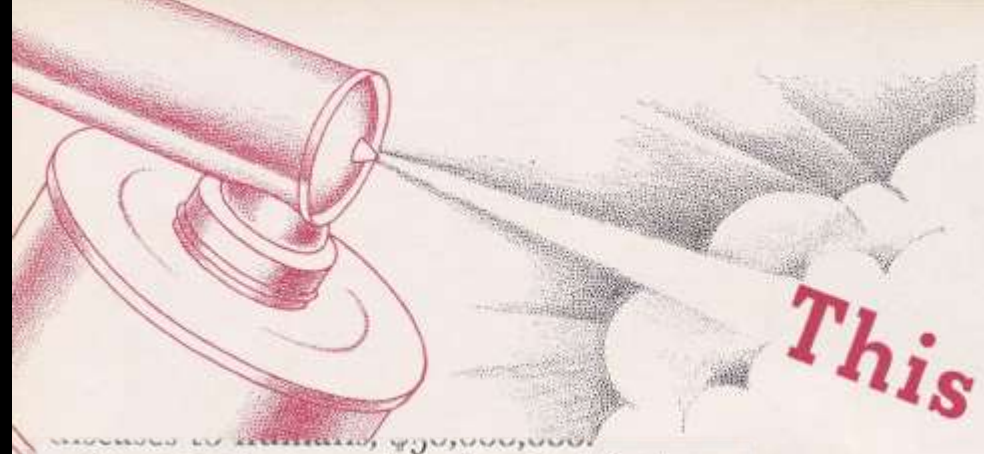
A 20th-Century Chemical Industry

CENTURIES BEFORE CHRIST, men used tar and pitch to caulk their ships to make them seaworthy. Probably Noah, a master craftsman, used these materials on the "Queen Elizabeth" of his day, less grandly labeled, "The Ark." At any rate, the continuous association of the products of the pine tree with the vessels that plied the seas caused them to be named "naval stores," a misnomer today since they are no more needed by the swift, steel hulled, diesel driven, streamlined

As a chemical industry, naval stores' history is brief, its accomplishments many, its future bright. About 1920, when Hercules entered the embryonic steam-distilled naval stores industry, turpentine, rosin, and pine oil were used in a few markets, but the field was limited and the market competitive. Thereupon, the company decided that Hercules must find new uses and new outlets for these products if it wished to become the leader in this industry.

Hercules Powder Company: pine stumps, "Naval Stores," & insecticides

***Hercules Mixer,* 1941**



This War May Never End

HERCULES' ENTOMOLOGIST—Friar Thompson, an authority on the life-cycles of insects and methods of extermination, has been largely instrumental in the development of effective insecticides from Hercules naval stores products.

In recent years, the chemical industry has supplied man with weapons to carry on his war with the insects. Effective sprays and poisons have come out of the laboratory. Were it not for their regular and systematic application, the insects would consume more food than man. Even so, the search for sprays with greater killing power is going on. Hercules is interested in this type of ammunition and is making definite progress in the field. Our connection with bug-fighting came about in this way:

In 1928, members of the Naval Stores Department discussed the possibility of developing agricultural uses for Hercules pine oil and other naval stores products. As a result of their discussion, a fellowship was established at the Georgia State College of Agriculture in Athens, under the direction of Dr. T. H. McHatton, then head of the

three years, Roger Pierpont, research entomologist on a Hercules fellowship, has completed tests on more than 6,000 formulas. It has been found that our D.H.S. Activator is an effective activator for both Pyrethrum and Rotenone and can be safely and economically included in commercial fly sprays containing these products. Likewise, it was found that our Yarmor Pine Oil would increase the effectiveness of live stock sprays containing Pyrethrum. Our latest development is Thanite, which, although not available commercially, seems to have properties that will enable it to serve as a primary toxicant for fly sprays.

panies using our products, he also supervises and correlates the experimental work which Hercules is conducting in various sections of the country in our constant search for new products and routine testing of old ones. Besides the research being carried on at our Experiment Station, we maintain fellowships at the University of Delaware, under the direction of Dr. L. A. Stearns, for studying the effects of various sprays on flies and roaches, and at Kansas State College of Agriculture for developing livestock sprays. The latter is under the direction of Dr. F. W. Atkinson. A thorough study of the clothes moth and carpet beetle is being made for Hercules in Dr. Warren Moore's laboratory at Bon Air, Virginia. At the Laboratory of Hygiene, University of Pennsylvania, Philadelphia, Dr. Henry Field Smith experiments with guinea

THE CRICKET—Crickets do much damage by feeding on woolen, silk and cotton clothing, and other fabrics, and annoy the species, *Homo Sapiens*, by chirping.

THE SILVER FISH—The chief food of the Silver Fish, pest of libraries, consists of material which contains starch, such as book bindings and wallpaper paste.

THE RED ANT—Some ants feed on sweets, some on greasy foods, and others on plants. They usually live in large colonies which it is important to destroy.

THE COCKROACH—The four species of cockroach—German, Oriental, American, and Wood—feed on anything organic that lies in their path: they carry disease.

Hercules Powder Company: pine stumps, "Naval Stores," & insecticides

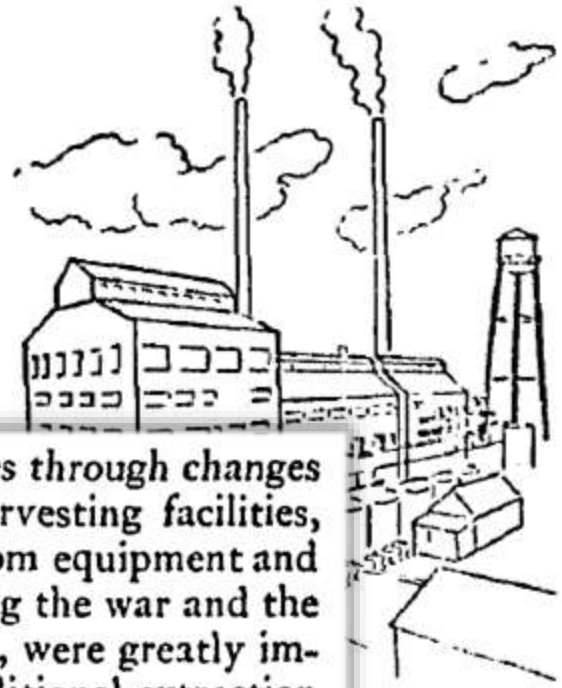
Hercules Mixer, 1941

Hercules Annual Report, 1947

Special efforts have been made to improve operating efficiencies through changes in equipment and processes, and in organization. Our wood-harvesting facilities, which suffered severely from equipment and manpower shortages during the war and the immediate postwar period, were greatly improved. Installation of additional extraction facilities has resulted in improved yields at the plants.

Results of field tests of our new agricultural insecticide, Toxaphene, have been very promising. A large pilot plant has been in operation at the Brunswick, Ga., plant during the year to supply Toxaphene for these tests. The results against cotton insects and grasshoppers have been sufficiently satisfactory to warrant construction of a commercial unit. Located at Brunswick, it will be in operation early in 1948.

Extensive testing in various fields indicates



NAVAL STORES DEPARTMENT

ALBERT E. FORSTER, General Manager

GENERAL OFFICES: Wilmington, Delaware.

PRODUCTS: Rosin, turpentine, pine oils, Poly-pale resins, Staybelite resins, Thanite, and other rosin and terpene chemicals, and DDT.

PLANTS: Brunswick, Ga., Hattiesburg, Mississippi.

INDUSTRIES SERVED: Textiles, insecticide, paint, paper, steel, rubber, and others.

Hercules Annual Report, 1945

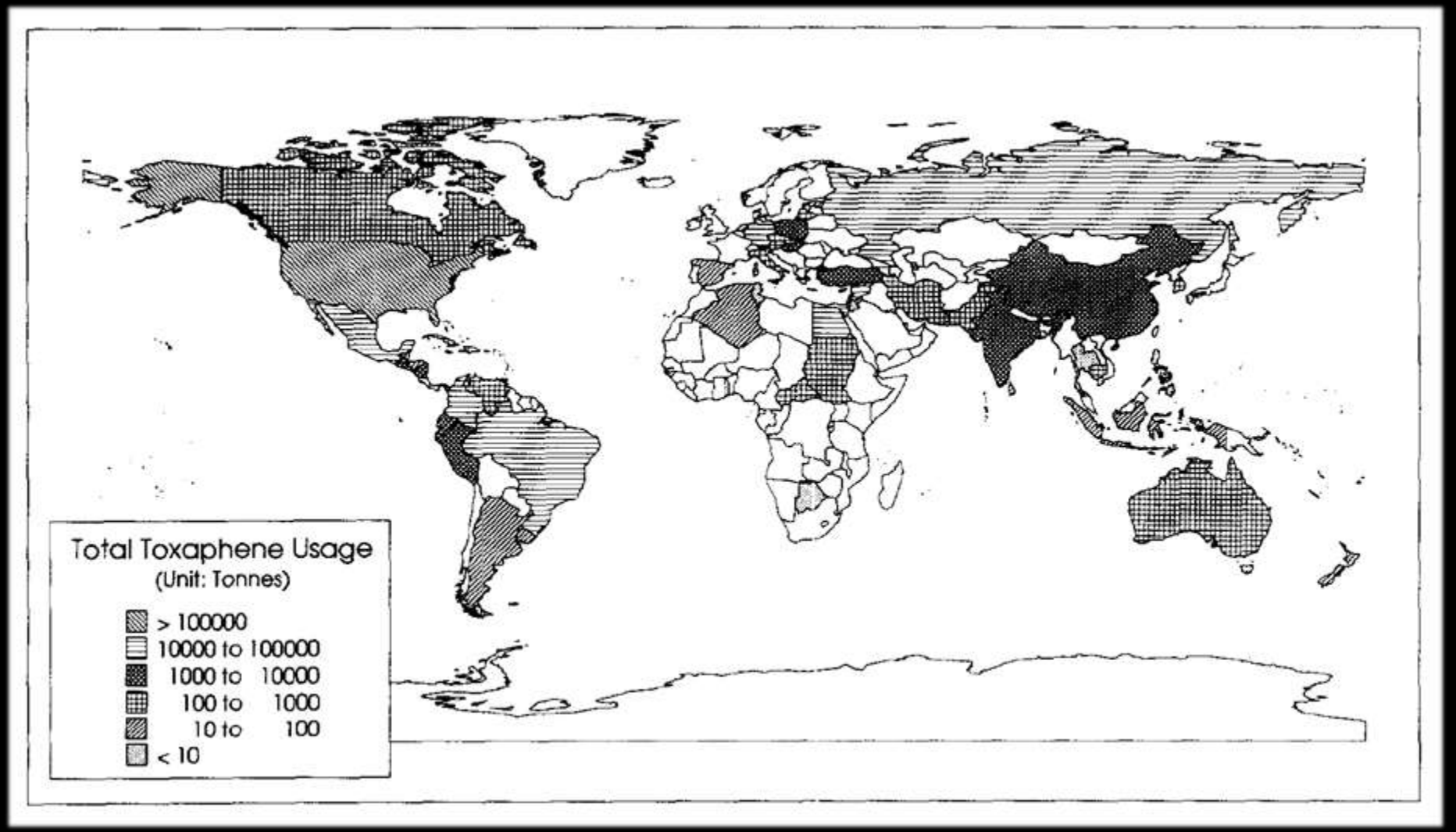
Toxaphene: US Usage (vs. other insecticides), per Davis 2014

1966		1,000s of lb.	1971		1,000s of lb.
Toxaphene	OC	34,605		Oil	73,950
DDT	OC	27,004	Toxaphene	OC	37,464
Aldrin	OC	14,761	Methyl parathion	OP	27,563
Carbaryl	CB	12,392	Carbaryl	CB	17,838
Paraffinic oil		11,419	DDT	OC	14,324
Ethyl parathion	OP	8,452	Ethyl parathion	OP	9,481
Methyl parathion	OP	8,002	Aldrin	OC	7,928

1976			1982		
Oil		60,000	Oil		50,000
Toxaphene	OC	34,178	Carbofuran	CB	12,300
Methyl parathion	OP	23,350	Methyl parathion	OP	11,335
Carbaryl	CB	15,829	Carbaryl	CB	9,984
Carbofuran	CB	11,623	Terbufos	OP	8,632
Ethyl parathion	OP	9,268	Toxaphene	OC	6,596

1989			1992		
Oil		35,000	Oil		51,102
Chlorpyrifos	OP	11,300	Chlorpyrifos	OP	14,765
Terbufos	OP	10,246	Terbufos	OP	8,690
Carbaryl	CB	8,616	Methyl parathion	OP	5,962

Toxaphene: Global Usage, 1950-1993

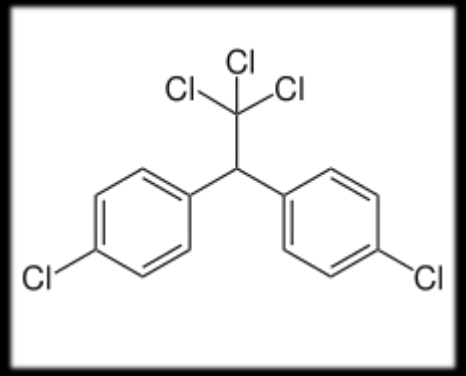


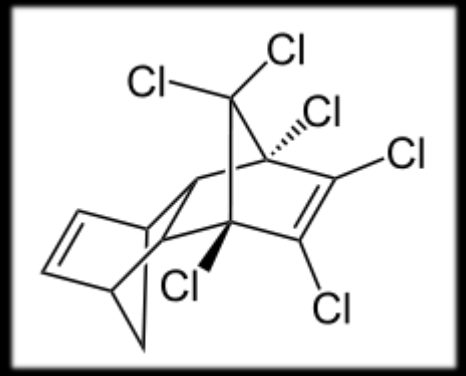
450K met. tons (accounted for)

1.3M met. tons (interpolated)

(Voldner and Li 1993)

How'd toxaphene stick around?





DDT: <u>one</u> molecular structure

Various feedstocks + Cl

Aldrin: <u>one</u> molecular structure

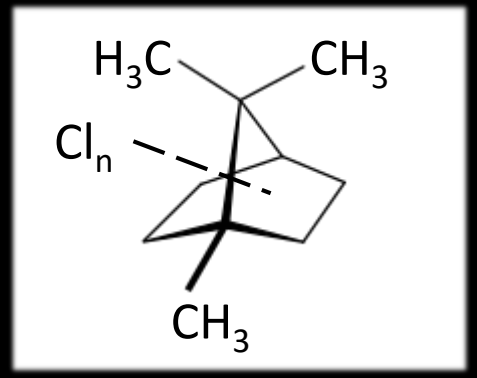
Cyclopentadiene (synthetic rubber byproduct) + Cl

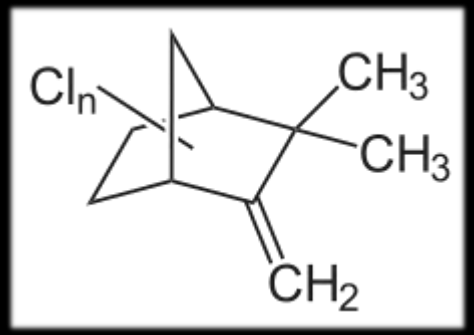
Toxic to birds

Toxic to fish

Pine stumps (α-pinene) + Cl

Toxaphene: <u>typically hundreds, in principle up to ~36,000</u> molecular structures



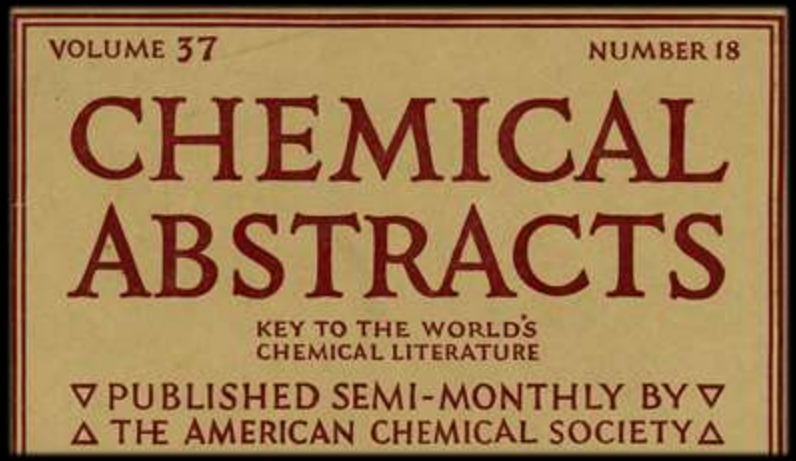


"...However only a few of the many hundred components in the commercial mixture have been isolated and examined, and the mixture remains the only practical analytical standard. Thus <u>analytical methods for toxaphene are at a rudimentary stage</u>..." (Bidleman & Muir 1993)

1. Apparatus, plant equipment and unit operations
2. General and physical chemistry
3. Subatomic Phenomena and Radiochemistry
4. Electrochemistry
5. Photography
6. Inorganic chemistry
7. Analytical chemistry
8. Mineralogical and geological chemistry
9. Metallurgy and metallography
10. Organic chemistry
11. Biological chemistry*
12. Foods
13. Chemical industry and misc. industrial products
14. Water, sewage, and sanitation
15. Soils, fertilizers, and agricultural poisons

For more on how modern chemistry got its all-&-only-materials scope & molecular orientation, stay tuned for my book-in-prog:

Compound Words: Chemical Information & the Molecular World



Modern chemistry: weaving connections among scientific & industrial activities via molecular cross-references

16. The fermentation industries
17. Pharmaceuticals, cosmetics and perfumes
18. Acids, alkalis, salts, and other heavy chemicals
19. Glass, clay products, refractories, and enameled metals
20. Cement and other building materials
21. Fuels and carbonization products
22. Petroleum, lubricants, and asphalt
23. Cellulose and paper
24. Explosives and explosions
25. Dyes and textile chemistry
26. Paints, varnishes, and lacquers
27. Fats, fatty oils, and soaps
28. Sugar, starch and gums
29. Leather and glue
30. Rubber and allied substances

Patents

* In nine subsections: General Biological Chemistry, Methods and Apparatus, Bacteriology, Botany, Nutrition, Physiology, Pathology, Pharmacology, Zoology

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