RUBIA PEREIRA GAISSLER

THE HISTORY OF ENVIRONMENT, SCIENCE AND SOCIETY TOLD BY DDT: A DISCOURSE AND CONTENT ANALYSIS OF THE MEDIA FROM THE UNITED STATES AND BRAZIL BETWEEN 1944 AND 2014

A HISTÓRIA DO AMBIENTE, CIÊNCIA E SOCIEDADE CONTADA PELO DDT: UMA ANÁLISE DE DISCURSO E DE CONTEÚDO DA MÍDIA DOS ESTADOS UNIDOS E DO BRASIL ENTRE 1944 E 2014

CAMPINAS
2015

Universidade Estadual de Campinas
Instituto de Filosofia e Ciências Humanas
Núcleo de Estudos e Pesquisas Ambientais

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Thesis presented to the Institute of Philosophy and Human Sciences of the University of Campinas in partial fulfillment of the requirements for the degree of Doctor in Environment and Society, in the area of Biological Aspects of Sustainability and Conservation

Tese apresentada ao Instituto de Filosofia e Ciências Humanas da Universidade Estadual de Campinas como parte dos requisitos exigidos para obtenção do título de Doutora em Ambiente e Sociedade, na área Aspectos Biológicos de Sustentabilidade e Conservação.

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Este exemplar corresponde à versão final da tese defendida pela aluna Rubia Pereira Gaissler e orientada pela Prof. Dra. Aline Vieira de Carvalho.

CAMPINAS

2015

Ficha catalográfica
Universidade Estadual de Campinas
Biblioteca do Instituto de Filosofia e Ciências Humanas
Cecília Maria Jorge Nicolau - CRB 8/3387

Gaissler, Rubia Pereira, 1986-
G129h The history of environment, science and society told by DDT : a discourse and content analysis of the media from the United States and Brazil between 1944 and 2014 / Rubia Pereira Gaissler. – Campinas, SP : [s.n.], 2015.

Orientador: Aline Vieira de Carvalho.
Coorientador: Jansle Vieira Rocha.
Tese (doutorado) – Universidade Estadual de Campinas, Instituto de Filosofia e Ciências Humanas.

1. DDT (Inseticida). 2. Comunicação de massa e meio ambiente. 3. Análise de discurso. 4. Análise de conteúdo (Comunicação). 5. Mídia. I. Carvalho, Aline Vieira de. II. Rocha, Jansle Vieira,1961-. III. Universidade Estadual de Campinas. Instituto de Filosofia e Ciências Humanas. IV. Título.

Informações para Biblioteca Digital

Título em outro idioma: A história do ambiente, ciência e sociedade contada pelo DDT : uma análise de discurso e de conteúdo da mídia dos Estados Unidos e do Brasil entre 1944 e 2014
Palavras-chave em inglês:
DDT (Insecticide)
Environment and mass media
Discourse analysis
Analysis of content (Communication)
Media
Área de concentração: Aspectos Biológicos de Sustentabilidade e Conservação
Titulação: Doutora em Ambiente e Sociedade
Banca examinadora:
Aline Vieira de Carvalho [Orientador]
Leila da Costa Ferreira
José Eduardo Viglio
Antônio Ribeiro de Almeida Júnior
Gabriela Marques di Giulio
Data de defesa: 23-03-2015
Programa de Pós-Graduação: Ambiente e Sociedade

UNICAMP

UNIVERSIDADE ESTADUAL DE CAMPINAS
INSTITUTO DE FILOSOFIA E CIÊNCIAS HUMANAS

A Comissão Julgadora dos trabalhos de Defesa de Tese de Doutorado, em sessão pública realizada em 23 de março de 2015, considerou a candidata RUBIA PEREIRA GAISSLER aprovada.

Este exemplar corresponde à redação final da Tese defendida e aprovada pela Comissão Julgadora.

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Abstract

This doctoral thesis aimed to analyze the media coverage of the pesticide DDT since its first appearance in the media, in 1944, until 2014. The established objective was to identify the main narratives used to talk about DDT and the observed discourse changes related to it throughout the period of time aforementioned. This was achieved by looking into selected media from two countries that have a relevant history concerning DDT: The United States and Brazil. The first was chosen because it was a heavy user and a strong advocate for DDT use from the 1940s to the 1960s, and also because it was the vortex of a debate that led to the DDT world ban in the 1970s; the second was included in the analysis to offer a counterpoint to the first, justified by a very distinct difference in cultural, geographic, economic and demographic aspects. The United States' magazines *TIME, The New Yorker,* and *Popular Science* were analyzed, and also the Brazilian magazines *Veja* and *Superinteressante.* The research identified a single discourse flip in the media coverage, in 1967, when DDT stopped being majorly seen as beneficial and started being predominantlyfacedas harmful. The quantitative analysis of the 711 media units that composed the data set showed oscillations in the coverage intensity during the 70 years studied, with a highlight to a peak between 1969 and 1971; such variations were interpreted bringing the historical and cultural context of each period and considering the trajectory of the environmental movement, the scientific journalism and of science itself. Additionally, the thesis was structured aiming to demystify the role of the North American biologist Rachel Carson in the DDT ban, investigating her influence in the DDT discourse trajectory not only when the *Silent Spring* was published, in 1962, but also observing in which ways her portraying as a symbol evolved in the following decades until reaching today's representations.

Keywords:DDT, Media and Environment, Discourse Analysis, Content Analysis.

Resumo

Esta tese de doutorado teve como objetivo analisar a cobertura midiática do pesticida DDT desde a sua primeira aparição na mídia, em 1944, até 2014. O objetivo estabelecido foi de identificar as principais narrativas usadas para falar sobre o DDT e as mudanças observadas no discurso referente ao mesmo durante todo o período de tempo acima mencionado. Isto foi atingido observando uma porção selecionada da mídia de dois países que têm um histórico relevante no que diz respeito ao DDT: os Estados Unidos e o Brasil. O primeiro foi escolhido por se tratar de um usuário intenso e um forte defensor da utilização do DDT entre as décadas de 1940 e 1960, e também por ter sido o vórtice de um debate que levou à proibição global do DDT, na década de 1970; o segundo foi incluído na análise para oferecer um contraponto ao primeiro, justificado por uma diferença muito distinta em aspectos culturais, geográficos, econômicos e demográficos. Foram analisadas as revistas Estadunidenses *TIME, The New Yorker* e *Popular Science,* e as revistas brasileiras *Veja* e *Superinteressante.* O estudo identificou uma virada discursiva única na cobertura da mídia, em 1967, quando DDT deixou de ser visto majoritariamente como benéfico e passou a ser principalmente visto como prejudicial. A análise quantitativa das 711 unidades midiáticas que fizeram parte do conjunto de dados mostrou oscilações na intensidade da cobertura ao longo dos 70 anos estudados, com destaque para um pico entre 1969 e 1971, sendo que tais variações foram interpretadas trazendo o contexto histórico-culturalde cada período abordado e considerando a trajetória do movimento ambientalista, do jornalismo científico e da própria ciência. Adicionalmente,a tese foi estruturada objetivando desmistificar o papel da bióloga norte-americana Rachel Carson na proibição de DDT, investigando sua influência na trajetória do discurso relacionado ao DDT tanto na época em que lançou a obra *Primavera Silenciosa*, em 1962, quanto observando de que maneiras o retrato da sua figura enquanto símbolo evoluiu nas décadas seguintes até chegar às representações oferecidas no presente.

Palavras-chave: DDT, Mídia e Ambiente, Análise de Discurso, Análise deConteúdo.

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Aos meus pais,

pelo amor infinito e apoio incondicional

Agradecimentos

Muitas pessoas participaram do processo de construção desta tese. Agradeço primeiramente duas pessoas muito queridas que acreditaram em mim e me possibilitaram fazer parte do grupo de alunos doutorandos do NEPAM, cada uma à sua maneira: Dra. Leila da Costa Ferreira e Dra. Lúcia da Costa Ferreira. Nada disso teria sido possível sem o apoio irrestrito da minha orientadora Dra. Aline Vieira de Carvalho, que me colheu e me deu toda a estrutura – intelectual e moral – necessária para que este trabalho se realizasse, sempre me deixando muito livre para realizar esta pesquisa conforme o que meus instintos diziam fazer sentido mas sempre colaborando com leituras e orientações muito preciosas. Pelos debates debruçados sobre incontáveis cafés e bolos, muito obrigada. Ao meu coorientador Dr. Jansle Rocha, agradeço pelas sugestões e comentários valiosos.

À toda a equipe do NEPAM, em especial Fátima e Waldinei, obrigada pelo cuidado para que a bolsa sempre chegasse e os documentos estivessem sempre em ordem. Agradeço aos professores e colegas pelas leituras compartilhadas, sugestões, palpites, diálogos e suporte técnico. Agradeço particularmente aos colegas Rosely e Ramonpela ajuda no desenvolvimento do projeto que resultou nesta tese e por serem os mais presentes durante a evolução deste trabalho.

Aos professores e colegas da Universidade de Cornell, por terem enriquecido minha pesquisa possibilitando uma imersão no Departamento de Comunicação que fez com que esta tese desse um salto em qualidade. Meu muito obrigada ao meu orientador Dr. Bruce Lewenstein por ter aceitado minha candidatura e aberto todas as portas para que eu pudesse usufruir tudo que Cornell podia me proporcionar.

Agradeço o apoio financeiro da CAPES para que eu pudesse me dedicar exclusivamente à pesquisa e por ter propiciado minha estadia na Universidade de Cornell.

À toda a minha família pela torcida e paciência quando tive que escapar das reuniões familiares para finalizar esta tese. Nadine, por ter possibilitado meu acesso à revista *Time.* Aos meus pais por terem me ajudado desde os primeiros passos da vida escolar, e por estarem presentes em todos os meus momentos mais importantes me cercando de todo suporte imaginável para que eu possa realizar meus sonhos. Ao Felipe pelo apoio emocional sem limites e por ser minha motivação e meu maior incentivo, meu agradecimento mais carinhoso.

Filosofia – Pablo Neruda

Fica provada a certeza
da árvore verde na primavera
e do córtex terrestre
- alimentam-nos os planetas
apesar das erupções
e o mar nos oferece peixes
apesar de seus maremotos -
somos escravos da terra
que também é dona do ar.

Passeando por uma laranja
eu passei mais de uma vida
repetindo o globo terrestre
- a geografia e a ambrosia -
os sucos cor de jacinto
e um cheiro branco de mulher
como as flores da farinha.

Nada se consegue voando
para se escapar deste globo
que te aprisionou ao nascer.
E há que confessar esperando
que o amor e o entendimento
vêm de baixo, se levantam
e crescem dentro de nós
como cebolas, azinheiras,
como tartarugas ou flores,
como países, como raças,
como caminhos e destinos.

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List of abbreviations

AAAS – American Association for the Advancement of Science

AC – Acre

ADI – Admissible Daily Intake

Anvisa – Agência Nacional de Vigilância Sanitária (National Health Surveillance Agency)

APA – American Psychological Association

Ascom – Acessoria de Comunicação da Anvisa (Anvisa's Communication Office)

BHC – Benzene Hexachlorid

BNDE – National Bank of Economic Development

CAS – Comissão de Assuntos Sociais (Social Issues Committee)

CCD – Chemical Control Division

CCD – Colony Collapse Disorder

CFC - Chlorofluorocarbon

COP – Conference of the Parties

CRC – Chemical Review Committee

DDT – Dichlorodiphenyltrichloroethane

DNAs – Designated National Authorities

ECZ – Environmental Council of Zambia

EPA – Environmental Protection Agency

FAO – Food and Agriculture Organization

FDA – Food and Drug Administration

Fiocruz - Fundação Oswaldo Cruz (Oswaldo Cruz Foundation)

Funasa – Fundação Nacional da Saúde (National Health Foundation)

GDP – Gross Domestic Product

GEF – Global Environment Facility

G.I. – Government Issued

GMO – Genetically modified organism

HCH – Hexachlorocyclohexane

Ibama – Instituto Brasileiro do Meio Ambiente (Brazilian Institute of the Environment)

IOC – Instituto Oswaldo Cruz (Oswaldo Cruz Institute)

IRD – Institute for Research and Development

ISA – Ideological State Apparatuses

IVM – Integrated Vector Management

JPL – Jindal Power Limited

LBA - Legião Brasileira de Assistência Social (Brazilian Social Assistance Legion)

LD – Lethal Dose

MMA – Ministério do Meio Ambiente (Ministry of the Environment)

NEPAM – Núcleo de Estudos e Pesquisas Ambientais (Environmental Researches Study Center)

NIMR – National Institute of Malaria Research

OPA – Office of Price Administration

OPPT – Office of Pollution Prevention and Toxics

PARA - Programa de Análise de Resíduos de Agrotóxicos em Alimentos (Program for the Analysis of Pesticide Residues in Food)

PC – Personal Computer

PIC – Prior Informed Consent

PLS – Projeto de Lei do Senado (Senate's Bill)

PMI – President's Malaria Initiative

POP – Persistent Organic Pollutant

Proálcool – Programa Nacional do Álcool (Alcohol National Program)

PT – Partido dos Trabalhadores (Worker's Party)

SEMA – Secretaria Especial do Meio Ambiente (Especial Secretariat of the Environment)

Seman – Secretaria do Meio Ambente (Secretariat of the Environment)

Sucam – Superintendência de Controle à Malária (Malaria Control Superintendence)

SUS – Sistema Único de Saúde (Unified Health System)

UCL – University College London

UFMT – Universidade Federal do Mato Grosso (Mato Grosso Federal University)

UN – United Nations

UNEP – United Nations Environmental Program

USDA – United States Drug Administration

USSR – Union of Soviet Socialist Republics

VP – Vice-president

WHO – World Health Organization

WPB – War Production Board

WWII – World War II

Presentation

> It is the responsibility of intellectuals to speak the truth and to expose lies.
>
> -Noam Chomsky, *The Responsibility of Intellectuals*, *1967*

A doctoral thesis dealing with dichlorodiphenyltrichloroethane (DDT), an old and forbidden product, may seem out of context and even unnecessary at first glance because from the beginning, it would not be part of our realities. This study, however, will show that DDT is a more current issue than we think, as it is still alive in the language (for example, in ***de****det**ização*, the Brazilian word for fumigating, even though this practice does not include the pesticide anymore) and the culture. I intend to show that the analysis of this case - that it is, I assure, current - has much to tell us about the relationship between people, media, and science, helping our understanding of the inclusion of topics such as global warming, sustainability, GMOs and many others that arise in contemporary media.

Because it is a case whose onset dates from the 1940s, DDT offers us a unique advantage over other issues. It is possible to analyze it historically and observe the changing discourses and narratives surrounding it, allowing us to tell the history of DDT drawing a parallel with aspects of the history of societies and the development of environmentalism in the twentieth century. The abundance of sources also portrays the complexity and provides plurality to the DDT study.

The choice of DDT as a theme was not hard, I studied other possibilities to look into the media coverage of an environmental issue (such as the *Apagão* campaign, the campaign to end the use of CFCs, for the end of the use of plastic bags, among others), but the amount of information, the vast period of study available and the curious change from “good guy” to “villain” facilitated my choice. Although it does not constitute a specific campaign, the story of a

compound whose chemical structure has always been the same, but whose interpretation varied so much throughout history, intrigued me.

Since its bug-killing properties were discovery in the late 1930s, DDT has been used as a pesticide in agriculture, in households and for sanitary measures in the control of diseases caused by insects, such as malaria and leishmaniasis. Even after its prohibition, first in the United States and then in several other countries, traces of DDT can still be found in the physical environment and living beings especially where it was vigorously applied.

I came across a sentence written by journalist Walter Silva, in an interview to Brazilian magazine *Veja*, that caught my attention: "There is no one in the world today who does not have DDT in their blood[1]" (“A comida,” 1978). I found this shocking. Even having been born eight years after Walter's statement, I, who had never personally come into direct contact with DDT, might have remnants of it in my blood (and it had to be the blood, extremely symbolic and a synonym for life, for vitality) because DDT accumulates in the environment. I immediately thought of the huge amount of chemicals, pharmaceuticals, sweeteners and stabilizers that surround our daily lives in our clothing, in personal care products,in the air, in the water, and in food. I also thought of the German sociologist Ulrich Beck’s theory of the risk society and the way we live risk and opportunity equally.Of how environmental risks and health consequences were not only a side effect of the industrial society but rather the main product of it.Are we being poisoned little by little, like the biologist Rachel Carson had observed in the 1960s? It is difficult to predict the future consequences that our chemical routine will bring to mankind, or how many cases of cancer and other diseases will be assigned to our everyday chemicals in a few decades and how much of the environment are we irreversibly poisoning. We can, however, look to the past with the privilege of hindsight and understand a case whose consequences have been widely observed and that has been often debated, and learn from it because even today, we have questions tooffer to the theme. My proposal is to think about

[1] All translations from Portuguese are my own.

the debate surrounding the benefits and harms that are still associated with DDT and its approaches by the media in a given time frame and source categories. This punctual DDT analysis relates to broader topics such as the abuse of pesticides and the current agricultural industrial model as well as working as a trampoline for discussions that involve the relation between nature and society, the role of technology and the image of science and how we deal with issues that go much beyond DDT.

Surrounded by controversy, the story of DDT has been told in various ways by the media, which appropriates of narratives and particular discourses to address the issue. DDT has already been the savior of humanity, the environmental villain, the solution to malaria, the symbol of progress, the poison shoved down our throats by the food industry. It is known that the word is our primary way of relating to the world, it is our entry into the symbolic universe and it is through it that we construct a sense of our existence (Lacan, 1977/1994); therefore, the possibilities of reporting a particular topic do influence our view of the world around us and consequently our actions towards this world.

I believe that DDT became one of the symbols of the conflicts between science and society. It works as a hook that revives the debate on the environmental responsibility of science and the consequences of technological advancement at particular moments during which the subject is placed in evidence - whether in the context of a discussion about GMOs, about stem cell research, a vaccine against H1N1 or any other topic where the scientific uncertainty fits and where there is room for questioning from the society about the trust that should be placed in experts.

This study aims to meditate upon the narratives involved in the media coverage of DDT and the discourses that constitute it, deconstructing these elements and revealing the factors that make up the coverage contemplated by this project. The methodology is mixed and guided by the French School of discourse analysis (Foucault, 1971; Pêcheux, 1990), even though only Pêcheux considered himself a discourse analyst and Foucault's influence was much more

in the area of archaeology. The term *French School* then refers mainly to Pêcheux' work and emerged in the 1960s with the influence of Althusser – who believed ideology was invested by language - having the help of disciplines such as philosophy and history and the help of researchers who were actually linguists, such as Denise Maldidier, Jean-Jacques Courtine and Jacqueline Authier-Revuz. The methodology relies on, though is not limited to, the French School[2],and through this methodology these reports will be examined from the following magazines: *Superinteressante* and *Veja* (from Brazil), *TIME*, *Popular Science* and *The New Yorker* (from the U.S.), as well as other printed materials such as advertisements and banner campaigns that I came across during the research. It is understood that restricting sources to printed categories would also restrict the public for one that is literate, one that would only have access to it through the ability of reading. I acknowledge radio and television as means of communication of the utmost importance, especially during the early twentieth century, and today. Despite not being part of the group of sources upon which this study is based, audiovisual materials will appear during the analysis when it is deemed important to complement the analysis of the complex media defined herein: digital materials, international documentaries, sources of other nature as advertisements of products already out of circulation with DDT in their formula, advertising and public health campaigns will also be used to complement the analysis.

There is a heavy inclusion of Rachel Carson and her *Silent Spring* in this thesis; the biologist and DDT are axes that go together, as they have been presented to the current reader. Exactly how inseparable are the two? Was Carson and her *Silent Spring* really the turning point in the DDT's representation as a villain or did the media confer her this position later, personifying the battle for the pesticide ban? Could we have had other driving forces of these discursive

[2]I recognize the great differences, mainly in terms of ideology and political orientation, that exist between Pêcheux, Foucault and Althusser.Though such combination might appear strange and unnatural, they share enough similarities to enable a methodology that includes what I consider to be the essential philosophy of each (Foucault's directions on how to analyze the discourse, Althusser's belief that the discourse analysis should be politically immersed, and Pêcheux's definition of the discourse as structure and event.

changes? Can we say that there is a complete change of discourse regarding DDT? I propose to investigate the elements that will help to answer these questions by looking into the Brazilian and North American media mentioned above.

The United States was chosen because of its relevance in DDT's history: it was widely used, there is a rich record of itand it was the starting point of the world ban after the publication of the *Silent Spring.* Besides that, I spent one year at Cornell University, in Ithaca, investigating *in loco* what DDT represented to the North American society by scavenging the libraries and talking to professors and students. This also explains why I chose to write this thesis in English; I wanted a larger public to have access to it, and English can reach broader audiences in academia. Additionally, to have the participation of my supervisor Bruce Lewinstein he had to be able to read the text and this was another incentive to write in English.

Brazil was chosen for three main reasons: first, because I wanted a counterpoint to the North American discourse, one that would represent a different culture, economy, society, policy, language and habits. The idea was to understand how the North American discourse was representative (or not) of the DDT overall discourse, and identify how two very different communities made use of DDT, internalized it, accepted and rejected it. Second, because it is a relevant context as since 2008Brazil has been the country that most consumes pesticides in the world - even though it is not the world's top food producer (Ministério do Meio Ambiente, n/d, para. 10).Third, because being Brazilian and understanding both the context and the language made Brazil an appropriate choice.

DDT, as many other problems related to the environment, lost attention from the media and (consequently?) society. Today DDT is seen as a problem from the past, something not pertinent. This is problematic because 1) DDT is still used by the ton and 2) it reflects the way we, as a society, as scientists, policy-makers and journalists, deal with environmental issues. Understanding these relations and reactions from the communication of the theme can strengthen the

environmental communication studies and strategies when it points out to processes that occurred in the DDT communication. We can learn from this example, avoid repeating the missteps and help to form the bases of a more efficient communication. It is with this set of concerns that I offer an historical insight into DDT, the pesticide culture and the narratives and discourses used by the media to inform the public about such issues.

PART I –Introduction and methodology

I will dedicate this first part to providing a historical context of DDT. I willintroduce the chemical, its history and uses to the reader so that he or she will know more about the object of study before following my analysis later on. I will also describe my theoretical and methodological approach, as well as providing an insight on the challenges that involve the media coverage of environmental topics. After all, what I am doing is telling a story, thusthis is what I chose for the beginning.

1.1. What DDT is

A poison is a poison. It is made to kill.
-Arjunan Ramasamy[3], *2002*

Dichlorodiphenyltrichloroethane, or DDT, is one controversial molecule. It was first synthetized in 1874, but it was not until 1939 that the Swiss chemist Paul Hermann Müller discovered its pesticide property (Souder, 2012). Müller used to work for *Geigy Drug Industries*, in Switzerland, and received theNobel Prize in Medicine in 1948 because of this finding. During the ceremony, DDT was declared to be an important discovery that illustrated the wonderful world of science.

Immediately after DDT was seen to have aninsecticide property, it was used to fight a beetle outbreak in potato fields in Switzerland with very successful results. This episode opened the doors for DDT use in other countries like the United States, where it started to be abundantly applied in domestic environments and widely used in agriculture. Being very efficient in killing insects (for example, during World War II North American, British and German soldiers used it against lice and other bugs) and helping stop the diseases spread by them

[3] Speech made by plantation worker in Malaysia presented to Syngenta Corporation's Shareholders at the company's annual meeting.

(especiallymalaria and typhus- North American army used DDT in over 1 million civilians to stop an endemic typhus manifestation in 1943 in Naples, as stated by Souder in 2012) and because of its potential uses in agriculture –it would play a crucial role in the Green Revolution (D'Amato,Torres, &Malm, 2002) – DDT started being synthetized and commercialized in large scale in the 1940s.

With the increasing use, people started to notice that in places where DDT was sprayed, insects, birds, and other small animals such as rodents would appear dead right after the application. The number of poisoning cases also rose, calling attention to the potential negative consequences ofDDT's use.

DDT use spread and early on there were already suspicions regarding its toxicity, corroborated by studies conducted by the United States Fish and Wildlife Service in Maryland,which in 1947 had a scientist whose job was exclusively to study the problems correlated with DDT. The bureau published its research (with the help of the biologist Rachel Carson) as notes and alerts to the public, and Carson even sent an article to the *Reader's Digest* magazine at the time, though it wasrejected from the publication.

While scientists in Maryland monitored the DDT sprayings and suspicions about its toxicityintensified due to empirical observation by the public, the United States detonated three nuclear devices: one in Alamogordo, New Mexico, and two in Japan, in Hiroshima and Nagasaki, killing between 150,000 and 250,000 people (Souder, 2012). Throughout the Cold War, several countries (especially the U.S. and the Soviet Union) conducted nuclear tests. Until 1963, when such tests were prohibited, 521 devices were detonated, 199 of them in the U.S. (Souder, 2012).

A byproduct of these tests was a dust, carried by high altitude winds,which eventually returned to the soil as radioactive precipitation (especially the isotopes strontium 90 and iodine 131). When they landed in pastures, the isotopes were ingested by the cattle and ended up contaminating the milk of the animals, therefore exposing the consumers to radiation. The American government assured that the byproducts did not pose a threat and that the tests

could go on for decades without causing any harm;it was different in real life though, and in 1962 tests conducted showed that the strontium levels in milk had doubled in some areas (Souder, 2012).

What is the relation between the nuclear tests, the strontium levels in milk and DDT? Likewise DDT and other contaminants, the effects of the nuclear precipitation may not be seen immediately and the consequences might take years, even decades to appear – oftentimes in disturbing levels when they will emerge all at once as serious public health and environmental problems. Rachel Carson, of whom I will talk in more detail in subchapter 2.3 of this study, recognized the parallel between pesticides and radioactive precipitation, and observed that our species has evolved throughout the millennia to become well adapted to the natural world, but recognized that we are not prepared for a modified environment where the natural balance has been broken (Carson, 1962/2002). Both DDT and radiation, in addition to the acute toxicity, have mutagenic properties and therefore the capacity to cause genetic damage that can be passed on to future generations (Souder, 2012). In these two examples the contamination was not limited to isolated places, but it spread through the landscape; Carson believed that these characteristics were part of a developing model from the modern age that translated the human impetuosity of imposing a rhythm upon nature instead of respecting nature's very own. This line of thought, which positions the development model of modernity (institutionalized, globalized, and based on faith in science and technology) in the center of the great environmental problems, is shared by a range of thinkers from environmental sociology, political ecology and other areas, such as Ivan Illich (1983), Andre Gorz (1997), John Hannigan (1995), Steven Yearley (1996), Anthony Giddens (1990), and Ulrich Beck (1992). Clearly these authors have their own specificities in their arguments, but they share the general belief that the thoughtless conquering of the space and exacerbated anthropocentrism is responsible for the crises in which we live now.

The DDT regulation varied greatly between different places, and this

will be discussed with more depth in section 2.1, *What the law says*, and 2.2, about international agreements.I will only say for now that DDT is still produced by the ton by India and widely used, especially in African countries in public health campaigns to fight malaria.

1.2. Media and environment

If we think of the media as a milieu through which people make sense of the world they live in, the evolution of media and media coverage is of great importance in the history of the relation between science and society, and likewise between environment and society. In a time without the Internet and with scarce use of the telephone, the newspapers, magazines, the radio and later, the television, were the broadcasters of what was happening in distant places, therefore the population got to know about a topic mostly through these media.

As I will develop further in a topic about discourse and narrative, the way a story is told highly influences the way the reader will understand it, and a strong narrative has the power to direct the meaning intended by its author. I emphasize though that the reader encounters a text within a context and with an“experience baggage”, by which I mean the other experiences that will come to play when making sense of a news article, like conversations with friends, familiar education, values, previous readings, religion and so on. John Hannigan, environmental sociologist, offers an interesting position originated from concepts central in the mass communication research of the 1950s and 1960s, that

> individual perception is powerfully affected by a panoply of primary (friends, family, co-workers) and secondary (public figures, mass media) influences which function as filters in the diffusion of information in the community. (1995, p. 95)

I certainly do not imply that a text offers only one possibility for

interpretation, but I strongly agree with Chartier (1999) when he states that the reading freedom is never absolute. It is with this thought in mind that I look into the media coverage of DDT, trying to identify omissions, repetitions and other elements that will tell me something about the generation of information and the intentions behind it.

Adding to the argument, the French philosopher of Algerian origin Louis Althusser (1971) includes the media in what he calls Ideological State Apparatuses (ISA), a category represented by specialized institutions and designators of realities that operate predominantly through ideology (which are unified under the dominant ideology belonging to the ruling class, according to the Marxist tradition he followed).Marxism as originally conceived is outdated, and increasingly it is seen that such bourgeois/ruling class is actually dispersed, truss, devoid of clear objectives and unity. I do not deny the existence of repression and social domination - which would be madness - but I detach the oppressor from a specific socio-economic class; I nevertheless agree with Althusser regarding the categorization of the media as a maintainer of inequality, but largely because it is controlled by a very limited number of companies (often consisting of a single family, especially in the case of Brazil) who own the major media and repeat the same message in channels, newspapers, magazines and portals apparently distinct but that drink from the same source. In a Foucaultian argument, one could say that the media is another state apparatus in the implementation of biopower as an instrument of governance, and this aspect cannot be dismissed lightly[4].

The phenomenon of media coverage, that accelerated and gained a more instantaneous and immediate nature in recent decades, has caused the media to acquire a new status where it became a reference for values, behaviors and habits to society. In addition, it is in a privileged, strategic position: between the systems of production and consumption (Gaissler, Andrade, & Acquaro, in press). Thus, what is said and how it is said greatly influence how social actors

[4]Michel Foucault develops the concepts of the state apparatus, biopower and governance in "Security, Territory, Population" (2009). The book is a compilation of the course taught by the philosopher between 1977 and 1978 at the Collège de France.

understand the world, and more importantly, act upon it, because the communication sources in mediatic society cause the individual to experience a different relationship with concrete references and their respective realities, consuming preconceived realities instead of products (Sodré, 2002). By offering someone already established realities, the media expresses its inversion of reality, making it seem that the constructed realities are more concrete than the real object, as stated by the British sociologist Anthony Giddens (2002).

There are many particularities involved in the environmental discourse, its content coming largely from the dialogue between media, science and society. I have previously defined discourse according to Foucault (1971) and Costa (1999) as a set of rules that determine the existence of things and an intangible arena where people rethink their social performance, and I reiterate that the inclusion of environmental issues in the media is not only destined to informational purposes, but I stress that it is an important medium by which people reorient their practices.

It is during this redesigning process of practices and also of the media and its formats that the environmental issues gains importance and become what they are today. If they previously were threatening matters that went against the living standards of capitalism, the adaptation of environmentalism (after much resistance) to the molds of the media softened the most structural criticisms by merging the themes related to the environment with other discourses of entrepreneurship, capitalizing on the theme. This generated much criticism from environmental advocates, who see this blend as a contamination of environmentalism and argue that the environment must be preserved for reasons of ethical and ideological nature, and not driven by economic reasons.

Environmentalism is today another chapter on the agenda, alongside health, economy, education and politics, gaining or losing prominence according to its ability to draw the attention of journalists (Schoijet, 2008). In many cases, it is a specific event that triggers the coverage of controversial issues, such as the resurgence of the debate on GMOs from a new product that comes into the

market (as in the case of transgenic salmon in 2012 in the United States[5]), or debate on pesticides from a contamination scandal (as happened in Brazil with the contamination of breast milk in 2011[6]).

Hannigan also analyzes how environmental issues are being portrayed in the media and how the discussions on this issue have changed focus to be transported to the mass media. He points out to some factors that draw attention from the press:

> A potential environmental problem must be articulated through the agendas of established "authority fora" (Hansen, 1991, p. 451), notably politics and science. If it does not receive this legitimation, a problem will likely stagnate outside the media arena . . . environmental problems which conform to a model of a publicly staged "social drama" are more likely to engage the attention of the media than those which do not. (1995, p. 69)

This social drama is one that applies a morality, creating villains, heroes and victims. The media seeks to apply to the environmental message existing and widely used cultural concepts to be recognized and supported by the public[7] even if it reduces the implications of the problem (Gaissler et al., in press). Hannigan draws on the Love Canal case as an example of a

> perfect media story . . . with the timid housewife turned activist Lois Gibbs as the heroine, neighborhood children with their increasing health problems as the primary victims, and Hooker Chemical as the odious polluter. (1995, p. 69)

Another example of the application of this morality through characters is the material used in the Brazilian vaccination campaign against H1N1

[5]Refer to Nosowitz (2012) for an example of the media coverage on the matter.
[6] Refer to "Pesquisa realizada" (2011) for an example of the media coverage on the topic.
[7] I will refer to *the public* repeatedly throughout this thesis; therefore a proper definition must be set. I rely on the work of Burns, O'Connor, & Stocklmayer (2003) for that and acknowledge *the public* as a very heterogeneous group, multifaceted and unpredictable, with different levels of knowledge, needs, interests and attitudes. Though it can be simply put as *every person is society*, it comprises overlapping groups such as that of the *lay public,* which I will often refer to, formed by "people, including other scientists, who are non-expert in a particular field" (Burns et al., p. 184).

organized by the Ministry of Health in 2009 and analyzed in my Masters dissertation in 2010. Several TV commercials and printed campaign posters cast Brazilian actor Marco Nanini, who at the time played the character Lineu in the comedy show *A Grande Família* ("The Big Family") by Rede Globo. The character was an ethical, honest sanitary agent (therefore a health authority) who valued the traditional family. In other words, a stereotypical example of good citizen; it was not by chance that among so many characters, among many artists and possibilities, Marco Nanini/Lineu was chosen as a leading figure to persuade the public that it was important to get vaccinated (Gaissler, 2010).

It is not just a matter of acquiring prominence, but as Hannigan brilliantly states gaining visibility is crucial "in moving environmental problems from conditions to issues to policy concerns" (1995, p. 58) and to that I would add into concrete results like laws and regulations. In the case of DDT in the United States, that initially marvelous chemical turned into a problem with strong visibility thanks to Rachel Carson's publication of the *Silent Spring,* and the matter gained momentum with the support of a public mass that was very unhappy with the way things were being dealt with. The debate arose with the book and the media coverage – that overall discredited Carson, as the reader will see in the examples I bring later on – brought the topic closer to the readers' minds; even if part of the media was portraying Miss Carson as a dramatic spinster, the topic was on the table. People were thinking about DDT, talking with their neighbors, discussing the matter during family dinners and it was not long before public pressure was so great that the U.S. government was forced to take the matter seriously, in a series of steps that led to its prohibition. Once more I fully agree with Hannigan's statement, "without media coverage it is unlikely that an erstwhile problem will either enter into the arena of public discourse or become part of the political process" (1995, p. 58).

In this educational game of characters and dualities (good and bad, right and wrong) cognitive processes come into play such as anchoring, fast and instinctive thinking versus slow and analytical thinking, association and several

other heuristic ways that will be discussed along this thesis and that for now limit my discussion to quoting. These processes are important to consider because it is during rapid information processing and heuristic shortcuts that we absorb these prefabricated messages more passively and end up incorporating them without further consideration and reflection - and later reproducing them.

If on the one hand the media has changed greatly with the advancements in technology, with an outburst of independent blogs and websites and with the inclusion of the traditional media in the virtual era, where publishing online is a must, on the other hand the structure of the content remains very similar and still the environmental issues are a challenge to be overcome. Thales de Andrade, researcher in media and environment, reports the inclusion of environmental issues in the media outlets in a context where a significant change occurred in these media formats. The traditional way of communicating gives room for new technologies that were developed in the 1990s, in a setting of globalization that,while disseminating these technological innovations, is also accentuated by them. Technological change not only reforms the medium of spreading information, but also the way information is spread, circulated and consumed. He points out one positive outcome of the technology & media association:

> The large-scale use of electronic mail, the dissemination of information in the World Wide Web and the possibility of transmitting images and audio through satellite re-dimensioned the daily life of environmental activism, making it deterritorialized and influential in different spheres. (Andrade, 2009, p. 35)

Thus, when the media assimilates it, the environmental discourse undergoes a series of changes and is associated with other discourses, as can be noticed nowadays in corporate advertising and policy management proposals that use environmental messages as economic levers (Gaissler et al, in press). It was necessary to adapt the messages to new journalistic formats, and the print newspapers were connecting themselves to new forms of communication that

have emerged - many of them providing digital versions of material originally published in print, often dating to before the advent of the Internet - and the largest outlets operate in an information loop that often involves print, televised and virtual media (Gaissler et al, in press). The language is adapted to the different platforms, but the brand usually maintains its corporate identity, seeking to circulate among the media cohesively. The cultural context, globalization and virtual phenomenon do not only impact the way of doing journalism, but also the way society perceives the world and negotiates the rules of social coexistence (Gaissler et al, in press).

This change in format does not necessarily imply a change in content, and though there might be a higher volume of information circulating - the actual variety of sources is not much different from before - and a somewhat more democratic arena where people can debate what is published, occasionally even with the participation of the author of the text, one cannot be naïve enough to believe that environmental journalism is now devoid of interests and is separate from the political game, or that the issues are being thoroughly covered. As I will show in partIII, the coverage still relies on characters, moralities, and archetypes, and there are difficulties that were not overcome – if not worsened – with the virtual era, as I will discuss in more detail further.

1.3. The challenge of including environmental topics in the media

There are more than a few challenges in reporting environmental issues in the mass media. Here I will discuss the ones I consider to be most essential: time pressure, the complexity of the matter, and the difficulty of understanding it as a real problem that is here and now.

About the complexity of environmental problems, Hannigan discusses how this issue results in a re-dimensioning of media practice:

> From a topic with no distinct identity of its own, the environment has progressed to the point where it is now an established part of everyday journalism. . . . While there has been an upsurge in coverage, there is no single overarching environmental discourse. Instead, the media are the site of multiple outlooks and approaches, some of which are in direct conflict with the others (1995, pp. 70-71).

He adds, "while the construction of news may be influenced by cultural or political factors, it is generally seen as the result of inescapable organizational routines within the newsroom itself" (Hannigan, 1995, p. 59). There is a somewhat fixed routine to ensure that journalists will meet deadlines and that there will always be stories to be printed (or televised, or published online) and because of this, there is a regular agenda of predictable stories, making the insertion of environmental issues harder to be included unless they are part of said regular agenda, which includes meetings and other anticipated happenings.

The incorporation of environmental issues by the media was different in places like the U.S. and Brazil, but there is a common ground regarding the challenges encountered. In the following paragraphs I will explore in more detail the case of Brazil, then I will briefly address the North American case and from both trajectories I will offer some thoughts concerning the challenges I mentioned. With the increasingly strong presence of environmental issues in the media, in 1989 some professionals in the social communication area - journalists, reporters and editors - met to discuss the inclusion of this theme in the Brazilian media. The register of this seminar provides the perspective of these professionals about the challenges faced and their analysis of the role that media outlets had played so far.

Augusto Nunes, from the newspaper *Estado de São Paulo*, reports that the ecological issue has always been treated by the press as a concern restricted to the sectors of the Brazilian left wing; those interested in environmental issues were seen as odd and boring. The lack of space in the media to address this issue - and to encourage environmental awareness - suffocates the perception of environmental issues by society, which, because of the lack of information, comes to understand such problems with a certain detachment. For him, the lack of

information also allows environmental crimes to continue to occur, contributing to the spread of the cliché that says that in a poor country, the environment is marginalized and Brazil, as a poor country, cannot afford placing environmental issues as a priority (Nunes, 1989).

It is worth making a brief interruption for an important caveat as to what Augusto Nunes says. This thought, he expresses, that in one instance places the blame for the lack of environmental awareness in the absence of information and knowledge by the population, depicts what can be interpreted in the area of science communication as an information deficit model, or simply deficit model. The model deals with the attitudes of the lay public regarding science, attributing the rather common hostility and skepticism towards science to the lack of information and consequently stating that the key to a good relationship between the lay public and science lies in science education and the dissemination of knowledge. The model, which was widely accepted in the communication field since it was coined in the 1980s, also suggests the separation of the population into two groups: experts and non-experts, arguing that communication should focus on information transfer from the group of experts to that of laymen.

Many scholars have come to disagree with the conclusions offered by the deficit model, which became quite controversial and was then revised in 2004 by Patrick Sturgis and Nick Allum in an article that has become a landmark for science communication. In it the authors test hypotheses from two theoretical branches using a quantitative methodology and arrived at results that point to the clear importance of knowledge as a determinant of attitudes toward science, but highlight "the complex and interacting nature of the knowledge-attitude interface" (Sturgis &Allum, 2004, p. 55) and accused the deficit model and the discussions that have addressed the relationship between public and science as extremely simplistic. I chose to include this comment to emphasize that the opinion of Nunes, dating back to when the deficit model was still high, reflects a discussion of utmost importance that cannot be overlooked; additionally I report here the advancement in the debate and the more balanced conclusion that today is

shared by researchers and teachers in the field of science communication (which, to my mind, offers many overlaps to the field of environmental communication).

The journalist Augusto Nunes also emphasizes the responsibility of the press - along with the educational sectors - in providing balanced information (which is not biased towards the optimism of developmentalists neither apocalyptic as that of fanatics, giving the issue a religious treatment) about the environment. Augusto Nunes says that although the Brazilian situation is complicated because the country has awakened too late to ecological issues, these have been addressed in the new generations and he is optimistic about it.

Another problem presented at the 1989 seminar relates to the fact that often, the consequences of environmental degradation are not immediate. Of course the problem is not the non-immediacy, but the impact that this condition causes over how a fact is disclosed (Gaissler et al, in press). Journalist Charles Petit reports that when he wanted - a little over two years before the event - to do a story about the greenhouse effect, the newspaper editor rejected the proposal because it was predicted that the consequences of that climate phenomenon would take some time to be perceived, and newspapers want to talk about what is immediate.

> "This climate change", he asked, "will it happen tomorrow?" "No," I replied, "it will take many years." He then ended the conversation by saying: "This is a newspaper of daily circulation. Forget about it." (Petit, 1989, p. 22)

The case of global warming is a good example of a problem that seems distant, but when it is associated to disasters it becomes evident and gains space in the media. Just as it favors the consequences that are immediately visible, the media expects immediate concrete measures to fix the problem, fueling the pressure for results and supporting the academic machinery (Gaissler et al., in press), ignoring that "complex environmental problems with multiple dimensions are the most difficult to process because they can easily become

bogged down in scientific disputes and interdepartmental rivalries" (Hannigan, 1995, p. 70).

In the following decade the debate continued in Brazil. In 1995 SOS Mata Atlântica Foundation and Konrad Adenauer Foundation sponsored a seminar with the theme Press and Environment. In the discussion, Washington Novaes, then a columnist for the magazines *Imprensa*, *Globo Ecologia* and *Gazeta Mercantil*, pointed out that the environmental issue was losing ground in the press because it is a threatening issue for the media, questioning the context of competition in which media itself is inserted. It is also threatening to journalists and the public, because it leads to reflection and revision of lifestyles and consumption (Mantovani & Campanili, 1996).

Besides difficulties with resources and lack of expertise the representatives of the Brazilian Press admitted that the issue is very complex. To achieve the goals of accurately informing and educating the public about environmental limits, much work is needed to accumulate information, and also a lot of research and effort in translating this knowledge so that it is accessible to the public of the mainstream media.

Marcelo Leite, Folha de São Paulo'sombudsman between 1994 and 1997, draws attention to the artificiality of the media - that is, the indifference of both the readers in reading and journalists in talking about the environment, resulting in shallow reporting without much prominence. He also emphasizes the role of the neoliberal ideology, quite widespread in the U.S., that influences various Brazilian media, directing its agenda. This perspective portrays environmental regulation as a public enemy and as an impediment to economic development (Gaissler et al., in press).

It is interesting to observe the discussions that arose between the communication professionals in these periods (1989 and 1995) and to think about which ones still exist or which are the consequences of these difficulties we can perceive in the current Brazilian press. Some environmental issues are already consecrated in the news media and are now taken as common issues between

pages about politics, economy and daily life, for example. Others, however, still are tangent to journalism and many topics of great relevance are not even on the agenda.

Besides all the difficulties mentioned, there is another very important aspect and that is still another obstacle in the coverage of environmental issues. This relates to the profession of the journalist, who often needs to cover in the same day the opening of a bridge, a scandal of soil contamination, and a case of armed robbery, for example. It is difficult for the professional to delve properly into the themes that need reporting, making a more detailed consideration of each case, properly covering political, economic, social and other relevant aspects and thus offering the reader a richer portrait, contextualized and consequently more faithful to what they witnessed. The journalist goes to the field often unprepared and this is a common practice of media companies that treat the news as a product and give the company an industrial character. You need to sell, and you need to write stories that sell; everyday topics and frivolous content such as the routine of celebrities or even relevant issues such as political scandals get the most attention and eventually sell more than a profound reflection on the environmental crisis, the risk society, post-modernism and other complex topics that are more difficult to digest.

In the United States, environmental communication arose from a different context, though sharing similarities with the Brazilian case when it comes to the challenges faced by environmental journalism today. One important distinction though is that the field grew out of the work of “a diverse group of communication scholars, many of whom used the tools of rhetorical criticism to study conflicts over wilderness, forests, farmlands, and endangered species as well as the rhetoric of environmental groups” (Cox, 2013, p. 13). Robert Cox also highlights that

> As environmentalism became a formidable force after Rachel Carson’s *Silent Spring* (1962), “environmental journalism grew with it” (Wyss, 2008, p. ix); some newspapers began an environmental beat, but beat

> or no beat, reporters found themselves covering issues like dioxin, smog, and endangered species, as well as oil spills, air pollution, and nuclear fallout (Palen, 1998, para. 1). In 1990, the field of environmental journalism was given a boost by the creation of the Society of Environmental Journalists (SEJ), whose mission "is to strengthen the quality, reach and viability of journalism across all media to advance public understanding of environmental issues" (www.sej.com.br). By the first decade of the 21st century, more than 1,400 journalists identified as environmental reporters in the U.S., with more than 7,500 journalists in other countries covering the environment (Wyss, 2008, p. ix). (Cox, 2013, p. 145)

John Muir was a key figure to argue in favor of the preservation of wilderness areas in the early 20th century, and his evocations of the sublime characteristic of nature let to a debate that had preservation, conservation and utilitarianism at its center. As I will address in my analysis, other topics such as toxic waste and pollution gained relevance throughout the decades and helped shape environmental journalism to its present state.

1.4. Discourse and narrative

This research relies on two concepts that will appear repeatedly: discourse and narrative. By narrative, we understand what is said, and by discourse how it is said. For Michel Foucault (1971), French philosopher, the discourse is the set of discursive rules that determine the existence of objects, concepts, enunciative modalities and strategies. The narrative on the other hand encompasses what is told. Additionally, Costa emphasizes, "the discourse is taken as a place for elaborating experiences that can contribute to a reorientation of the social practices of the agents" (1999, p. 17). There is a set of existing conditions that determine the statements that compose the discourse; in other words, the way a story is told is the result of a cultural context situated in time and space from which the discourses will form and develop. In this statement by French philosopher Michel Pêcheux, the relationship between language and discourse is intimate:

> The language as discourse serves not only as a communication instrument, it is a social production mean, being therefore the privileged place of ideology manifestation. Language is the mediation instrument between man and its reality, between man and other men, it is the ideologies vehicle. It cannot be studied outside society because the processes that constitute it are social-historical. (1988 as cited inCosta, 1999, p. 24)

For the Brazilian linguist José Luiz Fiorin (1993), a discursive formation determines what should be said. One should not think, however, that the world presents a legible face which must be deciphered (Foucault, 1971), but must pay attention to the fact that as the discourse is determined by the sociocultural context experienced by society at a point in history it also modifies this very context and has its "semanticity situationally guaranteed, that is, in the relationship process that it establishes between people and the situation" (Osakabe, 1979, p. 53).

Chartier calls attention to the fact that the same text allows for different readings. As he puts it,

> reading is always appropriation, invention, construction of meaning . . . but this reading freedom is never absolute. It is restricted by limitations derived from skills, conventions and habits that characterize, in their differences, the reading practices. (1999, p. 77)

When the reader gets a work he does it in a circumstance, in a specific time and context; these are particularities that will directly influence the interpretation of the reader and that will direct his/her unique reading of the text. As French philosopher Pêcheux, reminds us,

> every statement, every sequence of statements is therefore linguistically describable as a series (lexical-syntactically determined) of possible drift points, providing a place for the interpretation. It is in this space that discourse analysis intends to work. (1990, p. 53)

Discursive formations and ideologies, thus guide the interpretation of reality. Referring to her study in Eldorado do Carajás, Costa explains the importance of discursive formations to determine how agents understand the

reality in which they are situated. In the words of the researcher, "the discourse of these agents reflected and built day by day, the representation they had of reality in which they lived" (1999, p. 21). Brazilian philosopher Marilena Chauí explains the relationship between discourse, ideology and representation by stating that

> it is to create the illusion of reality as if it were reality. . . that ideology is organized as a logical and coherent system of representations (ideas and values) and standards or rules (of conduct) that indicate and prescribe to the members of society what to think and how to think, what to value what to feel, what to do and how to do it (1980, p. 113).

It can be said then that through communication among agents that handle the same code and from existing contexts in a given historical moment, discursive formations are constructionsthat will in turn offer pathways for understanding reality to the individual and thus dialogue with his or her own identity (Gaissler et al., in press). According to Pêcheux,

> just for its existence, every discourse marks the possibility of a destructuring-restructuring of those networks and paths: all discourse is the potential index of agitations in socio-historical affiliations of identification (1990, p. 56)

Thus, the socio-historical affiliation of identification and the context of formation of the discourse are modified by itself, in a motion in which the discourse is constantly changing reality and being changed by it.

1.5. Data set and data analysis

This methodology was designed to test three hypothesis. First, that there is one main discourse flip in the media coverage, when DDT stopped being seen as beneficial and started being looked at as harmful. Second, that the main discourse flip happened right after the *Silent Spring* was published in 1962. Third, that the coverage would grow after 1962, as a response to the uproar the book provoked.

Because DDT was so widely used and such a polemic topic, the amount of available material is colossal. This is good in the sense that there is a very rich coverage available to be studied, but at the same time it forces the researcher to make choices that will reduce this existing universe of data and allow the selected material to be investigated in depth.

Initially, I wanted to include the most various examples of media coverage I could find: magazines, newspapers, advertising, documentary videos, the bug movies of the 1960s and what else I came across. I knew I wanted to cover a large time period: since DDT started being mentioned in the media – something I identified as happening in the year of 1944 – until the present, because I wanted to pinpoint the flip(s) in the discourse throughout time. Because the changes through time were my priority and what I judged to be the most interesting characteristic allowed by the DDT study, I had to make more serious restrictions regarding the media I would analyze.

The first medium I excluded was the radio. Not because it is not relevant. On the contrary, I realize that for the illiterate public and especially in the 1940s, 1950s and 1960s it was a very significant communication vehicle (and in Brazil it was particularly important in the Amazon region, where DDT was heavily used against malaria). However, I would have to deal with transcripts and the difficulty of identifying every single time programs talked about DDT. I knew I wanted to include the 70-year period abovementioned and preferably, I would choose every single time DDT appeared in the chosen media outlets; this would be very hard to accomplish had I included radio, especially because the records are not as good as those of written media.

At this point I was left with the written material only, but there was still a very large amount of news to pick from. I started by making a “geographic cut”: I would only include media from the United States, because of the relevance of the country in DDT’s history, something I will start explaining in the introduction, and that from Brazil, not only because of my familiarity with the culture and language

but because I wanted to include a developing country that relied on DDT for disease control – a different use from that of the U.S.

I had written material from Brazil and the U.S. to chose from, but it was still a very large set. I did pre-research using the search engine of magazines from Brazil that had a high circulation rate – for example, *Veja*magazine – and tried to find an American magazine with a similar audience and purpose (in the case of *Veja,* a weekly magazine with news, politics, economy and opinion sections, I chose *TIME* magazine). I also wanted to look into the narrative of magazines aimed at communicating science to the lay public (I then chose *Superinteressante* and *Popular Science*). At this stage, I was looking at the number of results that came up to see if it was a feasible job. Another factor that was important to me was the time period covered by each magazine, which should ideally go from 1944 to the present. This was not possible to do when it came to the Brazilian magazines because some of the old magazines do not exist anymore and some of the ones that circulate today did not exist in 1944. In the case of old magazines (I looked into *O Cruzeiro*, *Manchete, Seleções* and *Vida Doméstica*, for example), the companies that edited them do not exist anymore and this probably explains why there is no digital archive available. As this study does not aim to produce a representative analysis of the North American and Brazilian printed magazine, but to understand the contexts of media coverage throughout the decades, this unbalance of the sources is compensated, to an extent, with the use of material outside the formal dataset (advertisings, newspaper excerpts etc.).

I decided to focus on magazines because this way I could read *all* the pieces that mentioned DDT instead of selecting a smaller sample of them, something I would be forced to do if I chose to look at newspapers, for example – *The New York Times* alone produced 6,580 results. However, because newspaper is such an important media that I did not want to leave behind I included a smaller, selected sample to enrich my analysis, something similar to

what I did with the audiovisual media: again, it would strengthen the points I was making without being formally part of the data set.

After selecting the magazines through this process, I ended up with 711 pieces, a number I was satisfied with because I knew I would manage to read them all throughout the doctorate. Considering the material I would include and that was not part of the formal data, I believed I had a very good sample to understand the aspects to which I was proposing.

The final data set came from a selection of magazines from Brazil and the United States. The magazines were selected considering their target audience (e.g. housewives, children and teenagers), circulation rates, style (e.g. science magazine, weekly news) and time period covered. The idea was to have a diverse input to offer different narratives related to DDT. The magazines chosen were the North Americans *TIME* magazine (founded in 1923), *Popular Science* (founded in 1872)and *The New Yorker* (founded in 1925) and the Brazilians *Veja*(founded in 1968) and *Superinteressante* (founded in 1987)and the time period considered starts from the first time DDT appeared in the media (1944) up to today, covering the whole media produced about DDT in the chosen outlets. The data set does not include Brazilian media from a period before 1968 because there are no available archives that would enable a thorough search, as the older magazines are not circulating today anymore.

I came across an enormous amount of information about DDT through engine searches, and by simply typing *DDT* and freely navigating through what came up I found the great majority of pictures I present, as well as some information and references. In the outlets I selected, I used the key word *DDT* in the search engines of the outlets' archives and considered every mention to DDT as part of my main dataset. As mentioned above, this amounted to 711 entries.

Because one of my objectives was to identify the intensity and frequency of the DDT debate, I did a content analysis where I quantified the number of entries I found per year, as well as the number of times DDT was cited per entry and per year. The idea is that the more often DDT was named in the

same news, the more likely it was the central topic of the material (for example, if DDT appeared only once in a 10-page news piece, it was likely being used as an example for another topic, or used as a metaphor). The goal was to use content analysis to achieve an objective, systematic description of the coverage. I quantified this by exhaustively reading each piece.

I then created an excel file where I listed each entry with the date, number of times DDT was mentioned, the type of publication and the orientation of the piece. By orientation, I mean whether it was talking positively or negatively about DDT, or if it mentioned it in a neutral way. Because I was very interested in understanding if Rachel Carson was indeed the turning point in the representation of DDT from a hero to a villain, I also discriminated the entries where either she or the *Silent Spring* was mentioned (positively or negatively, there was not one single neutral piece). I had then 5 categories: positive; neutral; negative; Rachel Carson/Silent Spring positive; Rachel Carson/Silent Spring negative. I attributed a color to each category and included this on the excel file. In figure 1 there is an example of what the analysis looked like.

Figure 1: An example of the analysis

DATE	PAGES	DDT	TYPE
12/08/44	1	15	POETRY
25/11/44	1	1	ADVERTISING
24/03/45	11	1	REPORT
26/05/45	1	15	ARTICLE
29/09/45	1	1	ADVERTISING
06/10/45	13	2	REPORT
27/10/45	1	1	NOTE
17/11/45	1	1	NOTE
24/11/45	1	1	ADVERTISING
26/01/46	3	18	ARTICLE
27/04/46	7	1	REPORT
18/05/46	11	1	REPORT
25/05/46	2	2	ARTICLE
20/07/46	2	1	ARTICLE
03/08/46	2	6	ARTICLE
26/10/46	1	1	NOTE
14/06/47	3	1	ARTICLE
07/02/48	3	3	ARTICLE
28/05/49	5	1	NOTE
04/06/49	1	1	NOTE
18/06/49	6	1	ARTICLE
30/07/49	9	2	REPORT
08/10/49	1	1	ADVERTISING
22/10/49	5	1	ARTICLE

I then grouped the number of entries, pages and DDT mentions by year, and counted the overall orientation and type for each magazine. Figure 2 is an example of this:

Figure 2: Another example of the analysis

YEAR	ENTRIES	PAGES	DDT
1944	2	2	16
1945	7	29	22
1946	7	28	30
1947	1	3	1
1948	1	3	3
1949	6	27	7
1950	2	28	4
1951	2	3	2
1952	4	64	8
1953	3	37	3
1954	2	22	155
1955	2	2	2
1956	9	41	10
1957	2	3	3
1958	2	12	3
1959	7	48	8
1960	5	22	7
1961	3	42	8
1962	4	100	134
1963	1	2	1
1964	2	7	2
1965	0	0	0
1966	3	61	3
1967	1	26	1

ORIENTATION	QUANTITY
POSITIVE	52
NEGATIVE	57
NEUTRAL	32
RC/SS POSITIVE	13
RC/SS NEGATIVE	2
TOTAL	156

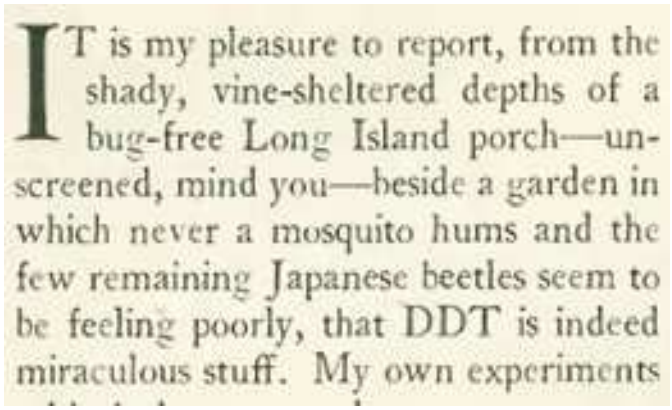
POSITIVE
NEGATIVE
NEUTRAL
RC/SS POSITIVE
RC/SS NEGATIVE

TYPE	QUANTITY
ARTICLE	85
LETTER	6
CARTOON	1
NOTE	19
POETRY	3
ADVERTISING	15
REPORT	27
TOTAL	156

RC/SS: 15/156

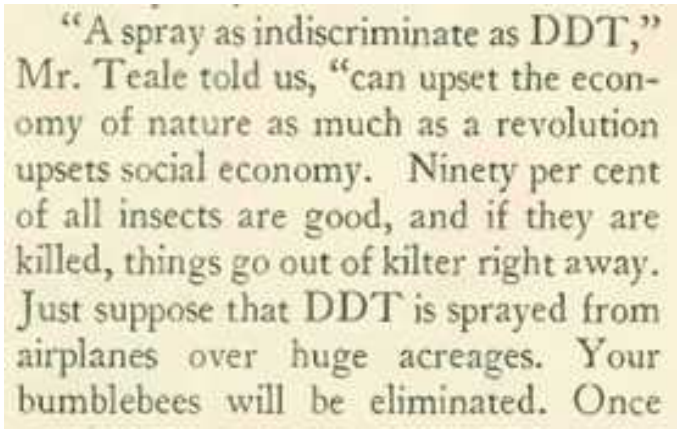
Naturally, the classification by orientation is subjective and especially the *neutral* category may be seen with distrust (is it possible for a media outlet to be neutral? In this case, the neutral instances occurred when DDT was not the central topic – see example below in Figure 5),but for the majority of the entries it was very easy to identify the tone. I will use *The New Yorker*magazine to give one example of each category for the reader to understand how I approached it.

Figure 3: The New Yorker, 08/03/1946[8], p. 56. Example of positive orientation



IT is my pleasure to report, from the shady, vine-sheltered depths of a bug-free Long Island porch—unscreened, mind you—beside a garden in which never a mosquito hums and the few remaining Japanese beetles seem to be feeling poorly, that DDT is indeed miraculous stuff. My own experiments

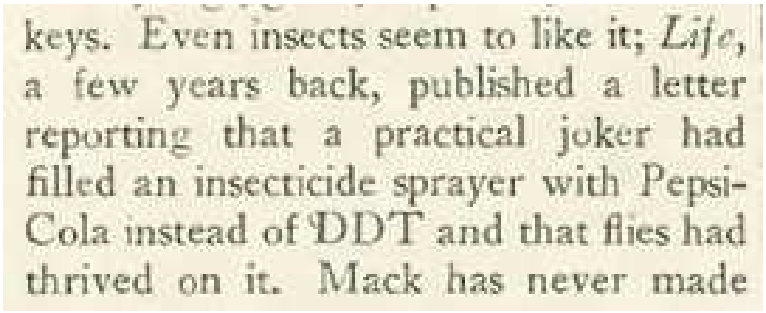
Figure 4: The New Yorker, 05/26/45, p. 18. Example of negative orientation



"A spray as indiscriminate as DDT," Mr. Teale told us, "can upset the economy of nature as much as a revolution upsets social economy. Ninety per cent of all insects are good, and if they are killed, things go out of kilter right away. Just suppose that DDT is sprayed from airplanes over huge acreages. Your bumblebees will be eliminated. Once

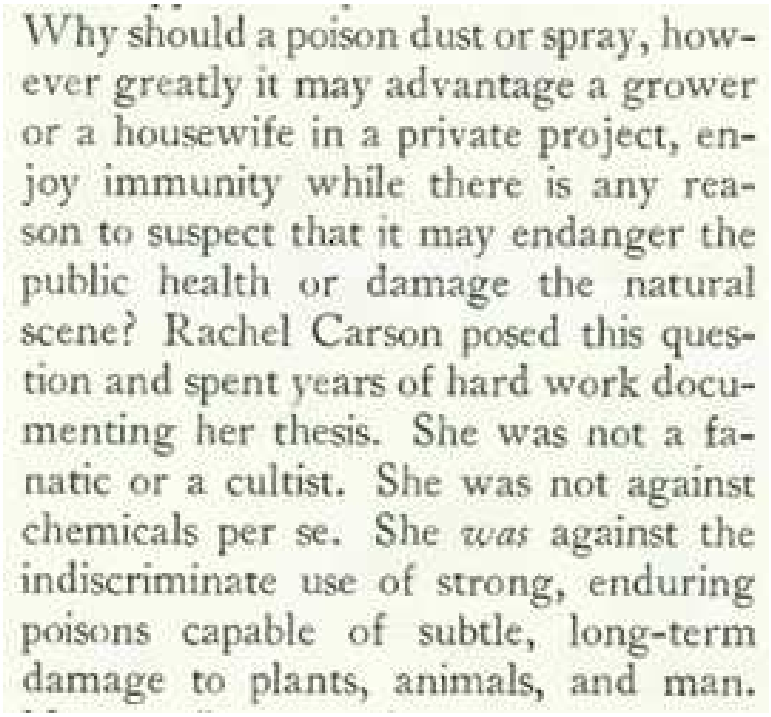
[8] The correct referencing for magazine sources, according to the American Psychological Association (APA) *Publication manual* (2012) followed by this work, must bring the author followed by the month and year of publication (as it follows: Author (year, Month). Title. *Magazine, volume* (issue), page number). When no author is identifiable, something very common in periodical magazines like the ones used here, the title of the article must substitute the author. Because this thesis relies heavily on magazines as the source of analysis, and because the specific magazine and respective date of publication are at the center of the analysis and fundamental for the understanding of the reader, a proper in-text citation would lose good part of its meaning and context, also making comparisons more difficult for the reader. The solution I found was to maintain the correct referencing in the Reference List, and use the format "*Magazine* (date), page number" both at in-text citations and in figures when referencing *TIME, Popular Science, The New Yorker, Veja and Superinteressante.* Paragraphs instead of age numbers for *TIME* are now shown because the digital archive used for consultation does not offer them. The date format will follow the American standard *month/day/year*or *month/year* when day is not available. All other magazines used will be properly cited. In the Annex, the reader will find a table for consultation with the in-text citation used and the correspondent one used in the Reference List.

Figure 5: The New Yorker, 07/08/50, p. 39. Example of neutral orientation



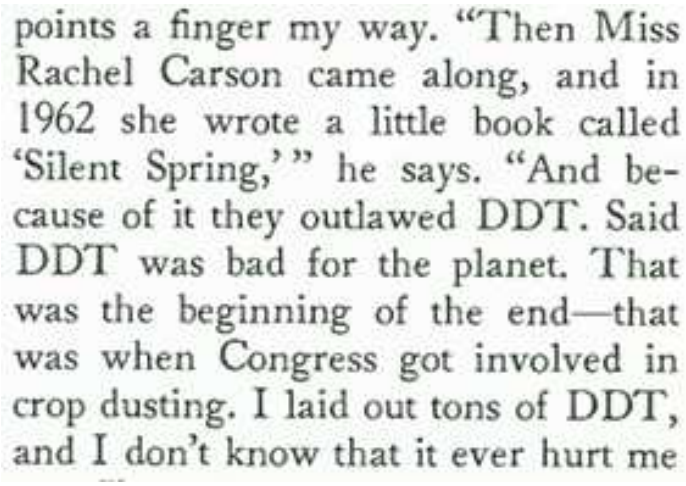
keys. Even insects seem to like it; *Life*, a few years back, published a letter reporting that a practical joker had filled an insecticide sprayer with Pepsi-Cola instead of DDT and that flies had thrived on it. Mack has never made

Figure 6: The New Yorker, 05/02/64, p. 35. Example of Rachel Carson/Silent Sprint positive orientation



Why should a poison dust or spray, however greatly it may advantage a grower or a housewife in a private project, enjoy immunity while there is any reason to suspect that it may endanger the public health or damage the natural scene? Rachel Carson posed this question and spent years of hard work documenting her thesis. She was not a fanatic or a cultist. She was not against chemicals per se. She *was* against the indiscriminate use of strong, enduring poisons capable of subtle, long-term damage to plants, animals, and man.

Figure 7: The New Yorker, 07/08/91, p. 56. Example of Rachel Carson/Silent Spring negative orientation



points a finger my way. "Then Miss Rachel Carson came along, and in 1962 she wrote a little book called 'Silent Spring,'" he says. "And because of it they outlawed DDT. Said DDT was bad for the planet. That was the beginning of the end—that was when Congress got involved in crop dusting. I laid out tons of DDT, and I don't know that it ever hurt me

I did not consider advertising in the final count to generate the coverage graphs because for *Popular Science* they amounted to 128 out of 196 pieces and this could be misleading to the reader, as they did not consist of proper articles talking about DDT. As I excluded them for *Popular Science,* I also excluded advertising for all the magazines. In the Annex section though, the reader will find the raw excel tables with advertising included for consultation if wished.

I used discourse analysis to meditate upon the material and look behind the curtains to see what was not being said, what was overly repeated, who were these outlets broadcasting to, what were the narratives used, what did people think about the matter, and other questions I needed to ask to help me answer my main research question: how have the discourses used by the media to talk about DDT changed over time? In other words, can we say that there is a complete change of discourse regarding DDT? To help answer these questions, I relied on material that offered a context of the time being analyzed – both cultural, historical, political, economical and scientific when that was the case. The objective was to provide the scenario in which the news was released to then understand how DDT was inserted on it.

PART II – Legal aspects and a milestone

2.1. What the law says

When it turned up on the market, not only DDT but also pesticides in general did not have any regulation regarding safety, only efficacy (Meiners & Morriss, 2001). The U.S. government and institutions welcomed the chemicals because they solved more than one problem at once:

> Members of Congress were happy to spend taxpayers' money to subsidize agricultural production through spraying, especially because it won the favor of chemical producers, too. A genuine sense of mission bolstered the powerful special interests at work- pesticides would boost food production, helping to end hunger. (Meiners & Morriss, 2001, para. 4)

Unfortunately at the time, the United States Drug Administration (USDA) was not well awareof"the effects of widespread dispersion of many of the chemicals it promoted and subsidized, partly because Congress directed funds for spraying but not research on environmental impacts." (Meiners & Morriss, 2001, para. 5).Crop price supports also encouraged farmers to squeeze more output from their land by using more chemicals. The USDA also promoted intensive chemical use and would do nothing to help organic farming or nonchemical farming methods (Bovard, 1989, p. 217, as cited in Meiners & Morriss, 2001, para. 7).

The market and the government encouraged pesticide use, but the law protected citizens who complained about pesticide drift. There were several cases from the 1950s that prove that liability was regularly imposed when pesticide was sprayed in one farm and drifted to a neighbor property damaging crops, and livestock (Meiners & Morriss, 2011).

The U.S. Department of Agriculture, the federal agency responsible for regulating pesticides before the foundation of the Environmental Protection

Agency (EPA) in 1970, started regulatory activities referent to DDT in the end of the 1950s and beginning of the 1960s with the objective of prohibiting many of the pesticide uses due to four main factors, as stated in an EPA Report from July, 1975: “increased insect resistance”, “the development of effective alternative pesticides”, “growing public concern over adverse environmental side effects” and “increasing government restrictions on DDT use” (EPA, 1975). Although the development of viable alternatives is put here as one of the motivators for the regulations, the lack of feasible substitutes for DDT is still today one of the big arguments for DDT use (this will be discussed in more detail in subchapter 2.2, where I will examine the Stockholm and Rotterdam Conventions). As discussed in the previous section, the work of Rachel Carson published in 1962 contributed greatly to the dissemination of concern about the dangers of DDT use and the need for establishing a more efficient control over the use of pesticides.

After the publication of her writings, an official order to cancel the use of DDT in the United States was issued by the EPA in 1972. Since then many studies have been conducted linking DDT to reproductive and carcinogenic effects (EPA, 1975) and the compound has since then been classified as “potentially carcinogenic” by the U.S. and other international authorities like the World Health Organization. Animal studies compiled by the U.S. agency indicated the development of liver cancer, justifying the classification (EPA, 1975), and very recent studies relate Alzheimer’s (Richardson et al., 2014), attention deficit hyperactivity disorder (Grandjean & Landrigan, 2014) and other pathologies.

Since the prohibition in the United States, which was one of the largest consumers and exporters at the time in addition to other places in Europe and elsewhere – influenced by the American positioning – it was argued by the EPA (1975) that DDT levels found in animal and human tissues had decreased considerably. However, because it is a persistent chemical that accumulates in adipose tissue and is able to travel long distances through the air (EPA, 1975), it is still found in various forms of life and more recent studies confirm the presence of DDT not only in the U.S. but in salmon and various other foods in the UK

(Expert Committeeon Pesticide Residues in Food [PRiF], 2013)[9], and in breast milk in Brazil (Palma, 2011). The widespread use of DDT throughout history makes it still a big problem, but for some reason it "fell off the radar" and ceased to be a major concern for government agencies and society - or rather, it started to be a concern for other people in India[10], Namibia and places other than those receiving constant attention from the mainstream media. Those who drink bottled water and have fast-food chains scattered in every corner seem far too concerned about their own cancers[11] to worry about third world diseases such as malaria (even if it is a problem of great dimensions in the Amazon region, very few people care about indigenous people and the poor) and populations intoxicated by the use of illegal pesticides that are long outdated.

In September 2006 there was a setback in the banning of DDT, when the World Health Organization (WHO) declared its support for the internal use of the compound in African countries where malaria was still (and is still) a serious public health issue (WHO, 2006), once again arguing that the benefits outweigh the environmental risks and agreeing with the Stockholm Convention conclusions, explained in more detail in the next section, 1.4. It is among the 12 pesticides recommended by the WHO for spraying programs, and it is the responsibility of each country to decide about the use or non-use of DDT. In the 1970s, the EPA alongside other countries and agencies conducted an advising work regarding the campaign management of the use of DDT and its monitoring, aiming to use it only

[9] The report emphasizes that this does not mean producers are using DDT today, but that residual DDT has been found in the samples tested (PRiF, 2013, p. 19)

[10] Currently India is the only country in the world that still produces DDT (with 10,246 tons produced between 2009 and 2011), besides being the largest consumer to fight cases of malaria and leishmaniasis (UNEP, 2012, p. 13)

[11] According to the World Health Organization, in 2013 there were over 14 million cases of cancer (including more than 8 million deaths. WHO, 2014a). In contrast, in the previous year were recorded 207 million cases of malaria - nearly 15 times more than the number of cancer cases (Fatalities were approximately 630,000, mostly among African children; WHO, 2014b). I do not intend to compare the seriousness or importance of each disease, but by bringing out the raw numbers I want to call attention for the priorities established and wish to reinforce an argument I will develop later on, that we could be much closer to completely eliminating DDT use if more funding and attention was destined to malaria research in the sense of looking for viable alternatives.

in cases of Integrated Vector Management (IVM) programs. They were also seeking to ensure that the compound was kept away from agricultural areas, protecting water sources and the incorporation of DDT by food (EPA, 1975). It is unclear where the agency stands on actions towards DDT today, and whether the aforementioned initiatives are still in practice, and one can question how they can safety from a chemical that is carried by the wind and impregnates in the environment for decades, what their protocol consists of and for how long they monitor the neighboring areas (if they do monitor them in the first place) to ensure that DDT was effectively kept away from fields and food; such questions are left unanswered by the Reports and online information available to the public.

In Brazil, legislation trajectory for DDT was quite different from the U.S. case presented. Only in 1985 did the National Health Surveillance Agency (Agência Nacional de Vigilância Sanitária, Anvisa) cancel the authorization for using the product for agricultural purposes, but the use was still legal in public health campaigns and wasn't prohibited until a decade later, in 1998.

Only in May 2009 a law enacted by former President Luiz Inácio Lula da Silva, which banned the manufacture, import, export, stock keeping, marketing and use of DDT. The new law, number 11.936/09, comes from a bill (PLS 416/99) from former Senator Tião Viana (Partido dos Trabalhadores [PT], Acre State) and was approved by Anvisa and the Secretariat of Health Surveillance, a division of the Ministry of Health. At the time, the former Anvisa manager of toxicology Luis Cláudio Meirelles declared through Anvisa's Communication Office (Ascom) "the new measure [would] end up with products stored in obsolete ways and [render] the definitive ban *of this dangerous pesticide* [emphasis added] for any use in the country" (Meirelles, 2009, para. 3).

As reported by Fabiano Maisonnave for Folha de São Paulo, the use of DDT in malaria programs in the Amazon resulted in the deaths of over 50 people (between 1994 and 2008) and the contamination of at least 450 former agents of Sucam, according to data provided by the *DDT e a luta pela vida* committee ("DDT and the struggle for life"), composed by former employees and people who

lost family members in events related to DDT (Maisonnave, 2008)[12]. The commission members assert that at the time they were informed (by someone they do not specify) that DDT was only harmful to insects - even when there were already a significant number of studies that associated the pesticide to neurological health issues and other complications. The members of the commission are still fighting for indemnification, and to this day Funasa (Fundação Nacional da Saúde, the National Health Foundation in Brazil) does not recognize the intoxication of the Sucam agents. However, in February 29th of 2012 the Comissão de Assuntos Sociais (CAS, Social Issues Comission) suggested a bill that gives a lifelong allowance of R$2500 to the servers and their families (PL 3525/12). Until April 2014, the case was still proceeding through.

2.2. What international agreements say: The Stockholm and Rotterdam Conventions

I have dealt with the specific cases of Brazil and the United States in terms of legislation, but I redeem important to offer the general international regulatory legislation concerning DDT: firstly, because both countries are inserted in an international context; secondly, because these agreements represent a conducting thread on which the countries rely when making decisions about pesticide use and even adjusting their national pesticide laws. We can also perceive how the United Nations decisions and recommendations vary from the Brazilian and North American.

To Weber, Aliyeva and Vijgen, the recent synergy of the Stockholm, Rotterdam and Basel Convention (the last one's mission being protecting human health and the environment against the adverse effects of hazardous wastes) represents the "best international opportunity to holistically address and improve the management of these chemicals and their related wastes" (2012, para.1).

[12]The situation will be addressed with more detail in subchapter 3.5, pages 79-80.

2.2.1. The Stockholm Convention

Internationally, the United Nations Environment Programme, UNEP,regulates the current situation of DDT and other POPs (persistent organic pollutants). With the help of several agencies (such as the EPA itself, since 1996) and countries, a treaty was negotiated which regulates the prohibitions and restrictions of POPs, known as the Stockholm Convention[13]. The Convention includes a very controversial exception for the use of DDT to control mosquitoes that are vectors of malaria and leishmaniasis, arguing that controlling the diseases and deaths caused by them around the world justify the controlled and timely use of DDT (UNEP, 2012, 2013).

The last meeting of the Conference of the Parties, which responds to UNEP as part of the Stockholm Convention, which deals with the situation of POPs, was held in Genève, Switzerland, in 2013.The meeting, which was the sixth of the group and took place from April28th to May 10th, produced a 110-page document that rescued the conclusions of the previous meeting and added the reports submitted by members of the expert group. Despite being the last report on POPs, I will address in more detail the penultimate meetingheld in April 2011 – more specifically, one particular document dedicated exclusively to DDT. This is because the latest report does not provide significant differences from the second to last, and because this document I will explore dealt with DDT with much more detail and therefore I consider it a richer material for analysis. The information I will discuss in the following paragraphs concerns then an annex to the 2011 report published in 2012, entitled “Report of the Expert Group on the assessment of the production and use of DDT and its alternatives for disease vector control” (UNEP, 2012).

The report, which I identify as the most complete document - although

[13] Every report issued by the Conference of the Parties can be accessed at http://chm.pops.int/TheConvention/ConferenceoftheParties/ReportsandDecisions/tabid/208/Default.aspx

brief, with just 29 pages - about the current global situation of DDT[14], has five chapters: situation and analysis of the production and use of DDT; availability, suitability and implementation of alternatives to DDT; implementation of vector control strategies, methods and products; capacities for countries to transit from DDT to other alternatives; action taken by parties/partners to reduce reliance on use of DDT. The last part of the report brings conclusions and recommendations.

Before I get to the details, I want to emphasize the importance of such meeting and the resultant report. DDT is a topic forgotten by many, and very often when I speak of my research I have to explain what DDT is and give a summary of its history, because a great number of people – especially those under 30 years old - have never heard of it. It was interesting to note, during my time in the United States, that a good number of the people I talked to havehad already heard of DDT and knew something about it, probably for three reasons that I identify.

First, because Rachel Carson is such a strong cultural symbol there; second, because her battle against the "pesticide dictatorship" has DDT as a condensation symbol[15]; third because I was talking to people with a scientific and/or environmental background. However, I find it surprising to meet people in Brazil who have never heard of DDT and this surprise comes from three places: first of all, because DDT was used in Brazil long after it was banned in the United States I expected people to recognize it more promptly; secondly, because there have been scandals involving DDT contamination and one of them, regarding research from Federal University of Mato Grosso (UFMT) about DDT contamination in breast milk, received a lot of media attention in 2012. Last but not least, we have DDT in our lexicon because in Portuguese the word used for *fumigating*is ***dedet****ização,* a word that derives directly from DDT and that resembles it phonetically. It is very common to hear people speaking of

[14] The group last met in 2014, but until January 2015 the report had not been published. Because of this, I use the last report available, form the 2012 meeting.
[15] Graber defines a condensation symbol as a word or phrase that "stirs vivid impressions involving the listeners' most basic values" (Graber, 1976, p. 289, as cited in Cox, 2013, p. 71)

*de**t**etização* instead of *de**d**etização* and that is probably because people in general have never given much thought to where the word come from.

As I stated earlier, DDT has been forgotten (or silenced?) by the media and by many stakeholders, giving the false impression that the problem belongs to the past. However, according to my assumption, present in the development of this whole thesis, that DDT is still a risk in several locations on the planet, the problem persists because DDT is still in use in several countries, infecting humans and the environment. It is for this reason that I include in this study the most recent data and more than that, the positioning of authorities that generated conclusions that serve as a guide for organizations like the WHO, globally, and for Ministries of Health at the national level, on how to act about this pesticide. My argument here is that DDT is not a "hot" topic anymore, even though it still constitutes a big problem as I argue in this study. Thus, to have a group of experts meeting every year to speak of it, even if tangentially, and having one of the meetings dedicated to DDT is something I consider of great importance.

Before the meeting of the Stockholm Convention in 2012, a questionnaire was sent to 178 parties regarding the use, stockpiling, production and reliance on DDT, among other items. Only 24 surveys, a bit more than 13%, were returned, which makes them unrepresentative and limits the extrapolation of the conclusions that have been reached. Unfortunately, it is the most complete and current data on the overall situation of DDT and is thus the starting point of the recommendations made by the Convention. Brazil has not returned the questionnaire and was not mentioned in any moment of the report, nevertheless there is evidence that there is obsolete DDT stocked in the country (refer to subchapter 3.5where I talk about the Cidade dos Meninos case for more details). This observation does not intend to invalidate the data presented, but to warn of a critical reading of the same and the awareness that the numbers are probably even more alarming than presented. Additionally, there is no reference concerning to where these questionnaires are sent (to someone in the Ministry of

Health? Of Development? Of Environment?), and who is responsible for answering and returning them.

The group recognizes 18 countries as registered for DDT use in specific situations. Of the 18, 12 have responded to the questionnaire, with the remaining 6 abstainers: Botswana, China, Marshall Islands, Namibia, Senegal and Venezuela. Of the 24 parties, 7 countries reported DDT use: India, Eritrea, Zambia, Swaziland, South Africa, Mozambique and Mauritania. It is known by the Convention that Gambia uses DDT, but this has not been officially notified in the report. The remaining parts that returned the completed questionnaire were: Ethiopia, Yemen, Morocco, Madagascar, Uganda, Gambia, Bahrain, Jordan, Argentina, Mexico, Albania, Lithuania, Rwanda, Cambodia, Seychelles and Monaco (UNEP, 2012, p. 12).

Though the report brings the sum of DDT global production and consumption, the numbers cannot be trusted as they show India's consumption as being larger than the total world production: according to the report, between 2009 and 2011 (the period covering the questionnaires sent) the total global DDT production was of 10,246 tonnes, all produced in India by Hindustrian Insecticide Ltd, which appears as the only producer in the world. The output is a powdered product, which is then formulated and packaged in South Africa by Avima Company Ltd. Regarding the use, India appears in the first place (10,520 tons), followed by South Africa (132,67 tons), Zambia (44,76 tons) and Eritrea (42,64 tons). Between 2000 and 2009, 82% of DDT produced was used in India and 11.3% in Ethiopia (van den Berget al., 2012). If there is another interpretation to the data that results in logical math, it is incomprehensible. It is also important to remember that these reported uses are intended solely to combat diseases such as malaria and leishmaniasis, and not in other contexts of agriculture and family farming, for example.

Even for parties that no longer use DDT, there is the record of the organochloride in stock. Included in this group are South Africa, India, Jordan, Gambia, Mauritania and Swaziland, plus Bangladesh (which is not part of the 24

countries cited but which has a reserve of 602 382 tones of obsolete DDT according to a study published by Rahman in 2013).

In the discourse of the Expert Group there is a concern with the safe and sustainable use of DDT (I personally believe and argue that there is no safe or sustainable use of this), but there is no mention of what would be a sustainable use or even what is the definition of sustainability used by the Group. The WHO provides instructions - mostly in English and often without translation to all the places where such instructions are needed, which raises a question about how useful such guidelines are - to minimize environmental contamination and human exposure to DDT, but these are hard to find in the website; as stated in the 2012 document, in some countries where vector control programs are supported by partners such as PMI (President's Malaria Initiative), spray operators are trained to handle and dispose of the pesticide (UNEP, 2012, p. 15). There is no specification about who offers training and what it is, however.

The justification presented for the DDT use is that it is locally safe (no more detailed explanation of what the term actually means is offered), effective, has long residual efficacy and there are no affordable alternatives. In contrast, the section dedicated to enumerate potential alternatives to DDT lists possibilities such as the implementation of integrated vector management (IVM), vector control capabilities at the national level, and non-chemical control (e.g. biological control). It is surprising that the list of 11 alternatives to DDT formulated by WHO includes malathion - which together with DDT was heavily attacked by Rachel Carson in the Silent Spring as a highly damaging compound to the environment and living beings. Exactly 50 years before the meeting of the Stockholm Convention in Geneva happened, Carson warned of the great dangers of DDT, malathion, parathion and many others. In my view, this can only be understood as a setback that shows that attitudes regarding DDT are reactionary and devoid of adequate contemporary context by suggesting replacement of DDT by an equally harmful compound.

Another indication of this lack of contemporary context is the approach

of the influence of climate change, a topic of highest relevance at the moment, in the already alarming scenario of diseases like malaria and dengue, which share the same vector, when it is almost a consensus among scientists that climate change will have major impacts on the populations of vectors which will significantly increase (Martens, Jetten, Rotmans, and Niessen, 1995; Githeko, Lindsay, Confalonieri, Ulisses andPatz, 2000; Rogers & Randolph, 2006). There is a brief discussion on climate change in a report from 2013 (UNEP, 2013, p. 13), which is further developed in Annex E “Approach to the consideration of climate change interactions with the chemicals proposed for listing in the annexes of the Stockholm Convention” and where the Committee recognizes the scientific evidence of climate change and its interaction with chemicals. There is also a table:

Figure 8: (Partial) table elaborated by the Persistent Organic Pollutants Review Committee addressing potential climate change impacts and interactions with POPs (2013)

Table 1. Summary of potential climate change impacts and interactions with POPs according to the Draft Guidance

Climate change impact	Induced change	Type of study	Reference chapter in the Draft Guidance
Temperature effects on water solubility of the chemical	Exposure of biota	Laboratory studies or field studies	4.2 (b) and (e)
Salinity effects on the bioavailability of the chemical	Exposure of biota	Laboratory studies or field studies	4.2 (b) and (e)
Changes in primary production	Exposure of herbivores and zoo plankton	Modelling or field studies	4.2 (c) and (e)
Changes in POP levels in prey or food	Exposure of predators or humans	Modelling or field studies	4.2 (c), (d) and (e)
Change of prey by predators	Exposure of predators	Field studies	4.2 (c) and (e)
Migration of new species	Exposure of biota in the new region	Field studies	4.2 (a) and (e)
Releases from new sources	Exposure of biota and humans	Field studies	4.2 (a) and (e)
Remobilisation from secondary sources	Exposure of biota	Modelling or field studies	4.2 (a), (d) and (e)
Changes in solar irradiation	Photolytic degradation rate of the chemical	Modelling or evaluations based on fate properties	4.3 (a) and (c)
Temperature changes in air, water, soil or sediment	Abiotic, photolytic degradation or microbial degradation	Modelling, field studies or laboratory studies	4.3 (a), (b) and (c)
Changes in pH in water, soil or sediment	Microbial degradation and activity	Modelling, field studies or laboratory studies	4.3 (b) and (c)
Changes in salinity in sea water or fresh water	Microbial degradation	Laboratory studies or field studies	4.3 (b) and (c)
Temperature effects on uptake rates and elimination rates	Accumulation levels and rates in organisms	Modelling, laboratory studies or field studies	4.4 (a) and (c)
Changes in food web structures	Accumulation levels up the food chain and across food webs	Modelling or field studies	4.4 (b) and (c)
Temperature effects on volatilisation of the chemical	Environmental distribution and transport of the chemical, including long-range transport	Modelling, monitoring and/or evaluations based on fate properties	4.5 (a), (b) and (c)
Changes in wind pattern and strength	Atmospheric transport of airborne particulates and the chemical	Modelling, monitoring and/or evaluations based on fate properties	4.5 (b) and (c)
Changes in rainfall	The transport pathways, the	Modelling, monitoring	4.5 (b) and (c)

The table lists a summary of potential climate change impacts and interactions with POPs, with the climate change impact (e.g. temperature effects on water solubility of the chemical, change of prey by predators and migration of new species), the induced change (respectively exposure of biota, exposure of predators and transport of the chemical to new regions), the type of study

recommended (e.g. laboratory or field work) and the reference chapter in the Guidance. It claims to show a “summary of potential climate change impacts and interactions with persistent organic pollutants according to the guidance on how to assess the possible impacts of climate change on the work of the Persistent Organic Pollutants Review Committee” (p. 3), but the information comes across as quite disconnected from the topic and not very clear, nor helpful; it would be better contextualized if it brought the impacts of the events in the climate that could cause a dramatic raise in the vectors populations (because disease control is the main justification given for DDT’s and other pesticides use), a much more applicable piece of information that got left behind.

My argument is that in the report of a convention formed to perform the governance of the global pesticide use, bans and recommendations and also the major data-gatherer on the matter, many themes are superficially addressed and climate change, a very relevant and present-day one is one of these topics. A couple of paragraphs and the aforementioned table are not enough to cover a matter that affects millions every year.

This does not appear on the 2012 Report though, and the climate change discussion is much more technical than conceptual; in addition to that, there is no mention of communication between the Stockholm Convention and climate authorities for a collaboration, even though it is clear that the topics converge in a relevant manner. Given this lack of communication, it is curious that the 2012 report asks countries to engage in the development of a relationship between the Ministry of Agriculture of the parties with the respective Ministries of Health (responsible for disease control) and Environment (responsible for regulatory issues), in the sense of "harmonizing regulations and pesticide management practices so as to minimize human and environmental contamination" (UNEP, 2012, p. 21) when it falls short in that same communication intricacy.

The document closes with a list of conclusions and recommendations, which I limit my quoting to just the first of each, verbatim. In conclusion number 1

the report confirms that

> In certain settings, there is a continued need for DDT for disease vector control in accordance with WHO recommendations and guidelines on the use of DDT, until locally appropriate and cost-effective alternatives are deployed for a sustainable transition away from DDT (UNEP, 2012, p. 25)

It is frustrating that this is the first conclusion of the report, and it makes the exhaustively repeated discourse of social and environmental sustainability sound fake, giving the impression that the issue of DDT use has been, once again, left out and neglected. Indeed there is the presentation of a list of major donors and funders of research aimed at vector control (Global Fund, UNEP/GEF, Bill and Melinda Gates Foundation, the United States Government, the European Union, GEF - Global Environment Facility - and IRD - Institute for Research and Development, from France), as well as funded projects (India has a budget of $ 1.7 million aimed at developing and promoting original non-chemical alternatives to DDT), but this speech seems to lose part of its meaning before the conclusion: we still need the DDT. Corroborating this item, the first recommendation (which means an endorsement, different from a conclusion that has the character of statement) says: "The DDT Expert Group Recognizes that there is a continued need for DDT in specific settings for disease vector control where effective or safer alternatives are still lacking" (UNEP, 2012, p. 26).

Intrigued by this position, I went after the affiliations of some of the Convention members searching for their trajectories, backgrounds, associations with other organizations and/or companies, trying to better understand who these people and from where their decision come. I focused on 9 specific people: the current President and Vice-presidents (VPs) of the Bureau of the Conference of the Parties and some members present in the meeting that generated the 2013 Report: the Chair of the Committee, the Executive Secretary and two members from Brazil and India. This is what I came across, and the affiliations were the most recent information I found.

Starting with the current members, the President Dr. Mohammed Oglah Hussein Khashashneh, from Jordan, is also the director of the Hazardous Substances and Waste Management, Ministry of Environment; the VP Mr. David Kapindula is manager-inspectorate of the Environmental Council of Zambia (ECZ); VP Mario A. Vega Hernández is the Minister Counselor, Environmental Affairs Officer for the Permanent Mission of Costa Rica to the United Nations; VP Marie-Pierre Méganck, from France, is the General Direction of Risk Prevention in the French Ministry of Ecology, Durable Development and Energy; I found no reliable information on VP Ekaterine Imerlishvili.

From the 2013 Committee, Mr. Jim Willis is the former director of the U.S. EPA Office of Pollution Prevention and Toxics (OPPT), Chemical Control Division (CCD), and the Executive Secretary of the Basel, Stockholm and Rotterdam Conventions. He was responsible for organizing and holding the negotiations that led to the Stockholm and Rotterdam Conventions; the Brazilian Dr. Estefania Gastaldello Moreira has a PhD in pathology and researcher in neurotoxicology; Ram Niwas Jindal, from India, is the Wholetime Director of Jindal Power Limited (JPL), a company of fuel supply in India with power plants and reliance on coal mines that self-proclaims environmentally friendly, even though there is no further explanation on how coal power can be sustainable and eco-friendly; I found no information about the Chair of the Committee, the German Reiner Arndt, besides he held this position.

Except from Mr. Ram Jindal, who is the Director of a large power company in India - that might be a family business given its name - the members I looked up are either connected to research or engaged in similar organizations. I found no conflict of interest between the members and the Convention objectives that would cause me to say that the decisions made were influenced by industries and their advocates, or by the political sphere; nevertheless, given the history of the pesticide industry it would not have surprised me if I had.

2.2.2. The Rotterdam Convention

Because the law on pesticides works differently in each country, it was (and still is) a common practice to export banned pesticides to parties where its use is still legal. This common and unethical practice is an easy way to dispose of stockpile that becomes obsolete and to carry on with a profitable business, disregarding the risks posed to those who buy dangerous chemicals: if it is considered dangerous in one country, why would it be safe elsewhere?

If on the one hand the Stockholm Convention deals with the situation of POPs internationally, including DDT, on the other the Rotterdam Convention deals with the Prior Informed Consent (PIC) and information exchange regarding the international trade of certain chemicals. The Rotterdam Convention, which was adopted on September 1998 and came into force in February 2004, has two main objectives as stated in the Convention website:

> 1) To promote shared responsibility and cooperative efforts among Parties in the international trade of certain hazardous chemicals in order to protect human health and the environment from potential harm;
> 2) To contribute to the environmentally sound use of those hazardous chemicals, by facilitating information exchange about their characteristics, by providing for a national decision-making process on their import and export and by disseminating these decisions to Parties (Rotterdam Convention, 2010a, para. 1).

This policy of informed consent includes other requirements such as the obligation from the seller to inform the buying Party of each national ban of severe restriction of a chemical, “the possibility for a Party which is a developing country or a country in transition to inform other Parties that it is experiencing problems caused by a severely hazardous pesticide formulation under conditions of use in its territory” (Rotterdam Convention, 2010a, para. 7) and other measures that can help developing countries make informed decisions regarding the import of chemicals. These measures have to be read with a good dosage of criticism though, for it is known that political and economical pressures can null all the

precaution brought by the Convention and there are other barriers that might come into play (for example, safety instructions made available in English in a country where other languages are spoken). Nevertheless, it is imperative to have an organization that deals with this issue through communication, a crucial tool of conviviality.

The Convention is part of the United Nations and overseen by UNEP, UNESCO and FAO. It works through two main mechanisms (the PIC and the information exchange) and four main players: Parties and their Designated National Authorities (DNAs), which "are countries or regional economic integration organizations that have ratified, accepted, approved or acceded to the Convention" (Rotterdam Convention, 2010b, para. 4.); Conference of the Parties (COP), which "oversees the operation of the Convention and makes decisions regarding amendments to the Convention" (Rotterdam Convention, 2010b, para. 5); the Chemical Review Committee (CRC), a subsidiary body of the COP composed by government designated experts responsible for reviewing notifications and proposal by the Parties and making recommendations to the COP (Rotterdam Convention, 2010b, para. 6); and the Secretariat, which makes administrative arrangements, verifies and disseminates information and fosters collaboration and cooperation with other international organizations (Rotterdam Convention, 2010b, para. 7). It is not rare that members of the Stockholm Convention will also be part of the Rotterdam Convention and other organizations and institutions with a similar mission.

2.3. Rachel Carson and the *Silent Spring:* a guided tour to the past

The role of Rachel Carson, the north American biologist and naturalist writer, is so relevant to the story of DDT and to environmentalism *per se,* that it needs a careful look into and a proper introduction of its own. I will have her and her book as two conduct lines through which we will take a first look into some of

the decades I am considering in this study.

Rachel Carson was a biologist born in Springdale, Pennsylvania, in 1907. She was also a writer, and a naturalist whose most famous work is the book *Silent Spring,* published in 1962, in which she released a dossier exposing the negative effects of pesticides – mainly DDT. The impact of this particular book was immense, and can be seen in this *The New York Times*headline from July 1962:

Figure 9. *The New York Times* extract, July 22nd 1962: a gentle writer provokes uproar in the pesticide industry (Lee, 1962)

'Silent Spring' Is Now Noisy Summer

Pesticides Industry Up in Arms Over a New Book

By JOHN M. LEE

The $300,000,000 pesticides industry has been highly irritated by a quiet woman author whose previous works on science have been praised for the beauty and precision of the writing.

The author is Rachel Carson, whose "The Sea Around Us" and "The Edge of the Sea" were best sellers in 1951 and 1955. Miss Carson, trained as a marine biologist, wrote gracefully of sea and shore life.

In her latest work, however, Miss Carson is not so gentle,

Rachel Carson Stirs Conflict—Producers Are Crying 'Foul'

fending the use of their products. Meetings have been held in Washington and New York. Statements are being drafted and counter-attacks plotted.

A drowsy midsummer has suddenly been enlivened by the greatest uproar in the pesticides industry since the cranberry scare of 1959.

Miss Carson's new book is entitled "Silent Spring." The title is derived from an idealized situation in which Miss Carson envisions an imaginary town where chemical pollution has silenced "the voices of spring."

In the book, Miss Carson defended the position that we were slowly poisoning the environment and threatening the security of humankind by insisting on the inadequate use of chemical pesticides. In the introduction of the fortieth anniversary of the *Silent Spring* by Houghton Mifflin, the biographer Linda Lear tells that

> Carson wrote at a time of new affluence and intense social conformity. The Cold War . . . was at its zenith. The chemical industry, one of the chief beneficiaries of postwar technology, was also one of the chief authors of the nation's prosperity. DDT enabled the conquest of insect pests in agriculture and of ancient insect-borne disease *just as surely as the atomic bomb destroyed America's military enemies*[emphasis added] and dramatically altered the balance of power between humans and nature. The public endowed chemists, at work in their starched white coats in remote laboratories, with almost divine wisdom. The results of their labors were gilded with the presumption of beneficence. In postwar America, *science was god, and god was male*[16] [emphasis added] (Lear, 2002, p. x).

At this point, it is worth bringing a retrospective from environmental sociology that will help us understand Carson's context. Until the end of the 1950s, the environmental issue (represented by the"nature terminology", once terms such as *sustainability* and even *environmental issue*were not much present as part of the vocabulary) was not central in the social theory, because the sociologists were focused on other issues related to progress and development, besides the organization of a new social system. It was also with the manifestation of environmental disasters like that ofLove Canal[17], Castle Bravo[18], the Great Smog of 1952[19], the Minamata disease[20] and the Palomares incident[21]that the intellectuals of the time awoke to the environmental matters, together with the very Malthusian concern of population boom and shortage of resources (in the course of time, they realized that the distress was much more that of resource distribution than that of their absolute quantities).

[16] Aware of this gender issue, in her first articles for the *Sun* Carson signed as R. L. Carson hoping that the audience would take her seriously by assuming the initial *R.* would stand for a male name and therefore a male scientist (Lear, 2002, p xiii).

[17] 21,000 tons of toxic industrial waste containing dioxin was buried in the 1940s by Hooker Chemical (now Occidental Petroleum Corporation) near Love Canal, in the Northeastern area of New York State. The case became a national symbol of lack of concern with future generations and gained worldwide attention with the miscarriages, cancers and birth defects that resulted from it.

[18] The first test conducted by the United States of a dry fuel thermonuclear hydrogen bomb detonated in the Bikini Atoll in 1954, it lead to a tremendous radiological contamination.

[19] A smog blanked covered London for 5 days in 1952, due to a cold weather and windless condition that collected airborne pollutants from the use of coal.

[20] In 1956 industrial water containing methylmercury coming from Chisso Corporation was released into Minamata Bay and the Shiranui Sea, in Japan, leaving over 2,000 fatalities.

[21] In 1966 the crash of the B-52G bomber of the USAF Strategic Air Command led to the plutonium contamination of Palomares, in Spain.

Especially in the 1960s, a decade contemporary to Carson's studies about DDT and other pesticides, social movements arose with an environmental appeal linked to pacifist and anti-nuclear activities – which were a huge concern at the time, when the campaign against the Vietnam War represented the core of anti-war engagements. In France, it was after May of 1968 that other banners were introduced.To summarize, there is a "culture broth" that is stimulating a different lifestyle that goes beyond the production and consumption system, which are unrestrained, irregular and aiming at profit above everything else.

Even though she was part of this context and shared many of these concerns, Rachel Carson did not have a dialogue with the intellectuals of that time, sociologists arrived somewhat late in the debate (or realization) that already existed amongst naturalists. If today the environmental and social matters are impossible to separate, this relation was still very young at Carson's time and this is proven by the general lack of interaction between the social and environmental fields. The environmental movement started in The United States from a very pragmatic matter - Carson's complaint of DDT and other pesticides – and then arose the theory that would give support to the events that had happened. It is important to have in the back of the mind the thought of this abyss that existed between sociologists and environmentalists when we think about Carson's impact and the significance of her image to the society of the time, as much as the repercussion of the biologist as a symbol and as the personification of a historic milestone.

Carson innovated in various aspects. In addition to the career choice, not at all a conventional one for a woman in the 1950s, she did not write for a restricted group of intellectual scientists, but for the lay public. This proved to be an advantage when the *Silent Spring* was published, because she could not be fired for she was not part of any institution, and her credibility was maintained because she was not part of the system she was reproaching.

I will go back to a specific time in Carson's life that is usually ignored but that was nonetheless fundamental to allowing her to dedicate completely to

writing and latter to publishing the *Silent Spring:* her years working for the American Government.

In the 2013 meeting of the American Association for the Advancement of Science (AAAS) in Boston, MA, the 50-year anniversary of the *Silent Spring* publishing was celebrated. There was a discussion session dedicated to Rachel Carson's legacy and her contribution to science, under various perspectives that included the inclusion of women in science and the social role of the scientist. The three following paragraphs come from personal communication with Professor Gregg Pascal Zachary, from Arizona University

Before becoming a literary celebrity, Carson worked for 16 years for the American government as a scientist, writer, and director for conservation programs. These years are well documented especially thanks to the efforts of Linda Lear (2002, 2009) and William Souder (2012), to the Fish and Wildlife Service for preserving Carson's writings, to Mark Lytle (2007) and Cynthia Britt (2010). Zachary emphasized that the years Carson worked for the Government as a biologist (between 1935 and 1951), instead of being seen as a detour and a delay in her literary career, should be understood as foundational.

During these years Carson practiced her writing, published stories and started to win over the public, in addition to having an income that allowed her to sustain herself and help her mother, something she would have had difficulty achieving with her writing career alone. She was in charge of writing scripts for 7-minute radio programs produced by the agency she worked for, and the research she made to write them were the basis for a series of articles she wrote for the *Baltimore Sun,* one of the most influential newspapers at the time. Even Carson identifies this period as a turning point in her career.

The 16 years during which she worked for the American Government contributed greatly to her achieving maturity as an extremely well informed intellectual, creative and attentive to the global challenges and technical-scientific problems, leaving the North American scope and reaching a worldly awareness. She built a very fruitful network of contacts and sources that would help her in her

books published later on, and also acquired status, credibility and most importantly, the *trust* of an ever-growing public. It was also during these years of service that she met Elmer Higgins, who became an ambitious mentor and supported her literary projects with enthusiasm.

Through the radio programs and the articles published in the *Baltimore Sun* and other newspapers, she started to gain a loyal audience. The biologist was already well known much before the publication of the *Silent Spring* in 1962 because she had already published ecological novels, books where she wrote about the environment in a poetic way, very different from the traditional manner employed by biologists and other scientists who cherished objectivity instead of cultivating contemplation.

In her first book, *Under the Sea-Wind* (1941), she followed the journey of a marine bird from Patagonia to the Arctic Circle. The book did not take off and it sold fewer than 2,000 copies, with a profit lower than $700 in 5 years (while at her government job she earned $3,800 per year). It was with *The Sea Around Us,* published as a series by *The New Yorker* in 1951 that Carson established herself as a writer amongst the lay public. The book was a success and figured in the best-seller list of *The New York Times* for 86 weeks (Miller, 2004), was translated in 31 languages according to Zachary – 28 according to Lear (2002) – and received the National Book Award (Souder, 2012). The success turned Carson into a writer acknowledged by her unique style, transitioning between ecology and lyricism, making her the main science writer in the United States (Lear, 2002, p. 14)

To my understanding, Carson's success was due to a three important elements that I would like to elucidate.

Firstly, she responded positively to a task that still today challenges scientists and journalists - that of approximating science from the lay public. She claimed that the complexities of science should be presented in a literary language that brings the public closer to the topics, and insisted that the popularization of scientific understanding was something possible, desirable and

was a professional obligation. The biographer Linda Lear tells that in a gathering at the Drexel Institute of Technology for the Geographical Society award dinner, Rachel Carson said in her speech that:

> Scientists are often accused of writing only for other scientists. They are even charged with opposing any attempt to interpret their findings in language the layman can understand. Literature is merely the expression of truth. And scientific truth has power to improve our world only if it is expressed (Lear, 2009, p. 224).

It is clear that Carson defended the proximitybetween the public and science, and the author put this in practice in her literary novels by using a captivating language that was inspiring and full of complexity and nuance. When dealing with science as a trivial theme and addressing the audience without the superiority oftentimes credited to scientists, treating the reader like a close friend, she received positive feedback and a group of loyal readers.When she was awarded the National Book Award for nonfiction in 1952, she emphasized in her acceptance speech that

> This notion that "science" is something that belongs in a separate compartment of its own, apart from everyday life, is one that I should like to challenge. Science is part of the reality of living; it is the what, the how, and the why of everything in our experience (American Chemical Society National Historic Chemical Landmarks, 2012).

Secondly, besides the proximity to the public, Carson had the public's*trust*and this point is crucial in helping us understand what the *Silent Spring* really meant. Because she did not work for the government any longer, nor was she affiliated with any institution, Carson was seen as an independent person who did not defend any particular interests besides the duty of truth. As Linda Lear affirms, Rachel Carson "was a trusted voice in a world riddled by uncertainty" (2002, p. xiv). Not only was it a trustworthy voice, it was also an *optimistic* one.Carson believed in a society free of pesticides and poisons that would coexist harmoniously with the environment, and her books transmitted the

idea that this was an achievable goal.

Third, in the *Silent Spring,* she challenged the character of absolute truth of modern science, and maybe because she exposed the flawed side of the scientific entity her *Silent Spring* was so noisy as put by *The New York Times*. She gave voice to a generation announcing many of the central points of environmentalism, many of which still exist, like the social and environmental accountability of the chemical industry and the ethical role of the scientist. In 1945, when she tried to share her concerns about DDT in the *Reader's Digest,* she tried to spread her fear and suspicion that the technological advancements were surpassing the rhythm of the sense of moral responsibility of human beings.

If on the one hand the moment was not propitious, because part of the North American society was still delighted with the benefits brought by the chemical industry and the market associated with this activity was in full speed[22], on the other hand she found fertile ground in a time of nuclear tension and fear of the imminence of war against the USSR, with a population hungry for change. The portraying of DDT as a benefit arising out of progress can be seen in the following advertisement published in 1947 by *Killing Salt Chemicals.*I find this image to be very exquisite, because it carries a rich symbolism and it is able to convey the representation that was associated with DDT:

[22] Some of these companies still carry on with their activities, like *Monsanto*, that produced DDT and today accumulates controversies regarding ethics and the social and environmental responsibility of its agricultural products and transgenics.

Figure 10: *Killing Salt Chemicals* advertising, 1947: presenting the amazing insecticide benefactor of all humanity ("DDT is good", 1947)

The great expectations held for DDT have been realized. During 1946, exhaustive scientific tests have shown that, when properly used, DDT kills a host of destructive insect pests, and is a benefactor of all humanity.

Pennsalt produces DDT and its products in all standard forms and is now one of the country's largest producers of this amazing insecticide. Today, everyone can enjoy added comfort, health and safety through the insect-killing powers of Pennsalt DDT products . . . and DDT is only one of Pennsalt's many chemical products which benefit industry, farm and home.

GOOD FOR FRUITS—Bigger apples, juicier fruits that are free from unsightly worms . . . all benefits resulting from DDT dusts and sprays.

GOOD FOR STEERS—Beef grows meatier nowadays . . . for it's a scientific fact that—compared to untreated cattle—beef-steers gain up to 50 pounds extra when protected from horn flies and many other pests with DDT insecticides.

Knox Out FOR THE HOME—helps to make healthier, more comfortable homes . . . protects your family from dangerous insect pests. Use Knox-Out DDT Powders and Sprays as directed . . . then watch the bugs "bite the dust"!

Knox Out FOR DAIRIES—Up to 20% more milk . . . more butter . . . more cheese . . . tests prove greater milk production when dairy cows are protected from the annoyance of many insects with DDT insecticides like Knox-Out Stock and Barn Spray.

KILLING SALT CHEMICALS

97 Years' Service to Industry • Farm • Home

GOOD FOR ROW CROPS—*25 more barrels of potatoes per acre* . . . actual DDT tests have shown crop increases like this! DDT dusts and sprays help truck farmers pass these gains along to you.

Knox Out FOR INDUSTRY—Food processing plants, laundries, dry cleaning plants, hotels . . . dozens of industries gain effective bug control, more pleasant work conditions with Pennsalt DDT products.

What could they do with a monstrous amount of war-product after the

war was over? They could turn it into a miracle, a domestic use product, and sell it to civilians. Vandana Shiva claims that

> it is only when the industry that should have wrapped up after the war, decided oh, let's just make nice ads: "DDT is good for me". If you look at the ads of the period when the war was ending, they show how an industry that had gotten used to war profits, was now transforming itself into an agro-chemical industry.(2014, para. 2)

This advertising brings a well-considered constructionof the narrative that all life forms appreciate DDT, through a combination of key words and icons: from the clichéd housewife in her neat apron to the pets, fruits and vegetables. *Killing Salt Chemicals* proudly claims to be the world's largest producer of the pesticide, whose great expectations became reality and which was submitted to "exhaustive scientific tests" – in other words, it is "safe"-and it is a "benefactor of all humanity". The image fails to show the real backstage of DDT production, as Carson did. To the industries and other advocators of the pesticide culture, she was not going against DDT; she was going against progress, human health and comfort, against a product that was "good for fruits", "good for steers", "good for the crops", "for the home", "for dairies", "for industry". This is just one sample of what the pesticide represented, and I will discuss more examples throughout this thesis.

According to Carson (1962/2002), during the first decades of spreadingDDT use the population itself started to identify changes in the environment, changes that were associated with the use of DDT and similar products. There are several reports in her book of domestic animals, wild birds, and small animals found dead with signs of poisoning, and farmers whose health became impaired after the application of DDT in their crops (Carson, 1962/2002; D'Amato, Torres, and Malm, 2002). The population started to question the so far unquestioned scientific knowledge, and biologists and ecologists began conductingstudies analyzing the effects of DDT on human health and the consequences it brought to the environment. As put by Linda Lear in the Preface

of a 2002 edition of the*Silent Spring*, “the public endowed chemists, at work in their starched white coats in remote laboratories, with almost divine wisdom” (Lear, 2002, p. xi).

Carson's thesis that we were slowly poisoning the environment and the beings contained therein – humans certainly included - put into debate the knowledge and power held by science in a time when such issues were just beginning to be raised by jeopardizing a discourse that circulated without major confrontation. As Carvalho and Funari (2010) assert when they talk about the power of discourse, "because they are perceived, in cultural terms, as translators of the truths of the world, these discourses become unquestionable and therefore powerful" (p. 8).

Carson was using an ecological perspective that was just starting to be presented and it was still mocked and rejected by the scientific community and the general public even though it had been formally introduced decades ago. In this topic, it is worth noting that the 1930s represented an important moment for ecology:the use of the term*ecosystem*(Bonfiglioli, 2005). Since then, the study of ecology (term coined in 1866 by Ernest Haeckel, biologist, philosopher and naturalist,) became more tightlyassociated with the idea that man pollutes and destroys an environment that is formed by a complex network of interactions between living organisms and the physical environment.

This approach of integrated ecological thinking was accompanied by the realization that science was in fact quite ignorant in the face of such complexity and by interfering with nature, humans could trigger serious problems and initially unimagined imbalances, which could escape from their control. DDT and other products similar to it -DDD, dieldrin, parathion and malathion - continued to be applied in the following decades in the United States and elsewhere in the world, changing landscapes and changing the ecological balance in a continuous war against pests and insects[23] (Carson, 1962/2002). In

[23] The study of culture and its relationship with insects appear in studies of cultural entomology, which are very interesting to better understand this continual war Carson referred to. For an

the context of the aforementioned integrated ecological thinking (which brings into focus the complexity of ecosystem functioning, or the "ecological web of life" as posed by Carson), the *Silent Spring* was a milestone in the history of the environmental movement and arguably in DDT's. Frank B. Golley considers that

> Rachel Carson ignited the environmental movement through her book on the effects of pesticides. Ecologists were asked to testify on both sides of the debates that followed. . . . The use of pesticides by humans disturbed in a fundamental way the natural order of the world. *The issue was a moral one* [emphasis added]. The ecosystem, and sometimes "the ecology", was being disturbed, and humans were in danger of destroying the system upon which they lived.(1993, p. 3)[24]

In Carson's work, originally published in editions of *The New Yorker* on 16, 23 and 30 of June 1962 at a price of 25 cents of dollar per copy, Carson exposes the environmental damage caused by this and other pesticides and the risks they pose to human health, an ecological approach that emphasizes the complexity of biotic relationships between animals, plants, humans and the physical environment, as well as emphasizing the ignorance of science about the possible consequences that human interference in this intricate web can bring (Carson, 1962/2002). Carson combines scientific studies, reports from farmers, scientists and citizens and statistical data on DDT and other pesticides, building a history of the usage and the problems caused by DDT in the North American territory.

As asserted by Hecht (2011), due to Carson's existing fame as the author of naturalistic books and also thanks to the politically sensitive nature of their work, the *Silent Spring* material drew widespread public attention just after it was published in The New Yorker. When the book itself was released in

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interesting introduction on the topic, I recommend the work of Tsutsui (2007) about the movies of the 1950s portraying giant insects.

[24] Other authors share the determination of the *Silent Spring* as the landmark for the beginning of the environmental movement, such as Souder (2012). Defining a starting point can be complicated and quite controversial, but what can be grasped here is, more than the establishment of a date or event, the importance of the book when externalizing concerns that were shared by a wider group of people.

September of the same year with the fixed price of $5.0 Carson and her theory had already raised a major political and environmental debate; at the end of that year, the magazine would include the *Silent Spring* in its Book of the Month initiative in October, through which it distributed a book chosen by the editors. This initiative shows the extent to which the *Silent Spring* was inserted into the editorial market that season.

The movement against*Silent Spring* and its author were huge, and the book was not well received by all. The manufacturing industry of DDT and other pesticides organized collectively a robust lobby that aimed to discredit the argument Carsonmade, to the point of saying that she was influenced by the Soviet Union and Eastern Europe in a project to undermine the American State (Souder, 2012). This accusation came, I repeat, in a setting of nuclear tension, anxiety and generalized fear, and was accompanied by criticisms that called Carson subversive, a pacifist - an affiliation with pejorative connotation associated to the left - and even “spinster”. To Souder,

> [the military-industrial complex] fierce opposition to *Silent Spring* put Rachel Carson and everything she believed about the environment firmly on the left end of the political spectrum. And so two things — environmentalism and its adherents — were defined once and forever (2012, n.p.).

As I have stated earlier, it was a moment in the relationship between science and society in which the public began to question scientists as to their social responsibility, largely due to the reality of the atomic age and the risks associated with this kind of energy (Hecht, 2011). People realized that scientists could not - should not - be separated from the social and political ramifications of technological innovation, challenging the monocultural epistemology[25] (a term coined by John Rogers Searle in 1995). In this context, Carson and her figure as someone whom people trusted, and her ideas, values and ideals were welcomed

[25]Carvalho and Funari (2010, p.8) explain the term as "an unshakable belief in scientific objectivity and in the possibility of reaching a supposed concrete reality that would surround us."

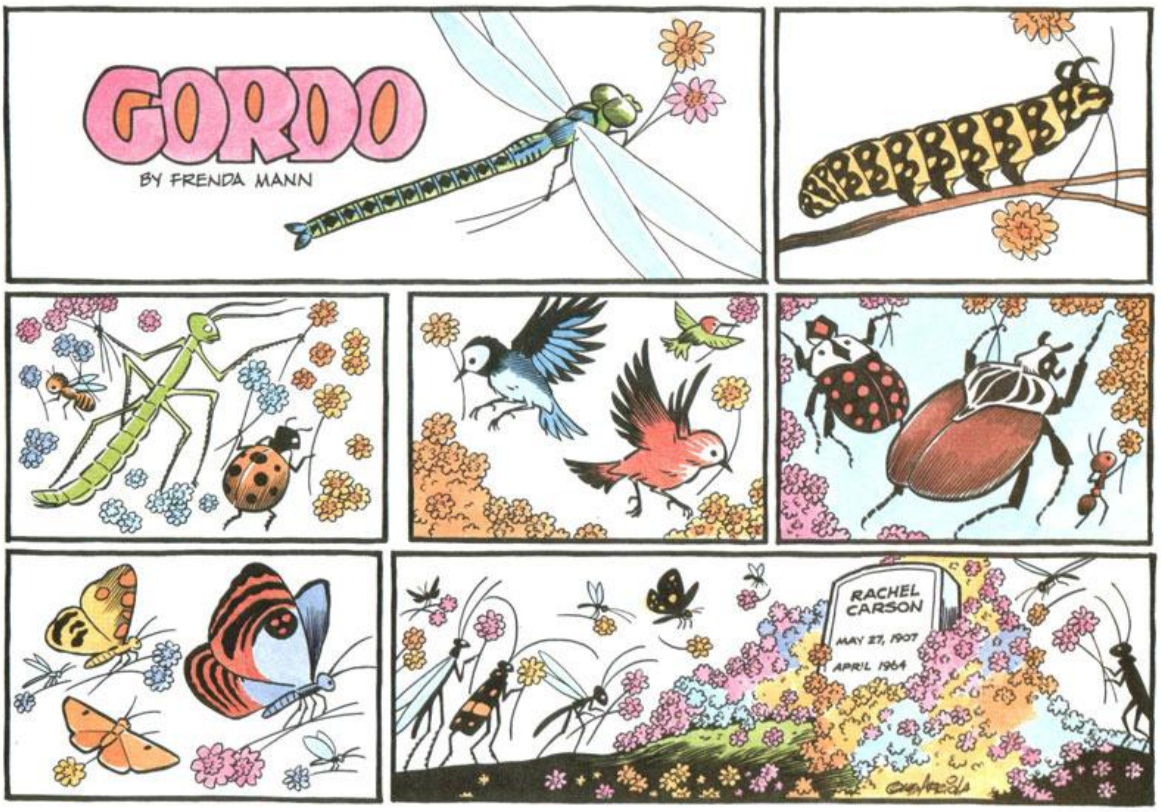
when considering the science she performed (Hecht, 2011), and her persona already existent in the imagination of the public helped to amplify the impact of her book[26].

Thus, largely thanks to Carson, in the 1960s DDT (a compound previously considered extremely beneficial to society at large) acquired a new interpretative possibility where it embodied a major environmental villain that accumulated in the food chain, contaminated the environment and the beings inserted therein, and persisted in the field for many years even after ceasing its use. DDT then went on to be the symbol of an environmental crisis and a debate that was far beyond DDT and other pesticides, but which questioned the role of science and scientists (Foote, 2007).

I emphasize that the stories that surround DDT are by no means simplistic, on the contrary: it is surrounded by controversies, contradictions, interest groups and issues of cultural, economic and political order which make its study both fascinating and of great importance for academic advancement in understanding the details of the media approach to environmental issues. It is worth noting that although the history of DDT is inseparable from Rachel Carson and her *Silent Spring* (as seen in the image below, where animals pay homage to her by placing flowers in her grave), it is not only this instance that DDT appears; Carson began with her publication a movement for environmental protection that, very slowly, reverberated through the media, where it started being increasingly discussed precisely thanks to her initial impact.

[26] José Augusto Drummond (2006) makes an interesting observation about the impact of Carson's book. He sais there are references to an episode he could not confirm that indicate how dangerous the *Silent Spring* was considered to be, because her heirs would have supposedly sold the copyright of the book to a pesticide industry that would then stop new editions of the book from being republished. Drummond could not confirm this episode, and in my research I have not seen any reference to this.

Figure 11: Cartoon from *Gordo* comic strip, 1970: birds and insects overflow Rachel Carson's grave with flowers (Arriola, 1970)



On August 29th of 1962, the former U.S. President John F. Kennedy attended a press conference in Washington, which lasted about 28 minutes. Near the end, in the minute 26:48 and after a series of questions that revolve around the nuclear issue, a reporter raises a question about DDT:

> Mr. President, there appears to be growing concern among scientists as to the possibility of dangerous long-range side effects from the widespread use of DDT and other pesticides. Have you considered asking the Department of Agriculture or the Public Health Service to take a closer look at this? (White House Audio Recordings, 1962, 26:47)

Kennedy replies that "yes, and I know that they already are. I think particularly, of course, since Miss Carson's book, but they are examining the matter" (White House Audio Recordings, 1962, 27:02).

In this example itis not just the content of the question or the answer by themselves that matter, but the fact that the issue was raised at a press conference that was almost completely about the nuclear tests and Cuba, which were the major concerns of the moment. This shows that even before *Silent Spring* was released as a book (which only happened a month after the conference), it already had a considerable impact and reached the highest political levels. That same day, Kennedy had his science advisor, Jerome Wiesner, lead a commission whose purpose was to investigate allegations made by Carson (Souder, 2012). The promise to investigate the environmental contamination of a highly lucrative compound was new and unprecedented, and in the view of Souder at that time,the "gentle, optimistic proposition called 'conservation' began its transformation into the bitterly divisive idea that would come to be known as 'environmentalism'"(Souder, 2012, p. 4).

The dissemination of news related to DDT is not restricted to the years following the publication of Carson but extends from previous years, in the late 1930s, reaching the present where although mostly forbidden there remains a debate about the use of DDT and other chemicals of similar effect on behalf of the end of malaria in African countries, for example. The phenomenon of "mediatization" that has accelerated in recent decades, of which Carson was part of, allowed the media to acquire a new status where it has deepened as reference for values, behaviors and habits to society (Gaissler et al., in press).

In Brazil*Melhoramentos Editora* published the first translated version in 1964, but the book was already on the news in 1962, when it was published. This is the excerpt from the newspaper *Folha de São Paulo*that brings the gist of the book:

> The North American biologist Rachel Carson, author of the famous "The sea around us", was playing a violent indictment against insecticides. . . . Miss Carson judges that the massive use of insecticides, mortal poisons to the insects, also affects men, who are not immunized against the effect of toxic substances. The danger seems so important that the North American biologist does not hesitate in comparing its consequences to those of a nuclear war. (Barnier, 1962)

Contrary to the serious, trusting tone by which Carson is described in this previous piece, the newspaper *O Estado de São Paulo*was much more eager to portray Carson as an alarmist:

> This is the prediction of the future, lugubriously drawn by the writer and marine biologist Rachel Carson, in her last book "Silent Spring", commented in the "Science" section of "Time", from New York, of 28-9-62. That white dust she sees falling from the sky is not radioactive, as one would assume at first: it is chemical products, it is pesticides used in agriculture, that inspire so much fear to the nature-lover, who imagines the existence of DDT in the limit that a child is breastfed in the maternal breast, in the potato that it eats, in the water it drinks or where it baths, in the clothes it dresses, in the objects it touches . . . in everything Rachel Carson smells DDT.("Valor do praguicida", 1962)

Clearly the two outlets have an opposite positioning when it comes to the topic. The *O Estado de São Paulo* support of pesticide use becomes transparent two paragraphs later:

> Differently, however, think other scientists that for many years have been integrated in the researches around the dangerousness of the modern pesticides, *these wonderful products*[emphasis added] that are used in public health, save millions of lives; applied in agriculture, have been raising the harvests in 20% or more; used in livestock, has getting the cattle rid of parasites, making them produce more meat, more leather, more milk; and used in agglomerated centers and households, has got society rid of fleas, bedbugs, cockroaches and moths of flies and mosquitoes.("Valor do praguicida", 1962)

In general, the topic was not much discussed even when the *Silent Spring* Portuguese translation came out. *O Estado de São Paulo* briefly mentioned the release, this time with a much more moderate tone:

> From Rachel Carson, it was also published by Melhoramentos the book "Silent Spring", that integrated the series Today and Tomorrow and where it tells the story of the death of numerous birds in a North American city, "victims that they have been of our mad control attempt of our environment, through chemical substances" that poison birds, insects, fishes and even the earth ("Ensaio sobre", 1964)

The media coverage on Rachel Carson will be further explored in section 3.3, which covers the years between 1960 and 1979, and the following sections.

PART III – Looking into the media

When I designed the structure for this thesis, I wanted to offer to the reader the tools I judged necessary for understanding the DDT/pesticide scenario before jumping to the rough analysis and respective conclusions. Clearly, my choices of what is important enough to be included here and what should be left behind are my own and there is no escape from partiality for every word is carried with intention; with that in mind, I frequently offer the original sources and the multiple sides of the argument, without leaving my own inferences behind, to enable the readers to do their own research if they want to do so – something I highly encourage. In the annex of this thesis there is a series of tables with the raw data of the entries for further analysis by the readers, if wished.

Because I believe this thesis serves not only an academic purpose but also a civic one, and because I truly think that one of academia's most important purposes is to empower society, I started with a historical background followed by a subjective section about how to read a text and the nuances of interpretation.

Now that the "ground rules" and basic information are set, I will finally bring forward the material I have chosen to analyze. I have split the data into groups of two decades because I judge it to be enough time for considerable changes in cultural context and in history to happen and therefore to be studied, but not too long to turn the reading into an excessively difficult task. Time is certainly a fluid and relative account but I hope this will make as much sense to the reader as it does to me. I will start each subchapter with a context, and embroider the studied material with elements that will add meaning to the story as I analyze the DDT coverage.

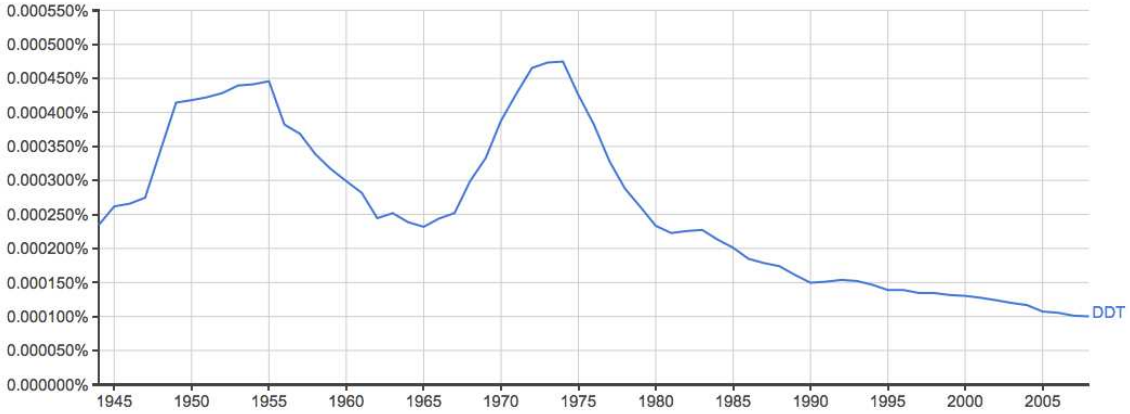
I did not know what I would come across when I started this research, and was very surprised by the many things I have read; again, in the name of a more impartial study, I will quote verbatim several paragraphs and pieces I extracted from the over 3000 pages I have read. I tried to arrange them in a way that would not be too tiresome, but sometimes there will be a long sequence of

quotes. I ask the reader for patience and hope that you will bear with me throughout this section, which I trust to be the most interesting part of this thesis.

3.1. A 70-year overview

During the 70 years analyzed by this thesis, the media coverage varied greatly in content and intensity. DDT was very present in the selected magazines during the first decade after its presentation to the market, with a tone that highlighted scientific marvel and a world of possibilities. When its novelty aspect passed, around 1952, the media lost interest on it – something that changed greatly between 1969 and 1971, during an "environmental momentum" created by Earth Day and the Stockholm Convention, as I will explain in more detail further. This variation in intensity can be followed in Figure 13 and in Figure 12, that brings the frequency the term *DDT* was mentioned in books that are part of the Google Books collection[27]. Though it constitutes of a relative frequency, it also indicates two peaks: from 1950 to 1955 and between 1970 and 1975.

Figure 12: Popularity of the term *DDT* since 1944



(Source: Google Books NGram Viewer)

[27]Google Books NGram Viewer is an online tool launched in 2010 that charts the relative frequency of any word or expression, from 1800 to the present, in books that are part of the Google Books collection. It uses n-gram statistics and is available for free at https://books.google.com/ngrams

In the beginning, the coverage was mainly positive, something that changed a few years after the publication of the *Silent Spring* by Rachel Carson. I identify the year when the discourse turned from a mainly positive to a mainly negative one as 1967. This can be verified in Figure 14.

Figure 13: Media coverage from 1944 to 2014 by number of entries

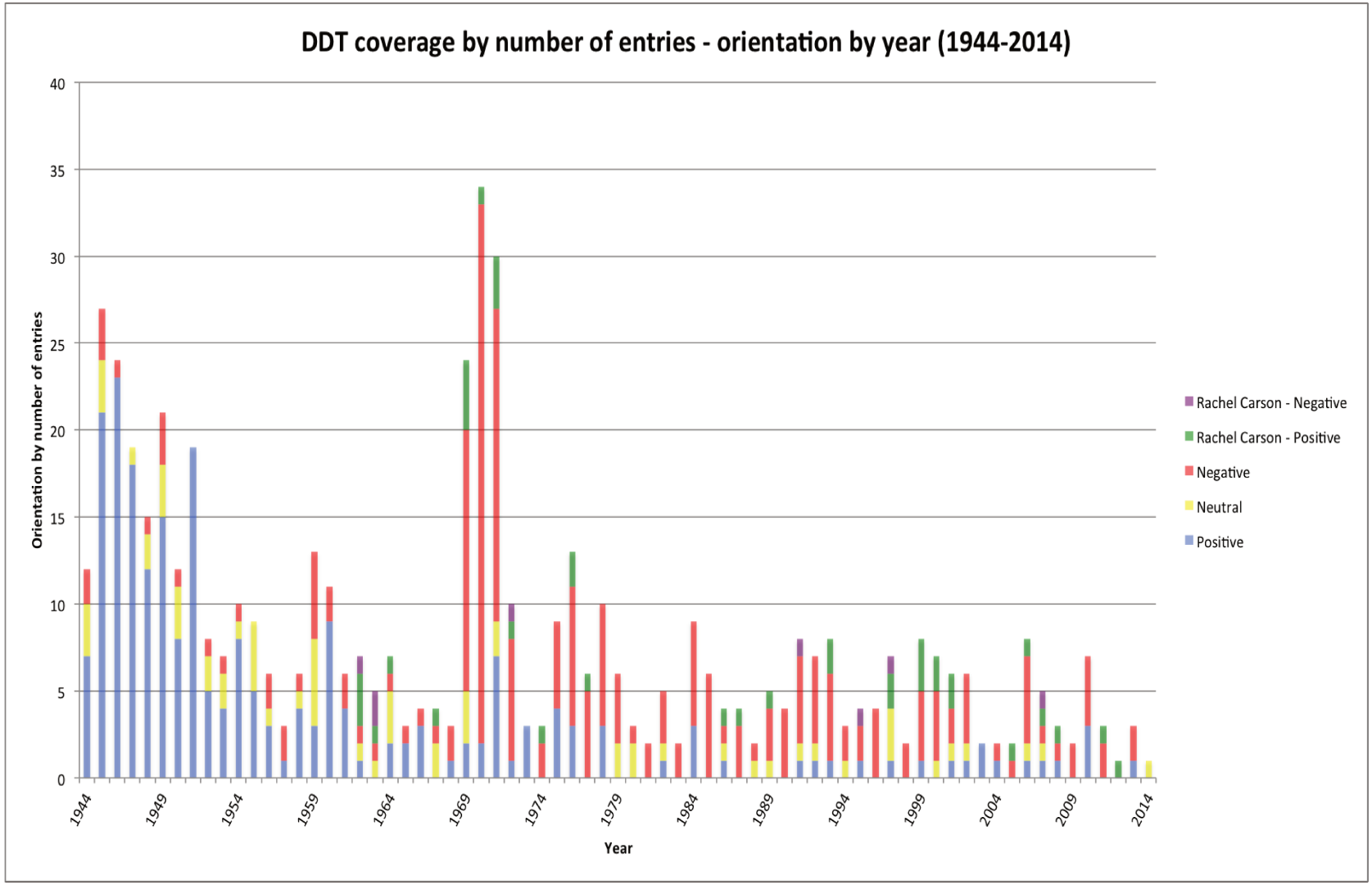
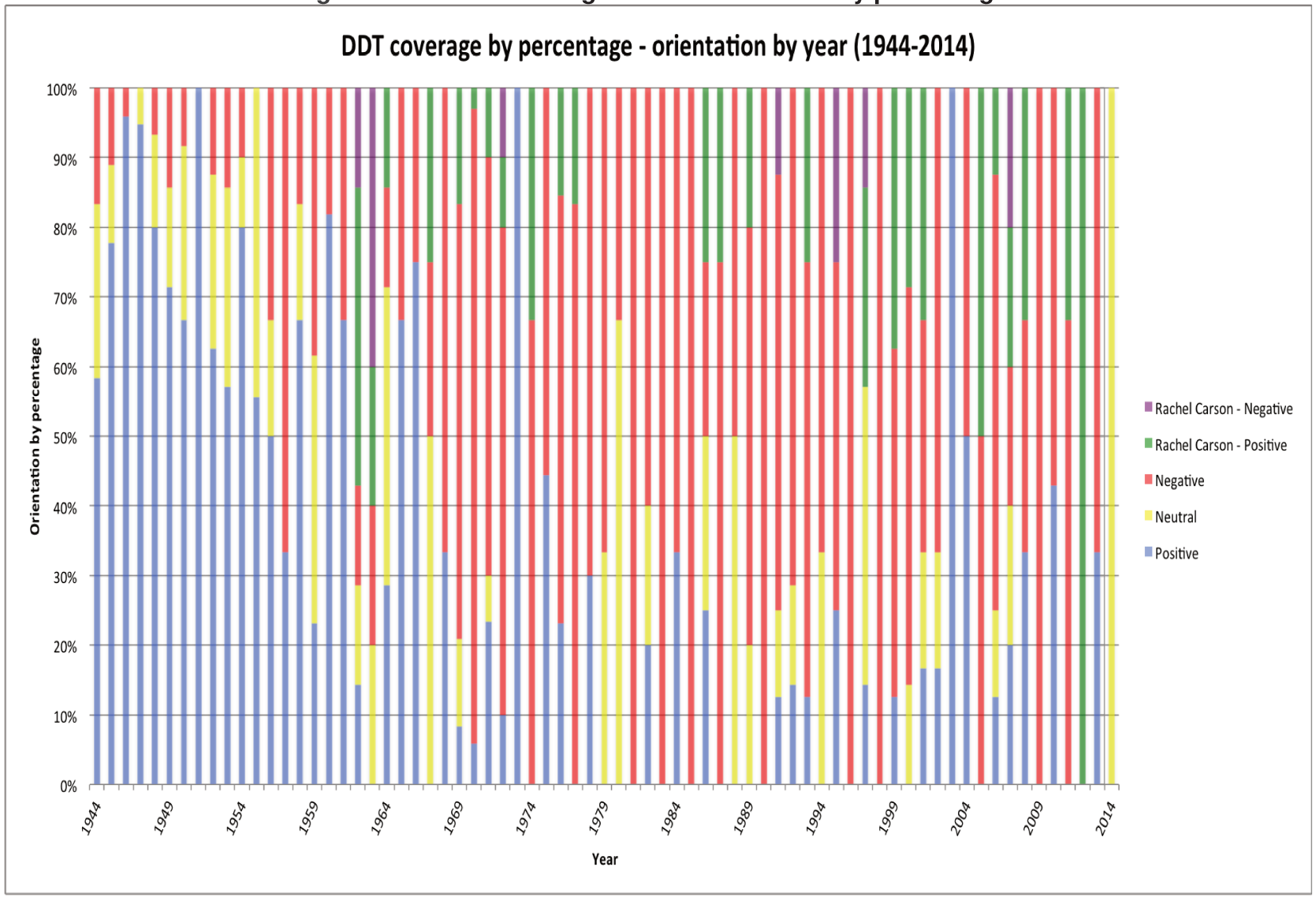


Figure 14: **Media coverage from 1944 to 2014 by percentage**



Not only the absolute number of reports dropped over time, but the frequency they mentioned DDT also did. This means that in the beginning, DDT appeared more often in the news and it was mentioned more in the same piece, as the protagonist. As the decades passed, DDT was mentioned fewer times mainly because the reports were not about it anymore, but rather mentioned it to serve as a hook for a broader issue (for example, as an example of a chemical that was used in the past and is now seen as a persistent pollutant). This changes can be seen in Figure 15:

Figure 15: Number of reports and DDT mentions by period

PERIOD[28]	NUMBER OF REPORTS	NUMBER OF TIMES DDT WAS MENTIONED
1944-1959	211	801
1960-1979	198	639
1980-1999	97	187
2000-2014	58	176[29]

After this introductory overview, I will now address each period in more depth.

3.2. The 40s and 50s: War and progress

To understand the DDT case, one must understand that the story of pesticides does not start in agriculture, but in war. The largest chemical companies at the time – namely *Bayer*, *Basf* and *Hoechst*–developed a series of war chemicals that had devastating consequences for humanity, with Agent Orange being one of the most famous cases of destruction by a chemical weapon. DDT is just one example of a chemical extensively used during this

[28]The periodization chosen for this study was a temporal one, that divided the 70-year period into decades to facilitate the analysis. Other option could have been chosen, for example taking into consideration the intensity of the coverage provided by the NGram Viewer (Figure 12).

[29] This period appears with a higher number than expected due to one entry from *The New Yorker* that, alone, mentioned DDT 77 times. If we discard this entry, the number of DDT mentions between 2000 and 2014 goes to 99, a consistent result if we consider the coverage drop.

period; it was a product that generated a very profitable business that the industriesnaturally did not want to let go with the end of the War. When World War I and World War IIwere over, thesechemical companies crafted a new market that would absorb the massive quantity of chemicals that were now obsolete bymaking them available to civil society for domestic use and motivate its use in agriculture due to its pest-killing properties. David Naguib Pellow, Professor in the Ethnic Studies Department at the University of California illustrates this in his book *Resisting Global Toxics* (2007) that

> during World War I, the Bayer Corporation developed poisons, including mustard and chlorine gases, that were used in trench warfare. As part of the larger IG Farben Company, Bayer developed the insecticide Tabun in 1936 under the direction of Gerhard Schrader. Schrader also later discovered the toxic nerve agents Sarin and Soman, as well as the chemical compound E 605, the principal ingredient in the pesticide parathion. . . . Soon after World War II, Bayer and other firms released a range of organophosphorus compounds, including parathion, into the marketplace as insecticides for agricultural use. (p. 159)

The 1940s and 1950sinherited a synthetic and technologic boomin the post-war era,especially in the U.S., a boom that comprised not only of pesticides but other novelties like radio navigation, the first computer and nuclear power,additionally to the spread use of compounds in public healthsuch as penicillin and DDT.Society marveled at the potentials of DDT as LieutenantColonel A. L. Ahnfeldt told*TIME* magazine in 1944:

> DDT will be to preventive medicine what Lister's discovery of antiseptics was to surgery. . . . So great are DDT's potentialities that no fewer than seven U.S. laboratories and hundreds of biochemists are concentrated on it. Production has multiplied 350-fold in the last year; four manufacturers are now turning out about 350,000 pounds a month – all for the Army (*TIME*, 06/12/44, para. 1)

We can start looking into the coverage by seeing the overall orientation and frequency the magazines mentioned DDT:

Figure 16: Media coverage from 1944 to 1959 by number of entries

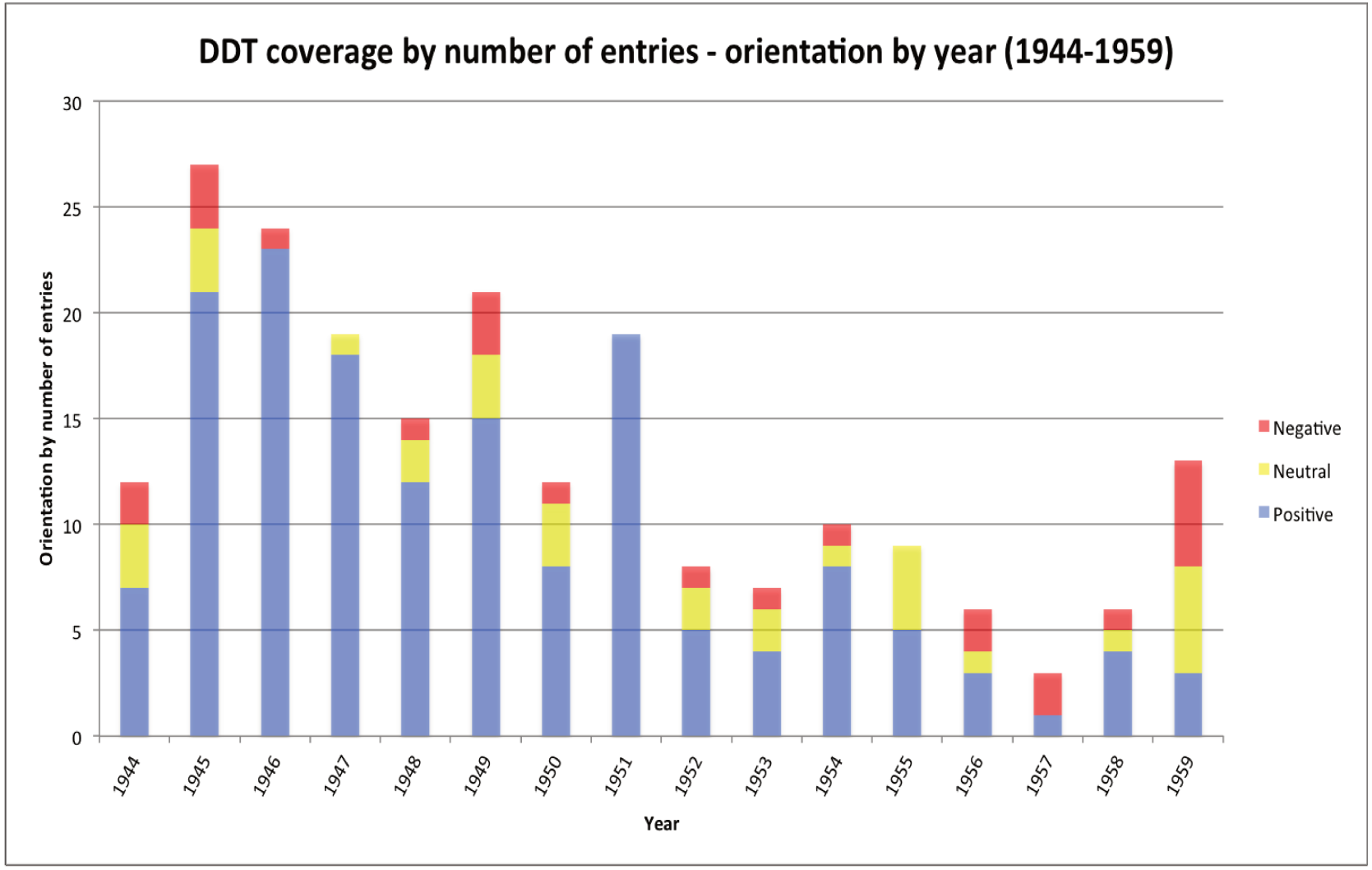
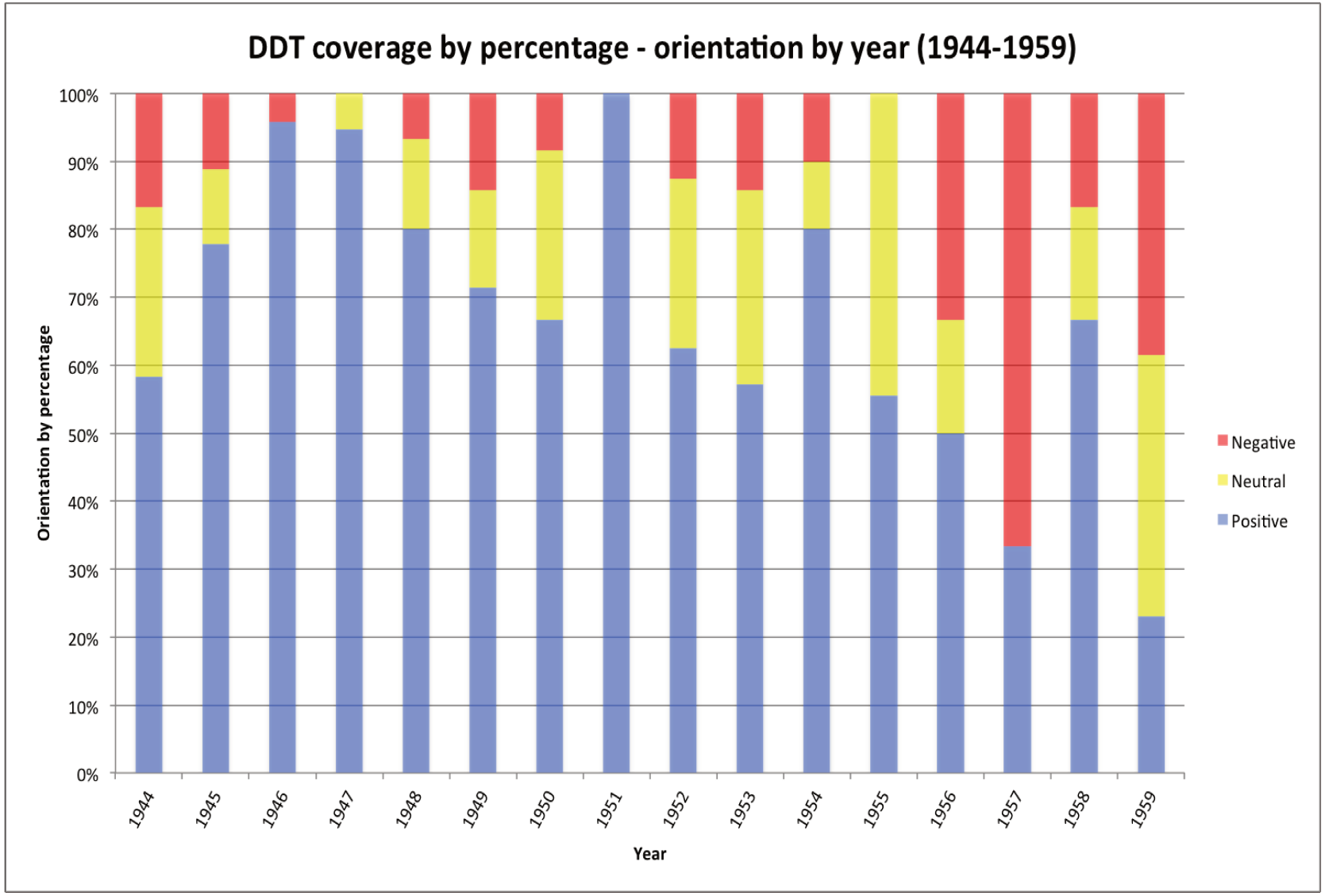


Figure 17: Media coverage from 1944 to 1959 by percentage



There is an interesting discourse evolution to be noticed here, especially looking at the second graph I present and at the tables in the annex - and my focus is on the North American case because of the abundance of sources there, in this period, in detriment of those from Brazil (where DDT arrived with such strength a bit later). The very first reactions to DDT were negative, something that can start to be explained by this excerpt from *The New Yorker*:

> Reasonable quantities of that long-heralded miracle stuff, DDT, are around now, in the form of sprays and powders which have proved themselves satisfactory in the opinion of reliable manufacturers but which are being received by the unpredictable average consumer with something less than the expected hurrah. To give the public its due, there is some reason for this perverse attitude. Too much had been claimed for DDT in advance, and *it was rushed onto the market* [emphasis added] before people had any clear idea of what it could be used for. (*The New Yorker*, 01/26/46, p. 56)

DDT was rushed onto the market; a product that came from nowhere was now flooding the shelves of pharmacies and department stores and people were skeptic. After this first impact, when people started giving DDT a try, they saw the efficiency of the product (for it does, indeed, kill bugs): they heard a neighbor testifying how good it has been for the garden:

> It is my pleasure to report, from the shady, vine-sheltered depths of a bug-free Long Island porch – unscreened, mind you – beside a garden in which never a mosquito hums and the few remaining Japanese beetles seem to be feeling poorly, that DDT is indeed miraculous stuff. (*The New Yorker,* 08/03/46, p. 56)

They saw it more often in the news and got used to its image, they heard the experience of soldiers coming back from the war. DDT had proved itself efficient and people were now much more open to accept it, and so was the media. The discourse changed from a skeptical one, to an overall embracing one (though the negative effects still had space for discussion, the coverage was mainly positive). As time passed, DDT's effects started to show up – poisoned animals, the diminishing of birds, ecological unbalance – and the coverage turned

into a cautious, and then, negative one. Following the negative mood that was starting to become powerful, Rachel Carson came in scene – even though, I reaffirm, she was not the first one to talk about DDT with more depth (nobody talked about it with as much depth as she did, though).

Going back to the beginning of the coverage, DDT first appeared in *TIME* magazine in the March 6th edition of 1944, featuring a story about 1,300,000 people dusted in Naples, Italy. DDT was such a sensation that several of the first media groupsto report itcensored its chemical name, adding to the mysterious, secrecy-filled atmosphere that would raise expectations. It was presented as magic, but a very scientific one. Even thoughthe omission happened in this referred *TIME* edition, a*Life* magazine's edition one week older[30]had the name fully published. As *Life* and *TIME* had an overlapping audience, the readers noticed the discrepancy and in the following edition of *TIME*, from March 27th 1944, there were 6 published letters from readers complaining about the censoring and asking "doesn't your Medicine editor read *Life*?", having the editors reply: "He will from now on." The censorship episode was again mentioned in the December 6th 1944 edition of *TIME*.

In the case of *The New Yorker,* the first appearance was in the August 12th edition of 1944. It featured a poemfilled with war vocabulary where DDT appears as the almighty hero of the time:

> Little insect, roach, or flea,
> Have you met with DDT?
> In the foxhole, up the line,
> DDT gets eight in nine.
> In the tank, beside the gun,
> DDT means battle won.
> Bunk and barrack, tent and cot:
> Now we know the answer, what?
> Termite, moth, lamented louse:
> DDT is on the house.
> Should you enter with the cat,
> DDT takes care of that.
> Dusting DDT about
> Cures the cat but cuts you out.

[30] *Life* edition from February 28th, 1944.

> Do you fly, or do you crawl?
> DDT will fix you all.
> Beetle, borer, bedbug-these
> Horrors worse than DDT's-
> On the leaf, in corn, in bed
> DDT has knocked 'em dead.
> This our weal and this their woe
> In the kit of G.I. Joe[31],
> East and West, a world away:
> Letters tough as O.P.A.[32] (*The New Yorker*, 08/12/44, p. 56)

The magazine *Popular Science* has a peculiar coverage, with most of the entries mentioning DDT being comprised of advertisings of some sort, from DDT-based insecticides to pharmaceutical encyclopedias, for example the ones on Figures 15 and 16. The articles are shorter than those of *TIME* magazine and especially *The New Yorker,* and rarely the DDT matter is covered with more depth.The first coverage is from the August 1944 edition and talks about the diseases carried by common housefly, completing that "when peace comes, new insecticide DDT . . . will help to decimate this dangerous pest" (*Popular Science,* August/44, p. 117).

[31] G.I. is a term used to make reference to the soldiers of the U.S. Army, and it stands for Government Issued. After WWII, it became a generic term for U.S. soldiers.
[32]Stands for Office of Price Administration.

Figure 18: Formulary advertising in *Popular Science,* May/45

Figure 19: Martindale dust mask advertising, *Popular Science,* December/45

Contrary to my expectations, that assumed nothing significantly negative or inquisitivehad been said about DDT too long before Rachel Carson's publishing of the *Silent Spring* in 1962.The issue of potential toxicity was already raised the very first times DDT appeared in the North American media – something remarkably different from the *Veja*coverage decades later, when this possibility was reported by the magazine as nonsense even in 1968. Contrarily, the risks were present to *TIME*depending on the type of contact,affirming that "concentrated DDT is toxic to men and animals when swallowed, but in the weak dilutions used for sprays and dusts, it has been found harmless to the skin" (*TIME,* 06/12/44, para. 7). Two months later the risks were brought up again in the magazine:

> The extraordinary new insecticide DDT is not without drawbacks. Last week doctors of the U.S. Public Health Service issued a warning (confirming some previous reports - TIME, June 12) that DDT may be toxic to people and animals as well as insects. . . .The doctors' conclusion: DDT is "a definite health hazard," andshould be used with care. (*TIME,* 08/07/44, para. 1)

Though *The New Yorker* was a bit delayed on this negative coverage, it was also present in this magazine in 1945:

> An amateur naturalist we know, who is currently skipper of a landing barge in the South Pacific, wrote us a letter a few weeks ago describing the effect of DDT, the deadly military insecticide sprayed from airplanes before invasions. "It kills every insect", he informed us. "The Lord knows what's going to happen if they start using it promiscuously in the States". . .However, Edwin Teale, former president of the New York Entomological Society, who has been making DDT his major work for several years, doesn't sound fine. "A spray as indiscriminate as DDT," Mr. Teale told us, "can upset the economy of nature as much as a revolution upsets social economy. Ninety per cent of all insects are good, and if they are killed, things go out of kilter right away." (*The New Yorker*, 05/26/45, p. 18)

The idea of a two-sided novelty is very frequent, for example in the piece "the more entomologists study DDT, the new wonder insecticide, the more convinced they are that it may be a two-edged sword that harms as well as helps"

(*TIME,* 04/16/45, para. 1). This idea is brought upthe first time something negative is said about DDT in *Popular Science*, in the February 1946 edition, where it is presented as a chemical that may be a blessing, but may be a curse (*Popular Science*, February/46, p. 71). Even though this shows that already in 1944(in the case of *TIME* magazine) there was a concern with the health consequences related to DDT, this did not stop or slow down the production and the pesticide use was not controlled by any regulation. The potential and confirmed risks, the advice from scientists and researchers, the concern from the population and the overall uncertainties surrounding DDT were not enough to counterbalance the power relations played by agribusiness and chemical monopolies in the U.S. and elsewhere. The risks were embraced instead of cautiously tackled and the bases of what we today understand as the *precautionary principle* were completely disregarded (even though the theoretical concept of the precautionary principle[33] would only be developed in Europe in the early 1970s, scientific responsibility and precaution should already be at place regardless of theoretical backup).

The concern with human and animal health consequences was not a feeling restricted to doctors and biologists; the lay public showed great concerntowards the new chemical, something I could notice when reading the *Letters* sections of the pieces I analyzed. Many readers revealed critical assessment of DDT and expressed concernwith the potential harms – there were even several mentions to the disappearing of birds, an image that became an anchoring symbol of Rachel Carson's *Silent Spring* publication almost 20 years later. This can be seen in the line "you have overlooked the fact that it is also deadly against the honey bee", by reader Bob Niehaus (*TIME,* 08/21/44, para. 1), and reader L. L. McArthur Jr.:

[33]A new paradigm for risk developed in the early 1970s, the precautionary principle is a decision-making framework that supports an approach to risk based on the principle of precaution. To Kriebel et al. (2001), it has four central pillars: "taking preventive action in the face of uncertainty; shifting the burden of proof to the proponents of an activity; exploring a wide range of alternatives to possibly harmful actions; and increasing public participation in decision making" (p. 871). We find more recent examples of similar behavior in various new technologies and drugs, where a good level of disregard for the precautionary principle pushes a novelty forward: fracking, tar sands[33], GMOs and nuclear power are just a few examples.

> could Entomologist C. F. Campbell inform your readers whether, after the application of DDT in 20 acres of timberland, the birds that usually appear in them have gone elsewhere? *"Wonder insecticides" probably have their consequences*[emphasis added]. (*TIME*, 08/21/44, para. 2)

This supports the idea that Miss Carson gave voice to a generation that was already concerned, being a remarkable amplifierof the news rather than the only pioneer herself –though she performedindeed a beautiful job of information networkingand prepared a rich dossier. I did not predictthat the public had this level of concern and deep reasoning from the beginning, but expected it to come at least a decade after the broad use of DDT – in the 1960s – or even a few years after the *Silent Spring* publication, in the late 1960s and early 1970s, together with the rise of other social movements for peace, feminism, gay rights and environmental causes.

This anticipation does not minimize Miss Carson's work, for she indeed appears to be the one who broadcasted the bad news worldwide as she personified the beginning of the environmental movement, a role attributed to her later on. She called the attention of policy makers – even President Kennedy's - through her book and having done so, started the commotion that led to the prohibition of DDT in the United States in 1972. However, she was not the first one to denounce DDT and observe the harmful effects in small animals and humans. People did indeed observe empirically the deaths of small animals, the disappearing of birds, the intoxication of people after DDT sprayings.

Differently from *Veja,Popular Science* and *Superinteressante*–though the coverage for *Veja*only starts in 1968 and for *Superinteressante* in 1987so a side-by-side comparison would be unfair –, there is definitely a more critical approach to DDT in *TIME*("Veteran exterminators are interested but not enthralled by the idea of such war-born insecticides as DDT (*TIME*, June 12). They are inclined to think bugs will survive DDT, too" –*TIME,* 08/28/44, para. 11) and *The New Yorker.* It feels like both magazines were not afraid of debating with their readers and*TIME* editor regularlypublished letters and responded to them– such

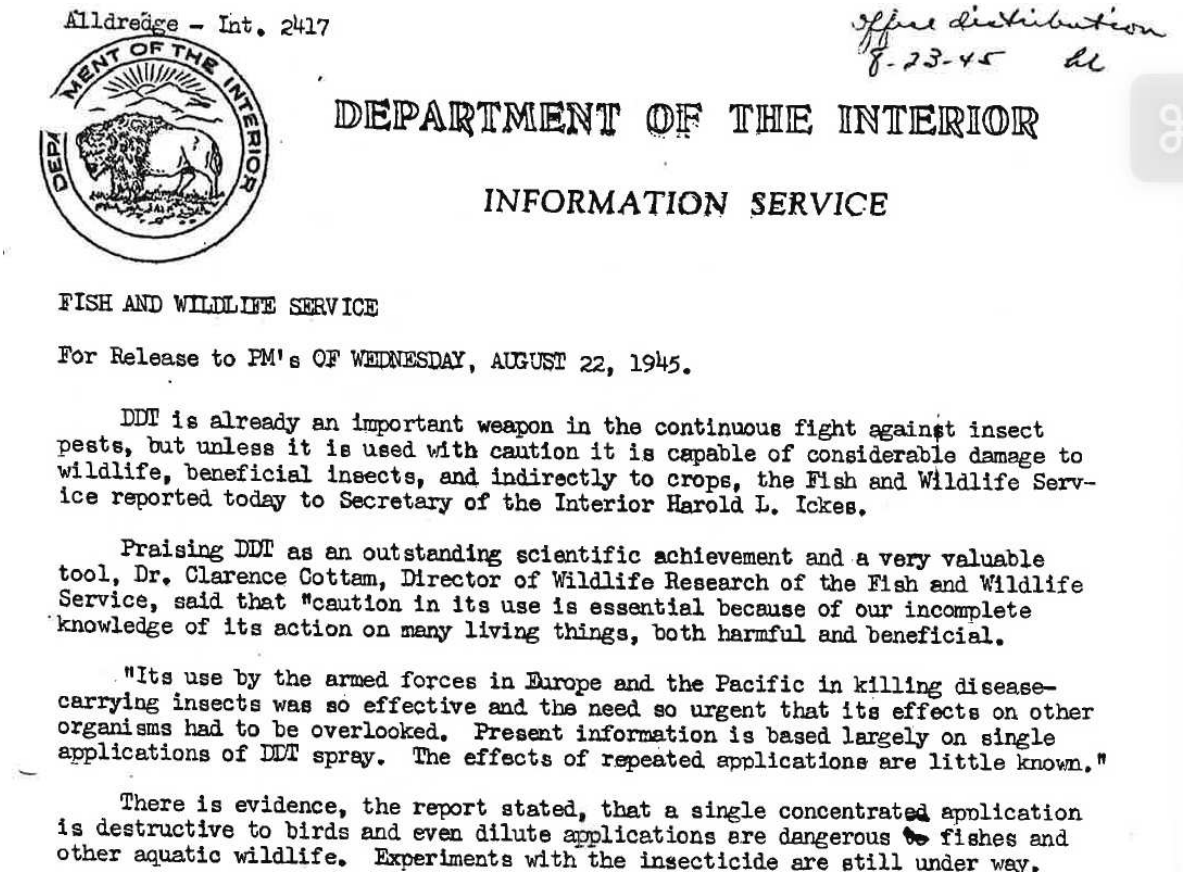
interaction is not as fluid in *The New Yorker*, but the contributors of the magazine have shown great concern towards DDT and offered a space for debate and critical thinking.In the case of *Popular Science,* the articles are more straight-forward, matter-of-fact: they bring new products that have DDT on the formula (for example new paint that is used in ships to protect against barnacles in the December 1945 edition, or a pipe device that kills insects in the edition of October, 1948), a huge amount of advertisings and instructions on how and where to use DDT in the household.

Despite the presence of concern regarding DDT, there seems to be a general idea – particularly in the official discourse of authorities, who oftentimes are quoted in the magazines - that the proper use of DDT completely nulls the negative effects, for example, spraying trees before they blossom sothe fruits would not be contaminated and remained safe for human consumption (a practice we know for a fact that does not exempt fruits from contamination). In the face of such a great discoverythere is an effort to manage the harmful side and use the marvelous properties of DDT insociety's favor; science is assumed to have all the right answers, given time for research. The governmental official discourse was not uniform, and while DDT use was encouraged there was also a competing narrative running at the time that stated that "the U.S. Department of Agriculture, summing up two years of intensive, nationwide testing, last fortnight reported: 1) DDT is unquestionably the most promising insecticide ever developed; but 2) it is not yet safe for general use." (*TIME*, 04/16/45, para. 5). Four months later, the Fish and Wildlife Service released a note (Figure 20) that carried heavy war vocabulary (*important weapon*, *continuous fight*), ecological concern and a down-to-earth, transparent approach summarized by the following excerpt:

> Its use by the armed forces in Europe and the Pacific in killing disease-carrying insects was so effective and the need so urgent that its effects on other organisms had to be overlooked. Present information is based largely on single applications of DDT spray. The effects of repeated applications are little known (Department of the Interior, 1945, para. 3).

Figure 20: Heading of Fish and Wildlife Service press release from 1945

stating that even though it is "already an important weapon . . . it is capable of considerable damage"



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DEPARTMENT OF THE INTERIOR

INFORMATION SERVICE

FISH AND WILDLIFE SERVICE

For Release to PM's OF WEDNESDAY, AUGUST 22, 1945.

DDT is already an important weapon in the continuous fight against insect pests, but unless it is used with caution it is capable of considerable damage to wildlife, beneficial insects, and indirectly to crops, the Fish and Wildlife Service reported today to Secretary of the Interior Harold L. Ickes.

Praising DDT as an outstanding scientific achievement and a very valuable tool, Dr. Clarence Cottam, Director of Wildlife Research of the Fish and Wildlife Service, said that "caution in its use is essential because of our incomplete knowledge of its action on many living things, both harmful and beneficial.

"Its use by the armed forces in Europe and the Pacific in killing disease-carrying insects was so effective and the need so urgent that its effects on other organisms had to be overlooked. Present information is based largely on single applications of DDT spray. The effects of repeated applications are little known."

There is evidence, the report stated, that a single concentrated application is destructive to birds and even dilute applications are dangerous to fishes and other aquatic wildlife. Experiments with the insecticide are still under way.

Even though a portion of *TIME*'s and *The New Yorker*'s readers and the magazines' editors alreadysaw DDT as potentially harmful,in Brazil DDT was depicted as utterly positive up to the 1980s and evidence against it was promptly discredited and portrayed as controversial, inconclusive and was defended by people who did not take into account the millions suffering from malaria in developing countries – what *Veja* magazine would later call*ecoxiitas*, a scornfulneologism that can be translated as *ecoshias*. It is interesting to note that even though DDT was used during WWII with the purpose of killing disease-borne insects, with a specific concern towards malaria, the disease is not a much present topic during the first two decades of DDT coverage (from 1944 to 1959). It

starts appearing more often in the media from the 1970s onward, and the DDT-malaria association becomes even more frequent in the 1980s.

Being a chemical born in war, DDT was prone to such analysis in propaganda and that is justified when we think of the war atmosphere that surrounded pop culture, not only during the wars, but echoing after them as well. One of the most recurrent expressions usedis the *war on insects* and it was so overly repeated and reinforced that such images are still alive and accompanied by the idea of men as conquerors and dominators of nature. One example of this war analogy is the*TIME* piece

> but DDT is not a kill-all. Against two of the most common U.S. crop destroyers, the Mexican bean beetle and the cotton boll weevil, DDT has proved disappointing. Man has not yet won his war with the insects. (*TIME,* 06/12/44, 10)

What these advertisings and news do not tell when they repeat the same single story is that war is not an adventure where brave, manly, righteous men go to but rather one that results in death, injury, trauma, disease, and a great deal of suffering. Making use of such analogies and appealing to the nationalism of the population is, to say the least, unfair and misleading.

To understand the impact the DDT arrival had on the U.S. society, in 1944 it was one of the topics mentionedin the*TIME*'s yearly questionnaire that was distributed in hundreds of schools and colleges to measure the populations' knowledge of current affairs. The question posed was the following:

> DDT, one of the great scientific achievements of World War II is: 1) The jet-propulsion engine. 2) The robot submarine. 3) A better explosive than TNT. 4) An insecticide that promises to conquer mosquitoes, bedbugs, roaches, flies. 5) A wonder drug twice as effective as penicillin (*TIME,* 10/23/44, para. 1)

In 1945, in celebration of the allegedinsect extinction in Michigan's Mackinac Island, the residents burned their flytraps in "a big public bonfire" (*TIME,* 08/27/45, para. 2). In the infamous war on insects the battlefield atmosphere

transcends the front and reaches the civilians, who are flooded by war vocabulary: *war against winged pests*, *blessings of peace*, *almost as good a friend as a rifle*, *bug bombs* (aerosol sprays), *enemy*, *extermination*. Except this time, the enemy is nature. This war appeal can be seen in this advertisement of the insect repellent *Skat*, at*Life* magazine

Figure 21: *Skat* repellent advertising, a product used by the U.S. Army and representative of values like honor, bravery, righteousness, and responsibility ("Fighting for you", 1942)

In a 1945 edition of *TIME*, after Pearl Harbor and the end of the WWII, the magazine compares DDT to the atomic bomb as a “great killer”: the former, for insects; the latter, for people (*TIME,* 09/17/45, para. 1). The end of the war also left a huge surplus of leftovers, including a large quantity of DDT sprayers that were sold by department stores such as Gimbel’s, in Washington D.C. The nationalistic, geopolitical narrative do not stop after WWII; Air Force General George C. Kenney, former boss of the Strategic Air Command,affirmed

> if you have a swamp full of mosquitoes, you can hire a lot of men to swat at them with fly swatters. Or you can wipe out the mosquitoes with DDT. I like the latter method. Hit the real criminals, Russia, before they hit us. (*TIME,* 04/26/54, para. 8)

In the U.S., DDT was everywhere. People were spiking their orange juice with it (*TIME,* 09/15/47, para. 2), putting it up on their children’s walls (Figure23), bathing in it (Figures25 and 26), throwing it instead of rice at weddingsWhorton 1974, p. 248 as cited in Meiners & Morriss, 2001) - something that can help make sense of the odd association in Figure22 -applying it in every room of their households (Figure24), using it against a wide range of insects. It became such an intrinsic part of the culture partly because the market was overflowing with DDT products, the newspapers and magazines were full of articles, advertisings and interviews related to it, it was the talk of the town in nearly every U.S. town. In Brazil the scenario was slightly different; besides the usage in agriculture, DDT was largely used by the Brazilian government to eliminate malaria from various States (for example Ceará, Minas Gerais and Piauí) and in 1950 then president Eurico Gaspar Dutra announced the eradication of dengue fever in Brazil thanks to DDT – an announcement proved later to be wrong, as dengue fever is still a serious public health issue in the country.

Figure 22: "Be happy with Detefon", a Brazilian advertising that pairs two unlikely things: pesticides and marriage ("Sejam felizes", 1952)

Figure 23: *Woman's Day Magazine* publishes the *Trimz* advertising of children wallpaper impregnated with DDT: tested and commended by Parent's magazine ("Protect your children", 1947)

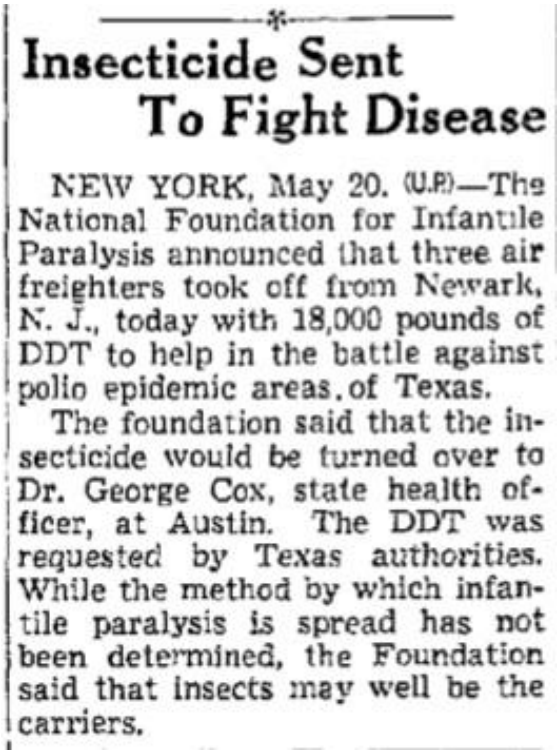
Figure 24: DDT kill-coat advertising: convenient quick killing of all household insect pests ("DDT kill-coat", 1947)

Figure 25: Nurse happily applies DDT on a crying child (Konig, 1945)

Figure 26: DDT tank sprays children at a New York beach, who play cheerfully around the fog ("Flying and biting", 1945)

DDT was used against many kinds of disease. Asthe cause of poliomyelitis was still unknown, large quantities of DDT were sprayed aiming to diminishits incidence in urban environments where the situation was more severe because there were suspicions that an insect was the vector of the disease. A vaccine was developed in the 1950s and it is now known that poliois caused by a virus and the disease it transmitted orally and through contaminated food and water(World Health Organization, 2015). This piece from the local newspaper *Nevada State Journal*, from 1946 illustrates this episode:

Figure 27: *Nevada State Journal* piece from 1946 ("Insecticide sent", 1946)



Insecticide Sent To Fight Disease

NEW YORK, May 20. (U.P.)—The National Foundation for Infantile Paralysis announced that three air freighters took off from Newark, N. J., today with 18,000 pounds of DDT to help in the battle against polio epidemic areas of Texas.

The foundation said that the insecticide would be turned over to Dr. George Cox, state health officer, at Austin. The DDT was requested by Texas authorities. While the method by which infantile paralysis is spread has not been determined, the Foundation said that insects may well be the carriers.

As the stores packed their shelves with insecticides, back in 1945 the informal market had started in the United States, alongside reports of civilians making homemade DDT for domestic use like the suburb chemist Walter Steuber, who said "any competent chemist can figure out the formula and make DDT out of non-priority materials" (*TIME,* 08/06/45, para. 2). After people figured out the

recipe and started making DDT in their backyards, the War Production Board (WPB) announced that regular manufacturers would be allowed to sell limited supplies of DDT to civilians.

Not only the popular culture and the market that were highly affected by DDT, but it was impactful for public policies and even the U.S. Congress, as it was the starting point of a series of legislations concerning pesticides:

> Thanks to DDT, the manufacture of insecticides is now a seventy-million-dollar-a-year industry; an Insecticide, Fungicide and Rodenticide Act was passed by Congress in 1947; a spate of precautionary administrative orders has issued from the Department of Agriculture, the Food and Drug Administration, and the Fish and Wildlife Service; the American Medical Association has set up a Committee on Pesticides; and a committee of the House of Representatives has conducted a prolonged inquiry into the presence of chemicals in food products. (*The New Yorker,* 07/17/54, pp. 31-32)

As nowadays one of the big concerns towards DDT comes from the environmental field, it is fundamental to look into such aspects of the media coverage of DDT. Ecological notions of species interrelation and food chain are timid, yet present here and there. There are comments on *TIME* about how killing insects that live on the surface of the lakes might kill the food supply of fishes for example (*TIME,* 12/10/45; *TIME,* 1/7/46; *TIME,* 9/16/46). Even more timid is the idea of bioaccumulation, and there is very little concern when it comes to the effects DDT might have in humans – the main perceived threat rests on the application process and the moments immediately after it, somanipulation instructions for both these stages of DDT use are frequent. Only in 1946 DDT is first reported by *TIME* magazine as something that upsets the *balance of nature* (here anthropomorphized as a feminine, powerful figure that has its own laws and enough strength to overcome whichever chemicals we choose to throw on it), and even so in a way that is not at all irreversible. This same natural balance image is rescued years later by *The New Yorker,* linked to a “small but eloquent” group:

> One group that has been leery of DDT right from the start is made up of the balance-of-nature people-conservationists, ecologists, game wardens, bird watchers, fishermen, and kindred spirits. . . . Organic farmers, who deplore the use of any chemicals at all in raising crops, make up another group, small but eloquent, that has clamored against DDT. . . . As the organic farmers see it, the world is caught in an endless cycle of piling chemical upon chemical, each one more poisonous than the last. . . . These intimations of doom are not, of course, shared by the Department of Agriculture, the agency that developed and sponsors DDT as an agricultural boon, or by most farmers, whose cash position has been notably improved by using it. (*The New Yorker,* 07/17/54, pp. 35-38)

Those who step forward and call for action more emphatically – as Rachel Carson would do later – are discredited – as she was, later on – and portrayed naively (rather than a shallow judgment, this statement comes from the reading of the material). This happened in 1957 with the Murphy case (Meiners & Morriss, 2001), when the U.S. citizen Robert Cushman Murphy – who was the curator emeritus at the Museum of Natural History – together with a group of Long Island residents filled a suit against the USDA because of its spraying program. They argued that the government was using their private properties for public use without a just compensation, and that DDT was a poison that could do harm to humans, animals, birds and insects and that it put their garden food at risk by making them unsafe for consumption. Because of the spraying program, that covered millions of acres in the eastern part of the New York State and was aimed to eradicate the gypsy moth, organic farmers could not claim their food was organic (Meiners & Morriss, 2001). The judge reviewed the program and decided that the benefits justified the harm. Murphy went back in federal justice court the following year with more evidence of DDT dangers but once more, the court dismissed the claims and the case was closed.

Another example of a group being discrediting is that of beekeepers, who had showed great concern regarding the death of bees due to DDT – something disturbingly similar to the very contemporary Colony Collapse Disorder (CCD) and the suspicions of pesticide blame; for Dr. Vincent Brian Wigglesworth, identified by *TIME* as one of Britain's foremost authorities on insect physiology, "beekeepers are a vociferous race. Like the bees they care for, their more lovable

qualities may become obscure when they are aroused – and they do not take kindle to DDT" (*TIME,* 01/07/46, para. 4). The term *useful insects* is recurrent, reinforcing the idea that nature exists to serve and please humankind.

Three years later in 1949 under the title "Nature can take it", environmentalists are portrayed by *TIME* as "naturalists [who] issued grisly warnings that the poison would 'upset the balance of nature'" and that "it was better to pass up DDT and let natural balances rule the swamps and forests" (*TIME,* 08/08/49, para. 1). In response to this, Dr. C. H. Hoffman of the U.S. Department of Agriculture and J. P. Linuska of the Fish & Wildlife Service – an agency Miss Rachel Carson would later be part of – described this mentality as a "childlike faith in what nature will provide". *TIME* concludes that if used correctly, DDT will have no effects on "desirable wildlife"(*TIME,* 08/08/49, para. 1), again putting nature in a position of servitude.

Historically, environmentalists have been called naïve, childish, dramatic, tree huggers and all varieties of other pejoratives; there is also a gender issue involved in this problem, with women being frequently associated with beauty, delicate features, flowers, pink, and nature; images of a "Mother Nature" are constant, but there is never a "Father Nature" figure in this cultural mindset (likely because nature is frequently seen as a life giver, just like the female is the bearer and caretaker of offspring). This care for nature and the natural world would then be tightly intertwined with the feminine, as in a masculine world there is no space for such divagations; Rachel Carson was repeatedly discredited under the argument that a woman with no husband and children could not be trusted, as if the only talent women are allowed to have is that of being a housewife. The same way that nature is seen as feminine, science is absolutely masculine: objective, pragmatic, accurate, meticulous, progressive, persistently right. The male is still seen, up to today, as the ruler of the family, the conqueror, the warrior, the subjugator (of economy, of women, of nature, of politics, of all that lies within the Earth). It is still undeniably a man's world we live in, and as long as we keep perpetrating and endorsing it, we will keep living in a world where nature

is not a priority. This strong, foundational belief, of men (represented by science) *versus* nature, will be carried on through the decades to become deeply internalized by society, resulting in attitudes that rely on science to correct the environmental abuse man entitles himself to practice.

This portrayal, however, does not necessarily mean that scientists and media were disagreeing, but that ideas of ecology, environmental balance, non-dominance and the consequences of human interference on nature were still somewhat new even in science, restricted to a small group discriminated by the broader academic society. Hannigan for example illustrates that

> In the field of intellectual production, Aldo Leopold's publication of the *Land Ethics* was first printed in the posthumous book *A Sand County Almanac* in 1949, where the fusion of ecology and ethics was first seen, even though his view of the land not as a commodity or property but as a part of the natural world that should be imbued of ethical right *only became popular after it was reprinted in 1968*[emphasis added]. (1995, pp. 118-119)

In the DDT coverage analyzed by this research, it is not until 1948 that perspective is shifted and nature is placed as a protagonist, emphasizing the right to life that all beings share. James Augustus Hyslop saw things from the "insect's point of view", and for him

> both men and insects have a right to live on the earth. But we slap the insect down – put DDT on him. The average man thinks of insects as a pest, that we'd be better off without them. We wouldn't; we'd be extinct. When people say to me "What use is an insect", I answer, "What use are you?" (*TIME,* 10/11/48, para. 5)

In the same year, Paul Muller (the chemist who discovered DDT's insecticide properties) received the Nobel Prize for Medicine together with US$44,000 for his findings, underlining the importance, relevance and impact of DDT in society and reinforcing the message of its goodness to the public.

Interestingly, during the first couple of years, as DDT was an absolute novelty, the media articles were strictly aboutit: what is was, what was it being

used for, where was it being applied, its properties, and instructions for handling and so on. Just a few years later DDT became part of the popular culture and started being used in different contexts: in metaphors, to represent technology and progress, to assert cleanliness, to exemplify a situation, to make reference to something and so on. It was absorbed by language (in Brazilian Portuguese, with the word **d**e**d**e**t**ização meaning fumigating and being used until today) and became part of the daily expressions, like "it's like finding a live insect in a bottle of DDT" (*TIME,* 10/31/55, para. 1) or in the parody of Bill Hayes' recording of "The Ballad of Davy Crockett":

> Born on a tabletop in Joe's Café,
> The dirtiest place in the U.S.A.,
> Killed his paw with TNT
> Killed his maw with DDT (*TIME,* 08/01/55, para. 9)

There are many aspects surrounding DDT allowing it to be captured under different framings: technological, environmental, chemical, legal, lexical and many others.When it came to contamination and poisoning, distresses were a marginal discourse hardly ever mentioned. In 1946, the official discourse transmitted by the U.S. Department of Agriculture reassured that

> the danger of handling DDT has been greatly exaggerated. It is less toxic than other insecticides (arsenate of lead, nicotine), in two years has not injured any of the thousands of workers who have handled it constantly (*TIME,* 06/24/46, para. 8)

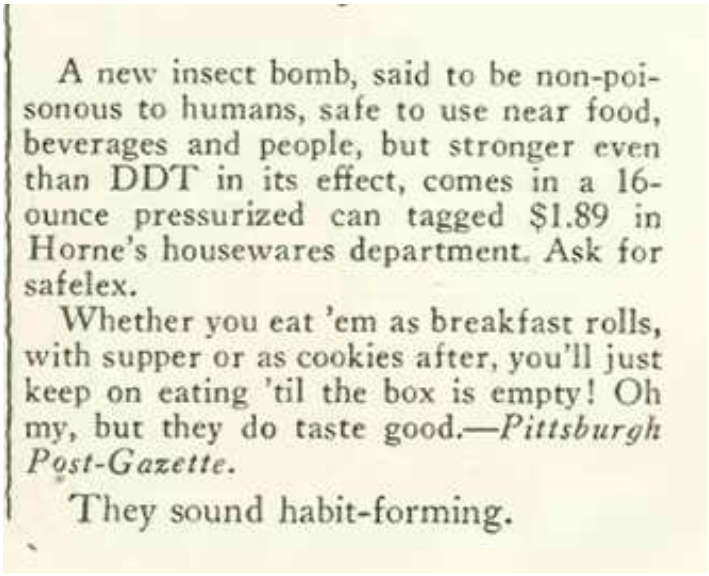
In 1949 the*New York Post* columnist Albert Deutsch published a series of articles called "DDT and You", where he raised awareness to DDT use (a business that in just two years boomed into a $30 million industry in the U.S.) and poisoning, as well as calling attention to the contamination of milk products and foodstuffs(Desrochers, & Shimizu, 2012, p. 48). For *TIME* magazine, even though warnings had been repeated in technical journals, the public was to blame: "delighted with DDT", it was using the chemical recklessly (*TIME,* 04/11/49, para.

2). The standard discourse of health officials was that there was no cause for alarm. In a *TIME*April 1950 edition,“safe DDT” is announced by Lieut. Commander William J. Perry and Lieut. Leonard J. Bodenlos of the U.S. Navy Medical Corps, who reassure that DDT is practically harmless (*TIME*, 04/24/50, para. 1). They affirm to have analyzed the body fat of people who have been constantly exposed to DDT and announce that no trace of the chemical was found in their samples (*TIME,* 04/24/50, para. 2).Even though part of the public knew that this was not the case and had seen by themselves the harm it does, DDT use would remain unregulated for over two decades.

When addressing the deaths related to DDT that have been reported, the Lieutenants state that they were most likely due to the kerosene that goes in the mixture than to DDT itself (*TIME,* 04/24/50, para. 3). Because of people’s utter faith in science and in science’s infinite capacity for problem-solving, saying that a drug or a technology has been approved by scientists or tested in laboratories or scientifically developed carries a very substantial weight (refer for example to Figure23, of *Trimz* wallpaper advertising, and the reassuring tone of “medical science knows”).

This note from a *TheNew Yorker* September edition of 1956 indicates that the public was concerned to the point that safety became a very relevant issue when selling pesticides:

Figure 28: "Stronger even than DDT in its effect", *Safelex* is announced in *The New Yorker*(09/15/56, p. 78)



A new insect bomb, said to be non-poisonous to humans, safe to use near food, beverages and people, but stronger even than DDT in its effect, comes in a 16-ounce pressurized can tagged $1.89 in Horne's housewares department. Ask for safelex.

Whether you eat 'em as breakfast rolls, with supper or as cookies after, you'll just keep on eating 'til the box is empty! Oh my, but they do taste good.—*Pittsburgh Post-Gazette.*

They sound habit-forming.

Journalists and science, and science and the lay public even more, were strangers to each other. Let us take the history of the American Association for the Advancements on Science (AAAS) in the U.S. as an empirical representation of what was happening at the time when it comes to these relations. This information comes from several conversations I had with science journalist and communication researcher Dr. Bruce Lewenstein.

Founded in 1848, the AAAS was the major scientific society in the United States. It was first in AAAS meetings that scientists, geographically dispersed, started communicating and sharing their researches. In the later years and up to WWII, these new interactions enabled enough connections so that each field would start meeting separately in self-organized events and the AAAS encounter became a place where different areas could network; science, education and policy experts could join, always with wide coverage by the newspapers (Lewenstein, personal communication, February 2013).

By the 1960s, the findings *per se* were not being presented at the AAAS anymore and people focused on the implications of their works because

they had mostly already exposed their work in detail to colleagues in specific conferences and symposia where each research field would meet, and at AAAS they were dealing with a different audience. At this point, the annual meeting became a space where journalists could go to get science's breaking news and both the speakers and the event organization adjusted to this more specific purpose(Lewenstein, personal communication, February 2013).

Taking the AAAS trajectory as example, we can perceive that especially science was still organizing itself as a community and a mature relation with media, which includes scientists knowing how to talk with journalists and journalists knowing how to understand scientists and report appropriately to the audience, and would only happen with a lot of effort from both sides. The 1940s and 1950s were a time of novelties, of science, technology and promises of progress, from T-shirts (1942), microwaves (1945), Polaroids (1947), the first computer (1945), color TVs (1951), to McDonalds (1955).It was a time of conflicts: Pearl Harbor (1941), Stalingrad (1942), D-Day (1944), Hiroshima and Nagasaki (1945), Ghandi's assassination (1948). It was certainly a time of scientific breakthrough, from the formulation of the Big Bang theory (1948), breaking the sound barrier (1947), the first organ transplant (1950) and the polio vaccine (1952) to the discovery of the DNA structure (1953);the United Nations were founded in 1945, NASA in 1958. These two decades were the time of war, science and consumerism, of the American Dream and the American Way of Life, of rockability, Elvis Presley and Marilyn Monroe.

Brazil was becoming industrialized, and here too the post-war feeling was followedby a technological one – and by Brazil's first World Cup title. Under the governance of presidents Getúlio Vargas (deceased in 1954) and Juscelino Kubitchek invested in infrastructure (roads, airports, hydroelectric plants) and base industries and the general feeling of that time was that Brazil was on its way to becoming a modern, successful country – especially due to a notorious change in the lifestyle as a good portion of the rural populationmoved to the city. In 1957, the construction of Brasilia to be the new capital of Brazil had started and this was

a strong symbol that the country was walking towards modernization. With some years of delay, the same equipment that was used by U.S. housewives arrived in the kitchen of those who could afford it and with it, another assets such as the television; the era of consumerism was also starting here.

Two decades in a nutshell

From 1944 until 1959, DDT's coverage was overall positive – though there were already concerns regarding its toxicity and long-term effects. Because it was a new product, the focus was on use instructions, dosage and purposes, especially in the 1940s; advertising focused on its unprecedented success on killing bugs and used the image of a modern life to convince the public that DDT was part of a new era that should be embraced.The number of reports was more intense from 1945 to 1951, presenting a drop from 1952 onwards.

3.3. The 60s and 70s: The boogie man of pollution and population

The 1960s was the decade of the public recognition of the environmental crisis in Western societies, in a historical time that matched the political tensions of the Cold War, the counterculture movement, demographic pressures, shortage of energy sources and other elements that stimulated the organization of civil society in the search for a solution for the generalized crisis that took place (Andrade, 2009).

It was a moment in the relationship between science and society in which the public was questioning scientists about their social responsibility, largely due to the reality of the atomic age and the risks associated with this type of energy (Hecht, 2011). LaFollette (1990), a researcher of the history of science communication, notes that the potential hazards associated with the post World War II scientific advancements did not necessarily have a negative impact on

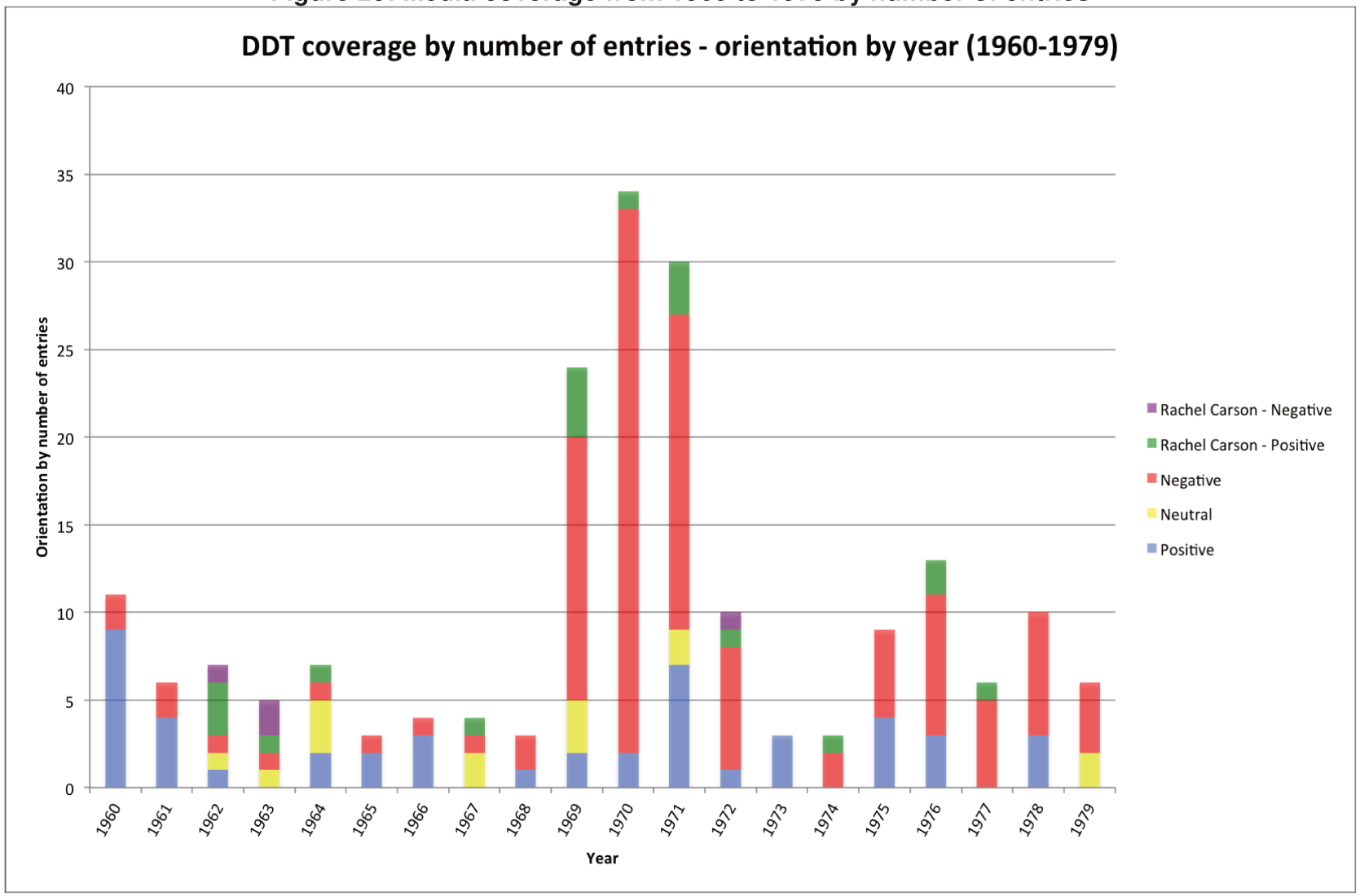
science; what happened was that people realized that scientists could not - and should not - be exempted from the social and political ramifications of technological innovation.

Therealizationof man being the source of environmental pollution due to its activities, particularlywhen it came to the development of industry and progress, was downing. This can be noticedin the*TIME* magazine articlethat affirms

> the new, more subtle contaminants bear such exotic names as alkyl benzene solfonate and acrolein, and they differ in one major respect from the contaminants of a century and a half ago. *They are man-made - the undesirable byproducts of technological progress* [emphasis added].(*TIME* 09/26/60, para. 1)

When it comes the intensity of the media coverage, the debate over DDT surprisingly did not rise stronger right after *Silent Spring* but exactly the opposite: there was a drop on the amount of news, as if the media was trying to avoid the polemic topic and waiting for things to calm down.This can be noticed in the following graph, as there is a decrease from 1960 on particularly between 1965 and 1968:

Figure 29: Media coverage from 1960 to 1979 by number of entries

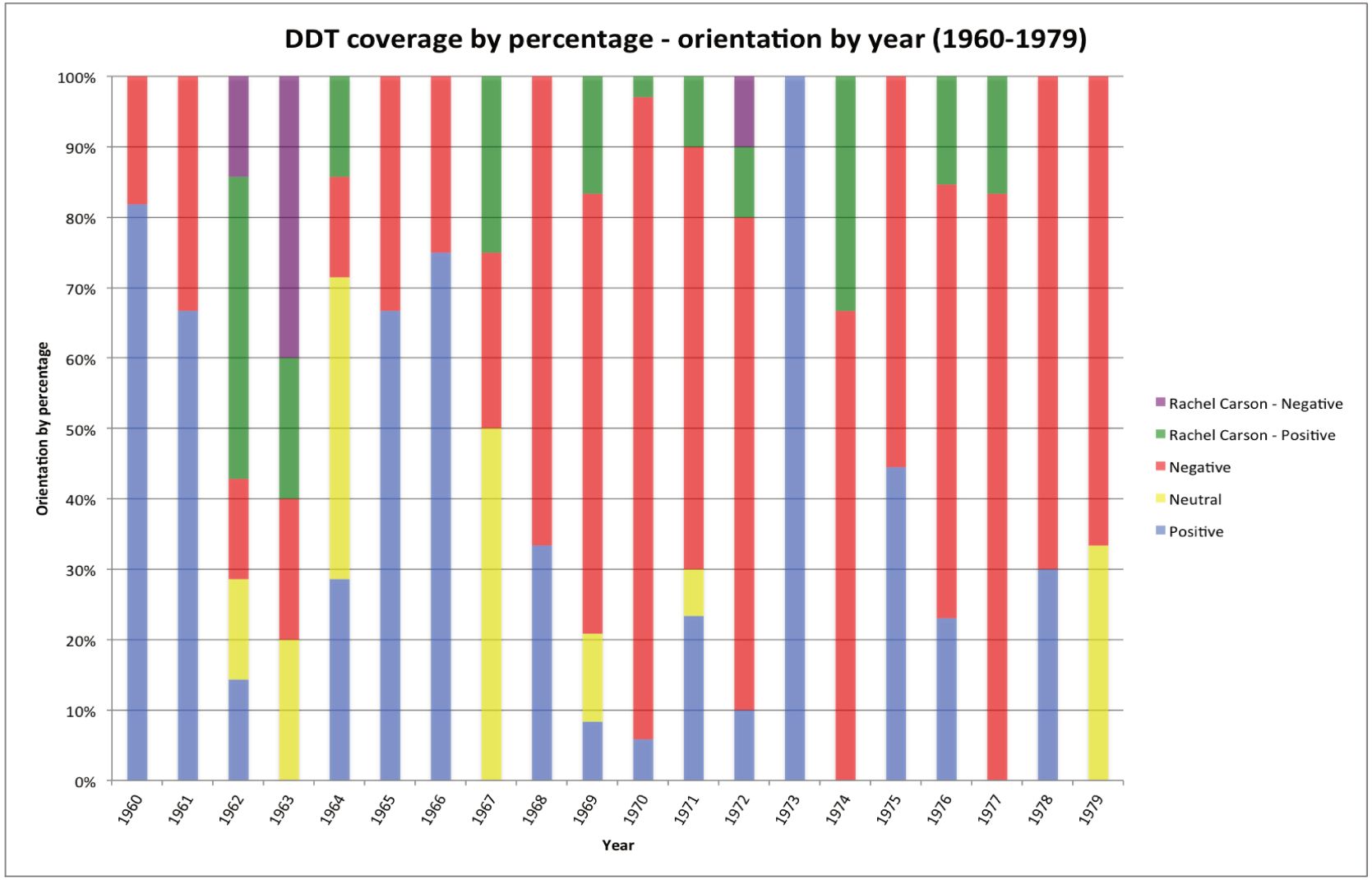


This comeback between 1969 and 1971 – especially of negative records – reflects a rise in environmental concern possibly influenced by the mood amplified byevents likethe United Nations Stockholm Convention (1972) and Earth Day in 1970 (whose occurrence, by itself, signifies that the environment was a central, overall concern in the international sphere). Another interesting remark is that the coverage peak (mostly negative) anticipated the world ban, in 1972, lead by the U.S.; it is possible that the combination of popular pressure (amplified by environmental movements) and intensive media coverage induced the ban. Curiously, the coverage dropped significantly after this event.

There is a smaller peak in 1975 and 1976thatreproduces a particular rise in the coverage of *Veja*magazine these two particular years (adding up to 11 entries alone). In this specific magazine's coverage in the two referred years, DDT was frequently mentioned together with benzene hexachlorid – BHC. They were considered already proved damaging to men in the 11/03/76 edition and said to be a necessary evil one week later in 11/10/76, in a confusing positioning with constant oscillation.

If we look into the orientation of the articles by percentage, we can see that there was a good rise in the proportion of the negative coverageafter the *Silent Spring* and that the following year, in 1963, most of the coverage mentioned Rachel Carson negatively. The impact of the *Silent Spring* is inconsistentwith the omission by the media, thatstopped talking about DDT when it should be doing the exact opposite, but the impact of the book in the discourse shift becomes visually clear:

Figure 30: Media coverage from 1960 to 1979 by percentage



In this period many of the reports are matter-of-fact, and a very little minority of them brings forward any deeper discussion about DDT, matching its benefits and harms and offering a consistent positionon the polemic about whether to use it or not. The talks over replacing DDT by something more efficient, less poisonous, that would not end up breeding resistant strains of insects becomes more frequent from 1958 on. Just asfrequent are worries about population growth, for example in the *TIME* edition of 01/11/60:

> As 1960 began, the world's population stood at 2.8 billion; within 40 years, predicted U.N. experts, it would be somewhere between 6 and 7 billion. Long a hot topic among pundits, whose jargon phrase for it is "the population explosion," the startling 20th century surge in humanity's rate of reproduction may be as fateful to history as the H-bomb and the Sputnik, but it gets less public attention. (*TIME*, 01/11/60, para. 2-3)

The overpopulation concern was the central topic of Paul Ehrlich's book *The Population Bomb*, published in 1968, in a context of exponential growth with the world population reaching 3 billion in 1960 with estimates to reach 4 billion in the 1970s. The problem was not overpopulation by itself, but the consequences it would bring to world economy, as the resources supply would become increasingly scarcer with time. It was a topic largely seen through the frame of food security, in the traditional media (newspapers, magazines, television and radio) and through the frame of the political dynamics of urbanization by the intellectual academics, influenced by Marxism but with a sturdy disappointment with real-life socialism.

The trending of the topics abut pollution and overpopulation are not restricted to the media covered in this research, but a peak in the middle 1970s can be observed in the Google Books NGram Viewer generated graphics of the terms:

Figure 31: Popularity of the term *pollution* since 1944

(Source: Google Books NGram Viewer)

Figure 32: Popularity of the term *overpopulation* since 1944

(Source: Google Books NGram Viewer)

The concerns over food production due to the population growth facilitated the implementation of a set of measures that would later be known as the Green Revolution, which I will talk about in more detail at the end of this section. Briefly put, it included the incorporation of machinery and technology such as irrigation in the production system, heavy use of pesticides, herbicides and other chemicals and the favoring of monoculture. With this pesticide abuse, a

concerned public repeatedly tried to stop companies from poisoning their land but oftentimes found no endorsement from the law.

Similarly to the Murphy case in 1957 and 1958 (described in section 3.1), in 1960 the citizens of Long Island did not manage to stop the aerial spraying in their lands. In the 04/30/60 edition of *The New Yorker*, we see that the authorities are still resistant and that the case did not evolve well:

> Long Island homeowners lost their court fight to prevent the aerial spraying of DDT. The Supreme Court refused to review the case. Justice William O. Douglas, in a dissenting opinion, pointed out that by a Food and Drug Administration ruling not a trace of DDT must be present in milk, and that the plaintiffs in the case had produced evidence that milk from their dairies had been contaminated, as well as that vegetables and fruits had been contaminated and birds and fish had been killed (*The New Yorker,* 04/30/60, p. 109)

This happened even though the public showed increasing concern towards DDT, for example in this letter from a *The New Yorker* reader:

> DDT sprayed on elm trees for beetle control on the Michigan State University campus in the years 1954-59 took a heavy toll of robins. A study of the effects of the spray program was made by Professor George J. Wallace, zoologist at the University. He found that in 1954 there was approximately one pair of robins to an acre. By the summer of 1958, there were no robins. The next spring, robins returned, but they sickened and died and were then replaced by others that moved in. Thus, the number of birds killed by the spray is believed to be several times as great as the original breeding population of the area. (*The New Yorker*, 04/02/60, p. 96)

A couple of years after that, in the very same magazine, the *Silent Spring* would be published and would have a great impact on the pesticide business. As put by this edition of *TIME* from 1962,

> There is no doubt about the impact of Silent Spring; it is a real shocker. Many unwary readers will be firmly convinced that most of the U.S.—with its animals, plants, soil, water and people—is already laced with poison that will soon start taking a dreadful toll, and that the only hope is to stop using chemical pesticides and let the age-old "balance of nature" take care of obnoxious insects. (*TIME,* 09/28/62, para. 5)

The treatment given to Miss Carson ranged from one that gave her full credit for denouncing a degrading industry that was a menace to the North American population (and even of the whole humankind) to one that completely discredited and ridiculed her, like this piece from *TIME* edition of 09/28/62:

> Many scientists sympathize with Miss Carson's love of wildlife, and even with her mystical attachment to the balance of nature. But they fear that her emotional and inaccurate outburst in Silent Spring may do harm by alarming the nontechnical public, while doing no good for the things that she loves. (*TIME,* 09/28/62, para. 20)

Many articles positioned themselves between these two opposite poles, and it was common to see how exactly the tone of the reports varied greatlyin the same outlet – as mentioned about *Veja*magazine earlier in this study. In the same *TIME* edition of 09/28/62, we can distinctly perceive this tone variation from the previous paragraph:

> Scientists, physicians, and other technically informed people will also be shocked by Silent Spring—but for a different reason. They recognize Miss Carson's skill in building her frightening case; but they consider that case unfair, one-sided, and hysterically overemphatic. Many of the scary generalizations—and there are lots of them—are patently unsound. "It is not possible," says Miss Carson, "to add pesticides to water anywhere without threatening the purity of water everywhere." *It takes only a moment of reflection to show that this is nonsense* [emphasis added]. Again she says: "Each insecticide is used for the simple reason that it is a deadly poison. It therefore poisons all life with which it comes in contact." Any housewife who has sprayed flies with a bug bomb and managed to survive without poisoning should spot at least part of the error in that statement. (*TIME,* 09/28/62, para. 6)

Despite many outlets discredited her and her work, and though many people who were using DDT received the book's accusations with disdain, it was fundamental to raise awareness and bring the debate to the public sphere. This can be observed in the same article from *TIME,* where again there is a tone shift in the following paragraph when they say that "Carson's oversimplifications and downright errors only serve to highlight a question that has bothered many Americans: Just how dangerous are insecticides?". This awareness can also be

spotted in this *Popular Science*paragraph*,* particularly in the emphasized sentence:

> Whatever your opinion of *Silent Spring*, Rachel Carson's controversial book about insect killers, you'll get no argument at all about one obvious result – *users of insecticides are having searching second thoughts this season about bug poisons*[emphasis added]. (*Popular Science,* June/63, p. 106)

Popular Science's coveragewas particularly different, especially due to the magazine style that counted witha significant number of advertising pieces promoting DDT as discussed in the previous subchapter. When referring to Rachel Carson, the widespread impact of the book becomes clear as the magazine merelyrefers to it without needing to explain its content, assuming that the reader already knows what it talks about – and has an opinion regarding it.

Even though *The New Yorker* published the *Silent Spring* in three separate blocks in the 16/06/62, 23/06/62 and 30/06/62 editions, before it was edited into a book, the magazine did not publish a single word about DDT or Carson in that year. The next time DDT would make an appearance in the magazine would be over a year later, in October 1963, when it issued an article about the book *The middle passage,* by V. S. Naipaul, which included topics of colonialism, poverty and "since the control of malaria by DDT", the problem of overpopulation (*The New Yorker,* 10/12/63 p. 214). The magazine could hardly anticipate the furor that the three-part article by Miss Carson would bring, and exempted itselffrom the debate and kept a safe distance from the polemic. DDT would only be in the magazine's pages again in May 1964, after Carson's death, in an article that praised her work and highlighted the permanence of the pesticide problem and the disregard of authorities:

> Rachel Carson is dead, but the sea is still around us, the edge of the sea still supports life in almost unbelievable variety, and the manufacturers of pesticides are enjoying their usual spring upsurge in sales . . . as Miss Carson pointed out in her last book, no one can yet say what a "substantial" amount of a modern poison really is. . . . Right

> there, it seems to us, is the basic flaw in our regulatory machinery. American justice holds the accused person innocent until proved guilty; *somehow this concept has crept over into industry, where it doesn't belong* [emphasis added], and has been applied to products of all kinds. (*The New Yorker,* 05/02/64, p. 35)

The industry was very fast in their response and attributed the poisoning cases listed in the *Silent Spring* as rare accidents caused by careless handling. The North American governmental agencies were in a state of denial and were incisive in their overly repeated narrative that pesticides were not harmful:

> While many insecticides are roughly as harmless as DDT, others are considerably more poisonous to humans. But *in the opinion of respected experts*[emphasis added] of the U.S. Public Health Service, none have done appreciable damage to the U.S. public or are likely to do so. (*TIME,* 09/28/62, para. 10)

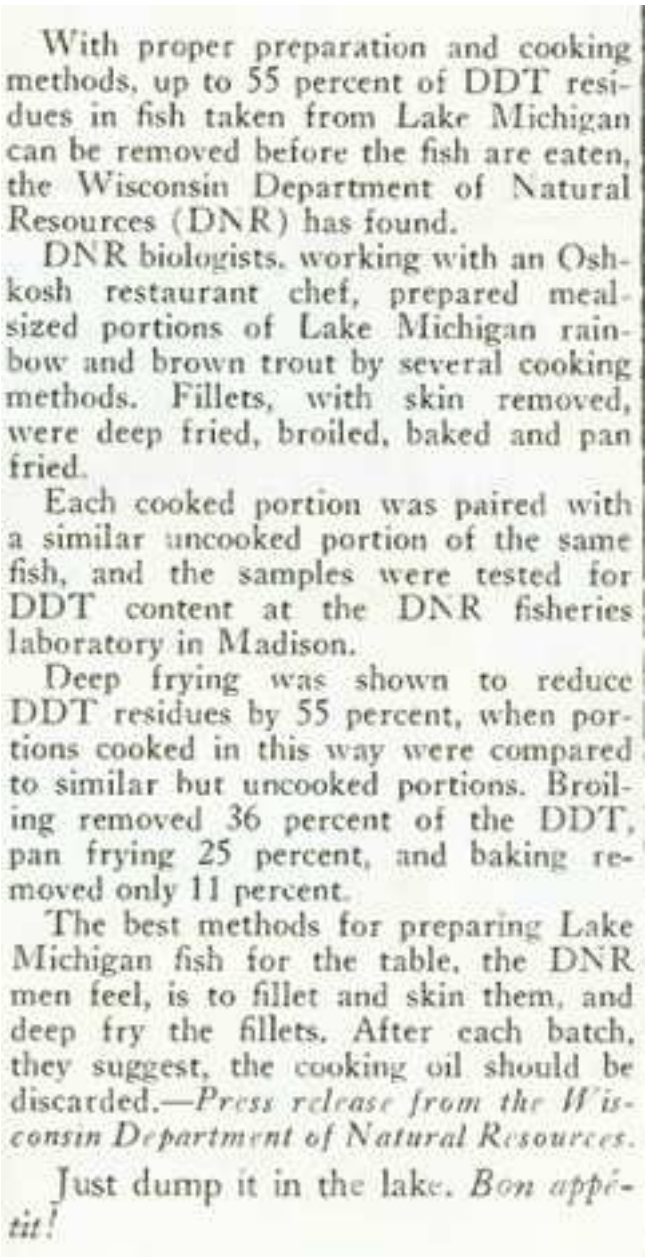
The narratives will sound familiar to a 21st century reader, for example the valuing of technology and progress, the trust in science and scientists, the technocracy and the dominance of the expert's discourse, the limitless nature that can take all the harm we cause and always recover. Not very different from today, in the 1960s man isportrayed as the dominator, "the king of beasts" as put very clearly by this statement:

> Lovers of wildlife often rhapsodize about the "balance of nature that keeps all living creatures in harmony," but scientists realistically point out that the balance was upset thousands of years ago when man's invention of weapons made him the king of beasts. The balance has never recovered its equilibrium; *man is the dominant species on his planet, and as his fields, pastures and cities spread across the land, lesser species are extirpated, pushed into refuge areas, or domesticated* [emphasis added]. (*TIME,* 09/28/62, para. 16)

Meanwhile, despite the resistance of authorities in recognizing the urgency of the situation, the DDT contamination as a topic became so ordinary that inconsistently alongside the denial, the public wasoriented on how to cope with it, for example in this *The New Yorker* piece from a 1969 edition that

compares the removal of DDT accomplished by different cooking methods:

Figure 33: *The New Yorker* 09/06/69, p. 128 - DDT goes down better deep fried



With proper preparation and cooking methods, up to 55 percent of DDT residues in fish taken from Lake Michigan can be removed before the fish are eaten, the Wisconsin Department of Natural Resources (DNR) has found.

DNR biologists, working with an Oshkosh restaurant chef, prepared meal-sized portions of Lake Michigan rainbow and brown trout by several cooking methods. Fillets, with skin removed, were deep fried, broiled, baked and pan fried.

Each cooked portion was paired with a similar uncooked portion of the same fish, and the samples were tested for DDT content at the DNR fisheries laboratory in Madison.

Deep frying was shown to reduce DDT residues by 55 percent, when portions cooked in this way were compared to similar but uncooked portions. Broiling removed 36 percent of the DDT, pan frying 25 percent, and baking removed only 11 percent.

The best methods for preparing Lake Michigan fish for the table, the DNR men feel, is to fillet and skin them, and deep fry the fillets. After each batch, they suggest, the cooking oil should be discarded.—*Press release from the Wisconsin Department of Natural Resources.*

Just dump it in the lake. *Bon appétit!*

Though this may come across as bizarre and absurd to the 21st century reader, we are still caught up in the same practices:

Figure 34: The *dirty dozen* and the *clean fifteen*(Environmental Working Group, 2013)

Food monitoring for pesticides has become common practice, and in Brazil it is mainly conducted by Anvisa through PARA (Programa de Análise de Resíduos de Agrotóxicos em Alimentos, Program for the Analysis of Pesticide Residues in Food).We have a patronizing look to the past at the same time as we ask ourselves how could the public accept such absurd level of poisoning and neglecting, however we fail on asking ourselves about the things we are putting up with when we should certainly not be. Though we criticize past generations for acting against the precautionary principle, we repeat such positioning.

By the early 1970s, a more holistic approach to the environment was

gaining space as the ecosystem ecology became central to the rise of environmentalism, as explained by Hannigan: “first, the language and logic of ecology was linked to rising concerns about radioactive fallout, pesticide poisoning, overpopulation, urban smog and the like to produce what appeared to be an inclusive scientific theory of environmental problems” (1995, p. 118). Not only that, but a “small group of influential writers and thinkers” such as Rachel Carson, Paul Ehrlich and Garrett Hardin (with his milestone *The tragedy of the commons* published in *Science* magazine, in 1968) helped to bring ecological thinking and vocabulary from the higher intellectual circles to those of the lay public. In addition, the first United Nations Conference, that took place in Stockholm in 1972, and the publication of the *Meadows Report* in the same year by the Club of Rome addressing the limits to growth helped create a global ecological conscience as the environmental problems that resulted from the economic growth “stop being seen as punctual issues and assume a global character” (Seixas, 2011, p. 160). Hannigan points outtwo other strong forces behind this ecosystem ecology rise: the fusion of ecology and ethics (led by Aldo Leopold’s *The Land Ethics*) and the cooptation of scientific ecology by the environmental movement, through which the latter gained legitimacy and the earlier gained attention and followers.To Albuquerque,

> if in the 1960s the organizations acted strictly in the local and regional sphere adopting punctual measures and strategies, from the 1970s on its importance and visibility will slowly reach the international realm as consequence of the change in perspective concerning the environmental issue that also leaves the local sphere to transform itself into a global entity. (2011, p. 237)

The Brazilian participation at the Stockholm Convention in 1972 had an interesting outcome.With a discourse that prioritized growth at all costs to achieve a deeply desired modernization, Brazil’s participation in a meeting with high concerns about the environment was, to say the least, a diplomatic embarrassment. Fearing that the environmental issue would became an obstacle to the envisioned modernization, Brazil created in 1973 the Special Secretariat for

the Environment (Secretaria Especial do Meio Ambiente, SEMA). Unfortunately, at this time the internalization of the environmental matters is still far from the practical field, being much more restricted to rhetoric.

This international reach of the environmental crisis in the 1970s reflected on the DDT coverage, which had a rise between 1969 and 1971. The organization of social movements combined with the fear of a global crisis and environmental breakdown brought a dramatic tone and a sense of unity, collectiveness and urgency to the media:

> The great question of the '70s is: Shall we surrender to our surroundings or shall we make our peace with nature and begin to make reparations for the damage we have done to our air, to our land and to our water? . . . The real problem is much bigger than the U.S. By curbing disease and death, modern medicine has started a surge of human overpopulation that threatens to overwhelm the earth's resources. (*TIME*, 02/02/70, para. 1-5)

This *TIME* issue also puts Paul Ehrlich (who became a recurrent reference in the media) on the spotlight,showing some level of dialogue between social scientists and environmentalists and the lay public - facilitated by the media:

> Neo-Malthusians like Stanford Population Biologist Paul Ehrlich grimly warn that the biosphere cannot sustain that many people. As Ehrlich puts it: "There can only be death, war, pestilence and famine to reduce the number." (*TIME*, 02/02/1970, para. 16)

Though the *Silent Spring* was published in 1962 with an extensive list of references that supported the thesis that we were poisoning our environment and ourselves by abusing chemicals that were proved to be dangerous, the discourses in favor of DDT were still strong in the 1960s (with more presencein the United States), the 1970s and 1980s (though generally weaker in the United States, it were stronger in Brazil). In a 1970 publication, the former chief of the Vector Biology and Control division at the WHO, James Wright, not only states that the DDT spraying for malaria “represents little danger to ecosystems” but

declares that

> DDT has shown itself to be *remarkably safe*[emphasis added] for man. Since malaria control was begun in 1945, no toxic effects have been recorded among the 200,000 or more spraymen who have been employed over long periods or among the hundreds of millionsof people who have lived in houses that have been sprayed for a number of years. These observations are confirmed by extensive health monitoring in DDT factories on persons exposed to massive doses of the compound. Although some of these men had concentration in their fat 50 times as high as that found in the normal U.S. population, their general standard of health did not differ from that of the normal population. In fact *the only recorded cases of DDT poisoning have been in persons who had deliberately or accidentally ingested large quantities* [emphasis added]. (Wright, 1970/1980, p. 77)

Even today it is surprisingly difficult to find information about pesticide poisoning, and to find information about the very few reported cases– for example, about the occupation of the intoxicated person or details on how the poisoning happened. In the documentary directed by the Brazilian Sílvio Tendler "O veneno está na mesa 2" (or "Poison is on the table, part 2"), forest engineer Sebastião Pinheiro (18:18) and medicine professor Raquel Rigotto (18:43) both state that if one wants to know how many cancer cases, in Brazil, are linked to pesticides, he or she will find no answer (Tendler, 2014). This comes from an ideological conflict, one in which the pesticide companies that profit billions of dollars every year are very interested in hiding the contamination and intoxication episodes to keep them away from the media and consequently, from public attention. This omission gives the impression that pesticides comprise a safe business, when in fact it is exactly the opposite: estimates from 1999 to 2009 show that one person is intoxicated every 90 minutes in Brazil (Bombardi, 2011, p. 7),and people have been intoxicated since pesticides arrived in the market.It is important to say that these numbers are underestimated, because most of the intoxicated workers do not look for medical assistance, and those who do it fail to claim to have been poisoned in their work environments fearing retaliation from their employers. In addition to that, many cases are wrongly diagnosed.

Though generally the official discourse (of the WHO and the FDA, for

example) only arrived later to the realization of DDT's already proved harmful effects, the tone had already changed in advertisings – that now highlighted the absence of DDT in their formulas and practices:

Figure 35: "How to live the organic way" book advertising at *The New Yorker,* 11/07/70, p. 184

The Vietnam War was happeningbetween 1959 and 1975, and againthe industry develops a chemical to be used as a war weapon and releases it to the marketplace after the end of the war. Pellow (2007) gives a detailed

description of what for him represents “one of the worst cases of toxic warfare and environmental racism in history” (p.159): the Agent Orange case, a herbicide developed by Dow Chemical Corporationand produced by Dow and Monsanto and widely used during the U.S.-Vietnam War to destroy the foliage that served as camouflage to the Vietcong soldiers. Pellow tells that

> Agent Orange has extraordinary high concentrations of dioxin, the most toxic substance known to science, and has caused irreparable harm . . . [in the] military campaign involving the dumping of an estimated 12 million gallons of Agent Orange and other chemicals in South Vietnam, causing physical deformities in tens of thousands of children and destroying 14 percent of the nation’s forests. The Vietnamese government recently reported that more than 70,000 of its citizens suffer from medical diseases related to Agent Orange exposure. Other estimates are closer to 1 millionbecause many people who suffer were not born at the time.(2004, pp. 159-160)

Meanwhile, Brazil was going through a military dictatorship that lasted from 1964 until 1985, and there was a paradox regarding academia: at the same time that intellectuals from the left were exiled and moved to Europe and even Latin American countries where the dictatorship had not yet arrived, the necessity for development and planning from the military government forced a partnership with academia, and the Brazilian post-graduation had an expressive growth and development at the time.This political framing that valued the industrialization and modernization of Brazil was highly impactful to what would become the Brazilian agricultural model, based on monoculture, heavy machinery, chemical inputs and with a strong targeting to exportation. To better understand the changes that were happening in Brazil and that culminated in the 1970s Green Revolution, I want to specifically address the evolution of the industry and of agriculture from the 20th century in the country.

In the turn from the 19th to the 20th century, agriculture and farming represented 45% of the national Gross Domestic Product (GDP) and the industry accounted for 11.6%.The coffee market, the immigration flow and the foreign investments enabled the State of São Paulo to begin its urbanization and

industrialization pioneering process with a strategic investment on energy, a tactic that would be adopted by other States later on. By the 1920s, the industry accounted for 16% of the GDP and the participation of agriculture dropped to 38% (Bonelli, 2006, as cited in Barros, 2014) and before 1930, agriculture represented to the government nothing more than an income source. Meanwhile, the services sector rose dramatically and in 1930 accounted for 50% of the GDP.

Brazil went through a dramatic change with the 1930 Revolution, an armed movement leaded by the States of Minas Gerais, Paraíba and Rio Grande do Sul that culminated in the deposition of the then president Washington Luís, who was substituted by Getúlio Vargas in a coup. This would result in a new Constitution, approved in 1934, and since Vargas did not approve of it, a new one in 1937. It was the *Vargas Era*, which lasted for the 15 years Getúlio Vargas remained president and his term was marked by a stimulation of urban activities, a shift from agriculture to industry as Brazil's priority production activity and a crisis on the coffee market (caused by an unbalance between production and demand that was so intense that the government bought and burned the stock to try and keep this superproduction from dropping the coffee price even more) (Barros, 2014). These characteristics would set the ground for the Brazilian modern economy.

In 1940 the agriculture GDP had dropped to 30% of the total GDP and the industry accounted for 19% (Bonelli, 2006, as cited in Barros, 2014). Despite the advancement of the industry – or maybe because of it – the population presented a very worrying nutritional state and it became a national concern, with the publishing of the book *Geografia da Fome* ("The Geography of Hunger", my translation) in 1946 by Josué de Castro embodying this distress. One of the governmental reactions to this problem was to promote the *march to the West*, a 1940 campaign with the objective of occupying the frontiers of the Center-West region (Barros, 2014, p. 85). To Melo (1985, as cited in Barros, 2014), 85% of the total agricultural product rise in the 1940s was due to this expansion, whichpermitted an enormous rise in Brazil'sfarming area. In the 1950s this

percentage was of 72% and in the 1960s, 65%.It is important to stress that this occupation was achieved through a great deal of violence especially towards the indigenous population that inhabited the Center-West and also towards the immigrants, who were a major labor force at the time. This expansion and incentives like the very low price of the land resulted in a high land concentration in the hands of very few people and an inequity in land distribution that is up to today a very serious problem in Brazil and one important source of today's social inequality.

In 1950 the agriculture GDP had dropped to 22.5% of the total and the industry's had risen to 15.5% (Bonelli, 2006, as cited in Barros, 2014). The productivity of the industry was very attractive to a population that lived in the rural environments, resulting in a robust migrating movement of people that were poorly educated, not alphabetized and that would consequentially assume jobs that did not pay well and did not offer good work conditions as these people had to settle for anything was offered to them because of the lack of opportunity. Their expertise, of farming the land, was not useful for the industrial movement that took place and these people would be pushed to unemployment, poor conditions and marginalization – and with a low participation in the workforce, there was a low participation in the internal market. The industry incentive was still very strong and in 1952 the National Bank of Economic Development (BNDE) was created. Petrobras, under the motto "the oil is ours", was created in 1953.

Between the 1950s and the 1970s the Brazilian economy grew 6.8% and agriculture had grew 4.1% per year. If in this period (1950-1960) the agricultural GDP shrank until it reached 17% of the total, that of the industry rose to almost 30%. Naturally, this reflected in the food price that rose 42% in this decade (it had already risen 35% between 1940 and 1950). There was an advance in the heavy industry, of the durable goods market and of basic supplies. In the 1970s there was a boom in the private investments and a risen incentive from the State – financed with foreign resources – in infrastructure and state industries like for example that of oil, chemicals, armory and pesticides (Barros,

2014).

By 1970, as the agricultural GDP participation reached 14% (compared to 45% at the beginning of the century) and the industrial rose to 33%, the urban population represented 56% of the total and the discussion regarding how to solve the supply problem reached the political and academic spheres.The agricultural strategy relied on low prices, increased land use and high productivity ensured through the principles of the Green Revolution, that was promptly adopted by Brazil, such as the use of heavy machinery and inputs (herbicides, pesticides and other chemicals and modified seeds). To Barros (2014), the incentives to agriculture were interpreted as a compensation for an economy that invested heavily in the industry and favored this sector in detriment of the agricultural.

In the beginning of the 1970s, the exporting of agricultural products becomes favorable in comparison with those destined to the internal market due to two factors that impacted the world economy: the oil crisis and the commodities boom (Barros, 2014). As a response to the oil crisis, the Brazilian government created the National Alcohol Program (Proálcool) in 1975, a program that aimed to substitute oil by alcohol as a fuel. With this,agriculture became more involved with the energy issue so now there were multiple roles to be executed by this sector as listed by Barros: internal supply, foreign exchange generation, inflation control and participation in the solution of the energy issue.Brazil then arrived at the 1980s with an agricultural system that welcomed pesticides that DDT and relied heavily on technology to the improve production.

The effects of the Green Revolution were globalized and not at all restricted to Brazil. Though this movement culminated in the 1970s, it had started decades earlier since the 1940s and was readilyassimilated by developing countries that had a more serious problem of bad nutrition and starvation as the set of techniques and products promised to solve worldwide hunger.While it represented a considerable rise in food production, it came at a cost that was not thought through or properly balanced at the time: health problems (because of the

abuse of chemicals), risen greenhouse emissions, dependence on non-renewable energy sources (for the machinery and transport), biodiversity loss (mainly due to the monoculture system), environmental pollution (by DDT and several other chemicals), a severe decline in the food quality (poisoned by the chemical use) and social inequality (with an oppression of small farmers because wealthier ones have better access to credit, land and machinery).

Two decades in a nutshell

In the 1960s DDT was already incorporated in societies in such a way that it was present in nearly every U.S. and Brazilian household. With the years that had passed since its introduction in the market, the toxic effects were more clearly noticed and the debate over its use gained depth. Though the *Silent Spring* was published in 1962, at least until 1979 (the last year of this two-decade period) Rachel Carson's image was still not very tightly associated with that of DDT, and a minority of the coverage mentioned her. There was a substantial peak on coverage between 1969 and 1971 (a year before the U.S. ban), in the middle of environmental discussions that comprised other core themes such as pollution and overpopulation. The big turn in the discourse – from a mainly positive coverage to a mainly negative one – happened in 1967, and though from then onwards the coverage would sometimes bring positive pieces here and there (something that would happen more frequently in the *Veja* coverage) the positive narratives would never become dominant again.

3.4. The 80s and 90s: The trending topics of toxic waste and greenhouse effects

The 1980s were a period of technological advance, geopolitical turmoil and cultural boom, especially with the introduction of Personal Computers (PCs) by IBM and the invention of the World Wide Web (1989) marking the beginning of

the Internet era. Other remarkable events include the assassination of Brazilian rubber tappers union organizer Chico Mendes (1988) and in the geopolitical front, the fall of the Berlin wall (1989). Major disasters occurred such as the Bhopal poison gas leak (1984), that killed thousands of people and injured several thousand others, the Chernobyl nuclear disaster (1986) and the Exxon Valdez oil spill (1989).

If the 1980s were carried with historical moments, the 1990s were not left behind: from the launching of Hubble telescope into space (1990), the official end of the Cold War (1992), Nelson Mandela's elections as South Africa's President (1994), to the cloning of a sheep by scientists (1997). In the environmental field, the milestone convention Rio-92 or ECO-92 happened in Brazil; the meeting put together 35,000 people and 106 heads of state for a UN conference destined to discuss environment and development (Seixas, 2011, pp.161-162)

One important advance in the environmental realm,at the local level,was the creation of the *Superfund* (1980) in The United States. The legislation was funded through new taxes applied to the chemical industry and it was destined to clean up abandoned toxic waste dumps, as a reaction to the Love Canal and Times Beach disasters. Even though a follow up report in 1992 found out that only 84 of the 1,245 sites were successfully cleaned up ("The toxic mess", 1992), the awareness it raised and the taxation of the chemical companies consist of advances that must be recognized.

In Brazil, the transition from the military government to the democratic system did not bring significant changes to the environmental field – except for the creation of special organs destined to deal with the environment as a topic of its own legitimacy. The Ministry of the Urban Development and Environment was created in 1985 and in 1989, influenced by events such as Chico Mendes' assassination. The government createdthe Ibama (Instituto Brasileiro do Meio Ambiente, Brazilian Institute of the Environment); in 1990, the then president Fernando Collor de Mello created the SEMAN (Secretaria do Meio Ambiente,

Environment Secretariat) and in 1999, the former president Fernando Henrique Cardoso established the Ministry of the Environment (MMA) as it is known today (after the creation of the Ministry of the Urban Development and Environment, a confusing sequence of denomination changes - into the Ministry of the Environment and the Legal Amazon (Ministério do Meio Ambiente e da Amazônia Legal) in 1993, to Ministry of the Environment, Hydric Resources and the Legal Amazon (Ministério do Meio Ambiente, dos Recursos Hídricos e da Amazônia Legal) in 1995 – culminated in the MMA establishment in 1999). Though this certainly represented an advance in the environmental insertion into the political field in Brazil, actions destined to improve the quality of life of the environments remained in the backstage.

In the theoretical field, though it is still too early to talk about a real, profound questioning of the development model and its intrinsic connection to the environmental crisis, *ecodevelopment* appeared as a new proposal based on principles elaborated by Ignacy Sachs in a 1986 publication. In the following year, the *Brundtland Report* (produced by the World Commission on Environment and Development, a United Nations commission) offered a complex analysis of the globalized social, economic and environmental problems.

When it comes to DDT, the overall number of reports dropped considerably during this period, as if the world ban had also carried a ban on the debate - *Popular Science* for example only had 6 articles mentioning DDT in this period of time.

Figure 36: **Media coverage from 1980 to 1999 by number of entries**

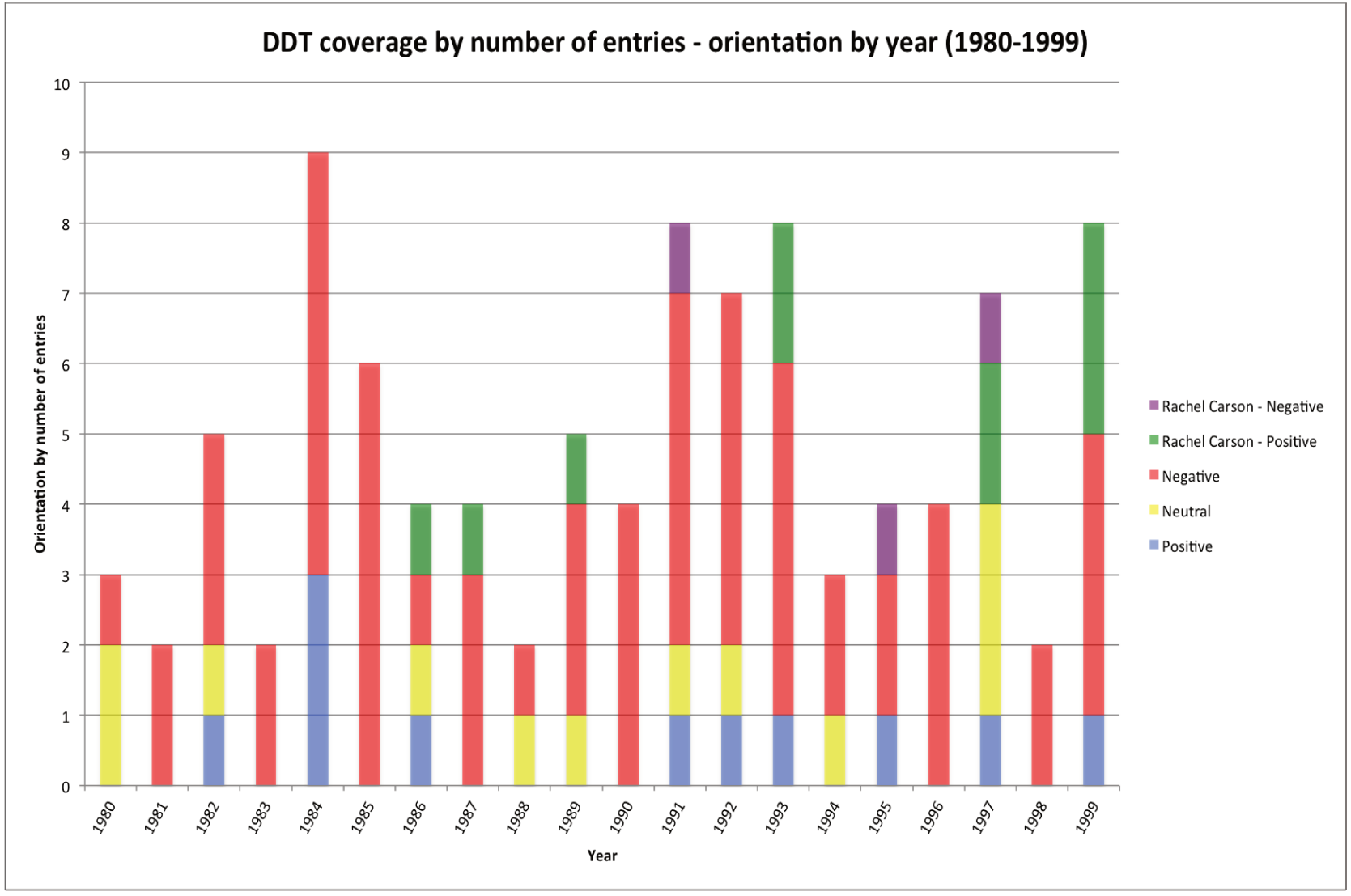
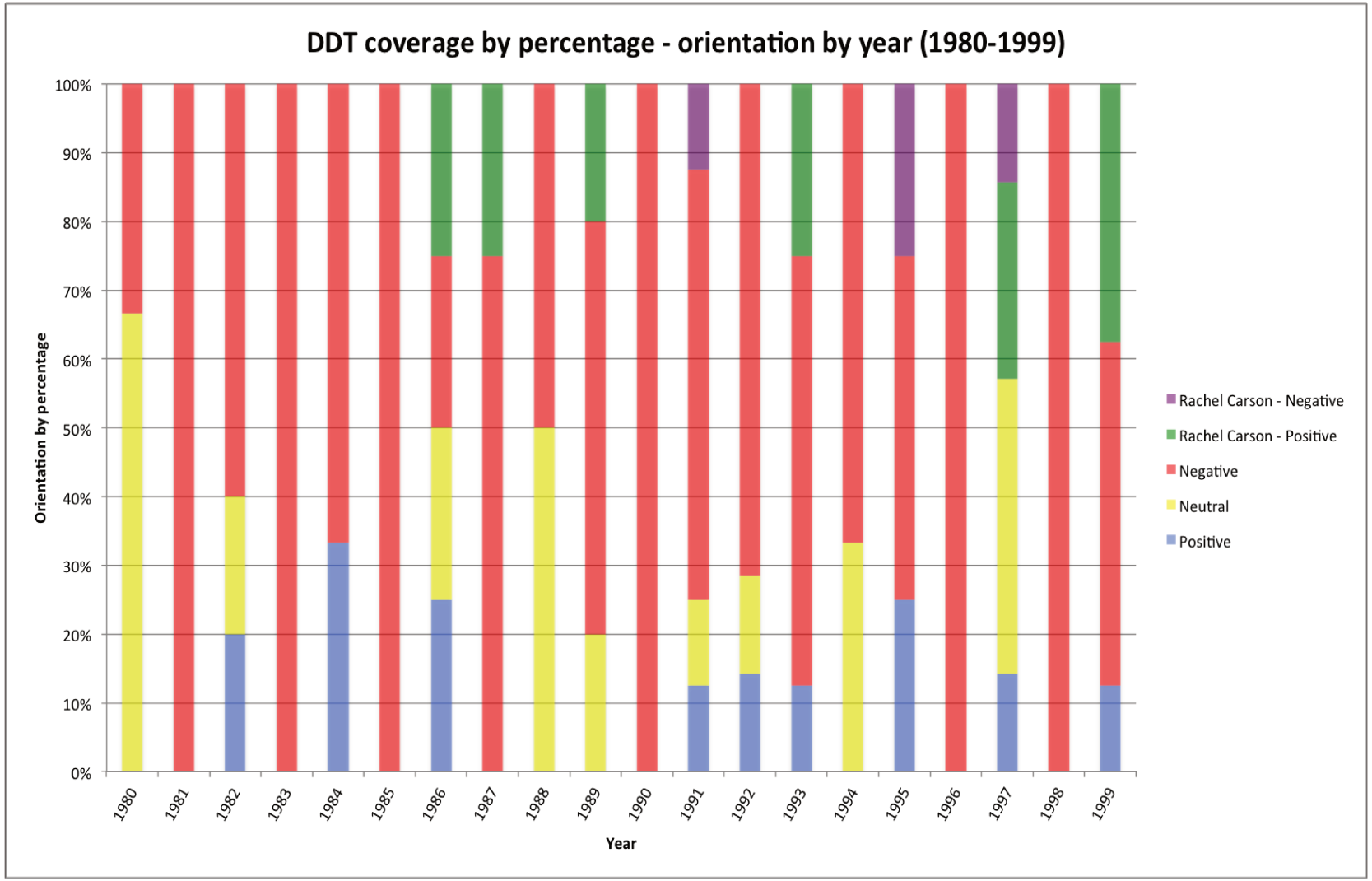


Figure 37: **Media coverage from 1980 to 1999 by percentage**



Forgetting a topic after its peak has passed is a typical reaction from the event-focused and event-driven media, but ignoring a problem does not make it disappear; it is not because DDT was not as present in the media as before that the problem was gone – quite the opposite. The outlets seem to occasionally remember the pastime pollution, with the new trending topic of bioremediation:

> The public never heard much about bioremediation until March 1989, when the *Exxon Valdez*-loaded with more than 50 million gallons of crude oil-ran into a reef in Alaska's Prince William Sound and began hemorrhaging oil. That summer, scientists applied fertilizers to test plots at contaminated beaches, hoping to enhance the microbial degradation of the oil that washed ashore. The technique appeared to be successful. . . . But oil isn't the only contaminant that microorganisms eat. They can slurp down an alphabet soup of hazardous materials: DDT, TNT, and PCBs, for example. (*Popular Science,* Jul/92, p. 70)

If DDT was not so present in the media anymore, it has not been forgotten as a toxic waste when it was mentioned; there were still worries about erasing the damage done and the pollution caused. The narrative that assures science can solve all problems (in this case, with magnificent microbes that magically "slurp down" all the pollution) was once again present. DDT was not at all gone; it was just further away from the reader's eyes.

Usually when I tell people that I study DDT, I have to explain what DDT is - especially when it comes to younger generations, roughlypeople under their thirties. When I talk to someone who knows what DDT is, usually their reaction is "DDT, really? Is it still relevant?". People tend to get very surprised and even shocked when I explain that DDT is still produced by the ton and that it figures as one of the WHO *recommended* pesticides for public health campaigns. This detachment from a very palpable reality, one in which the publicfails to recognize the problem as such or does not attribute the propersignificance to it, is very much due to the lack of debate about topics that for some reason are not interesting to be on spot. In the 1980s and 1990s, even though many countries - including Brazil - were still allowed by law to use DDT, it became "old news". Malaria, and consequently DDT use, was still very present and therefore a

serious issue in African countries and in places like Brazil, where the Amazon forest hosted populations of *Anopheles* that could benefit greatly from ecological disruptions that enabled new environments to be conquered and oftentimes, new human populations to be bitten. As reported by Sonia Shah (2010),

> between 1970 and 1996, the Brazilian government, supported by the World Bank, engineered widescale development projects in the untouched jungles of the Amazon. Their agriculture and mineral extraction projects disrupted the jungle environment, creating new habitats for malarial mosquitoes. Migrant workers and others flooded into the region, residing in crude dwellings, where they were vulnerable to mosquito bites. Soon, parasites from a sparse population of rubber tappers (unrecognized by the government), who traditionally lived in the jungle, started to infect the newcomers. Between 1970 and 1999, the malaria caseload in the Amazon region of Brazil zoomed from around 30,000 to 600,000 (pp. 80-81)

The current situation of these pastworkers from Sucam (the Brazilian agency formerly responsible for managing public health campaigns) is very serious yet tremendously neglected, as I will address in the subchapter 3.5.

Going back to the DDT overall coverage for these two decades and the public awareness on the matter, I believe the root of the current overall alienation towards DDT (and also the pesticide culture) is greatly due to the downfall on coverage that aggravated in the 1980s but that startedwith malaria being ignored by the media as a relevant topic in the 1950s. With a high reliance on DDT's success for eradicating malaria and the subsequent failure to do so,

> malaria disappeared from the headlines. Books on the topic went out of print. Scientists stopped studying the disease; educators stopped teaching it. So completely did malaria vanish from the public mind that many people in the West grew up thinking that there was, literally, no more malaria in this world (Shah, 2010, p. 219)

Not only was the coverage frequency much lower, but also its content frequently led the public to believe the DDT/pesticide problem was part of a distant past:

> Difficult though it is to remember, there was a time when people thought that pesticides were magic, a penicillin for produce; that black people naturally were second-class citizens and that women naturally belonged in the home; that a rapidly growing population was a sign of the world's vigor; that nuclear power plants offered free, sparkling-clean power. (*The New Yorker,* 06/02/86, p. 23)

DDT was old news and concerns over DDT and overpopulation were substituted by newer threats, such as environmental contamination, triggered by eventslike that of Love Canal, the Bhopal episode and others:

> The U.S. faces other grave environmental risks: acid rain, smoggy skies, radioactive wastes and lethal gases escaping from industrial plants. Over the past five years, the EPA reported last week, mishaps in the handling or production of chemicals have caused some 1,500 injuries and 135 deaths. But the disposal of dangerous wastes is clearly the most pressing concern. (*TIME,* 10/14/85, para. 5)

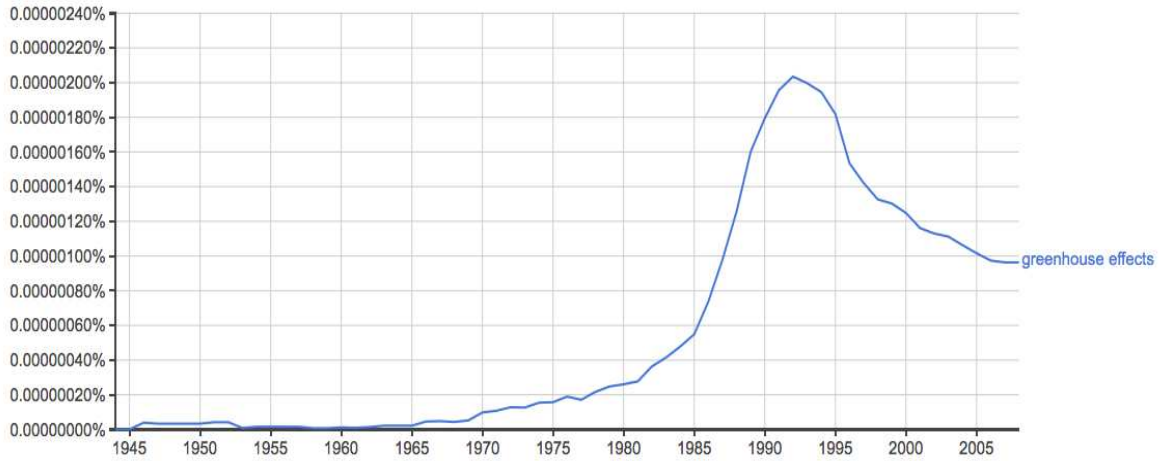
It became common practice to measure environmental quality through pollution indexes, possibly because pollution was at the center of the environmental concerns during the 1970s and this enabled the growth of the field, the creation of indexes and their analysis further on.Back then, such indexes were created and improved and it was now possible to look at their evolution through the years and realize the alarming scenario they represented. These indicators were mainly looking into air pollution, water pollution and food contamination. The fear of pollution gave space to the fear of intoxication:

> Fifteen years ago, public-opinion polls on environmental issues showed that most people were worried about water and air pollution – especially smog. Now, even though these problems remain largely unsolved, polls show that as a public concern air and water pollution runs behind a new environmental threat - toxic chemicals. (*The New Yorker*, 06/15/87, p. 52)

Two new topics in particular were trending in the coverage at the time, those of*toxic waste* and *greenhouse effects.* This tendency is not restricted to the magazines analyzed here, but by using Google Books NGram Viewer we can follow the popularity of these two terms as they appeared in books with a peak in

the 1990s:

Figure 38: Popularity of the term *greenhouse effects*since 1944



(Source: Google Books NGram Viewer)

Figure 39: Popularity of the term *toxic waste*since 1944

(Source: Google Books NGram Viewer)

It is important to note that periodicals such as newspapers and magazines offer a more immediate response to trending topics, as books take much longer to be written, edited, published and circulated than the two

formers.Because of that, the analysis of books (something valuable as they offer information about what is relevant enough to be in a publication of higher investment such as a book) has to take into account a certain delay on the approach of new topics, a consequence of the slower characteristic of the editorial process.

Now surrounded by new environmental concerns and as a symbol that represents of chemical abuse, DDT is brought up again in the same *The New Yorker* piece:

> In the early nineteen-seventies, this problem was due largely to agricultural products – insecticides, herbicides and fungicides. DDT and similar chlorinated insecticides were the most notorious examples. In 1972, the use of DDT and related insecticides was banned in the United States because they were shown to promote cancers and also to be a hazard to wildlife . . . Since 1950, however, the roster of serious chemical pollutants gas steadily expanded. Hundreds of toxic chemicals, many of them carcinogenic, have been detected in water supplies, air, and food . . . The chemical industry has, largely unrestrained, become the major threat to environmental quality. (*The New Yorker*, 06/15/87, p. 52)

Together with greenhouse effects, another ghost shows up as a protagonist of humankind's doom: global warming. Public health was a central concern approached within these two themes, as well as the extinction of species and though still tangentially, the end of natural resources.

Negative coverage towards DDT became predominant after the main discourse shift in the late 1970s, and Rachel Carson was more frequently mentioned together with it. However, it is from the 1980s onwards that her portraying steadied and her image started to become the romanticized, heroic one we recognize today in the media, of the "very brave woman" who wrote a "very brave book" (*TIME,* 03/29/99, para. 1):

> And then there was Rachel Carson's *Silent Spring*. Published in 1962, it embedded a message about the folly of trying to conquer nature within an exposition about the dangers of pesticides to animal and human life. Despite the formidable opposition of the chemical industry, which ridiculed Carson as an overly emotional woman unqualified to judge the

> health effects of compounds like DDT, her thorough research and exquisite ability to turn dry science into evocative prose won the hearts and minds of the public, who made the book an enormous best seller. . . . Carson was a publishing oxymoron--a prodigy who published her first essay in *St. Nicholas Magazine* at age 11, and a late bloomer who found success as a writer only in her 40s. (*TIME,* 10/06/97, para. 1-3)

This is not restricted to *TIME,* but also appears in *The New Yorker:*

> Had Rachel Carson not written when she did about the dangers of DDT, it might well have been too late by the time anyone cared about what was happening. She pointed out the problem; she offered a solution; the world shifted course. (*The New Yorker,* 09/11/89, p. 91)

Not only does *The New Yorker* praise Miss Carson, but it also reproves *TIME*'s unfair coverage (even though the reproving magazine did the same in the past) when addressing the issue of chemicals in the United States:

> When "Silent Spring" was published as a book, in 1962, *Time* said that Carson, in warning her readers about the health hazards posed by exposure to DDT and other pesticides, was guilty of 'frightening and arousing' them. One leading scientist (male, as it happened) questioned her right to worry about future generations, pointing out that she was a spinster who had no children. That kind of talk is no longer acceptable in the United States, but the widespread use of toxic chemicals is still tolerated, and the Clinton Administration is talking about relaxing some of the laws that have been passed to prevent the sale of food containing cancer-producing chemicals. (*The New Yorker,* 06/07/93, p. 114)

Much more timid and somewhat naïve is the *Popular Science* article asserting that "in 1962, Rachel Carson's *Silent Spring* examined the dangers of indiscriminate use of pesticides and herbicides. Although pesticides and herbicides are still used frequently today, they are applied much less liberally on crops" (*Popular Science,* Aug/99, p. 12).

It took a while, but the narratives and discourses changed. I identify two incentives that together help explain the narrative change as they influenced the media coverage. The first comes from the idea that since its birth in the 1970s until the 1980s, the environmental movement became a stronger, more cohesive group that had by then gained space in the public arena. Rachel Carson

personified the movement's ideologies in her qualities of persistence, strength, honor, irreverence, and good-heart, providing an icon, a leader for people to admire and providing footsteps to follow.

If the first force that drove the discourse change addresses the positive aspects of Rachel Carson, the second one focuses on the diminished negative propaganda towards her. The still remaining doubts that questioned DDT's toxicity and harmfulness (fueled by the growing health concerns about the abuse of toxics in the past by a generation that now felt the consequences of its use) essentially vanished, getting restricted to a minority of advocates oftentimes backed up by the pesticide and agriculture business; this enabled the positive narratives about Miss Carson to flourish (considering that given time, the diversity of discourses tends to narrow down to a few dominant ones that become overly repeated: the "middle-aged spinster" and "hysterical woman" narratives practically vanished).

After decades of environmental disasters, media coverage about the environment, and warnings from scientists about different threats, environmentalism finally made its way through societies in a somewhat globalized manner: 80% of the North Americans and 2/3 of Europeans considered themselves environmentalists (Castells, 1999, p. 141), governments started including a "green agenda" in their proposals to gain voters, private companies showed growing effort on including nature, somehow, in their marketing agendas. Protecting the environment became a common goal slightly more internalized by governments, international organizations, the private sector and the public. Because the environmental issues had been assimilated by the social sciences in the 1970s and 1980s and now assumed a globalized, inter-relational nature, in the 1990s the environmental debate brought solid contributions from the social disciplines as it incorporated the interdisciplinary approach. It embraced the *quality of life* and *risk society* concepts, and saw in the partnership with other disciplines a necessity to tackle the environmental challenge in its magnitude (Seixas, 2011).

Decades after the most intense use of DDT, there was a higher recognition of the health problems caused by it, with an emphasis on cancer, hormones and reproductive problems. This can be observed for example in *TIME* magazine:

> Though banned in the U.S. in 1972, DDT is not forgotten. Soluble in fat, the insecticide leaves trace amounts that can linger for decades in human tissue. Now a study published by the National Cancer Institute suggests that these residual effects may be deadly. Researchers from the Mount Sinai School of Medicine and New York University have found that the greater the exposure to DDT the higher the risk of breast cancer for women (*TIME,* 05/03/93, para.1)

And again in the same outlet 6 years later:

> Although levels of DDT contamination are gradually falling in countries where the pesticide has been banned, new scientific research suggests that the chemicals are still a serious threat everywhere. Studies show that even small amounts of pesticide can disrupt the working of human hormones, interfering with reproduction and the functioning of the immune system. That's why representatives of more than 100 nations will gather at a U.N. meeting in Nairobi this week to work toward a global treaty that would phase out DDT and 11 other pesticides, known as the dirty dozen. Environmentalists say it's possible to find alternative ways to fight malaria--and get rid of DDT once and for all (*TIME,* 02/01/99, para.1)

At times, DDT was portrayed as something very present. *TIME* reminded its readers that "no matter where you live or when you were born, you almost surely have at least a small amount of DDT stored in the fatty tissues of your body" (*TIME,* 02/01/99, para. 1). On an opposite direction though, was a new trend suggesting that DDT is not as bad as it was portrayed in the past and even that it should have never been banned:

> [Norman] Borlaug [awarded the Nobel Peace Prize in 1970 for increasing the world's food production though his work in wheat breeding] has ever since [the First World War] been a defender of DDT and similar chemicals, with the proviso that they should be employed, like medicine, in proper, supervised dosages. He likes to point out that he had no strong objections to the banning of DDT in the United States, where malaria is rare, but that when it was banned in India, following

> world-wide protests against its use anywhere, the annual incidence of malaria rose from two hundred and fifty thousand to seven and a half million (*The New Yorker,* 12/17/84, pp. 91-92)

Veja brought up a similar argumentover 10 years after Borlaug's declaration to *TIME*:

> The book *Silent Spring,* by Rachel Carson, blames DDT for the disappearing of certain American birds. But it does not mention the thousands of people from all over the world that got rid of malaria because of the correct and efficient use of DDT (*Veja*, 04/02/97, p. 11)

Not only experts such as Norman Borlaug backed up this DDT praise butalso lay people who worked closely with DDT, like the former agriculture pilot Hayes interviewed by *The New Yorker*:

> 'Then Miss Rachel Carson came along, and in 1962 she wrote a little book called 'Silent Spring,'' he says. 'And because of it they outlawed DDT. Said DDT was bad for the planet. That was the beginning of the end – that was when Congress got involved in crop dusting. I laid out tons of DDT, and I don't know that it ever hurt me any. I've eaten more DDT than about anybody, and my son was born fine. He came to earth bald and naked. I've never been sick a day in my life (*The New Yorker,* 07/08/91, pp. 56-57)

Academia was also involved in such praises, for example in*The New Yorker* piece:

> A classic food fight took place recently in the editorial pages of the *Wall Street Journal,* in the form of letters between Bill Moyers, who narrated a 'Frontline' special, broadcast in March, that indicated the Environmental Protection Agency for its convoluted system of regulating pesticides, and Dennis Avery, a researcher at the Hudson Institute, who wrote an editorial denouncing the broadcast. The Avery editorial went as far as to declare DDT a safe, useful pesticide that should have never been banned (*The New Yorker,* 07/19/93, p. 4)

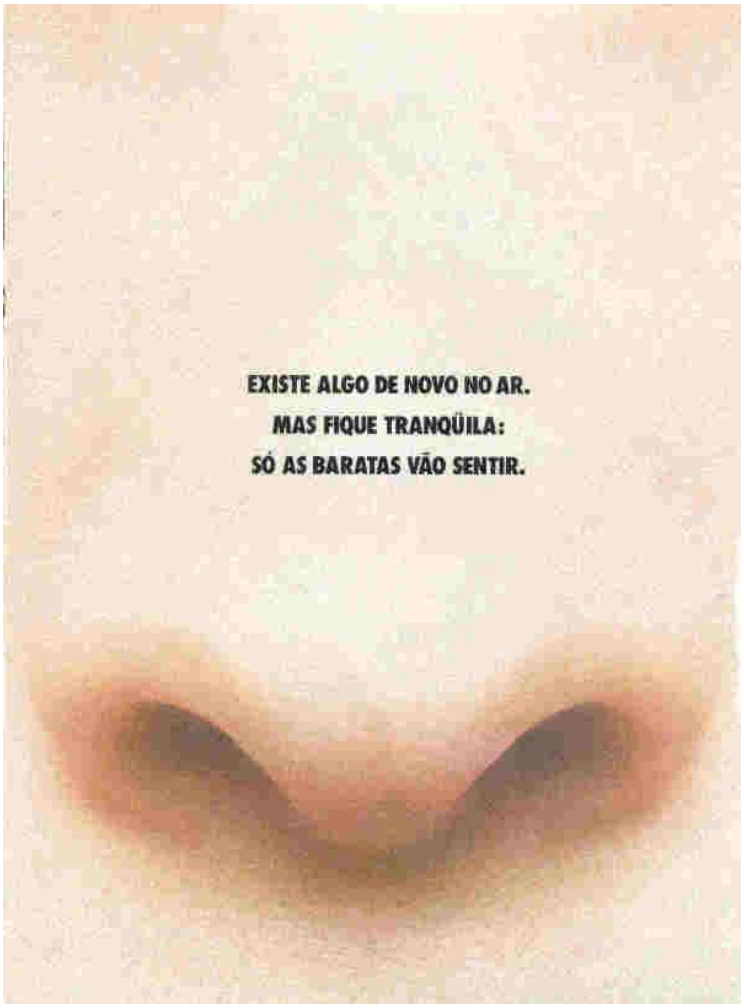
The assertions of a Nobel prize winner, the researcher of a renowned institute, and a lay man who dealt closely with DDT could have lead the public to think that maybe DDT was not really that bad. Though they represent a minority,

through the space the media offered to them their discourse gained legitimacy and the public was usually caught in the middle of this narrative battle, something that still happens today.

Though they no longer have DDT in their formula, insecticide advertising frequently focused on safety (Figure 40) and subtlety (Figure 41):

Figure 40: SBP advertising highlighting its safety lock (“SBP elétrico”, 1997)

Figure 41: “There’s something new in the air. But keep calm: only cockroaches will feel it” (“Existe algo”, 1994)



Usually, the reports that talk positively about DDT in the 1990s are reprinted pieces that were originally written in the 1950s and 1960s. This happened in occasions when the magazines reissued what was being talked about in the past, with a historical appeal.

With a total of 7 pieces in these two decades, *Superinteressante’*sapproach was usually connected to themes related to the environment, though very superficial in content, and though DDT was never the central theme it was mentioned more than once as one of the molecules that

could be degraded by particular fungi species - in September 1992 and February 1997. Malaria was also a relevant topic, but in this case DDT was presented as a cheap weapon used by WHO:

> In 1955, the basic weapon against malaria was the insecticide and pesticide DDT. In this year, WHO organized a relatively cheap combat plan, with a calculated cost of 25 cents of dollar per person. DDT and other toxics were spread, in the endemic regions of the planet, in an attempt to eliminate the mosquito and also block its dangerous parasite (*Superinteressante,* Mar/93, p. 22)

Two decades in a nutshell

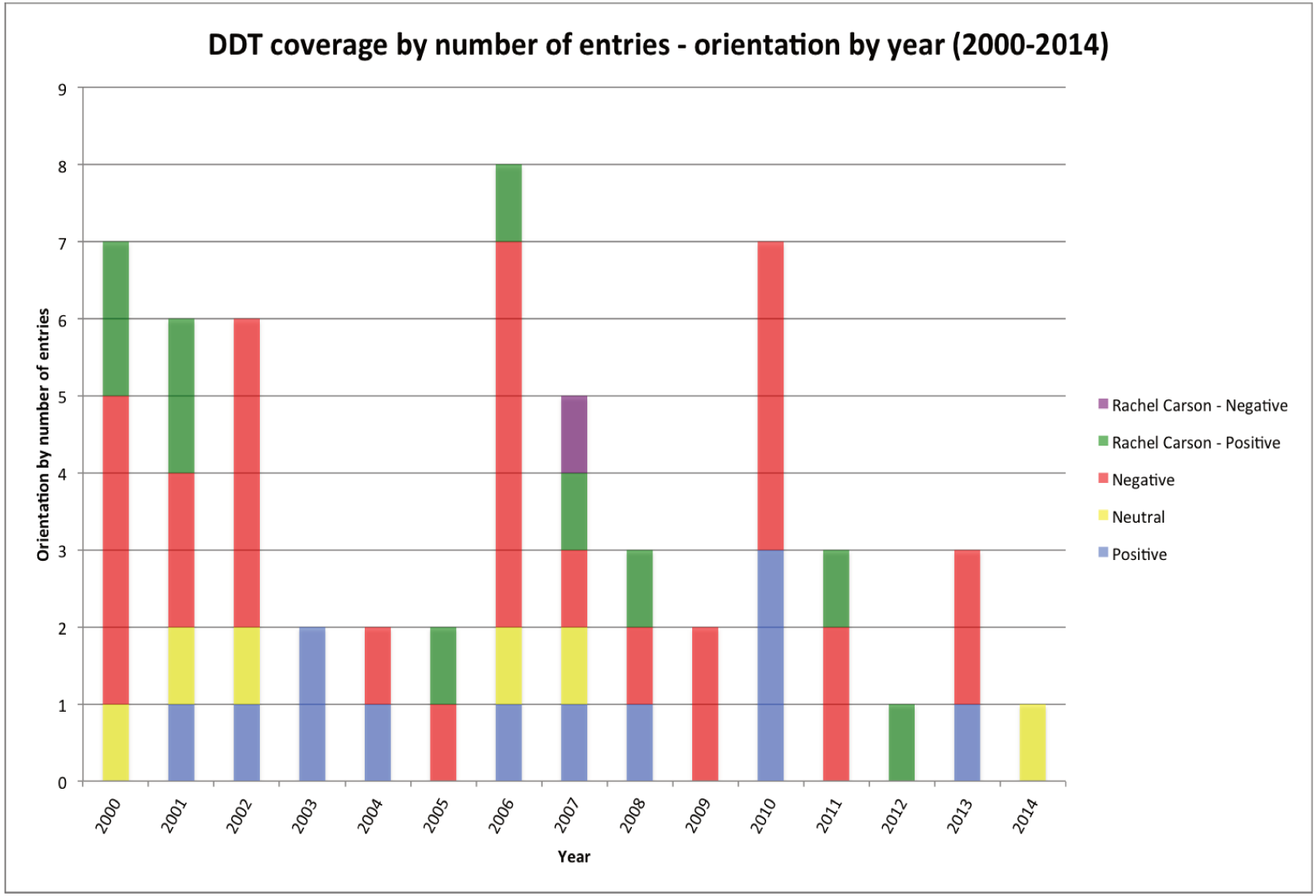
The absolute number of reports on DDT dropped considerably between 1980 and 1999 and the coverage was very erratic, oscillating between small peaks. With the ban in the U.S. and many other countries (Brazil not included), the new pesticides that did not contain DDT in their formula arose and the advertisement turned its focus to safety instead of efficiency, as it had been before. In Brazil DDT was applied at large in the Amazon region to fight malaria outbreaks (with serious health consequences to the fumigating workers) but the media rarely mentioned this situation and DDT started to become part of a past that did not belong to the public's reality anymore.

3.5. The 2000s and 2010s: Old problems are old

The period between 2000 and 2014 was marked by disasters. From the 9/11 attacks (2001) to Hurricane Katrina in The U.S. (2005), the earthquake in Haiti (2010), Deepwater Horizon disaster (2010), and Japan's earthquake and tsunami (2011), there was a lot of attention directed to "the power of nature" and concerns over natural resources and the limits to growth as the world population reached 7 billion (2011).

With the passage of the decades, the diversity of DDT coverage narrowed down to a handful of narratives and images associated to it: the near extinction of the bald eagle in the past, Rachel Carson and the *Silent Spring,* cancers and other health consequences derived from chemicals, the naivety of past generations in applying such a dangerous compound, the pollution derived from chemical abuse.

Figure 42: Media coverage from 2000 to 2014 by number of entries



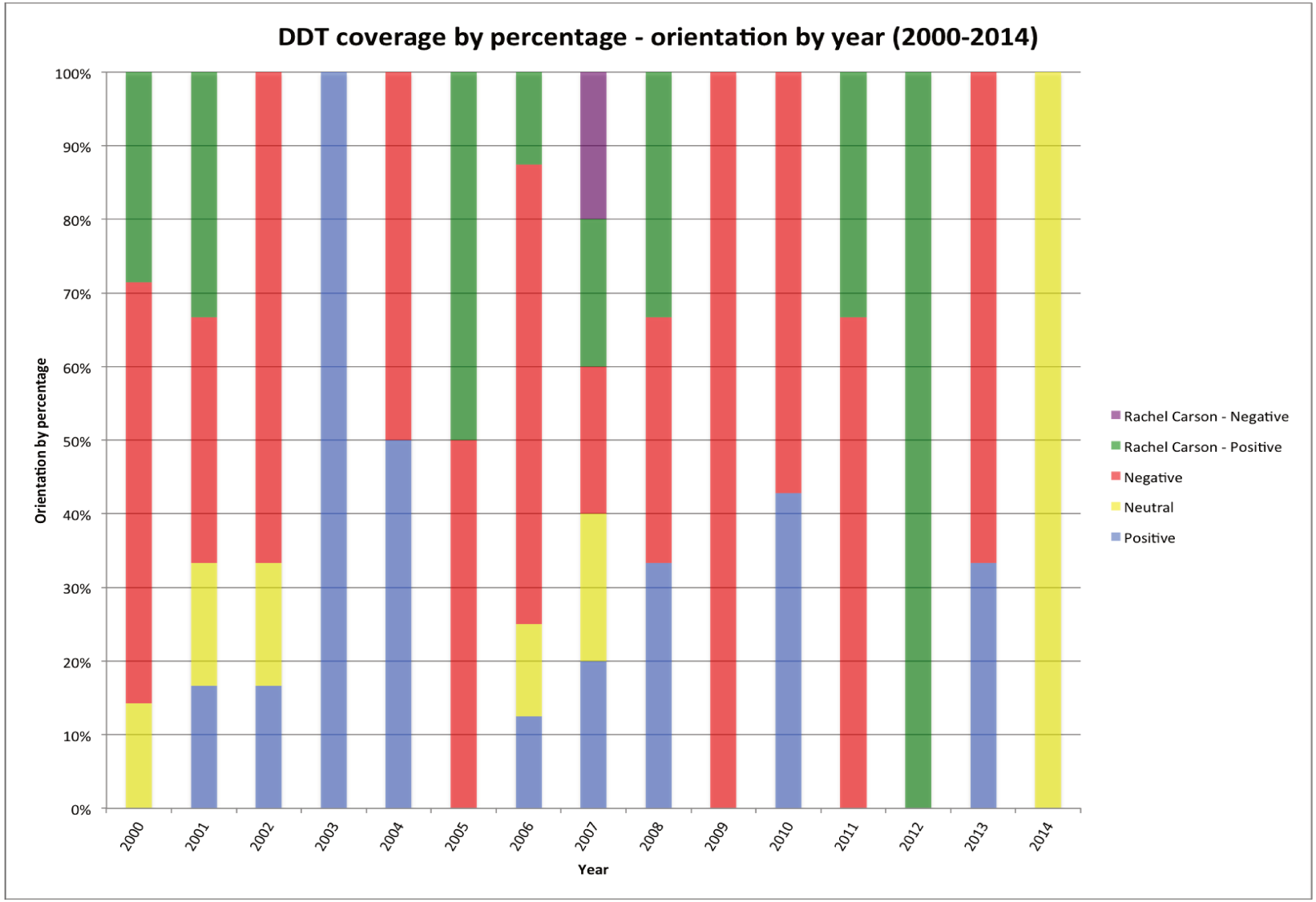
The coverage was poor in absolute numbers and in variety. Though the internet brought the possibility of variety in opinion and sources, the repetition becomes clear when one reads what has been said about DDT and such repetition does not only occur within the same outlet, but crosses the magazines analyzed. Although DDT constitutes of a very palpable reality in many parts of the world, it is mostly spoken of in the past tense as a topic that has been long outdated.

One exception is the narrative that portrays DDT as a toxic waste that still lingers, for example when *TIME* says that organic food contains chemicals because "pesticides that were banned long ago, like DDT, can hang around in soil for years" (*TIME,* 05/20/02, para. 2). This fear of remaining DDT is also brought up by *Popular Science* in 2006, one year after category 5 hurricane Katrina destroyed part of the United States. The report addresses the pollution that spread over New Orleans and states that the city "is covered with such levels of toxins, including arsenic and DDT, that families with children shouldn't return to the city until it's cleaned" (*Popular Science,* Feb/06, p. 45), but it fails to address where does the DDT come from.

Curiously, narratives with a positive tone come to place (Figure 43). They state the importance of DDT for phasing out malaria and put into question the real harmfulness of the pesticide, scaling the importance of saving wildlife *versus* saving human lives. It is interesting to think that this comeback happens decades after the most intense use of DDT, and the generations that did not come into direct contact with it, who do not have a direct memory of it, are among the ones posing such questions. An example of this argument can be seen in this letter sent to *TIME,* where reader Sebastian Schmid claims that

> The article on new efforts to eradicate malaria, "Battling a Scourge," does not mention the sad fact that the environmentalists pushing the ban of DDT have caused the death of millions [June 28]. After 1972, when the U.S. banned the use of this pesticide, a move that was followed by the rest of the world, the number of malaria deaths grew quickly. It would be desirable for scientists to once again study the advantages of DDT to help eradicate malaria once and for all (*TIME,* 07/19/10, para.1)

Figure 43: Media coverage from 2000 to 2014 by percentage



This also happens in the same magazine in 2004, in a report about malaria that starts by talking about the attempt to control it in the past and the realization that it could never be completely eradicated in other countries as it had been in the U.S., partly because

> There was also a growing backlash against DDT, a pesticide that is highly effective at attacking mosquitoes but whose indiscriminate use in agriculture killed many fish, beneficial insects and birds. Although only small amounts of DDT are needed to control malaria--usually in indoor-spraying campaigns--its toxic reputation made cash-strapped governments in Africa, which often must rely heavily on international donors, hesitant to use it (*TIME,* 06/26/04, para. 9)

The defense over DDT becomes evident a few paragraphs later, where the appeal of saving lives comes forth as the reported brings up that

> recent experience in South Africa shows just how well DDT can work. In 1996 the South African government, under pressure from international and domestic environmental groups, decided to phase out its use of DDT in residential spraying and rely instead on pesticides containing pyrethroid chemicals. Unfortunately, it turned out that many anopheles mosquitoes in South Africa were resistant to pyrethroids. The number of cases of malaria, which had been hovering between 8,000 and 13,000 a year, grew steadily worse, and by the year 2000 it had reached 64,000 cases, with 423 deaths. When the government reintroduced DDT spraying in the middle of that year, the results were dramatic. The number of cases fell almost immediately (*TIME,* 06/26/04, para. 16)

A very similar argument, though much more subtle, is made two years later again by *TIME* when it discusses the WHO decision of bringing DDT back*:*

> Nearly 30 years after phasing out the widespread use of DDT to control malaria, the World Health Organization (WHO) has reversed itself. . . . Why? DDT is particularly effective at repelling and not just killing mosquitoes, which helps protect enclosed spaces. Environmental organizations aren't thrilled by the idea, but two of the largest have endorsed limited spraying, figuring that *some risk to the environment is justified to save human lives* [emphasis added](*TIME,* 11/26/06, para. 12)

When addressing Rachel Carson, there is an established praise tone that can be synthetized in this piece by *Veja* magazine in 2001 that affirms “wasn’t

for the dramatic description by Rachel Louise Carson of the Springs with no 'bird singing', we would remain oblivious to the fact that 'we are part of the natural balance' of the planet" (*Veja,* Jan/01, p. 50). *The New Yorker* offers an explanation to that that goes in the same direction of the argument I make about Rachel Carson becoming a condensation symbol:

> In 1962, Rachel Carson published "Silent Spring". It became a No. 1 best-seller, and is often said to have started the movement that led to the ban on DDT and, ultimately, the creation of the Environmental Protection Agency . . . In all of these cases, it can be said (and in most of them it has been said) that the changes the books are associated with would have happened anyway. As [Stephanie] Coontz puts it, about [Betty] Friedan [the writer of "The Feminine Mystique", from 1963] "Books don't become best sellers because they are ahead of their time." But people like to be able to point to a book as the cause for a new state of mind, possibly for the same reason that people prefer anecdotes to statistical evidence. A book personalizes an issue. It has an Erin Brockovich effect: it puts a face on the problem; it sets up a David-and-Goliath drama. (*The New Yorker,* 01/24/11, p. 79)

Current times do not bring a very different scenario than might be expected, in terms of narrative, practices and ideology, from that of the past decades. Science and technology have led us to believe we can live a life free of annoyances and inconveniences, from bugs (by spraying some insecticide – Figures 44, 45 and 46[34]) to hot days (by turning on the air conditioning). Though we have repeatedly seen science fail (and failure is indeed an intrinsic feature of the scientific process) and even trigger catastrophes that have attested that it can solve fundamental problems but also create them, science is still seen as the holder of all answers and solutions; there is a faith and unconditional trust in science as a source of human betterment and social progress, especially in Brazil, when compared for example to the United Kingdom, where there is a sense of

[34] Though today's insecticides do not have DDT in their formula, at least in Brazil and The United States, I believe their emphasis on safety (exemplified by Figure 46) comes as a response to the public's awareness towards chemicals after the DDT use and subsequent ban. The idea of overpowering insects (Figure 45) and protecting oneself from them (Figure 44) are old narratives that survived the passing of time and are presented here to show that even though DDT is not part of these products, its memory is present in the sense that it helped create the narratives they still echo.

ambivalence and a feeling that the public is kept in the dark when it comes to scientific issues (Phill Macnaghten, personal communication). This is partially due to the image that has been attributed to science and scientists as almighty, know-it-all, distant figures. The myth of a disturbance-free, infinite-resource world is a dangerous one that should be carefully destroyed so that it will not end the public's confidence and support for science but rather lead to a better understanding of what science is, how the scientific method works and in which ways scientists should be held accountable.

Figure 44: *Jungle Formula* allows you to enjoy a night outside ("This summer", 2013)

Figure 45:Surprise the insects – and arachnids – before they surprise you ("When they least", 2007)

Figure 46:An insecticide that puts your family under a protection dome ("Terrível contra", 20??)

Naomi Klein addresses this faith in technology from a risk perspective, using the BP disaster (also knows as the Deepwater Horizon oil spill or Gulf of Mexico oil spill) as an example thathighlights that

> after telling ourselves for so long that our tools and technology can control nature, suddenly we were face-to-face with our weakness, with our lack of control, as the oil burst out of every attempt to contain it. . . . But even more striking than the ferocious power emanating from that well was the recklessness with which that power was unleashed -- the carelessness, the lack of planning that characterized the operation from drilling to clean-up. If there is one thing BP's watery improv act made clear, it is that, as a culture, we have become far too willing to gamble with things that are precious and irreplaceable, and to do so without a back-up plan, without an exit strategy.(Klein, 2010, 2:32)

The imprisoning narrative-loop that happened throughout the past decades is unsettling and alarming. Repeating the authorized discourse, the *single story*, poses serious dangers. Telling a story focusing repeatedly in one point turns it into the single truth (for example, that pesticides are essential, that we need them to feed the world population, that it is impossible to do so without it, that poisoning only comes from misuse, and that technology will always save us). These hegemonic discourses carry values, for example, that technology is always entirely good, that laboratory-made is better than homemade, that sterilized is always safer, that formula is more modern and advanced than breast milk (as it was reinforced in the 1990s), that natural is dirty and dangerous, that he who grows is poor – therefore primitive – and that he who buys it ready and packed is modern and advanced, that chemical-filled goods are a synonym of progress, and that progress is always welcomed and desired.

Public involvement has not evolved as it should either. Public accountability in helping solve environmental problems should also be at the center of the ecological debate - if the public relies solely on scientific solutions and disregard behavioral change and education as part of the solution, this poses a serious problem. We must weight the costs and benefits of our actions and our choices as consumers not only for the present, but for the future. We must accept

the inevitability of thinking collectively and beyond the present. We need, as a society, to meditate deeply upon our habits, our values, and more importantly, upon the society we want to be. It is a matter of commitment with a more ethical, equal, sustainable, healthy and happy world community. We must move beyond technical fixes and realize there is not one single or even set of technologies that will save us from the devastating scenario we keep creating,

> because this is our real master-narrative: however much we mess up, there will always be more -- more water, more land, more untapped resources. A new bubble will replace the old one. A new technology will come along to fix the messes we made with the last one. . . . Now the problem is that the story was always a lie. The Earth always did have limits. They were just beyond our sights. And now we are hitting those limits on multiple fronts. I believe that we know this, yet we find ourselves trapped in a kind of narrative loop. Not only do we continue to tell and retell the same tired stories, but we are now doing so with a frenzy and a fury that, frankly, verges on camp. (Klein, 2010, 11:43)

Regarding the pesticide culture, not much progress has been made when it comes to diminishing our reliance on chemicals – though public awareness seems to have risen in the past decade. Since 2009 Brazil has been the world's largest pesticide consumer (Ministério do Meio Ambiente, n/d, para. 10). According to data from Globo Rural presented by Bombardi (2011), in 2010 the chemical companies that produce pesticides had a net income of 15 billion reais[35]. Most part of this income (92%) was controlled by foreign companies here listed by higher to lower net income: *Syngenta* (Switzerland), *Dupont* (United States), *Dow Chemical* (United States), *Bayer* (Germany), *Novartis* (Switzerland), *Basf* (Germany) and *Milenia* (Holland/Israel). The U.S. *Monsanto*, the producer of glyphosate, is not on the list so this is probably an underestimation (Bombardi, 2011, p. 1).

According to Brazilian public health scholar Wanderlei Pignati, billions of liters of pesticides are applied yearly in Brazil:

[35]In March 2015 this amounted to more than 5 billion dollars.

> And I am not talking about the diluted pesticide. One liter of herbicide bought at these establishments is diluted in 100 liters of water to make the solution and pulverize. This has a destine, and part of it goes to fight that we are used to call ivy, like the fungus. A part goes to the soil, another evaporates and goes to the air. Another condenses and goes to the rain, and other yet goes to groundwater. This path of the pesticides to groundwater is what will leave residues in drinking water or in the water of the rivers, streams and Pantanal, inclusively. This will have impacts on the health of animals and human beings. (n/d, para. 4)

Many types of pesticides are stored on fat tissues and many of them, like the chlorates, never leave it. “It’s the case of endosulfan. When a woman produces milk to nurture her baby, this liquid will have pesticides on its composition. This is because the milk has 2 to 3% of fat” (Pignati, n/d, para. 2). And many types of pesticides are stored on fat tissues and many of them, like the chlorates, never leave it. It’s the case of endosulfan.

Instead of moving from a pesticide culture that poisons our food, we have carried on with a system that is not sustainable from any point of view. Not only that, but we are being told the same lies and are still scared by old ghosts such as food scarcity, when in fact

> the industrial monoculture agriculture only produces 30% of the food we eat in the world, and it is not quality food because it is GM and also has pesticide on it. And 50% of the food that is eaten by humankind is produced by smallholders that control 20% of the land. Now you imagine you were to give 50% of the land to the smallholders. There would be food for everyone (Altieri, 2014).

Not only we accept a food production system that relies on heavy pesticide application, but we have normalized the amount of poison we can take through the outragingindex of the Admissible Daily Intake (ADI). We accept there is a tolerable quantity the human body can take (an absurd notion when it comes to persistent chemicals) and we trust that there will be constant vigilance over the food in the supermarkets and shops so that the food that crosses the ADI limits will be taken off from circulation. We know, however, that things work very differently in reality and that the news are constantly reporting irregularities found in the supermarket shelves. Also, the ADI comes from a rudimentary concept of lethal

dose (LD), meaning that a certain population (usually of rats) is submitted to crescent doses of the substance. When half of the population is dead, you have the LD. It is an extremely reductionist method that does not take chronic effects into account. Organic food not only offers nutrition without contamination, but it comes from a production system devoid of environmental contamination, land expropriation and other evils that should already be banned from a society that prioritizes quality of life instead of profit and worship for money.

People who were in direct and intense contact with DDT in the past are up to today suffering the consequences of this, like the case of the former Sucam workers I mentioned before. Working in the jungle fumigating DDT in the Amazon region, they are current under a very delicate situation. Around 540 agents worked fumigating DDT only in the state of Acre between the 1970s and 1990s, 240 of which are already dead due to severe intoxication. At least 15 others are awaiting for death only in the Acre capital Rio Branco[36], most of them paralyzed to the point of needing assistance to eat and even being unable to speak due to neurologic paralysis (Muniz, 2015, para. 1).

At the time, the government told the agents (known in the past as the "malaria soldiers") that DDT was harmless and trusting that statement they worked in the middle of the jungle wearing regular uniforms that offered no protection and aluminum hats. Today, the government authorities and agencies do not recognize the intoxication of Sucam workers as legitimate, claiming there is no exam that proves that the diseases these men present are a consequence of DDT use, affirming that the servers are covered by the Sistema Único de Saúde (SUS, Unified Health System) and that they do not need special attention because DDT's harmfulness has not been proved (Muniz, 2015, para. 27). Toxicologist Anthony Wong, on the other hand, affirms that these workers were

[36]This data isunderestimated. Firstly, because it only accounts for Rio Branco city in Acre state, not considering other cities and states that belong to the Amazon region and were similarly fumigated. Secondly, because the numbers come from an estimate by the Associação DDT e a Luta Pela Vida (DDT and the Fight for Life Association), which lacks personnel to visit all the municipalities and states to properly calculate the affected. The association started the count in 2000, and 11 died in 2014 alone in Rio Branco (Muniz, 2015, para. 5)

likely infected not only by DDT but also by the oil-based solvent used to prepare the fumigating mix. The diseases they now present might not be a direct result of DDT only, but are related to a lifestyle derived from a whole life under inappropriate work conditions and that the State should be held accountable (Muniz, 2015, para. 29-34).

The government offers no assistance or compensation to the workers and their families, who suffer greatly with a very low income and very high maintenance costs due to the needed medication to alleviate the symptoms – there is no cure for DDT intoxication. One of the workers, Mr. Sebastião Bezerra, spends over R$1000 of the R$2000 monthly income in medicine (Muniz, 2015, para. 8). Others spend over 60% of their income in medical attention, like Mr. Raimundo Gomes, who presents heart and kidney problems. He states that he is only waiting for death to come and has already prepared his family (Muniz, 2015, para. 10). It is, to say the least, an outraging situation.

Another serious case of contamination is that of Cidade dos Meninos, an area located in the Brazilian State of Rio de Janeiro. In the 1940s, the area hosted a sheltering center managed by the Legião Brasileira de Assistência Social (LBA, Brazilian Social Assistance Legion) that promoted educational and professionalizing activities offered to poor children from 3 to 18 years old.

In 1947 the center started to share the area with the Instituto de Malariologia (Malariology Institute), that coordinated the production of organochlorides such as hexachlorocyclohexane (HCH) and DDT for disease control (Buosi &Felfili, 2004). In 1961 the industrial activities started being deactivated until complete shutdown in 1965. The remaining material, something between 300 and 400 tons of pesticides, were abandoned in the site (Ministério da Saúde, 2003).

According to Paulo Bessa, Environmental Law scholar, after the deactivation the people who lived there started to illegally sell the remaining production, something the authorities only realized in the 1980s. At the time, there were still around 40 tons of pesticide left in the contaminated area and several

families living in the zone (Bessa, 2005). As the area is only 131km away from Riocentro, where the Rio+20 meetings happened, the topic regained attention as reported by Hanrrikson de Andrade. According to data from the Health Ministry presented by him, 97,2% of the people who live in Cidade dos Meninos – that is, 1,944 people - are poisoned and the authorities have not acted properly since the 1960s (Andrade, 2012).

I offer one last example of past DDT use affecting today's society, again in Brazil,to reinforce that the issue is definitely not behind us:the contamination of books from the Brazilian São Paulo University's library. Workers from the contaminated library went on strike on February 2015 demanding proper management of the 9,200 books contaminated with DDT, DDE – a DDT metabolite – and other unnamed toxics (Souza, 2015).

Two decades in a nutshell

From 2000 to 2014 the media spoke very little of DDT, and when it did it was usually very briefly. To today's reader, DDT is presented as something from the past that is not part of their life – except when it is portrayed as a pollutant that remained in the environment. It is commonly brought up in articles about malariathat have an historical appeal, often mentioned with a positive approach as a chemical whose comeback would benefit millions of lives if applied correctly and with parsimony. This is balanced by reports that blame DDT for the suffering of people who were in direct contact with it, like former Brazilian fumigating workers; though this approach was not significant among the selected media, it was reported by independent journalists.

3.5.1. What about malaria?

Malaria has been a recurrent topic in the media related to DDT, as I have shown throughout this thesis in different examples among the media I

analyzed.DDT appeared repeatedly in malaria campaigns, and malaria appeared repeatedly in DDT advertisement; the connection between the two terms isvery tight. In this topic I will address malaria in a much more present-day manner than a historical one, not only because a historical approach has already been made in earlier chapters but especially because I want to discuss the current DDT situation and status. Because ending malaria is the pillar argument used by DDT advocates today, I could not leave this aspect behind. Through that, this topic aims to address the golden question: do we still need DDT today?

I will begin by pointing out that malaria eradication is a long-term commitment and far from an easily achievable goal, if achievable at all. However, more importantly than anything, controlling it if not eradicating it is a goal ethically and morally worth pursuing. This is the reason why I insist on the opinion that investment, effort, patience and above all, intelligence should be destined to help the millions of people suffering from a disease that is very much concentrated in poor countries where the population lack the most basic resources to fight it, such as clean water and nutritious food. Considering that early diagnosis and a fairly cheap, simple treatment are in most cases sufficient to avoid complications and death, the numbers are not only outrageous but unacceptable.

I will dedicate this subchapter to giving an overview of the current scenario concerning malaria research. More than providing a dossier, I will rather indicate a few possibilities that scientists are exploring, as well as the challenges and the milestones. I warn the reader that pinpointing how far we are from eradicating malaria is the million-dollar question that remains unanswered and I reiterate the two main points I stress in the earlier paragraph: 1) it is a long-term commitment and 2) it is morally worth pursuing.

To understand the main lines of research I looked into some of the most prominent malaria research centers, namely the Johns Hopkins Malaria Research Institute, the National Institute of Malaria Research (NIMR) in India, the Walter and Eliza Hall Institute of Medical Research in Australia, the Fundação Oswaldo Cruz (Fiocruz) in Brazil, and scattered research from several universities

that appeared in the news related to malaria research I came across. I also rely heavily on the work of Sonia Shah, a North American journalist with Indian origins whose book *Fever* offers a fantastic look into the malarious world.

Malaria is a blood disease caused by a *plasmodium* parasite and transmitted by an *Anopheles* mosquito. There are over 70 *Anopheles* that are able to transmit malaria, and dozens of *plasmodium*spread around diverse geographies and ecosystems and infecting different animals, from birds to snakes (Shah, 2010). There are five main types of malaria that affect *Homo sapiens*, caused by five different parasites: *Plasmodium vivax, Plasmodium malariae, Plasmodium ovale, Plasmodium falciparum* and *Plasmodium knowlesi.* The previously infected female of the mosquito *Anopheles* transmits the parasite when it feeds on human blood, infecting a new victim around one week later when it feeds again – though this depends highly on the mosquito habits and because there are so many different kinds of mosquito and *plasmodium*, there is an overwhelming number of possible combinations that can result in malaria. During the bite, the *plasmodium* in the blood is sucked by the mosquito and will then be mixed with its saliva in the next bite, carrying the disease further. The symptoms vary depending on the *plasmodium* type, on the immunity of the victim and whether him or her still has a spleen, but they include fever, chills, headache, sweats, fatigue, nausea and vomiting. The fever & chills combination is the characteristic that distinguishes malaria from other diseases and that has enabled historians to identify the presence of the disease in ancient civilizations, being possible to affirm that malaria has been present since the beginning of the humankind history – something around 500,000 years (Shah, 2010)

Every year, over 200 million people are infected by malaria. In Brazil, 99.6% of the malaria cases happen in the Amazon region and the diminishing of infections has been fairly successful over the last few years. The cases have dropped 26% in only one year (241 thousand in 2012 against 177 thousand in 2013, according to data from Fundação Oswaldo Cruz [Fiocruz]). Deaths dropped 40% in the same period (60 in 2012 to 36 in 2013). To the immunologist Cláudio

Tadeu Daniel-Ribeiro, head of the Laboratório de Pesquisa em Malária (Instituto Oswaldo Cruz/Fundação Oswaldo Cruz [IOC/Fiocruz]) and president of the Tropical Medicine and Malaria International Federation, the success is due to early diagnosis and this is where efforts should be focused to drop even more the numbers, as the disease is fairly simple to be treated in the beginning but could lead to death if the patient takes too long to start treatment (Menezes, 2014).

Even though in Brazil the majority of cases happen in the Amazon, 60% of the cases are identified within 48 hours of infection; in the rest of the country, only 19% of the cases are identified so fast, making the risk of mortality 80 times higher in the non-endemic area. When it comes to a disease that can be easily recognized and treated, each case of death should be seen as unacceptable.

Throughout the centuries there were many plants and compounds used to prevent malaria and to fight its symptoms. Studying the pharmacological breakthroughs can be a distressing task as the new drugs and discoveries were by and large accompanied by an incredible degree of negligence and disregard for the advise of experts. One aspect that was first unknown, and later largely ignored, was the issue of resistance (though it was frequently reported in the media when it talked about DDT from the 1960s onwards):

> *Plasmodium* did not survive for millennia by virtue of some unerring killer instinct, unfailingly homing in on the immunological loopholes and secret hiding places in its prey. It survived by being more adaptable than its hosts. . . . The parasite's tremendous adaptability most likely escaped observers during the quinine era . . . but inside drug-dosed bodies all over the world, parasite populations found themselves under assault. Under those conditions, the few hardy individual parasites that could withstand the toll were suddenly plucked from obscurity. The first signs that malaria parasites could resist synthetic drugs cropped up during the tail end of World War II. (Shah, 2010, pp. 103-104)

Even though well informed malariologists know of the challenges imposed by malaria and of the near impossibility of achieving eradication, research goes on – though it has slowed down greatly after DDT, when

authorities took eradication for granted and relied too much on DDT's efficiency; they did not count with the environmental backlash and with the issue of mosquito resistance. One of the research areas conducted in the Brazilian institute Fiocruz involves the bacteria *Wolbachia,* which is being tested as a virus blocker for dengue, malaria, yellow fever and other vector-borne diseases (Ferreira, 2014). The Institute also invests in social research, like the project by political scientist and Fiocruz Amazônia researcher Ricardo Agum Ribeiro that aims to map the political influences in malaria fighting in the Amazon, namely to understand how the change between governments impacts political policies (Fiocruz Amazônia, 2014).

Malaria research currently involves various fronts. Huldén, McKitrick and Huldén published in 2013 a study that suggests that segmenting sleeping arrangements in a household might provide better control of the disease. One of the authors explains that the mosquitoes mainly feed at night and they usually return to the same location to feed again; because of that, the more people sleeping in the same area, the greater the likelihood of the mosquito spreading the disease to uninfected people (Huldén, McKitrick, & Huldén, 2013).

Because the disease works in a cycle, several studies interfere in the sequence of the disease trying to break it and consequently stop it. There are research teams concentrating efforts on sterilizing the mosquito, while others are developing transgenic sterile mosquitoes that would slowly replace the native populations of infected ones; there is a heavy effort on developing a vaccine, there are vaccines already being tested with promising perspectives. Another possibility was published on *Nature* in July, 2014: researchers at Washington University School of Medicine looked into the behavior of the parasite inside the red blood cell of the host. They found out that to transform the red blood cell into a suitable home, the parasite starts a series of major renovations that will enable it to grow properly, steal nourishment and dump waste, all through a series of proteins that must pass from a single pore in the parasite's compartment to the red blood cell. With the passage blocked, the parasite stopped growing and died

(Beck, Muralidharan, Oksman, & Goldberg, 2014). Another study published in the same *Nature* issue also calls attention to the importance of the pore.

Malaria is a very old disease that is believed to have accompanied mankind since we evolved from the apes (Shah, 2010), and the eradication dream is not something new either. According to Shah (2010) there are three main challenges when it comes to malaria suppression, and they are scientific (not only because the parasite is extremely complex and adaptive, but also because thanks to the excessive reliance on the success of the massive DDT campaigns starting in the 1950s the scientific research diminished trusting that the instruments for fighting malaria would be enough to end the problem – something science would have to catch up with later on when it realized malaria eradication did not go as planned), economic (even though campaigns focus on cheap material and instruments, such as DDT and bed nets, a lot of investment is needed to take people to malarial places – which are usually of difficult access – to work with the communities, besides the money directed to research itself. Not only that, but malaria is related to other aspects such as bad sanitation and lack of access to clean water, what Shah calls “malarial way of life”, that depend on heavy infrastructure investments to be overcome) and cultural. The cultural aspect is possibly the most difficult to tackle and I will approach it in more detail.

As told by Sonia Shah, a North American science journalist who visited her family in India throughout her life and is familiar with the malaria scenario, in malarial places people are so used to the disease that they do not see it as a deadly, dangerous issue. Rather, it is very commonplace. It is also seen as an illness that comes and goes, similarly to what Western societies would think of a cold or flu. The amount of people affected by malaria every year is so huge that even though the percentage of deaths is very low, it adds up to a big number and puts malaria into the spotlight; however, for those living with it in their routine, it is nothing more than part of life.

This makes the eradication much harder because the cooperation of people is not very high, simply because they do not see it as a priority. Lets take

the example of bed nets, which are donated by the thousands, as they are a very cheap and efficient way to prevent malaria. Giving the bed nets to, say, a family in Angola, is worth nothing if the members of the family do not put it up every single night before they sleep and if they do not sleep underneath it through the whole night. The difficulty is that agencies frequently do not take into account the reasons why a person might not want to use it: maybe their house has a round shape round and installing a square object is hard; maybe it prevents the breeze from getting in and they might not want to use it because of the hot weather; maybe having to get out every time they want to release themselves is too much of a hassle. The point is, there are several reasons why someone might not use the net and it is incredibly naïve to think that by providing it, we are effectively helping diminish malaria. In fact, Shah highlights research that points out that only 20% of those who received the nets did use them – and this number might be exaggerated, as people who distributed the nets were the ones asking if those who received it had been using it. It is very likely that many people responded *yes* when in reality their answer should be *no*.

Shah gives a very interesting example to helps us understand how people who live in places very affected by malaria see it. Imagine someone from Kenya comes to America and offers a solution for cold and flu: face masks. This person explains it is very cheap and effective, the only thing you have to do is to wear it, everyday during cold season, when you go to work, walk by the streets, go to the supermarket and perform your daily activities. Would you wear it?

We must think of the reality of people we want to approach before imposing on them solutions that make sense to us and to our context. For many, the disease represents a spiritual punishment and can also be caused by third-party envy. To sum up, “we’ve got a disease it’s scientifically complicated, it’s economically challenging to deal with and it’s one for which the people who stand to benefit the most care about it the least” (Shah, 2010, 8:57).

Other aspects of the malarial way of life have to be taken into account. Because the majority of cases affect African children, providing clean water and

food would already be of great help to diminish mortality by increasing the quality of the treatment and help the recovering of the victim – what is the use of medicine when the patient does not have food to nurture the body and help it recover? Malaria is much more an issue of poverty than one of a threatening parasite. It is treatable, it is curable, and it represents centuries of pilled inequality. There are a great many research groups looking into it, and with proper information the households could diminish the incidence by, for example, rearranging sleeping segments and using bed nets, besides learning to identify the disease in order to treat it on its early stages. If basic human rights such as access to food, water and a clean environment would almost suffice to end not only cases of malaria, but also those of diarrhea and starvation, I ask: do we really need DDT as a main weapon to help those people? Do we need to poison the environment and compromise its integrity for current and future generations before concentrating money and efforts on basic human rights? Should we maintain a business that kills some people with the justification of saving other?

Spraying the whole African continent with a potent bug-killer might seem, to those not informed enough and fairly new to the game, the most practical and efficient way to tackle malaria (even though the cultural aspects I detailed are not solved through spraying but through education and by valuing the local knowledge of the populations affected, working together with them to avoid a colonialist approach that pushes down solutions that might seem ideal on paper but that do not work on real life), but if by doing it we compromise the health of people and the environmental quality, we should rethink our tackling tactic. Not only that, but even if the environmental issue did not exist, it simply would not work: DDT resistance among mosquitos is a reality that will only spread as they reproduce and if as little as 1% of the *Anopheles* and mosquitoes resist, malaria will make a comeback stronger than ever.

Malaria also became an instrument for governments to defend interests that go way beyond the well-being and quality of life of the most infringed by the disease:

> For the United States, support for the oil industry was only one part of the political and economic incentives that propelled the government to devote resources to the antimalarial fight in 2005. . . .In addition, Africa's role in supporting the global terrorist network Al Qaeda – the network maintains a base in Khartoum, Sudam, and its leader, Osaba bin Ladin [*sic*], had called for jihad in Africa – had risen in significance after the terrorist attacks of September 11, 2001. . . . Accordingly, the first five countries targeted by the President's Malaria Initiative included oil-drenched Angola and Equatorial Guinea, along with copper-rich Zambia (Shah, 2010, pp. 232-233)

Advocates that blame Rachel Carson for the malaria death toll are either poorly informed and/or very malicious people that are likely much distant from the malaria realities. Unfortunately, such ignorance often echoes in the media and for long environmentalists have been blamed of alarmism, eco-xiism and other extreme adjectives especially by economists and lobbyist for practices that are not environmentally-friendly such as oil drilling, fracking and others. The media outlets and the public should go deeper in the investigation of the interests behind the criticism and the support of certain practices. As put by Shah,

> for free-market conservatives, supporting the antimalarial movement helped score points in ideological wars. They'd long battled the environmental lobby's push for more stringent environmental regulations. Under the theory that the enemy's enemy is a friend, free marketeers have rushed to defend environmentalist's totemic anti-hero DDT. The free-market economist Roget Bate of the conservative American Enterprise Institute, for example, is one of the most vocal defenders of DDT, which he lauds as "the single most valuable chemical ever synthesized to prevent disease." Africa Fighting Malaria, the group Bate founded, is dedicated to promoting the use of DDT against malaria (2010, p. 233)

I end this section reinforcing the three main points I wantedto stresswhen discussing malaria control: it is a long-term, uninterrupted goal. It is the moral thing to do. It will not come through DDT use.

Conclusion

When designing this PhD research, the objective was to better understand the intricacies of the relations between science and society byobserving how the media serves as a moderator between the two, particularly when it comes to an environmental topic. What bridges does it build? Is it straightforward and consistent in its reports? Where does it fall short?

By studying a theme that travelled through time, not only in its specificity when vested as DDT but in its representation as the broader matters it evokes, I could point out trends and behaviors that not only confirm what media studies have described (such as its repetitiveness, or the fact it rarely offers space for true conflict) but also add advance on the field adding new interpretations.

It is important to say that because Brazil is the world's largest pesticide consumer today, and pesticide use is also high in many other places, there is a strong social implication to this research that must not be left aside. Following the DDT coverage throughout the decades, and observing history and culture unravel parallel to it, allows for a more directed projection of the future – and betters the chances of modifying it by understanding the wheels that keep it moving.

By analyzing the DDT coverage, I expected to enable a broader discussion that would go beyond DDT, laying the ground for a deep reflection upon current topics related to the environment, like the pesticide culture and the reliance on technological fixes. I argue that DDT became one (but not the only) symbol of the conflicts between science, governmental entities, and society, as it both encapsulates and projects roles, morals, and values that corroborate and later become ideologies. One example of this symbolic role is when DDT evokesthe narrative of public distrust, represented for example by the idea that, in the past, both scientists and the government have been dishonest with the public when they assured that DDT was a safe pesticide and encouraged its use even knowing about its toxicity early on. Because of that symbolic characteristic, today

DDT often appears in the media as a hook that revives the debate on the environmental responsibility of science, the accountability of scientists and the consequences of technological advancement.

I aimed to meditate upon the narratives involved in the media coverage of DDT and the discourses that surround it, deconstructing these elements. More specifically, I meant to test three hypothesis. The first claims that there is one main discourse flip in the media coverage, when DDT stopped being seen as beneficial and started being looked at as harmful. This hypothesis would prove itself wrong if the discourse orientation changed over and over, and I wanted to pinpoint when it happened and why. Additionally, I meant to define the influence of a particular character, the North American biologist Rachel Carson, in the DDT discourse trajectory, identifying if her book*Silent Spring* consisted ofthe trigger to the turning point in the DDT's representation from a hero to a villain, as it is nowadays pointed out – my second hypothesis is that the main discourse flip happened right after the *Silent Spring* was published. My third hypothesis states that the coverage would rise after 1962, as a response to the uproar the book mentioned provoked.

The beginning of the DDT coverage was intense while the product was being presented to society. There was a strong focus on use instructions and an optimistic expectation towards the changes it would grant to society. DDT was a symbol of science and technology providing quality of life, as it promised to get rid of bugs and the diseases they carried. In the first years, part of the public showed skepticism towards such marvel – something I verified by reading the letters the readers sent to the magazines and that was reinforced in opinion columns. This hesitation was not something I expected, though it diminished greatly once DDT had been "accepted" after its efficiency as an insecticide was empirically observed by the consumers.

After thisinitial stages of apprehension and further acceptance, DDT became part of the everyday life of nearly every North American household. Though stronger in The U.S., it was also very present in Brazil. Because DDT is

accumulative and persistent, it took a few years for the public to perceive changes in the environment surrounding them and to achieve a certain conviction that it was, in fact, harmful. This occurred after bird populations dropped (particularly that of the bald eagle, extremely symbolic and representative of patriotism for U.S. citizens), together with a diminishing in fish populations and wildlife loss.

Amidst a disquieting atmosphere that was already questioning DDT's true effects, Rachel Carson published the *Silent Spring* in 1962*.* She was not the first to point out to DDT's destructive nature, but was the first to present a complete dossier backed up by strong evidence that demanded the DDT ban. Because she was already an established writer that had the public's trust, her book reached such public very deeply and profoundly. The *Silent Spring*offered an emotional narrative, tied with a sentimental appeal that made the catastrophic scenario she painted a very realistic one, and therefore authentic and very alarming. The book's repercussion was huge.

After 1962, the DDT coverage decreased. This proved my third hypothesis to be wrong, as I expected exactly the opposite, that the coverage would rise as a reaction to the *Silent Spring.* The media avoided the debate, when it should be doing the opposite: informing the public, interviewing stakeholders, and showing the multiple angles. This situation was only reversed in 1969, when the coverage presented a substantial peak that lasted until 1971. I credit this to a general rise in the discussion of environmental topics, with the consolidation of the environmental movement and events like Earth Day (1970) and the United Nations Human Environment Conference (1972) held in Stockholm.

Though the coverage dropped, the tone of the discourse changed. In 1967, it became predominantly negative and this situation would not change, in other words, the positive orientation would not overpower the negative again. This proves that there was indeed one main flip in the discourse, from a mainly positive to a mainly negative one, confirming my first hypothesis. I cannot attribute this change exclusively to the *Silent Spring*, but to a combination of factors that include the valuing of environmental issues, and the pressure applied by

environmentalists, that were now a much more cohesive group. Maybe the book did indeed trigger such atmosphere and even the environmental movement itself, as it is said so today, but it is most likely a (very important) part of a broader picture. Thus, I can not say with certainty if my second hypothesis is true or false relying solely on the data I gathered.

After a peak between 1969 and 1971, the intensity of the coverage dropped again. Though in Brazil DDT was still used, particularly in the Amazon region to fight malaria, the topic was left aside. In The United States, it acquired a tone that attributed naivety to the past generations for having used DDT and it often brought up the perspective of toxic waste and pollution.DDT started to become part of a past that did not belong to the public's reality anymore.

Since the 2000s, there was a comeback in positive narratives – though they are not sufficient to consider a new discourse flip. DDT is often put on a scale that has the saving of human lives on one side, and the environment on the other. The majority of the reports, though, are related to the past use. Many talk about malaria, and some mention current studies that link DDT to hormonal diseases, attention deficit hyperactivity disorder (ADHD)and cancers.

This study revealed a superficialand inconsistent coverage, particularly when it comes to the Brazilian magazines. It was not uncommon to read a report attacking DDT in one edition and one praising itin the following week. There was scarcely a deep discussion about DDT,or about what it represented in terms of the relation between science, technology and society. Very few reports offered a mature communication that would lead to the readers' reflection on the theme.

If knowledge is power, a well-informed society is definitely an empowered one. It is one that can say noto researchthat does not represent their interests, and one that can demand that both science and the governments serve the purposes it believes to be moral and right. It can demand quality of life, fairness, and sustainability. A public that understands science is much more prone to getting involved in the scientific process and to feeling comfortable with the outcomes if they feel they have been included in the decision-making, and is

therefore much more supportive and participative. This mature state relies deeply, though not only, on public communication, and there is certainly a long way to go for the media to provide such quality.

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Appendices

Annex I – Magazine entries: Citation list *in text* versus*references*

THE NEW YORKER

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05/26/45 – The talk of the town (1945, May 26). *The New Yorker,* pp. 14-19.

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08/06/45 – Steuber, Walter (1945, August 06). Homemade DDT. *TIME.*

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09/17/45 – The war against rats (1945, September 17). *TIME.*

12/10/45 – Fisherman, beware (1945, December 10). *TIME.*

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09/16/46 – Flyless mountain (1946, September 16). *TIME.*

09/15/47 – Miscellany (1947, September 15). *TIME.*

10/11/48 – Hyslop, James Augustus (1948, October 11). Spokesman for the enemy. *TIME.*

04/11/49 – Worse than insects? (1949, April 11). *TIME.*

08/08/49 – Nature can take it (1949, August 08). *TIME.*

04/24/50 – Safe DDT (1950, April 24). *TIME.*

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Feb/06 – Skloot, Rebecca (2006, February). Conflicting advice floods New Orleans. *Popular Science,* p. 45. Retrieved from http://www.popsci.com/archive-viewer?id=UhpR8HzVEeEC&pg=null&query=february%202006

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Annex II – Raw Data

POSITIVE
NEGATIVE
NEUTRAL
RC/SS - POSITIVE
RC/SS - NEGATIVE

TIME

ORIENTATION	QUANTITY
POSITIVE	118
NEGATIVE	111
NEUTRAL	27
RC/SS POSITIVE	18
RC/SS NEGATIVE	3
TOTAL	277

TYPE	QUANTITY
ARTICLE	264
LETTER	13
TOTAL	277

DATE	WORDS	DDT	TYPE
03/06/44	268	3	ARTICLE
03/27/44	1873	3	LETTER
06/12/44	651	20	ARTICLE
07/31/44	150	4	ARTICLE
08/07/44	145	8	ARTICLE
08/21/44	1441	4	LETTER
08/28/44	900	2	ARTICLE
10/23/44	508	1	ARTICLE
11/13/44	385	1	ARTICLE
12/25/44	244	8	ARTICLE
02/19/45	574	1	ARTICLE
04/16/45	305	7	ARTICLE
05/14/45	1780	1	LETTER
05/28/45	88	3	ARTICLE
07/23/45	200	5	ARTICLE
07/30/45	581	1	ARTICLE

08/06/45	228	7	ARTICLE
08/06/45	327	1	ARTICLE
08/27/45	334	8	ARTICLE
09/03/45	257	1	ARTICLE
09/10/45	278	2	ARTICLE
09/17/45	98	1	ARTICLE
09/24/45	288	1	ARTICLE
10/01/45	2201	1	LETTER
10/22/45	309	9	ARTICLE
11/12/45	248	1	ARTICLE
12/10/45	188	4	ARTICLE
01/07/46	463	18	ARTICLE
05/27/46	415	1	ARTICLE
06/03/46	364	1	ARTICLE
06/24/46	433	14	ARTICLE
06/24/46	301	11	ARTICLE
07/08/46	221	1	ARTICLE
08/05/46	301	2	ARTICLE
09/02/46	463	1	ARTICLE
09/16/46	319	5	ARTICLE
12/16/46	239	1	ARTICLE
01/27/47	299	5	ARTICLE
02/10/47	381	1	ARTICLE
04/14/47	332	5	ARTICLE
05/19/47	381	2	ARTICLE
06/30/47	3187	1	ARTICLE
08/11/47	431	1	ARTICLE
09/15/47	371	1	ARTICLE
09/29/47	252	1	ARTICLE
10/20/47	430	2	ARTICLE
11/17/47	792	1	ARTICLE
12/01/47	390	2	ARTICLE
01/12/48	731	1	ARTICLE
01/19/48	221	2	ARTICLE
01/26/48	305	4	ARTICLE
05/24/48	551	2	ARTICLE
08/02/48	467	1	ARTICLE
08/30/48	258	2	ARTICLE
09/06/48	269	2	ARTICLE
09/13/48	493	1	ARTICLE

10/11/48	422	1	ARTICLE
10/18/48	641	1	ARTICLE
11/08/48	475	1	ARTICLE
11/08/48	200	4	ARTICLE
01/24/49	643	1	ARTICLE
03/28/49	854	1	ARTICLE
04/11/49	412	16	ARTICLE
04/25/49	157	2	ARTICLE
06/20/49	629	1	ARTICLE
06/20/49	540	1	ARTICLE
07/04/49	3955	1	ARTICLE
08/08/49	412	11	ARTICLE
08/29/49	827	1	ARTICLE
08/29/49	402	1	ARTICLE
10/24/49	777	4	ARTICLE
11/14/49	444	1	ARTICLE
12/05/49	349	7	ARTICLE
01/02/50	1551	1	LETTER
04/17/50	334	1	ARTICLE
04/24/50	177	8	ARTICLE
05/01/50	692	1	ARTICLE
05/01/50	325	2	ARTICLE
07/17/50	232	1	ARTICLE
08/07/50	649	1	ARTICLE
01/01/51	142	7	ARTICLE
01/22/51	468	1	ARTICLE
02/05/51	2530	2	ARTICLE
04/30/51	75	2	ARTICLE
08/06/51	339	1	ARTICLE
08/13/51	315	1	ARTICLE
09/10/51	220	2	ARTICLE
10/22/51	591	1	ARTICLE
11/12/51	103	1	ARTICLE
11/26/51	535	1	ARTICLE
12/17/51	613	1	ARTICLE
03/03/52	4271	2	ARTICLE
05/12/52	520	1	ARTICLE
09/15/52	623	1	ARTICLE
03/16/53	334	1	ARTICLE
08/31/53	267	1	ARTICLE

11/23/53	727	1	ARTICLE
12/21/53	360	2	ARTICLE
02/15/54	569	1	ARTICLE
03/08/54	798	1	ARTICLE
04/26/54	755	1	ARTICLE
06/07/54	571	1	ARTICLE
01/17/55	259	1	ARTICLE
05/16/55	2233	1	ARTICLE
06/27/55	4824	1	ARTICLE
08/01/55	314	1	ARTICLE
10/31/55	688	1	ARTICLE
11/07/55	824	1	ARTICLE
05/21/56	512	1	ARTICLE
07/09/56	674	1	ARTICLE
04/29/57	484	1	ARTICLE
01/20/58	765	8	ARTICLE
11/17/58	824	1	ARTICLE
12/08/58	3623	2	ARTICLE
05/25/59	604	1	ARTICLE
06/01/59	226	2	ARTICLE
06/22/59	396	1	ARTICLE
07/27/59	4613	1	ARTICLE
10/05/59	610	1	ARTICLE
01/11/60	3478	1	ARTICLE
09/19/60	4587	1	ARTICLE
09/26/60	2021	1	ARTICLE
11/07/60	588	1	ARTICLE
12/26/60	520	1	ARTICLE
03/10/61	699	1	ARTICLE
07/21/61	684	1	ARTICLE
06/01/62	839	1	ARTICLE
08/31/62	802	1	ARTICLE
09/14/62	725	2	ARTICLE
09/28/62	2037	10	ARTICLE
03/29/63	824	2	ARTICLE
05/10/63	612	4	ARTICLE
07/05/63	446	1	ARTICLE
07/17/64	210	2	ARTICLE
08/21/64	1777	1	ARTICLE
08/28/64	1804	1	ARTICLE

09/04/64	1812	1	ARTICLE
06/25/65	780	1	ARTICLE
08/20/65	421	1	ARTICLE
10/22/65	600	1	ARTICLE
08/12/66	2603	1	ARTICLE
10/06/67	766	1	ARTICLE
11/24/67	738	1	ARTICLE
12/15/67	635	1	ARTICLE
05/10/68	2587	4	ARTICLE
08/16/68	538	1	ARTICLE
04/18/69	715	10	ARTICLE
05/02/69	4786	2	ARTICLE
06/06/69	188	1	ARTICLE
07/11/69	1395	36	ARTICLE
07/25/69	1179	6	LETTER
08/01/69	357	1	ARTICLE
08/08/69	249	3	ARTICLE
08/15/69	1164	2	ARTICLE
10/10/69	351	1	ARTICLE
10/10/69	268	1	ARTICLE
10/24/69	932	1	LETTER
10/24/69	1257	3	ARTICLE
11/07/69	744	1	ARTICLE
11/21/69	357	10	ARTICLE
12/05/69	203	1	ARTICLE
12/05/69	542	1	ARTICLE
12/12/69	457	2	ARTICLE
12/12/69	4940	1	ARTICLE
02/02/70	5109	3	ARTICLE
02/09/70	135	1	ARTICLE
02/23/70	796	1	ARTICLE
03/16/70	593	1	ARTICLE
06/08/70	998	1	ARTICLE
06/15/70	465	12	ARTICLE
07/13/70	615	1	ARTICLE
08/03/70	908	4	ARTICLE
08/24/70	1836	1	LETTER
08/31/70	4530	1	ARTICLE
09/28/70	823	1	ARTICLE
09/28/70	189	1	ARTICLE

10/12/70	666	6	ARTICLE
11/02/70	598	4	ARTICLE
11/16/70	1491	1	ARTICLE
11/16/70	669	1	ARTICLE
12/21/70	639	4	ARTICLE
01/04/71	2047	2	ARTICLE
03/01/71	193	6	ARTICLE
03/22/71	683	1	ARTICLE
04/12/71	561	4	ARTICLE
05/17/71	422	1	ARTICLE
06/28/71	355	3	ARTICLE
07/26/71	798	4	ARTICLE
08/02/71	765	1	ARTICLE
08/09/71	795	7	ARTICLE
10/11/71	842	2	ARTICLE
10/18/71	871	8	ARTICLE
11/08/71	529	1	ARTICLE
11/22/71	409	4	ARTICLE
12/13/71	1439	1	LETTER
01/03/72	889	2	ARTICLE
02/07/72	564	1	ARTICLE
06/05/72	809	1	ARTICLE
06/19/72	1060	1	ARTICLE
06/26/72	265	6	ARTICLE
07/17/72	2129	1	ARTICLE
08/07/72	422	1	ARTICLE
01/27/75	599	1	ARTICLE
04/28/75	591	1	ARTICLE
12/01/75	538	3	ARTICLE
07/12/76	5110	10	ARTICLE
07/26/76	586	3	ARTICLE
09/06/76	360	1	ARTICLE
03/07/77	2010	1	ARTICLE
07/25/77	403	1	ARTICLE
09/12/77	640	7	ARTICLE
04/10/78	315	1	ARTICLE
05/22/78	388	1	ARTICLE
03/12/79	953	1	ARTICLE
05/14/79	1492	1	ARTICLE
12/03/79	1298	3	ARTICLE

02/25/80	939	1	ARTICLE
09/22/80	5034	1	ARTICLE
12/01/80	929	1	LETTER
07/13/81	984	2	ARTICLE
10/05/81	1070	1	ARTICLE
07/19/82	401	3	ARTICLE
10/25/82	745	1	ARTICLE
07/11/83	505	1	ARTICLE
09/19/83	1477	1	LETTER
02/13/84	599	2	ARTICLE
05/21/84	1416	1	ARTICLE
07/23/84	1088	1	ARTICLE
08/13/84	1486	5	ARTICLE
09/17/84	1415	1	ARTICLE
12/17/84	420	2	ARTICLE
10/14/85	3663	1	ARTICLE
10/14/85	4484	1	ARTICLE
05/25/87	2359	1	ARTICLE
12/03/90	851	1	ARTICLE
06/29/92	1406	1	ARTICLE
08/10/92	2090	3	ARTICLE
05/03/93	142	4	ARTICLE
12/27/93	1198	3	ARTICLE
05/02/94	257	1	ARTICLE
07/11/94	772	2	ARTICLE
09/19/94	1812	4	ARTICLE
03/18/96	1215	1	ARTICLE
05/20/96	681	1	ARTICLE
10/06/97	548	1	ARTICLE
11/10/97	873	1	ARTICLE
02/02/98	802	1	ARTICLE
02/22/99	1869	1	LETTER
03/29/99	2599	4	ARTICLE
03/29/99	1563	2	ARTICLE
06/14/99	200	1	ARTICLE
04/26/00	1824	1	ARTICLE
04/26/00	3005	1	ARTICLE
08/21/00	5558	1	ARTICLE
10/30/00	3268	1	ARTICLE
04/16/01	332	1	ARTICLE

06/04/01	1216	3	ARTICLE
05/20/02	238	1	ARTICLE
08/19/02	193	1	ARTICLE
11/11/02	3486	1	ARTICLE
03/29/04	64	1	ARTICLE
07/26/04	1848	12	ARTICLE
03/21/05	738	1	ARTICLE
02/05/06	3962	1	ARTICLE
11/26/06	4934	4	ARTICLE
01/15/07	159	1	ARTICLE
05/05/08	383	1	ARTICLE
02/23/10	1007	3	ARTICLE
07/08/10	789	1	ARTICLE
07/19/10	755	2	LETTER
08/18/10	703	2	ARTICLE
09/04/10	885	3	ARTICLE
09/23/10	1716	1	ARTICLE
01/31/11	569	1	ARTICLE
10/20/11	3575	1	ARTICLE
10/01/12	673	8	ARTICLE
02/18/13	930	1	ARTICLE

THE NEW YORKER

ORIENTATION	QUANTITY
POSITIVE	40
NEGATIVE	55
NEUTRAL	31
RC/SS POSITIVE	13
RC/SS NEGATIVE	2
TOTAL	141

TYPE	QUANTITY
ARTICLE	85
LETTER	6
CARTOON	1
NOTE	19
POETRY	3
ADVERTISING	15
REPORT	27

TOTAL	156

DATE	PAGES	DDT	TYPE
08/12/44	1	15	POETRY
11/25/44	1	1	ADVERTISING
03/24/45	11	1	REPORT
05/26/45	1	15	ARTICLE
09/29/45	1	1	ADVERTISING
10/06/45	13	2	REPORT
10/27/45	1	1	NOTE
11/17/45	1	1	NOTE
11/24/45	1	1	ADVERTISING
01/26/46	3	18	ARTICLE
04/27/46	7	1	REPORT
05/18/46	11	1	REPORT
05/25/46	2	2	ARTICLE
07/20/46	2	1	ARTICLE
08/03/46	2	6	ARTICLE
10/26/46	1	1	NOTE
06/14/47	3	1	ARTICLE
02/07/48	3	3	ARTICLE
05/28/49	5	1	NOTE
06/04/49	1	1	NOTE
06/18/49	6	1	ARTICLE
07/30/49	9	2	REPORT
10/08/49	1	1	ADVERTISING
10/22/49	5	1	ARTICLE
07/08/50	18	1	ARTICLE
07/15/50	11	2	ARTICLE
03/03/51	1	1	ADVERTISING
07/14/51	2	1	ARTICLE
03/01/52	16	4	ARTICLE
04/05/52	15	1	REPORT
07/26/52	9	1	ARTICLE
11/22/52	24	2	REPORT
04/04/53	18	1	ARTICLE
08/22/53	17	1	ARTICLE
08/29/53	2	1	ARTICLE
07/17/54	21	154	REPORT
11/06/54	1	1	ARTICLE

06/16/55	1	1	NOTE
08/06/55	1	1	ARTICLE
05/05/56	1	1	ADVERTISING
06/02/56	1	1	ADVERTISING
07/28/56	1	1	NOTE
08/11/56	1	1	ADVERTISING
09/15/56	1	1	NOTE
09/29/56	1	1	ADVERTISING
10/13/56	1	1	ADVERTISING
10/27/56	1	1	ADVERTISING
12/15/56	33	2	ARTICLE
01/19/57	2	2	ARTICLE
07/27/57	1	1	ADVERTISING
11/08/58	1	2	NOTE
12/20/58	11	1	ARTICLE
07/11/59	17	1	ARTICLE
08/15/59	2	1	ARTICLE
08/15/59	1	1	NOTE
11/14/59	1	1	NOTE
12/12/59	24	1	REPORT
12/12/59	2	2	NOTE
12/19/59	1	1	NOTE
03/19/60	2	1	ARTICLE
04/02/60	1	1	NOTE
04/30/60	1	2	NOTE
09/17/60	1	1	NOTE
11/19/60	17	2	REPORT
07/15/61	14	3	ARTICLE
08/05/61	3	1	LETTER
12/02/61	25	4	ARTICLE
05/19/62	1	3	ADVERTISING
06/16/62	36	33	ARTICLE
06/23/62	37	51	ARTICLE
06/30/62	26	47	ARTICLE
10/12/63	2	1	ARTICLE
05/02/64	1	1	ARTICLE
08/29/64	6	1	ARTICLE
03/05/66	38	1	REPORT
10/08/66	1	1	POETRY
11/12/66	22	3	ARTICLE

02/04/67	26	1	ARTICLE
04/26/69	9	1	ARTICLE
07/26/69	24	1	REPORT
09/06/69	1	4	NOTE
01/31/70	4	1	ARTICLE
02/07/70	22	1	REPORT
03/14/70	2	1	ARTICLE
03/14/70	6	1	LETTER
03/21/70	40	1	ARTICLE
04/11/70	46	1	REPORT
05/23/70	9	2	REPORT
06/20/70	14	3	LETTER
08/15/70	2	3	ARTICLE
11/07/70	1	1	ADVERTISING
12/19/70	1	1	ADVERTISING
02/27/71	1	1	NOTE
03/27/71	26	4	ARTICLE
04/03/71	38	2	ARTICLE
07/17/71	2	1	ARTICLE
08/14/71	5	3	LETTER
10/02/71	28	7	REPORT
11/27/71	37	1	REPORT
12/04/71	22	1	ARTICLE
12/23/72	6	3	REPORT
06/16/75	5	4	ARTICLE
09/22/75	5	1	ARTICLE
09/06/76	1	2	ARTICLE
09/13/76	3	2	ARTICLE
07/25/77	22	3	REPORT
03/20/78	4	1	ARTICLE
07/03/78	26	4	REPORT
11/13/78	49	2	ARTICLE
06/18/79	40	1	REPORT
06/18/79	3	1	ARTICLE
01/04/82	10	1	ARTICLE
01/11/82	30	1	ARTICLE
12/17/84	28	4	ARTICLE
01/14/85	41	1	REPORT
06/10/85	17	1	ARTICLE
06/17/85	52	1	ARTICLE

10/07/85	22	1	ARTICLE
06/02/86	2	1	ARTICLE
09/08/86	1	1	POETRY
09/15/86	3	1	ARTICLE
05/18/87	21	2	ARTICLE
06/15/87	23	12	REPORT
06/19/89	25	1	ARTICLE
07/10/89	26	1	REPORT
09/11/89	45	5	ARTICLE
04/23/90	6	1	ARTICLE
08/27/90	3	1	ARTICLE
07/08/91	21	8	REPORT
08/12/91	14	2	ARTICLE
09/14/92	11	1	ARTICLE
06/07/93	1	4	ARTICLE
07/05/93	1	1	CARTOON
07/19/93	10	1	ARTICLE
07/19/93	2	1	ARTICLE
02/20/95	1	1	LETTER
07/31/95	1	1	ARTICLE
11/13/95	1	1	ARTICLE
01/15/96	12	2	ARTICLE
01/27/97	14	1	ARTICLE
06/23/97	5	1	ARTICLE
05/24/99	8	1	ARTICLE
09/27/99	9	1	ARTICLE
09/11/00	11	1	REPORT
02/19/01	2	1	ARTICLE
07/02/01	10	77	ARTICLE
08/06/01	1	8	LETTER
03/03/03	1	1	NOTE
05/22/06	7	1	ARTICLE
07/21/08	4	1	ARTICLE
04/06/09	11	1	ARTICLE
05/31/10	6	1	ARTICLE
01/24/11	4	1	ARTICLE
04/15/13	4	1	ARTICLE
07/22/13	10	1	ARTICLE
03/10/14	18	1	REPORT

POPULAR SCIENCE

ORIENTATION	QUANTITY
POSITIVE	45
NEGATIVE	17
NEUTRAL	0
RC/SS POSITIVE	4
RC/SS NEGATIVE	0
TOTAL	66

TYPE	QUANTITY
ADVERTISING	84
CLASSIFIED ADDS	44
ARTICLE	45
LETTER	6
NOTE	14
INTERVIEW	1
TABLE OF CONTENTS	2
TOTAL	196

DATE	PAGES	DDT	TYPE
aug/44	1	1	ARTICLE
jan/45	1	1	CLASSIFIED ADDS
jan/45	8	1	ARTICLE
feb/45	1	1	CLASSIFIED ADDS
may/45	5	31	ARTICLE
may/45	2	5	ARTICLE
may/45	1	1	CLASSIFIED ADDS
may/45	1	1	CLASSIFIED ADDS
aug/45	1	1	CLASSIFIED ADDS
aug/45	1	1	CLASSIFIED ADDS
sep/45	1	1	CLASSIFIED ADDS
oct/45	1	1	CLASSIFIED ADDS
oct/45	1	1	CLASSIFIED ADDS
oct/45	2	3	ARTICLE
dec/45	1	1	CLASSIFIED ADDS
dec/45	1	2	CLASSIFIED ADDS
dec/45	1	1	CLASSIFIED ADDS
dec/45	1	5	ARTICLE
dec/45	1	1	ADVERTISING

jan/46	1	1	CLASSIFIED ADDS
jan/46	1	2	CLASSIFIED ADDS
jan/46	1	1	CLASSIFIED ADDS
jan/46	1	1	CLASSIFIED ADDS
jan/46	1	1	ADVERTISING
feb/46	1	1	TABLE OF CONTENTS
feb/46	1	1	CLASSIFIED ADDS
feb/46	1	2	CLASSIFIED ADDS
feb/46	1	1	CLASSIFIED ADDS
feb/46	1	1	CLASSIFIED ADDS
feb/46	1	1	CLASSIFIED ADDS
feb/46	4	67	ARTICLE
feb/46	2	2	ARTICLE
mar/46	1	1	CLASSIFIED ADDS
mar/46	1	2	CLASSIFIED ADDS
mar/46	1	1	CLASSIFIED ADDS
mar/46	1	1	CLASSIFIED ADDS
mar/46	1	1	CLASSIFIED ADDS
mar/46	4	1	ARTICLE
apr/46	1	2	LETTER
apr/46	1	1	CLASSIFIED ADDS
apr/46	1	1	CLASSIFIED ADDS
apr/46	3	1	ARTICLE
apr/46	1	1	NOTE
may/46	1	1	CLASSIFIED ADDS
may/46	1	1	CLASSIFIED ADDS
may/46	1	1	CLASSIFIED ADDS
jun/46	1	1	CLASSIFIED ADDS
jul/46	1	1	TABLE OF CONTENTS
jul/46	1	1	CLASSIFIED ADDS
jul/46	1	3	NOTE
jul/46	1	1	ADVERTISING
oct/46	1	1	CLASSIFIED ADDS
oct/46	1	1	CLASSIFIED ADDS
oct/46	1	1	CLASSIFIED ADDS
jan/47	2	1	ARTICLE
jan/47	1	1	ADVERTISING
jan/47	1	1	CLASSIFIED ADDS
feb/47	1	1	ADVERTISING
feb/47	1	1	CLASSIFIED ADDS

mar/47	1	1	CLASSIFIED ADDS
mar/47	2	1	ARTICLE
apr/47	1	1	CLASSIFIED ADDS
apr/47	4	3	ARTICLE
apr/47	1	1	CLASSIFIED ADDS
may/47	2	2	ARTICLE
aug/47	1	1	ARTICLE
sep/47	5	1	ARTICLE
sep/47	1	1	ADVERTISING
nov/47	1	1	ADVERTISING
dec/47	1	2	NOTE
jan/48	1	1	ADVERTISING
may/48	1	1	ADVERTISING
jun/48	1	1	NOTE
jun/48	1	1	ADVERTISING
jul/48	1	1	ADVERTISING
oct/48	1	1	NOTE
jan/49	1	1	ARTICLE
mar/49	1	2	NOTE
mar/49	1	1	ADVERTISING
jun/49	1	1	ADVERTISING
jul/49	1	1	ADVERTISING
aug/49	1	1	ADVERTISING
sep/49	1	1	ADVERTISING
oct/49	1	1	ADVERTISING
dec/49	1	3	ARTICLE
dec/49	1	1	ADVERTISING
jan/50	1	1	ADVERTISING
mar/50	1	1	ADVERTISING
apr/50	1	1	ADVERTISING
apr/50	1	3	ADVERTISING
jun/50	1	1	LETTER
jun/50	1	1	ADVERTISING
sep/50	1	1	ARTICLE
sep/50	1	1	ADVERTISING
dec/50	5	1	ARTICLE
jan/51	1	1	NOTE
mar/51	1	1	ADVERTISING
mar/51	5	1	ARTICLE
may/51	1	1	ADVERTISING

may/51	1	1	NOTE
may/51	1	1	NOTE
jun/51	1	1	NOTE
oct/51	1	1	LETTER
oct/51	1	1	ADVERTISING
dec/51	1	1	ADVERTISING
dec/51	4	1	ARTICLE
apr/52	1	1	ADVERTISING
apr/52	1	1	ADVERTISING
may/52	1	1	ADVERTISING
jun/52	5	19	ARTICLE
jun/52	1	1	ADVERTISING
jul/52	1	1	ADVERTISING
aug/52	1	1	ADVERTISING
aug/52	1	1	ADVERTISING
aug/52	1	1	ADVERTISING
sep/52	1	1	ADVERTISING
oct/52	1	1	ADVERTISING
feb/53	1	1	CLASSIFIED ADDS
feb/53	1	1	ADVERTISING
mar/53	3	1	ADVERTISING
mar/53	1	1	ADVERTISING
apr/53	1	1	ADVERTISING
jul/53	1	1	ADVERTISING
aug/53	1	1	ADVERTISING
sep/53	1	1	ADVERTISING
feb/54	1	1	ADVERTISING
mar/54	1	1	ADVERTISING
apr/54	1	1	ADVERTISING
jun/54	5	3	ARTICLE
jun/54	1	1	ADVERTISING
jul/54	1	1	LETTER
jul/54	1	1	ADVERTISING
aug/54	4	1	ARTICLE
aug/54	1	1	ADVERTISING
aug/54	1	1	ADVERTISING
aug/54	1	1	ADVERTISING
sep/54	1	1	ADVERTISING
sep/54	1	1	ADVERTISING
sep/54	3	1	ARTICLE

oct/54	1	1	ADVERTISING
oct/54	1	1	ADVERTISING
jan/55	1	1	ADVERTISING
feb/55	1	1	ADVERTISING
mar/55	1	1	ADVERTISING
apr/55	1	1	ADVERTISING
apr/55	1	1	ADVERTISING
may/55	1	1	ADVERTISING
jun/55	1	1	ADVERTISING
jun/55	3	1	ARTICLE
jun/55	1	1	ADVERTISING
jun/55	1	1	ADVERTISING
jul/55	1	1	ADVERTISING
jul/55	1	1	ADVERTISING
aug/55	1	1	ADVERTISING
aug/55	1	1	ADVERTISING
aug/55	1	1	ADVERTISING
oct/55	1	1	ADVERTISING
dec/55	1	1	ADVERTISING
feb/56	1	1	ADVERTISING
apr/56	1	1	ADVERTISING
may/56	6	1	ARTICLE
jul/56	1	1	ADVERTISING
sep/56	1	1	ADVERTISING
nov/56	1	1	ADVERTISING
may/57	1	1	ADVERTISING
may/57	1	1	ARTICLE
may/57	1	1	ADVERTISING
sep/58	2	1	ARTICLE
oct/59	1	1	LETTER
mar/60	4	1	INTERVIEW
mar/61	4	1	ARTICLE
jun/63	5	1	ARTICLE
apr/64	4	1	NOTE
may/69	1	1	CLASSIFIED ADDS
aug/70	4	1	ARTICLE
oct/70	1	3	ARTICLE
dec/70	3	2	ARTICLE
aug/71	3	1	ARTICLE
oct/71	2	1	LETTER

nov/74	1	1	CLASSIFIED ADDS
aug/75	3	1	ARTICLE
aug/79	1	1	ADVERTISING
aug/79	1	1	ADVERTISING
jun/79	1	1	ADVERTISING
aug/79	1	1	ADVERTISING
feb/91	4	1	ARTICLE
apr/91	2	1	ADVERTISING
dec/91	6	1	ARTICLE
jul/92	6	2	ARTICLE
jun/93	2	1	ARTICLE
nov/97	5	5	ARTICLE
aug/99	3	2	NOTE
jul/00	1	1	NOTE
jan/02	1	2	ARTICLE
feb/06	1	1	NOTE
oct/06	11	1	ARTICLE
oct/08	2	1	ARTICLE

VEJA

ORIENTATION	QUANTITY
POSITIVE	20
NEGATIVE	37
NEUTRAL	3
RC/SS POSITIVE	4
RC/SS NEGATIVE	3
TOTAL	67

TYPE	QUANTITY
ADVERTISING	2
ARTICLE	57
LETTER	2
COMEDY (MILLOR)	2
NOTE	2
INTERVIEW	4
TOTAL	69

DATE	PAGES	DDT	TYPE
11/06/68	1	1	ARTICLE
04/23/69	1	1	ARTICLE
11/19/69	1	25	ARTICLE
12/03/69	2	1	ARTICLE
06/17/70	1	6	ARTICLE
09/16/70	1	1	ARTICLE
10/14/70	1	3	ARTICLE
11/25/70	11	1	ARTICLE
12/02/70	1	1	NOTE
01/20/71	2	1	ARTICLE
04/21/71	2	1	MILLOR
08/25/71	1	5	ARTICLE
10/27/71	2	14	ARTICLE
11/03/71	1	1	ARTICLE
12/01/71	1	2	LETTER
07/12/72	3	3	INTERVIEW
11/15/72	2	6	INTERVIEW
01/03/73	1	1	ARTICLE
07/05/73	1	1	ARTICLE
09/12/73	1	1	MILLOR
03/27/74	2	3	ARTICLE
09/04/74	5	4	ARTICLE
11/06/74	2	4	ARTICLE
06/18/75	1	1	ARTICLE
06/18/75	6	1	ARTICLE
07/09/75	1	2	ARTICLE
02/11/76	6	3	ARTICLE
02/18/76	2	7	NOTE
03/17/76	3	1	ARTICLE
07/14/76	3	1	ARTICLE
10/27/76	1	1	ARTICLE
11/03/76	2	1	ARTICLE
11/10/76	1	13	ARTICLE
11/17/76	8	1	ADVERTISING
12/08/76	8	3	ARTICLE
03/30/77	1	1	ARTICLE
06/15/77	1	13	ARTICLE
05/10/78	5	1	ARTICLE
07/12/78	7	1	ARTICLE

08/09/78	3	1	ARTICLE
09/27/78	1	2	ARTICLE
11/15/78	1	1	ARTICLE
05/30/79	2	2	ADVERTISING
07/11/79	3	3	ARTICLE
06/16/82	1	3	ARTICLE
08/22/84	2	1	ARTICLE
12/12/84	7	1	ARTICLE
05/07/86	6	1	ARTICLE
01/04/89	10	1	ARTICLE
12/13/89	1	1	ARTICLE
11/14/90	6	1	ARTICLE
01/02/91	1	3	NOTE
03/27/91	1	17	ARTICLE
05/08/91	1	1	ARTICLE
01/29/92	7	4	ARTICLE
02/05/92	3	1	LETTER
05/31/95	6	2	ARTICLE
02/21/96	2	1	ARTICLE
04/02/97	3	3	INTERVIEW
10/07/98	2	1	ARTICLE
12/22/99	4	1	ARTICLE
09/07/05	7	2	ARTICLE
09/20/06	2	2	ARTICLE
10/25/06	3	1	INTERVIEW
04/11/07	2	1	ARTICLE
08/22/07	4	1	ARTICLE
08/29/07	1	1	MILLOR
10/24/07	9	1	ARTICLE
01/07/09	2	1	ARTICLE

SUPERINTERESSANTE

ORIENTATION	QUANTITY
POSITIVE	3
NEGATIVE	8
NEUTRAL	2
TOTAL	13

TYPE	QUANTITY
ARTICLE	11
LETTER	1
INTERVIEW	1
TOTAL	13

DATE	PAGES	DDT	TYPE
nov/87	-	2	INTERVIEW
aug/88	6	2	ARTICLE
dec/88	5	1	ARTICLE
feb/91	5	1	ARTICLE
sep/92	1	1	LETTER
mar/93	6	2	ARTICLE
feb/97	7	1	ARTICLE
jan/00	-	-	ARTICLE
oct/01	6	1	ARTICLE
apr/02	4	2	ARTICLE
dec/02	6	2	ARTICLE
jan/03	-	3	ARTICLE
nov/06	6	1	ARTICLE